

FCC Test Report

(PART 22)

Report No.: RF181001C14-7

FCC ID: A4RG020F

Test Model: G020F

Received Date: Oct. 01, 2018

Test Date: Oct. 12, 2018 ~ Oct. 25, 2018

Issued Date: Dec. 27, 2018

Applicant: Google LLC

Address: 1600 Amphitheatre Parkway, Mountain View, CA 94043, USA

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

Test Location (2): B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231,
Taiwan, R.O.C

**FCC Registration /
Designation Number:** 427177 / TW0011



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Release Control Record

Issue No.	Description	Date Issued
RF181001C14-7	Original Release	Dec. 27, 2018

1 Certificate of Conformity

Product: Smartphone

Test Model: G020F

Sample Status: Identical Prototype

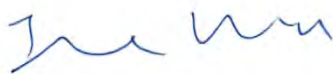
Applicant: Google LLC

Test Date: Oct. 12, 2018 ~ Oct. 25, 2018

Standards: FCC Part 22, Subpart H

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:

Dec. 27, 2018

Ivonne Wu / Supervisor

Approved by :



Date:

Dec. 27, 2018

Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
---	Peak to Average Ratio	Pass	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
22.917	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -29.23 dB at 2509.50 MHz.

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	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 11, 2018	Oct. 10, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-616	Dec. 14, 2017	Dec. 13, 2018
HORN Antenna ETS-Lindgren	3117	00143293	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Dec. 12, 2017	Dec. 11, 2018
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
MXG Vector signal generator Agilent	N5182B	MY53052658	May 24, 2018	May 23, 2019
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC -SMS-100-SMS-12 0+RFC-SMS-100-S MS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC -SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Universal Radio Communication Tester R&S	CMU200	123112	Dec. 28, 2017	Dec. 27, 2018
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 HsinTien Chamber 1.
 3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The IC Site Registration No. is 7450I-1.

3 General Information

3.1 General Description of EUT

Product	Smartphone	
Test Model	G020F	
Status of EUT	Identical Prototype	
Power Supply Rating	3.85 Vdc (Li-ion battery) 5.0 Vdc or 9 Vdc (adapter) 5.0 Vdc (host equipment)	
Modulation Type	GSM/GPRS	GMSK
	EDGE	GMSK, 8PSK
	WCDMA	QPSK
	CDMA	QPSK, OPQKS, HPSK
	LTE	QPSK, 16QAM, 64QAM
Frequency Range	GSM/GPRS/EDGE	824.2 ~ 848.8 MHz
	WCDMA	826.4 ~ 846.6 MHz
	CDMA	824.7 ~ 848.31 MHz
	LTE 5 (Channel Bandwidth: 1.4 MHz)	824.7 ~ 848.3 MHz
	LTE 5 (Channel Bandwidth: 3 MHz)	825.5 ~ 847.5 MHz
	LTE 5 (Channel Bandwidth: 5 MHz)	826.5 ~ 846.5 MHz
	LTE 5 (Channel Bandwidth: 10 MHz)	829 ~ 844 MHz
	LTE 26 (Channel Bandwidth: 1.4 MHz)	824.7 ~ 848.3 MHz
	LTE 26 (Channel Bandwidth: 3 MHz)	825.5 ~ 847.5 MHz
	LTE 26 (Channel Bandwidth: 5 MHz)	826.5 ~ 846.5 MHz
	LTE 26 (Channel Bandwidth: 10 MHz)	829 ~ 844 MHz
	LTE 26 (Channel Bandwidth: 15 MHz)	831.5 ~ 841.5 MHz
Max. ERP Power	GSM/GPRS	374.80 mW
	EDGE	95.46 mW
	WCDMA	40.35 mW
	CDMA	51.67 mW
	LTE 5 (Channel Bandwidth: 1.4 MHz)	50.12 mW
	LTE 5 (Channel Bandwidth: 3 MHz)	50.58 mW
	LTE 5 (Channel Bandwidth: 5 MHz)	51.05 mW
	LTE 5 (Channel Bandwidth: 10 MHz)	51.40 mW
	LTE 26 (Channel Bandwidth: 1.4 MHz)	51.26 mW
	LTE 26 (Channel Bandwidth: 3 MHz)	51.74 mW
	LTE 26 (Channel Bandwidth: 5 MHz)	52.22 mW
	LTE 26 (Channel Bandwidth: 10 MHz)	52.70 mW
	LTE 26 (Channel Bandwidth: 15 MHz)	53.19 mW

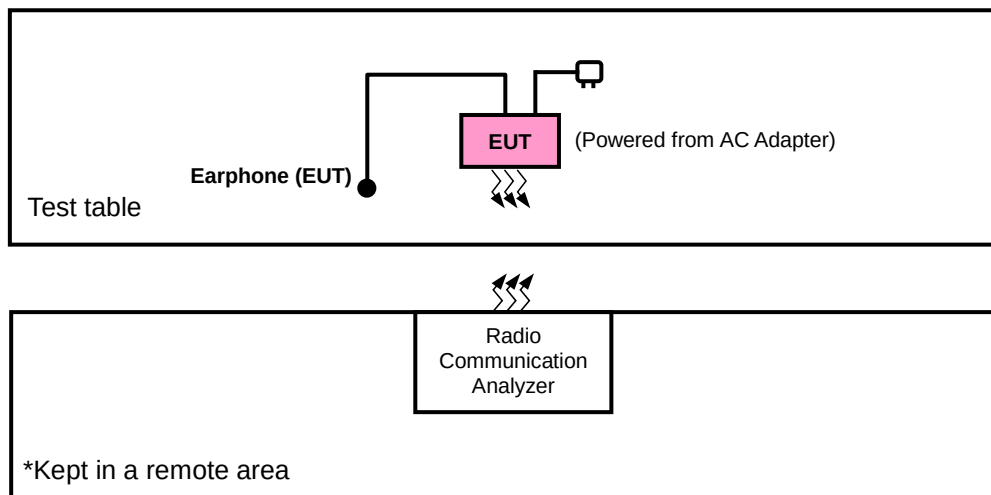
Emission Designator	GSM/GPRS	247KGXW
	EDGE	248KG7W
	WCDMA	4M16F9W
	CDMA	1M27F9W
	LTE 5 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE 5 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE 5 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE 5 (Channel Bandwidth: 10 MHz)	8M98W7D
	LTE 26 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE 26 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE 26 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE 26 (Channel Bandwidth: 10 MHz)	8M98W7D
	LTE 26 (Channel Bandwidth: 15 MHz)	13M5G7D
Antenna Type	PIFA Antenna	
Antenna Gain	GSM/GPRS	-5.1 dBi (Main) / -5 dBi (Aux.)
	EDGE	-5.1 dBi (Main) / -5 dBi (Aux.)
	WCDMA	-5.1 dBi (Main) / -5 dBi (Aux.)
	CDMA	-5.5 dBi (Main) / -5.3 dBi (Aux.)
	LTE 5	-5.1 dBi (Main) / -5 dBi (Aux.)
	LTE 26	-5.5 dBi (Main) / -5.3 dBi (Aux.)
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

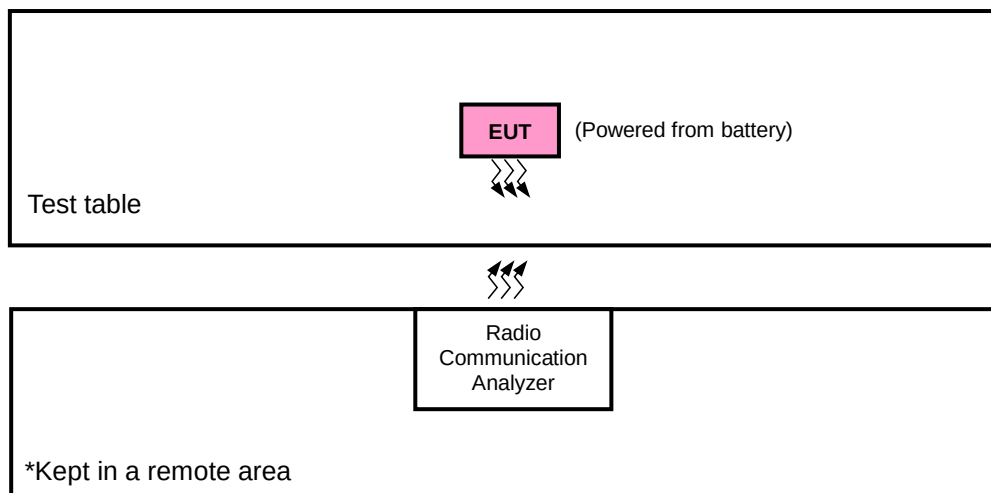
- There're 2 configurations for the EUT listed as below.
Main Sample: EUT + Battery 1
2nd Sample: EUT + Battery 2
✧ After pre-tested with the EUT, only the worst configuration (main sample) was chosen for the final test.
- The EUT's accessories list refers to Ext. Pho.
- The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.R.P. 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.

3.3 Test Mode Applicability and Tested Channel Detail

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

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

Band	ERP	Radiated Emission
GSM	X-plane	X-axis
EDGE	X-plane	X-axis
WCDMA	X-plane	X-axis
CDMA	X-plane	X-axis
LTE Band 5	X-plane	X-axis
LTE Band 26	X-plane	X-axis

GSM

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	128 to 251	128, 189, 251	GSM, EDGE
-	Modulation Characteristics	128 to 251	189	GSM, EDGE
-	Frequency Stability	128 to 251	128, 251	GSM, EDGE
-	Occupied Bandwidth	128 to 251	128, 189, 251	GSM, EDGE
-	Band Edge	128 to 251	128, 251	GSM, EDGE
-	Peak to Average Ratio	128 to 251	128, 189, 251	GSM, EDGE
-	Conducted Emission	128 to 251	128, 189, 251	GSM, EDGE
-	Radiated Emission	128 to 251	128, 189, 251	GSM, EDGE

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
-	Modulation Characteristics	4132 to 4233	4182	WCDMA
-	Frequency Stability	4132 to 4233	4132, 4233	WCDMA
-	Occupied Bandwidth	4132 to 4233	4132, 4182, 4233	WCDMA
-	Band Edge	4132 to 4233	4132, 4233	WCDMA
-	Peak to Average Ratio	4132 to 4233	4132, 4182, 4233	WCDMA
-	Conducted Emission	4132 to 4233	4132, 4182, 4233	WCDMA
-	Radiated Emission	4132 to 4233	4132, 4182, 4233	WCDMA

CDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	1013 to 777	1013, 384, 777	1xRTT
-	Modulation Characteristics	1013 to 777	384	1xRTT
-	Frequency Stability	1013 to 777	1013, 777	1xRTT
-	Occupied Bandwidth	1013 to 777	1013, 384, 777	1xRTT
-	Band Edge	1013 to 777	1013, 777	1xRTT
-	Peak to Average Ratio	1013 to 777	1013, 384, 777	1xRTT
-	Conducted Emission	1013 to 777	1013, 384, 777	1xRTT
-	Radiated Emission	1013 to 777	1013, 384, 777	1xRTT

LTE Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 2 RB Offset
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 7 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 12 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
-	Modulation Characteristics	20450 to 20600	20450	20 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
-	Frequency Stability	20407 to 20643	20407, 20643	1.4 MHz	QPSK	1 RB / 0 RB Offset
		20415 to 20635	20415, 20635	3 MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20425, 20625	5 MHz	QPSK	1 RB / 0 RB Offset
		20450 to 20600	20450, 20600	10 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK, 16QAM, 64QAM	6 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
-	Band Edge	20407 to 20643	20407	1.4MHz	QPSK	1 RB / 0 RB Offset
			20643	1.4MHz	QPSK	6 RB / 0 RB Offset
		20415 to 20635	20415	3 MHz	QPSK	1 RB / 5 RB Offset
			20635	3 MHz	QPSK	6 RB / 0 RB Offset
		20425 to 20625	20415	3 MHz	QPSK	1 RB / 0 RB Offset
			20635	3 MHz	QPSK	15 RB / 0 RB Offset
		20425 to 20625	20425	5 MHz	QPSK	1 RB / 14 RB Offset
			20625	5 MHz	QPSK	15 RB / 0 RB Offset
		20425 to 20625	20425	5 MHz	QPSK	1 RB / 0 RB Offset
			20625	5 MHz	QPSK	25 RB / 0 RB Offset
		20450 to 20600	20425	5 MHz	QPSK	1 RB / 24 RB Offset
			20625	5 MHz	QPSK	25 RB / 0 RB Offset
-	Band Edge	20450 to 20600	20450	10 MHz	QPSK	1 RB / 0 RB Offset
			20600	10 MHz	QPSK	50 RB / 0 RB Offset
		20450 to 20600	20450	10 MHz	QPSK	1 RB / 49 RB Offset
			20600	10 MHz	QPSK	50 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Peak to Average Ratio	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Conducted Emission	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK	1 RB / 2 RB Offset
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK	1 RB / 7 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK	1 RB / 12 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK	1 RB / 24 RB Offset
-	Radiated Emission	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK	1 RB / 2 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK	1 RB / 12 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK	1 RB / 24 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE Band 26

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	26865 to 26965	26865	15 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
-	Frequency Stability	26797 to 27033	26797, 27033	1.4 MHz	QPSK	1 RB / 0 RB Offset
		26805 to 27025	26805, 27025	3 MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26815, 27015	5 MHz	QPSK	1 RB / 0 RB Offset
		26840 to 26990	26840, 26990	10 MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26865, 26965	15 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK, 16QAM, 64QAM	6 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	26797 to 27033	26797	1.4 MHz	QPSK	1 RB / 0 RB Offset
			27033	1.4 MHz	QPSK	6 RB / 0 RB Offset
		26805 to 27025	26805	3 MHz	QPSK	1 RB / 5 RB Offset
			27025	3 MHz	QPSK	6 RB / 0 RB Offset
		26815 to 27015	26815	5 MHz	QPSK	1 RB / 0 RB Offset
			27015	5 MHz	QPSK	15 RB / 0 RB Offset
		26840 to 26990	26815	5 MHz	QPSK	1 RB / 14 RB Offset
			27015	5 MHz	QPSK	15 RB / 0 RB Offset
		26840 to 26990	26840	10 MHz	QPSK	1 RB / 0 RB Offset
			26990	10 MHz	QPSK	25 RB / 0 RB Offset
		26865 to 26965	26840	10 MHz	QPSK	1 RB / 24 RB Offset
			26990	10 MHz	QPSK	25 RB / 0 RB Offset
		26865 to 26965	26865	15 MHz	QPSK	1 RB / 0 RB Offset
			26965	15 MHz	QPSK	75 RB / 0 RB Offset
-	Peak to Average Ratio	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Conducted Emission	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK	1 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3 MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK	1 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10 MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25 deg. C, 65 % RH	3.85 Vdc	Karl Lee
Modulation Characteristics	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Frequency Stability	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Occupied Bandwidth	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Band Edge	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Peak to Average Ratio	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Conducted Emission	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee

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 22

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

Mobile / Portable station are limited to 7 watts e.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 1 MHz for GSM, GPRS & EDGE, and 5 MHz for WCDMA and CDMA, and 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G.
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

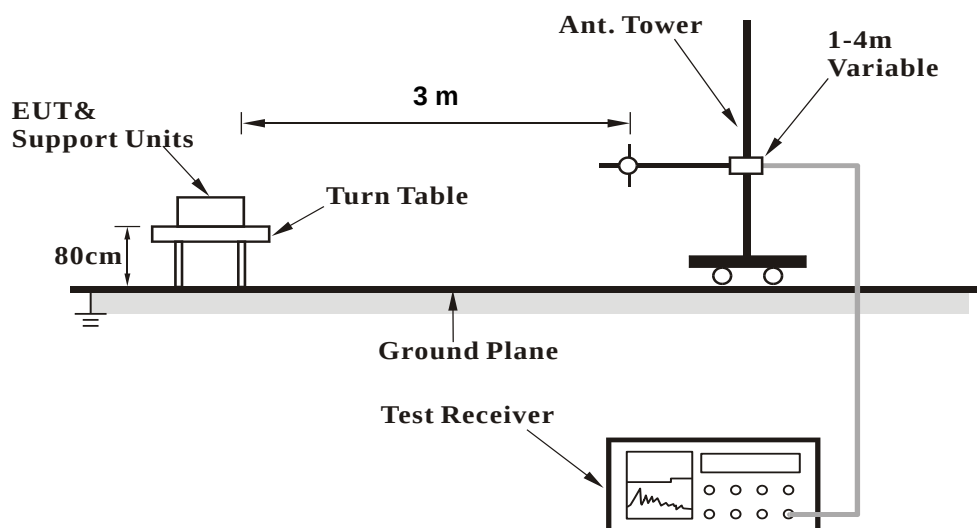
Conducted Power Measurement:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA, and 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.

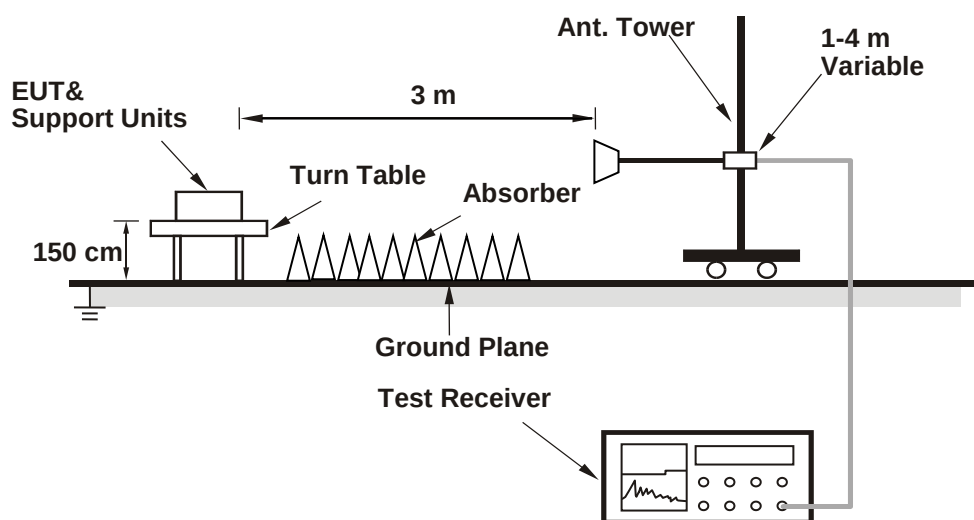
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

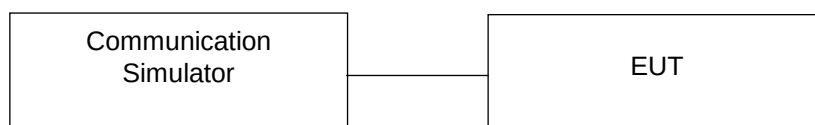


<Radiated Emission above 1 GHz>



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

Conducted Power Measurement:



4.1.4 Test Results

The worst configuration mode is presented in the report as below. Please refer to SAR test report for more detail test mode.

Band		TX Antenna	WLAN Function	Body-Worn/Hotspot
GSM	850	Ant 0	WLAN-Off	Body-Worn/Hotspot
WCDMA	B5	Ant 0	WLAN-Off	Body-Worn/Hotspot
CDMA	BC0	Ant 0	WLAN-Off	Body-Worn/Hotspot
LTE	B5	Ant 0	WLAN-Off	Body-Worn/Hotspot
	B26	Ant 0	WLAN-Off	Body-Worn/Hotspot

Conducted Output Power (dBm)

Band	GSM850		
Mode	Body-Worn / Hotspot		
Tx Antenna	Ant-0		
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
GSM (GMSK, 1Tx-slot)	33.56	33.61	33.55
GPRS (GMSK, 1Tx-slot)	33.53	33.58	33.52
GPRS (GMSK, 2Tx-slot)	31.73	31.78	31.72
GPRS (GMSK, 3Tx-slot)	29.52	29.57	29.51
GPRS (GMSK, 4Tx-slot)	28.28	28.33	28.27
DTM (GMSK, 2Tx-slot)	31.62	31.67	31.61
DTM (GMSK, 3Tx-slot)	29.48	29.53	29.47
EDGE (8PSK, 1Tx-slot)	27.02	27.07	27.01
EDGE (8PSK, 2Tx-slot)	26.78	26.83	26.77
EDGE (8PSK, 3Tx-slot)	24.63	24.68	24.62
EDGE (8PSK, 4Tx-slot)	22.08	22.13	22.07
DTM (8PSK, 2Tx-slot)	26.13	26.18	26.12
DTM (8PSK, 3Tx-slot)	24.20	24.25	24.19

Band	WCDMA V		
Mode	Body-Worn / Hotspot		
Tx Antenna	Ant-0		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	23.55	23.65	23.76
HSDPA Subtest-1	22.56	22.63	22.75
HSDPA Subtest-2	22.57	22.68	22.78
HSDPA Subtest-3	22.08	22.17	22.26
HSDPA Subtest-4	22.06	22.15	22.25
HSUPA Subtest-1	22.53	22.55	22.67
DC-HSDPA Subtest-1	22.51	22.60	22.70
DC-HSDPA Subtest-2	22.03	22.09	22.18
DC-HSDPA Subtest-3	22.02	22.07	22.17
DC-HSDPA Subtest-4	22.55	22.65	22.76
HSUPA Subtest-2	20.53	20.63	20.74
HSUPA Subtest-3	21.62	21.72	21.83
HSUPA Subtest-4	20.55	20.65	20.76
HSUPA Subtest-5	22.61	22.71	22.82

Band	CDMA BC0		
Mode	Body-Worn / Hotspot		
Tx Antenna	Ant-0		
Channel	1013	384	777
Frequency (MHz)	824.70	836.52	848.31
RC1+SO55	24.87	24.71	24.77
RC3+SO55	24.92	24.76	24.82
RC3+SO32(+ F-SCH)	24.88	24.72	24.78
RC3+SO32(+SCH)	24.87	24.71	24.77
RTAP 153.6	24.89	24.73	24.79
RETAP 4096	24.88	24.72	24.78

LTE Band 5															
Body-Worn / Hotspot															
Ant-0															
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20450	20525	20600				Channel		20425	20525	20625	
		Frequency (MHz)		829.0	836.5	844.0				Frequency (MHz)		826.5	836.5	846.5	
10M	QPSK	1	0	24.41	24.46	24.59	0	5M	QPSK	1	0	24.35	24.40	24.53	0
		1	24	24.48	24.53	24.66	0			1	12	24.42	24.47	24.60	0
		1	49	24.46	24.51	24.64	0			1	24	24.40	24.45	24.58	0
		25	0	23.51	23.56	23.67	1			12	0	23.45	23.50	23.63	1
		25	12	23.53	23.58	23.68	1			12	6	23.47	23.52	23.65	1
		25	25	23.46	23.51	23.64	1			12	13	23.40	23.45	23.58	1
	16QAM	50	0	23.50	23.55	23.65	1			25	0	23.44	23.49	23.62	1
		1	0	23.40	23.45	23.58	1		16QAM	1	0	23.34	23.39	23.52	1
		1	24	23.47	23.52	23.65	1			1	12	23.41	23.46	23.59	1
		1	49	23.45	23.50	23.63	1			1	24	23.39	23.44	23.57	1
		25	0	22.50	22.55	22.68	2			12	0	22.44	22.49	22.62	2
		25	12	22.52	22.57	22.70	2			12	6	22.46	22.51	22.64	2
	64QAM	25	25	22.45	22.50	22.63	2			12	13	22.39	22.44	22.57	2
		50	0	22.49	22.54	22.67	2			25	0	22.43	22.48	22.61	2
		1	0	22.42	22.47	22.60	2		64QAM	1	0	22.36	22.41	22.54	2
		1	24	22.49	22.54	22.67	2			1	12	22.43	22.48	22.61	2
		1	49	22.47	22.52	22.65	2			1	24	22.41	22.46	22.59	2
		25	0	21.52	21.57	21.65	3			12	0	21.46	21.51	21.60	3
3M	QPSK	25	12	21.54	21.59	21.69	3			12	6	21.48	21.53	21.63	3
		25	25	21.47	21.52	21.65	3			12	13	21.41	21.46	21.59	3
		50	0	21.51	21.56	21.69	3			25	0	21.45	21.50	21.63	3
	16QAM	1	0	23.31	23.36	23.49	1		QPSK	1	0	24.24	24.29	24.42	0
		1	7	23.38	23.43	23.56	1			1	2	24.31	24.36	24.49	0
		1	14	23.37	23.42	23.55	0			1	5	24.29	24.34	24.47	0
		8	0	23.42	23.47	23.60	1			3	0	24.20	24.25	24.38	0
		8	3	23.44	23.49	23.62	1			3	1	24.22	24.27	24.40	0
		8	7	23.37	23.42	23.55	1			3	3	24.15	24.20	24.33	0
	64QAM	15	0	23.41	23.46	23.59	1			6	0	23.33	23.38	23.51	1
		1	0	23.31	23.36	23.49	1	1.4M	16QAM	1	0	23.23	23.28	23.41	1
		1	7	23.38	23.43	23.56	1			1	2	23.30	23.35	23.48	1
		1	14	23.36	23.41	23.54	1			1	5	23.28	23.33	23.46	1
		8	0	22.41	22.46	22.59	2			3	0	23.19	23.24	23.37	1
		8	3	22.43	22.48	22.61	2			3	1	23.21	23.26	23.39	1
		8	7	22.36	22.41	22.54	2			3	3	23.14	23.19	23.32	1
1.4M	16QAM	15	0	22.40	22.45	22.58	2			6	0	22.32	22.37	22.50	2
		1	0	22.33	22.38	22.51	2		64QAM	1	0	22.25	22.30	22.43	2
		1	7	22.40	22.45	22.58	2			1	2	22.32	22.37	22.50	2
		1	14	22.38	22.43	22.56	2			1	5	22.30	22.35	22.48	2
		8	0	21.43	21.48	21.57	3			3	0	22.21	22.26	22.35	2
		8	3	21.45	21.50	21.60	3			3	1	22.23	22.28	22.38	2
	64QAM	8	7	21.38	21.43	21.56	3			3	3	22.16	22.21	22.34	2
		15	0	21.42	21.47	21.60	3			6	0	21.34	21.39	21.52	3

LTE Band 26															
Body-Worn / Hotspot															
Ant-0															
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26865	26915	26965				Channel		26840	26915	26990	
		Frequency (MHz)		831.5	836.5	841.5				Frequency (MHz)		829.0	836.5	844.0	
15M	QPSK	1	0	24.61	24.60	24.59	0	10M	QPSK	1	0	24.48	24.59	24.54	0
		1	37	24.58	24.50	24.56	0			1	24	24.54	24.48	24.51	0
		1	74	24.48	24.47	24.46	0			1	49	24.37	24.39	24.41	0
		36	0	23.69	23.68	23.67	1			25	0	23.55	23.55	23.62	1
		36	19	23.68	23.65	23.66	1			25	12	23.62	23.65	23.61	1
		36	39	23.61	23.56	23.59	1			25	25	23.55	23.50	23.54	1
		75	0	23.65	23.63	23.63	1			50	0	23.56	23.56	23.58	1
	16QAM	1	0	23.59	23.50	23.57	1		16QAM	1	0	23.59	23.37	23.52	1
		1	37	23.56	23.50	23.54	1			1	24	23.50	23.49	23.49	1
		1	74	23.46	23.42	23.44	1			1	49	23.45	23.28	23.39	1
		36	0	22.67	22.66	22.65	2			25	0	22.52	22.62	22.60	2
		36	19	22.66	22.64	22.64	2			25	12	22.65	22.51	22.59	2
		36	39	22.59	22.56	22.57	2			25	25	22.58	22.48	22.52	2
		75	0	22.63	22.56	22.61	2			50	0	22.63	22.45	22.56	2
	64QAM	1	0	22.55	22.49	22.53	2		64QAM	1	0	22.53	22.36	22.48	2
		1	37	22.52	22.47	22.50	2			1	24	22.44	22.42	22.45	2
		1	74	22.42	22.41	22.40	2			1	49	22.35	22.31	22.35	2
		36	0	21.63	21.55	21.61	3			25	0	21.59	21.43	21.56	3
		36	19	21.62	21.56	21.60	3			25	12	21.59	21.54	21.55	3
		36	39	21.55	21.55	21.53	3			25	25	21.40	21.42	21.48	3
		75	0	21.59	21.54	21.57	3			50	0	21.48	21.45	21.52	3
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26815	26915	27015				Channel		26805	26915	27025	
		Frequency (MHz)		826.5	836.5	846.5				Frequency (MHz)		825.5	836.5	847.5	
5M	QPSK	1	0	24.36	24.51	24.51	0	3M	QPSK	1	0	24.50	24.46	24.45	1
		1	12	24.41	24.43	24.48	0			1	7	24.46	24.41	24.42	1
		1	24	24.29	24.36	24.38	0			1	14	24.29	24.32	24.32	1
		12	0	23.52	23.46	23.59	1			8	0	23.47	23.61	23.53	3
		12	6	23.62	23.59	23.58	1			8	3	23.60	23.53	23.52	3
		12	13	23.51	23.43	23.51	1			8	7	23.47	23.46	23.45	3
		25	0	23.47	23.46	23.55	1			15	0	23.54	23.49	23.49	6
	16QAM	1	0	23.46	23.28	23.49	1		16QAM	1	0	23.22	23.51	23.43	1
		1	12	23.42	23.38	23.46	1			1	7	23.39	23.34	23.40	1
		1	24	23.38	23.16	23.36	1			1	14	23.23	23.35	23.30	1
		12	0	22.50	22.48	22.57	2			8	0	22.58	22.59	22.51	2
		12	6	22.56	22.36	22.56	2			8	3	22.45	22.55	22.50	2
		12	13	22.45	22.41	22.49	2			8	7	22.46	22.48	22.43	2
		25	0	22.57	22.37	22.53	2			15	0	22.30	22.46	22.47	2
	64QAM	1	0	22.40	22.30	22.45	2		64QAM	1	0	22.24	22.40	22.39	2
		1	12	22.29	22.32	22.42	2			1	7	22.31	22.43	22.36	2
		1	24	22.26	22.26	22.32	2			1	14	22.31	22.32	22.26	2
		12	0	21.59	21.29	21.53	3			8	0	21.39	21.45	21.47	3
		12	6	21.44	21.46	21.52	3			8	3	21.44	21.40	21.46	3
		12	13	21.27	21.32	21.45	3			8	7	21.28	21.43	21.39	3
		25	0	21.44	21.40	21.49	3			15	0	21.35	21.49	21.43	3
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)								
		Channel		26797	26915	27033									
		Frequency (MHz)		824.7	836.5	848.3									
1.4M	QPSK	1	0	24.49	24.47	24.53	0								
		1	2	24.36	24.51	24.50	0								
		1	5	24.25	24.26	24.40	0								
		3	0	24.55	24.51	24.46	0								
		3	1	24.64	24.49	24.45	0								
		3	3	24.39	24.49	24.38	0								
		6	0	23.43	23.58	23.57	1								
	16QAM	1	0	23.25	23.51	23.51	1								
		1	2	23.38	23.35	23.48	1								
		1	5	23.15	23.33	23.38	1								
		3	0	23.62	23.54	23.44	1								
		3	1	23.48	23.58	23.43	1								
		3	3	23.36	23.43	23.36	1								
		6	0	22.44	22.52	22.55	2								
	64QAM	1	0	22.25	22.42	22.47	2								
		1	2	22.27	22.44	22.44	2								
		1	5	22.27	22.33	22.34	2								
		3	0	22.28	22.56	22.40	2								
		3	1	22.48	22.55	22.39	2								
		3	3	22.32	22.33	22.32	2								
		6	0	21.45	21.40	21.51	3								

ERP Power (dBm)

GSM							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	128	824.2	-3.32	31.208	25.74	374.80	H
	189	836.4	-3.42	31.3	25.73	374.11	
	251	848.8	-3.37	31.222	25.70	371.71	
	128	824.2	-8.56	31.504	20.79	120.06	V
	189	836.4	-8.26	31.117	20.71	117.68	
	251	848.8	-9.12	31.922	20.65	116.20	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

EDGE							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	128	824.2	-9.26	31.208	19.80	95.46	H
	189	836.4	-9.41	31.3	19.74	94.19	
	251	848.8	-9.37	31.222	19.70	93.37	
	128	824.2	-14.60	31.504	14.75	29.88	V
	189	836.4	-14.25	31.117	14.72	29.63	
	251	848.8	-15.12	31.922	14.65	29.19	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

WCDMA							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	4132	826.4	-13.00	31.208	16.06	40.35	H
	4182	836.4	-13.12	31.3	16.03	40.09	
	4233	846.6	-13.08	31.222	15.99	39.74	
	4132	826.4	-18.26	31.504	11.09	12.86	V
	4182	836.4	-17.95	31.117	11.02	12.64	
	4233	846.6	-18.86	31.922	10.91	12.34	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

CDMA							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	1013	824.7	-11.96	31.208	17.10	51.26	H
	384	836.52	-12.12	31.3	17.03	50.47	
	777	848.31	-11.94	31.222	17.13	51.67	
	1013	824.7	-17.26	31.504	12.09	16.20	V
	384	836.52	-16.92	31.117	12.05	16.02	
	777	848.31	-17.66	31.922	12.11	16.26	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 5							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	20407	824.7	-12.12	31.208	16.94	49.41	H
	20525	836.5	-12.15	31.3	17.00	50.12	
	20643	848.3	-12.10	31.222	16.97	49.80	
	20407	824.7	-17.42	31.504	11.93	15.61	V
	20525	836.5	-16.97	31.117	12.00	15.84	
	20643	848.3	-17.80	31.922	11.97	15.75	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	20407	824.7	-13.12	31.208	15.94	39.25	H
	20525	836.5	-13.16	31.3	15.99	39.72	
	20643	848.3	-13.11	31.222	15.96	39.46	
	20407	824.7	-18.42	31.504	10.93	12.40	V
	20525	836.5	-17.98	31.117	10.99	12.55	
	20643	848.3	-18.81	31.922	10.96	12.48	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	20407	824.7	-14.13	31.208	14.93	31.10	H
	20525	836.5	-14.17	31.3	14.98	31.48	
	20643	848.3	-14.12	31.222	14.95	31.28	
	20407	824.7	-19.45	31.504	9.90	9.78	V
	20525	836.5	-18.99	31.117	9.98	9.95	
	20643	848.3	-19.82	31.922	9.95	9.89	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 5							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	20415	825.5	-12.08	31.208	16.98	49.87	H
	20525	836.5	-12.11	31.3	17.04	50.58	
	20635	847.5	-12.07	31.222	17.00	50.14	
	20415	825.5	-17.38	31.504	11.97	15.75	V
	20525	836.5	-16.93	31.117	12.04	15.98	
	20635	847.5	-17.76	31.922	12.01	15.89	
Channel Bandwidth: 3 MHz / 16QAM							
X	20415	825.5	-13.08	31.208	15.98	39.61	H
	20525	836.5	-13.11	31.3	16.04	40.18	
	20635	847.5	-13.08	31.222	15.99	39.74	
	20415	825.5	-18.39	31.504	10.96	12.49	V
	20525	836.5	-17.94	31.117	11.03	12.67	
	20635	847.5	-18.76	31.922	11.01	12.62	
Channel Bandwidth: 3 MHz / 64QAM							
X	20415	825.5	-14.09	31.208	14.97	31.39	H
	20525	836.5	-14.12	31.3	15.03	31.84	
	20635	847.5	-14.08	31.222	14.99	31.56	
	20415	825.5	-19.40	31.504	9.95	9.89	V
	20525	836.5	-18.95	31.117	10.02	10.04	
	20635	847.5	-19.76	31.922	10.01	10.03	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 5							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	20425	826.5	-12.04	31.208	17.02	50.33	H
	20525	836.5	-12.07	31.3	17.08	51.05	
	20625	846.5	-12.03	31.222	17.04	50.61	
	20425	826.5	-17.34	31.504	12.01	15.90	V
	20525	836.5	-16.89	31.117	12.08	16.13	
	20625	846.5	-17.72	31.922	12.05	16.04	
Channel Bandwidth: 5 MHz / 16QAM							
X	20425	826.5	-13.05	31.208	16.01	39.88	H
	20525	836.5	-13.07	31.3	16.08	40.55	
	20625	846.5	-13.03	31.222	16.04	40.20	
	20425	826.5	-18.35	31.504	11.00	12.60	V
	20525	836.5	-17.89	31.117	11.08	12.81	
	20625	846.5	-18.72	31.922	11.05	12.74	
Channel Bandwidth: 5 MHz / 64QAM							
X	20425	826.5	-14.06	31.208	15.00	31.61	H
	20525	836.5	-14.08	31.3	15.07	32.14	
	20625	846.5	-14.03	31.222	15.04	31.93	
	20425	826.5	-19.35	31.504	10.00	10.01	V
	20525	836.5	-18.90	31.117	10.07	10.16	
	20625	846.5	-19.72	31.922	10.05	10.12	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 5							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	20450	829.0	-12.00	31.208	17.06	50.79	H
	20525	836.5	-12.04	31.3	17.11	51.40	
	20600	844.0	-11.99	31.222	17.08	51.07	
	20450	829.0	-17.30	31.504	12.05	16.05	V
	20525	836.5	-16.85	31.117	12.12	16.28	
	20600	844.0	-17.68	31.922	12.09	16.19	
Channel Bandwidth: 10 MHz / 16QAM							
X	20425	826.5	-13.01	31.208	16.05	40.25	H
	20525	836.5	-13.04	31.3	16.11	40.83	
	20625	846.5	-12.99	31.222	16.08	40.57	
	20425	826.5	-18.31	31.504	11.04	12.72	V
	20525	836.5	-17.85	31.117	11.12	12.93	
	20625	846.5	-18.69	31.922	11.08	12.83	
Channel Bandwidth: 10 MHz / 64QAM							
X	20450	829.0	-14.02	31.208	15.04	31.90	H
	20525	836.5	-14.04	31.3	15.11	32.43	
	20600	844.0	-13.99	31.222	15.08	32.23	
	20450	829.0	-19.32	31.504	10.03	10.08	V
	20525	836.5	-18.85	31.117	10.12	10.27	
	20600	844.0	-19.70	31.922	10.07	10.17	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 26							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26797	824.7	-11.96	31.208	17.10	51.26	H
	26915	836.5	-12.08	31.3	17.07	50.93	
	27033	848.3	-12.05	31.222	17.02	50.37	
	26797	824.7	-17.28	31.504	12.07	16.12	V
	26915	836.5	-16.96	31.117	12.01	15.87	
	27033	848.3	-17.80	31.922	11.97	15.75	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	26797	824.7	-12.96	31.208	16.10	40.72	H
	26915	836.5	-13.09	31.3	16.06	40.36	
	27033	848.3	-13.05	31.222	16.02	40.01	
	26797	824.7	-18.29	31.504	11.06	12.78	V
	26915	836.5	-17.97	31.117	11.00	12.58	
	27033	848.3	-18.81	31.922	10.96	12.48	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	26797	824.7	-13.96	31.208	15.10	32.34	H
	26915	836.5	-14.10	31.3	15.05	31.99	
	27033	848.3	-14.06	31.222	15.01	31.71	
	26797	824.7	-19.30	31.504	10.05	10.13	V
	26915	836.5	-18.97	31.117	10.00	9.99	
	27033	848.3	-19.82	31.922	9.95	9.89	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 26							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26805	825.5	-11.92	31.208	17.14	51.74	H
	26915	836.5	-12.05	31.3	17.10	51.29	
	27025	847.5	-12.01	31.222	17.06	50.84	
	26805	825.5	-17.24	31.504	12.11	16.27	V
	26915	836.5	-16.92	31.117	12.05	16.02	
	27025	847.5	-17.76	31.922	12.01	15.89	
Channel Bandwidth: 3 MHz / 16QAM							
X	26805	825.5	-12.92	31.208	16.14	41.10	H
	26915	836.5	-13.05	31.3	16.10	40.74	
	27025	847.5	-13.02	31.222	16.05	40.29	
	26805	825.5	-18.25	31.504	11.10	12.89	V
	26915	836.5	-17.93	31.117	11.04	12.70	
	27025	847.5	-18.76	31.922	11.01	12.62	
Channel Bandwidth: 3 MHz / 64QAM							
X	26805	825.5	-13.92	31.208	15.14	32.64	H
	26915	836.5	-14.05	31.3	15.10	32.36	
	27025	847.5	-14.03	31.222	15.04	31.93	
	26805	825.5	-19.26	31.504	10.09	10.22	V
	26915	836.5	-18.94	31.117	10.03	10.06	
	27025	847.5	-19.76	31.922	10.01	10.03	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 26							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26815	826.5	-11.88	31.208	17.18	52.22	H
	26915	836.5	-12.02	31.3	17.13	51.64	
	27015	846.5	-11.98	31.222	17.09	51.19	
	26815	826.5	-17.20	31.504	12.15	16.42	V
	26919	836.5	-16.88	31.117	12.09	16.17	
	27015	846.5	-17.72	31.922	12.05	16.04	
Channel Bandwidth: 5 MHz / 16QAM							
X	26815	826.5	-12.88	31.208	16.18	41.48	H
	26915	836.5	-13.02	31.3	16.13	41.02	
	27015	846.5	-12.98	31.222	16.09	40.66	
	26815	826.5	-18.21	31.504	11.14	13.01	V
	26919	836.5	-17.89	31.117	11.08	12.81	
	27015	846.5	-18.73	31.922	11.04	12.71	
Channel Bandwidth: 5 MHz / 64QAM							
X	26815	826.5	-13.89	31.208	15.17	32.87	H
	26915	836.5	-14.02	31.3	15.13	32.58	
	27015	846.5	-13.98	31.222	15.09	32.30	
	26815	826.5	-19.22	31.504	10.13	10.31	V
	26919	836.5	-18.90	31.117	10.07	10.16	
	27015	846.5	-19.74	31.922	10.03	10.07	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 26							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26840	829.0	-11.84	31.208	17.22	52.70	H
	26915	836.5	-11.98	31.3	17.17	52.12	
	26990	844.0	-11.94	31.222	17.13	51.67	
	26840	829.0	-17.16	31.504	12.19	16.57	V
	26919	836.5	-16.84	31.117	12.13	16.32	
	26990	844.0	-17.68	31.922	12.09	16.19	
Channel Bandwidth: 10 MHz / 16QAM							
X	26840	829.0	-12.84	31.208	16.22	41.86	H
	26915	836.5	-12.98	31.3	16.17	41.40	
	26990	844.0	-12.94	31.222	16.13	41.04	
	26840	829.0	-18.16	31.504	11.19	13.16	V
	26919	836.5	-17.85	31.117	11.12	12.93	
	26990	844.0	-18.69	31.922	11.08	12.83	
Channel Bandwidth: 10 MHz / 64QAM							
X	26840	829.0	-13.85	31.208	15.21	33.17	H
	26915	836.5	-13.98	31.3	15.17	32.89	
	26990	844.0	-13.95	31.222	15.12	32.52	
	26840	829.0	-19.16	31.504	10.19	10.46	V
	26919	836.5	-18.86	31.117	10.11	10.25	
	26990	844.0	-19.70	31.922	10.07	10.17	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 26							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26865	831.5	-11.80	31.208	17.26	53.19	H
	26915	836.5	-11.94	31.3	17.21	52.60	
	26965	841.5	-11.90	31.222	17.17	52.14	
	26865	831.5	-17.12	31.504	12.23	16.73	V
	26915	836.5	-16.80	31.117	12.17	16.47	
	26965	841.5	-17.65	31.922	12.12	16.30	
Channel Bandwidth: 15 MHz / 16QAM							
X	26865	831.5	-12.81	31.208	16.25	42.15	H
	26915	836.5	-12.94	31.3	16.21	41.78	
	26965	841.5	-12.91	31.222	16.16	41.32	
	26865	831.5	-18.13	31.504	11.22	13.26	V
	26915	836.5	-17.81	31.117	11.16	13.05	
	26965	841.5	-18.66	31.922	11.11	12.92	
Channel Bandwidth: 15 MHz / 64QAM							
X	26865	831.5	-13.81	31.208	15.25	33.48	H
	26915	836.5	-13.95	31.3	15.20	33.11	
	26965	841.5	-13.91	31.222	15.16	32.82	
	26865	831.5	-19.14	31.504	10.21	10.51	V
	26915	836.5	-18.82	31.117	10.15	10.34	
	26965	841.5	-19.67	31.922	10.10	10.24	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

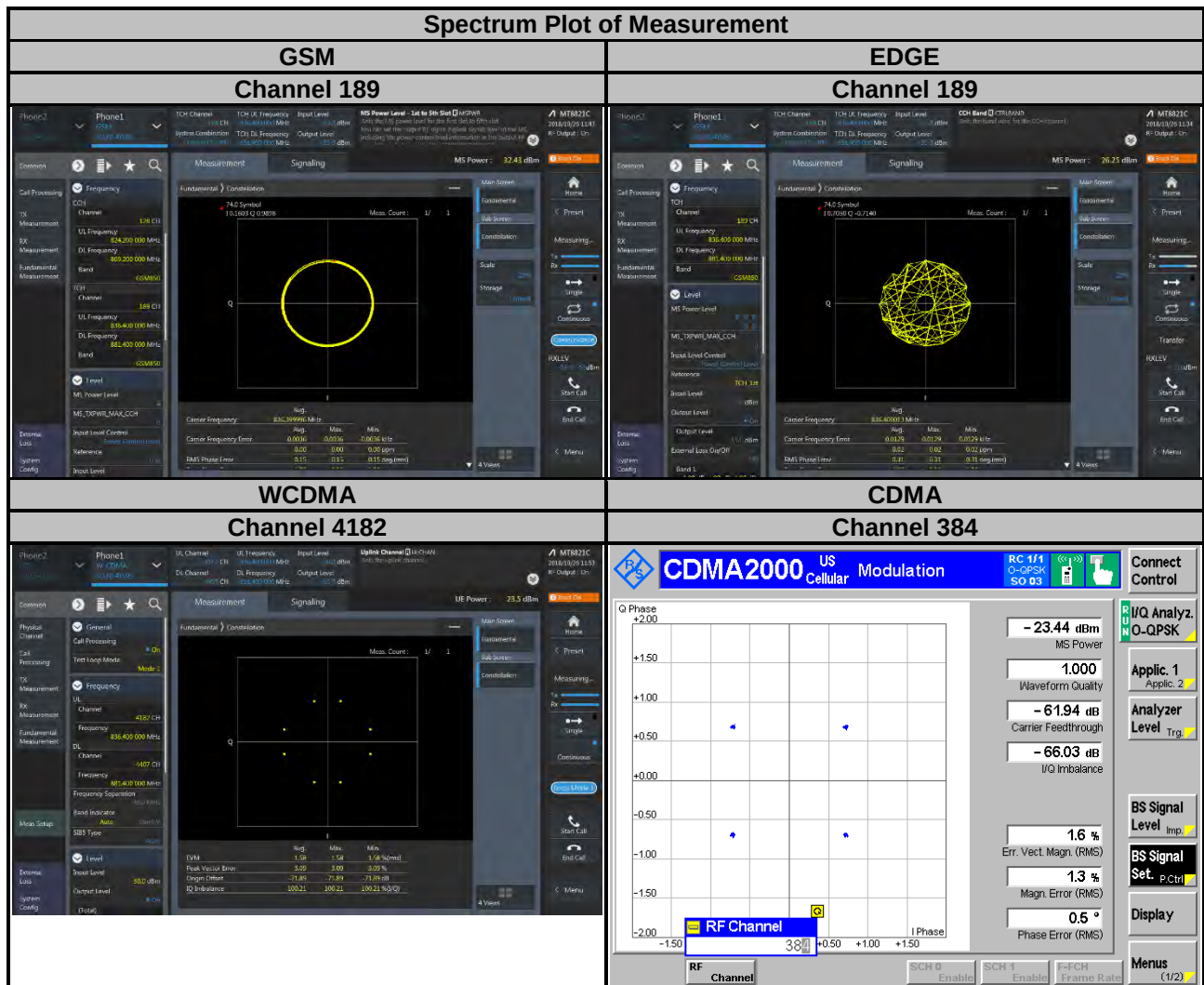
4.2.2 Test Setup



4.2.3 Test Procedure

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

4.2.4 Test Results



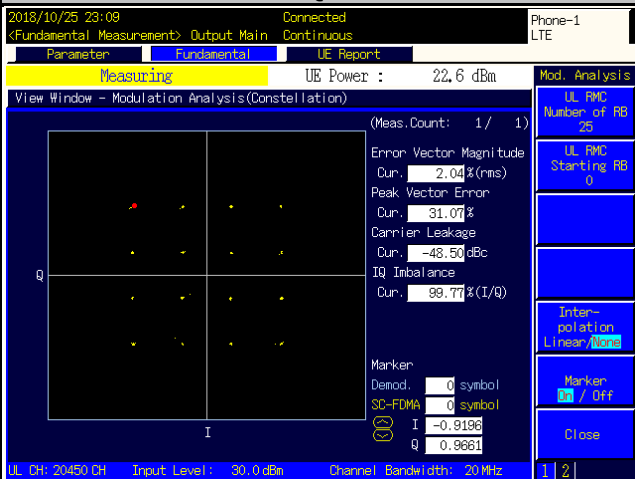
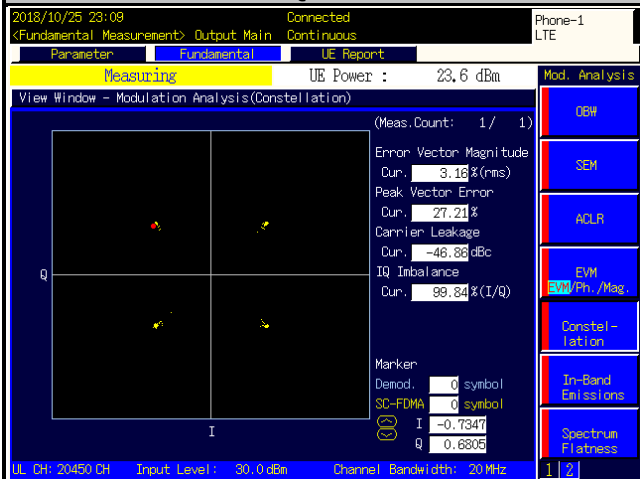
Spectrum Plot of Measurement

