

FCC Test Report

(PART 22)

Report No.: RF181008C16

FCC ID: NKRUMC-9628FHN

Test Model: UMC-9628FHN

Received Date: Oct. 08, 2018

Test Date: Oct. 24, 2018 ~ Nov. 07, 2018

Issued Date: Nov. 14, 2018

Applicant: Wistron NeWeb Corporation

Address: 20 Park Ave. II, Hsinchu Science Park, Hsinchu 308, Taiwan

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

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

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

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



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Release Control Record

Issue No.	Description	Date Issued
RF181008C16	Original Release	Nov. 14, 2018

1 Certificate of Conformity

Product: LTE Module

Brand: Wistron NeWeb Corp.

Test Model: UMC-9628FHN

Sample Status: Identical Prototype

Applicant: Wistron NeWeb Corporation

Test Date: Oct. 24, 2018 ~ Nov. 07, 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 : Gina Liu, **Date:** Nov. 14, 2018
Gina Liu / Specialist

Approved by : Dylan Chiou, **Date:** Nov. 14, 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 -31.46 dB at 2509.20 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	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 16, 2018	Mar. 15, 2019
Spectrum Analyzer Agilent	N9010A	MY52220314	Nov. 24, 2017	Nov. 23, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 06, 2017	Dec. 05, 2018
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
MXG Vector signal generator Agilent	N5182B	MY53050162	Jan. 10, 2018	Jan. 09, 2019
Preamplifier EMCI	EMC 012645	980115	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 330H	980112	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-800 0&3000	140811+170717	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1 000(140807)	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2018	Oct. 11, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jun. 28, 2017	Jun. 27, 2019
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	N/A	N/A

- Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 10.
 3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The IC Site Registration No. is 7450F-10.

3 General Information

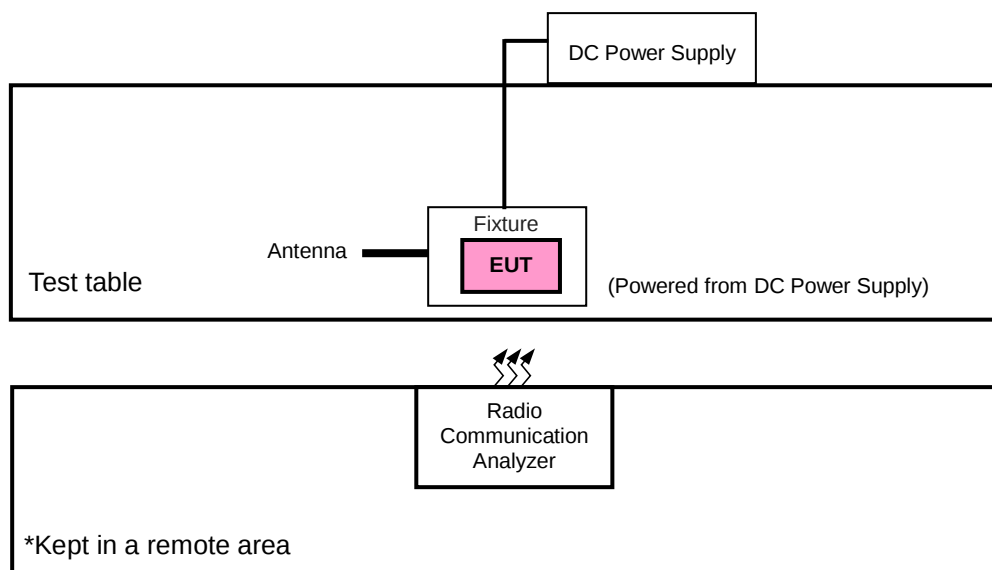
3.1 General Description of EUT

Product	LTE Module	
Brand	Wistron NeWeb Corp.	
Test Model	UMC-9628FHN	
Status of EUT	Identical Prototype	
Power Supply Rating	3.8 Vdc (DC Power Supply)	
Modulation Type	GSM/GPRS	GMSK
	EDGE	GMSK, 8PSK
	WCDMA	QPSK
	LTE	QPSK, 16QAM, 64QAM
Frequency Range	GSM/GPRS/EDGE	824.2 ~ 848.8 MHz
	WCDMA	826.4 ~ 846.6 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
Max. ERP Power	GSM/GPRS	2398.83 mW
	EDGE	528.45 mW
	WCDMA	314.77 mW
	LTE 5 (Channel Bandwidth: 1.4 MHz)	210.38 mW
	LTE 5 (Channel Bandwidth: 3 MHz)	222.33 mW
	LTE 5 (Channel Bandwidth: 5 MHz)	236.05 mW
	LTE 5 (Channel Bandwidth: 10 MHz)	250.03 mW
Emission Designator	GSM/GPRS	246KGXW
	EDGE	248KG7W
	WCDMA	4M15F9W
	LTE 5 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE 5 (Channel Bandwidth: 3 MHz)	2M70W7D
	LTE 5 (Channel Bandwidth: 5 MHz)	4M49W7D
	LTE 5 (Channel Bandwidth: 10 MHz)	8M97W7D
Antenna Type	Fixed External Antenna with 1.6 dBi gain	
Accessory Device	N/A	
Data Cable Supplied	N/A	

Note:

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

3.2 Configuration of System under Test



3.2.1 Description of Support Units

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

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Radio Communication Analyzer	Anritsu	MT8820C	6201300640	N/A
2.	Antenna	N/A	N/A	N/A	N/A
3.	DC Power Supply	Topward	33010D	807748	

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

Note:

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

3.3 Test Mode Applicability and Tested Channel Detail

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

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

Band	ERP	Radiated Emission
GSM	Z-plane	X-axis
EDGE	Z-plane	X-axis
WCDMA	Z-plane	X-axis
LTE Band 5	Z-plane	Z-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	4132	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

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 / 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
-	Modulation Characteristics	20450 to 20600	20525	5 MHz	QPSK, 16QAM, 64QAM	1 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	20425	5 MHz	QPSK	1 RB / 0 RB Offset
			20625	5 MHz	QPSK	15 RB / 0 RB Offset
		20450 to 20600	20450	10 MHz	QPSK	1 RB / 0 RB Offset
			20600	10 MHz	QPSK	1 RB / 14 RB Offset
		20407 to 20643	20407	1.4MHz	QPSK	25 RB / 0 RB Offset
			20643	1.4MHz	QPSK	1 RB / 24 RB Offset
		20415 to 20635	20415	3 MHz	QPSK	25 RB / 0 RB Offset
			20635	3 MHz	QPSK	50 RB / 0 RB Offset
-	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

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

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Conducted Emission	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK	1 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK	1 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK	1 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10 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	3.8 Vdc	Jisyong Wang
Modulation Characteristics	25 deg. C, 65 % RH	3.8 Vdc	Frank Chiu
Frequency Stability	25 deg. C, 65 % RH	3.8 Vdc	Frank Chiu
Occupied Bandwidth	25 deg. C, 65 % RH	3.8 Vdc	Frank Chiu
Band Edge	25 deg. C, 65 % RH	3.8 Vdc	Frank Chiu
Peak to Average Ratio	25 deg. C, 65 % RH	3.8 Vdc	Frank Chiu
Conducted Emission	25 deg. C, 65 % RH	3.8 Vdc	Frank Chiu
Radiated Emission	25 deg. C, 65 % RH	3.8 Vdc	Jisyong Wang, Thomas Wei

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

3.5 General Description of Applied Standards

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

FCC 47 CFR Part 2

FCC 47 CFR Part 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 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, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

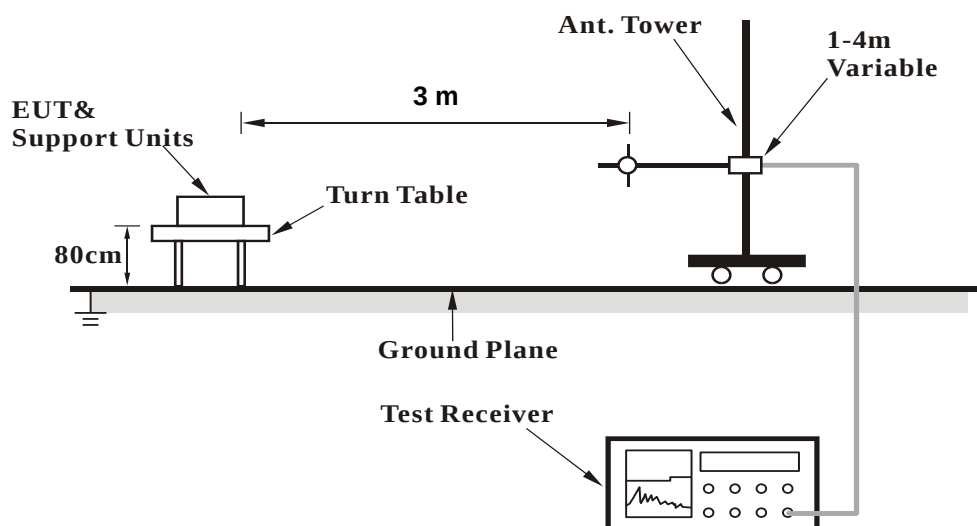
Conducted Power Measurement:

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

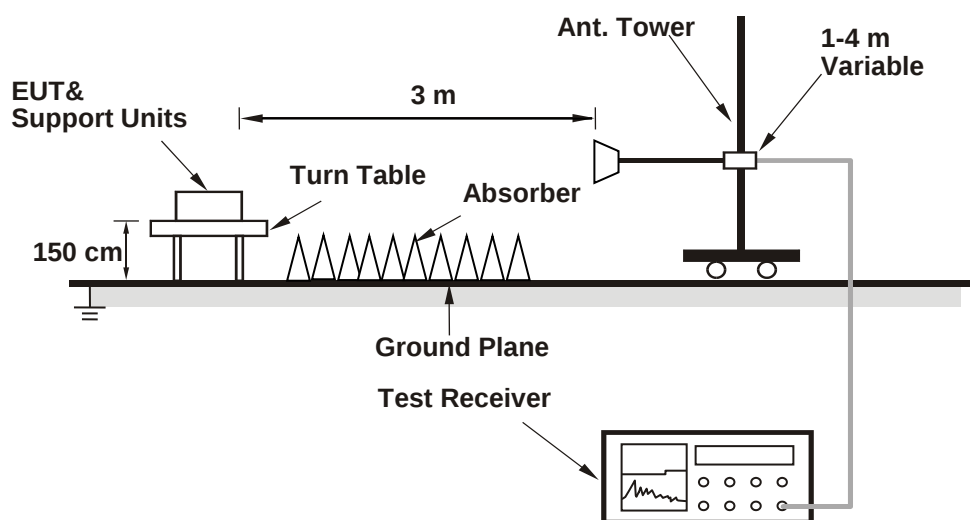
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

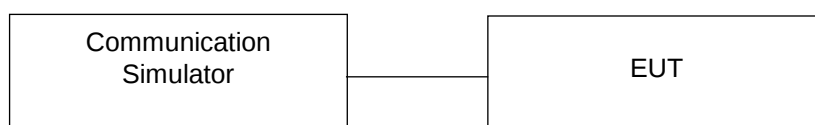


<Radiated Emission above 1 GHz>



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

Conducted Power Measurement:



4.1.4 Test Results

Conducted Output Power (dBm)

Band	GSM850		
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
GPRS (GMSK, 1Tx-slot)	33.35	33.34	33.45
EDGE (8PSK, 1Tx-slot)	26.91	26.93	27.08

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	24.44	24.26	24.02
HSDPA Subtest-1	22.78	22.53	22.28
HSDPA Subtest-2	22.84	22.63	22.21
HSDPA Subtest-3	22.43	22.11	22.69
HSDPA Subtest-4	22.42	22.12	22.69
HSUPA Subtest-1	22.73	22.68	21.54
HSUPA Subtest-2	21.45	21.52	21.10
HSUPA Subtest-3	21.94	21.22	20.83
HSUPA Subtest-4	22.48	21.81	21.44
HSUPA Subtest-5	22.90	22.70	22.10