LTE Band 5

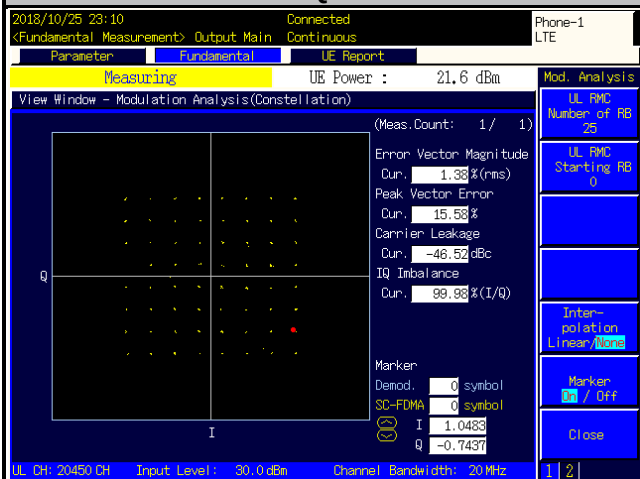
Channel 20450

QPSK

16QAM



64QAM

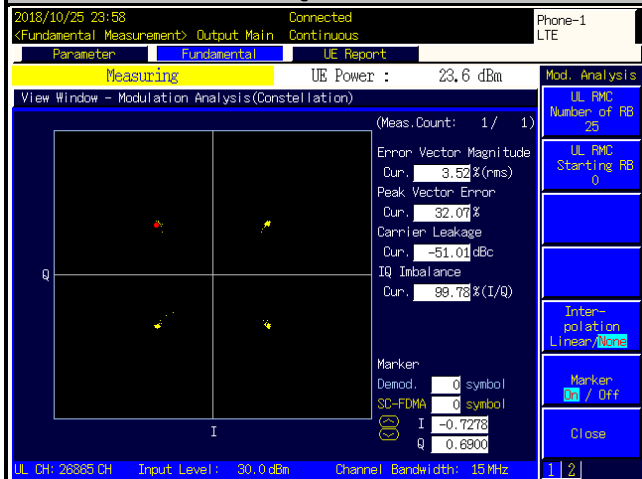


Spectrum Plot of Measurement

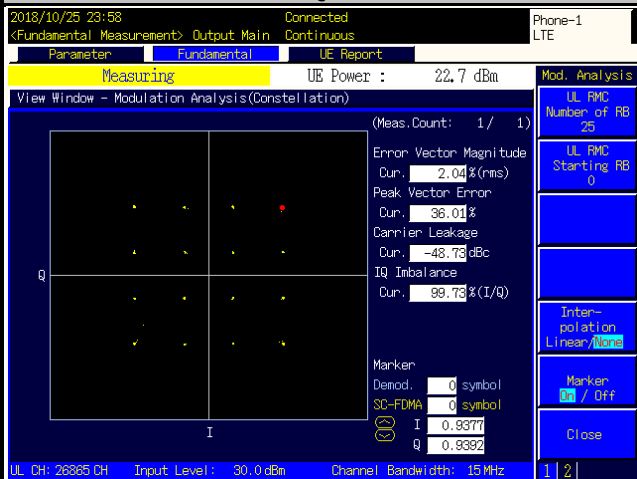
LTE Band 26

Channel 26865

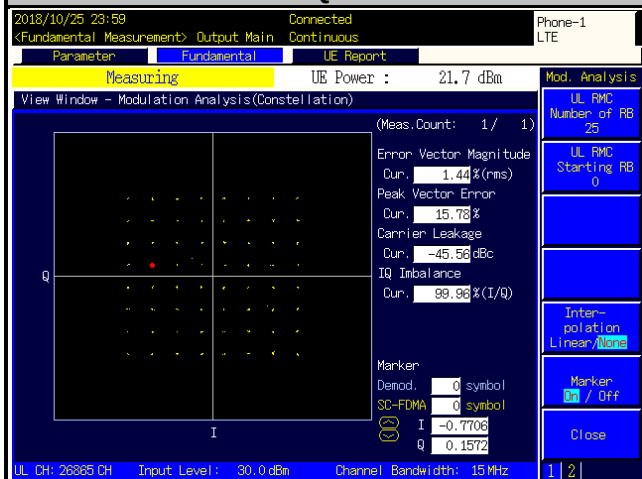
QPSK



16QAM



64QAM



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

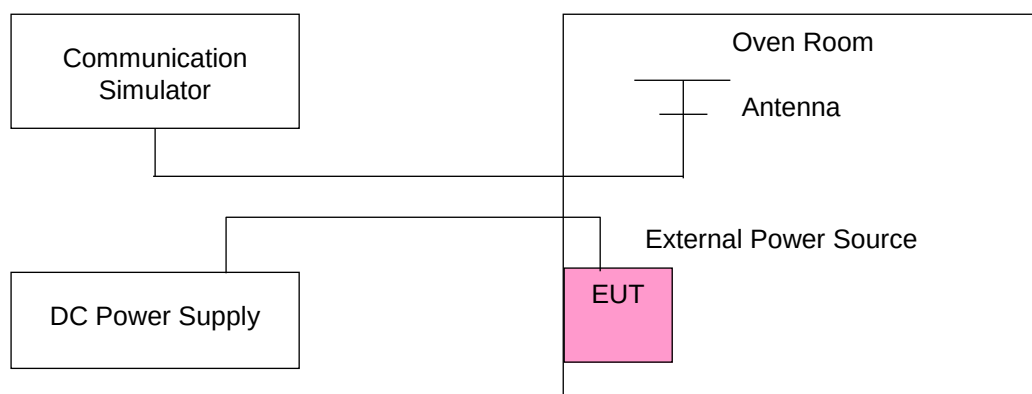
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

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)	GSM				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	824.200003	0.004	848.800003	0.004	2.5
3.6	824.200001	0.002	848.800001	0.001	2.5
4.4	824.200003	0.003	848.800004	0.004	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	GSM				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	824.200004	0.005	848.800001	0.001	2.5
-20	824.200002	0.003	848.800002	0.002	2.5
-10	824.200001	0.001	848.800003	0.004	2.5
0	824.200003	0.004	848.800002	0.003	2.5
10	824.200003	0.004	848.800003	0.004	2.5
20	824.199999	-0.002	848.799997	-0.004	2.5
30	824.199999	-0.001	848.799997	-0.004	2.5
40	824.199997	-0.004	848.799996	-0.004	2.5
50	824.199996	-0.004	848.799998	-0.003	2.5
55	824.199998	-0.002	848.799997	-0.003	2.5

Frequency Error vs. Voltage

Voltage (Volts)	EDGE				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	824.200003	0.004	848.800001	0.001	2.5
3.6	824.200002	0.002	848.800002	0.002	2.5
4.4	824.200003	0.004	848.800002	0.003	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	EDGE				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	824.200002	0.003	848.800004	0.005	2.5
-20	824.200003	0.003	848.800003	0.004	2.5
-10	824.200002	0.003	848.800004	0.004	2.5
0	824.200002	0.002	848.800004	0.005	2.5
10	824.200004	0.005	848.800004	0.004	2.5
20	824.199997	-0.004	848.799996	-0.004	2.5
30	824.199996	-0.004	848.799998	-0.002	2.5
40	824.199997	-0.003	848.799997	-0.003	2.5
50	824.199999	-0.002	848.799998	-0.002	2.5
55	824.199997	-0.003	848.799996	-0.005	2.5

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	826.400002	0.002	846.600002	0.002	2.5
3.6	826.400003	0.003	846.600003	0.004	2.5
4.4	826.400001	0.001	846.600004	0.005	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	WCDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	826.400002	0.003	846.600003	0.003	2.5
-20	826.400002	0.002	846.600001	0.002	2.5
-10	826.400002	0.002	846.600002	0.002	2.5
0	826.400004	0.005	846.600003	0.004	2.5
10	826.400003	0.004	846.600003	0.003	2.5
20	826.399998	-0.003	846.599999	-0.001	2.5
30	826.399998	-0.002	846.599998	-0.002	2.5
40	826.399998	-0.003	846.599998	-0.002	2.5
50	826.399997	-0.003	846.599998	-0.002	2.5
55	826.399998	-0.003	846.599999	-0.001	2.5

Frequency Error vs. Voltage

Voltage (Volts)	CDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	824.700003	0.004	848.310002	0.002	2.5
3.6	824.700003	0.004	848.310003	0.004	2.5
4.4	824.700003	0.003	848.310002	0.003	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	CDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	824.700004	0.005	848.310003	0.003	2.5
-20	824.700003	0.003	848.310004	0.004	2.5
-10	824.700002	0.002	848.310002	0.003	2.5
0	824.700004	0.005	848.310002	0.002	2.5
10	824.700001	0.001	848.310002	0.003	2.5
20	824.699998	-0.002	848.309998	-0.003	2.5
30	824.699999	-0.002	848.309997	-0.003	2.5
40	824.699998	-0.002	848.309997	-0.003	2.5
50	824.699996	-0.004	848.309998	-0.003	2.5
55	824.699997	-0.004	848.309998	-0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	824.700003	0.003	848.300002	0.002	2.5
3.6	824.700001	0.001	848.300001	0.001	2.5
4.4	824.700003	0.003	848.300001	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	824.700001	0.001	848.300002	0.003	2.5
-20	824.700003	0.003	848.300002	0.003	2.5
-10	824.700003	0.003	848.300002	0.002	2.5
0	824.700002	0.002	848.300002	0.003	2.5
10	824.700004	0.004	848.300004	0.004	2.5
20	824.699997	-0.004	848.299997	-0.004	2.5
30	824.699997	-0.004	848.299998	-0.003	2.5
40	824.699999	-0.001	848.299998	-0.003	2.5
50	824.699998	-0.003	848.299998	-0.003	2.5
55	824.699997	-0.004	848.299997	-0.004	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	825.500001	0.002	847.500001	0.001	2.5
3.6	825.500001	0.001	847.500003	0.003	2.5
4.4	825.500004	0.004	847.500002	0.003	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	825.500001	0.001	847.500002	0.002	2.5
-20	825.500001	0.001	847.500001	0.001	2.5
-10	825.500003	0.003	847.500002	0.002	2.5
0	825.500003	0.004	847.500002	0.002	2.5
10	825.500001	0.002	847.500002	0.002	2.5
20	825.499997	-0.004	847.499998	-0.002	2.5
30	825.499997	-0.003	847.499999	-0.001	2.5
40	825.499997	-0.003	847.499999	-0.002	2.5
50	825.499996	-0.005	847.499999	-0.002	2.5
55	825.499996	-0.005	847.499999	-0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	826.500003	0.004	846.500002	0.002	2.5
3.6	826.500003	0.004	846.500001	0.001	2.5
4.4	826.500004	0.004	846.500002	0.003	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	826.500002	0.002	846.500003	0.004	2.5
-20	826.500001	0.002	846.500003	0.003	2.5
-10	826.500003	0.003	846.500003	0.004	2.5
0	826.500003	0.003	846.500003	0.003	2.5
10	826.500003	0.004	846.500002	0.002	2.5
20	826.499997	-0.003	846.499998	-0.002	2.5
30	826.499998	-0.003	846.499999	-0.002	2.5
40	826.499998	-0.003	846.499997	-0.004	2.5
50	826.499997	-0.004	846.499998	-0.002	2.5
55	826.499997	-0.004	846.499998	-0.003	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	829.000003	0.004	844.000003	0.004	2.5
3.6	829.000003	0.004	844.000002	0.002	2.5
4.4	829.000002	0.002	844.000003	0.003	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	829.000003	0.004	844.000002	0.003	2.5
-20	829.000002	0.002	844.000001	0.001	2.5
-10	829.000003	0.003	844.000002	0.003	2.5
0	829.000004	0.004	844.000001	0.002	2.5
10	829.000002	0.003	844.000002	0.002	2.5
20	828.999998	-0.003	843.999997	-0.003	2.5
30	828.999998	-0.003	843.999996	-0.005	2.5
40	828.999999	-0.002	843.999999	-0.001	2.5
50	828.999997	-0.004	843.999999	-0.002	2.5
55	828.999997	-0.004	843.999999	-0.001	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	824.700004	0.005	848.300000	0.002	2.5
3.6	824.700004	0.004	848.300000	0.003	2.5
4.4	824.700003	0.004	848.300000	0.004	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	824.700002	0.003	848.300000	0.002	2.5
-20	824.700002	0.002	848.300000	0.003	2.5
-10	824.700002	0.003	848.300000	0.004	2.5
0	824.700003	0.003	848.300000	0.003	2.5
10	824.700001	0.001	848.300000	0.001	2.5
20	824.699997	-0.004	848.300000	-0.004	2.5
30	824.699998	-0.003	848.300000	-0.002	2.5
40	824.699999	-0.002	848.300000	-0.002	2.5
50	824.699998	-0.002	848.300000	-0.003	2.5
55	824.699998	-0.002	848.300000	-0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	825.500001	0.001	847.500000	0.002	2.5
3.6	825.500002	0.002	847.500000	0.003	2.5
4.4	825.500003	0.003	847.500000	0.004	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	825.500004	0.005	847.500000	0.003	2.5
-20	825.500004	0.005	847.500000	0.003	2.5
-10	825.500002	0.002	847.500000	0.002	2.5
0	825.500001	0.001	847.500000	0.002	2.5
10	825.500004	0.004	847.500000	0.002	2.5
20	825.499998	-0.002	847.500000	-0.002	2.5
30	825.499998	-0.002	847.500000	-0.003	2.5
40	825.499998	-0.002	847.500000	-0.003	2.5
50	825.499999	-0.002	847.500000	-0.004	2.5
55	825.499998	-0.003	847.500000	-0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	826.500001	0.001	846.500001	0.001	2.5
3.6	826.500003	0.004	846.500002	0.002	2.5
4.4	826.500001	0.001	846.500002	0.003	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	826.500002	0.003	846.500003	0.004	2.5
-20	826.500002	0.002	846.500003	0.003	2.5
-10	826.500001	0.001	846.500003	0.004	2.5
0	826.500004	0.004	846.500002	0.003	2.5
10	826.500003	0.004	846.500004	0.004	2.5
20	826.499999	-0.002	846.499997	-0.004	2.5
30	826.499998	-0.003	846.499998	-0.002	2.5
40	826.499997	-0.003	846.499999	-0.001	2.5
50	826.499996	-0.005	846.499998	-0.002	2.5
55	826.499997	-0.004	846.499997	-0.004	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	829.000003	0.003	844.000004	0.005	2.5
3.6	829.000002	0.003	844.000002	0.002	2.5
4.4	829.000002	0.002	844.000002	0.003	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	829.000002	0.003	844.000003	0.004	2.5
-20	829.000003	0.003	844.000004	0.004	2.5
-10	829.000003	0.004	844.000002	0.002	2.5
0	829.000004	0.004	844.000004	0.005	2.5
10	829.000004	0.005	844.000004	0.004	2.5
20	828.999999	-0.002	843.999997	-0.004	2.5
30	828.999998	-0.002	843.999998	-0.002	2.5
40	828.999998	-0.003	843.999998	-0.003	2.5
50	828.999998	-0.003	843.999998	-0.002	2.5
55	828.999997	-0.003	843.999998	-0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 15 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	831.500001	0.002	841.500003	0.003	2.5
3.6	831.500003	0.003	841.500002	0.002	2.5
4.4	831.500002	0.002	841.500002	0.002	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

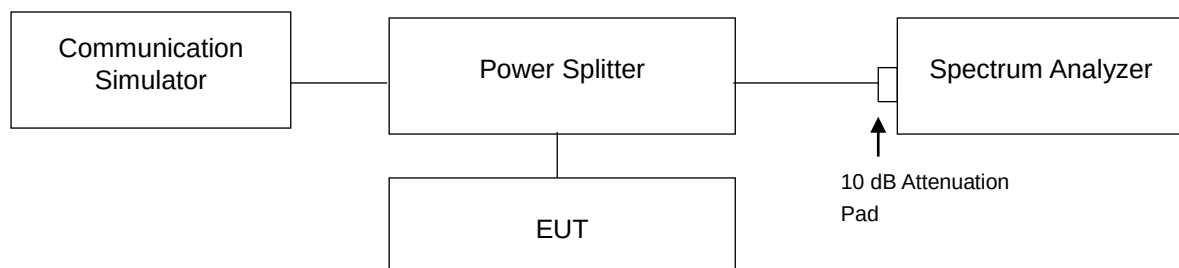
Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 15 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	831.500001	0.001	841.500002	0.003	2.5
-20	831.500004	0.004	841.500004	0.005	2.5
-10	831.500001	0.001	841.500003	0.003	2.5
0	831.500004	0.005	841.500003	0.004	2.5
10	831.500003	0.004	841.500004	0.005	2.5
20	831.499998	-0.002	841.499998	-0.002	2.5
30	831.499997	-0.003	841.499998	-0.003	2.5
40	831.499996	-0.005	841.499998	-0.002	2.5
50	831.499996	-0.005	841.499996	-0.005	2.5
55	831.499999	-0.002	841.499997	-0.004	2.5

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.

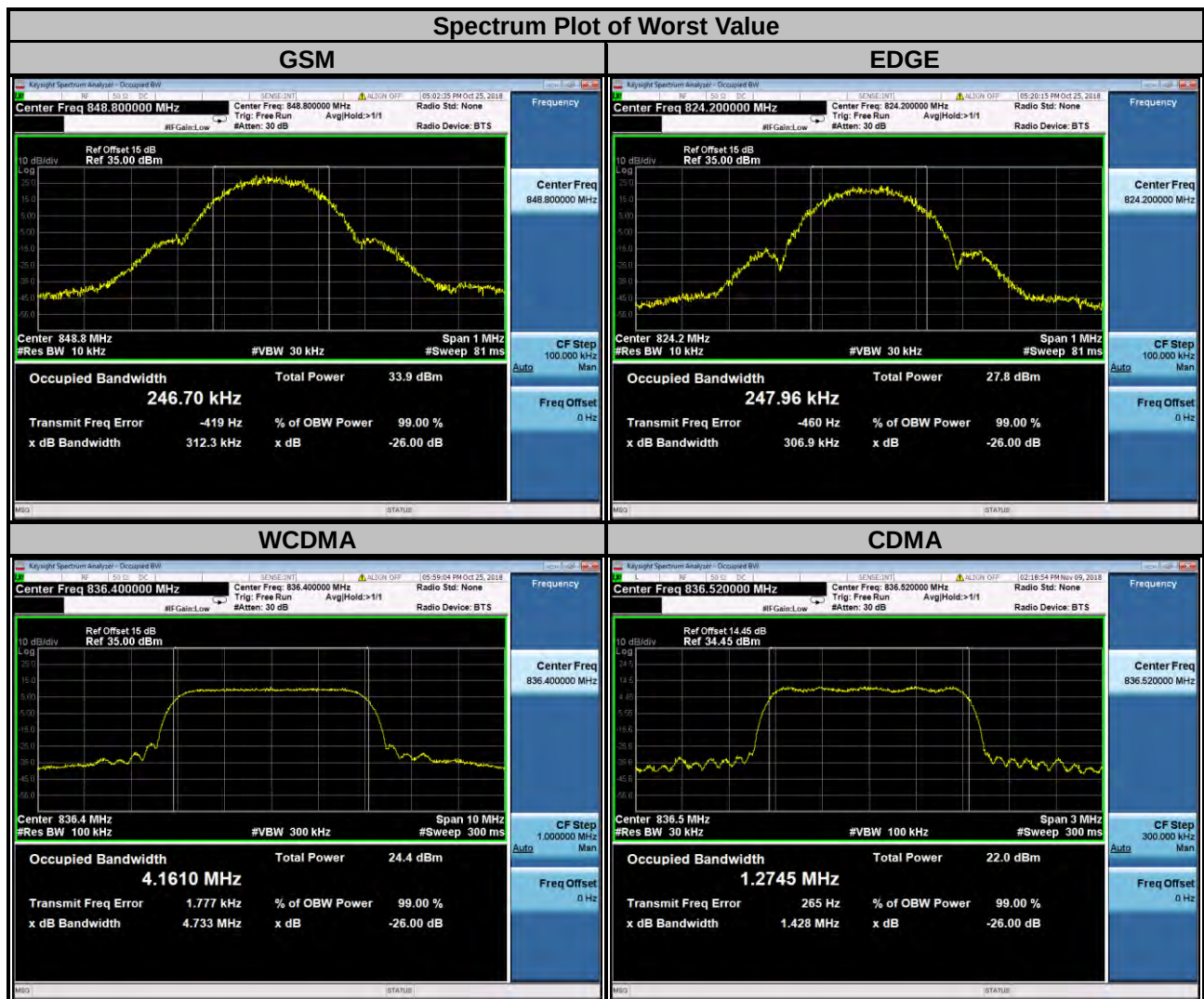
4.4.2 Test Setup



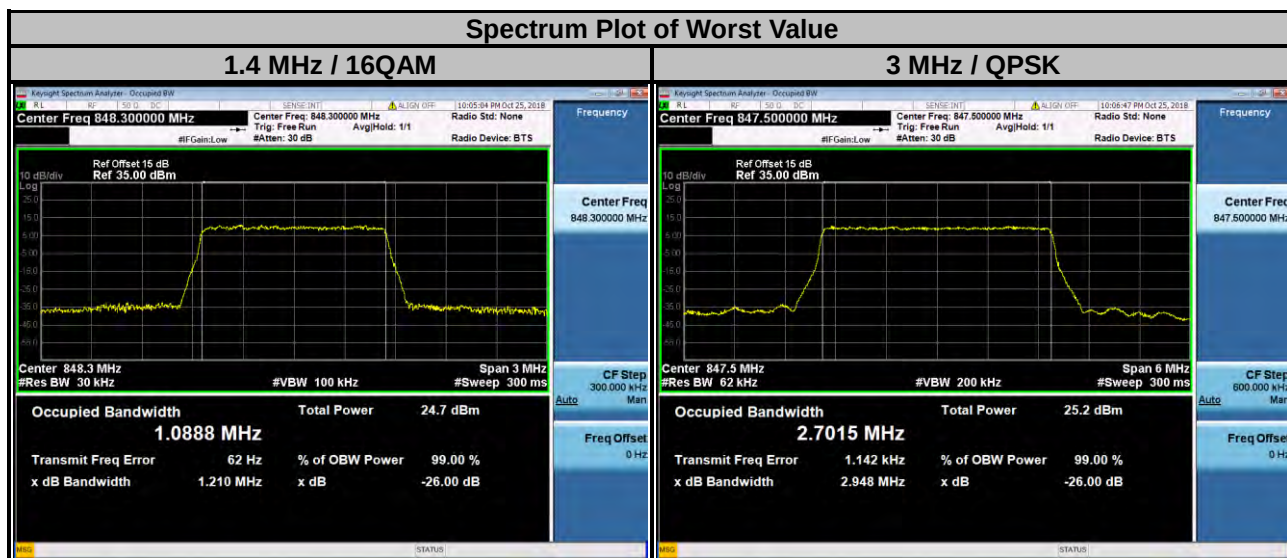
4.4.3 Test Result

<99 % Occupied Bandwidth>

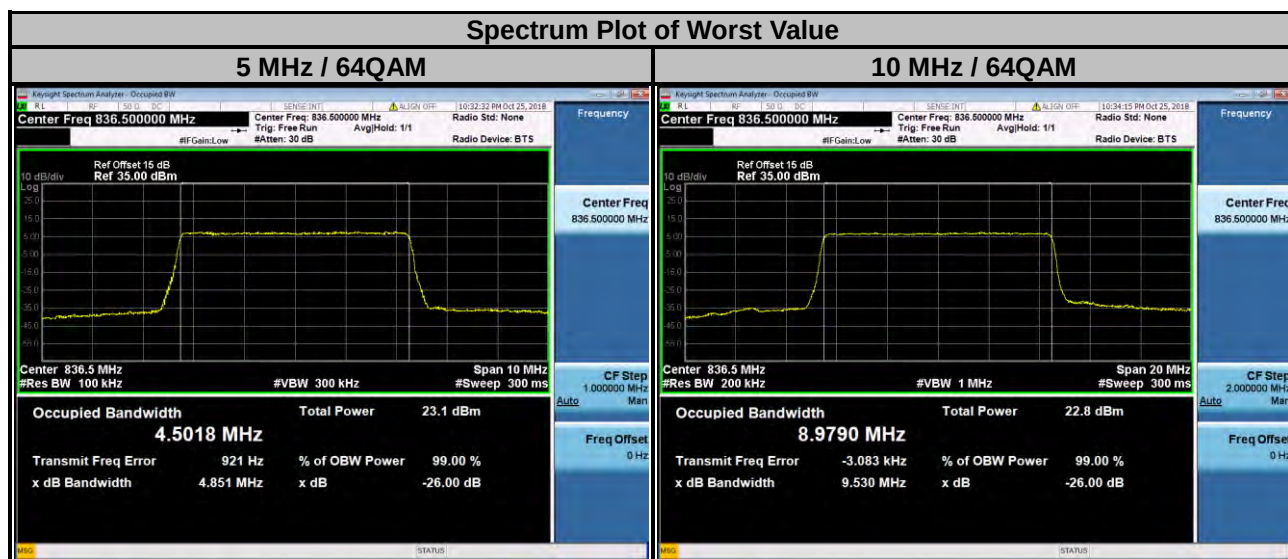
Channel	Frequency (MHz)	99 % Occupied Bandwidth (kHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)
		GSM	EDGE			WCDMA
128	824.2	245.20	247.96	4132	826.4	4.1545
189	836.4	246.36	243.90	4182	836.4	4.1610
251	848.8	246.70	247.42	4233	846.6	4.1581
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)				
		CDMA				
1013	824.70	1.2728				
384	836.52	1.2745				
777	848.31	1.2745				



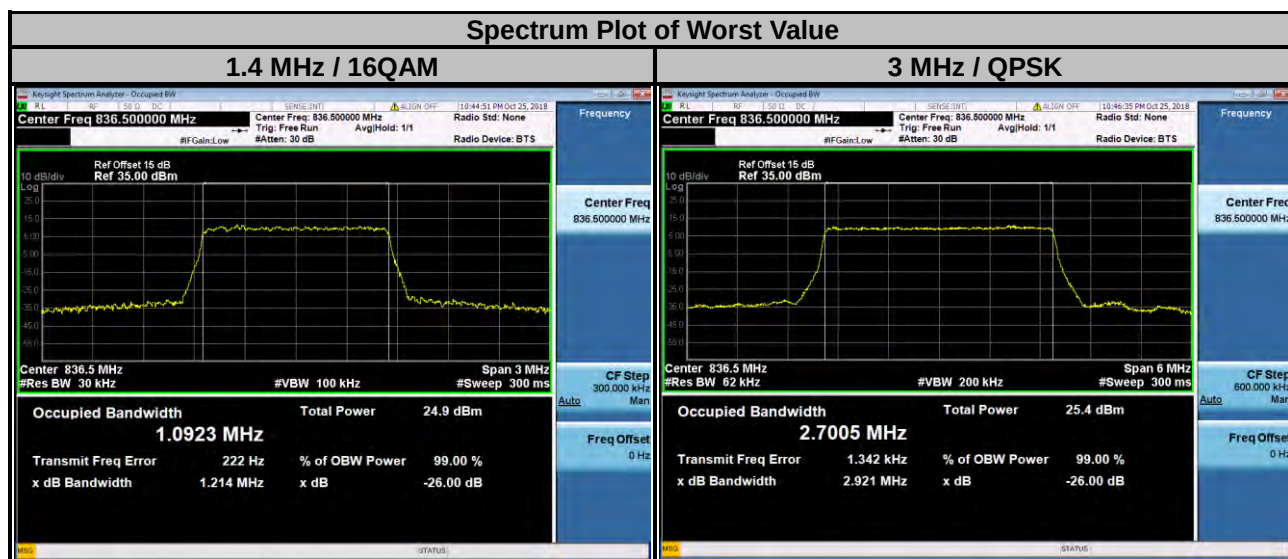
LTE Band 5									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20407	824.7	1.0866	1.0883	1.0867	20415	825.5	2.6977	2.6954	2.6976
20525	836.5	1.0863	1.0885	1.0879	20525	836.5	2.7009	2.6961	2.6995
20643	848.3	1.0864	1.0888	1.0871	20635	847.5	2.7015	2.6959	2.6967



LTE Band 5									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20425	826.5	4.4897	4.4937	4.5005	20450	829.0	8.9712	8.9674	8.9737
20525	836.5	4.4900	4.4958	4.5018	20525	836.5	8.9689	8.9692	8.9790
20625	846.5	4.4902	4.4920	4.4989	20600	844.0	8.9591	8.9644	8.9643



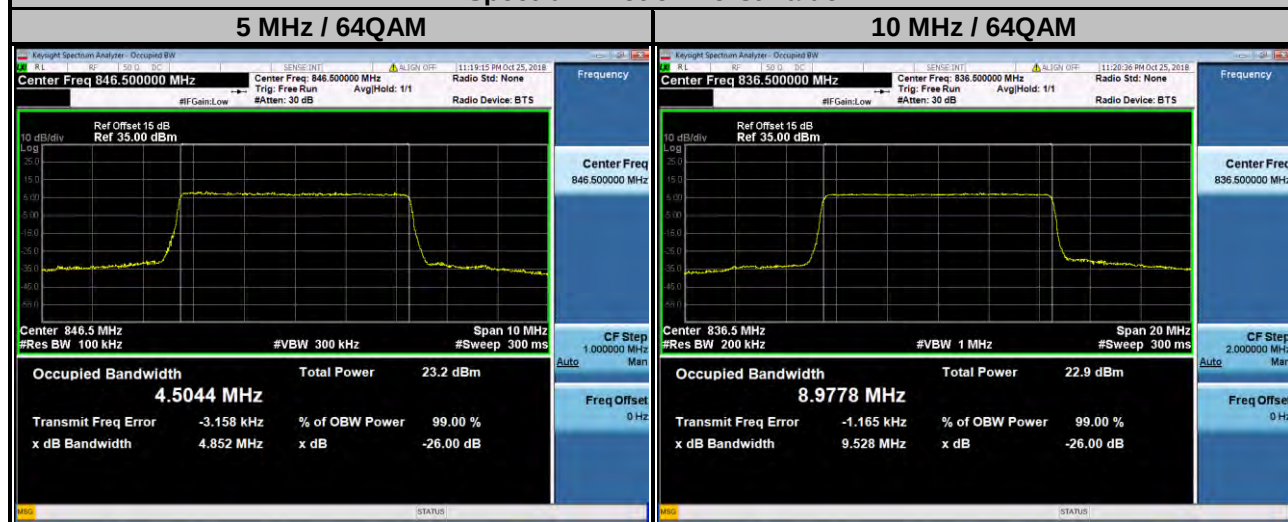
LTE Band 26									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26797	824.7	1.0879	1.0870	1.0881	26805	825.5	2.6990	2.6949	2.6974
26915	836.5	1.0869	1.0923	1.0872	26915	836.5	2.7005	2.6971	2.6988
27033	848.3	1.0872	1.0872	1.0884	27025	847.5	2.6997	2.6980	2.6983



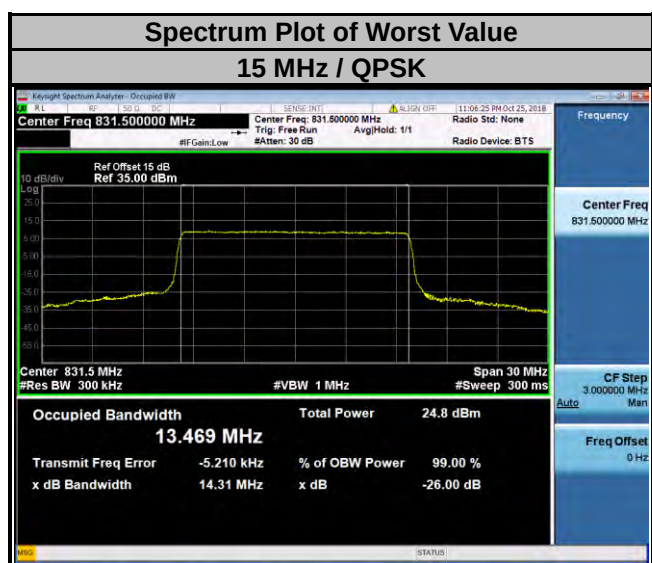
LTE Band 26

Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26815	826.5	4.4889	4.4947	4.5039	26840	829.0	8.9697	8.9676	8.9740
26915	836.5	4.4917	4.4939	4.5041	26915	836.5	8.9685	8.9752	8.9778
27015	846.5	4.4923	4.4927	4.5044	26990	844.0	8.9572	8.9631	8.9638

Spectrum Plot of Worst Value



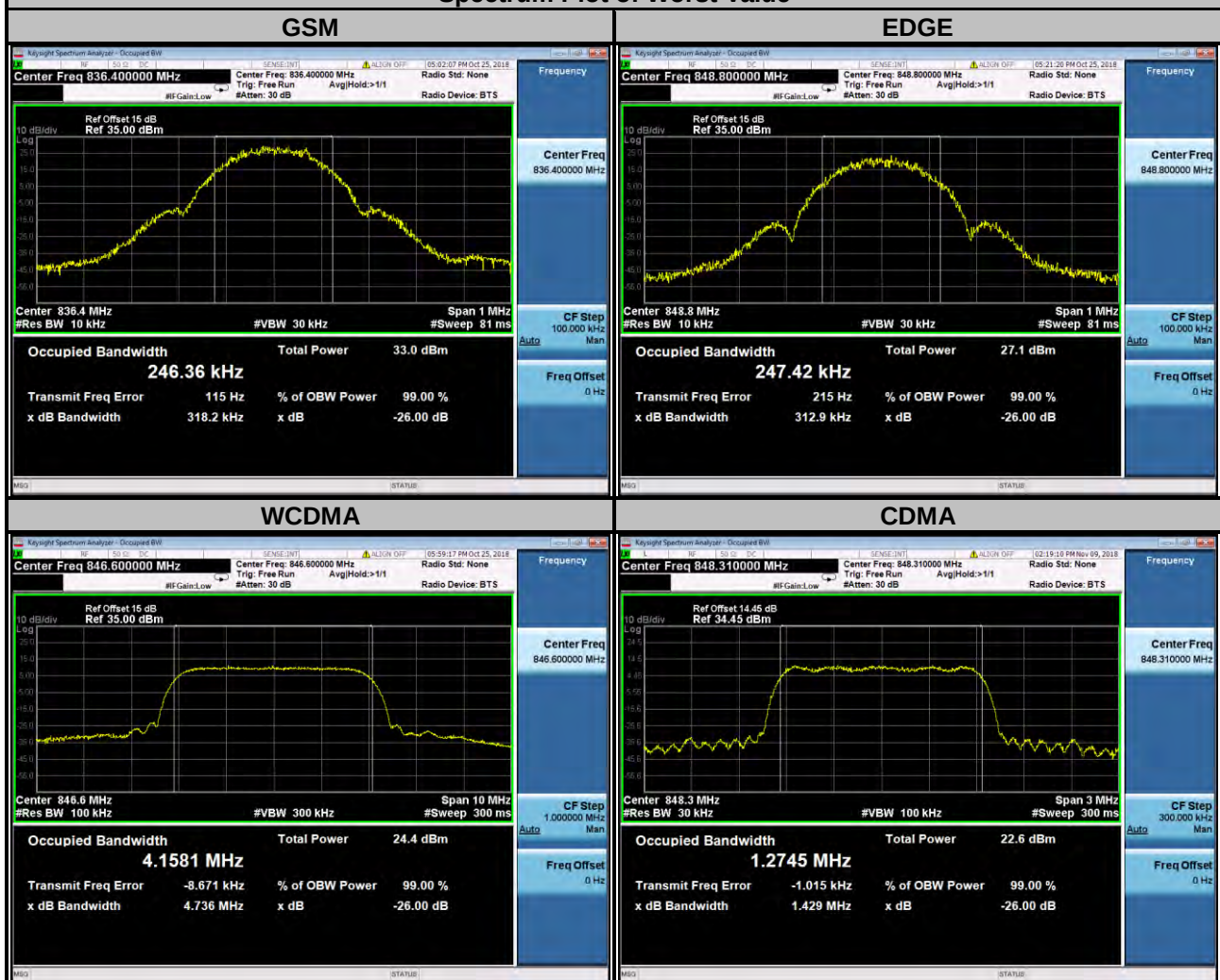
LTE Band 26				
Channel Bandwidth: 15 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26865	831.5	13.469	13.459	13.454
26915	836.5	13.455	13.446	13.439
26965	841.5	13.429	13.417	13.412



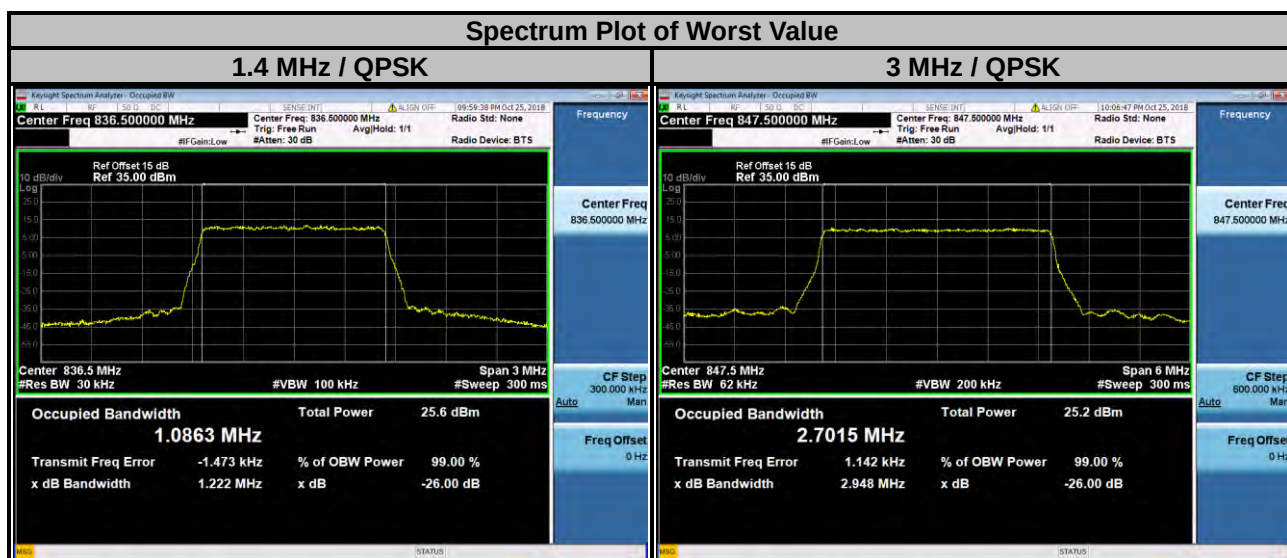
<26 dB Bandwidth>

Channel	Frequency (MHz)	26 dB Bandwidth (kHz)		Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
		GSM	EDGE			WCDMA
128	824.2	314.1	306.9	4132	826.4	4.735
189	836.4	318.2	312.2	4182	836.4	4.733
251	848.8	312.3	312.9	4233	846.6	4.736
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)				
		CDMA				
1013	824.70	1.423				
384	836.52	1.428				
777	848.31	1.429				

Spectrum Plot of Worst Value



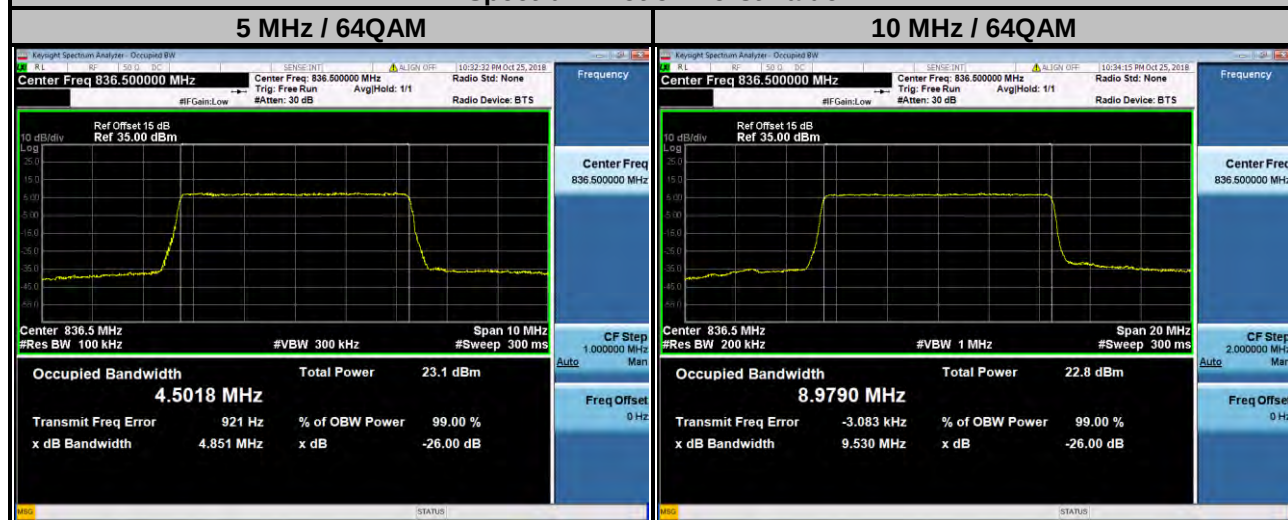
LTE Band 5									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20407	824.7	1.218	1.212	1.216	20415	825.5	2.921	2.924	2.901
20525	836.5	1.222	1.220	1.215	20525	836.5	2.926	2.926	2.907
20643	848.3	1.221	1.210	1.217	20635	847.5	2.948	2.925	2.917



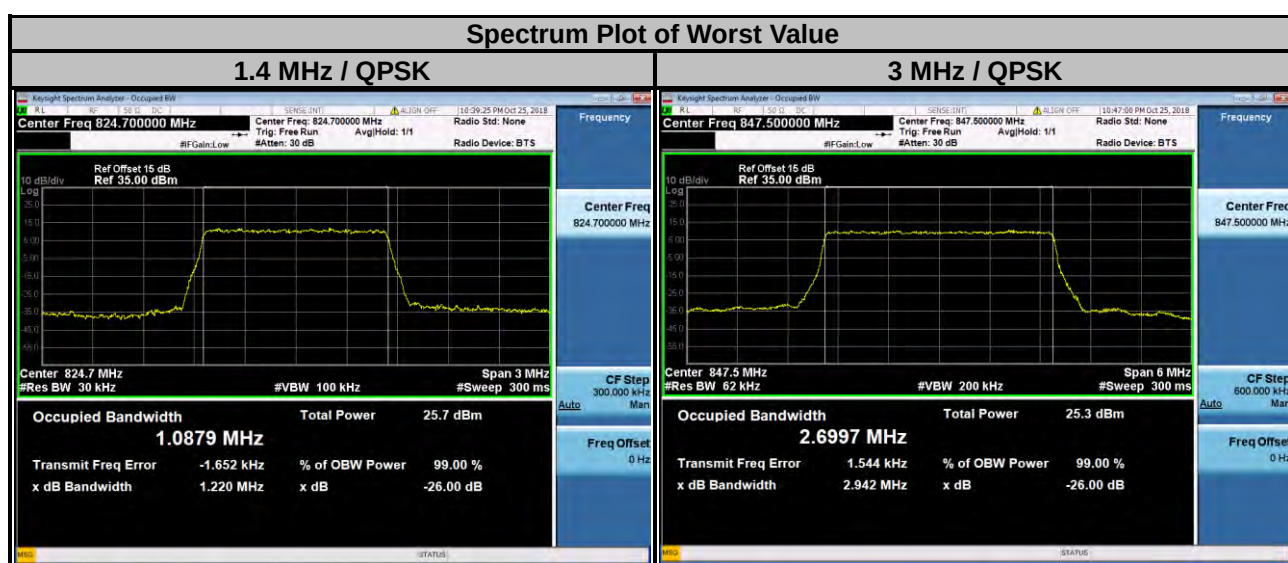
LTE Band 5

Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20425	826.5	4.814	4.802	4.826	20450	829.0	9.524	9.520	9.524
20525	836.5	4.834	4.800	4.851	20525	836.5	9.529	9.517	9.530
20625	846.5	4.811	4.803	4.807	20600	844.0	9.507	9.508	9.518

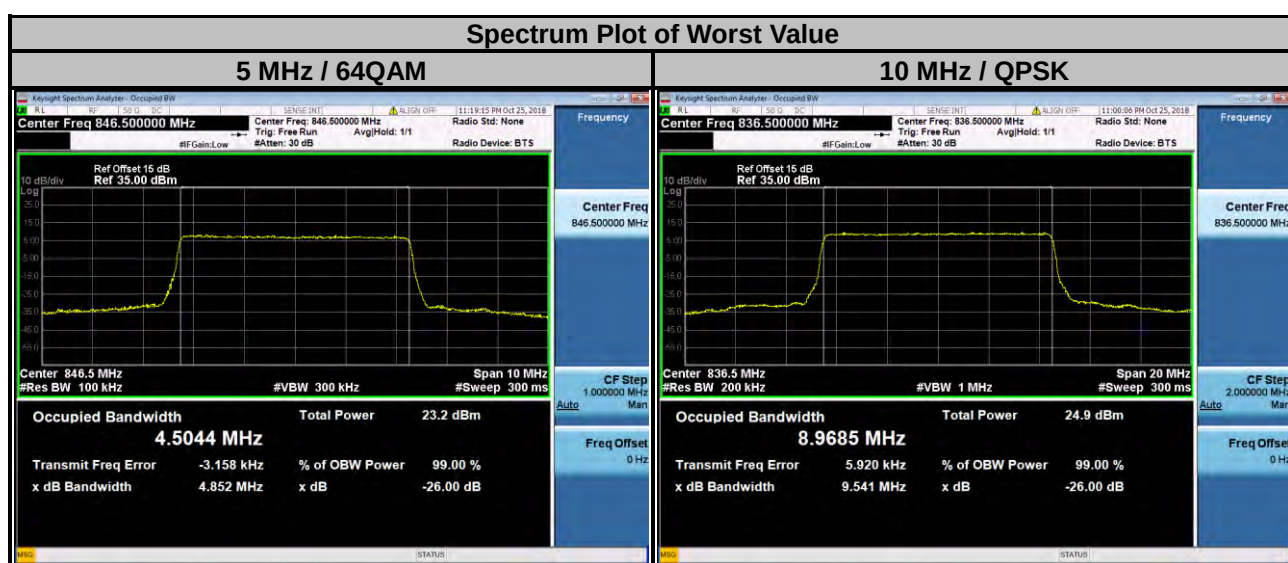
Spectrum Plot of Worst Value



LTE Band 26									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26797	824.7	1.220	1.215	1.217	26805	825.5	2.935	2.922	2.909
26915	836.5	1.220	1.214	1.216	26915	836.5	2.921	2.925	2.900
27033	848.3	1.218	1.218	1.217	27025	847.5	2.942	2.926	2.898



LTE Band 26									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26815	826.5	4.820	4.813	4.821	26840	829.0	9.524	9.512	9.526
26915	836.5	4.826	4.812	4.845	26915	836.5	9.541	9.522	9.528
27015	846.5	4.822	4.809	4.852	26990	844.0	9.513	9.508	9.508



LTE Band 26

Channel Bandwidth: 15 MHz

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26865	831.5	14.31	14.25	14.25
26915	836.5	14.29	14.26	14.24
26965	841.5	14.24	14.22	14.23

Spectrum Plot of Worst Value

15 MHz / QPSK

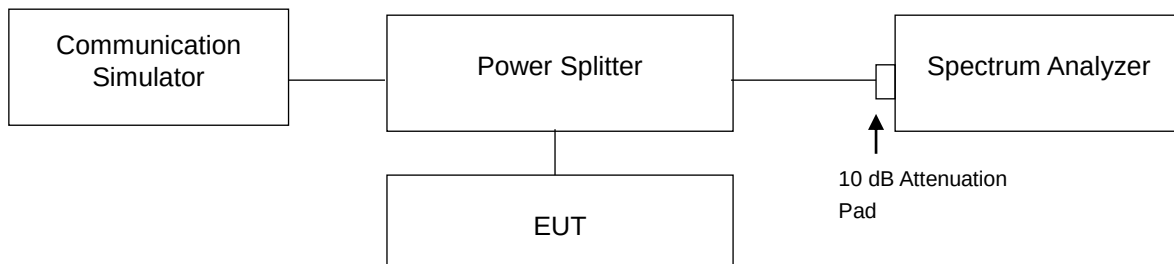


4.5 Band Edge Measurement

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.