LTE Band 5															
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	24.04	24.13	23.69	0	5M	QPSK	1	0	23.87	23.89	23.48	0
		1	24	23.84	23.86	23.46	0			1	12	23.78	23.88	23.44	0
		1	49	23.63	23.67	23.21	0			1	24	23.68	23.66	23.35	0
		25	0	22.82	22.87	22.42	1			12	0	22.81	22.79	22.41	1
		25	12	22.69	22.65	22.22	1			12	6	22.61	22.65	22.22	1
		25	25	22.59	22.52	22.15	1			12	13	22.44	22.55	22.18	1
	16QAM	50	0	22.71	22.90	22.48	1			25	0	22.64	22.79	22.35	1
		1	0	22.66	22.79	22.38	1		16QAM	1	0	22.69	22.69	22.27	1
		1	24	22.76	22.88	22.40	1			1	12	22.77	22.79	22.33	1
		1	49	22.60	22.65	22.29	1			1	24	22.51	22.65	22.30	1
		25	0	21.62	21.73	21.32	2			12	0	21.66	21.73	21.23	2
		25	12	21.55	21.72	21.20	2			12	6	21.55	21.62	21.07	2
	64QAM	25	25	21.45	21.54	21.19	2			12	13	21.36	21.50	21.09	2
		50	0	21.74	21.81	21.44	2			25	0	21.60	21.76	21.32	2
		1	0	21.85	21.91	21.45	2		64QAM	1	0	21.73	21.89	21.42	2
		1	24	21.72	21.81	21.37	2			1	12	21.70	21.77	21.31	2
		1	49	21.50	21.60	21.14	2			1	24	21.55	21.49	21.14	2
		25	0	20.60	20.47	20.15	3			12	0	20.56	20.54	20.16	3
		25	12	20.47	20.64	20.25	3			12	6	20.44	20.53	20.04	3
		25	25	20.52	20.43	20.06	3			12	13	20.37	20.56	19.97	3
3M	QPSK	50	0	20.80	20.72	20.30	3			25	0	20.59	20.52	20.15	3
		1	0	23.84	23.90	23.43	0	1.4M	QPSK	1	0	23.81	23.78	23.37	0
		1	7	23.67	23.75	23.29	0			1	2	23.62	23.78	23.31	0
		1	14	23.53	23.63	23.08	0			1	5	23.44	23.56	23.06	0
		8	0	22.63	22.75	22.42	1			3	0	22.67	22.72	22.36	0
		8	3	22.49	22.59	22.13	1			3	1	22.49	22.50	22.07	0
	16QAM	8	7	22.33	22.57	22.14	1			3	3	22.36	22.49	21.96	0
		15	0	22.69	22.71	22.27	1			6	0	22.66	22.69	22.20	1
		1	0	22.49	22.61	22.17	1		16QAM	1	0	22.71	22.73	22.43	1
		1	7	22.63	22.68	22.30	1			1	2	22.57	22.77	22.15	1
		1	14	22.42	22.48	22.07	1			1	5	22.50	22.66	21.99	1
		8	0	21.57	21.78	21.30	2			3	0	21.61	21.66	21.23	1
	64QAM	8	3	21.45	21.56	21.10	2			3	1	21.40	21.52	21.10	1
		8	7	21.38	21.44	21.17	2			3	3	21.31	21.37	20.90	1
		15	0	21.66	21.62	21.31	2			6	0	21.51	21.67	21.30	2
		1	0	21.71	21.78	21.33	2		64QAM	1	0	21.68	21.73	21.36	2
		1	7	21.61	21.66	21.24	2			1	2	21.63	21.63	21.30	2
		1	14	21.30	21.45	21.13	2			1	5	21.52	21.64	21.24	2
		8	0	20.62	20.55	20.18	3			3	0	21.46	21.53	21.18	2
		8	3	20.47	20.53	20.13	3			3	1	21.44	21.38	21.09	2
		8	7	20.44	20.51	20.00	3			3	3	21.33	21.42	21.15	2
		15	0	20.46	20.69	20.12	3			6	0	20.54	20.53	20.22	3

ERP Power (dBm)

GSM							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	128	824.2	-9.49	32.62	20.98	125.31	H
	189	836.4	-8.85	32.52	21.52	141.91	
	251	848.8	-9.11	32.65	21.39	137.72	
	128	824.2	2.91	32.76	33.52	2249.05	V
	189	836.4	3.56	32.39	33.80	2398.83	
	251	848.8	3.24	32.54	33.63	2306.75	

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)
Z	128	824.2	-10.49	32.62	19.98	99.54	H
	189	836.4	-10.11	32.52	20.26	106.17	
	251	848.8	-10.37	32.65	20.13	103.04	
	128	824.2	-3.76	32.76	26.85	484.17	V
	189	836.4	-3.01	32.39	27.23	528.45	
	251	848.8	-3.38	32.54	27.01	502.34	

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)
Z	4132	826.4	-12.49	32.62	17.98	62.81	H
	4182	836.4	-11.85	32.52	18.52	71.12	
	4233	846.6	-12.37	32.65	18.13	65.01	
	4132	826.4	-5.93	32.76	24.68	293.76	V
	4182	836.4	-5.26	32.39	24.98	314.77	
	4233	846.6	-5.60	32.54	24.79	301.30	

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)
Z	20407	824.7	-13.37	32.62	17.10	51.29	H
	20525	836.5	-12.43	32.52	17.94	62.23	
	20643	848.3	-12.93	32.65	17.57	57.15	
	20407	824.7	-7.77	32.76	22.84	192.31	V
	20525	836.5	-7.01	32.39	23.23	210.38	
	20643	848.3	-7.39	32.54	23.00	199.53	
Channel Bandwidth: 1.4 MHz / 16QAM							
Z	20407	824.7	-14.36	32.62	16.11	40.83	H
	20525	836.5	-13.42	32.52	16.95	49.55	
	20643	848.3	-13.92	32.65	16.58	45.50	
	20407	824.7	-8.76	32.76	21.85	153.11	V
	20525	836.5	-8.00	32.39	22.24	167.49	
	20643	848.3	-8.38	32.54	22.01	158.85	
Channel Bandwidth: 1.4 MHz / 64QAM							
Z	20407	824.7	-15.31	32.62	15.16	32.81	H
	20525	836.5	-14.37	32.52	16.00	39.81	
	20643	848.3	-14.87	32.65	15.63	36.56	
	20407	824.7	-9.71	32.76	20.90	123.03	V
	20525	836.5	-8.95	32.39	21.29	134.59	
	20643	848.3	-9.33	32.54	21.06	127.64	

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)
Z	20415	825.5	-13.13	32.62	17.34	54.20	H
	20525	836.5	-12.19	32.52	18.18	65.77	
	20635	847.5	-12.69	32.65	17.81	60.39	
	20415	825.5	-7.53	32.76	23.08	203.24	V
	20525	836.5	-6.77	32.39	23.47	222.33	
	20635	847.5	-7.15	32.54	23.24	210.86	
Channel Bandwidth: 3 MHz / 16QAM							
Z	20415	825.5	-14.12	32.62	16.35	43.15	H
	20525	836.5	-13.18	32.52	17.19	52.36	
	20635	847.5	-13.68	32.65	16.82	48.08	
	20415	825.5	-8.52	32.76	22.09	161.81	V
	20525	836.5	-7.76	32.39	22.48	177.01	
	20635	847.5	-8.14	32.54	22.25	167.88	
Channel Bandwidth: 3 MHz / 64QAM							
Z	20415	825.5	-15.10	32.62	15.37	34.43	H
	20525	836.5	-14.16	32.52	16.21	41.78	
	20635	847.5	-14.66	32.65	15.84	38.37	
	20415	825.5	-9.50	32.76	21.11	129.12	V
	20525	836.5	-8.74	32.39	21.50	141.25	
	20635	847.5	-9.12	32.54	21.27	133.97	

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)
Z	20425	826.5	-12.87	32.62	17.60	57.54	H
	20525	836.5	-11.93	32.52	18.44	69.82	
	20625	846.5	-12.43	32.65	18.07	64.12	
	20425	826.5	-7.27	32.76	23.34	215.77	V
	20525	836.5	-6.51	32.39	23.73	236.05	
	20625	846.5	-6.89	32.54	23.50	223.87	
Channel Bandwidth: 5 MHz / 16QAM							
Z	20425	826.5	-13.89	32.62	16.58	45.50	H
	20525	836.5	-12.95	32.52	17.42	55.21	
	20625	846.5	-13.45	32.65	17.05	50.70	
	20425	826.5	-8.29	32.76	22.32	170.61	V
	20525	836.5	-7.53	32.39	22.71	186.64	
	20625	846.5	-7.91	32.54	22.48	177.01	
Channel Bandwidth: 5 MHz / 64QAM							
Z	20425	826.5	-14.86	32.62	15.61	36.39	H
	20525	836.5	-13.92	32.52	16.45	44.16	
	20625	846.5	-14.42	32.65	16.08	40.55	
	20425	826.5	-9.26	32.76	21.35	136.46	V
	20525	836.5	-8.50	32.39	21.74	149.28	
	20625	846.5	-8.88	32.54	21.51	141.58	

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)
Z	20450	829.0	-12.62	32.62	17.85	60.95	H
	20525	836.5	-11.68	32.52	18.69	73.96	
	20600	844.0	-12.18	32.65	18.32	67.92	
	20450	829.0	-7.02	32.76	23.59	228.56	V
	20525	836.5	-6.26	32.39	23.98	250.03	
	20600	844.0	-6.64	32.54	23.75	237.14	
Channel Bandwidth: 10 MHz / 16QAM							
Z	20425	826.5	-13.64	32.62	16.83	48.19	H
	20525	836.5	-12.70	32.52	17.67	58.48	
	20625	846.5	-13.20	32.65	17.30	53.70	
	20425	826.5	-8.04	32.76	22.57	180.72	V
	20525	836.5	-7.28	32.39	22.96	197.70	
	20625	846.5	-7.66	32.54	22.73	187.50	
Channel Bandwidth: 10 MHz / 64QAM							
Z	20450	829.0	-14.63	32.62	15.84	38.37	H
	20525	836.5	-13.69	32.52	16.68	46.56	
	20600	844.0	-14.19	32.65	16.31	42.76	
	20450	829.0	-9.03	32.76	21.58	143.88	V
	20525	836.5	-8.27	32.39	21.97	157.40	
	20600	844.0	-8.65	32.54	21.74	149.28	

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

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

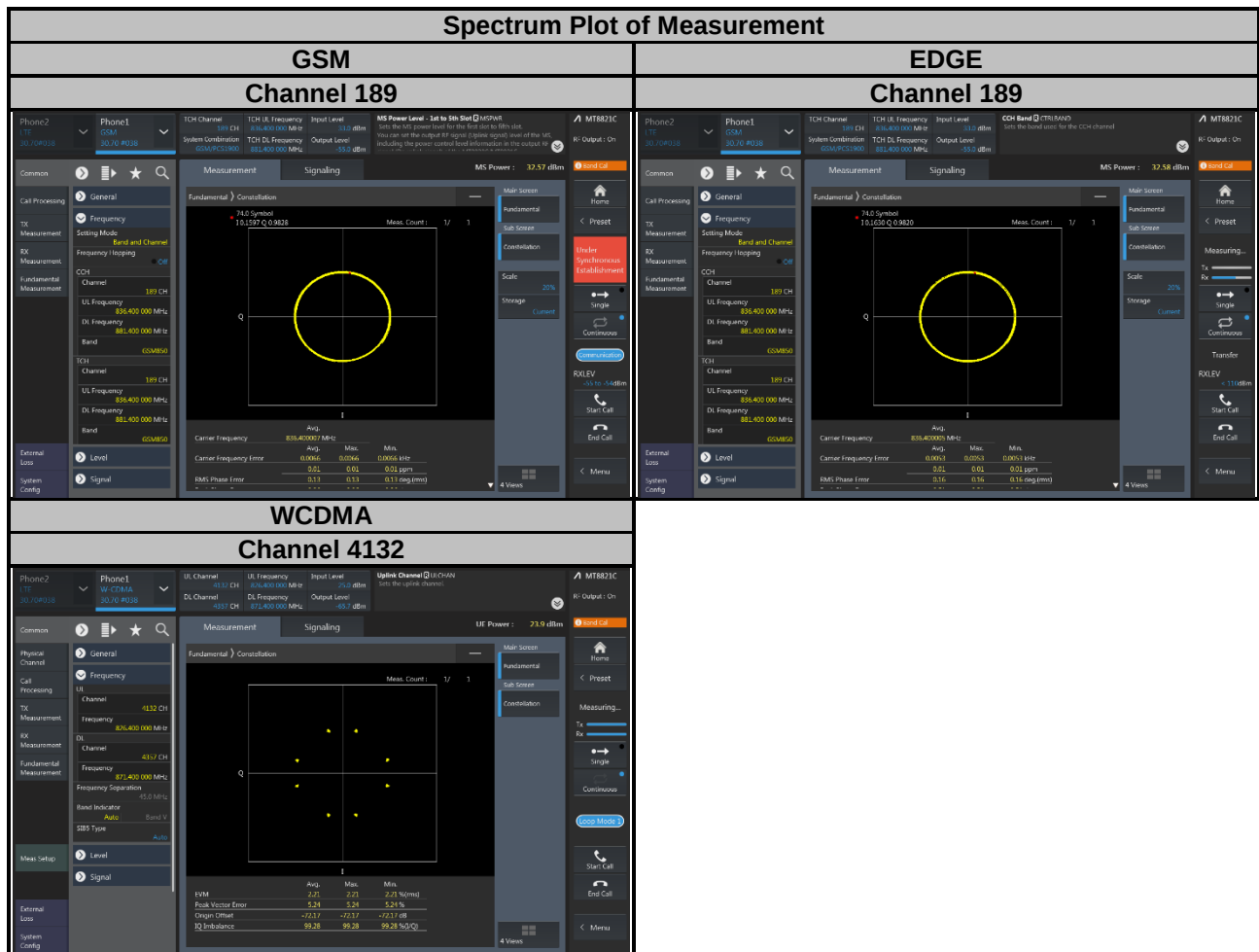
4.2.2 Test Setup



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

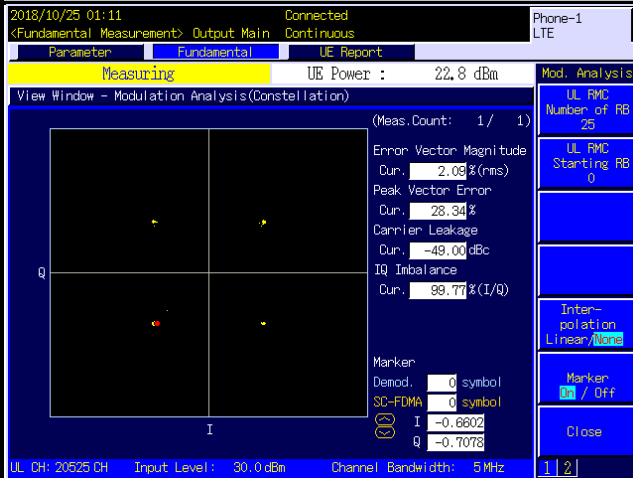


Spectrum Plot of Measurement

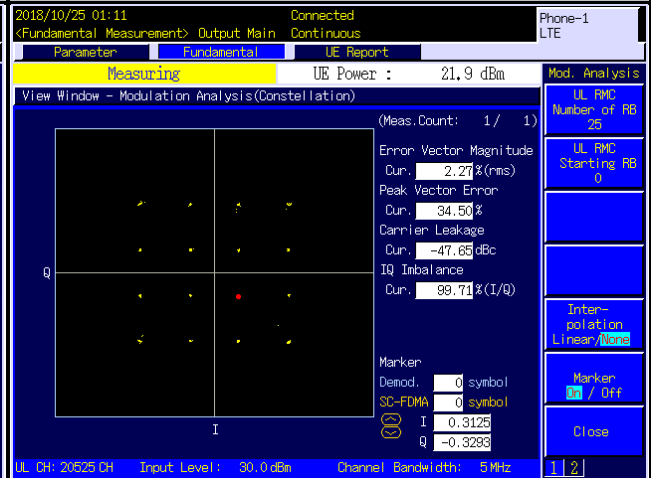
LTE Band 5

Channel 20525

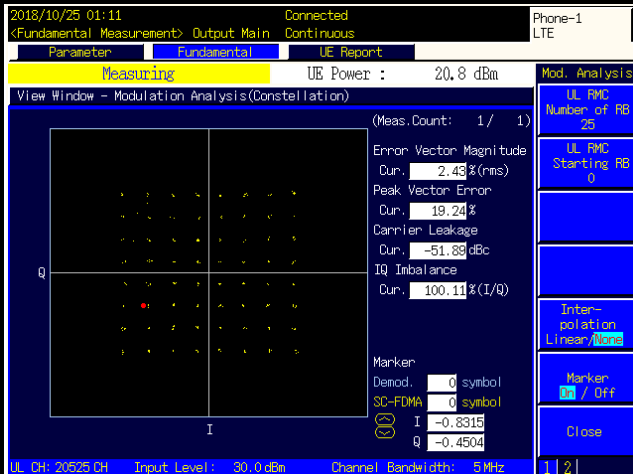
QPSK



16QAM



64QAM



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

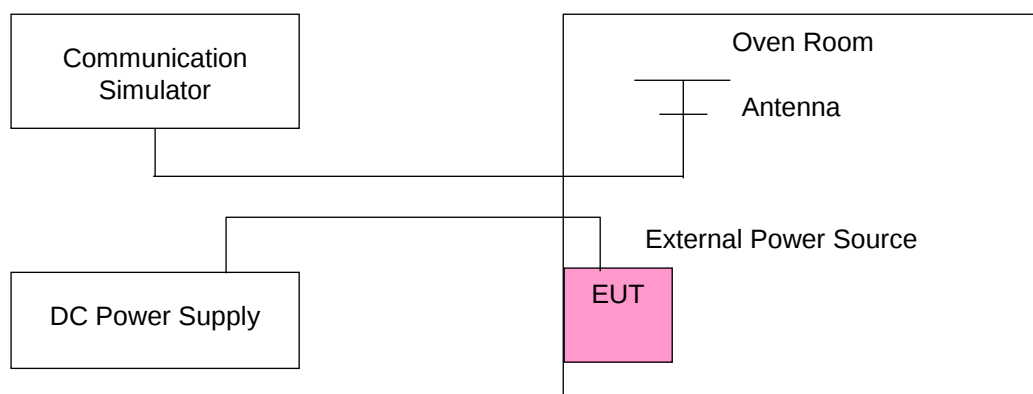
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

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)	
3.8	824.200002	0.002	848.800003	0.003	2.5
3.23	824.200004	0.005	848.800002	0.003	2.5
4.37	824.200002	0.003	848.800004	0.005	2.5

Note: The applicant defined the normal working voltage of the DC Power Supply is from 3.23 Vdc to 4.37 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	824.200002	0.002	848.800002	0.002	2.5
-20	824.200003	0.004	848.800003	0.004	2.5
-10	824.200001	0.001	848.800003	0.003	2.5
0	824.200001	0.001	848.800004	0.004	2.5
10	824.200003	0.003	848.800002	0.002	2.5
20	824.200001	0.002	848.800001	0.001	2.5
30	824.199998	-0.003	848.799996	-0.005	2.5
40	824.199998	-0.002	848.799999	-0.002	2.5
50	824.199996	-0.004	848.799997	-0.003	2.5
60	824.199997	-0.003	848.799998	-0.002	2.5
70	824.199998	-0.002	848.799997	-0.004	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)	
3.8	824.200003	0.003	848.800001	0.001	2.5
3.23	824.200002	0.002	848.800003	0.004	2.5
4.37	824.200003	0.003	848.800001	0.002	2.5

Note: The applicant defined the normal working voltage of the DC Power Supply is from 3.23 Vdc to 4.37 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	0.002	848.800002	0.002	2.5
-20	824.200003	0.003	848.800002	0.002	2.5
-10	824.200003	0.004	848.800002	0.002	2.5
0	824.200003	0.004	848.800002	0.002	2.5
10	824.200003	0.004	848.800003	0.003	2.5
20	824.200003	0.003	848.800002	0.003	2.5
30	824.199997	-0.003	848.799996	-0.004	2.5
40	824.199999	-0.002	848.799996	-0.004	2.5
50	824.199998	-0.003	848.799997	-0.004	2.5
60	824.199996	-0.005	848.799999	-0.001	2.5
70	824.199998	-0.003	848.799999	-0.002	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)	
3.8	826.400002	0.003	846.600003	0.004	2.5
3.23	826.400002	0.003	846.600003	0.004	2.5
4.37	826.400004	0.005	846.600002	0.002	2.5

Note: The applicant defined the normal working voltage of the DC Power Supply is from 3.23 Vdc to 4.37 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	826.400004	0.004	846.600002	0.002	2.5
-20	826.400003	0.004	846.600003	0.004	2.5
-10	826.400004	0.004	846.600001	0.002	2.5
0	826.400003	0.004	846.600003	0.004	2.5
10	826.400002	0.002	846.600002	0.002	2.5
20	826.400003	0.004	846.600002	0.002	2.5
30	826.399998	-0.003	846.599998	-0.002	2.5
40	826.399998	-0.002	846.599997	-0.003	2.5
50	826.399998	-0.002	846.599998	-0.002	2.5
60	826.399998	-0.002	846.599998	-0.003	2.5
70	826.399998	-0.002	846.599997	-0.004	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)	
3.8	824.700001	0.001	848.300001	0.001	2.5
3.23	824.700004	0.004	848.300002	0.002	2.5
4.37	824.700002	0.002	848.300001	0.001	2.5

Note: The applicant defined the normal working voltage of the DC Power Supply is from 3.23 Vdc to 4.37 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	824.700003	0.004	848.300002	0.003	2.5
-20	824.700003	0.004	848.300003	0.004	2.5
-10	824.700003	0.004	848.300002	0.002	2.5
0	824.700002	0.003	848.300004	0.004	2.5
10	824.700004	0.005	848.300003	0.004	2.5
20	824.700002	0.002	848.299997	-0.004	2.5
30	824.699998	-0.003	848.299996	-0.004	2.5
40	824.699997	-0.004	848.299997	-0.004	2.5
50	824.699997	-0.003	848.299997	-0.004	2.5
60	824.699997	-0.003	848.299997	-0.004	2.5
70	824.699999	-0.001	848.299999	-0.002	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)	
3.8	825.500003	0.004	847.500003	0.003	2.5
3.23	825.500002	0.002	847.500003	0.003	2.5
4.37	825.500002	0.002	847.500002	0.002	2.5

Note: The applicant defined the normal working voltage of the DC Power Supply is from 3.23 Vdc to 4.37 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	825.500004	0.004	847.500004	0.004	2.5
-20	825.500003	0.003	847.500002	0.002	2.5
-10	825.500004	0.004	847.500003	0.003	2.5
0	825.500003	0.003	847.500001	0.002	2.5
10	825.500003	0.003	847.500001	0.002	2.5
20	825.500002	0.002	847.499998	-0.003	2.5
30	825.499998	-0.003	847.499998	-0.003	2.5
40	825.499996	-0.004	847.499998	-0.003	2.5
50	825.499999	-0.002	847.499997	-0.003	2.5
60	825.499998	-0.003	847.499997	-0.003	2.5
70	825.499999	-0.002	847.499999	-0.001	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)	
3.8	826.500003	0.004	846.500001	0.001	2.5
3.23	826.500001	0.001	846.500002	0.002	2.5
4.37	826.500003	0.004	846.500003	0.003	2.5

Note: The applicant defined the normal working voltage of the DC Power Supply is from 3.23 Vdc to 4.37 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	826.500001	0.002	846.500004	0.004	2.5
-20	826.500002	0.002	846.500002	0.002	2.5
-10	826.500003	0.004	846.500003	0.003	2.5
0	826.500003	0.003	846.500003	0.003	2.5
10	826.500003	0.003	846.500003	0.003	2.5
20	826.500003	0.003	846.499997	-0.003	2.5
30	826.499998	-0.002	846.499998	-0.002	2.5
40	826.499997	-0.004	846.499999	-0.001	2.5
50	826.499997	-0.004	846.499996	-0.004	2.5
60	826.499999	-0.001	846.499996	-0.004	2.5
70	826.499998	-0.002	846.499999	-0.002	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)	
3.8	829.000004	0.004	844.000002	0.002	2.5
3.23	829.000002	0.003	844.000004	0.005	2.5
4.37	829.000001	0.002	844.000003	0.003	2.5

Note: The applicant defined the normal working voltage of the DC Power Supply is from 3.23 Vdc to 4.37 Vdc.

Frequency Error vs. Temperature

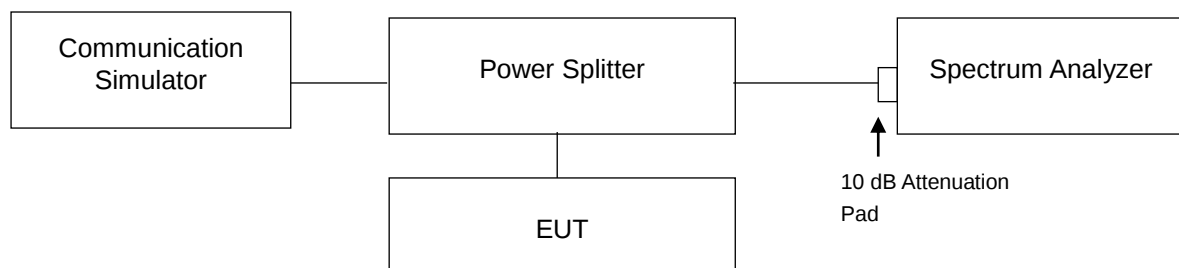
Temp. (°C)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	829.000002	0.003	844.000002	0.002	2.5
-20	829.000003	0.004	844.000003	0.004	2.5
-10	829.000004	0.004	844.000002	0.002	2.5
0	829.000002	0.003	844.000002	0.002	2.5
10	829.000001	0.002	844.000003	0.004	2.5
20	829.000003	0.003	843.999998	-0.002	2.5
30	828.999997	-0.004	843.999996	-0.004	2.5
40	828.999997	-0.004	843.999997	-0.004	2.5
50	828.999999	-0.001	843.999997	-0.004	2.5
60	828.999998	-0.002	843.999997	-0.004	2.5
70	828.999998	-0.003	843.999998	-0.002	2.5