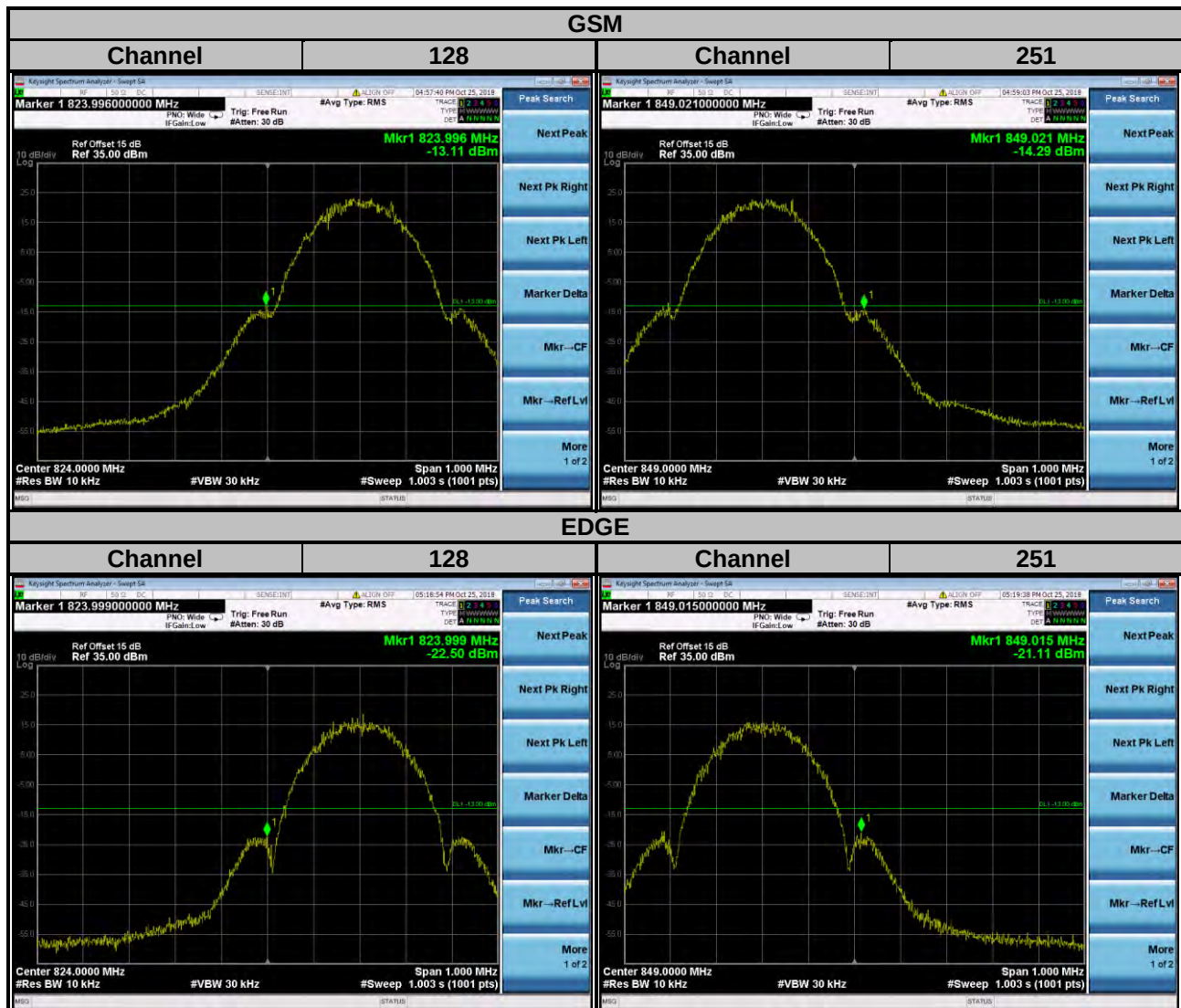
4.5.2 Test Setup

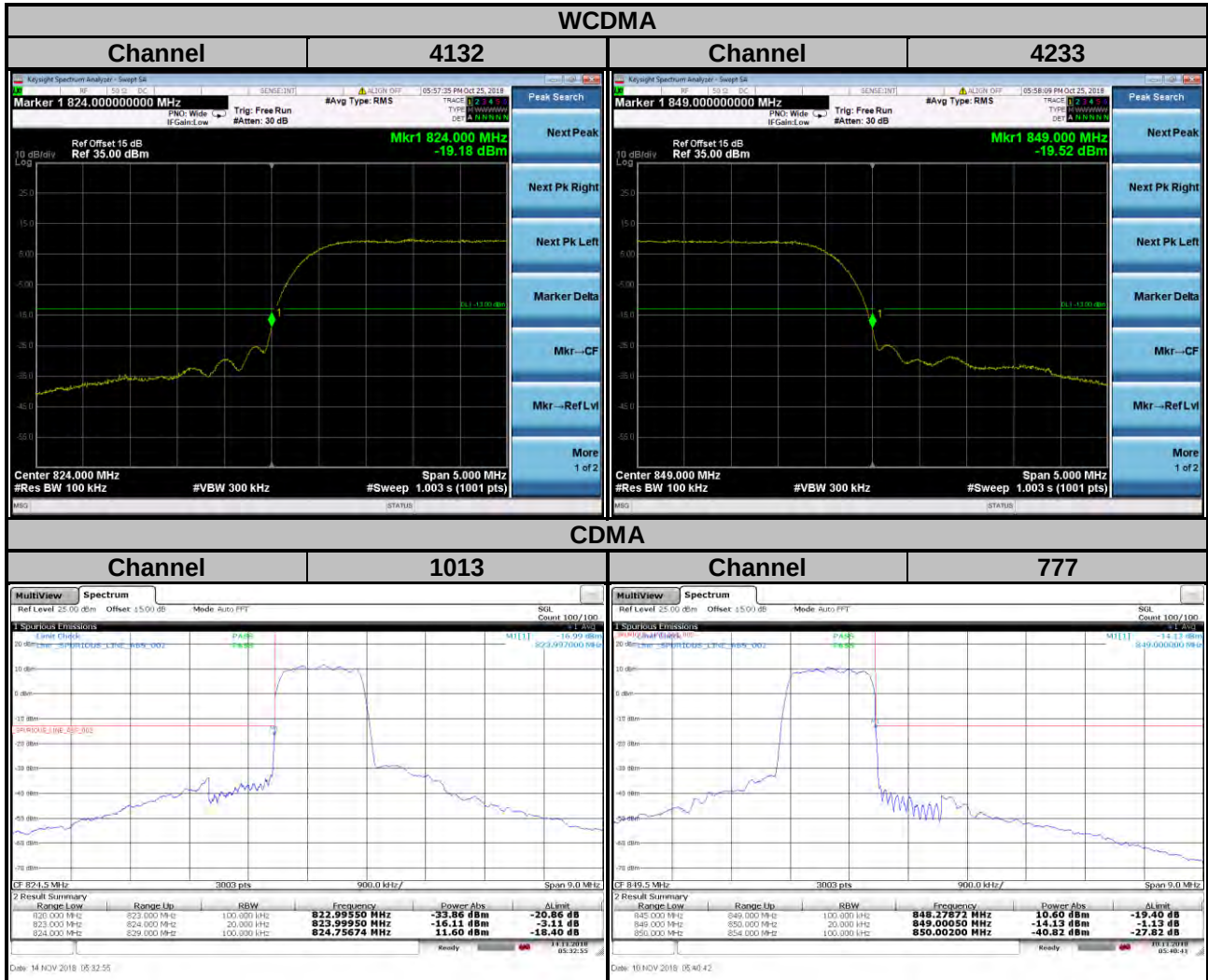


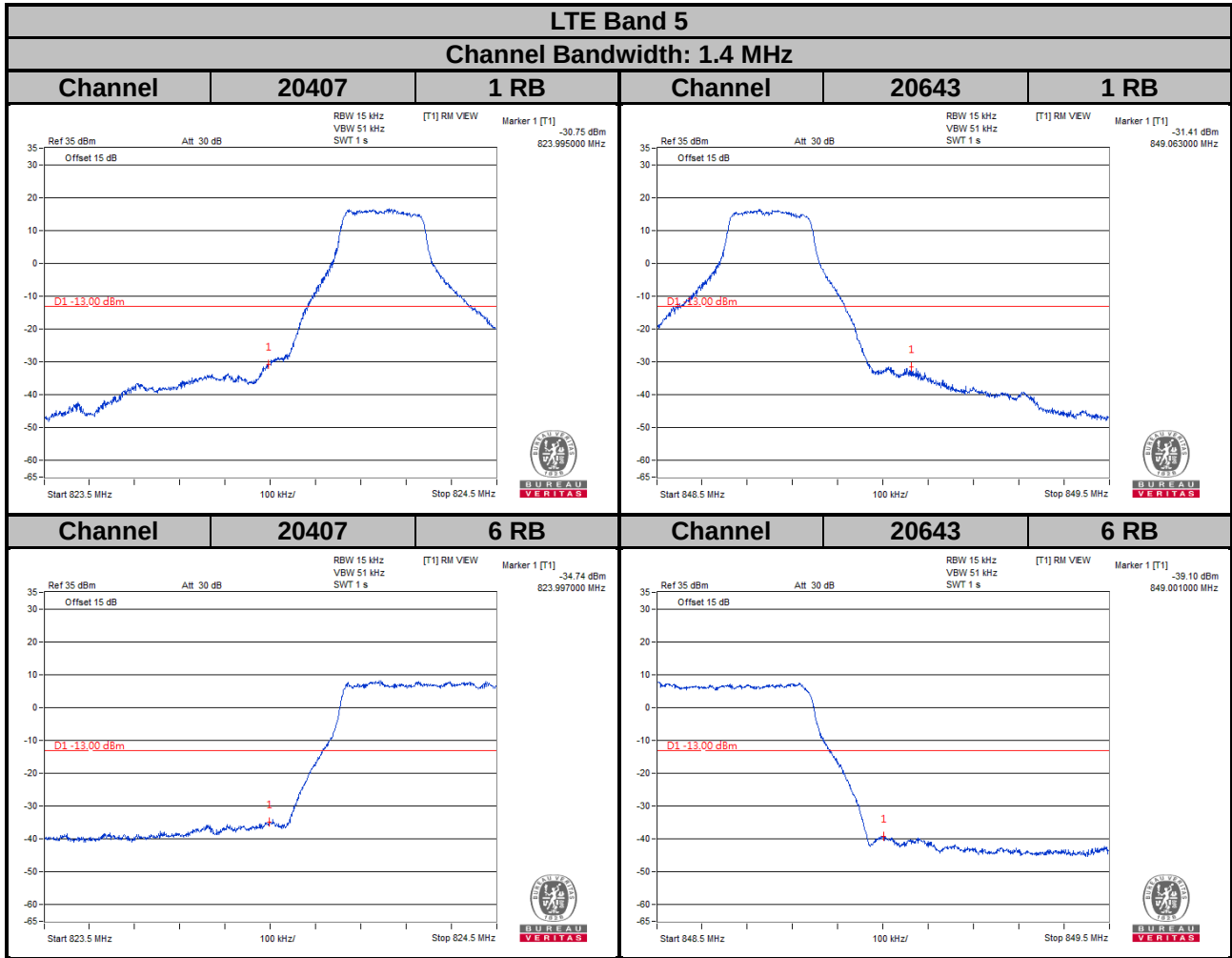
4.5.3 Test Procedures

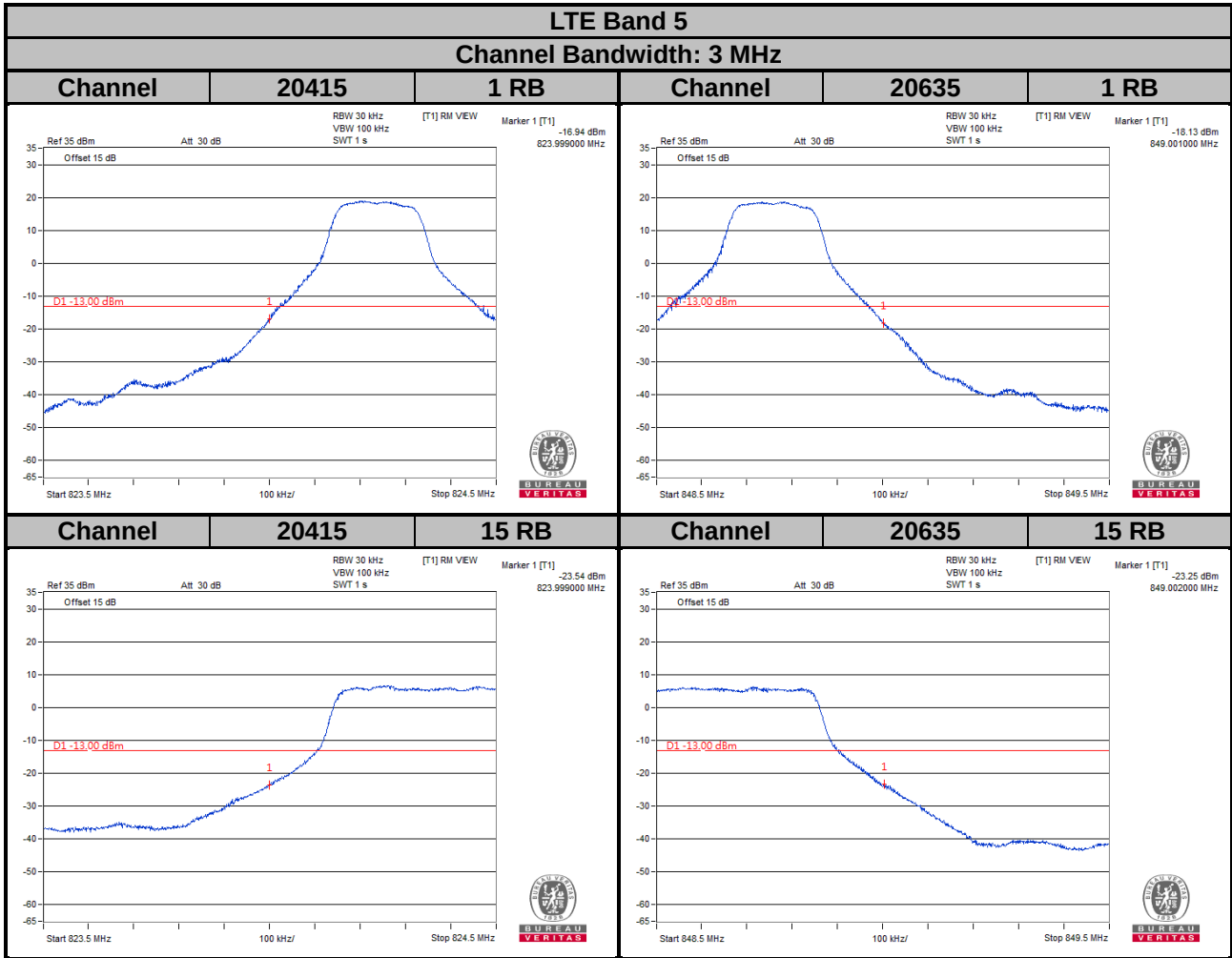
- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 10 kHz and VB of the spectrum is 30 kHz (GSM/GPRS/EDGE).
- The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
- The center frequency of spectrum is the band edge frequency and span is 9 MHz. RB of the spectrum is 20 kHz and VB of the spectrum is 62 kHz (CDMA).
- 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).
- Record the max trace plot into the test report.

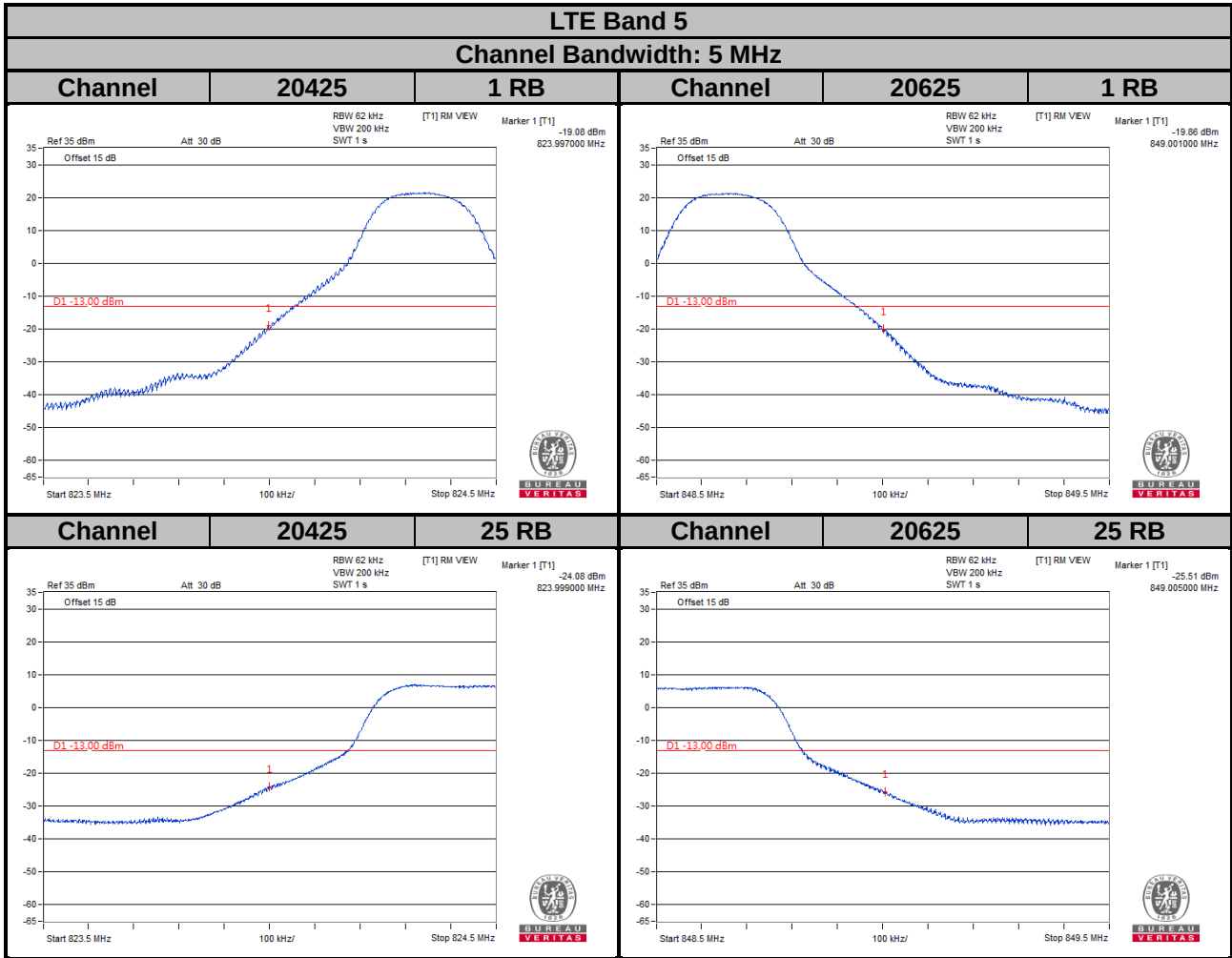
4.5.4 Test Results

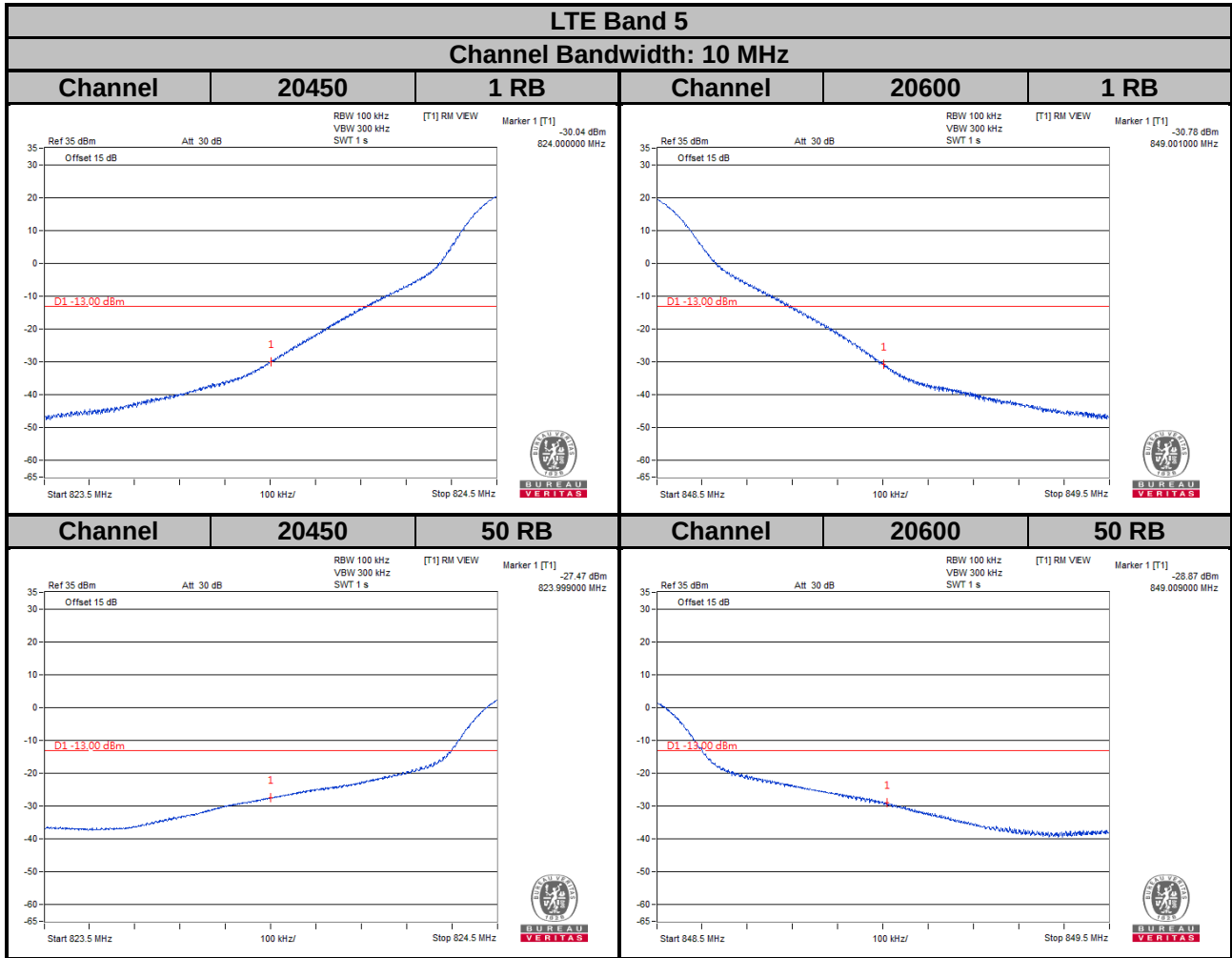


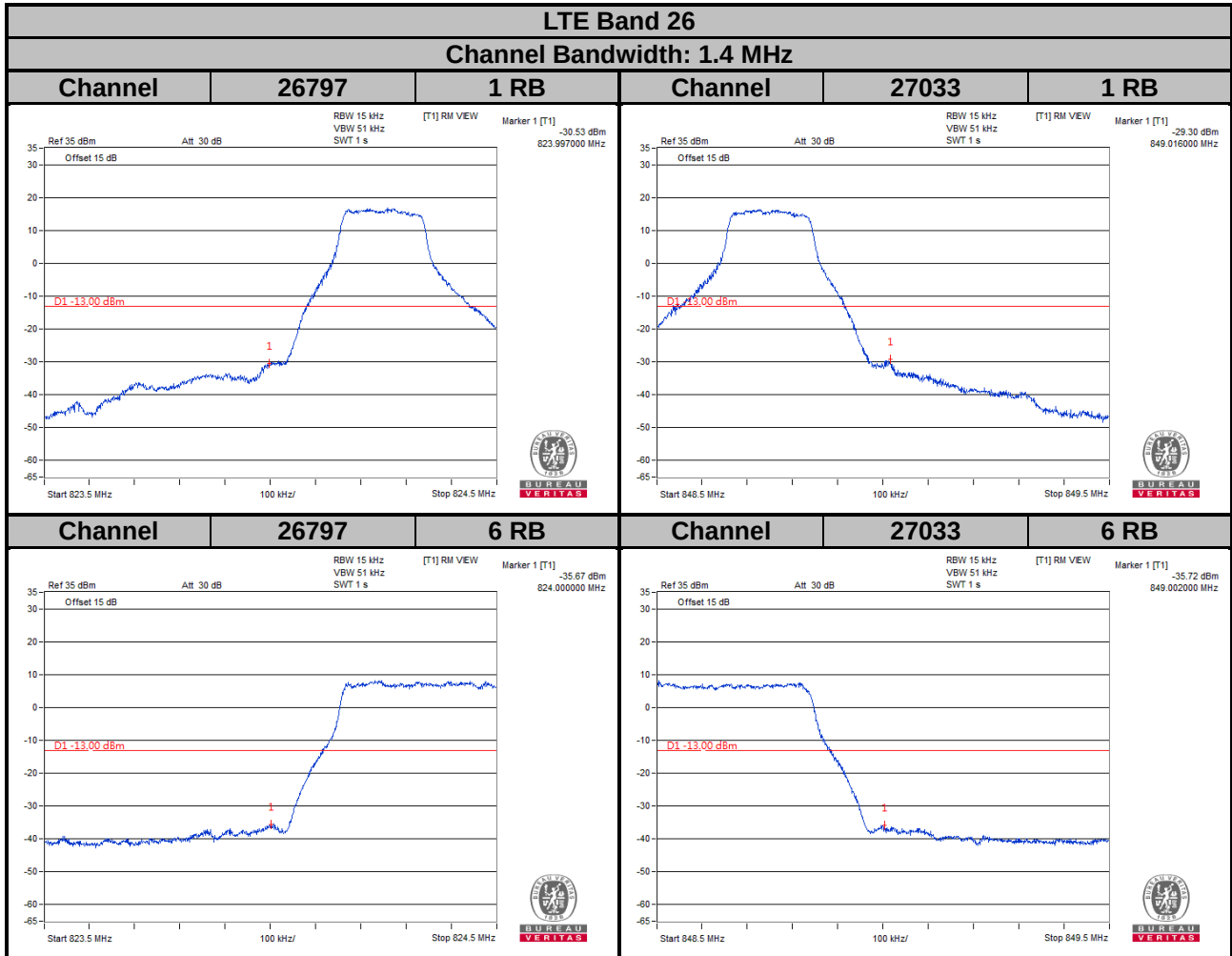






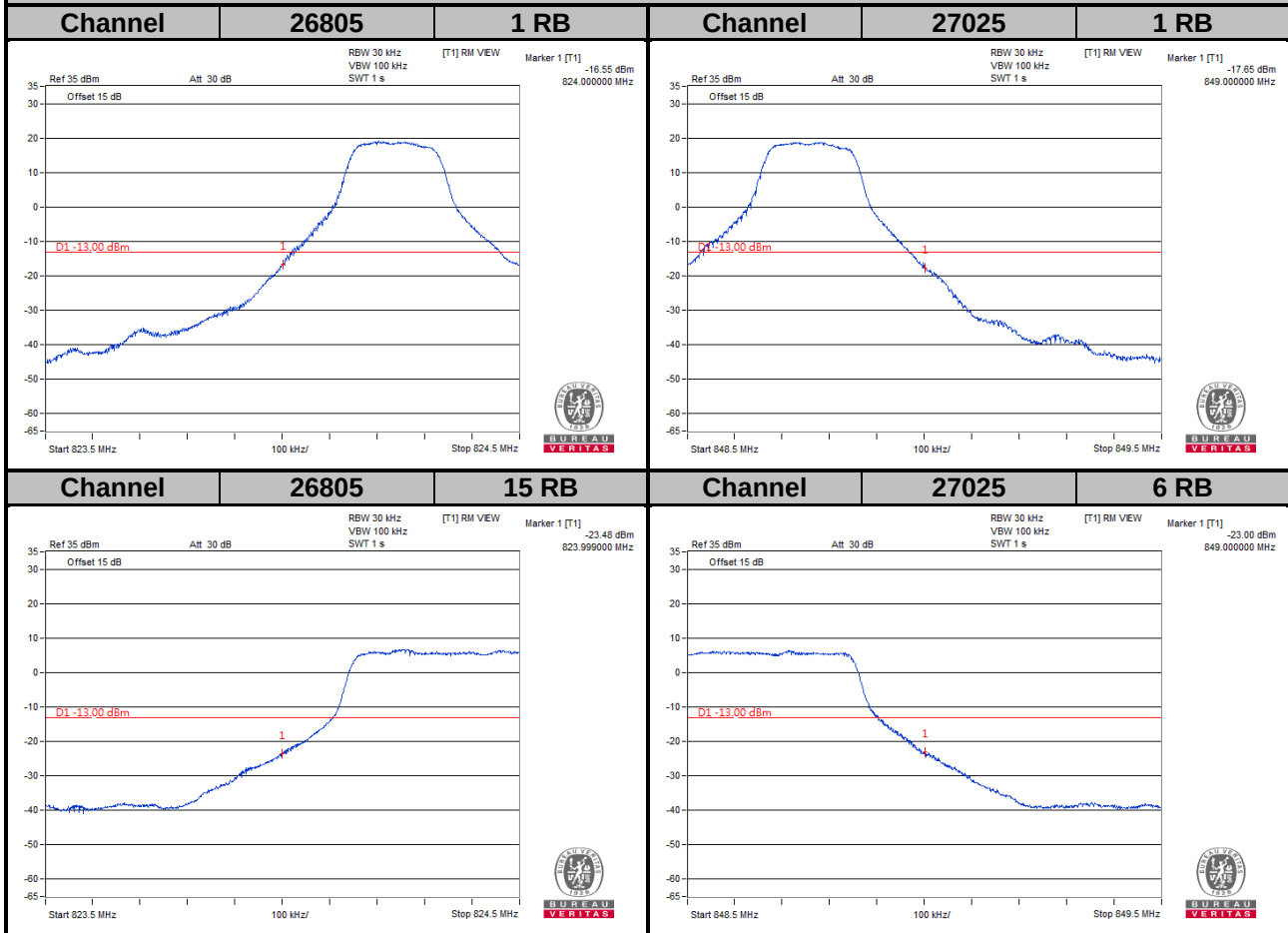


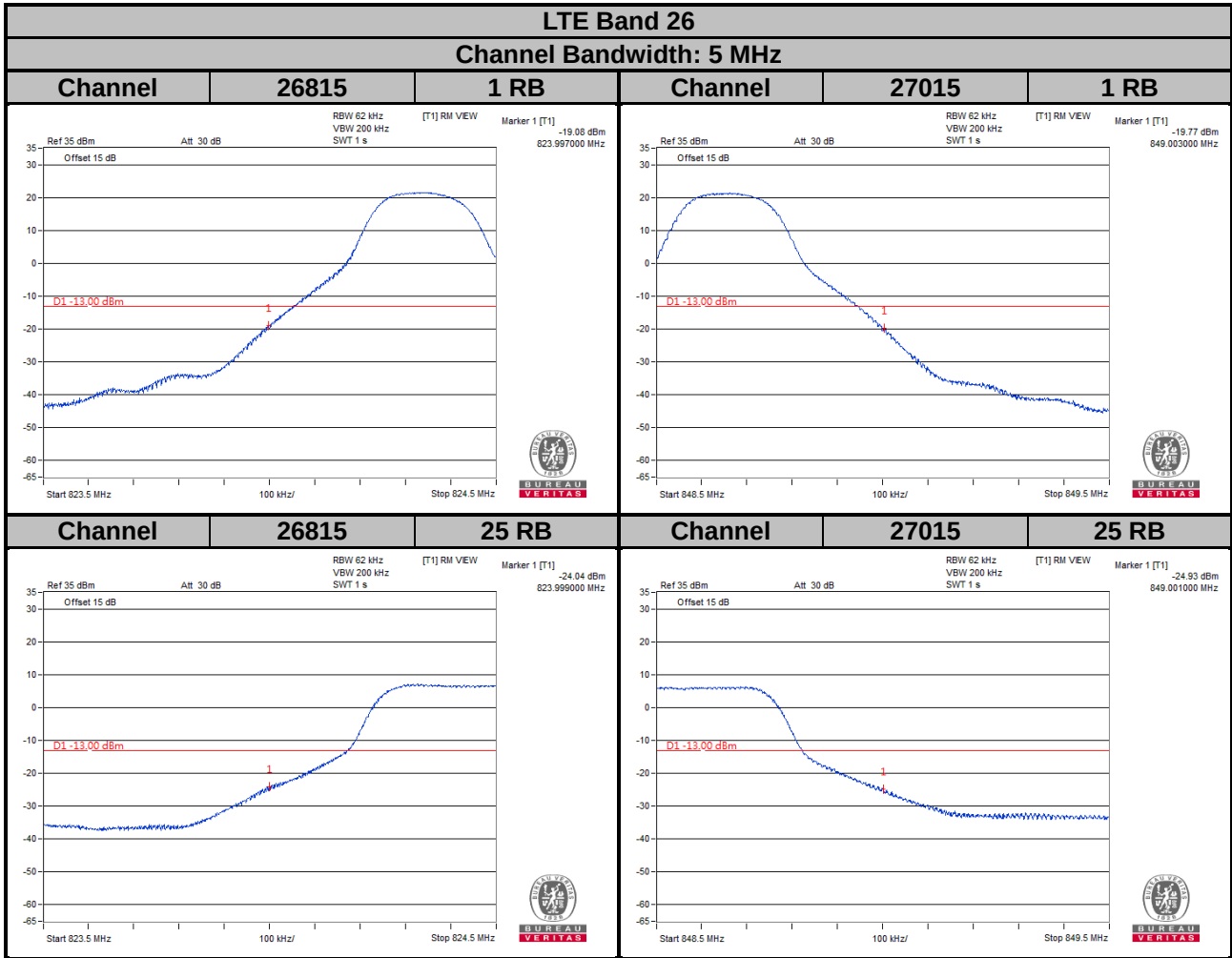


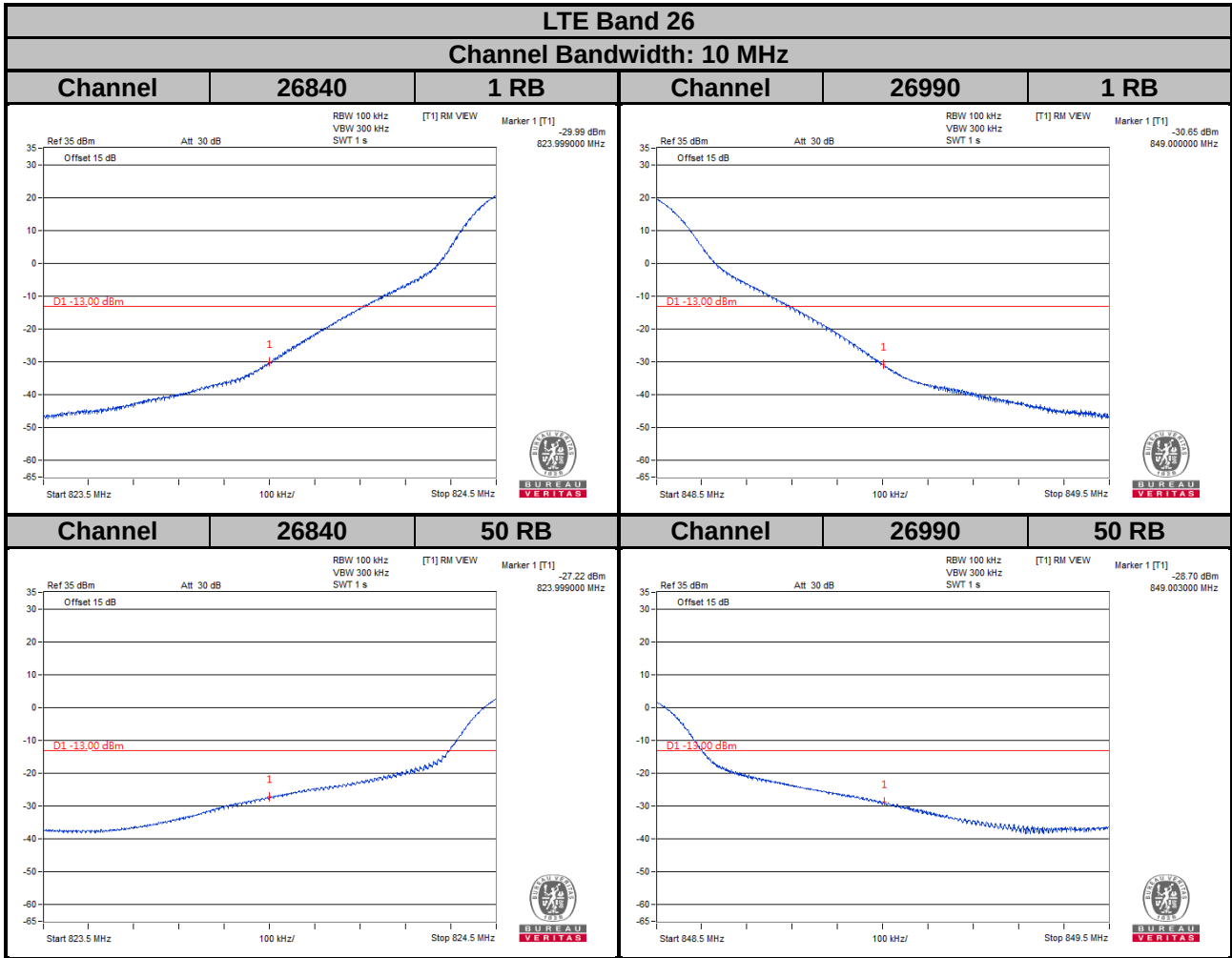


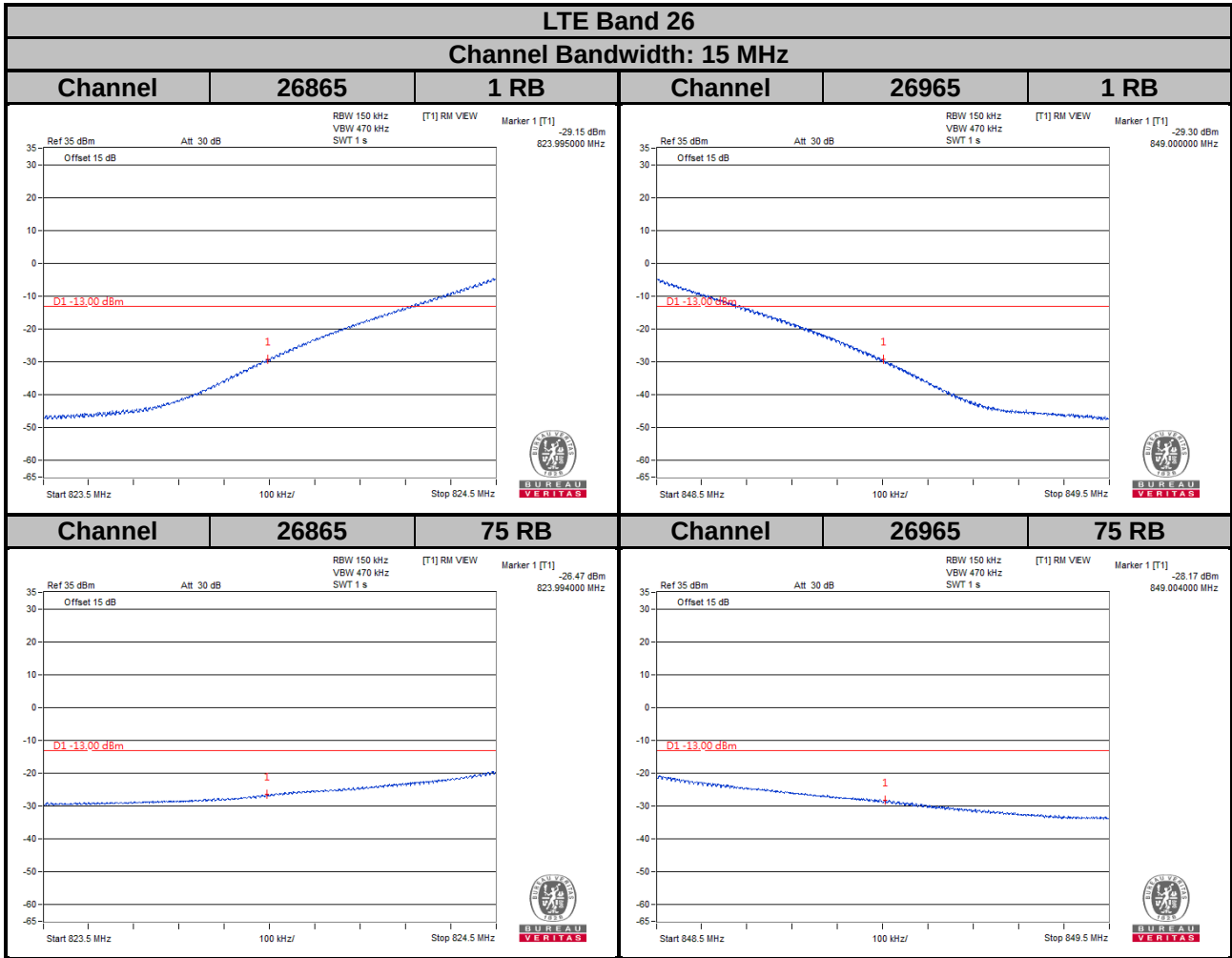
LTE Band 26

Channel Bandwidth: 3 MHz







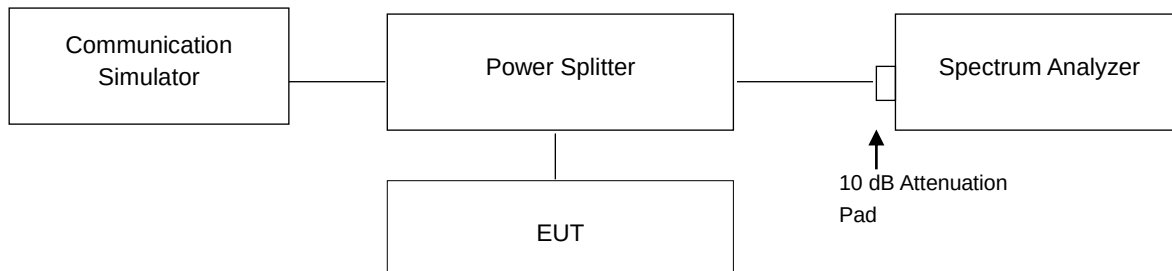


4.6 Peak to Average Ratio

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

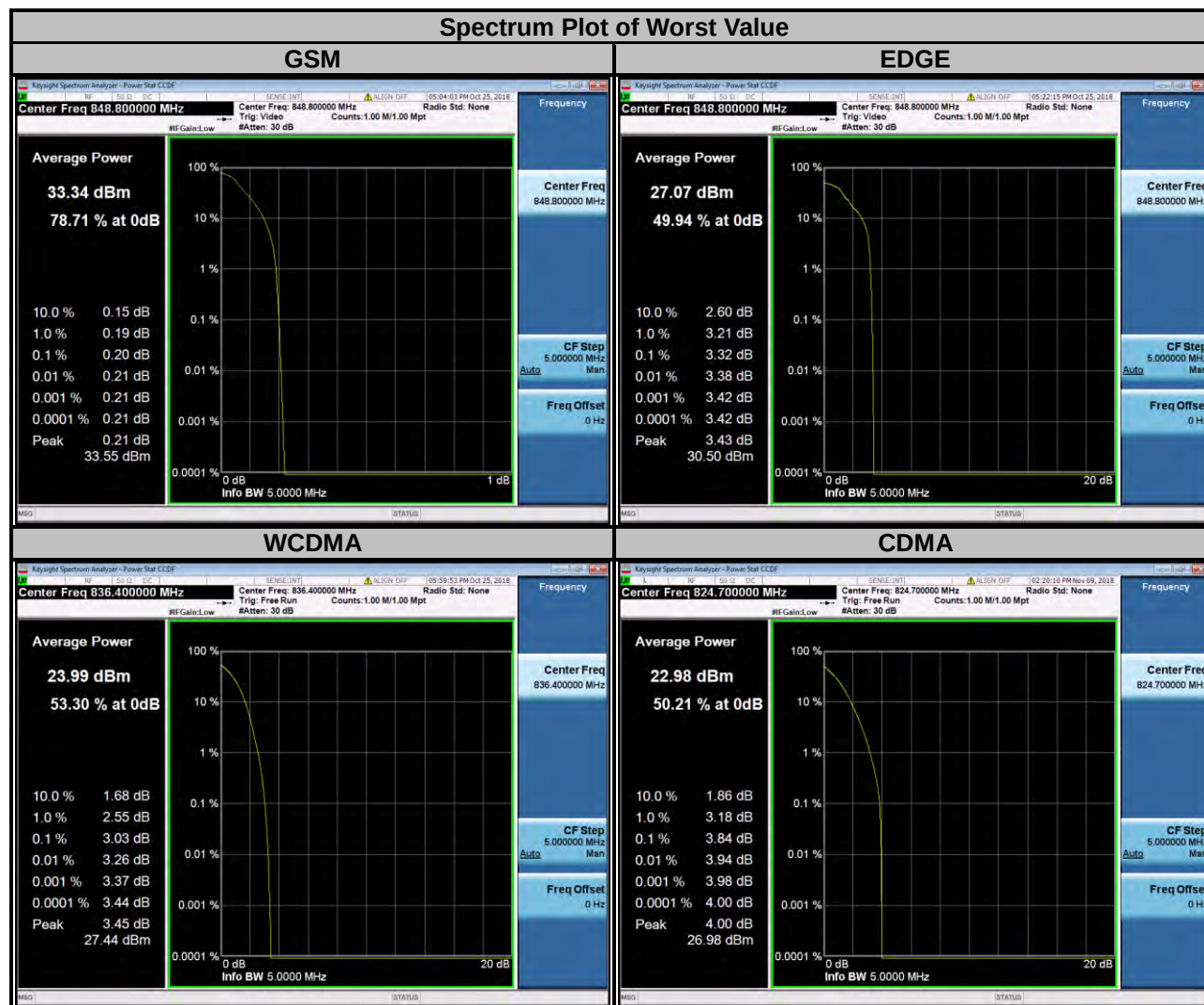


4.6.3 Test Procedures

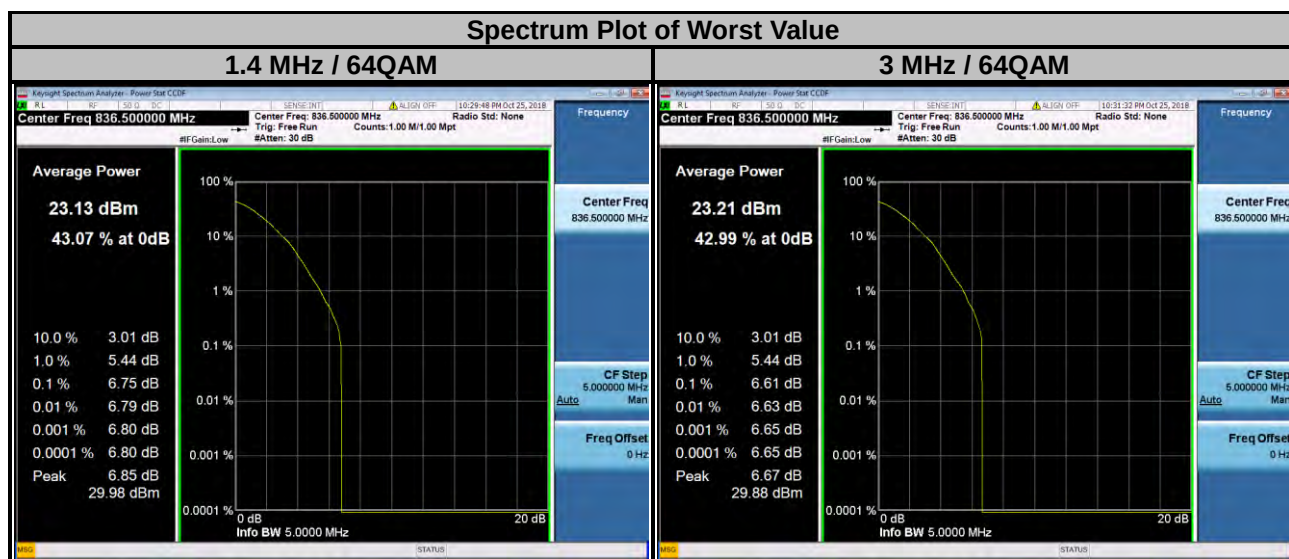
1. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.6.4 Test Results