4.4 Occupied Bandwidth Measurement

4.4.1 Test Procedure

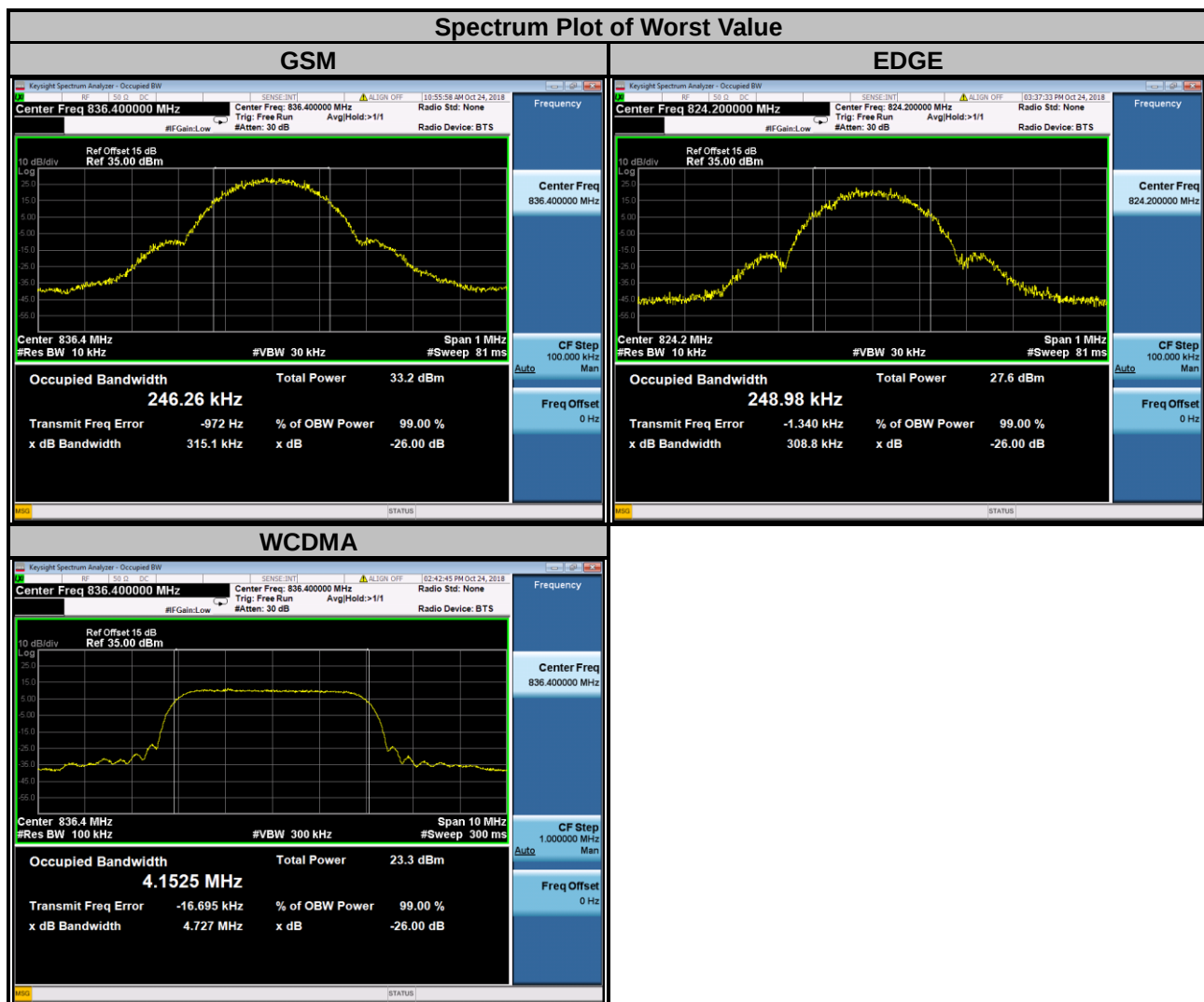
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function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

4.4.2 Test Setup

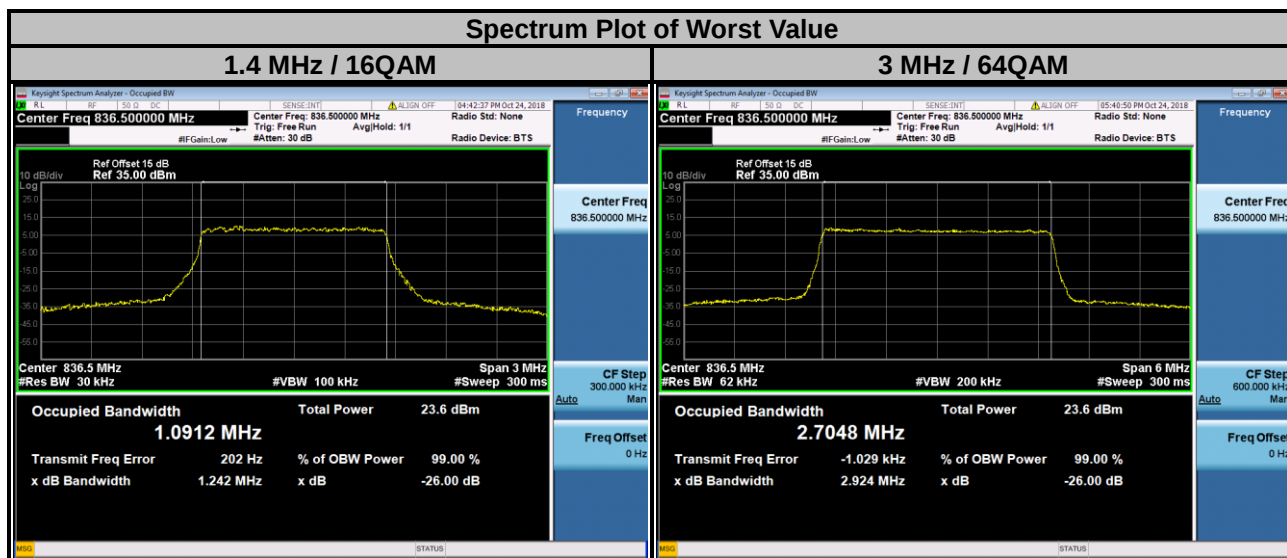


4.4.3 Test Result

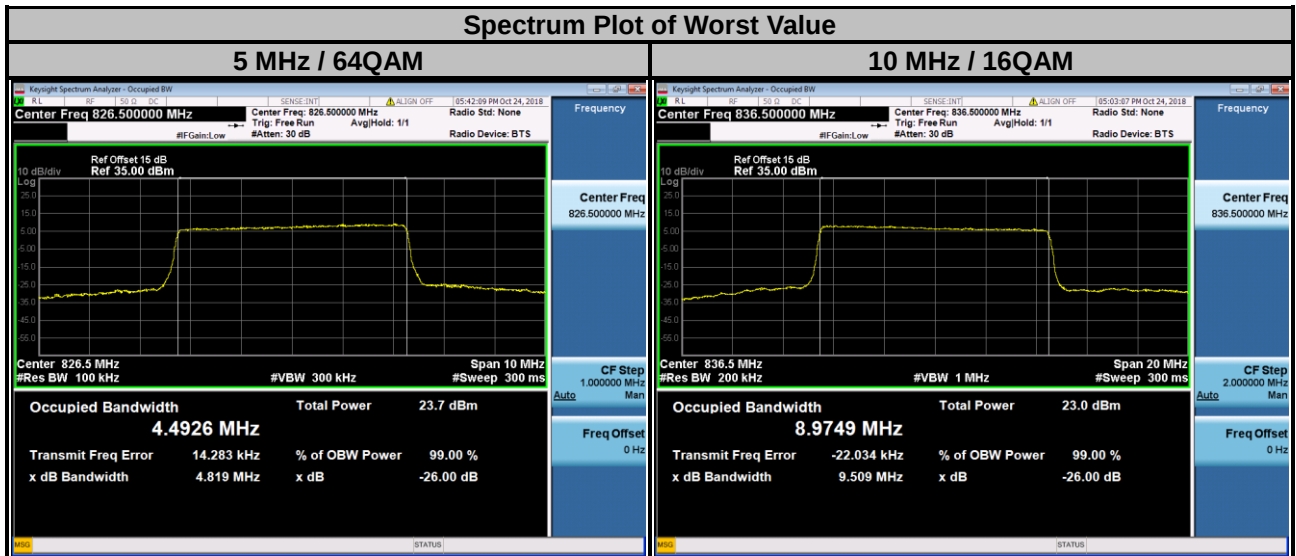
Channel	Frequency (MHz)	99 % Occupied Bandwidth (kHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)
		GSM	EDGE			WCDMA
128	824.2	244.17	248.98	4132	826.4	4.1486
189	836.4	246.26	243.59	4182	836.4	4.1525
251	848.8	245.18	248.17	4233	846.6	4.1288



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	1.0886	1.0882	1.0875	20415	825.5	2.7034	2.6989	2.7031
20525	836.5	1.0872	1.0912	1.0875	20525	836.5	2.7017	2.6972	2.7048
20643	848.3	1.0886	1.0880	1.0869	20635	847.5	2.7001	2.6963	2.7028



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	4.4899	4.4902	4.4926	20450	829.0	8.9032	8.9079	8.8956
20525	836.5	4.4921	4.4920	4.4922	20525	836.5	8.9720	8.9749	8.9729
20625	846.5	4.4826	4.4840	4.4883	20600	844.0	8.9350	8.9365	8.9303

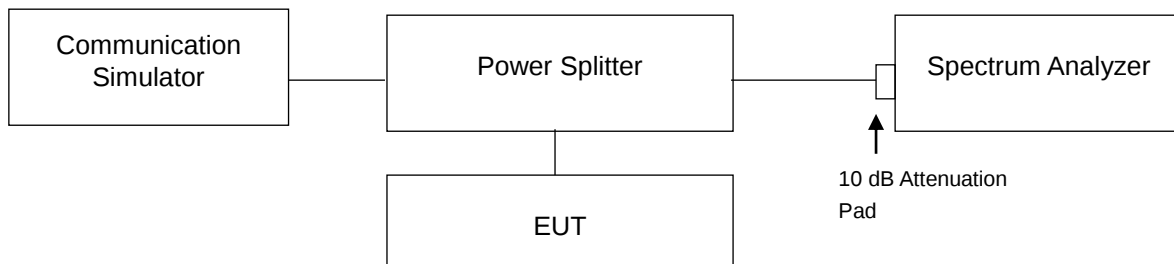


4.5 Band Edge Measurement

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.

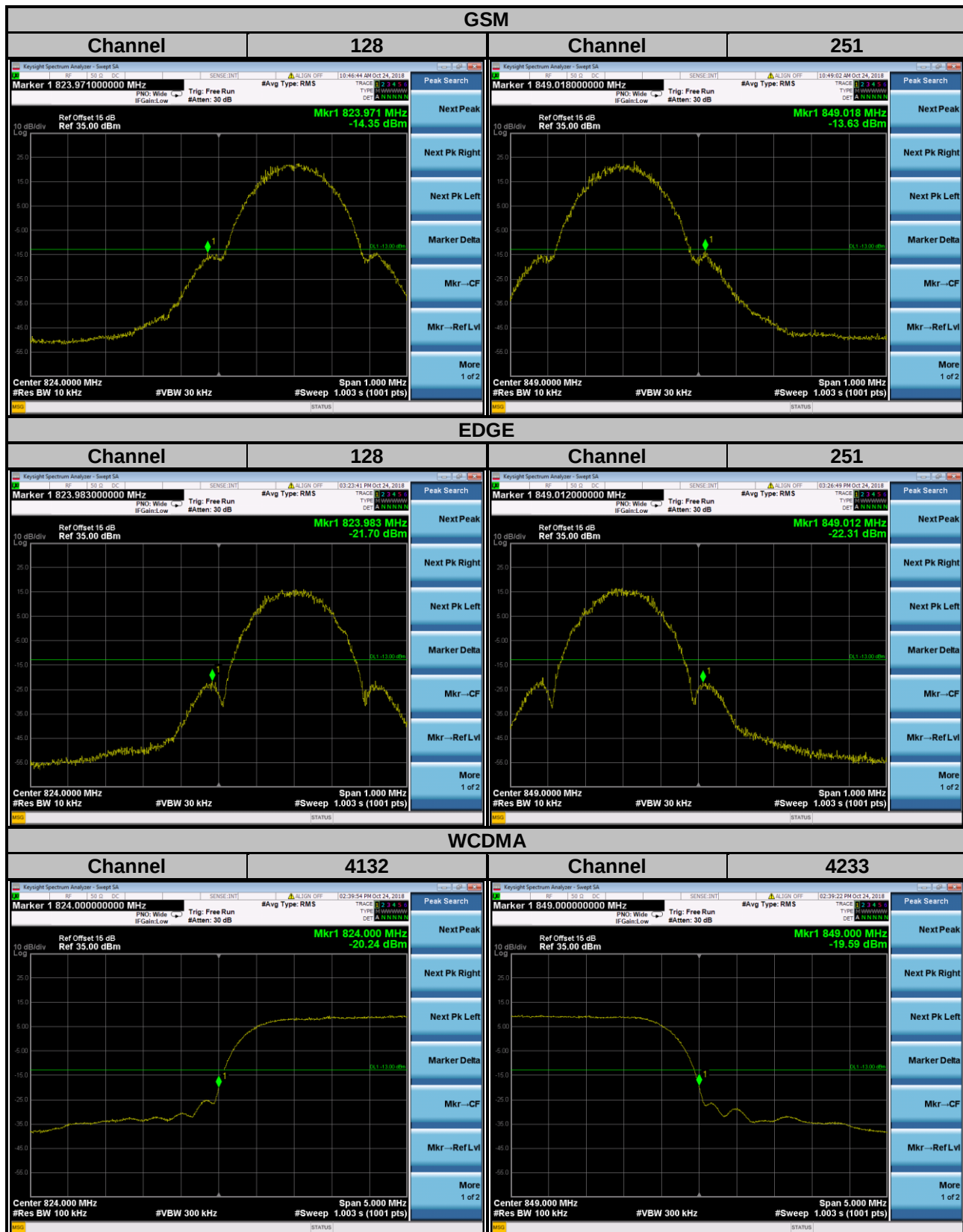
4.5.2 Test Setup



4.5.3 Test Procedures

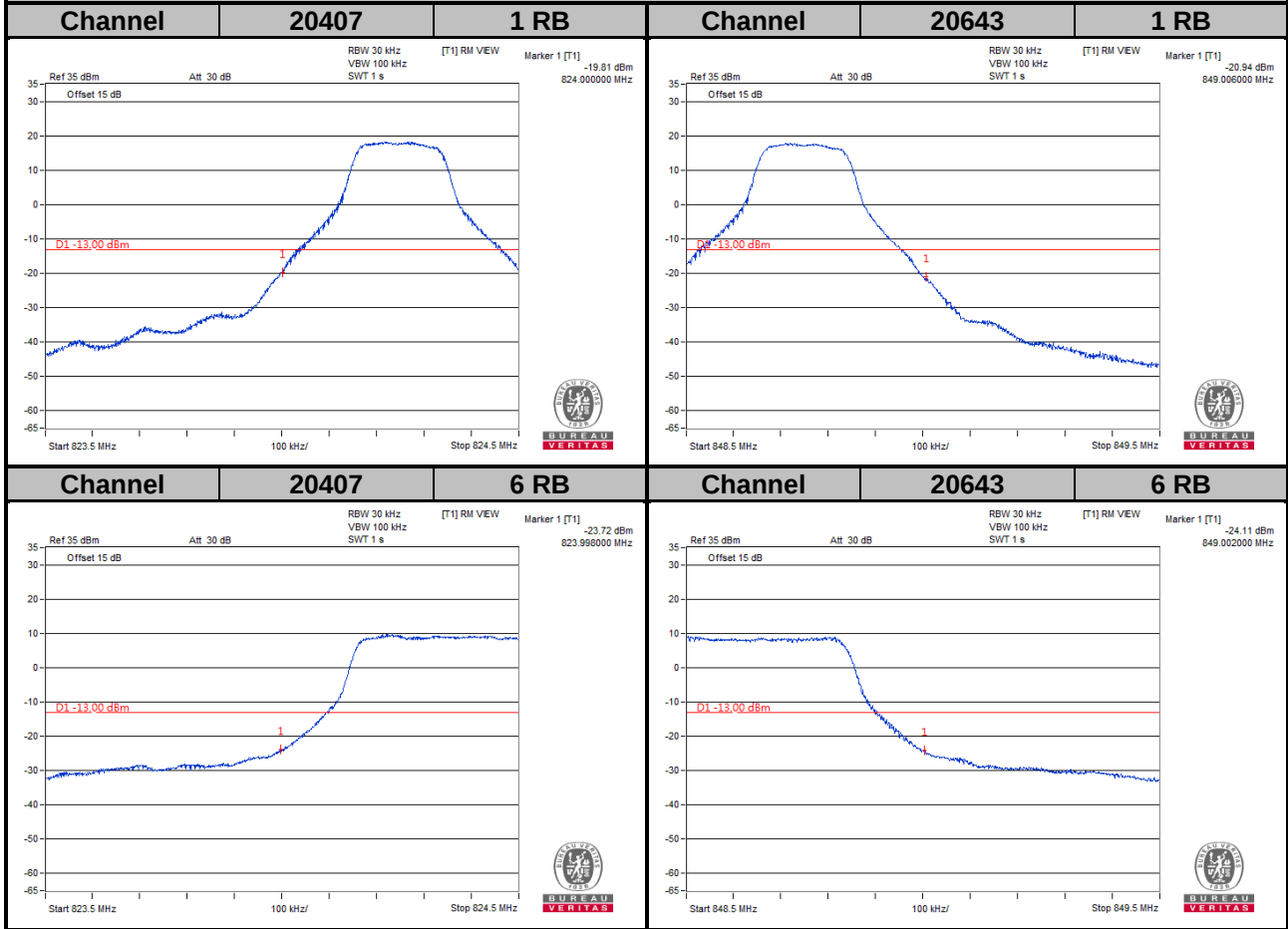
- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 10 kHz and VB of the spectrum is 30 kHz (GSM/GPRS/EDGE).
- The center frequency of spectrum is the band edge frequency and span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