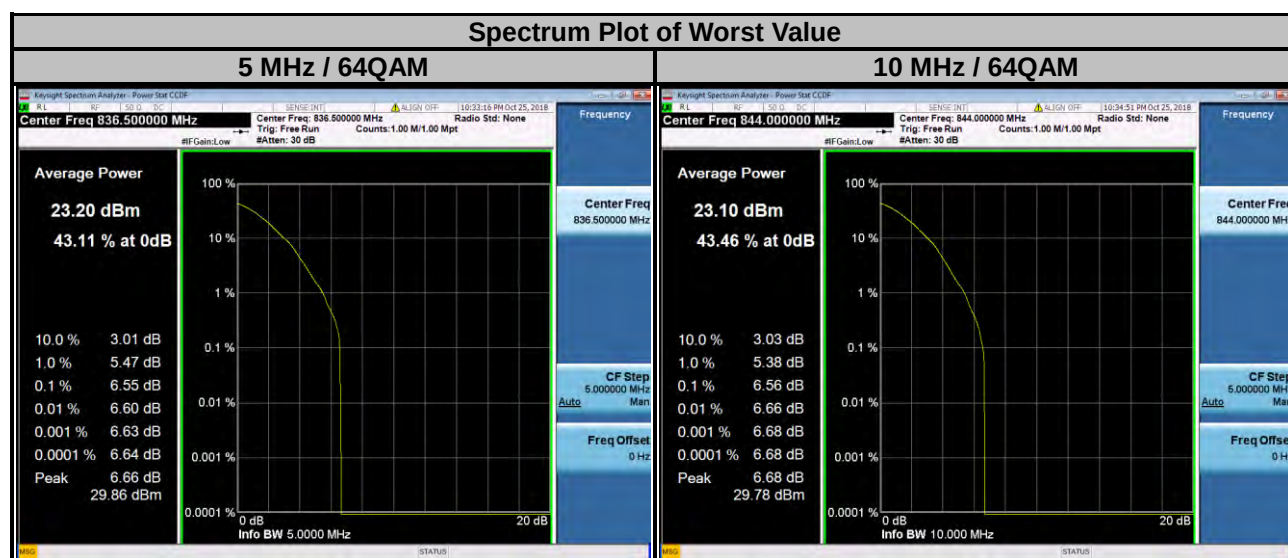
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)
		GSM	EDGE			
128	824.2	0.17	3.26	4132	826.4	2.97
189	836.4	0.18	3.26	4182	836.4	3.03
251	848.8	0.20	3.32	4233	846.6	3.02
Channel	Frequency (MHz)	Peak to Average Ratio (dB)				
		CDMA				
1013	824.70	3.84				
384	836.52	3.61				
777	848.31	3.79				



LTE Band 5									
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	64QAM			QPSK	16QAM	64QAM
20407	824.7	3.83	5.15	6.33	20415	825.5	3.58	5.13	6.23
20525	836.5	3.82	5.53	6.75	20525	836.5	3.61	5.32	6.61
20643	848.3	3.77	5.02	6.16	20635	847.5	3.55	5.23	6.29



LTE Band 5									
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	64QAM			QPSK	16QAM	64QAM
20425	826.5	3.59	5.12	6.31	20450	829.0	3.50	5.00	6.14
20525	836.5	3.62	5.33	6.55	20525	836.5	3.53	5.08	6.12
20625	846.5	3.59	5.25	6.35	20600	844.0	3.49	5.20	6.56



LTE Band 26

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 3 MHz

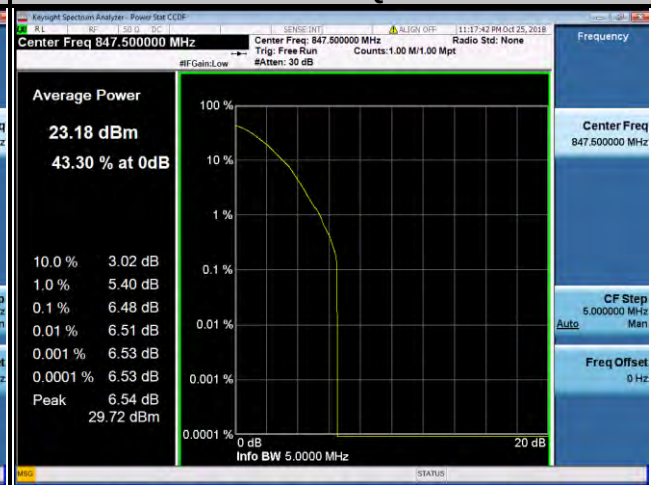
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26797	824.7	3.76	5.27	5.38	26805	825.5	3.52	5.18	5.02
26915	836.5	3.65	4.47	5.57	26915	836.5	3.50	4.34	5.36
27033	848.3	3.76	5.08	6.36	27025	847.5	3.55	5.24	6.48

Spectrum Plot of Worst Value

1.4 MHz / 64QAM



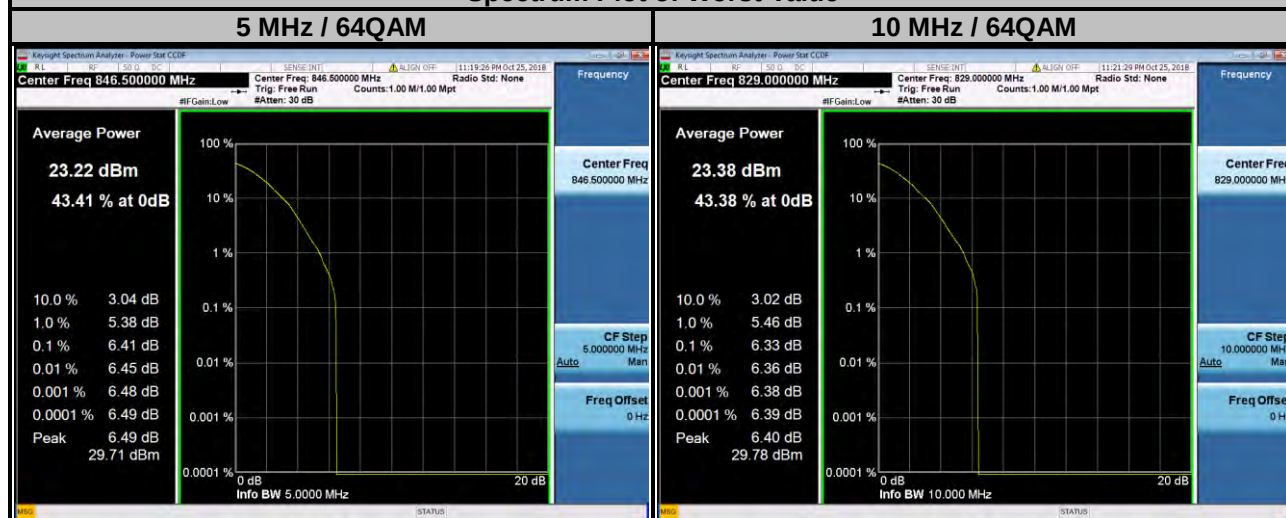
3 MHz / 64QAM



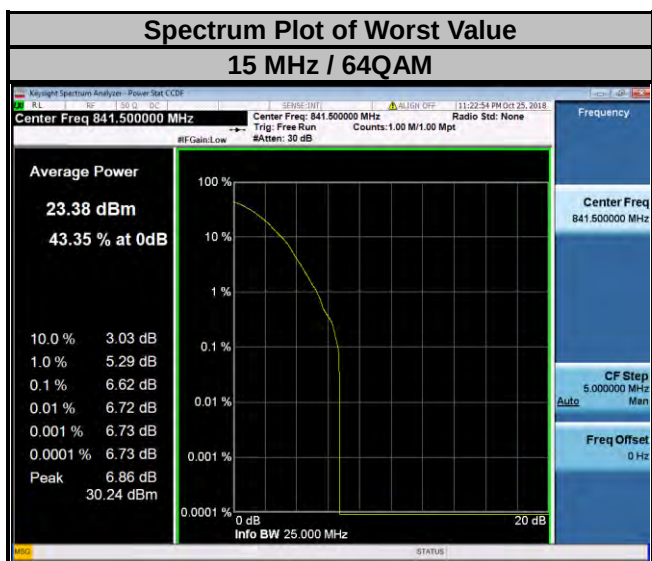
LTE Band 26

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	64QAM			QPSK	16QAM	64QAM
26815	826.5	3.53	5.18	5.05	26840	829.0	3.46	5.10	6.33
26915	836.5	3.42	4.15	5.24	26915	836.5	3.53	5.14	6.21
27015	846.5	3.54	5.21	6.41	26990	844.0	3.37	4.27	5.44

Spectrum Plot of Worst Value



LTE Band 26				
Channel Bandwidth: 15 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM
26865	831.5	3.40	5.10	6.30
26915	836.5	3.45	5.00	5.87
26965	841.5	3.44	5.18	6.62

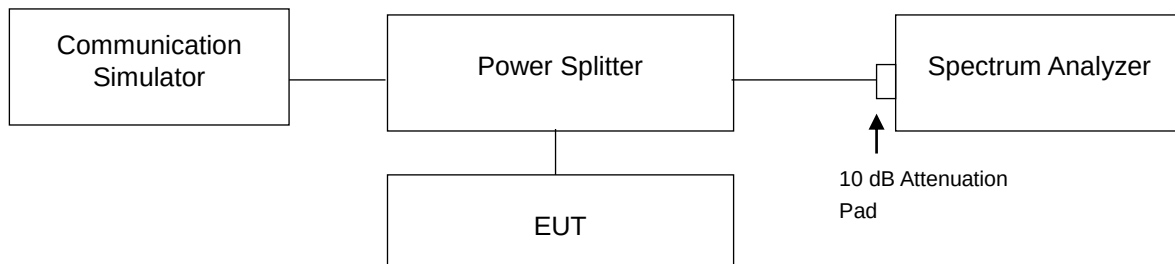


4.7 Conducted Spurious Emissions

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 = 100 kHz and VBW = 300 kHz is used for conducted emission measurement.
- Measuring frequency range is from 1 GHz to 10 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

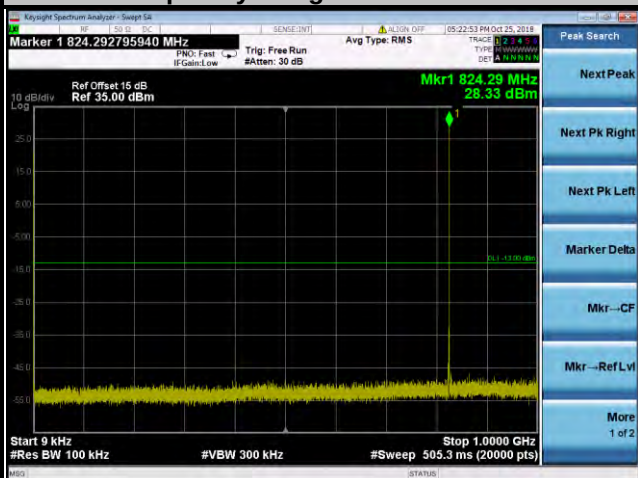


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

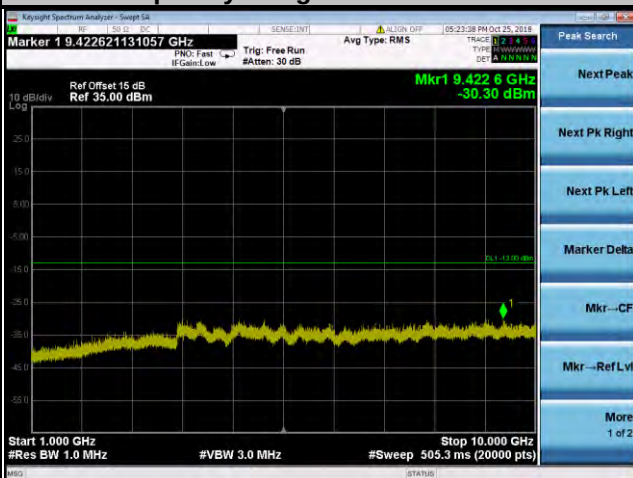
EDGE

Channel 128

Frequency Range: 9 kHz ~ 1 GHz

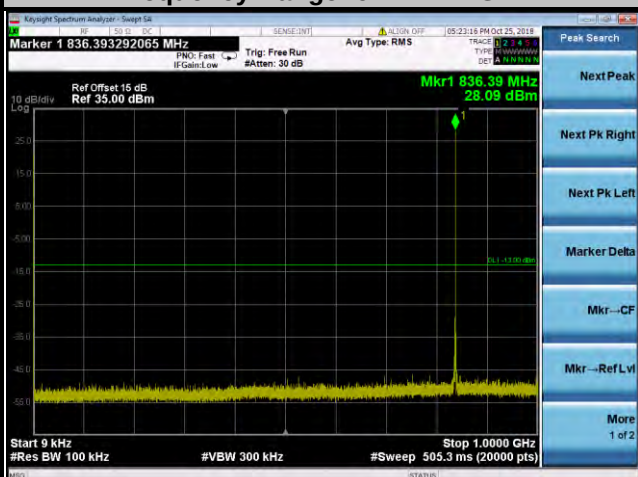


Frequency Range: 1 GHz ~ 10 GHz

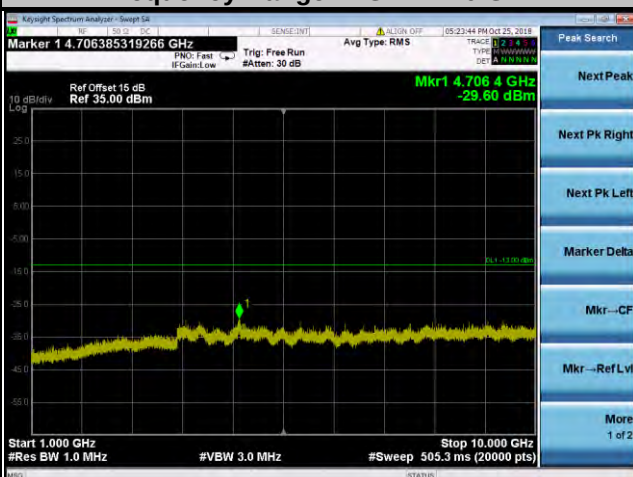


Channel 189

Frequency Range: 9 kHz ~ 1 GHz

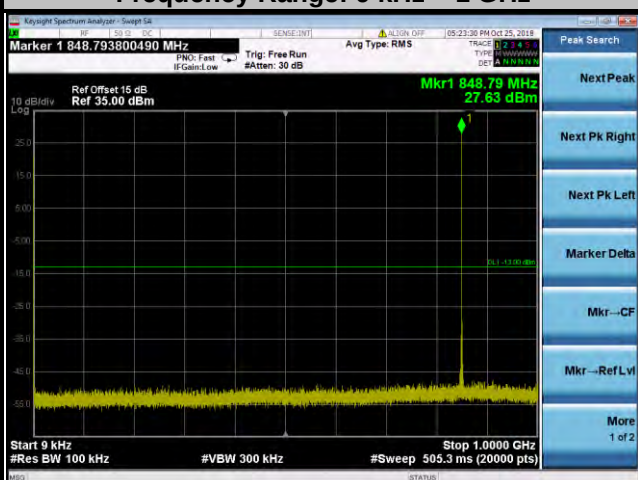


Frequency Range: 1 GHz ~ 10 GHz

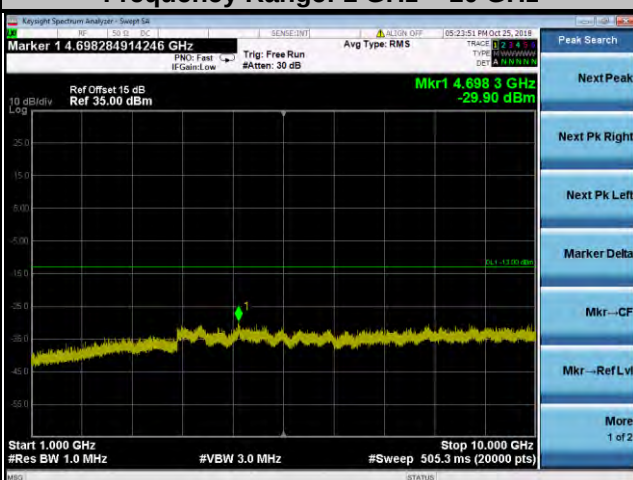


Channel 251

Frequency Range: 9 kHz ~ 1 GHz



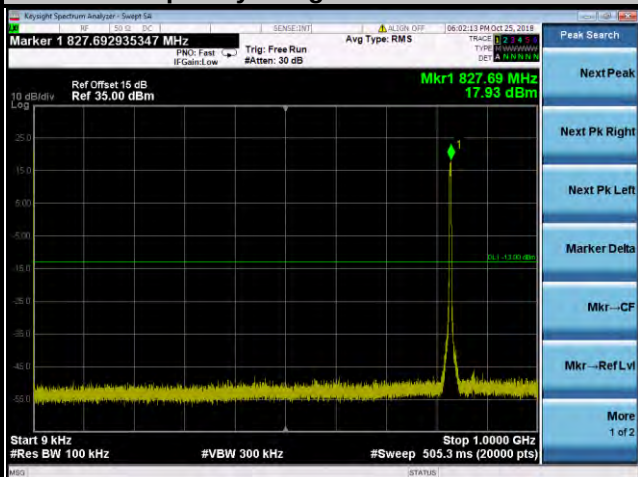
Frequency Range: 1 GHz ~ 10 GHz



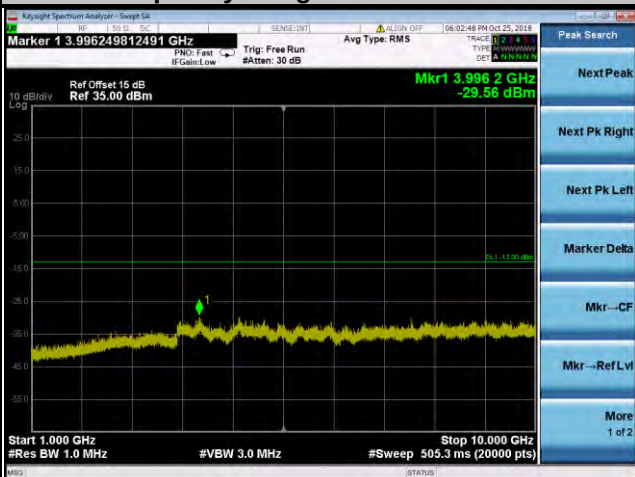
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

WCDMA Channel 4132

Frequency Range: 9 kHz ~ 1 GHz

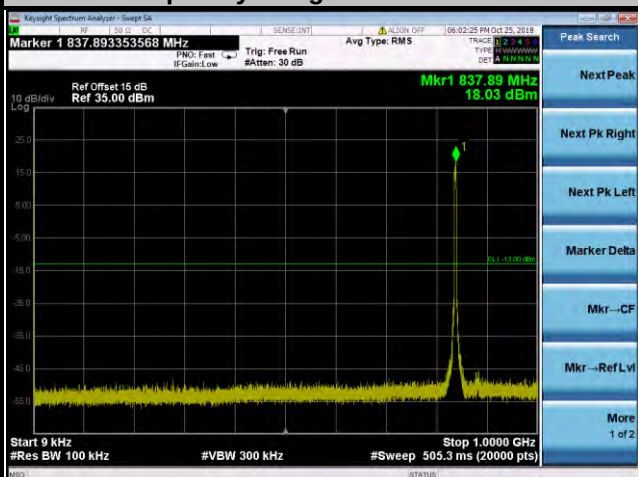


Frequency Range: 1 GHz ~ 10 GHz

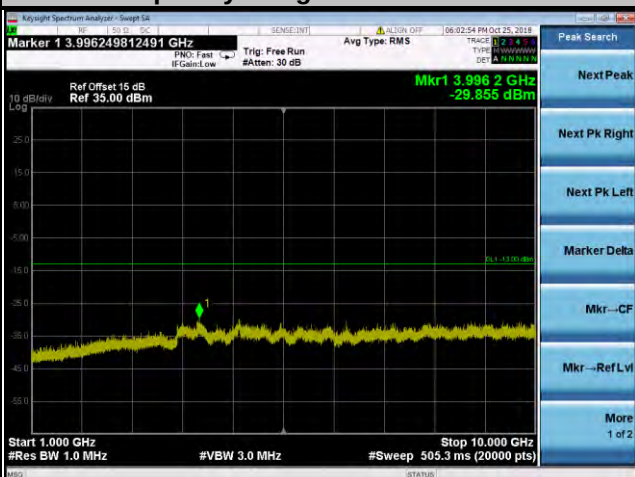


Channel 4182

Frequency Range: 9 kHz ~ 1 GHz

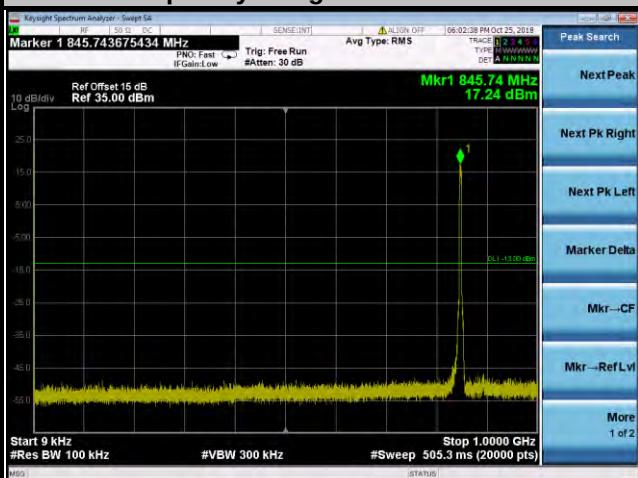


Frequency Range: 1 GHz ~ 10 GHz

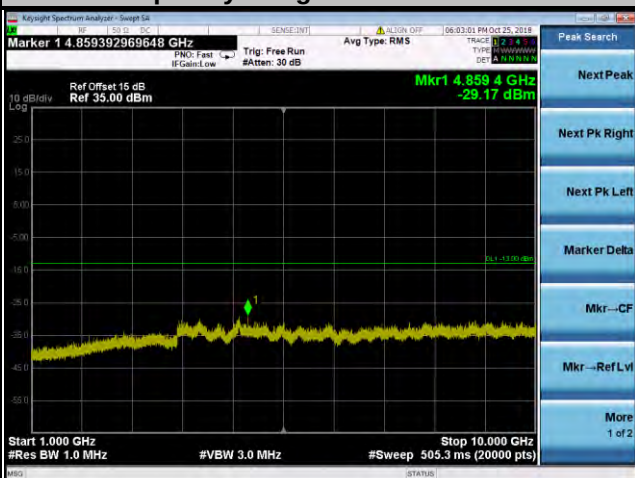


Channel 4233

Frequency Range: 9 kHz ~ 1 GHz



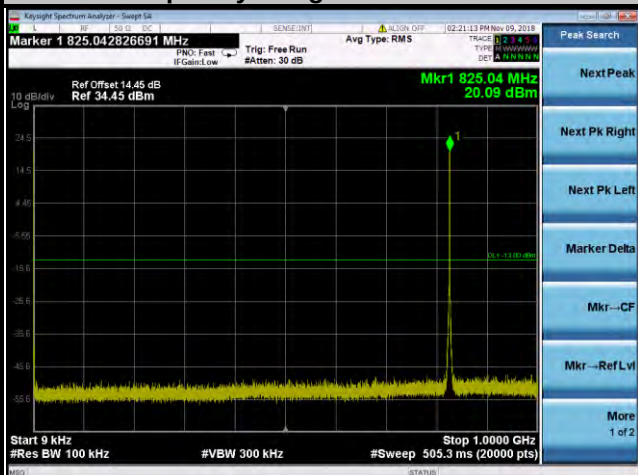
Frequency Range: 1 GHz ~ 10 GHz



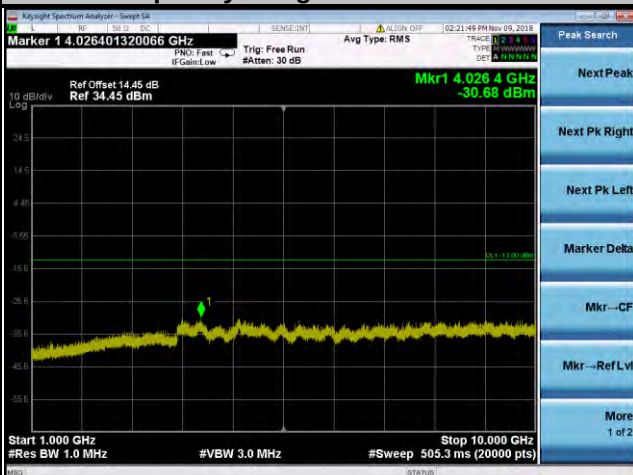
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

CDMA Channel 1013

Frequency Range: 9 kHz ~ 1 GHz

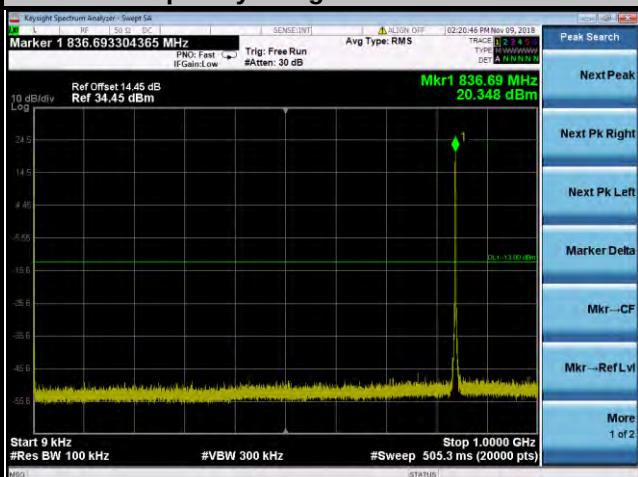


Frequency Range: 1 GHz ~ 10 GHz

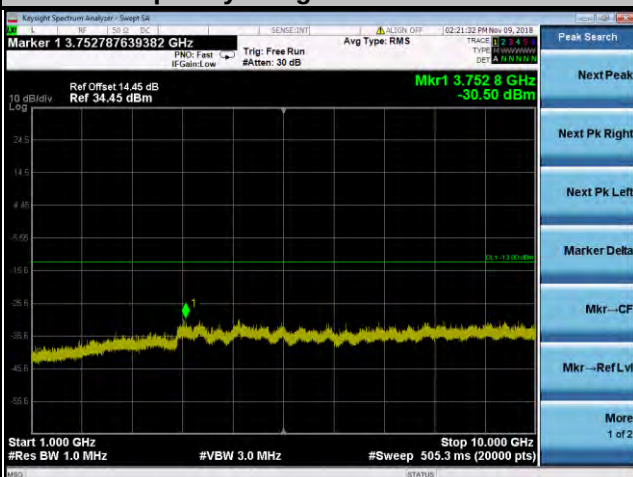


Channel 384

Frequency Range: 9 kHz ~ 1 GHz

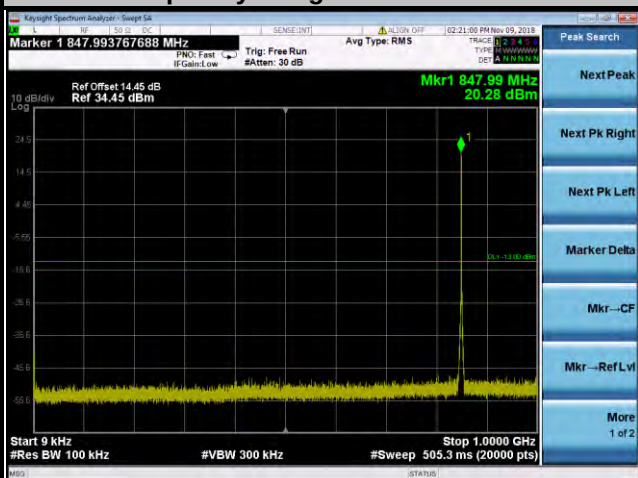


Frequency Range: 1 GHz ~ 10 GHz

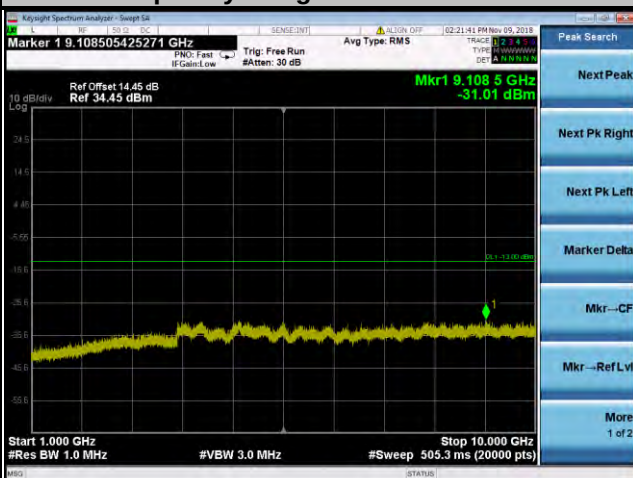


Channel 777

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



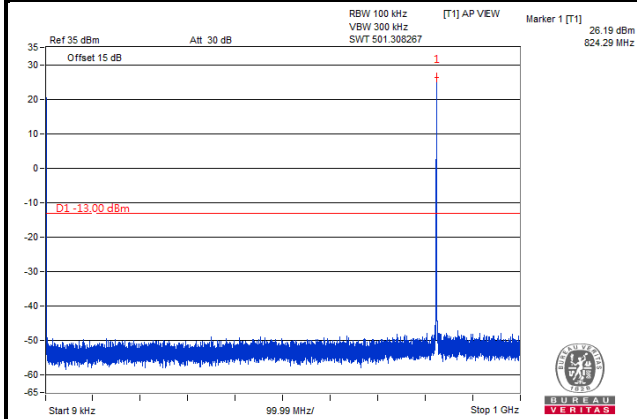
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 5

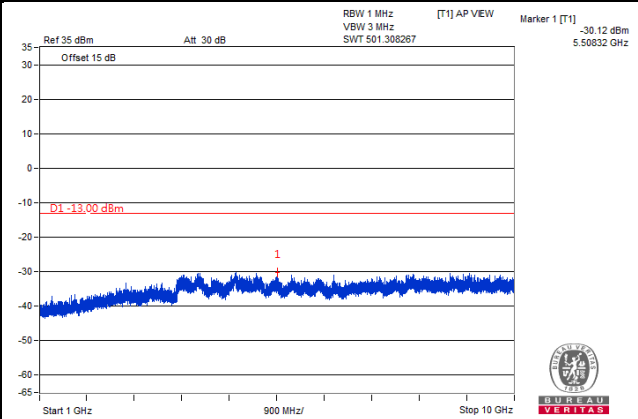
Channel Bandwidth: 1.4 MHz

Channel 20407

Frequency Range: 9 kHz ~ 1 GHz

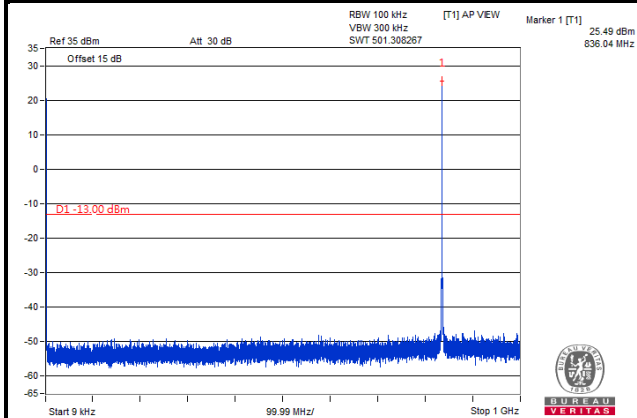


Frequency Range: 1 GHz ~ 10 GHz

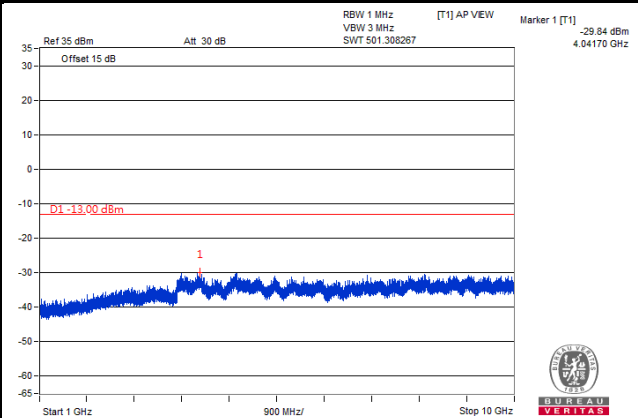


Channel 20525

Frequency Range: 9 kHz ~ 1 GHz

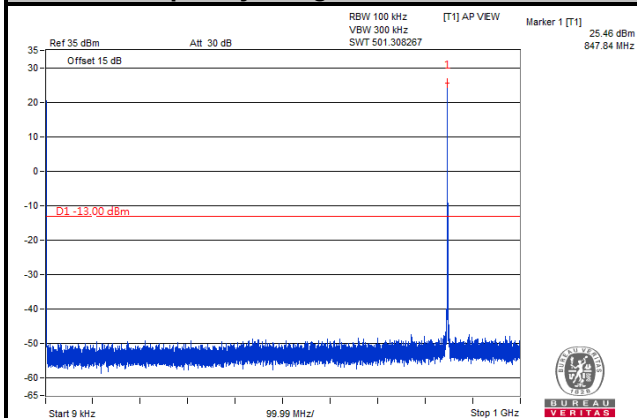


Frequency Range: 1 GHz ~ 10 GHz

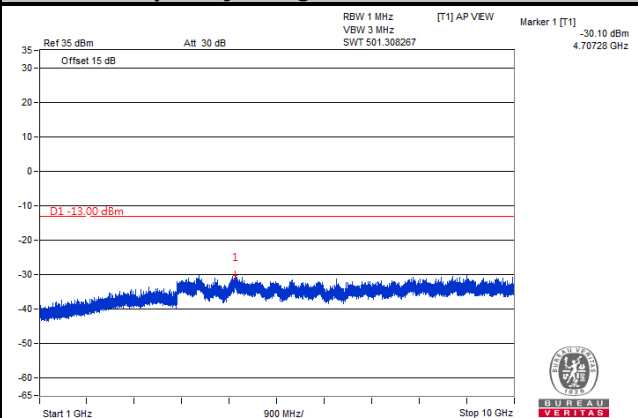


Channel 20643

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



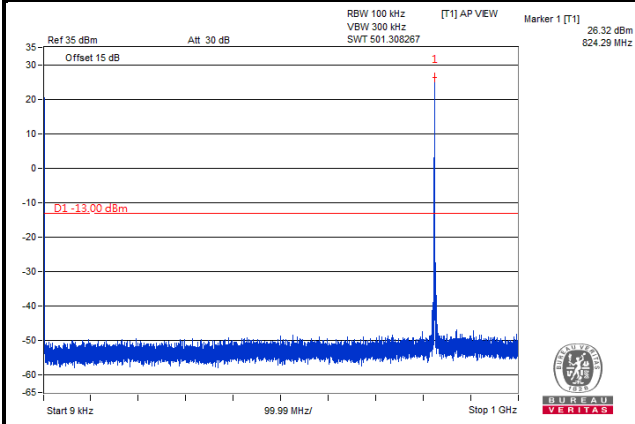
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 5

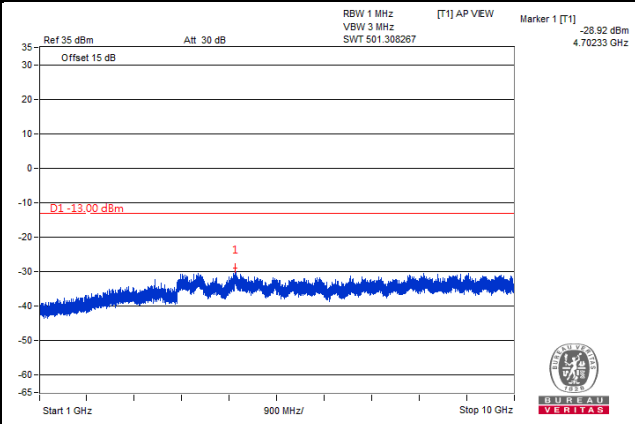
Channel Bandwidth: 3 MHz

Channel 20415

Frequency Range: 9 kHz ~ 1 GHz

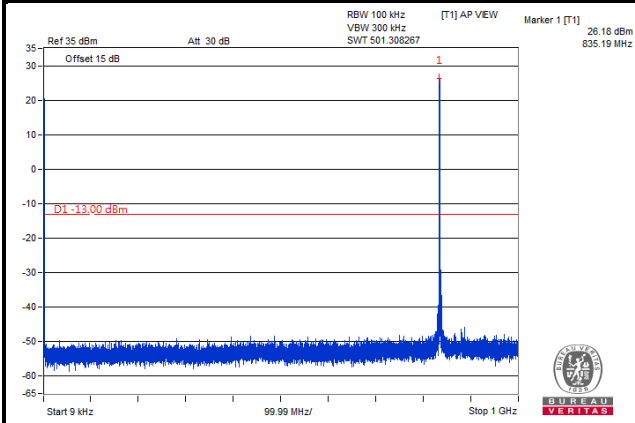


Frequency Range: 1 GHz ~ 10 GHz

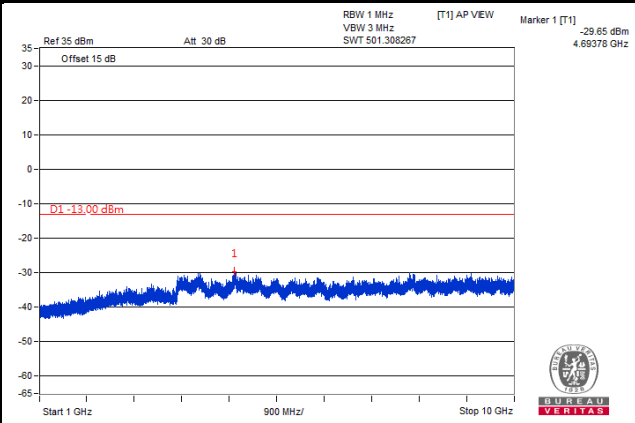


Channel 20525

Frequency Range: 9 kHz ~ 1 GHz

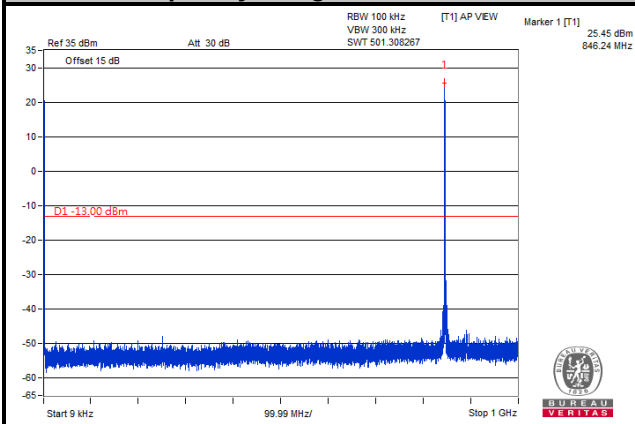


Frequency Range: 1 GHz ~ 10 GHz

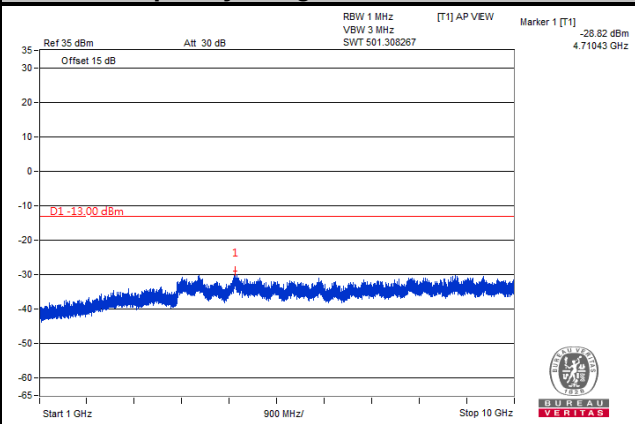


Channel 20635

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



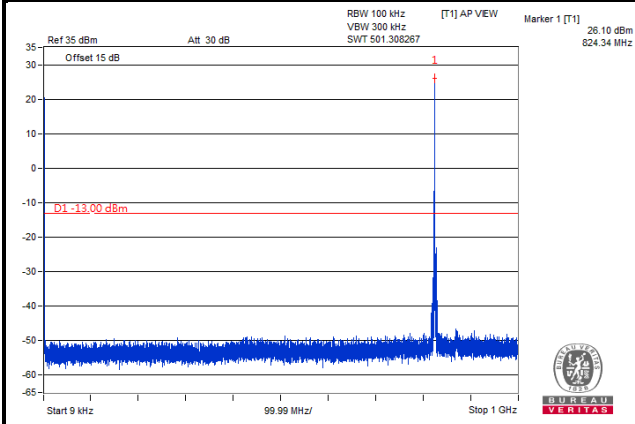
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 5

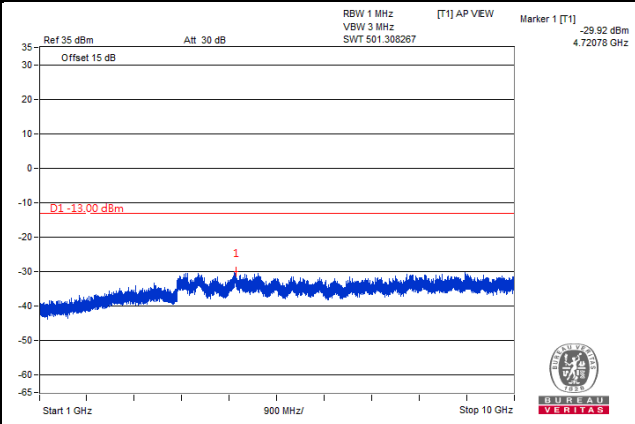
Channel Bandwidth: 5 MHz

Channel 20425

Frequency Range: 9 kHz ~ 1 GHz

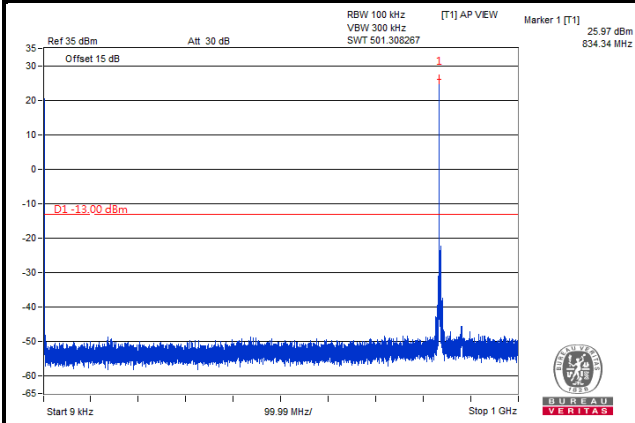


Frequency Range: 1 GHz ~ 10 GHz

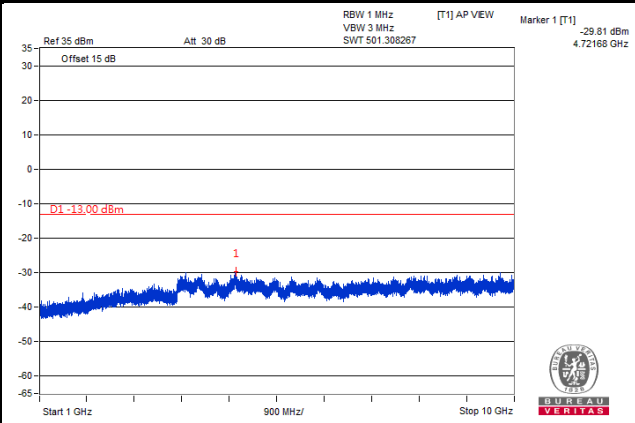


Channel 20525

Frequency Range: 9 kHz ~ 1 GHz

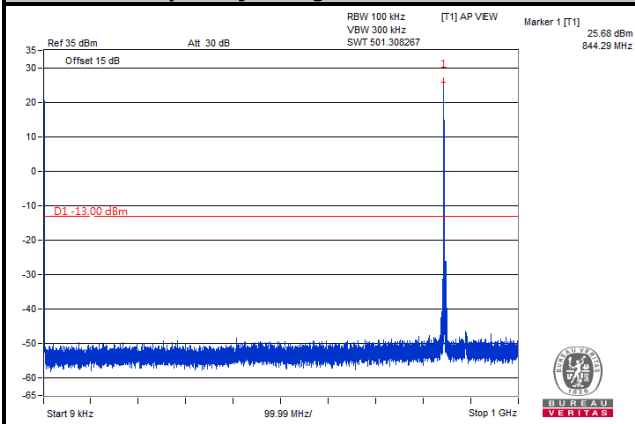


Frequency Range: 1 GHz ~ 10 GHz

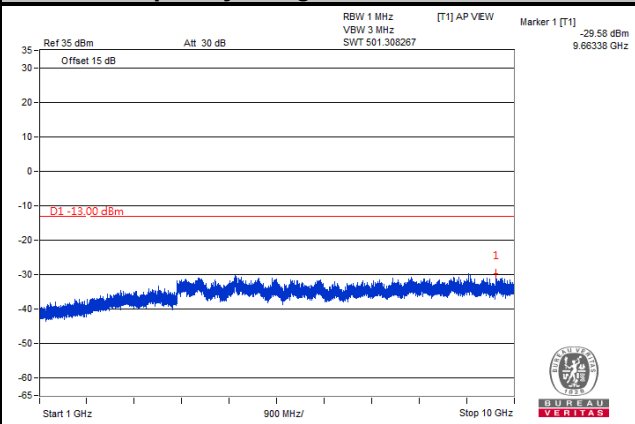


Channel 20625

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



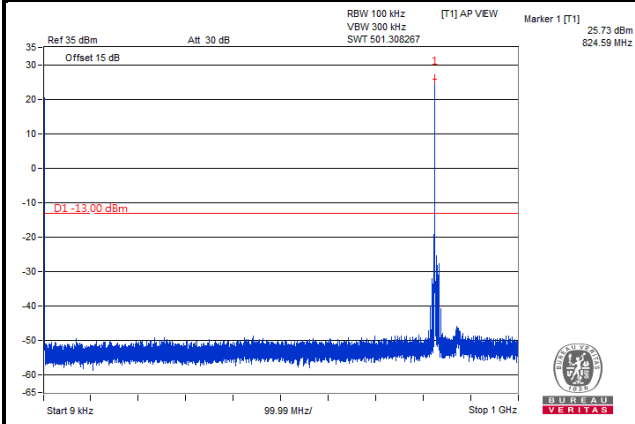
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 5

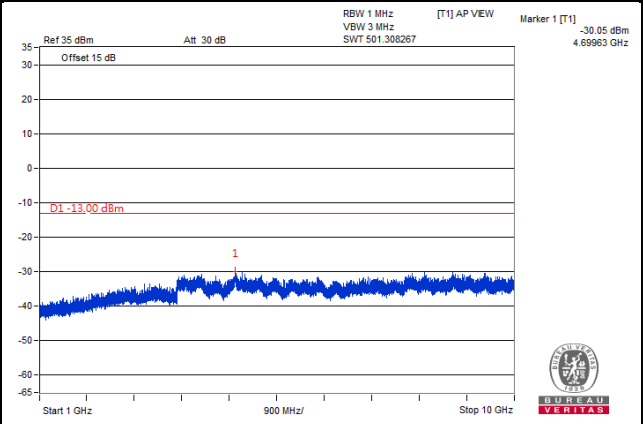
Channel Bandwidth: 10 MHz

Channel 20450

Frequency Range: 9 kHz ~ 1 GHz

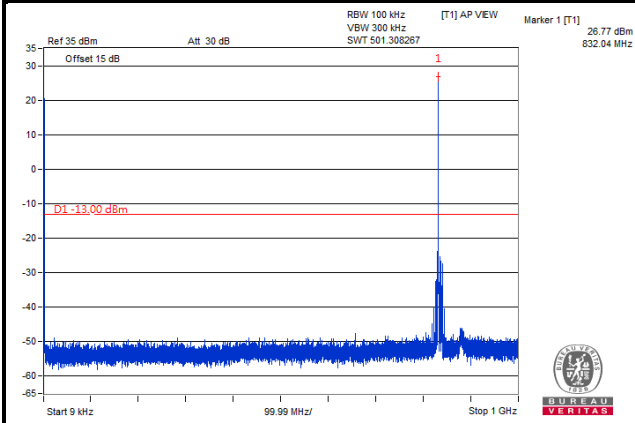


Frequency Range: 1 GHz ~ 10 GHz

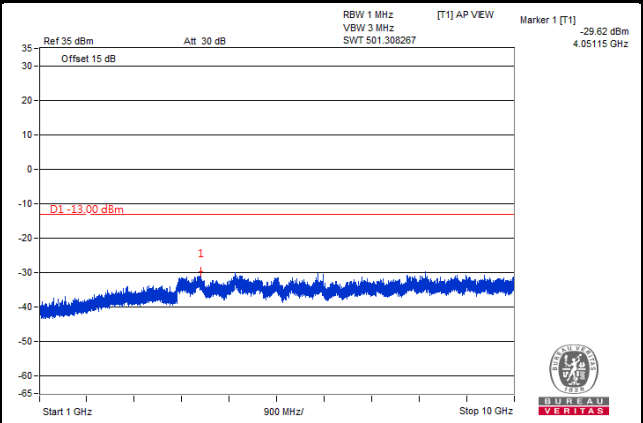


Channel 20525

Frequency Range: 9 kHz ~ 1 GHz

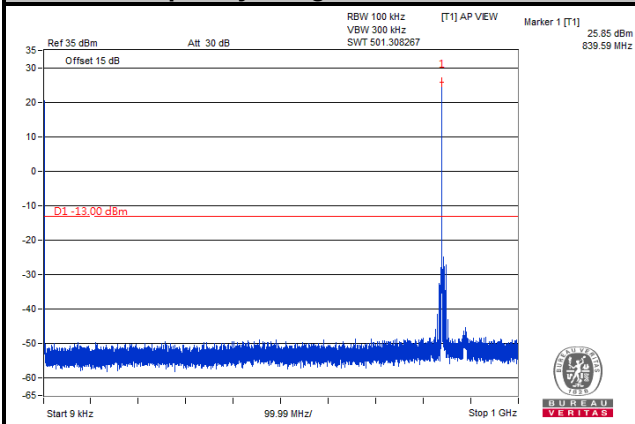


Frequency Range: 1 GHz ~ 10 GHz

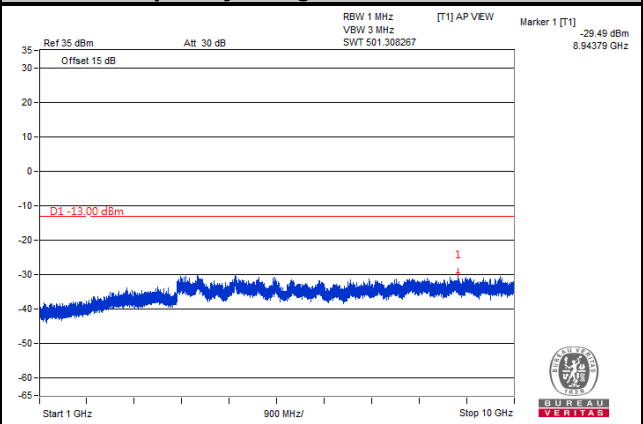


Channel 20600

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



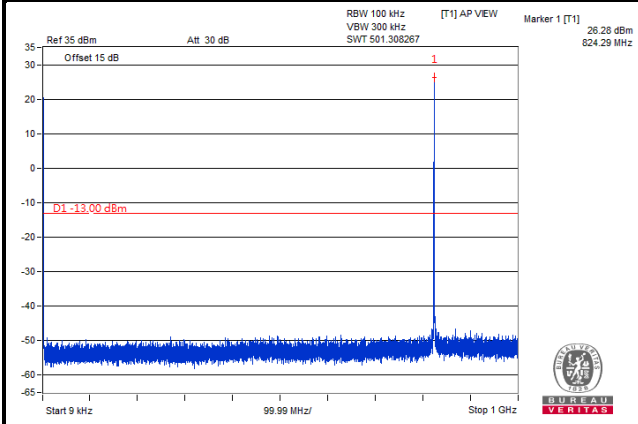
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 26

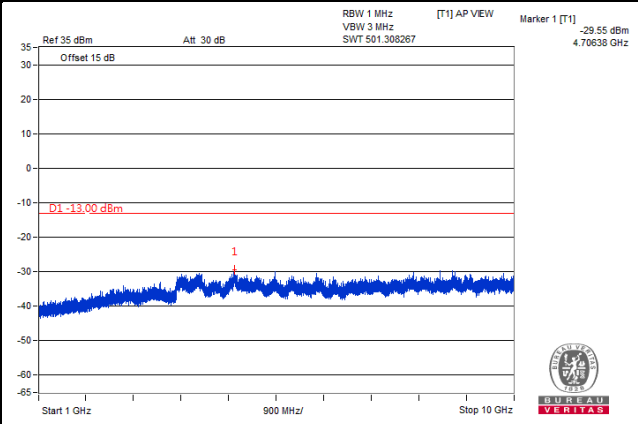
Channel Bandwidth: 1.4 MHz

Channel 26797

Frequency Range: 9 kHz ~ 1 GHz

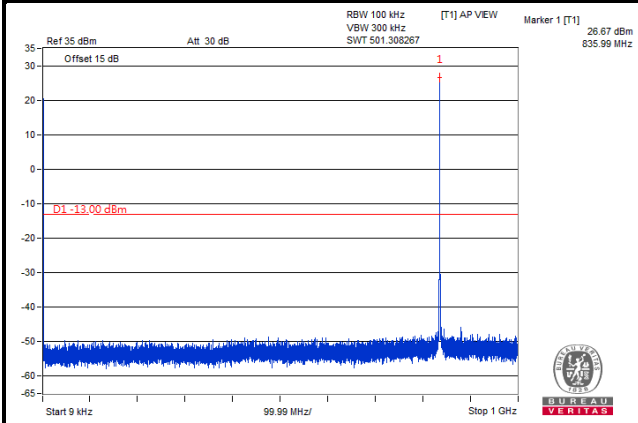


Frequency Range: 1 GHz ~ 10 GHz

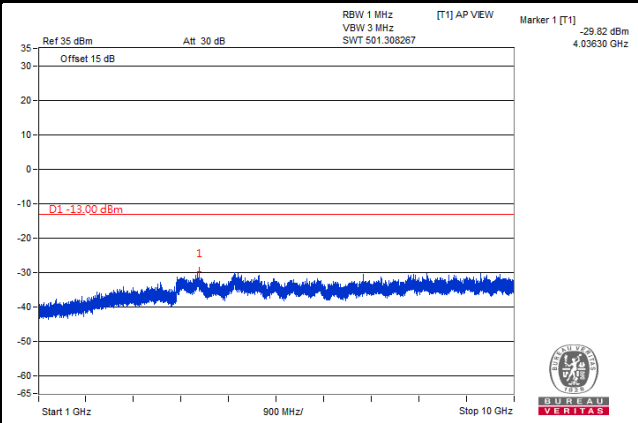


Channel 26915

Frequency Range: 9 kHz ~ 1 GHz

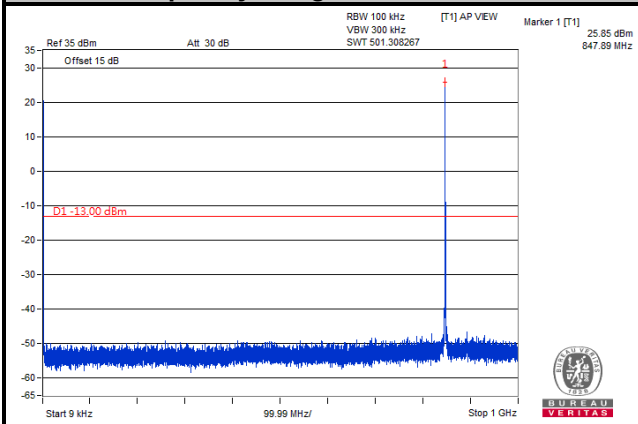


Frequency Range: 1 GHz ~ 10 GHz

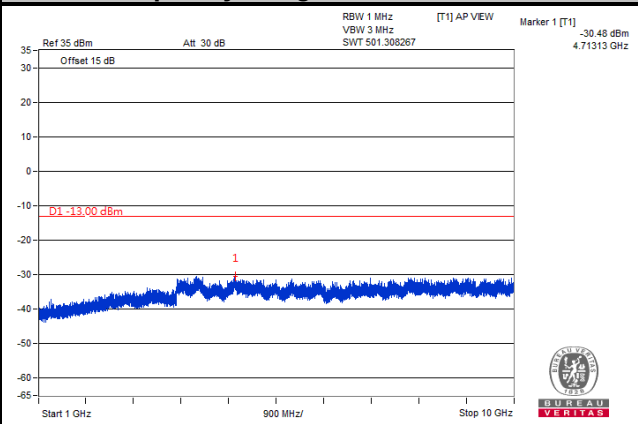


Channel 27033

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



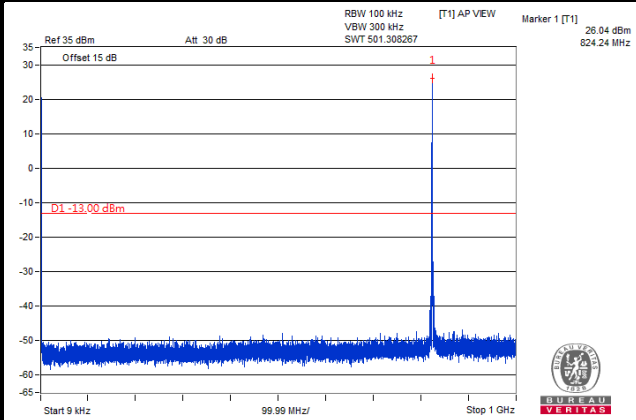
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 26

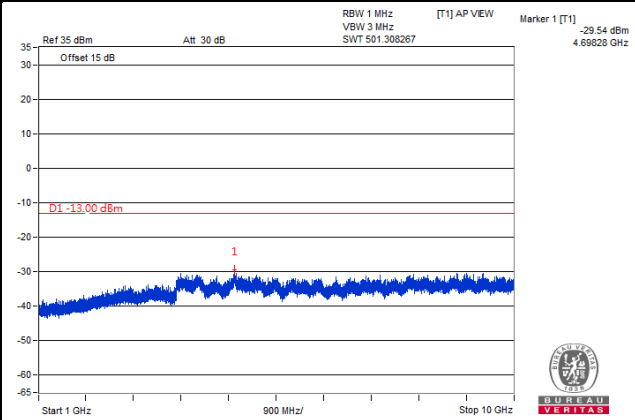
Channel Bandwidth: 3 MHz

Channel 26805

Frequency Range: 9 kHz ~ 1 GHz

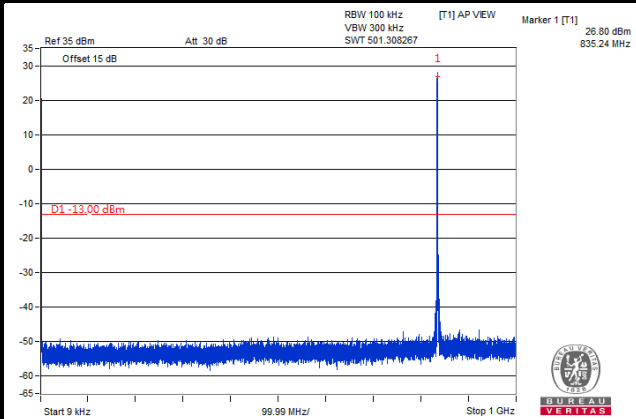


Frequency Range: 1 GHz ~ 10 GHz

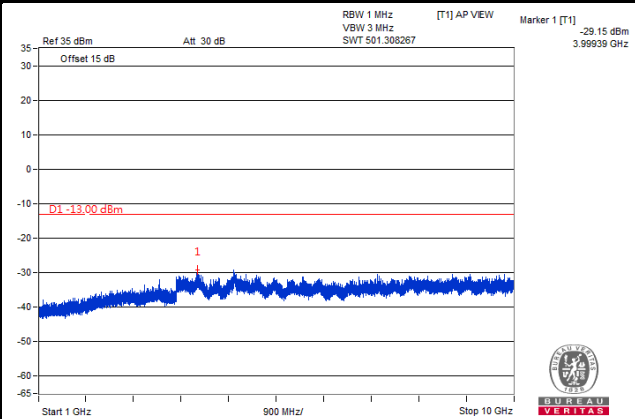


Channel 26915

Frequency Range: 9 kHz ~ 1 GHz

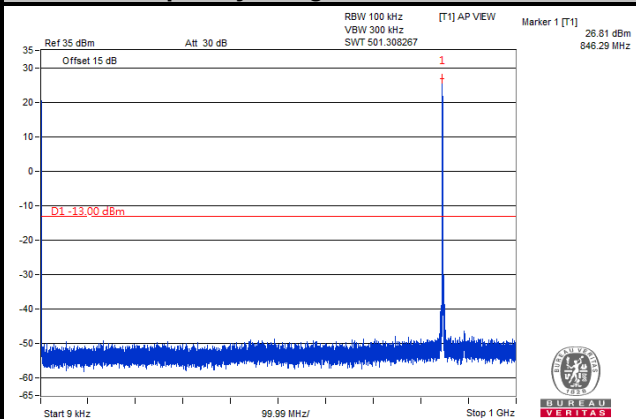


Frequency Range: 1 GHz ~ 10 GHz

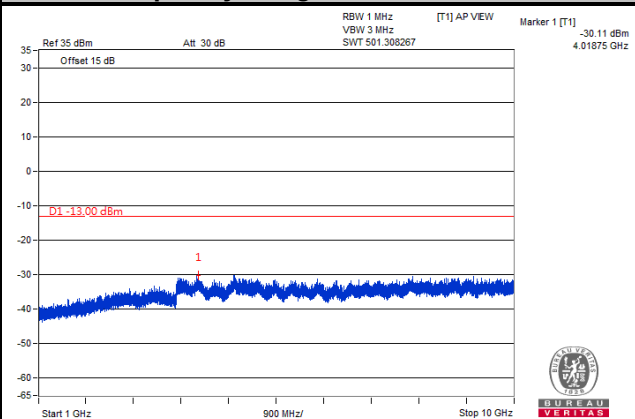


Channel 27025

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



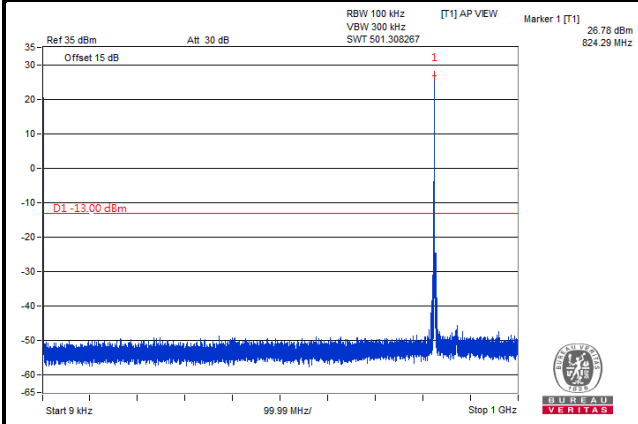
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 26

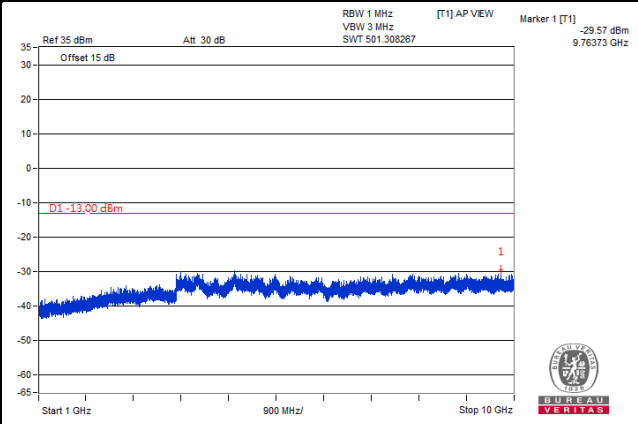
Channel Bandwidth: 5 MHz

Channel 26815

Frequency Range: 9 kHz ~ 1 GHz

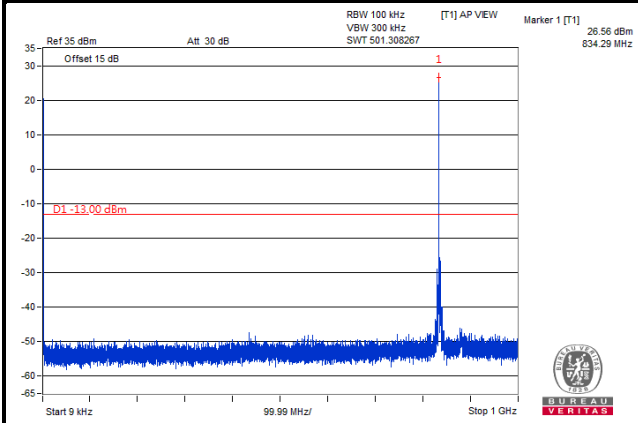


Frequency Range: 1 GHz ~ 10 GHz

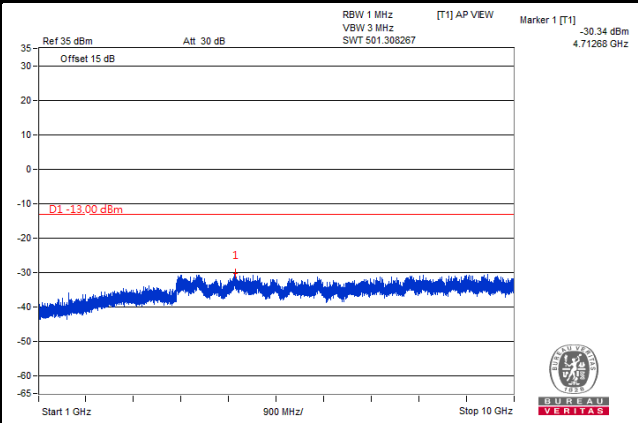


Channel 26915

Frequency Range: 9 kHz ~ 1 GHz

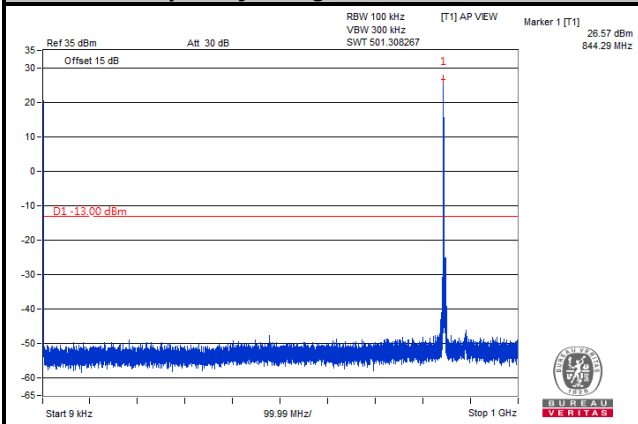


Frequency Range: 1 GHz ~ 10 GHz

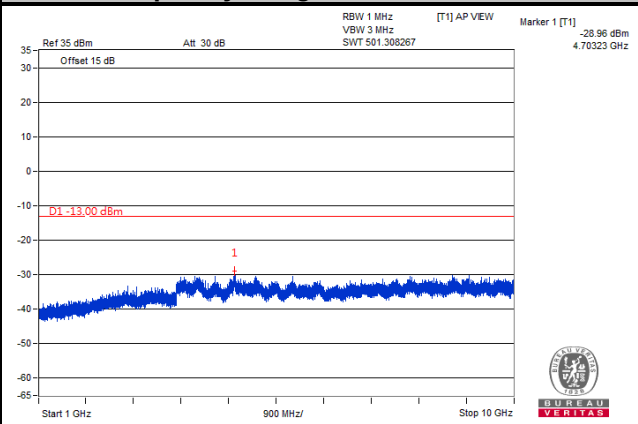


Channel 27015

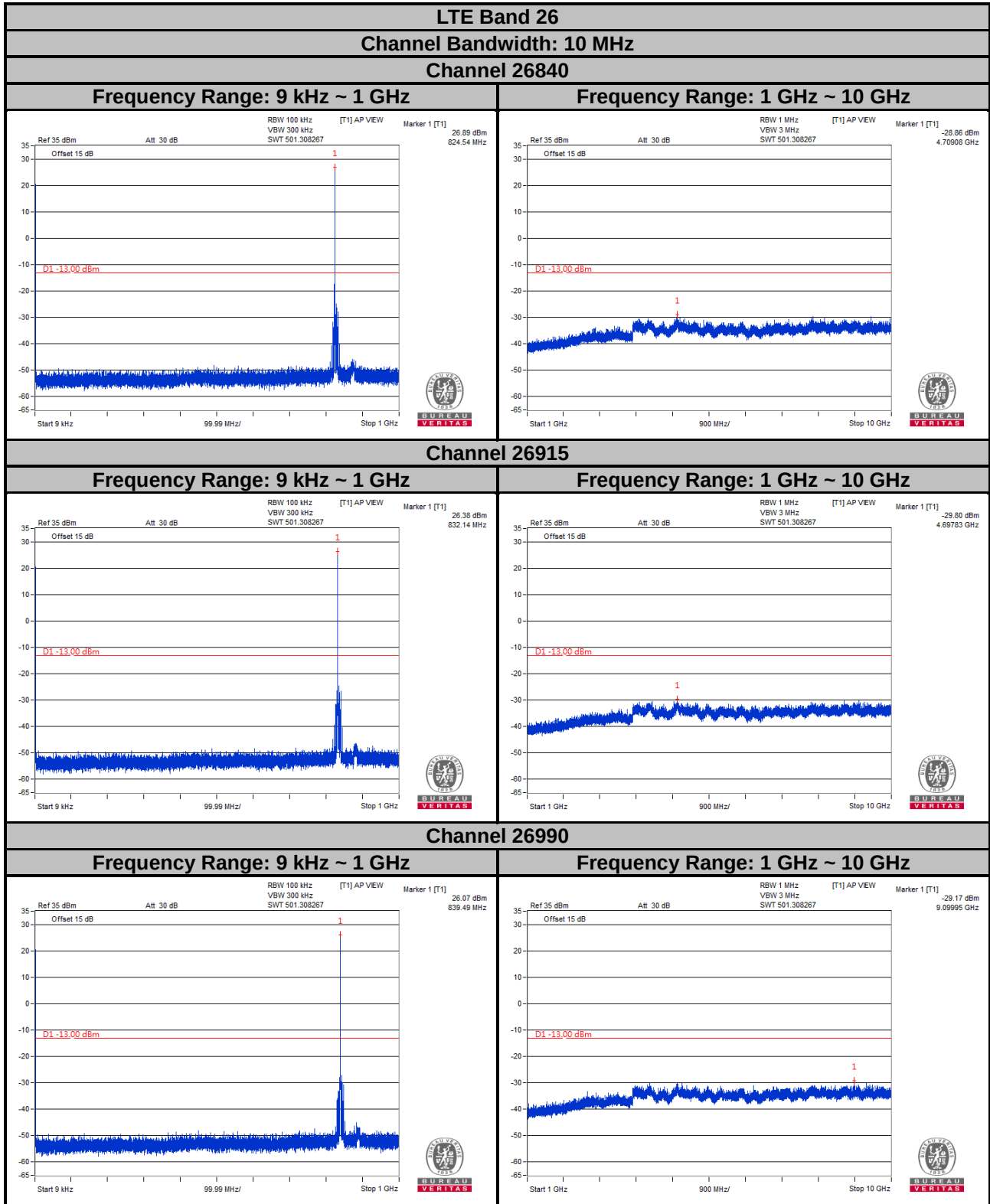
Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



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



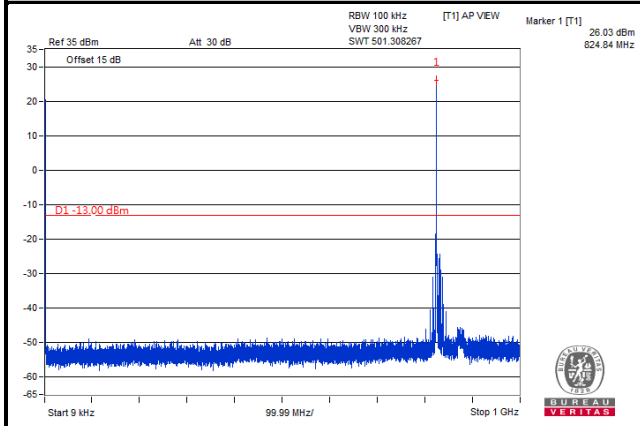
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 26

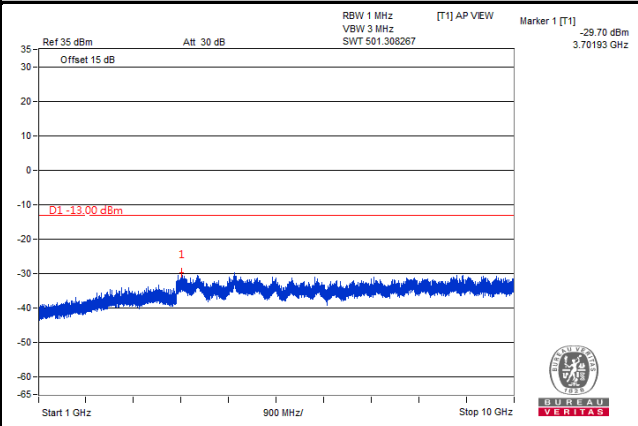
Channel Bandwidth: 15 MHz

Channel 26865

Frequency Range: 9 kHz ~ 1 GHz

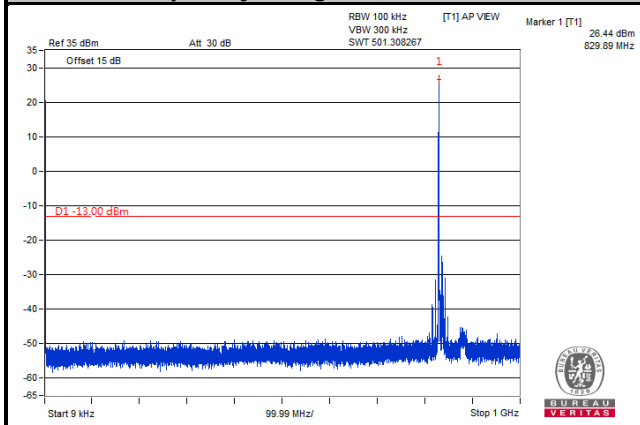


Frequency Range: 1 GHz ~ 10 GHz

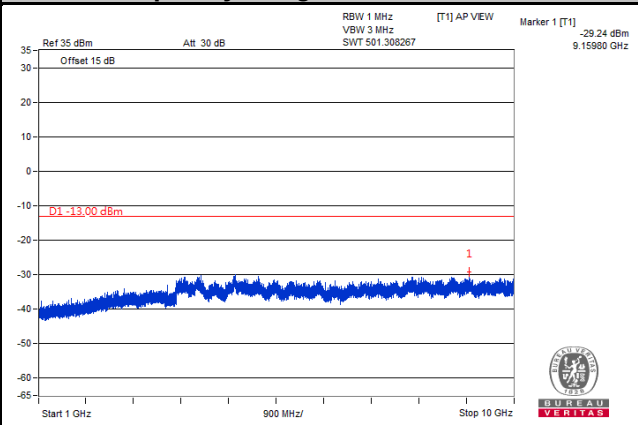


Channel 26915

Frequency Range: 9 kHz ~ 1 GHz

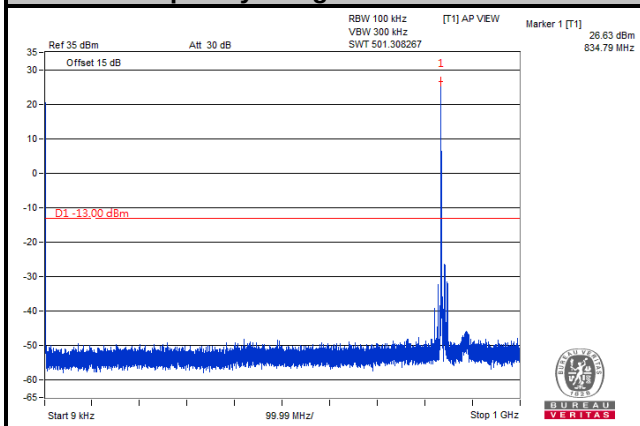


Frequency Range: 1 GHz ~ 10 GHz

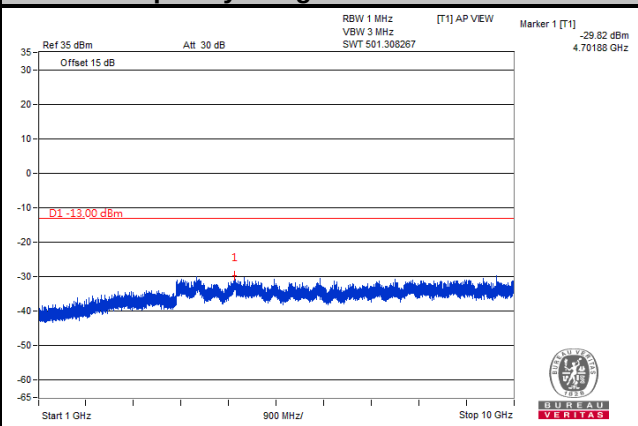


Channel 26965

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



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.

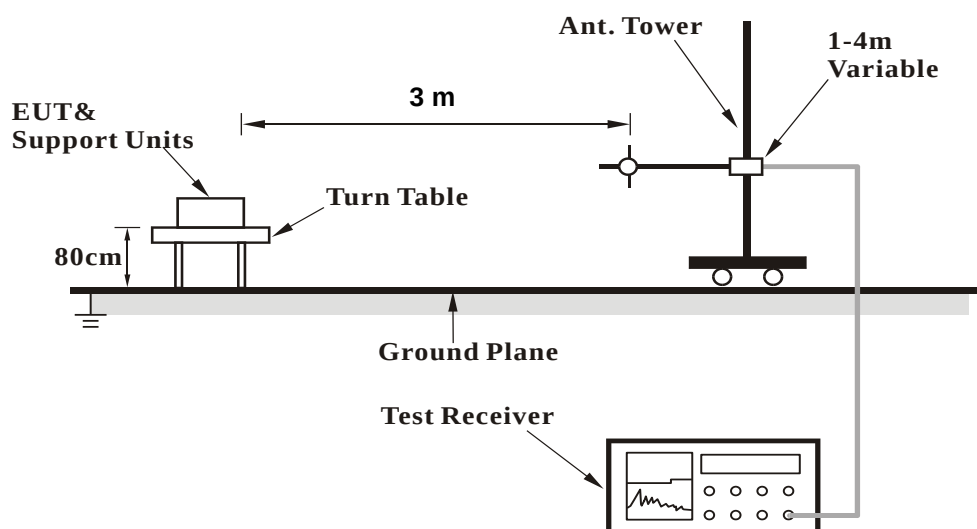
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.8.3 Deviation from Test Standard

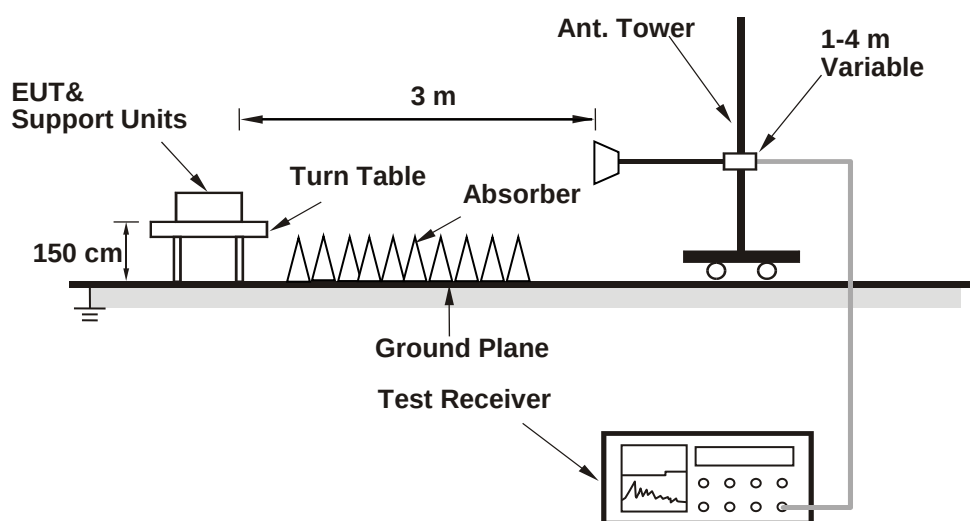
No deviation.

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

GSM:

Low Channel

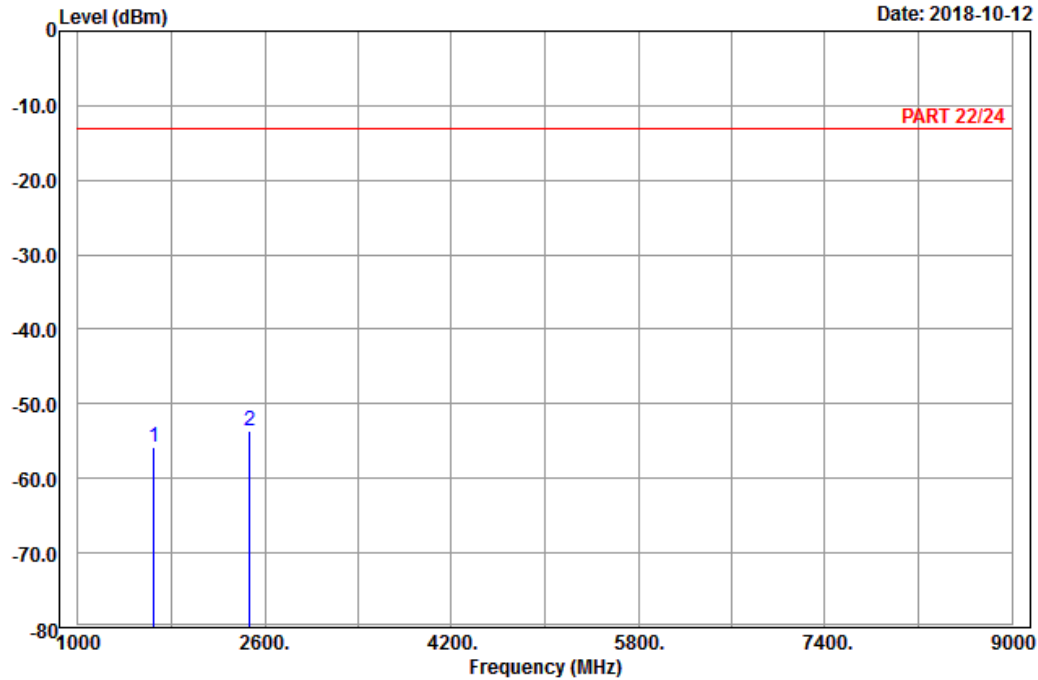


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-12



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : GSM 850_Link_CH128
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1648.40	-55.77	-63.50	-13.00	-42.77	7.73	Peak
2 pp	2472.60	-53.55	-64.58	-13.00	-40.55	11.03	Peak

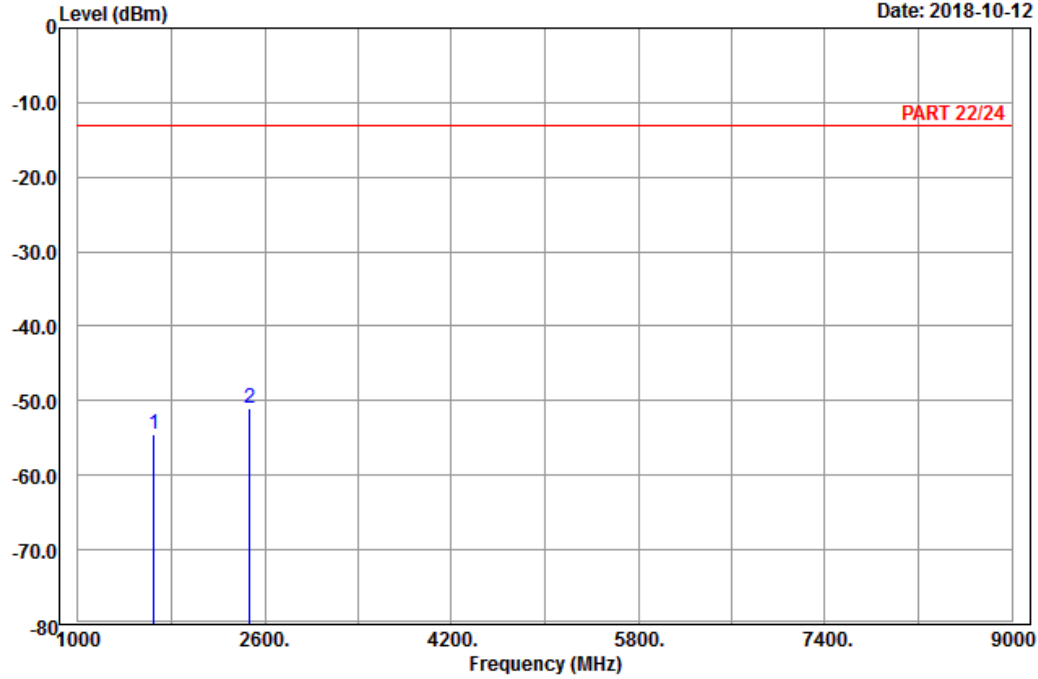


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A D T

Data: 6

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : GSM 850_Link_CH128
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1648.40	-54.49	-62.22	-13.00	-41.49	7.73	Peak
2 pp	2472.60	-51.09	-62.12	-13.00	-38.09	11.03	Peak

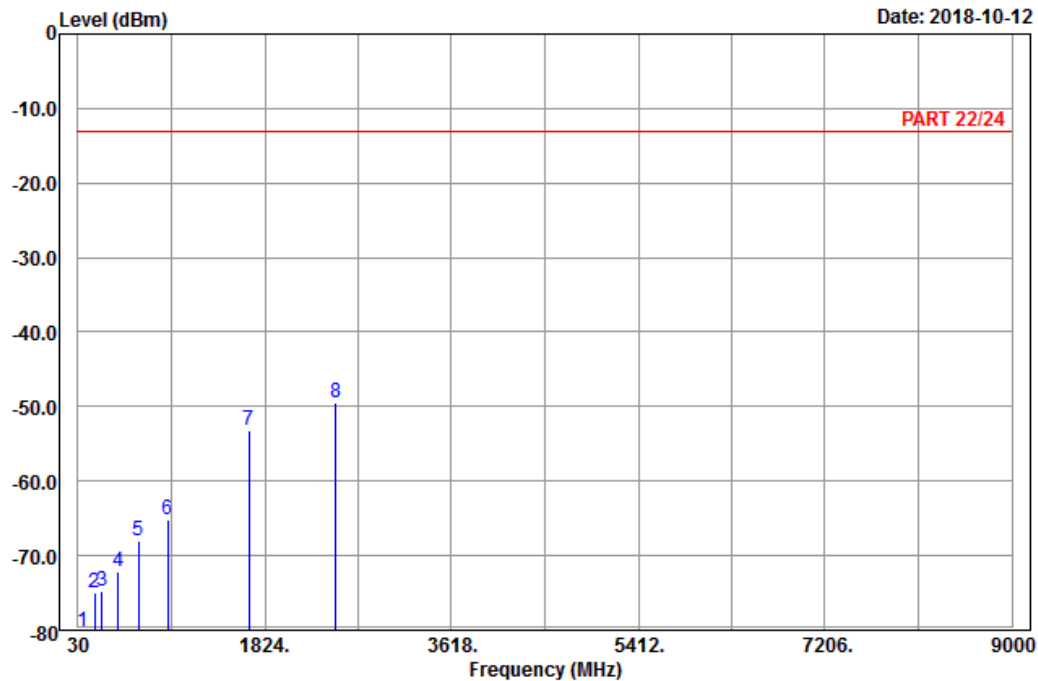
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : GSM 850_Link_CH189
 Tested by: Karl Lee

		Read	Limit	Over			
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	76.98	-80.30	-68.20	-13.00	-67.30	-12.10	Peak
2	187.95	-75.03	-69.33	-13.00	-62.03	-5.70	Peak
3	258.69	-74.84	-69.25	-13.00	-61.84	-5.59	Peak
4	413.40	-72.19	-69.15	-13.00	-59.19	-3.04	Peak
5	613.60	-68.04	-68.31	-13.00	-55.04	0.27	Peak
6	890.10	-65.17	-67.78	-13.00	-52.17	2.61	Peak
7	1672.80	-53.09	-61.00	-13.00	-40.09	7.91	Peak
8 pp	2509.20	-49.59	-60.87	-13.00	-36.59	11.28	Peak