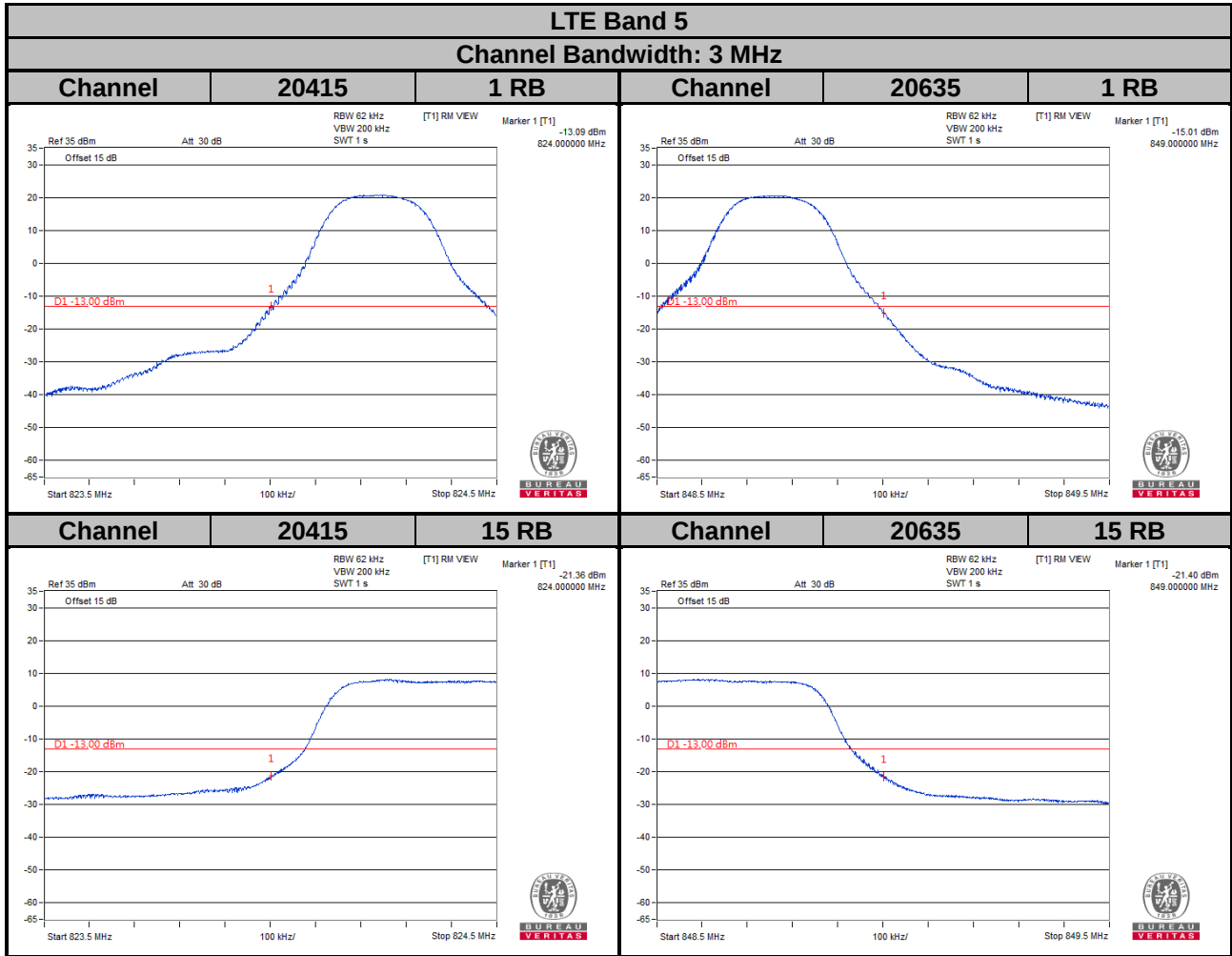
4.5.4 Test Results

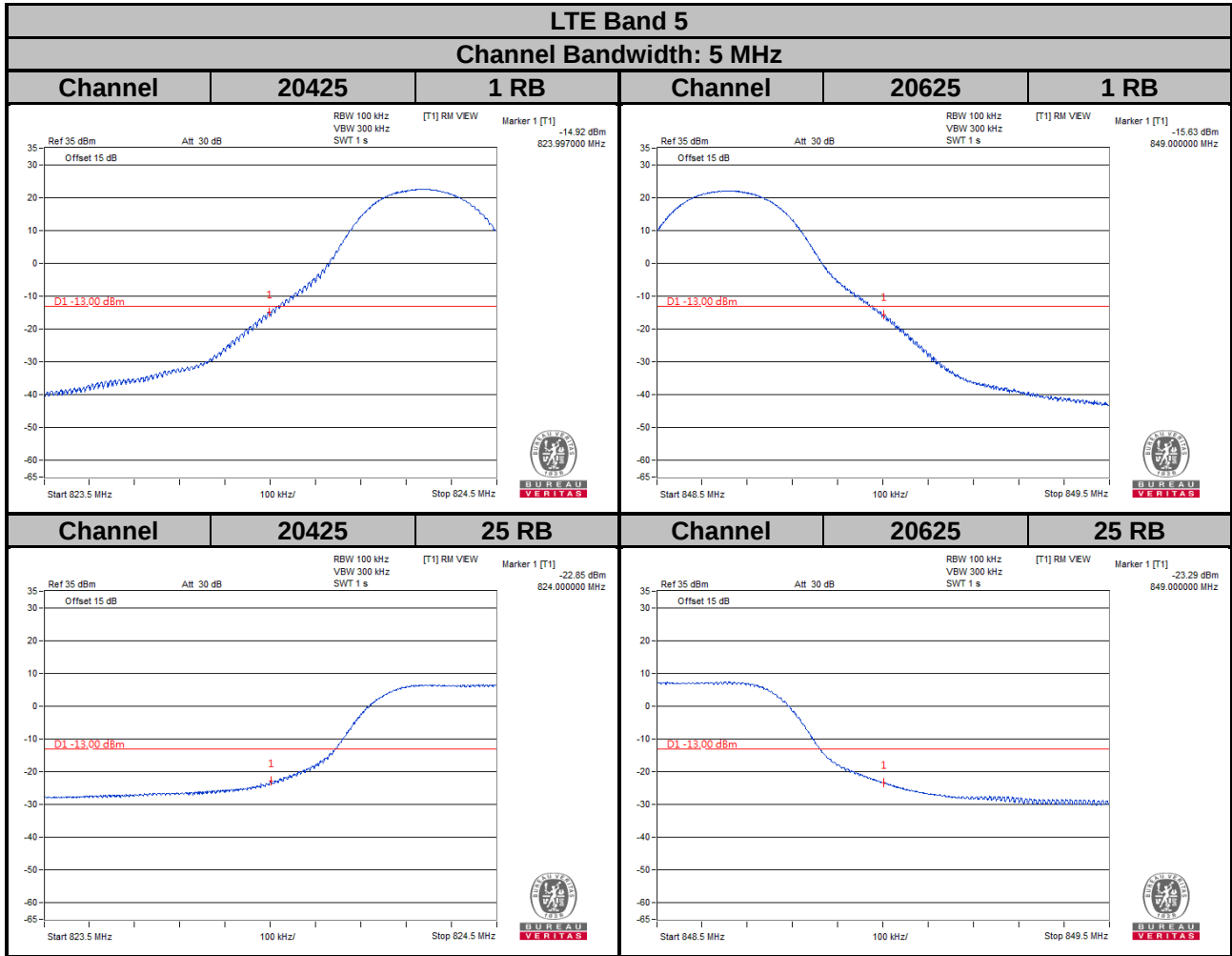


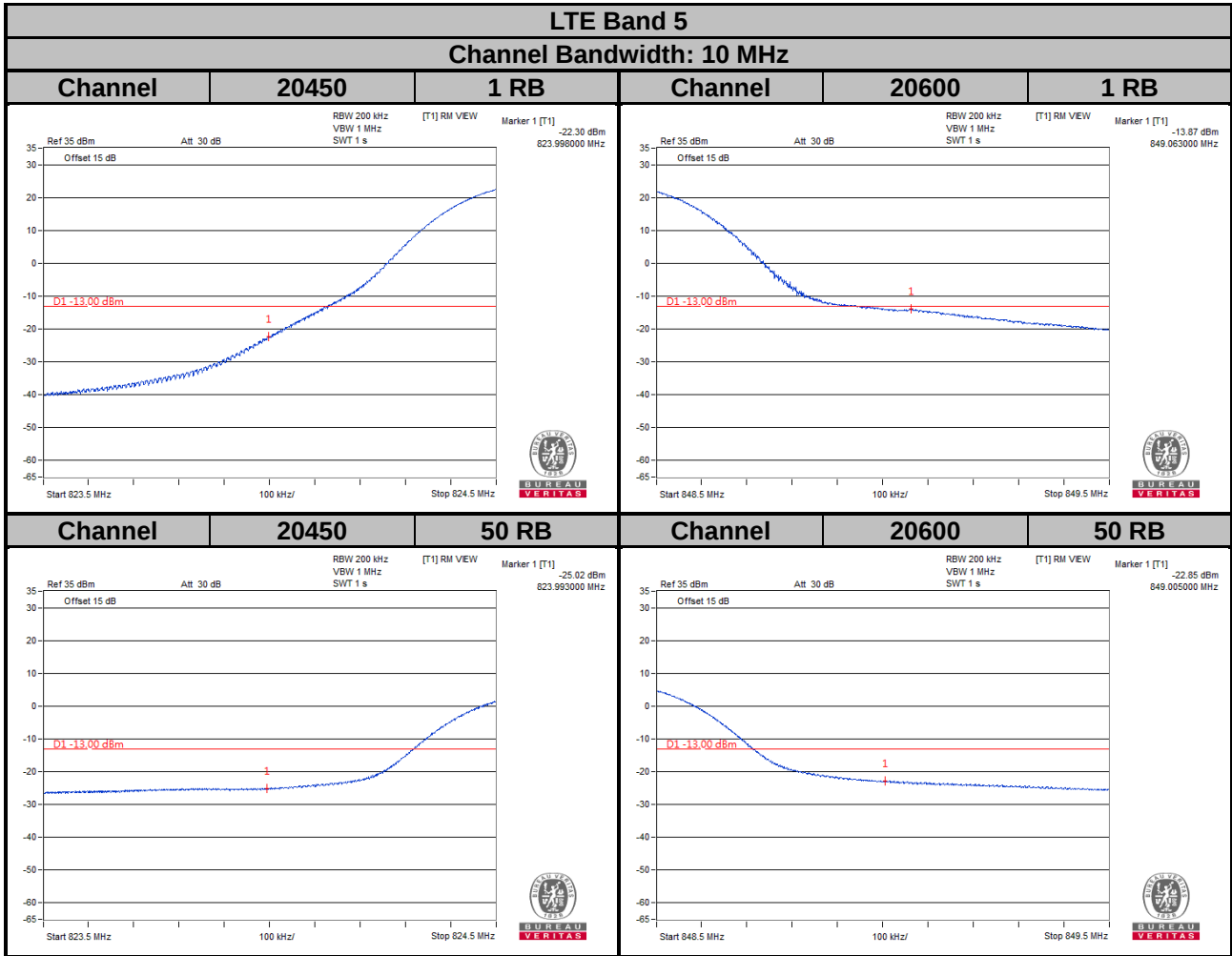
LTE Band 5

Channel Bandwidth: 1.4 MHz







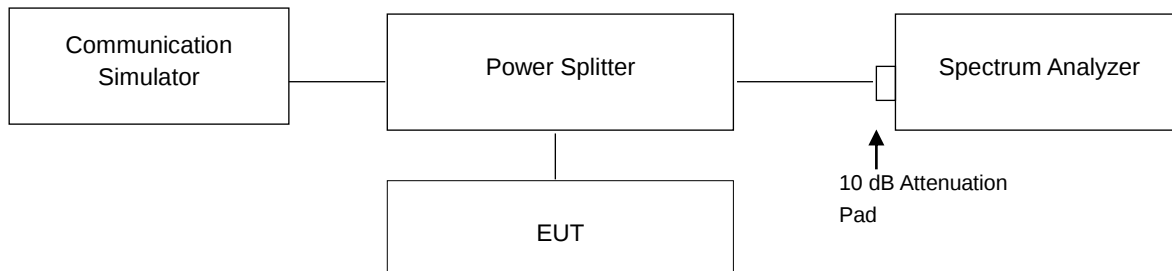


4.6 Peak to Average Ratio

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

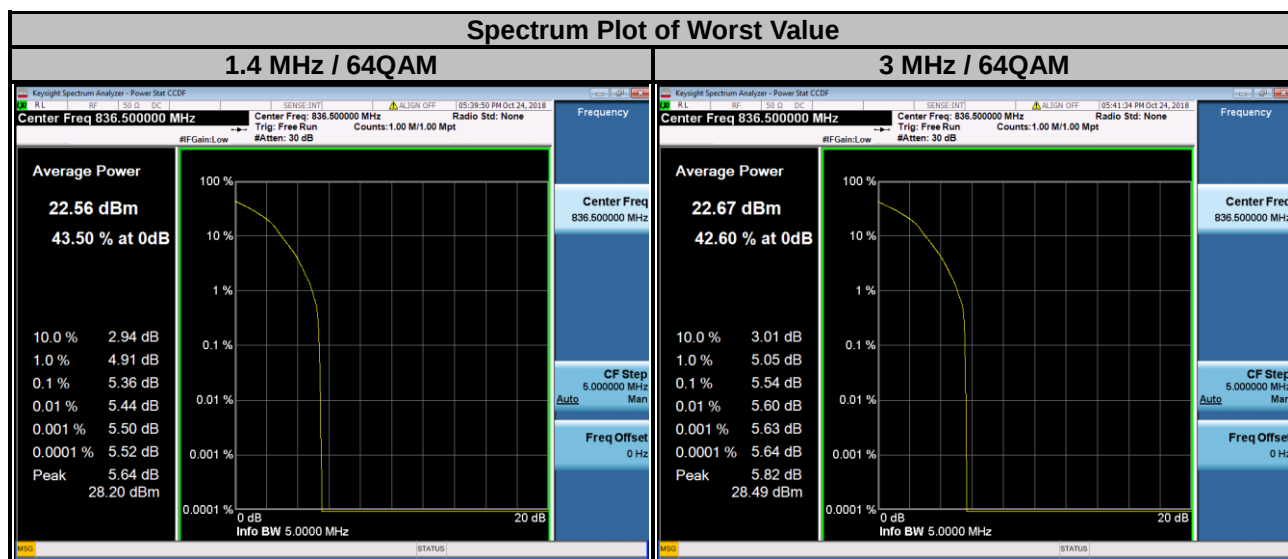
1. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.6.4 Test Results

Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)
		GSM	EDGE			WCDMA
128	824.2	0.20	3.24	4132	826.4	3.00
189	836.4	0.26	3.26	4182	836.4	3.06
251	848.8	0.25	3.23	4233	846.6	2.91



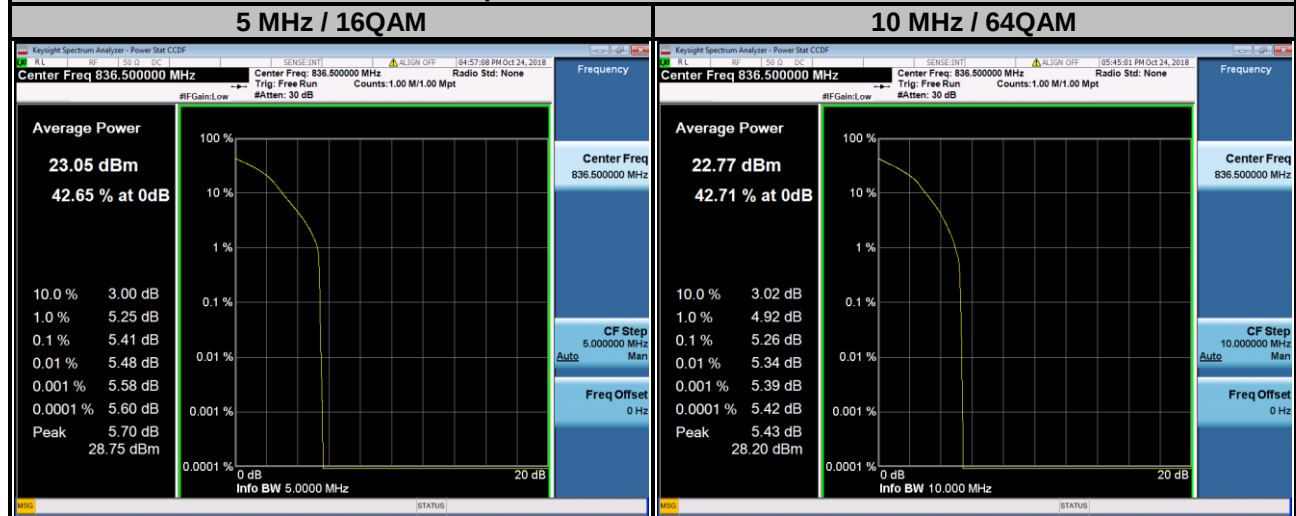
LTE Band 5									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20407	824.7	4.21	5.10	5.09	20415	825.5	4.20	5.07	5.16
20525	836.5	4.44	5.26	5.36	20525	836.5	4.60	5.42	5.54
20643	848.3	4.08	4.91	5.00	20635	847.5	3.99	4.84	4.90



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	4.21	5.05	5.14	20450	829.0	4.18	5.13	5.15
20525	836.5	4.53	5.41	5.38	20525	836.5	4.24	5.14	5.26
20625	846.5	4.03	4.87	4.87	20600	844.0	4.21	5.12	5.25

Spectrum Plot of Worst Value

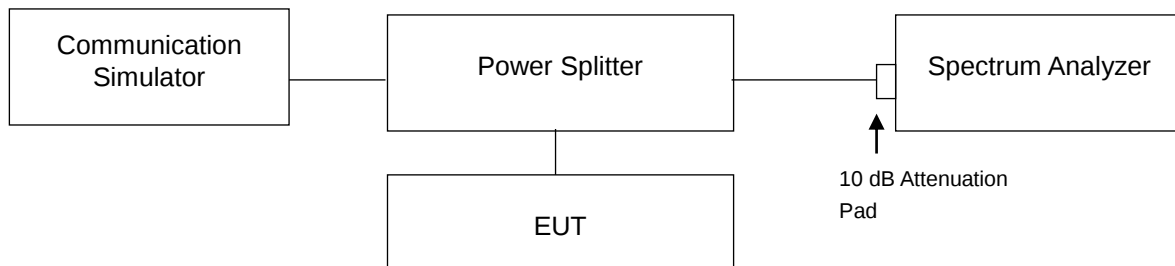


4.7 Conducted Spurious Emissions

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.

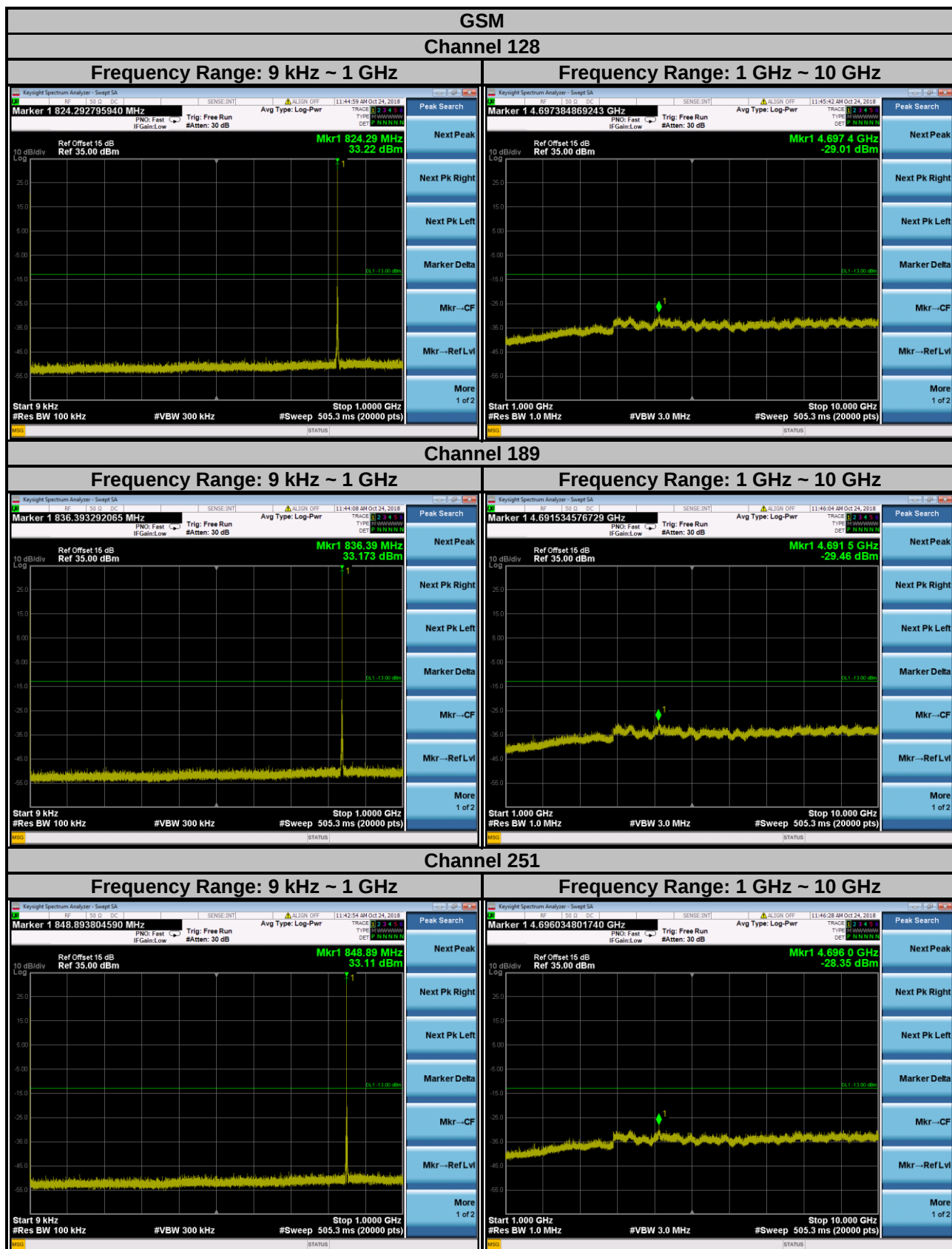
4.7.2 Test Setup



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.