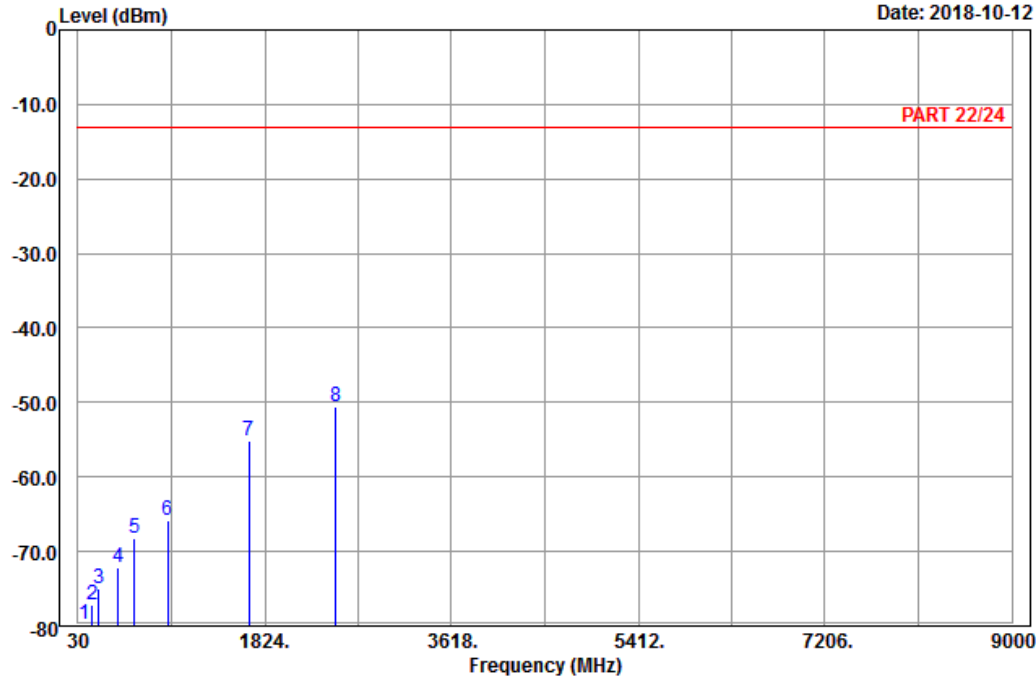


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A D T

Data: 10

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : GSM 850_Link_CH189
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	95.88	-79.86	-69.52	-13.00	-66.86	-10.34	Peak
2	166.89	-77.22	-70.23	-13.00	-64.22	-6.99	Peak
3	232.77	-74.99	-69.25	-13.00	-61.99	-5.74	Peak
4	413.40	-72.06	-69.02	-13.00	-59.06	-3.04	Peak
5	575.80	-68.22	-67.64	-13.00	-55.22	-0.58	Peak
6	890.80	-65.77	-68.38	-13.00	-52.77	2.61	Peak
7	1672.80	-55.16	-63.07	-13.00	-42.16	7.91	Peak
8 pp	2509.20	-50.62	-61.90	-13.00	-37.62	11.28	Peak

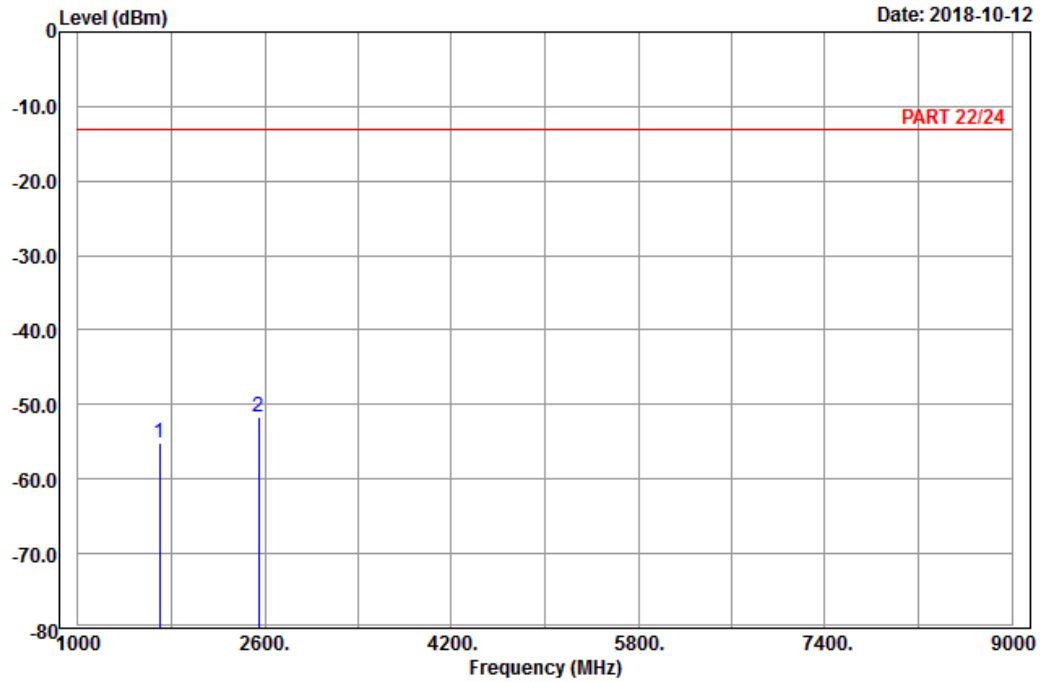
High Channel



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A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : GSM 850_Link_CH251
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1697.60	-55.16	-63.30	-13.00	-42.16	8.14 Peak
2 pp	2546.40	-51.60	-63.07	-13.00	-38.60	11.47 Peak

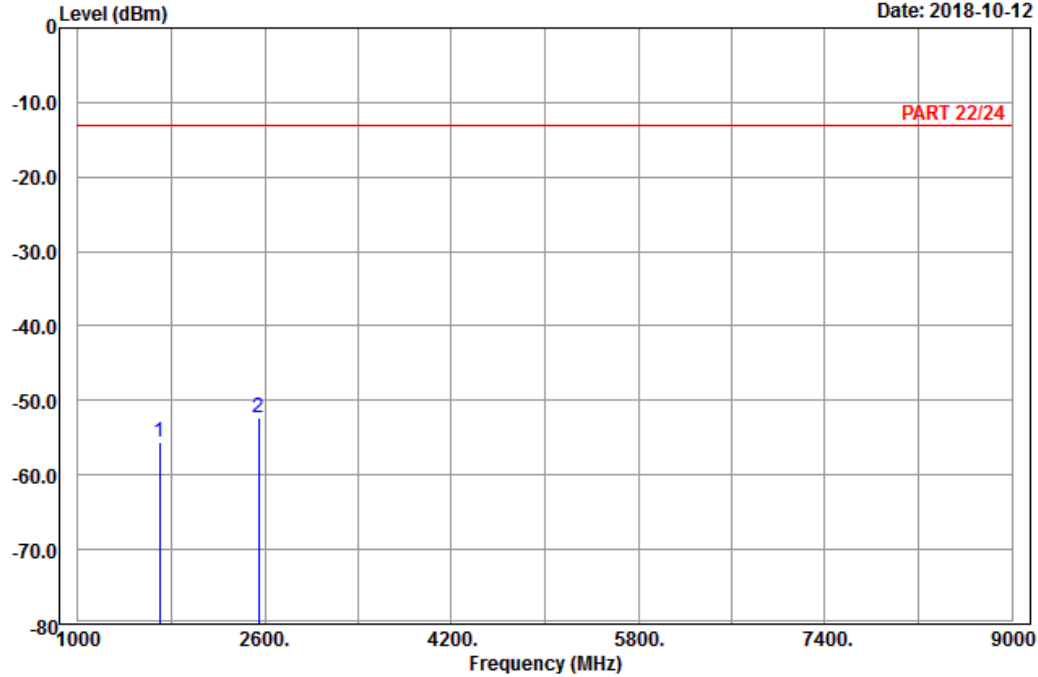


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A D T

Data: 6

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : GSM 850_Link_CH251
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1697.60	-55.61	-63.75	-13.00	-42.61	8.14	Peak
2 pp	2546.40	-52.27	-63.74	-13.00	-39.27	11.47	Peak

EDGE:
Low Channel

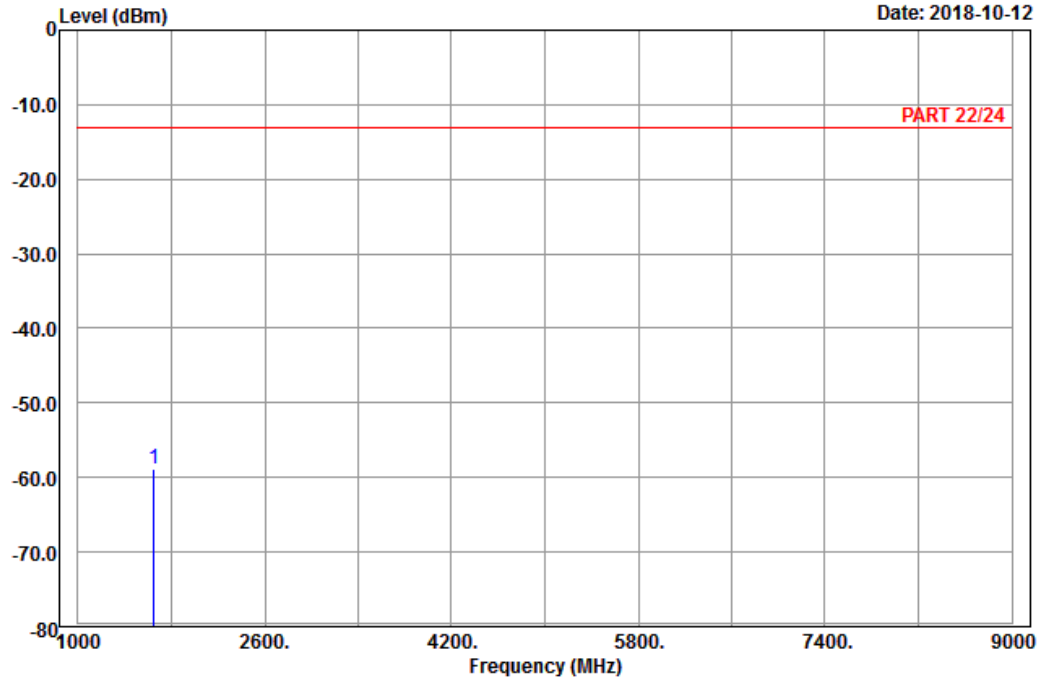


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : EDGE 850_Link_CH128
Tested by: Karl Lee

			Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark	
MHz	dBm	dBm	dBm	dB	dB		
1 pp 1648.40	-58.76	-66.49	-13.00	-45.76	7.73	Peak	

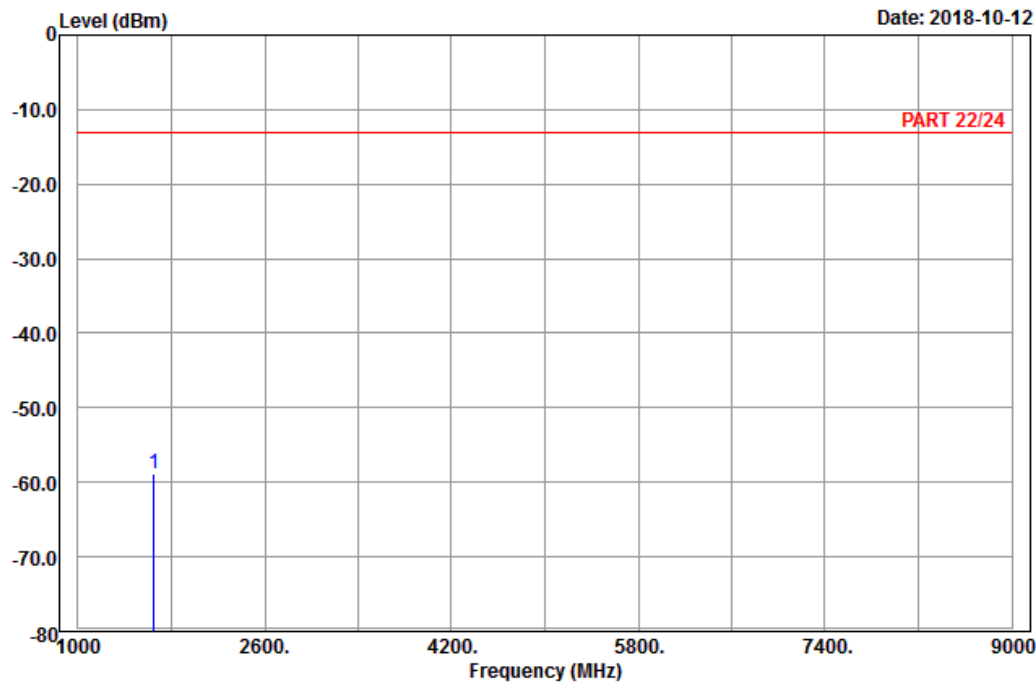


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A D T

Data: 6

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : EDGE 850_Link_CH128
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1648.40	-58.80	-66.53	-13.00	-45.80	7.73	Peak

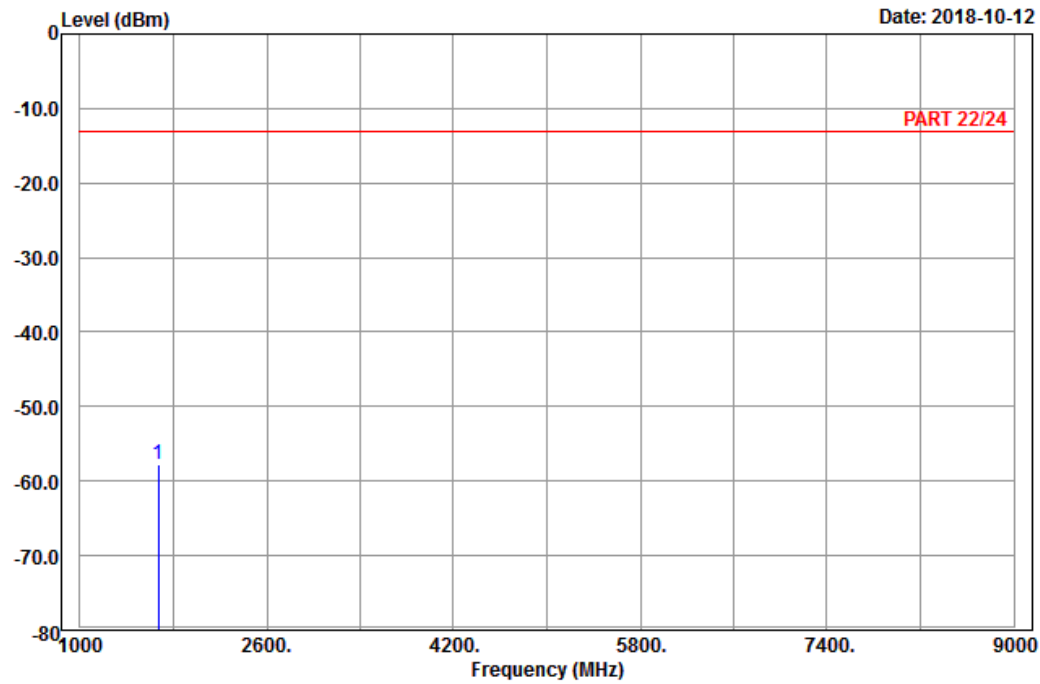
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : EDGE 850_Link_CH189
 Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1672.80	-57.76	-65.67	-13.00	-44.76	7.91	Peak

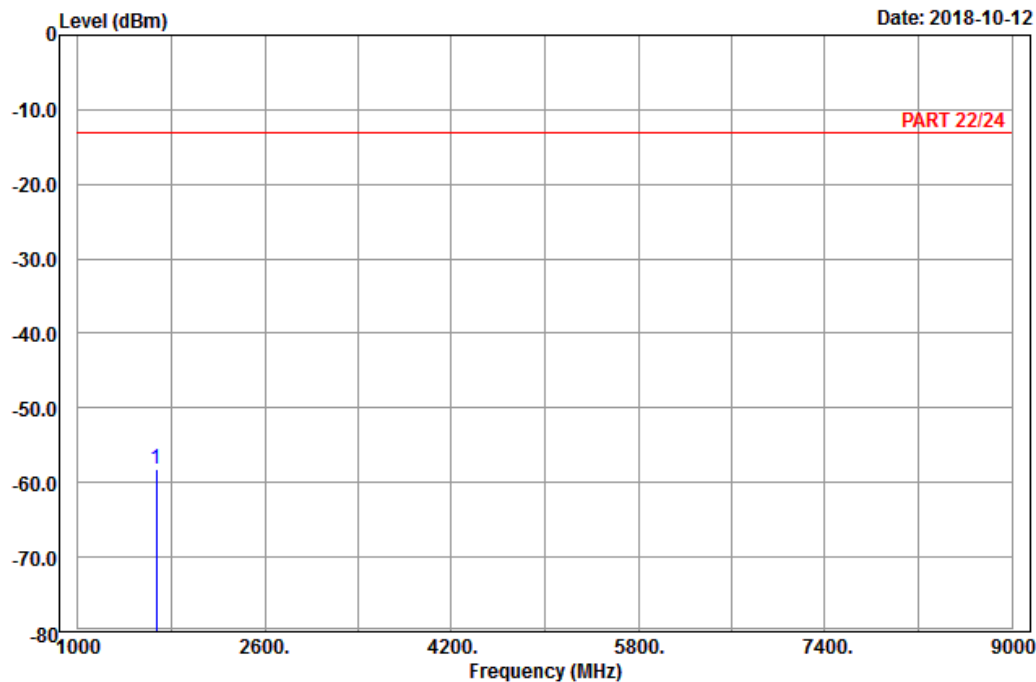


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : EDGE 850_Link_CH189
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1672.80	-58.22	-66.13	-13.00	-45.22	7.91	Peak

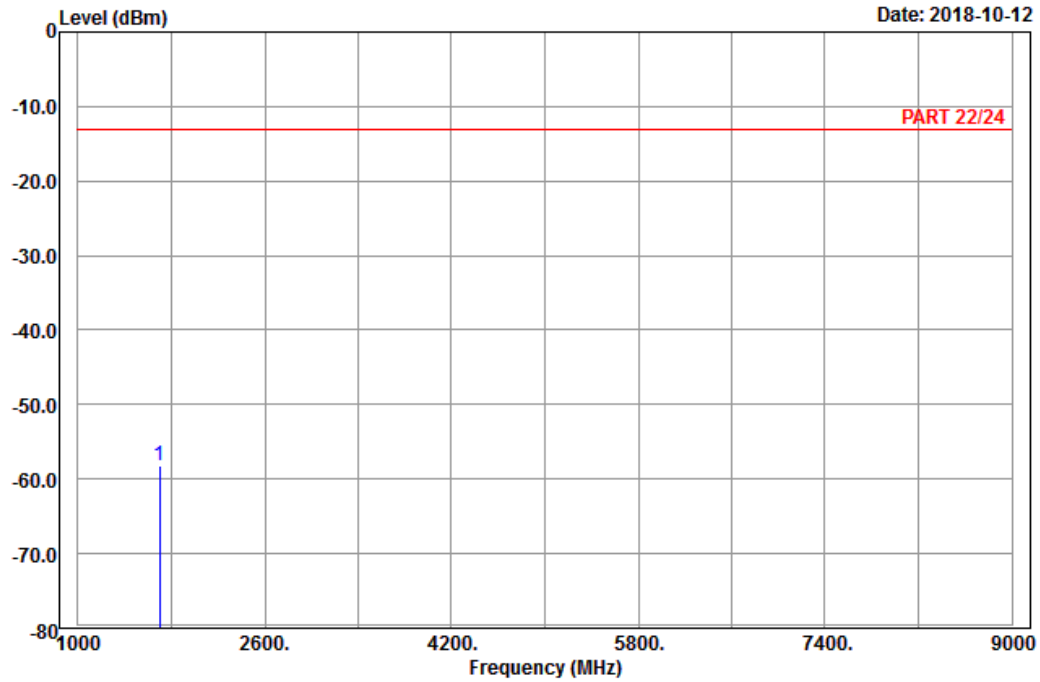
High Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : EDGE 850_Link_CH251
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1697.60	-58.14	-66.28	-13.00	-45.14	8.14	Peak

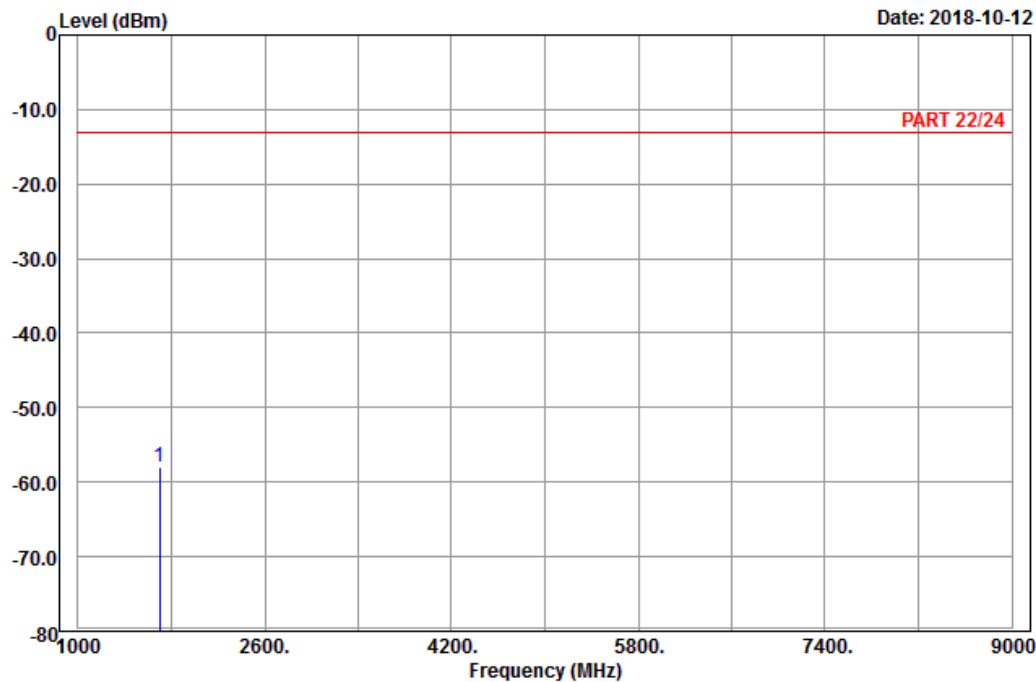


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : EDGE 850_Link_CH251
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1697.60	-58.08	-66.22	-13.00	-45.08	8.14	Peak

WCDMA:
Low Channel

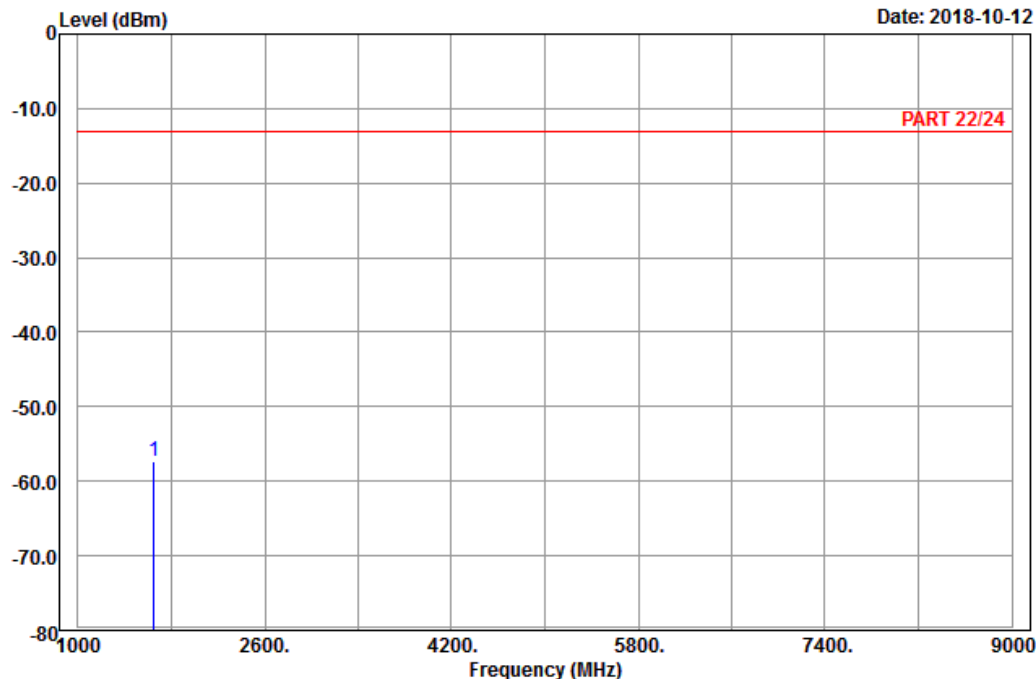


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : Band V_Link_CH4132
Tested by: Karl Lee

			Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark	
MHz	dBm	dBm	dBm	dB	dB		
1 pp 1652.80	-57.27	-65.00	-13.00	-44.27	7.73	Peak	

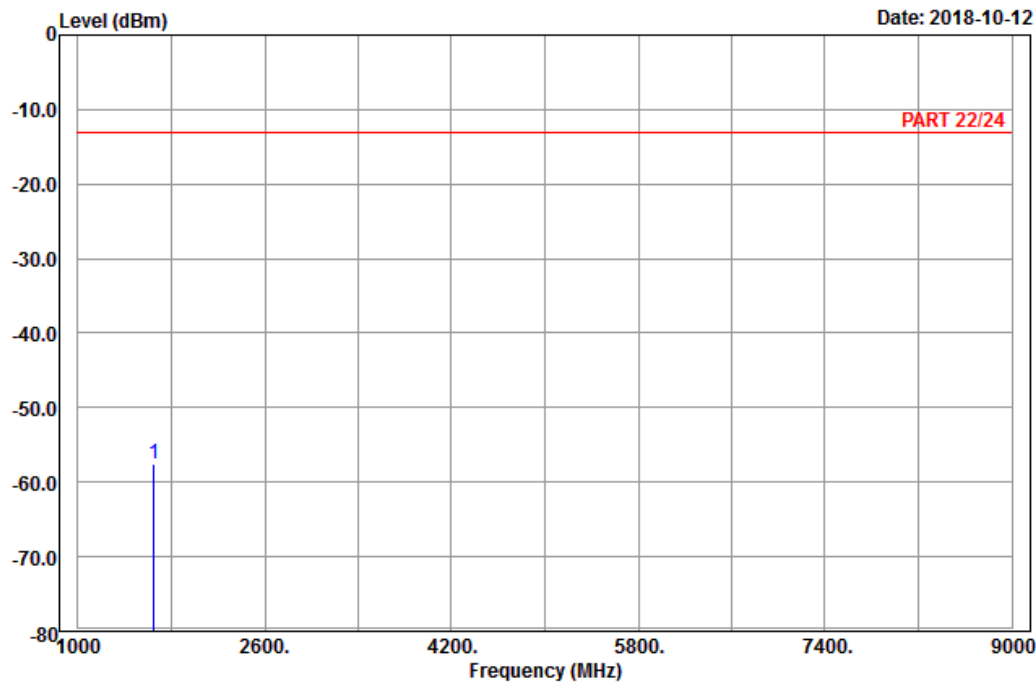


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band V_Link_CH4132
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1652.80	-57.62	-65.35	-13.00	-44.62	7.73	Peak

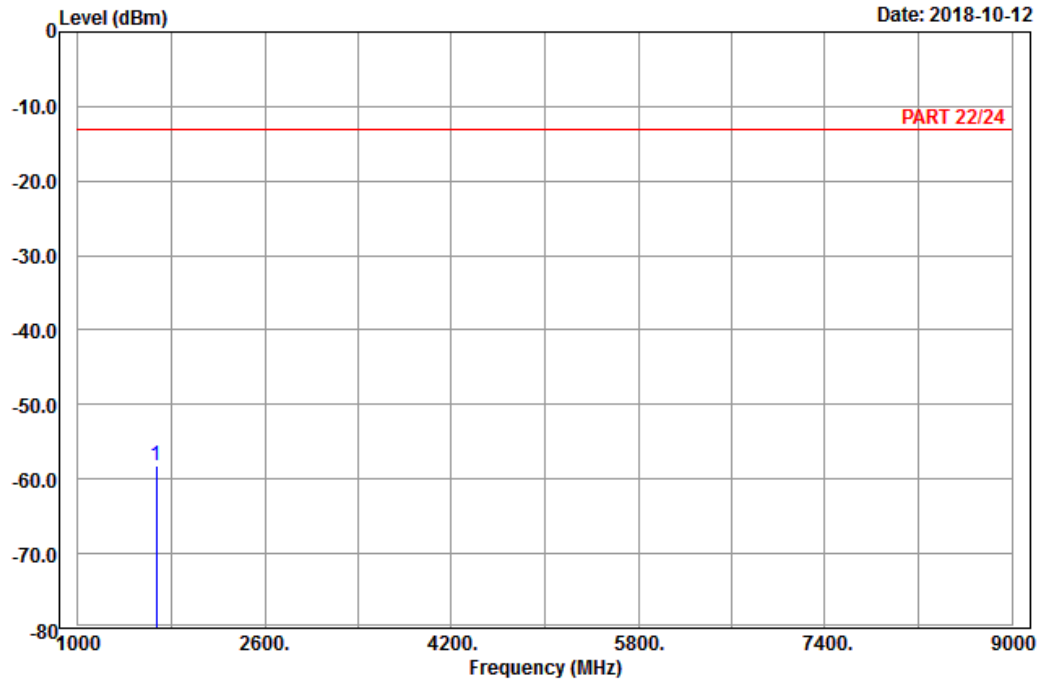
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : Band V_Link_CH4182
 Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1672.80	-58.17	-66.08	-13.00	-45.17	7.91	Peak

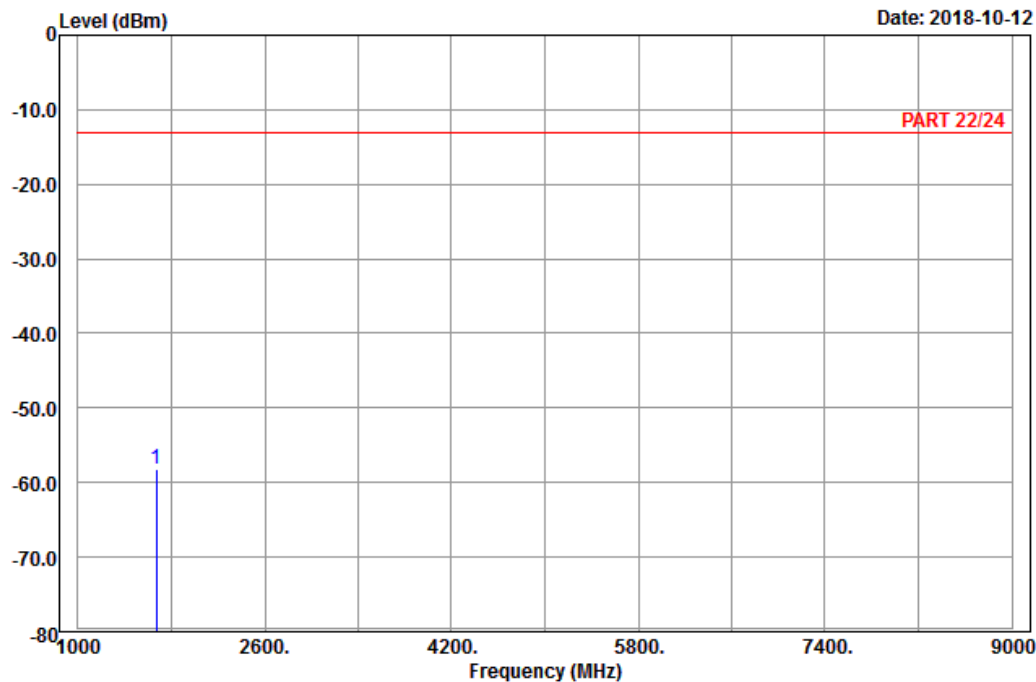


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band V_Link_CH4182
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1672.80	-58.22	-66.13	-13.00	-45.22	7.91	Peak

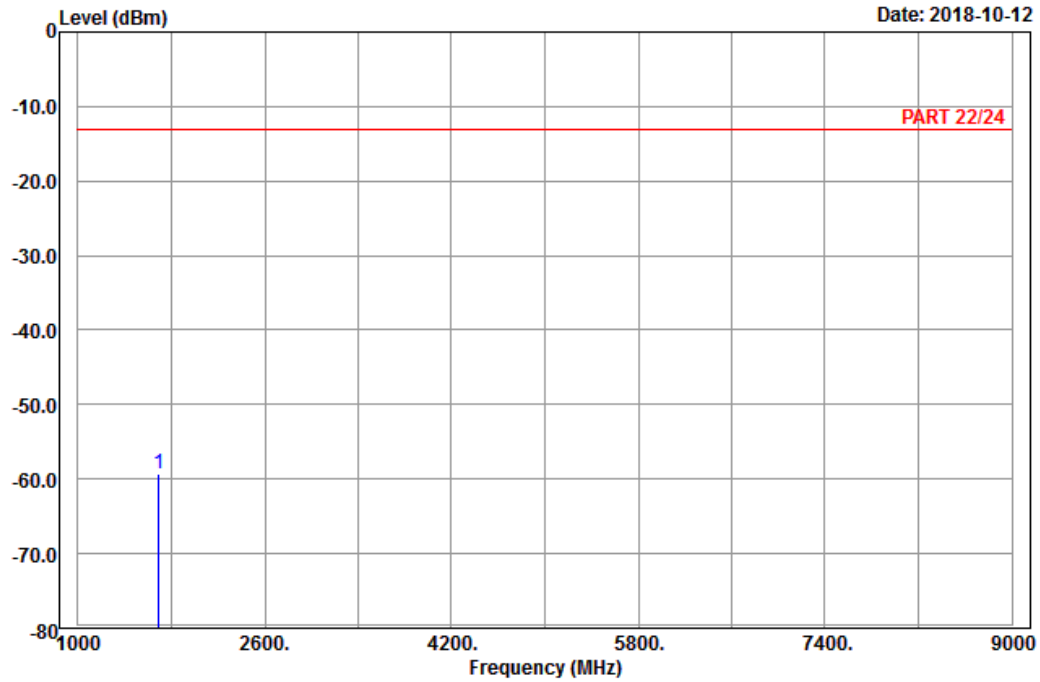
High Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : Band V_Link_CH4233
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1693.20	-59.19	-67.33	-13.00	-46.19	8.14	Peak

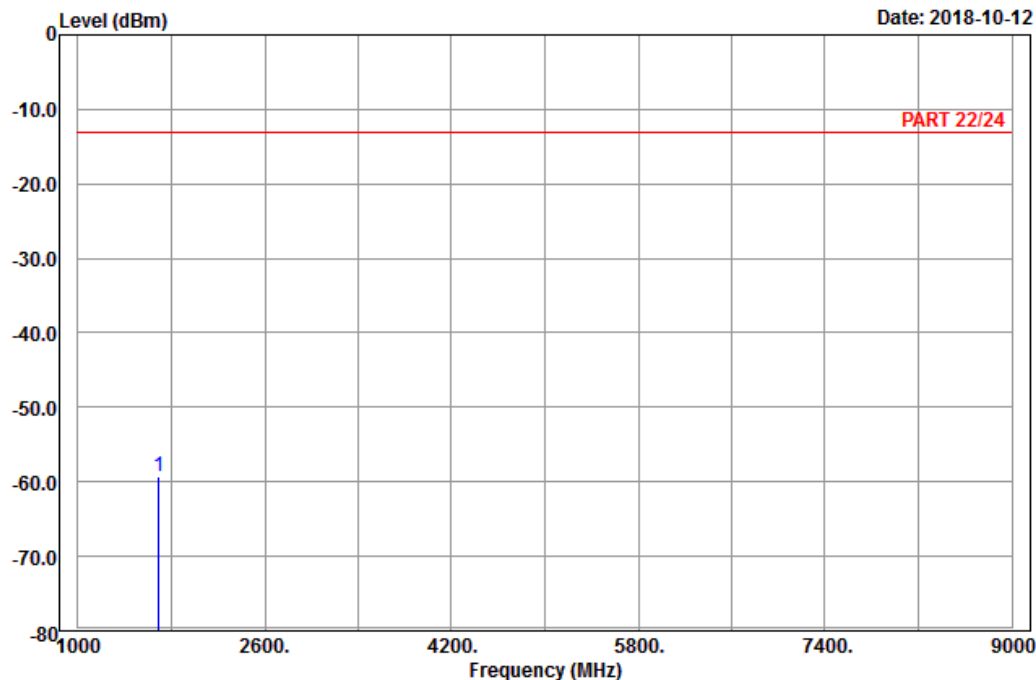


Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 6

Date: 2018-10-12



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band V_Link_CH4233
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1693.20	-59.35	-67.49	-13.00	-46.35	8.14	Peak

CDMA:
Low Channel

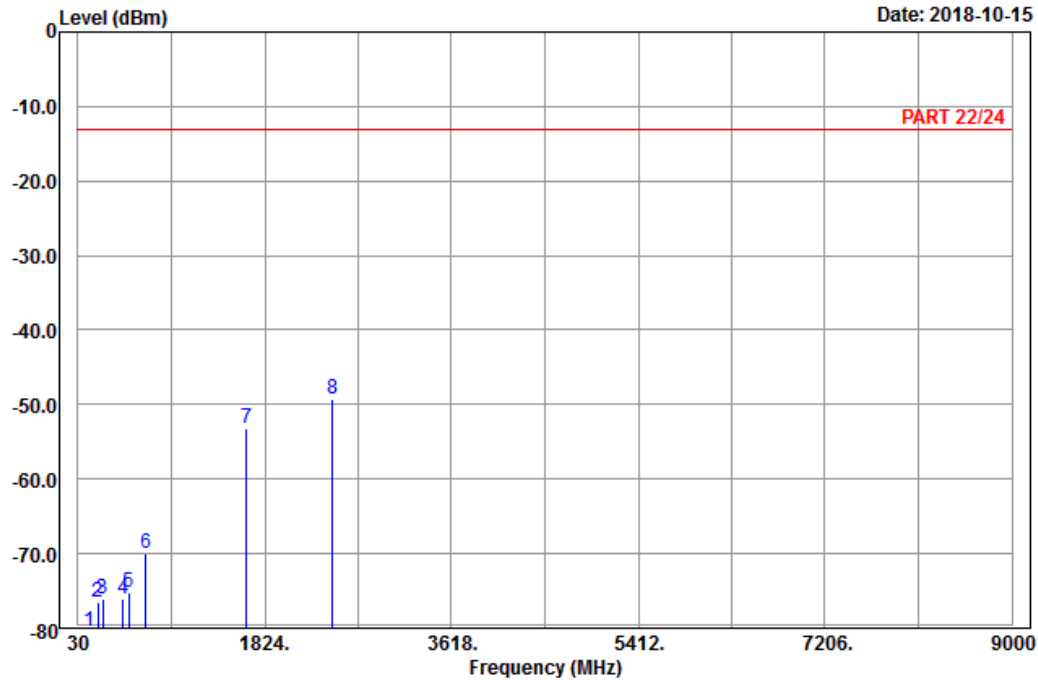


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9

Date: 2018-10-15



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : BC 0_Link_CH1013
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	143.40	-80.38	-72.59	-13.00	-67.38	-7.79	Peak
2	224.67	-76.41	-70.56	-13.00	-63.41	-5.85	Peak
3	269.22	-76.00	-70.32	-13.00	-63.00	-5.68	Peak
4	462.40	-76.02	-71.81	-13.00	-63.02	-4.21	Peak
5	515.60	-75.24	-71.09	-13.00	-62.24	-4.15	Peak
6	678.70	-70.07	-69.80	-13.00	-57.07	-0.27	Peak
7	1649.40	-53.10	-60.83	-13.00	-40.10	7.73	Peak
8 pp	2474.10	-49.16	-60.19	-13.00	-36.16	11.03	Peak

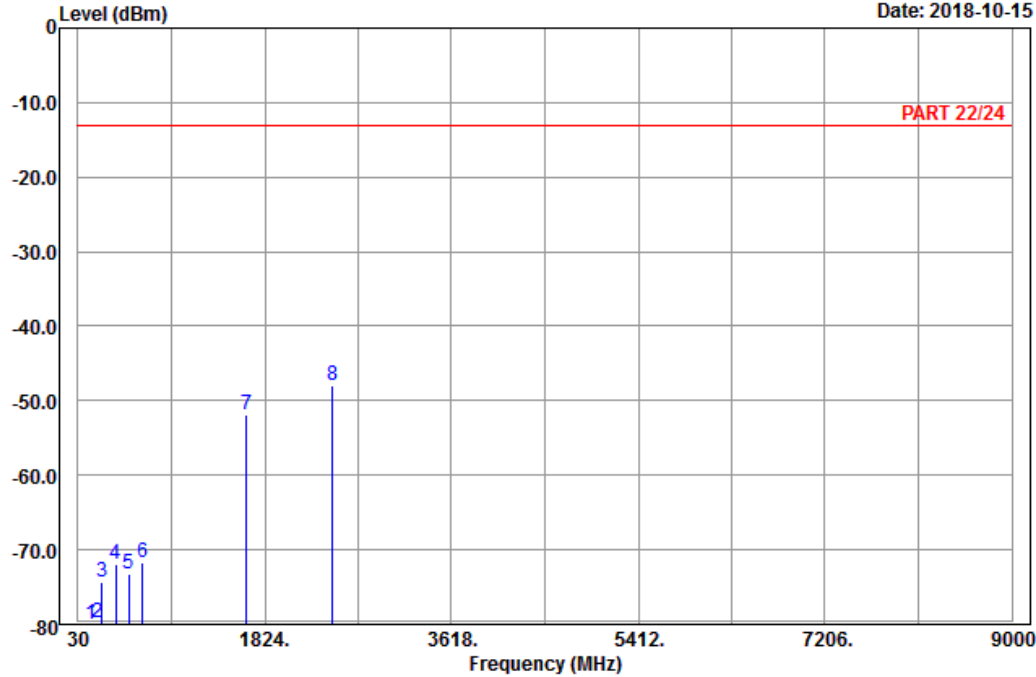


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2018-10-15



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : BC 0_Link_CH1013
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	161.22	-80.05	-72.48	-13.00	-67.05	-7.57	Peak
2	219.00	-79.69	-73.77	-13.00	-66.69	-5.92	Peak
3	259.23	-74.26	-68.67	-13.00	-61.26	-5.59	Peak
4	394.50	-71.92	-68.92	-13.00	-58.92	-3.00	Peak
5	521.20	-73.33	-69.54	-13.00	-60.33	-3.79	Peak
6	653.50	-71.79	-71.64	-13.00	-58.79	-0.15	Peak
7	1649.40	-51.94	-59.67	-13.00	-38.94	7.73	Peak
8 pp	2474.10	-48.04	-59.07	-13.00	-35.04	11.03	Peak

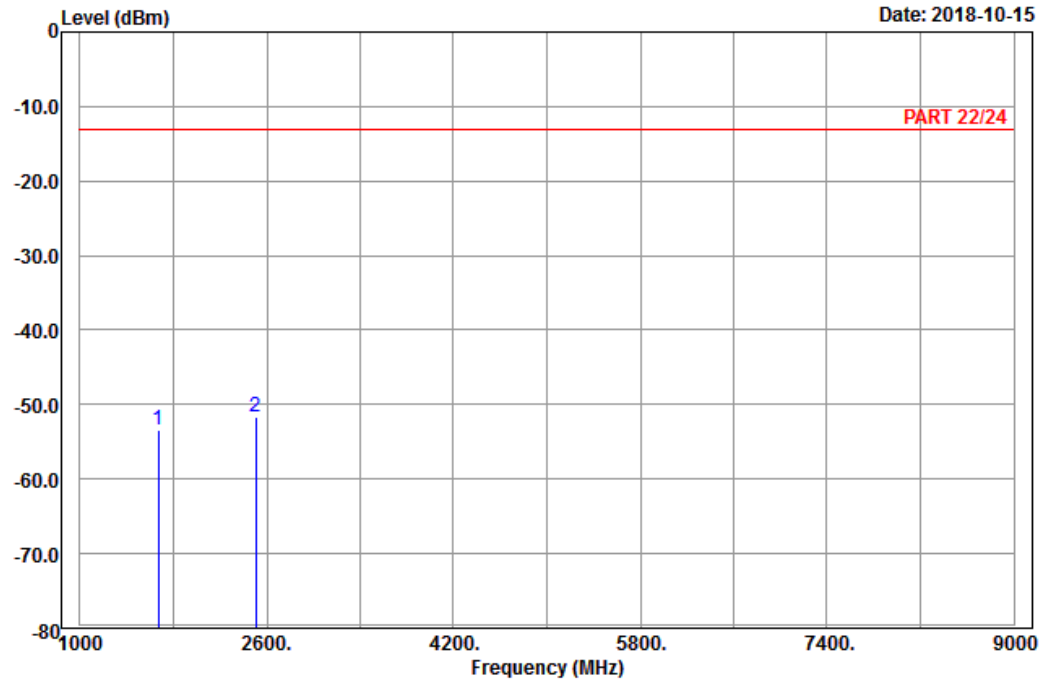
Middle Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : BC 0_Link_CH384
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1673.04	-53.32	-61.23	-13.00	-40.32	7.91 Peak
2 pp	2509.56	-51.68	-62.96	-13.00	-38.68	11.28 Peak

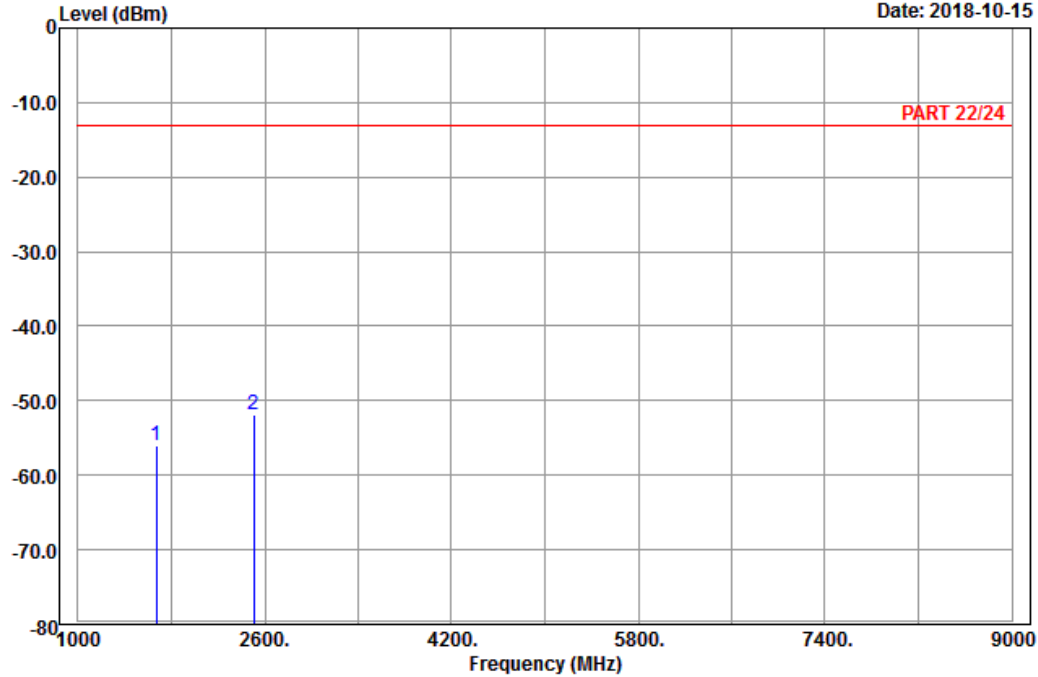


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-15



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : BC 0_Link_CH384
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1673.04	-55.99	-63.90	-13.00	-42.99	7.91	Peak
2 pp	2509.56	-51.92	-63.20	-13.00	-38.92	11.28	Peak

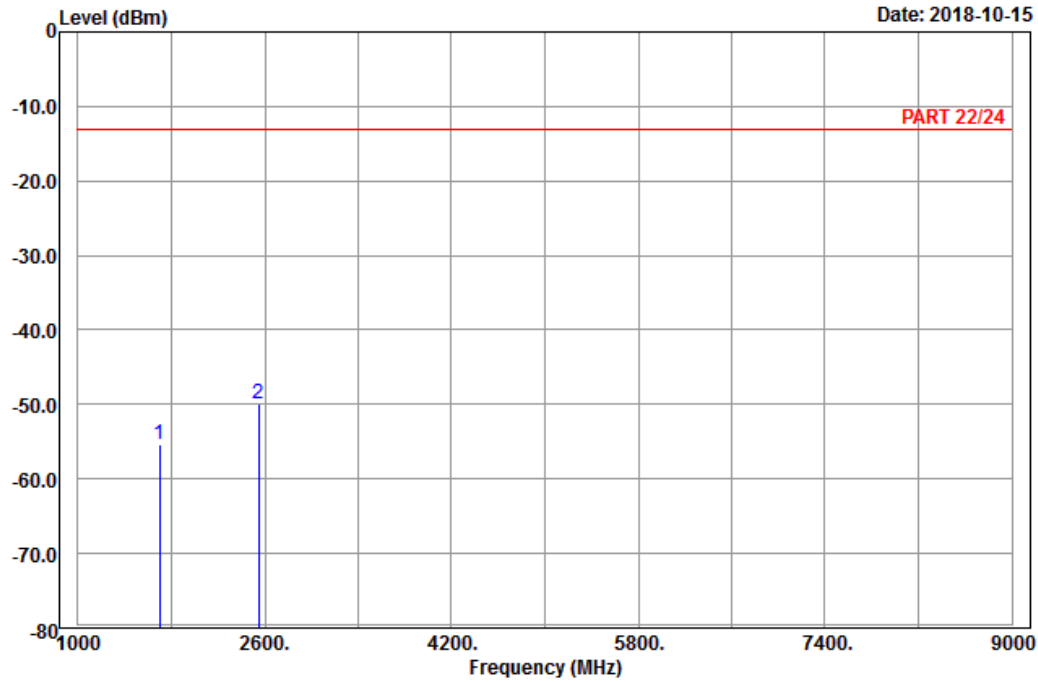
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : BC 0_Link_CH777
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1696.62	-55.44	-63.58	-13.00	-42.44	8.14 Peak
2 pp	2544.93	-49.83	-61.30	-13.00	-36.83	11.47 Peak

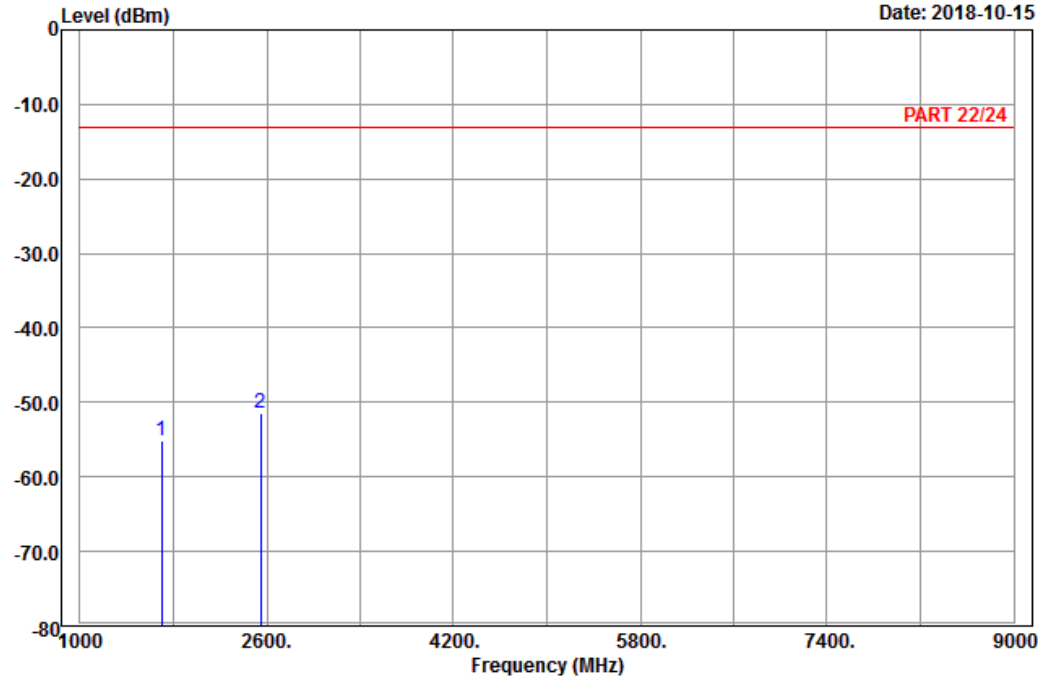


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-15



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : BC 0_Link_CH777
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1696.62	-55.19	-63.33	-13.00	-42.19	8.14	Peak
2 pp	2544.93	-51.34	-62.81	-13.00	-38.34	11.47	Peak

LTE Band 5
Channel Bandwidth: 1.4 MHz / QPSK
Low Channel

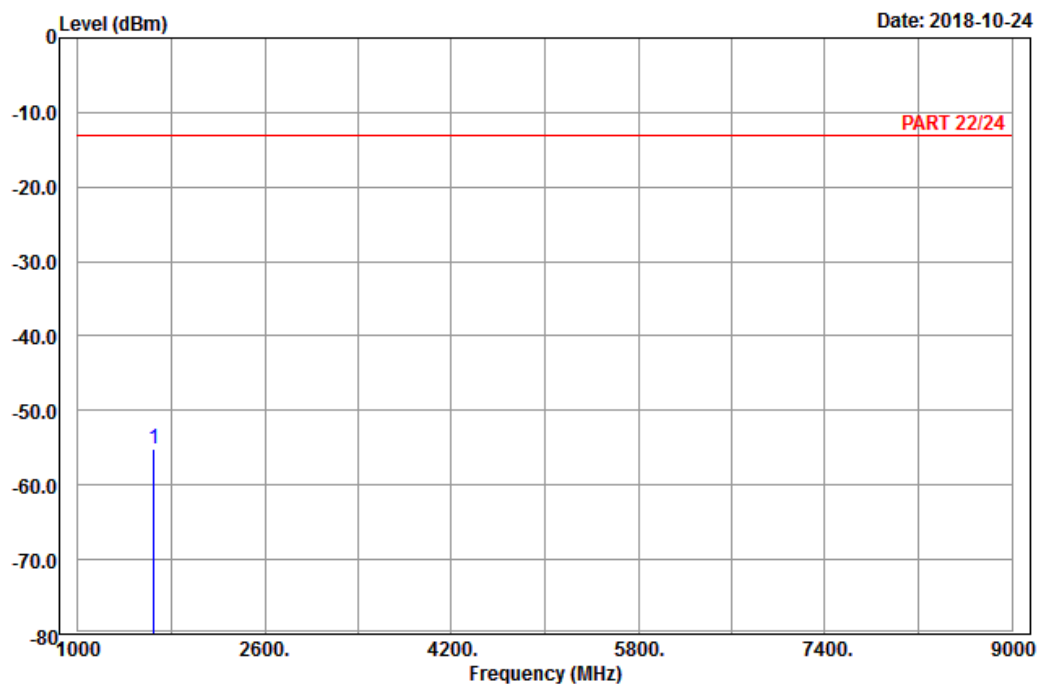


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20407
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1649.40	-55.24	-62.97	-13.00	-42.24	7.73	Peak

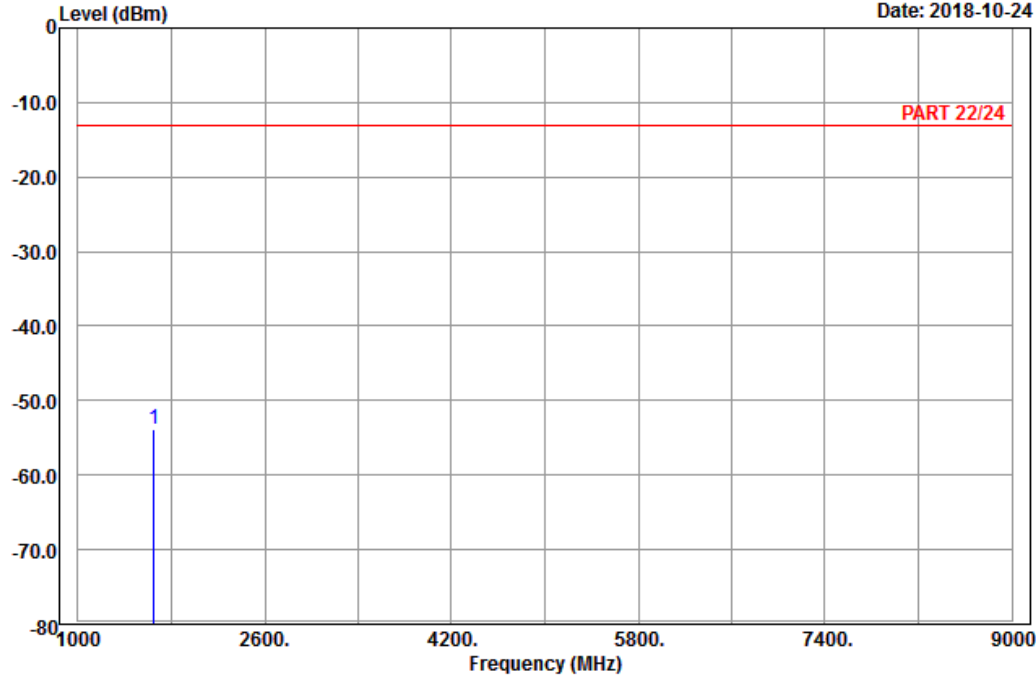


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20407
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1649.40	-53.88	-61.61	-13.00	-40.88	7.73	Peak

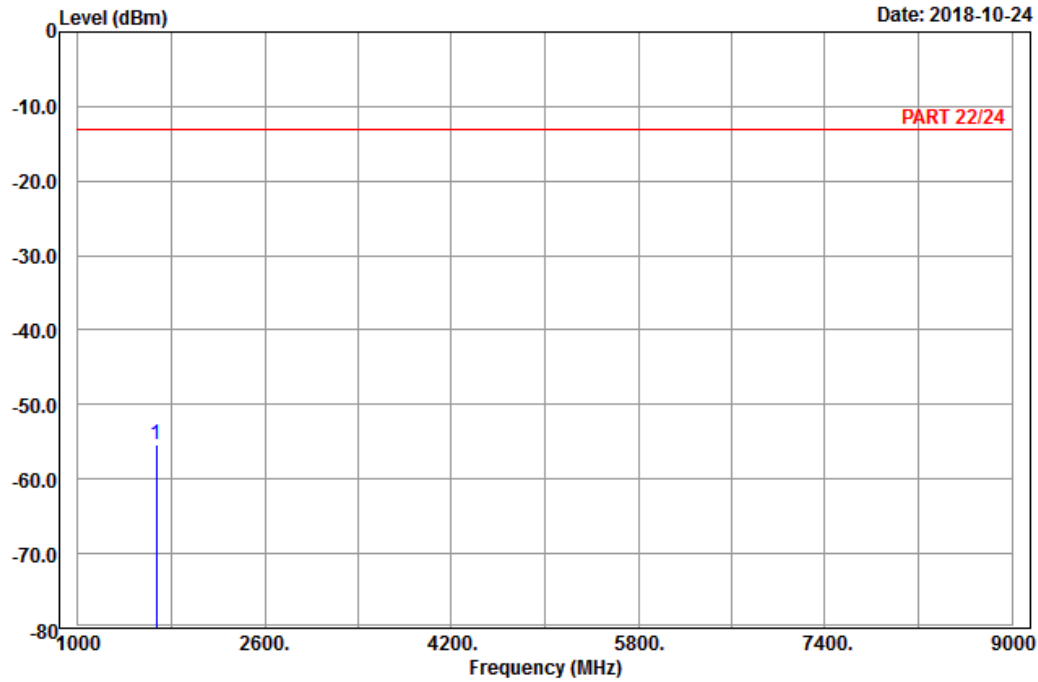
Middle Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20525
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-55.26	-63.17	-13.00	-42.26	7.91	Peak

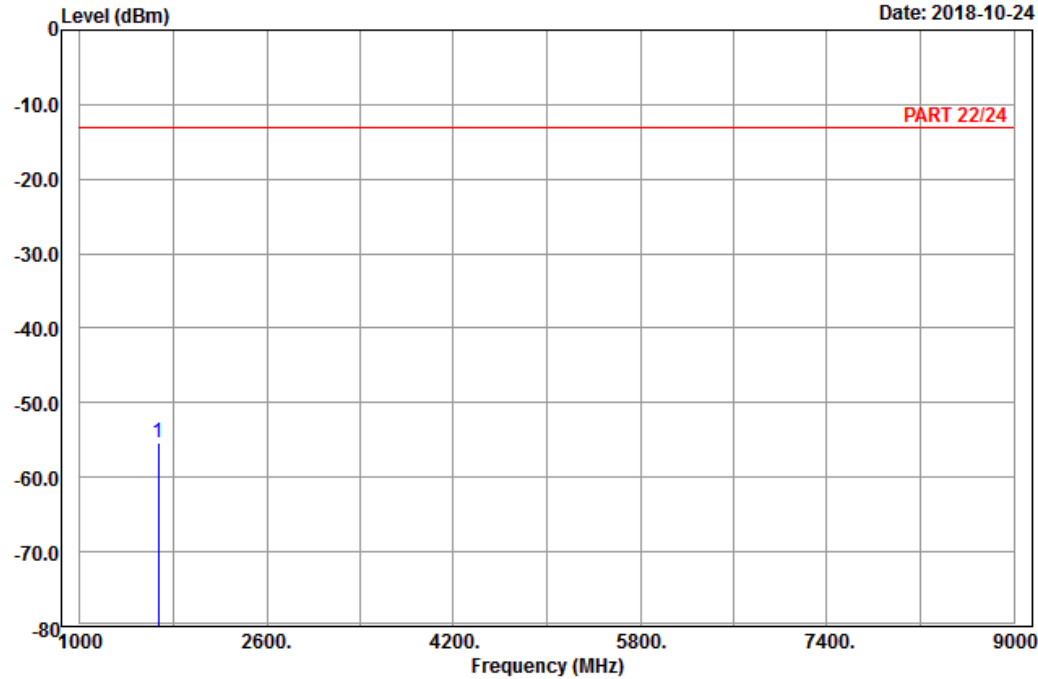


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20525
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-55.33	-63.24	-13.00	-42.33	7.91	Peak

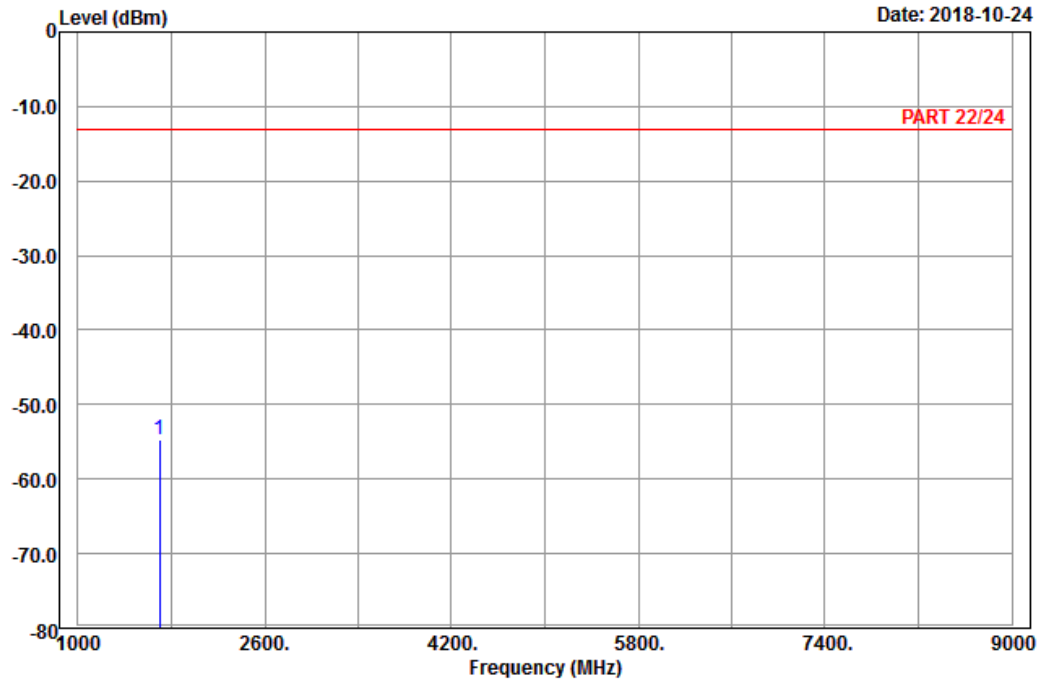
High Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20643
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1696.60	-54.79	-62.93	-13.00	-41.79	8.14	Peak

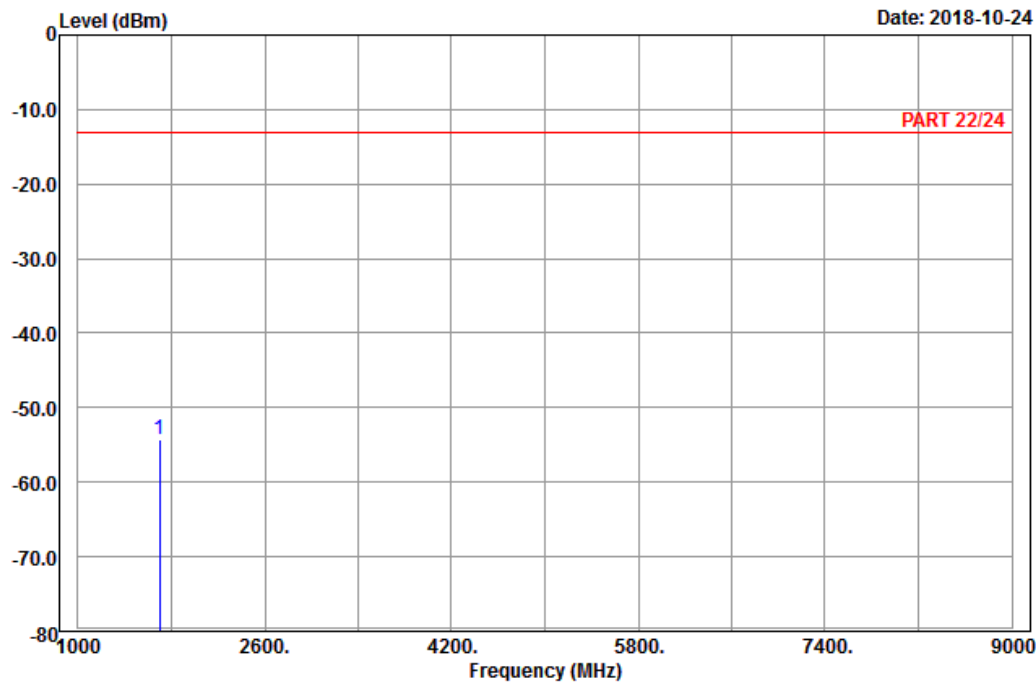


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20643
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1696.60	-54.25	-62.39	-13.00	-41.25	8.14	Peak

Channel Bandwidth: 5 MHz / QPSK
Low Channel

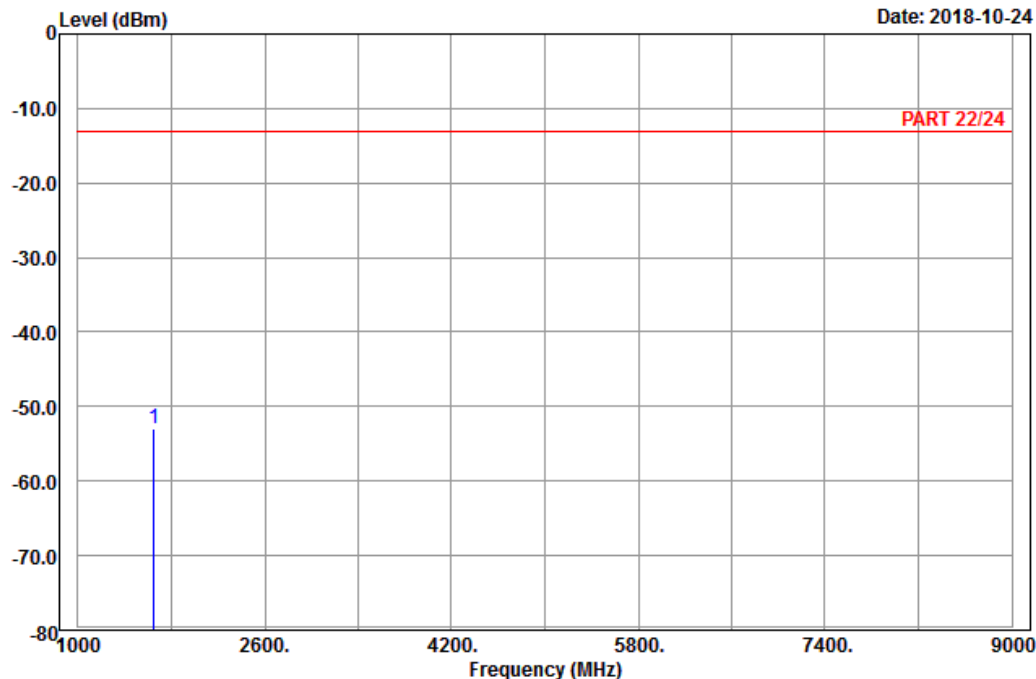


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20425
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1653.00	-52.87	-60.60	-13.00	-39.87	7.73	Peak

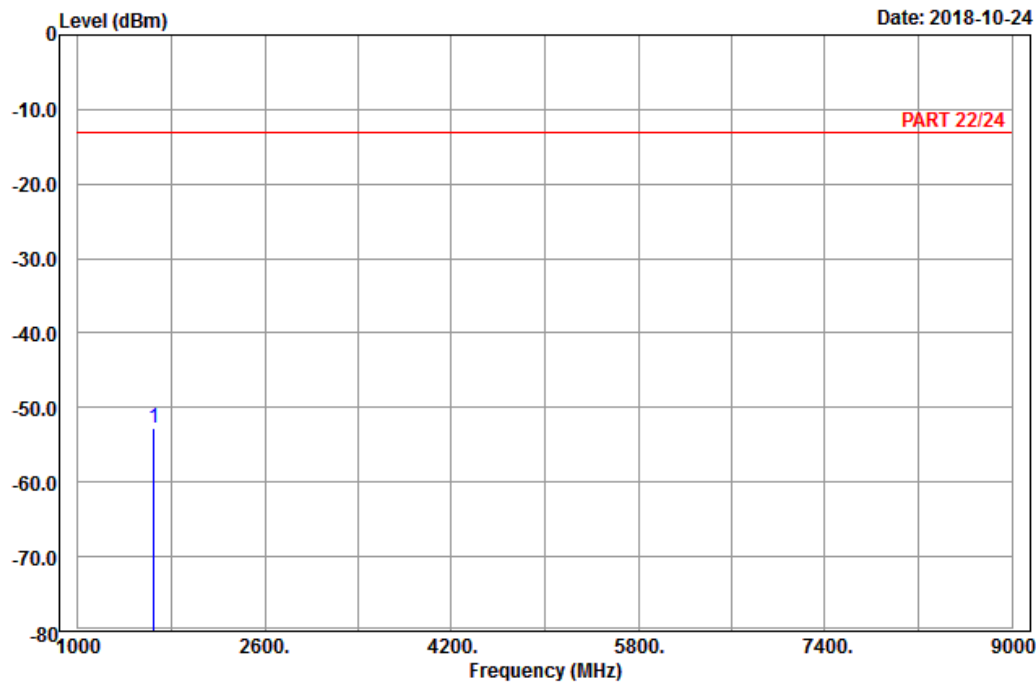


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20425
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1653.00	-52.71	-60.44	-13.00	-39.71	7.73	Peak

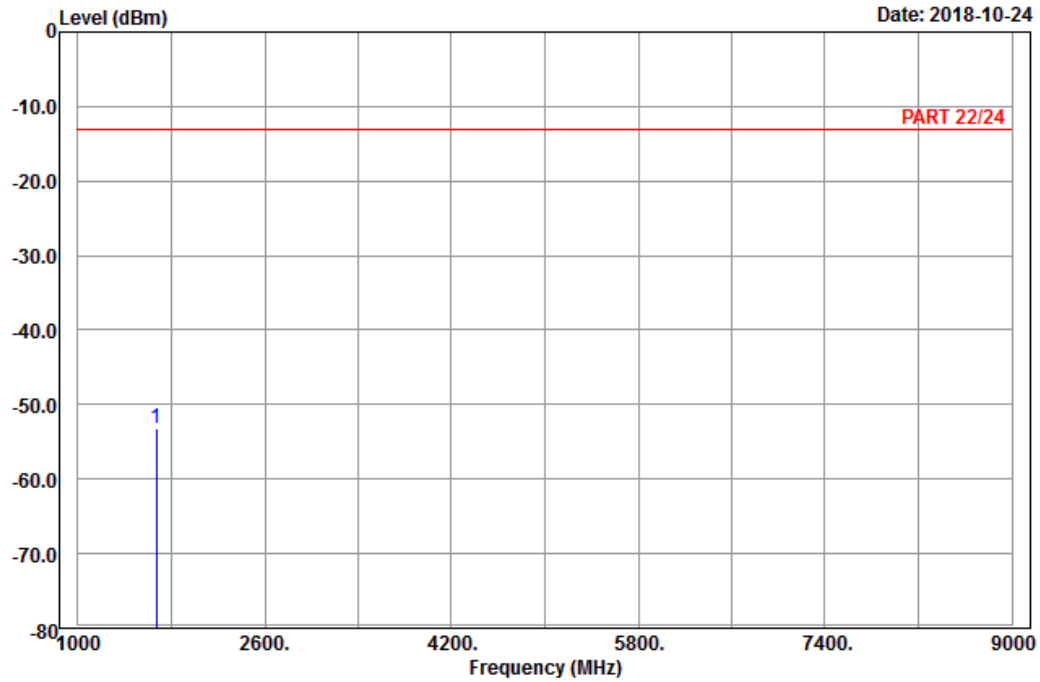
Middle Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20525
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-53.10	-61.01	-13.00	-40.10	7.91	Peak

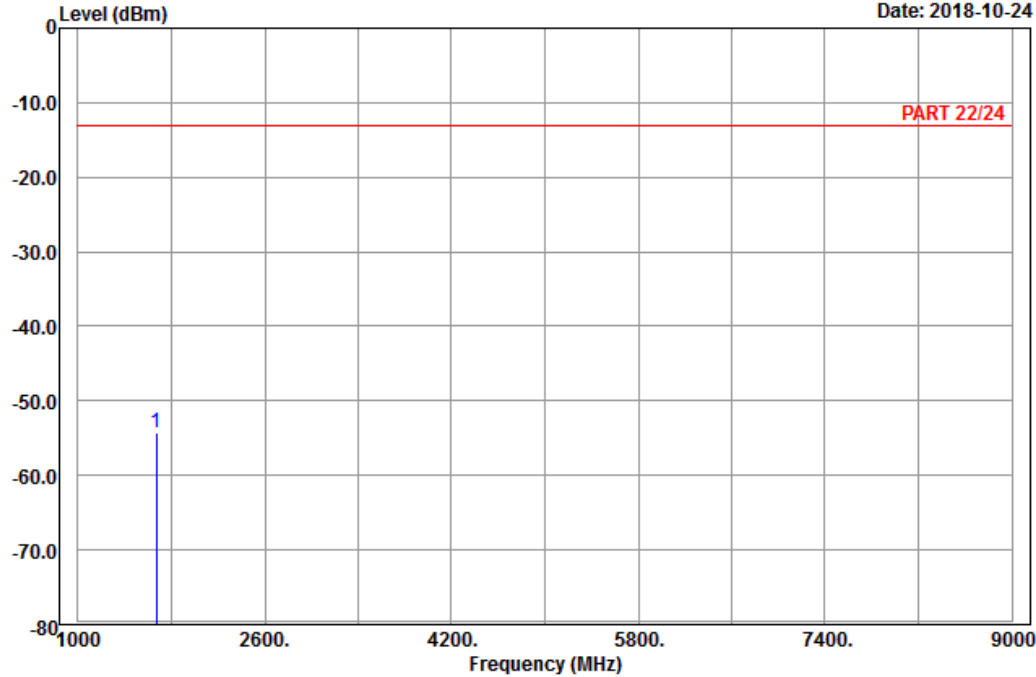


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20525
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-54.22	-62.13	-13.00	-41.22	7.91	Peak

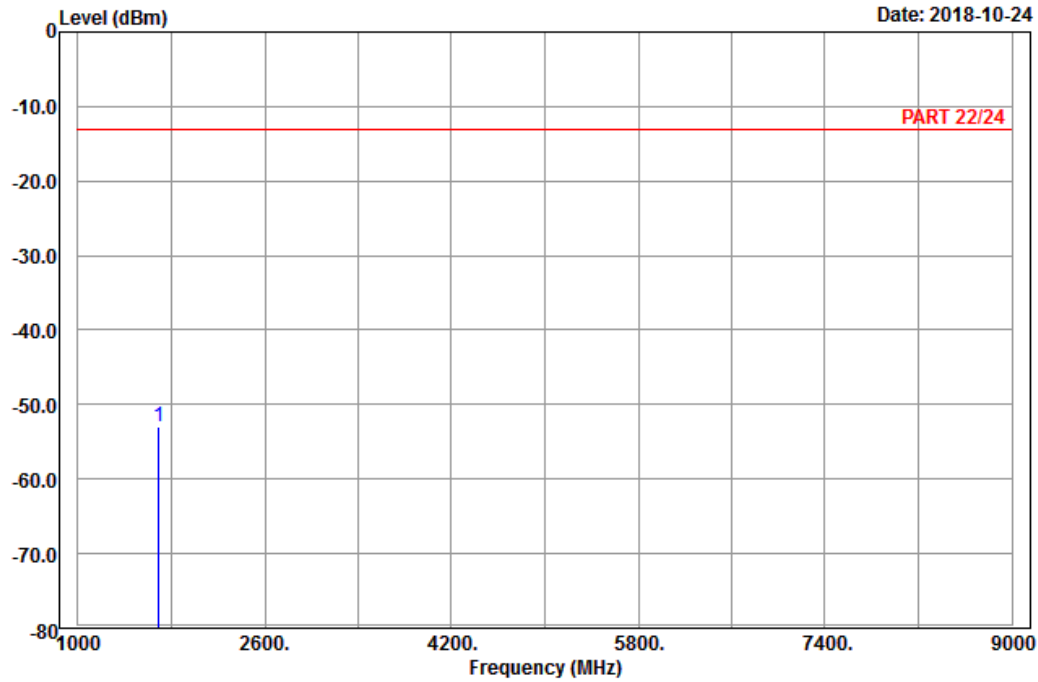
High Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20625
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1693.00	-52.88	-60.90	-13.00	-39.88	8.02	Peak

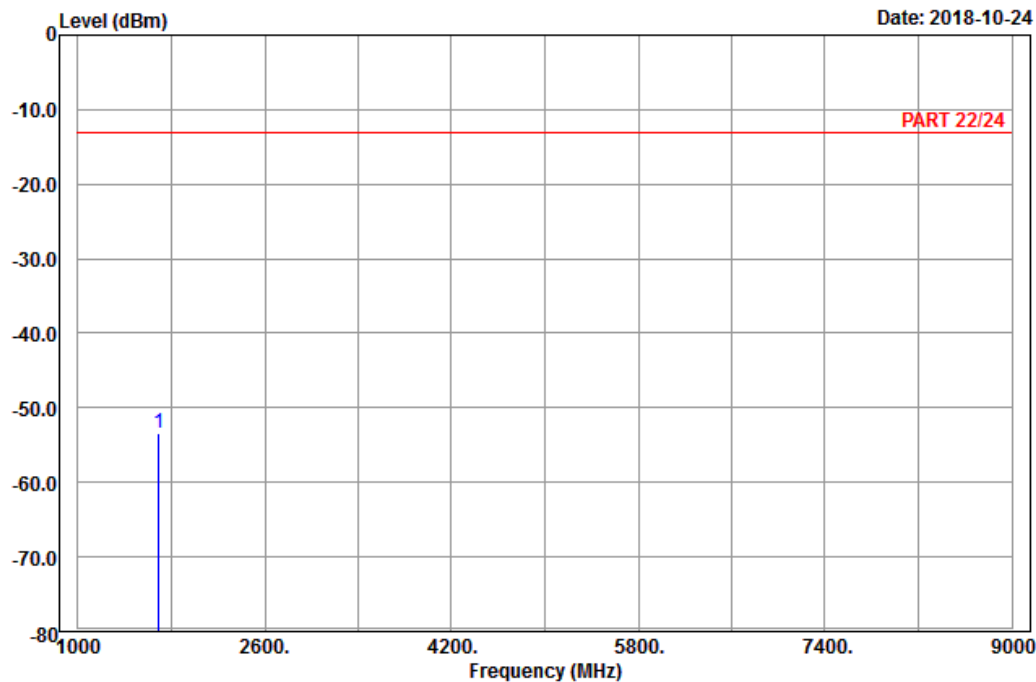


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20625
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1693.00	-53.40	-61.42	-13.00	-40.40	8.02	Peak

Channel Bandwidth: 10 MHz / QPSK
Low Channel

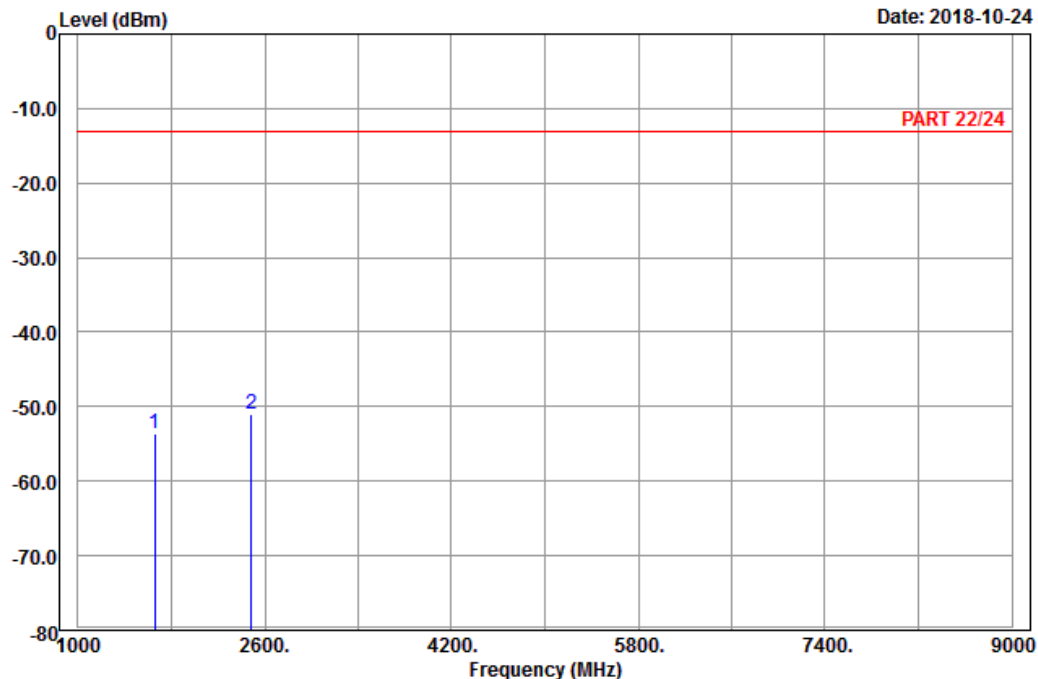


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20450
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1658.00	-53.68	-61.59	-13.00	-40.68	7.91	Peak
2 pp	2487.00	-51.09	-62.13	-13.00	-38.09	11.04	Peak

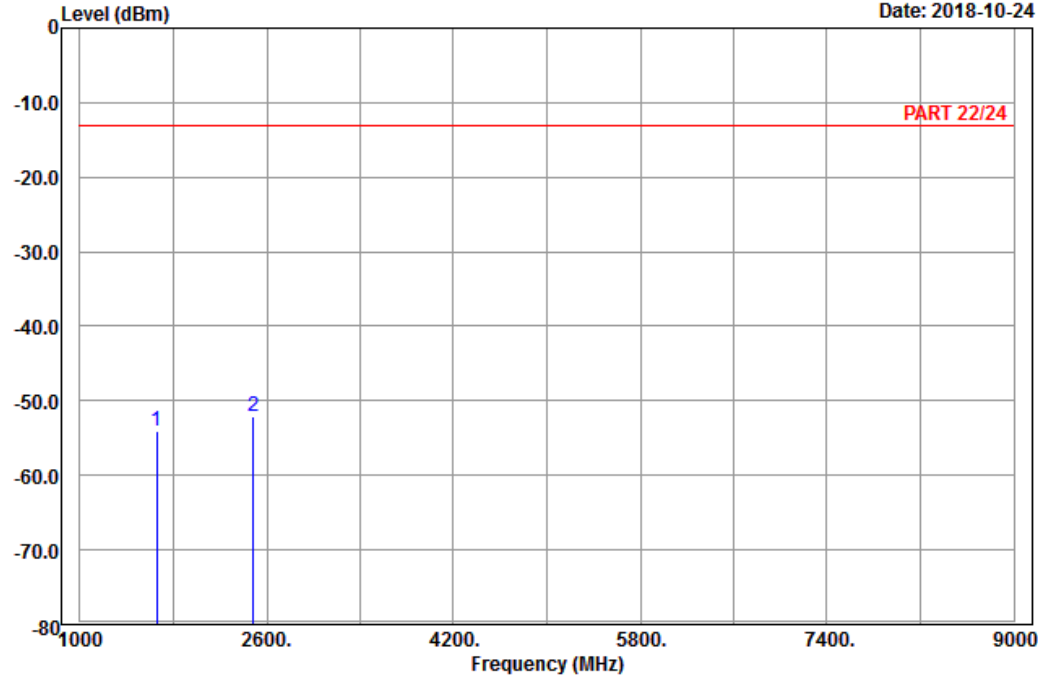


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20450
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1658.00	-54.01	-61.92	-13.00	-41.01	7.91	Peak
2 pp	2487.00	-52.01	-63.05	-13.00	-39.01	11.04	Peak

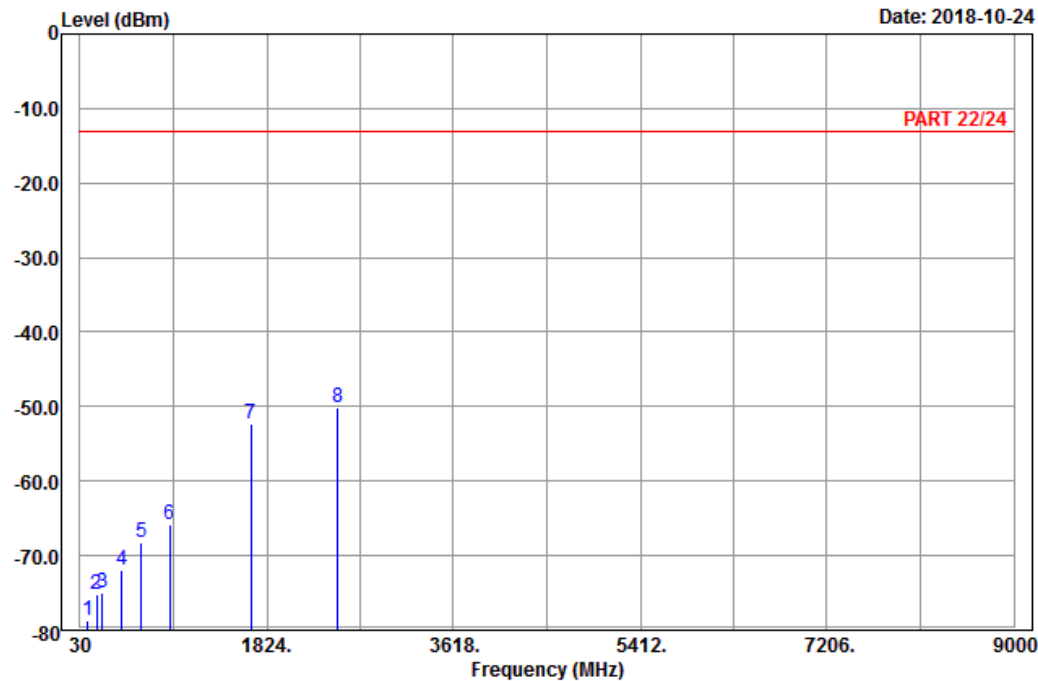
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : LTE_Band 5_Link_CH20525
 Tested by: Karl Lee

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	104.79	-78.74	-69.21	-13.00	-65.74	-9.53	Peak
2	187.41	-75.20	-69.51	-13.00	-62.20	-5.69	Peak
3	241.68	-74.98	-69.36	-13.00	-61.98	-5.62	Peak
4	431.60	-71.96	-68.52	-13.00	-58.96	-3.44	Peak
5	622.00	-68.33	-68.51	-13.00	-55.33	0.18	Peak
6	890.10	-65.84	-68.45	-13.00	-52.84	2.61	Peak
7	1673.00	-52.27	-60.18	-13.00	-39.27	7.91	Peak
8 pp	2509.50	-50.10	-61.38	-13.00	-37.10	11.28	Peak

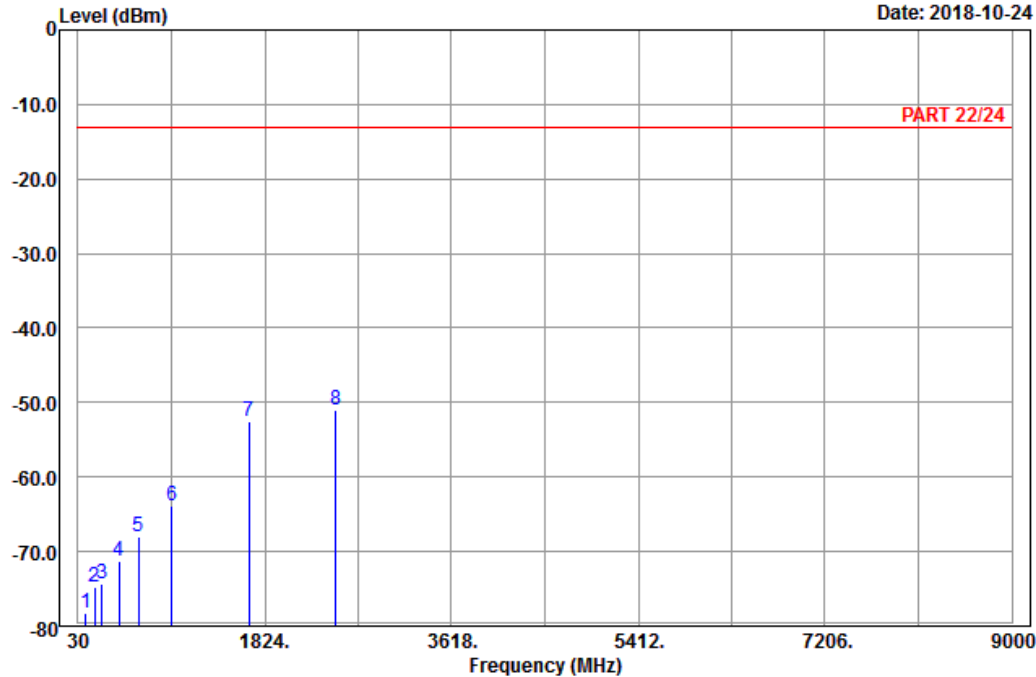


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2018-10-24



Site : 966 chamber 1
 Condition: PART 22/24 Vertical
 Remark : LTE_Band 5_Link_CH20525
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	105.33	-78.31	-68.89	-13.00	-65.31	-9.42	Peak
2	187.41	-74.79	-69.10	-13.00	-61.79	-5.69	Peak
3	259.23	-74.26	-68.67	-13.00	-61.26	-5.59	Peak
4	423.20	-71.39	-68.14	-13.00	-58.39	-3.25	Peak
5	612.20	-67.94	-68.23	-13.00	-54.94	0.29	Peak
6	927.20	-63.81	-67.92	-13.00	-50.81	4.11	Peak
7	1673.00	-52.47	-60.38	-13.00	-39.47	7.91	Peak
8 pp	2509.50	-51.09	-62.37	-13.00	-38.09	11.28	Peak

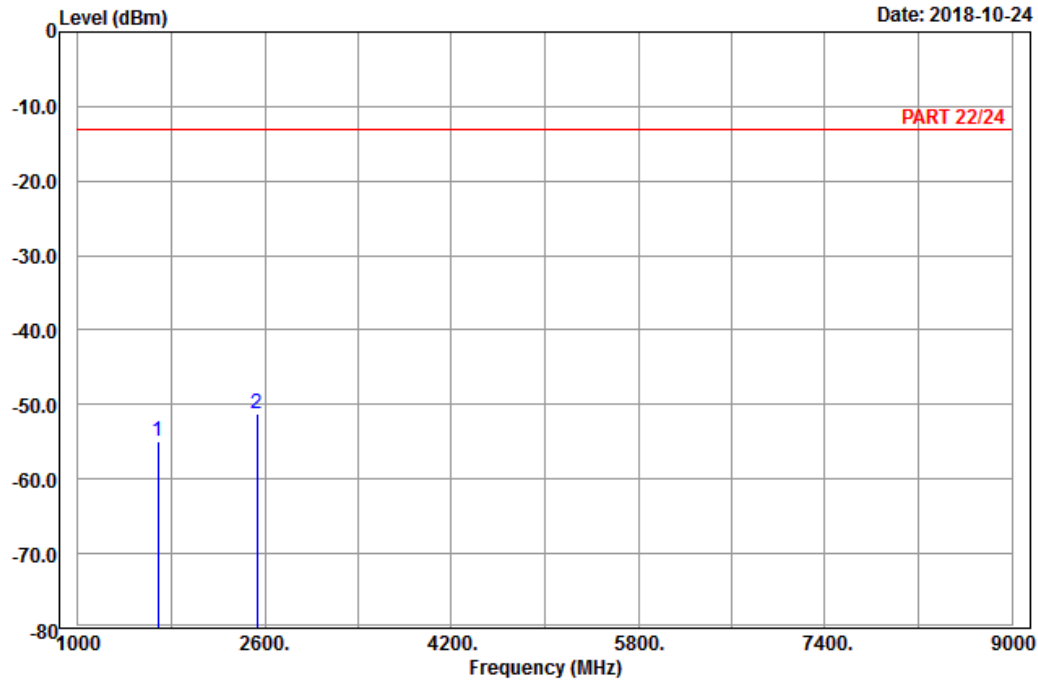
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : LTE_Band 5_Link_CH20600
 Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1688.00	-55.01	-63.03	-13.00	-42.01	8.02 Peak
2 pp	2532.00	-51.23	-62.61	-13.00	-38.23	11.38 Peak

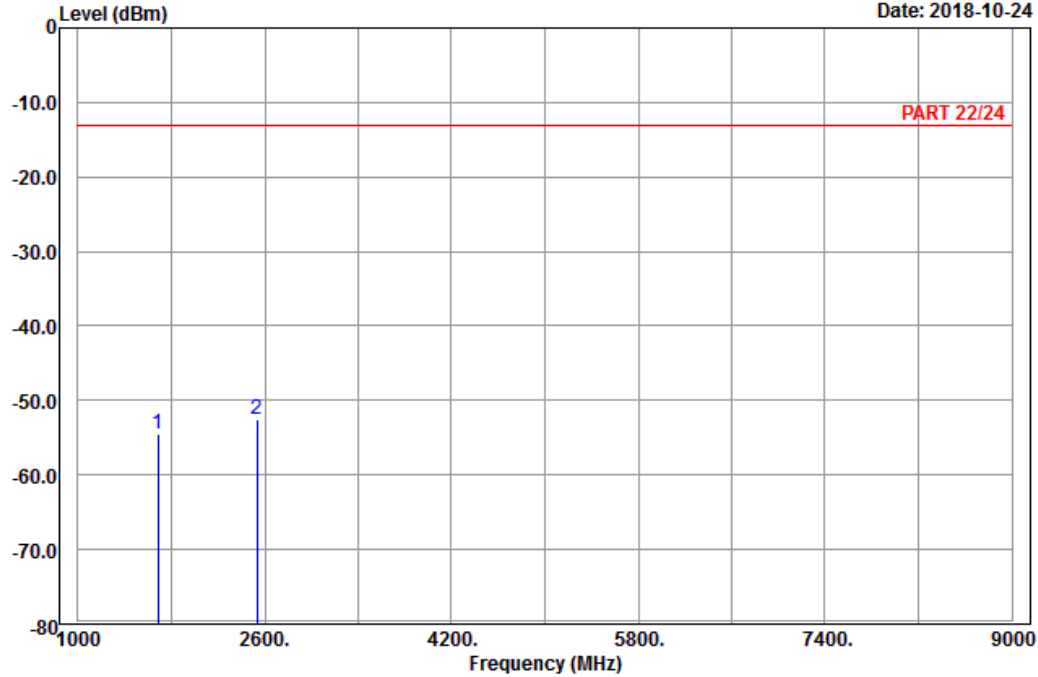


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20600
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1688.00	-54.55	-62.57	-13.00	-41.55	8.02	Peak
2 pp	2532.00	-52.52	-63.90	-13.00	-39.52	11.38	Peak