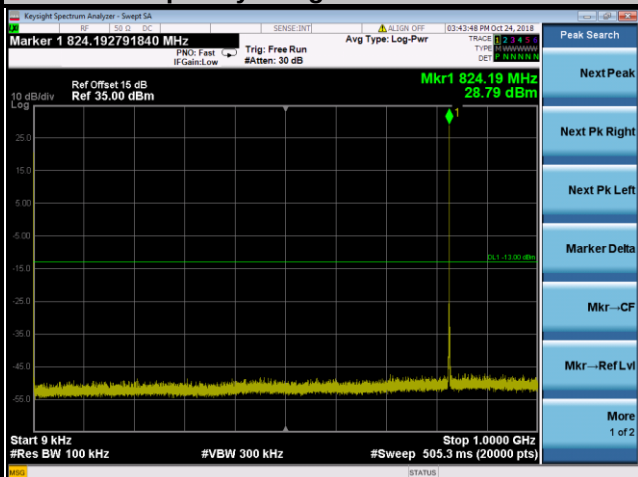
4.7.4 Test Results



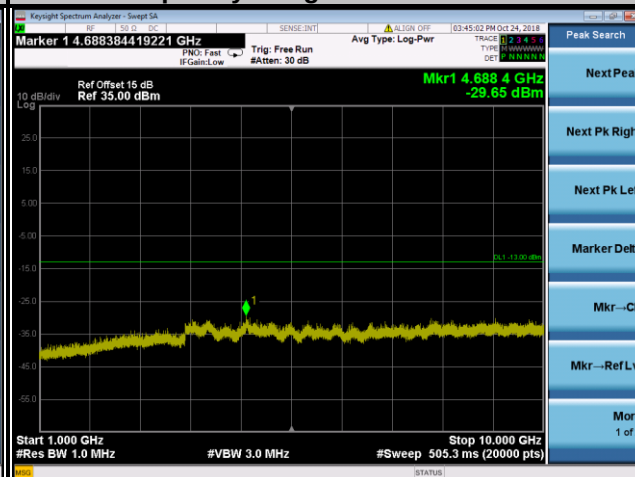
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

EDGE Channel 128

Frequency Range: 9 kHz ~ 1 GHz

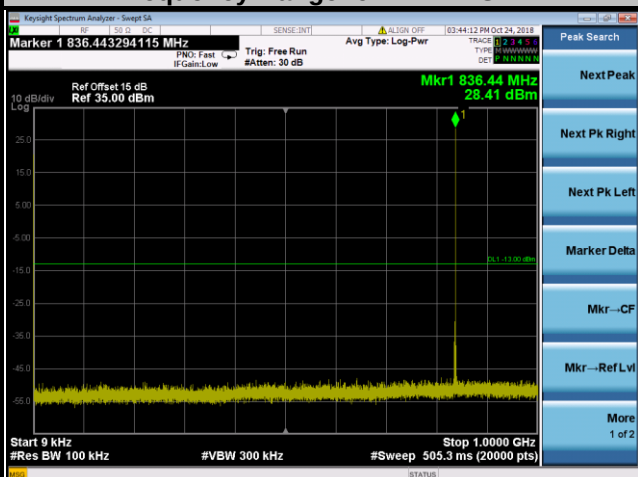


Frequency Range: 1 GHz ~ 10 GHz

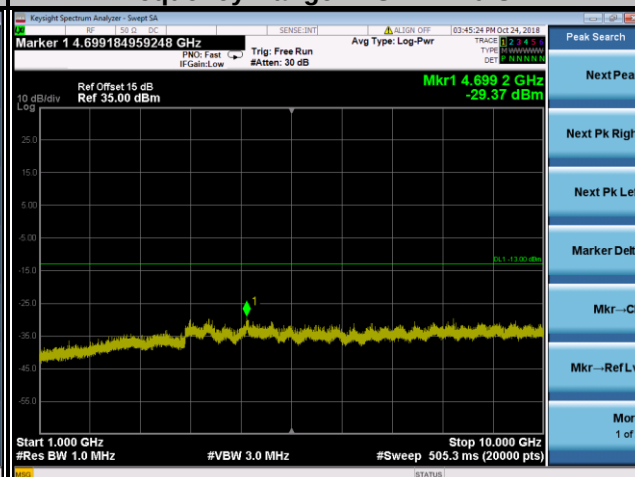


Channel 189

Frequency Range: 9 kHz ~ 1 GHz

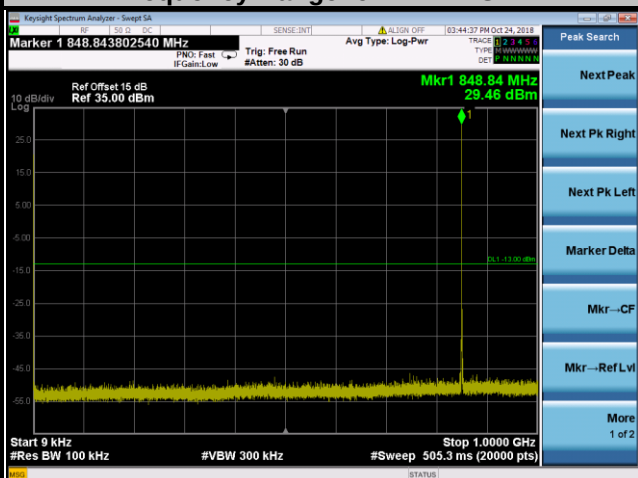


Frequency Range: 1 GHz ~ 10 GHz

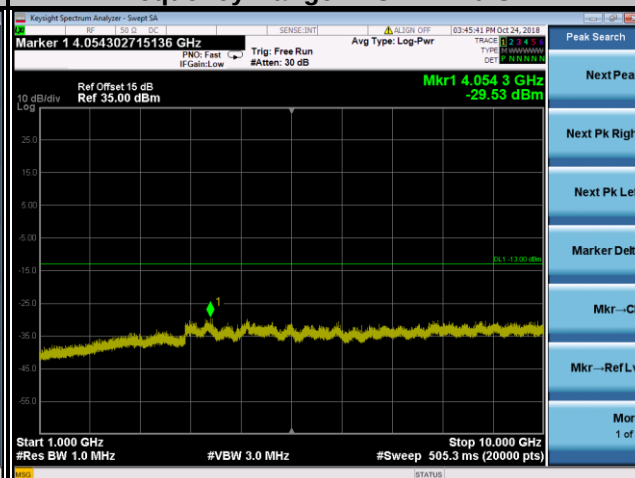


Channel 251

Frequency Range: 9 kHz ~ 1 GHz



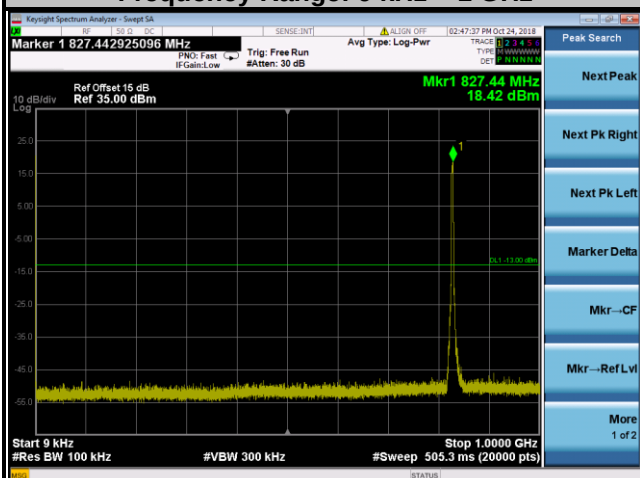
Frequency Range: 1 GHz ~ 10 GHz



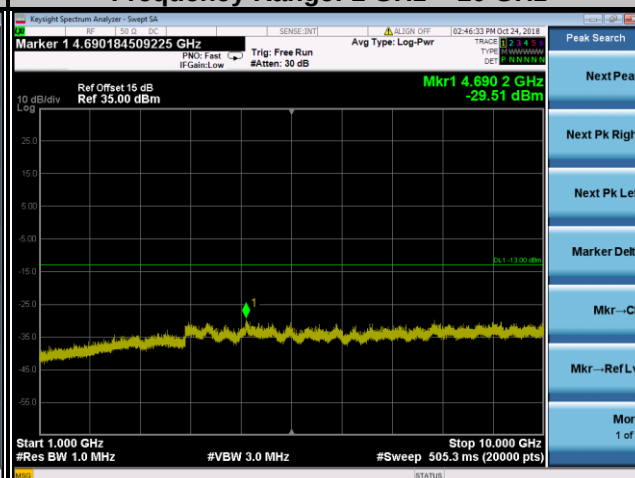
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

WCDMA Channel 4132

Frequency Range: 9 kHz ~ 1 GHz

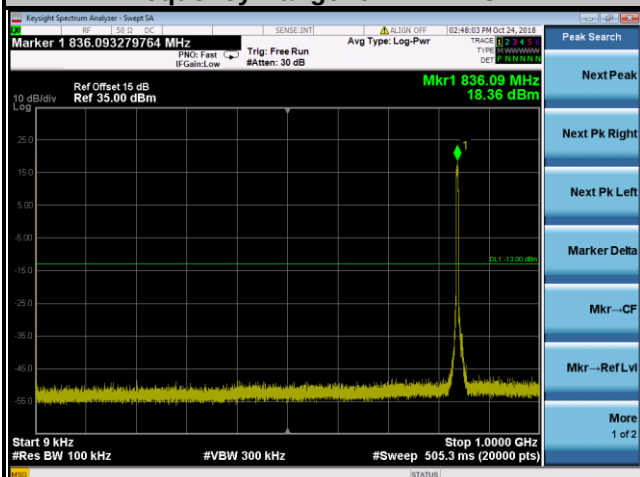


Frequency Range: 1 GHz ~ 10 GHz

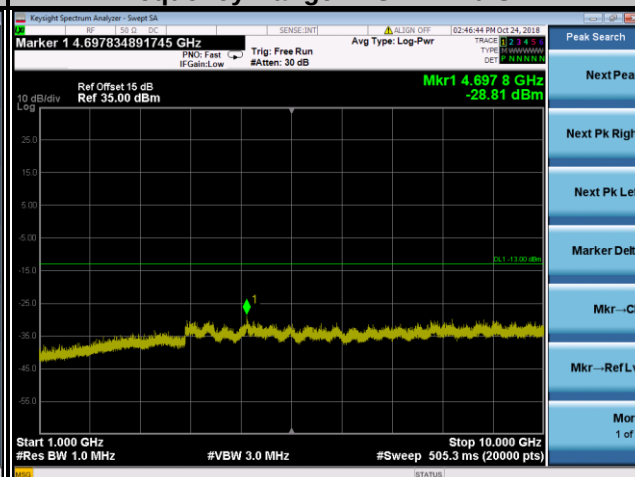


Channel 4182

Frequency Range: 9 kHz ~ 1 GHz

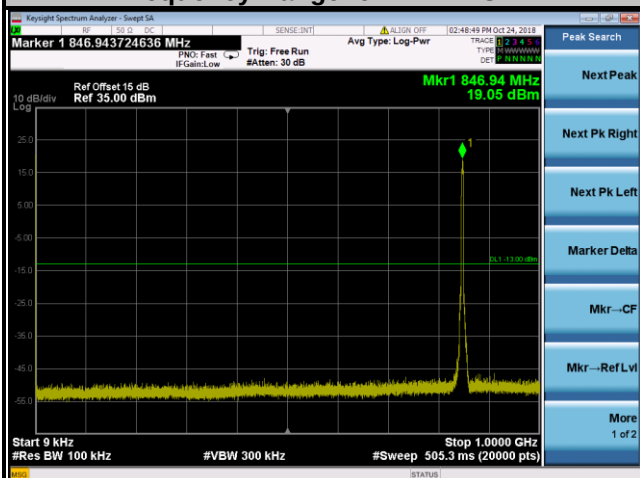


Frequency Range: 1 GHz ~ 10 GHz

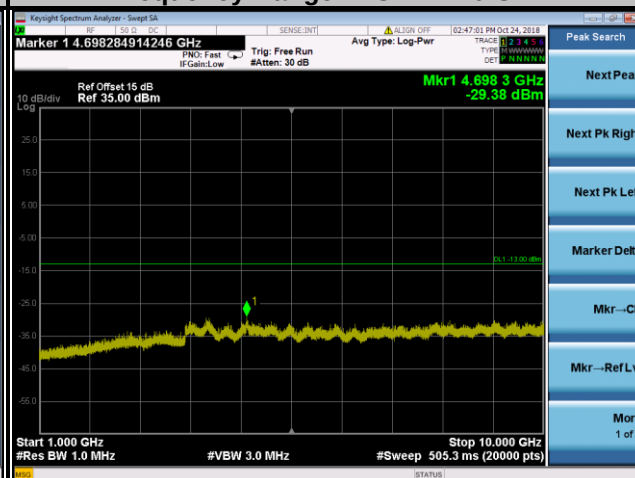


Channel 4233

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



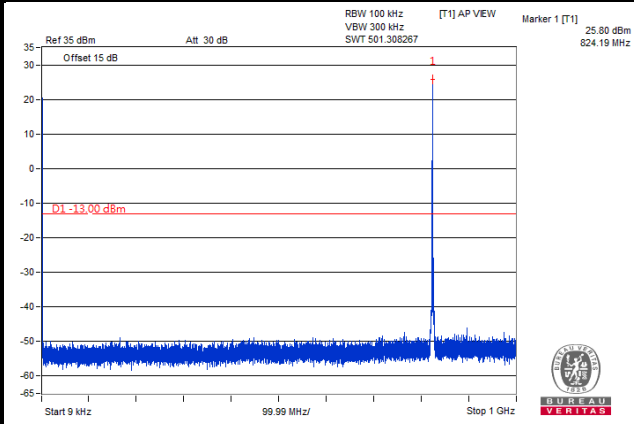
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 5