LTE Band 26
Channel Bandwidth: 1.4 MHz / QPSK
Low Channel

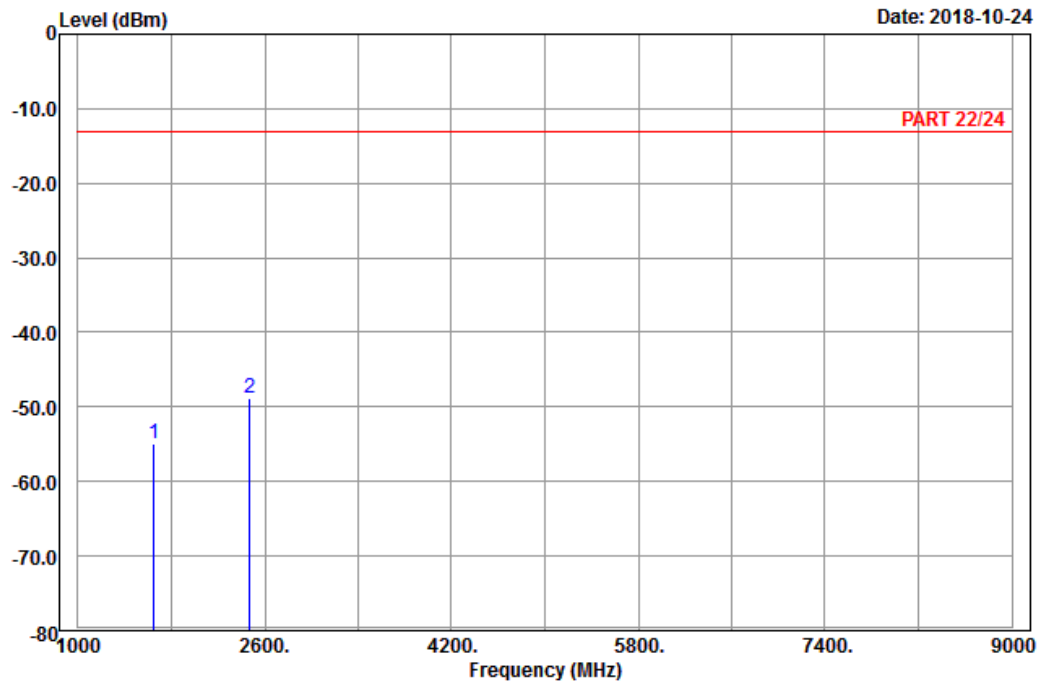


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 26_Link_CH26797
Tested by: Karl Lee

		Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor Remark
	MHz	dBm	dBm	dBm	dB	dB
1	1649.40	-54.88	-62.61	-13.00	-41.88	7.73 Peak
2 pp	2474.10	-48.81	-59.84	-13.00	-35.81	11.03 Peak

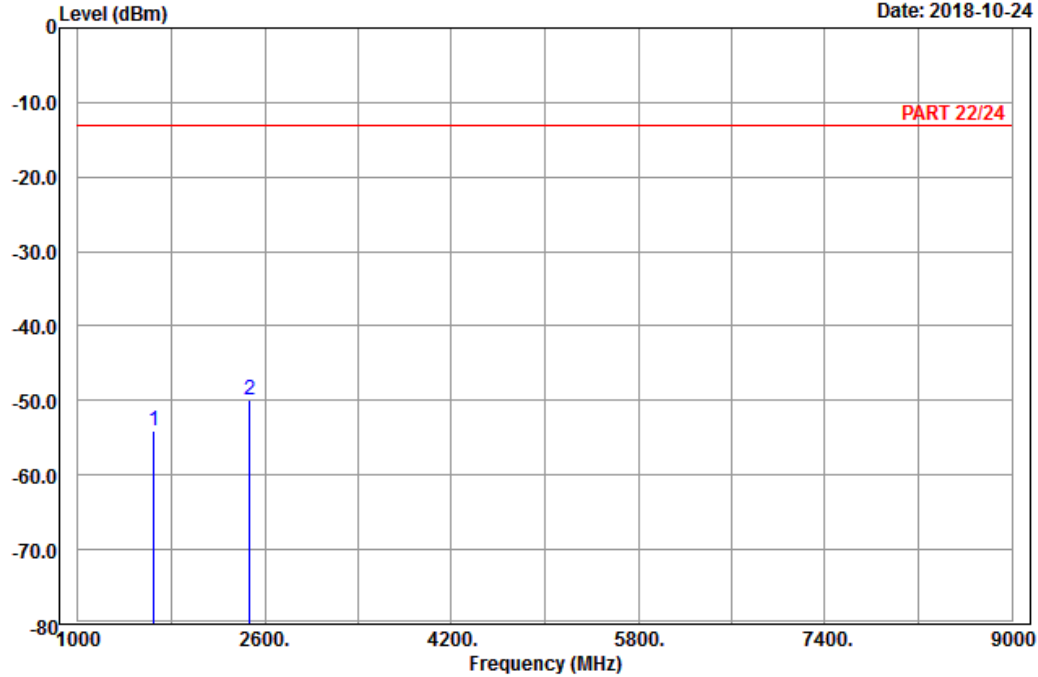


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 26_Link_CH26797
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1649.40	-54.00	-61.73	-13.00	-41.00	7.73	Peak
2 pp	2474.10	-49.90	-60.93	-13.00	-36.90	11.03	Peak

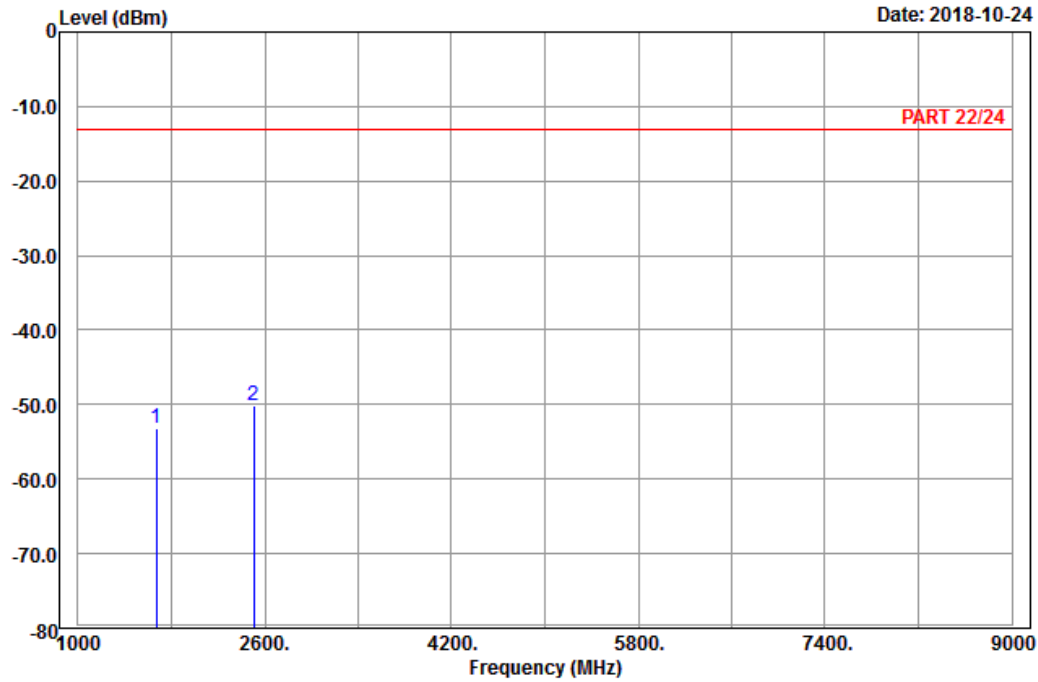
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : LTE_Band 26_Link_CH26915
 Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-53.27	-61.18	-13.00	-40.27	7.91 Peak
2 pp	2509.50	-50.15	-61.43	-13.00	-37.15	11.28 Peak

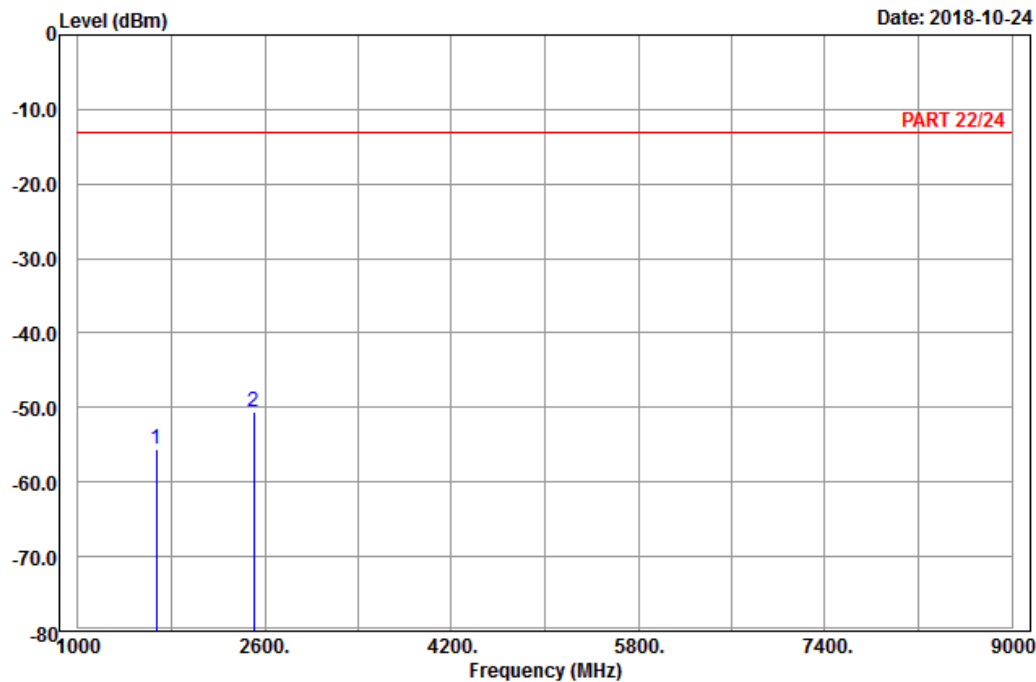


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 26_Link_CH26915
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-55.66	-63.57	-13.00	-42.66	7.91	Peak
2 pp	2509.50	-50.49	-61.77	-13.00	-37.49	11.28	Peak

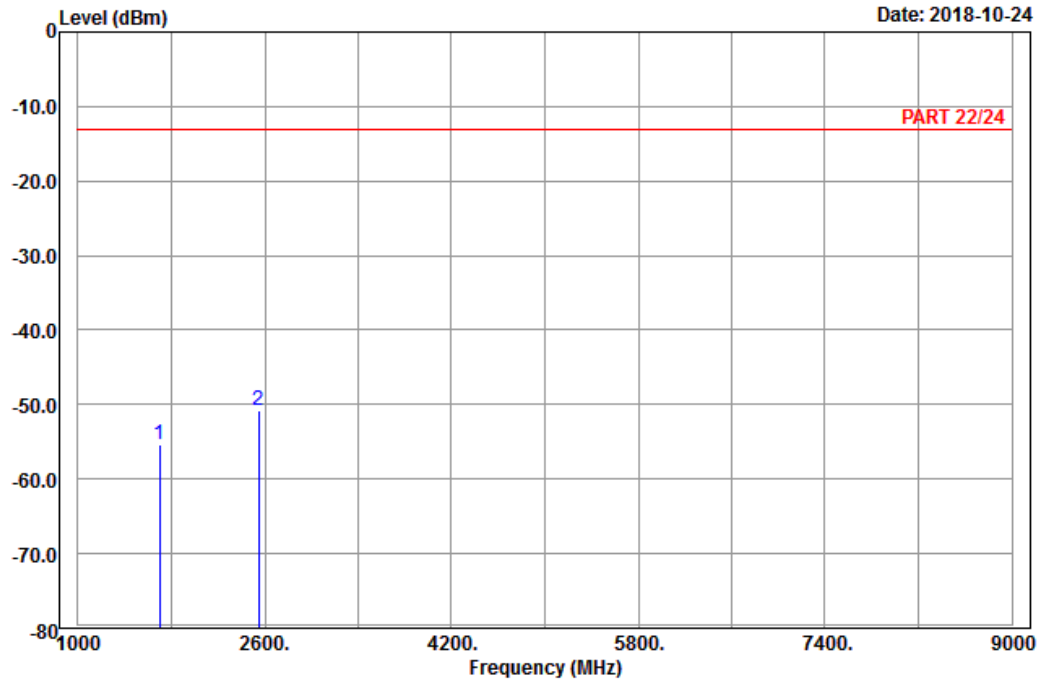
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : LTE_Band 26_Link_CH27033
 Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1696.60	-55.44	-63.58	-13.00	-42.44	8.14 Peak
2 pp	2544.90	-50.77	-62.24	-13.00	-37.77	11.47 Peak

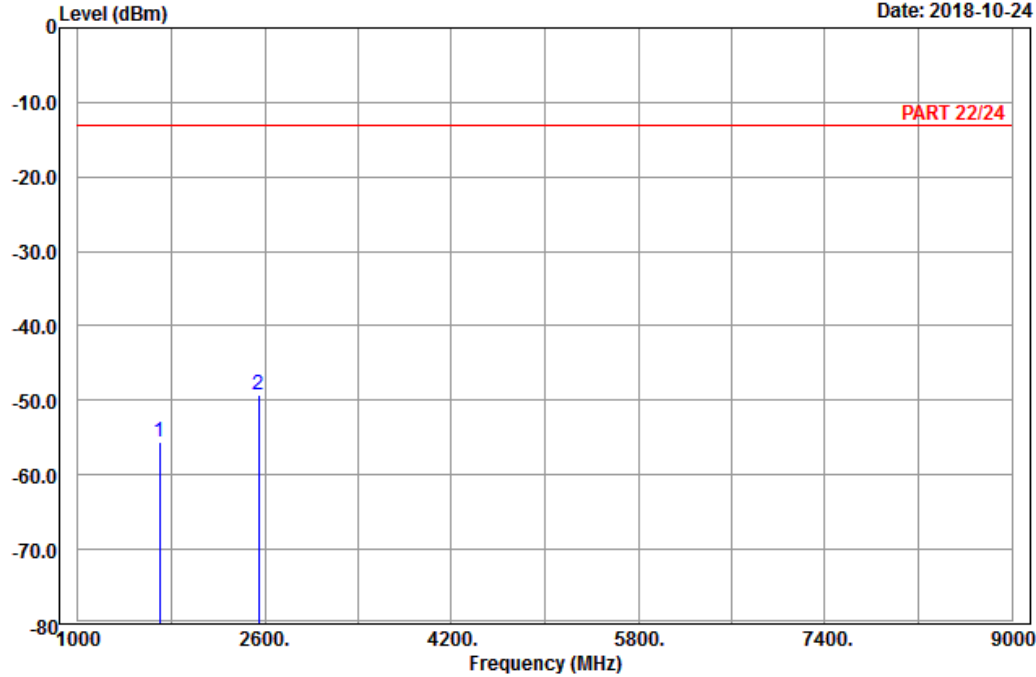


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 26_Link_CH27033
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1696.60	-55.58	-63.72	-13.00	-42.58	8.14	Peak
2 pp	2544.90	-49.23	-60.70	-13.00	-36.23	11.47	Peak

Channel Bandwidth: 5 MHz / QPSK
Low Channel

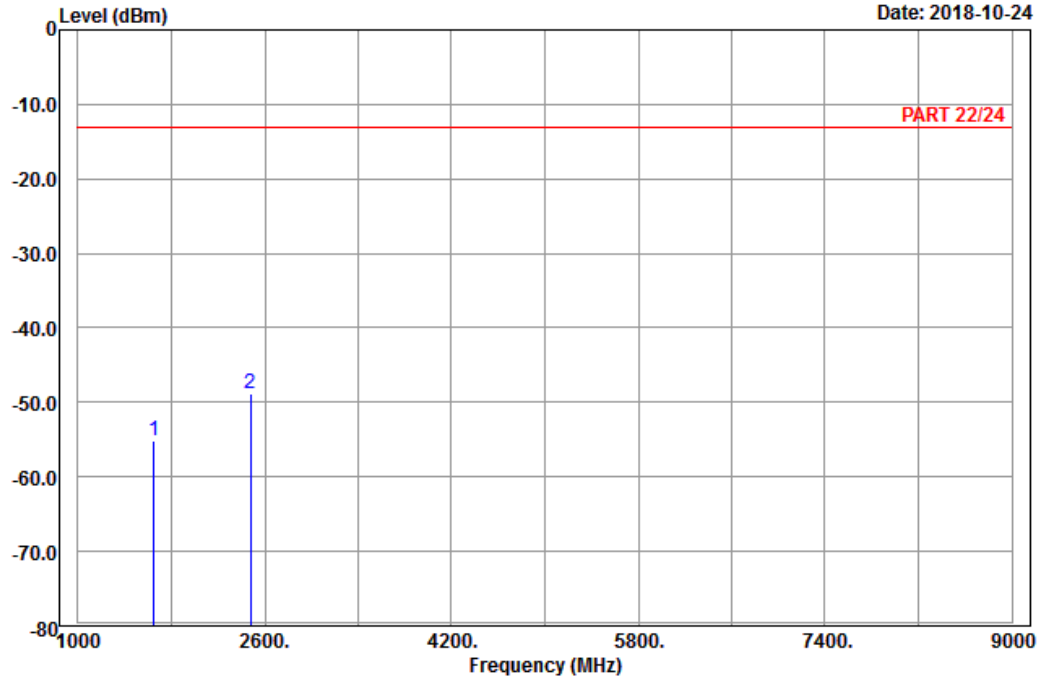


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 26_Link_CH26815
Tested by: Karl Lee

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1653.00	-55.18	-62.91	-13.00	-42.18	7.73	Peak
2 pp	2479.50	-48.90	-59.93	-13.00	-35.90	11.03	Peak

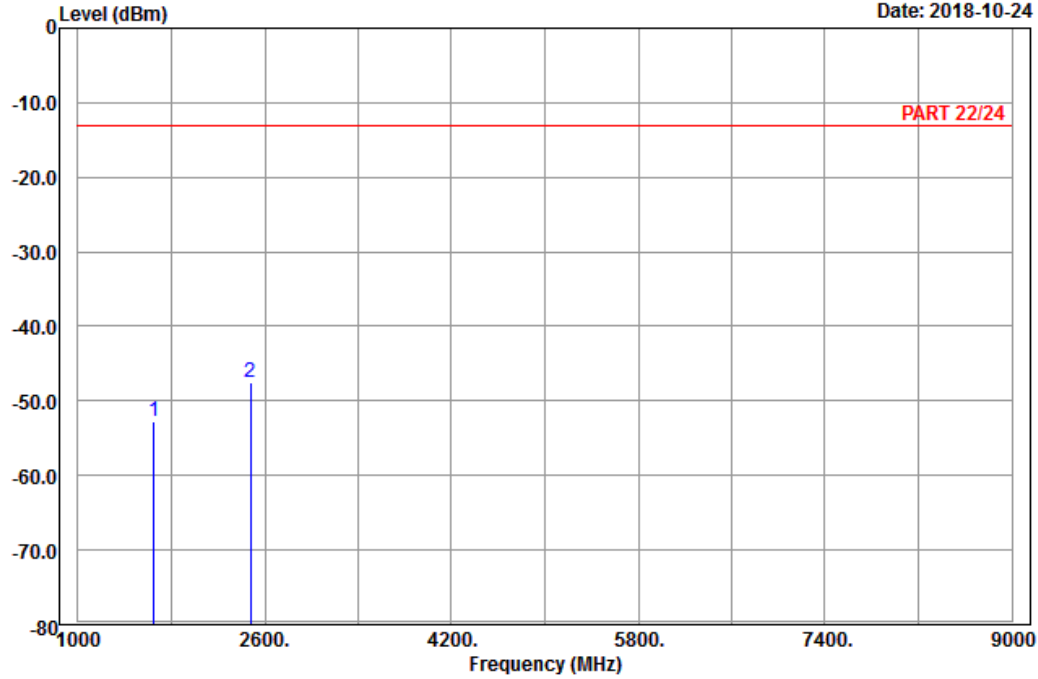


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 26_Link_CH26815
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1653.00	-52.84	-60.57	-13.00	-39.84	7.73	Peak
2 pp	2479.50	-47.57	-58.60	-13.00	-34.57	11.03	Peak

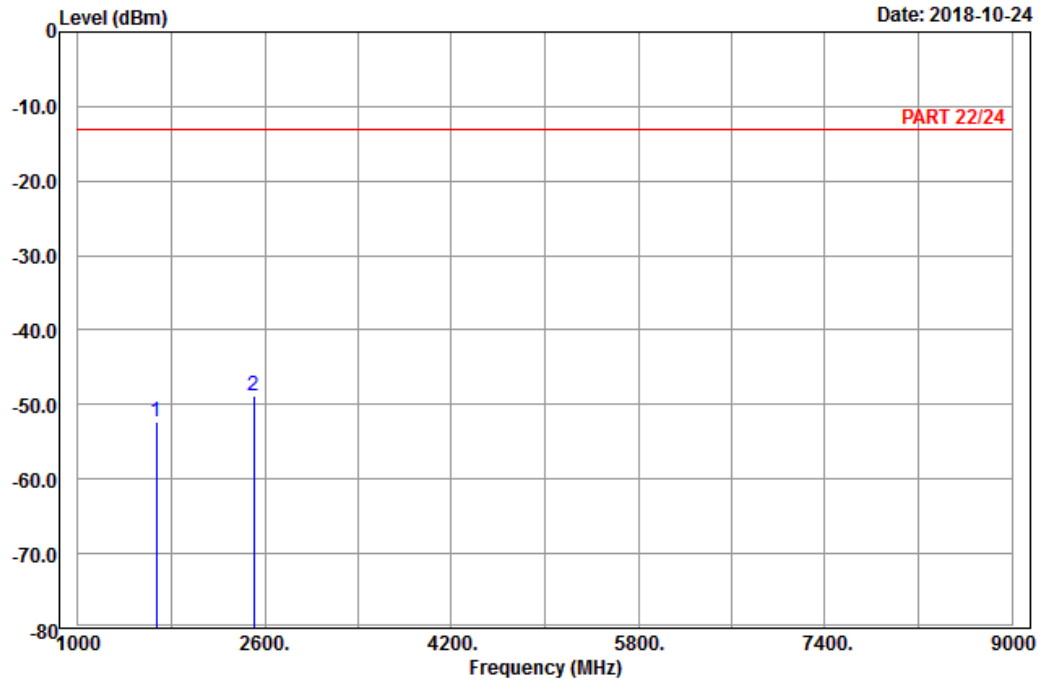
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : LTE_Band 26_Link_CH26915
 Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-52.33	-60.24	-13.00	-39.33	7.91 Peak
2 pp	2509.50	-48.90	-60.18	-13.00	-35.90	11.28 Peak

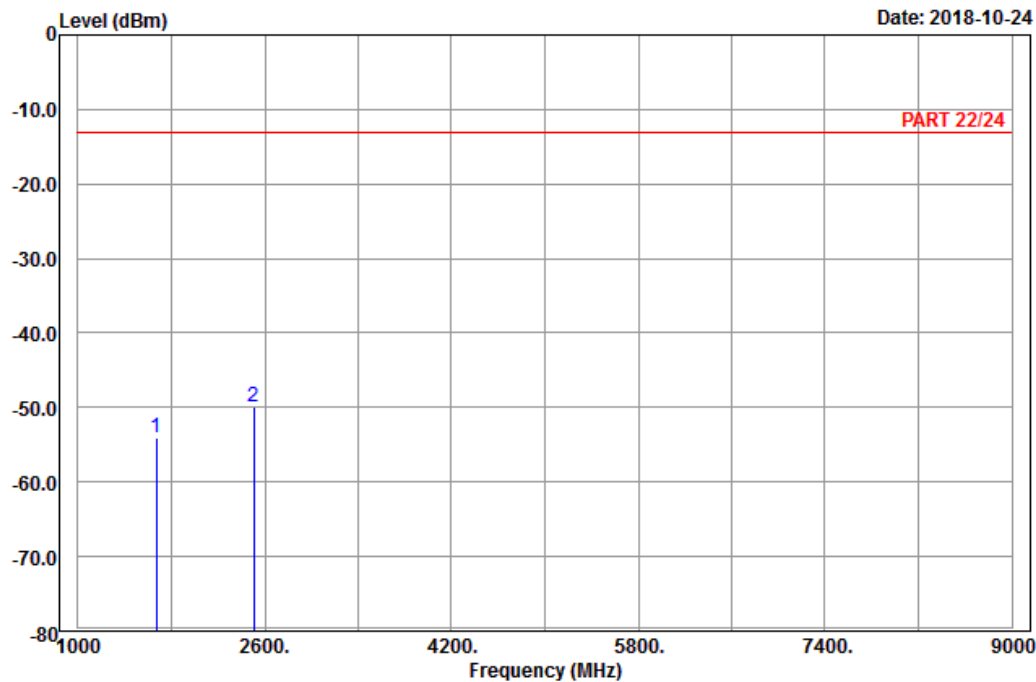


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 26_Link_CH26915
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-53.96	-61.87	-13.00	-40.96	7.91	Peak
2 pp	2509.50	-49.83	-61.11	-13.00	-36.83	11.28	Peak

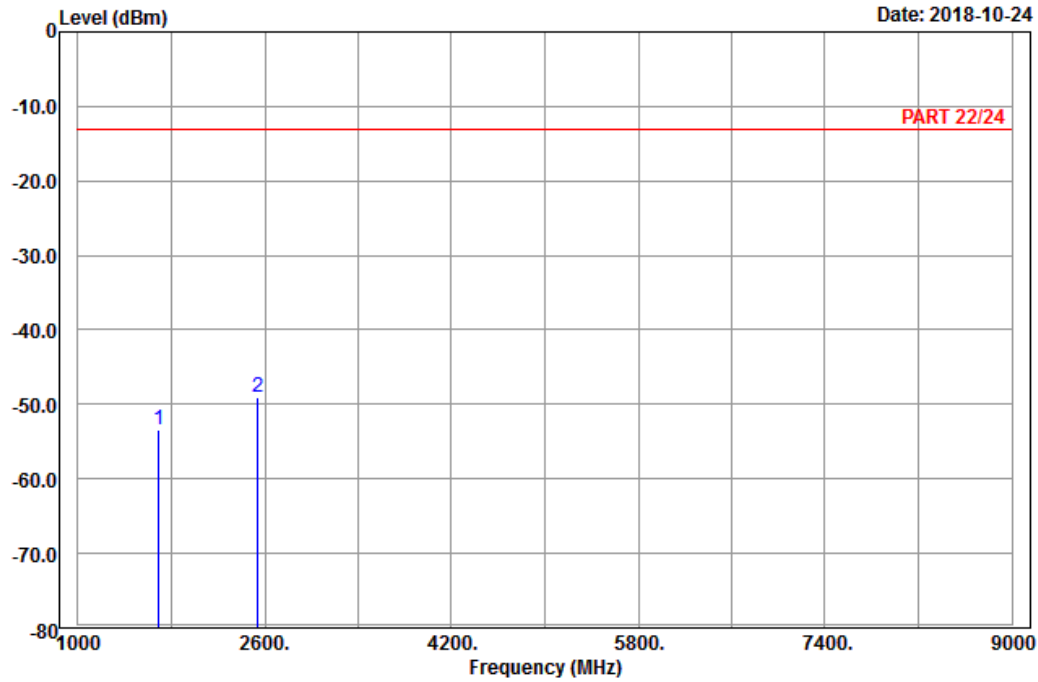
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : LTE_Band 26_Link_CH27015
 Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1693.00	-53.44	-61.46	-13.00	-40.44	8.02 Peak
2 pp	2539.50	-49.03	-60.50	-13.00	-36.03	11.47 Peak

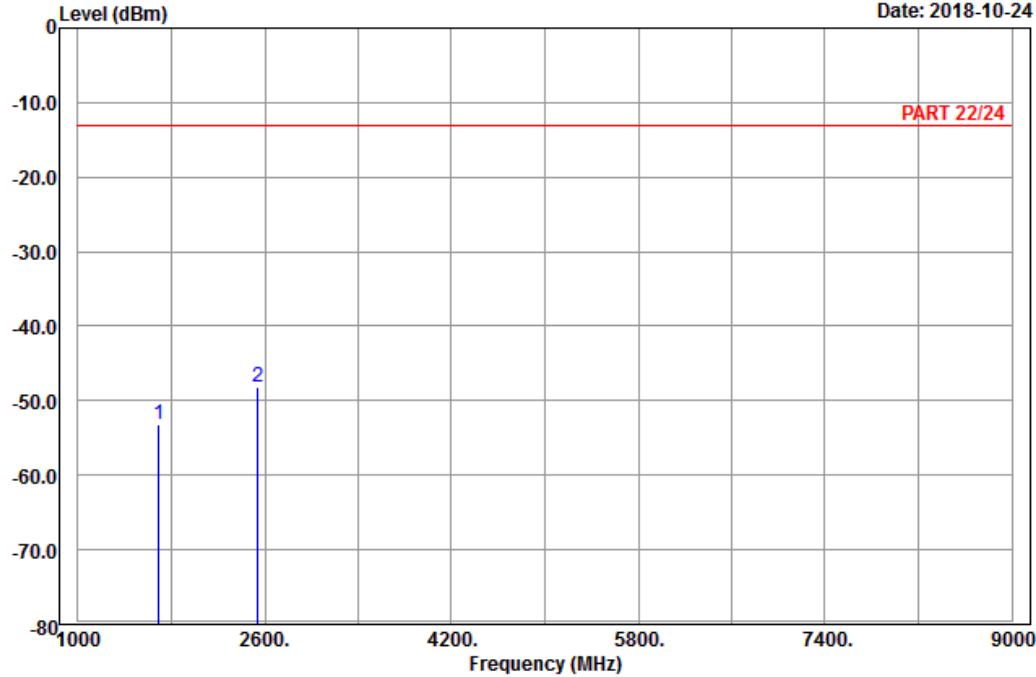


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 26_Link_CH27015
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1693.00	-53.21	-61.23	-13.00	-40.21	8.02	Peak
2 pp	2539.50	-48.11	-59.58	-13.00	-35.11	11.47	Peak

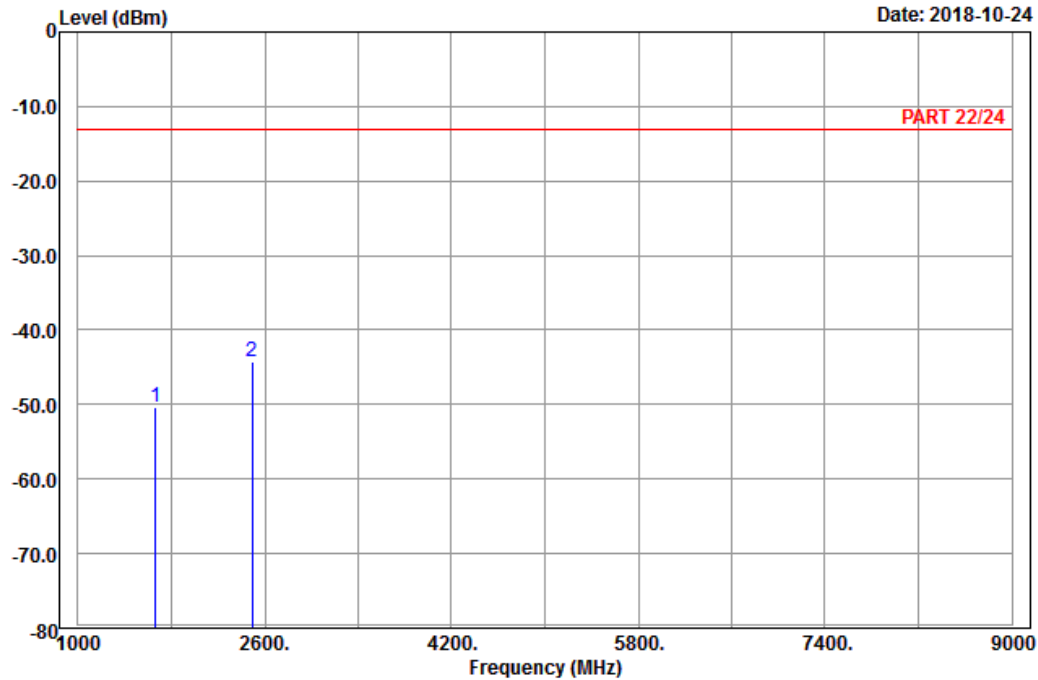
Channel Bandwidth: 15 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 26_Link_CH26865
Tested by: Karl Lee

		Read	Limit	Over			
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1663.00	-50.42	-58.33	-13.00	-37.42	7.91	Peak
2 pp	2494.50	-44.19	-55.23	-13.00	-31.19	11.04	Peak

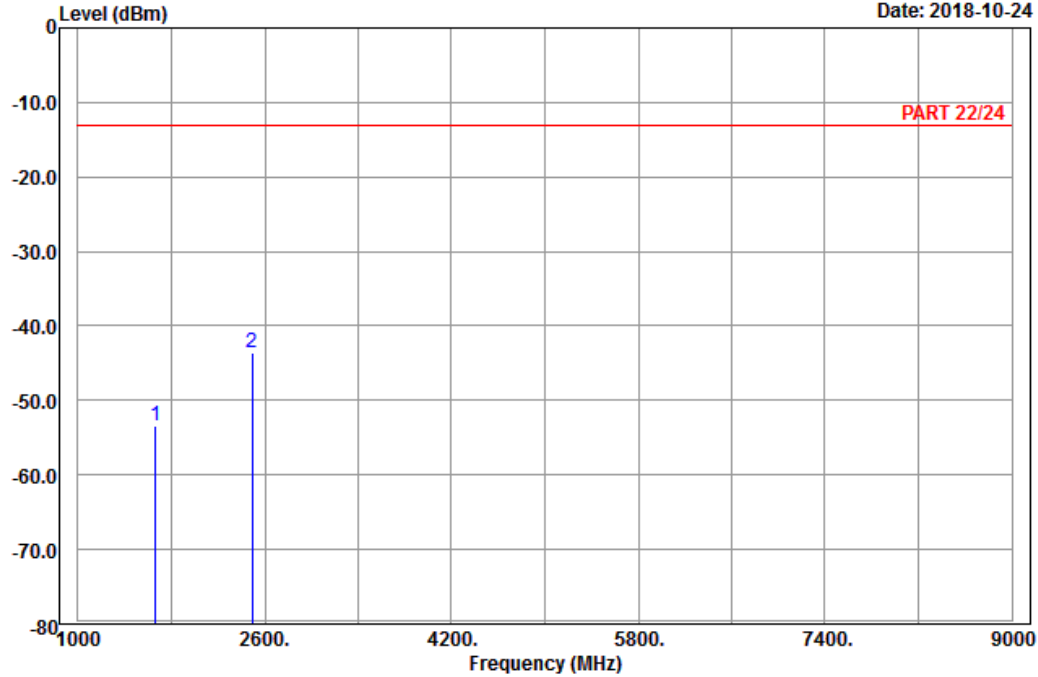


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 26_Link_CH26865
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1663.00	-53.50	-61.41	-13.00	-40.50	7.91	Peak
2 pp	2494.50	-43.57	-54.61	-13.00	-30.57	11.04	Peak

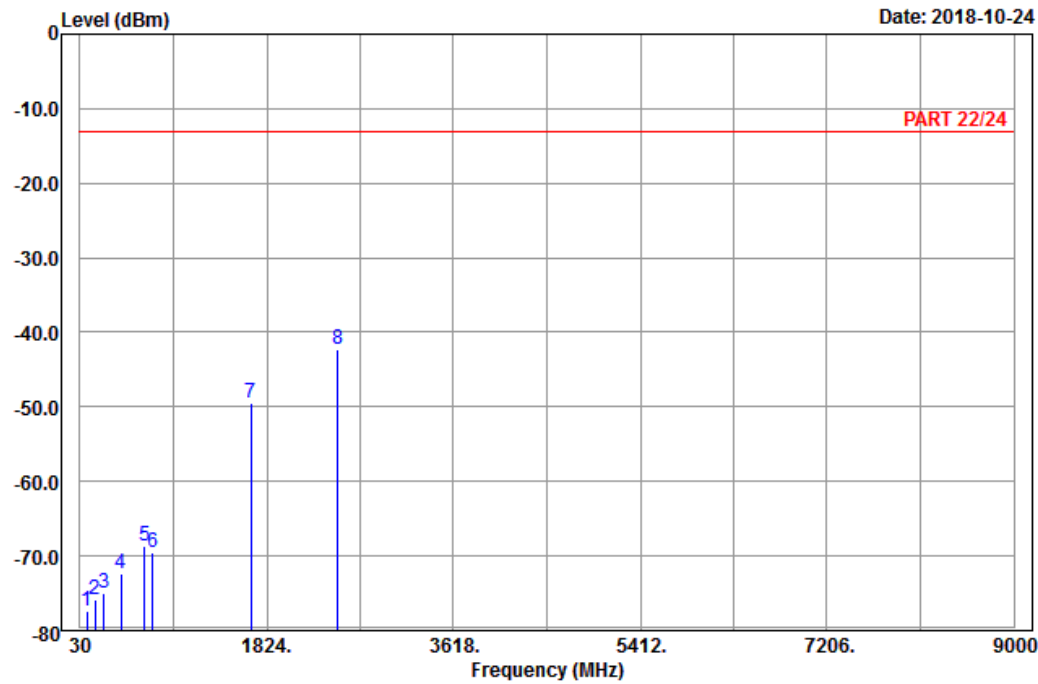
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : LTE_Band 26_Link_CH26915
 Tested by: Karl Lee

		Read	Limit	Over			
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	96.96	-77.35	-67.06	-13.00	-64.35	-10.29	Peak
2	177.96	-75.88	-70.10	-13.00	-62.88	-5.78	Peak
3	259.23	-75.09	-69.50	-13.00	-62.09	-5.59	Peak
4	421.80	-72.32	-69.09	-13.00	-59.32	-3.23	Peak
5	649.30	-68.75	-68.63	-13.00	-55.75	-0.12	Peak
6	729.10	-69.56	-68.63	-13.00	-56.56	-0.93	Peak
7	1673.00	-49.47	-57.38	-13.00	-36.47	7.91	Peak
8 pp	2509.50	-42.23	-53.51	-13.00	-29.23	11.28	Peak

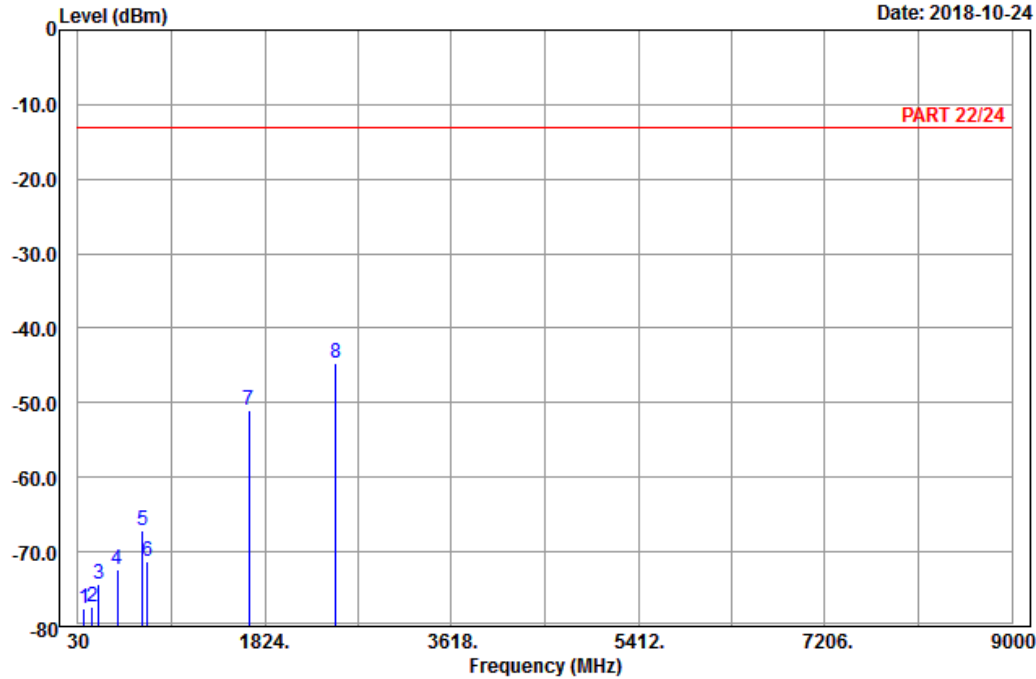


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 26_Link_CH26915
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	85.08	-77.71	-66.49	-13.00	-64.71	-11.22	Peak
2	168.78	-77.28	-70.48	-13.00	-64.28	-6.80	Peak
3	231.96	-74.36	-68.61	-13.00	-61.36	-5.75	Peak
4	405.00	-72.40	-69.53	-13.00	-59.40	-2.87	Peak
5	649.30	-67.19	-67.07	-13.00	-54.19	-0.12	Peak
6	699.70	-71.20	-70.83	-13.00	-58.20	-0.37	Peak
7	1673.00	-51.10	-59.01	-13.00	-38.10	7.91	Peak
8 pp	2509.50	-44.58	-55.86	-13.00	-31.58	11.28	Peak

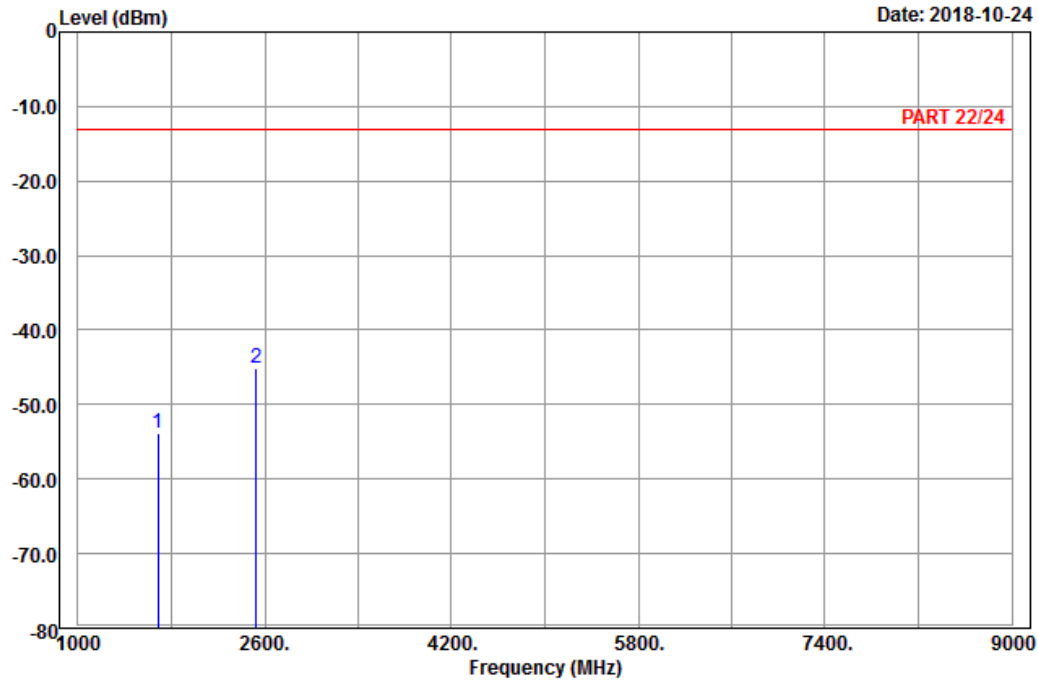
High Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 26_Link_CH26965
Tested by: Karl Lee

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1683.00	-53.88	-61.90	-13.00	-40.88	8.02 Peak
2 pp	2524.50	-45.23	-56.61	-13.00	-32.23	11.38 Peak

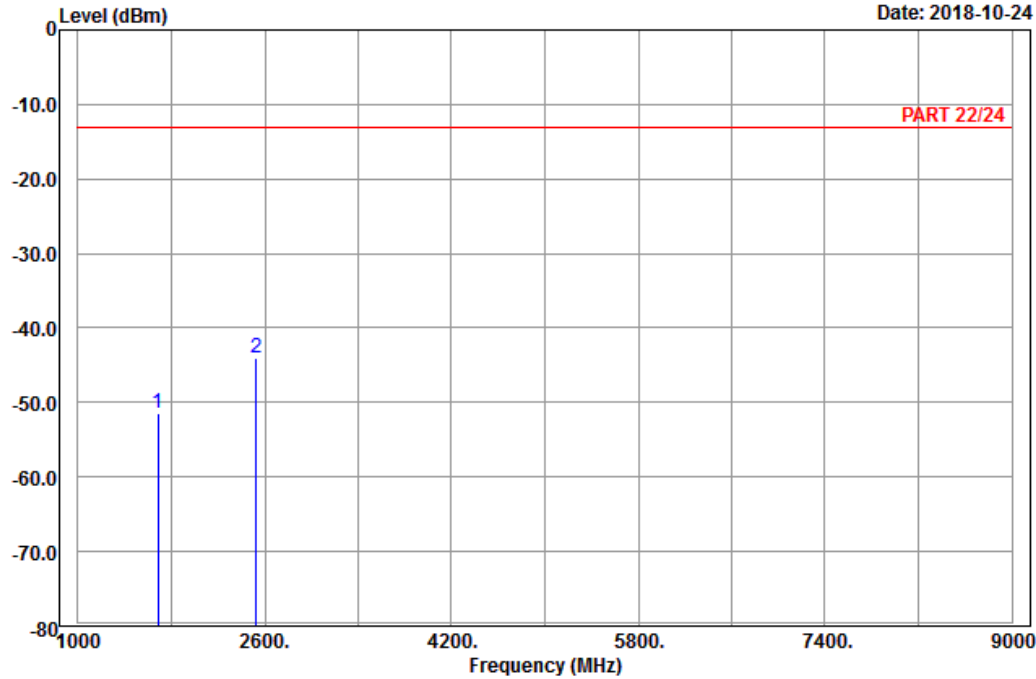


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2018-10-24



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 26_Link_CH26965
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1683.00	-51.49	-59.51	-13.00	-38.49	8.02	Peak
2 pp	2524.50	-43.99	-55.37	-13.00	-30.99	11.38	Peak

5 Pictures of Test Arrangements

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

Appendix – Information on 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:

Linko 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

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Tel: 886-3-3183232

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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.

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