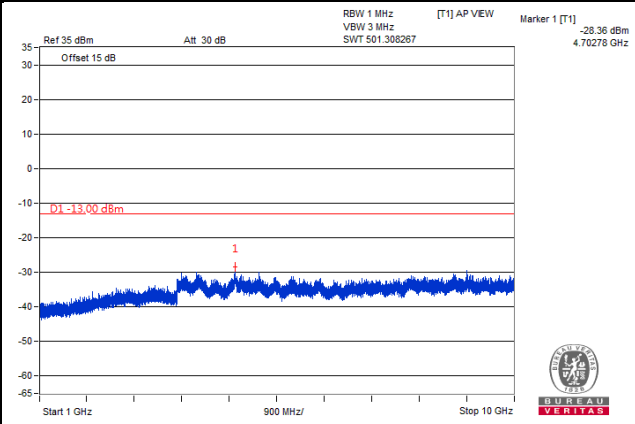
Channel Bandwidth: 1.4 MHz

Channel 20407

Frequency Range: 9 kHz ~ 1 GHz

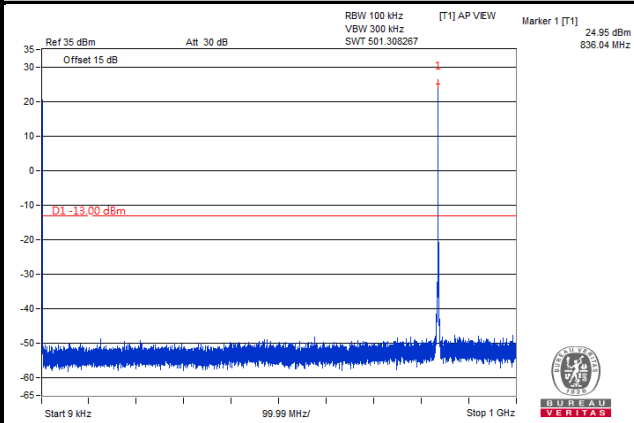


Frequency Range: 1 GHz ~ 10 GHz

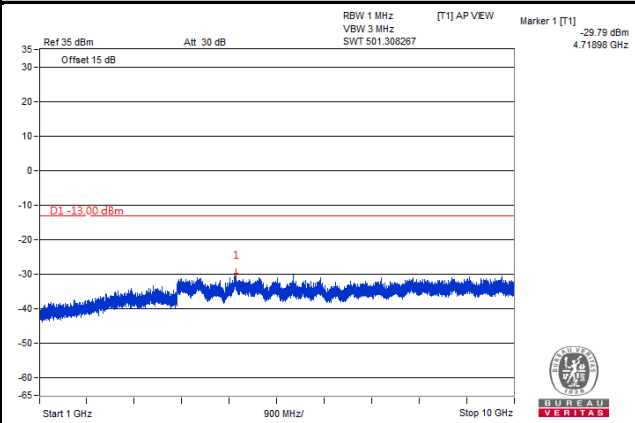


Channel 20525

Frequency Range: 9 kHz ~ 1 GHz

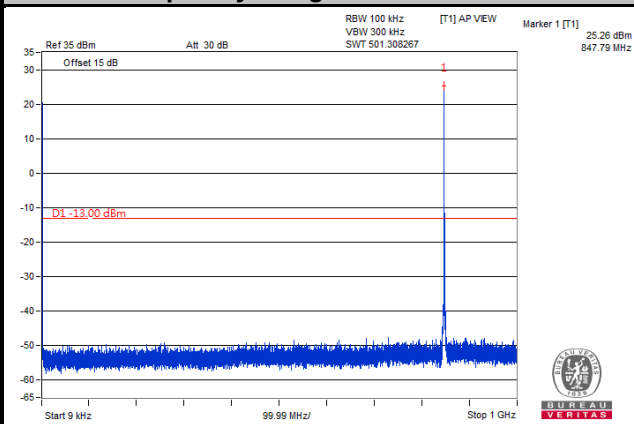


Frequency Range: 1 GHz ~ 10 GHz

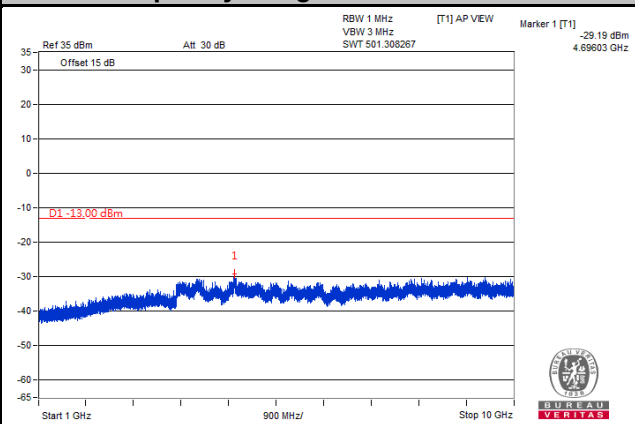


Channel 20643

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



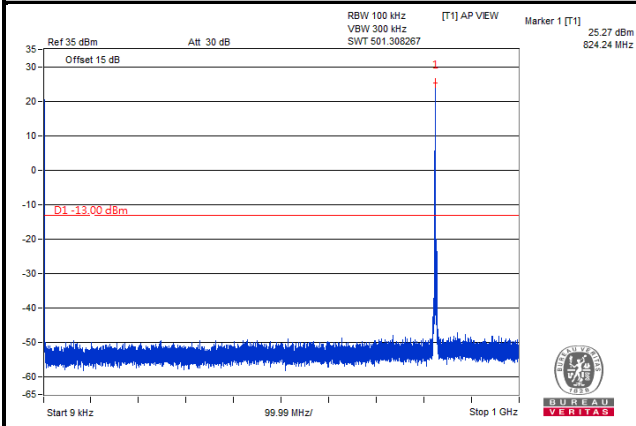
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 5

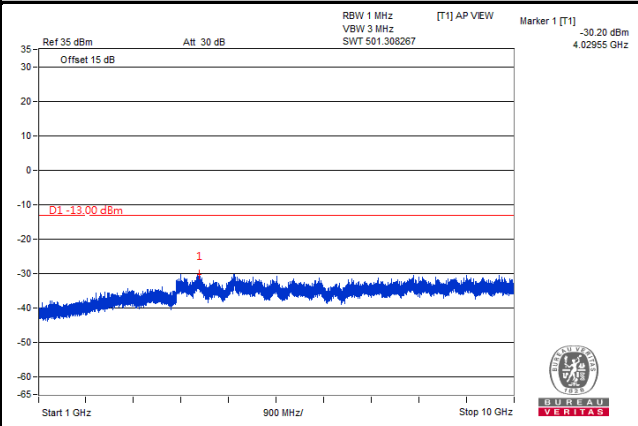
Channel Bandwidth: 3 MHz

Channel 20415

Frequency Range: 9 kHz ~ 1 GHz

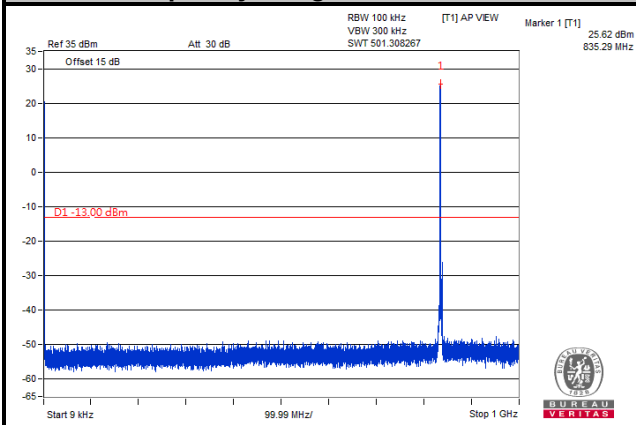


Frequency Range: 1 GHz ~ 10 GHz

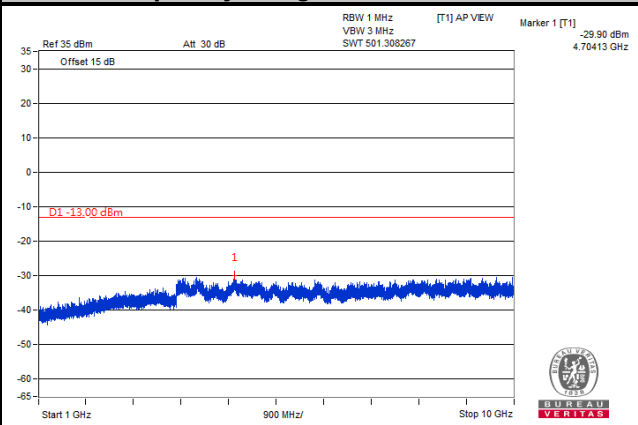


Channel 20525

Frequency Range: 9 kHz ~ 1 GHz

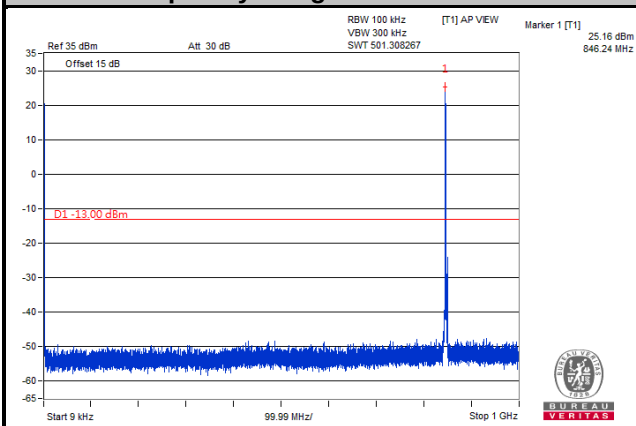


Frequency Range: 1 GHz ~ 10 GHz

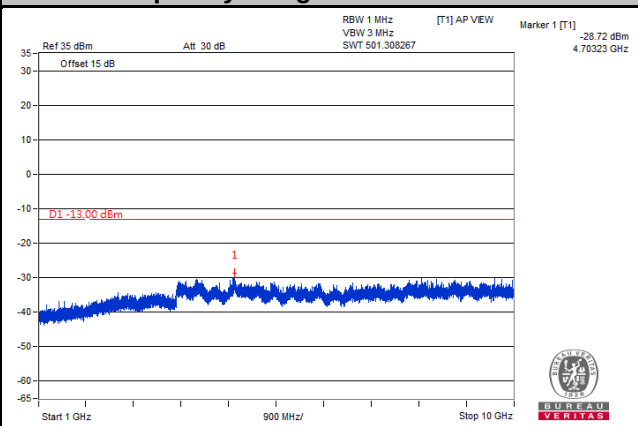


Channel 20635

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



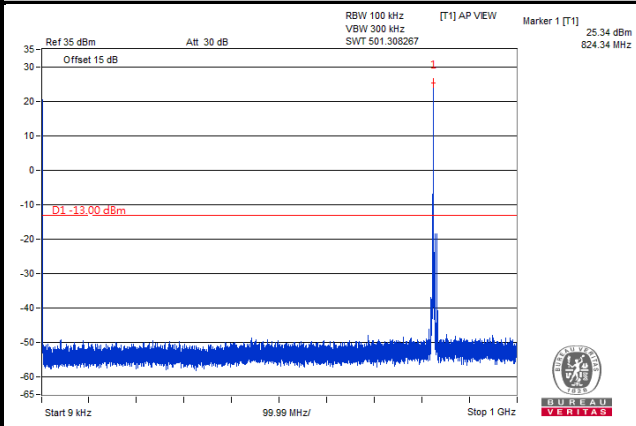
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 5

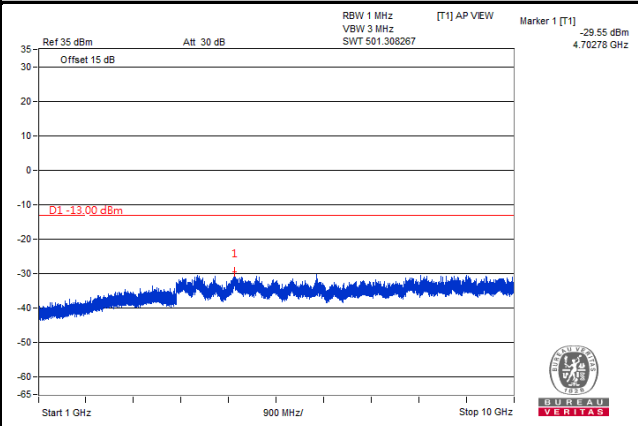
Channel Bandwidth: 5 MHz

Channel 20425

Frequency Range: 9 kHz ~ 1 GHz

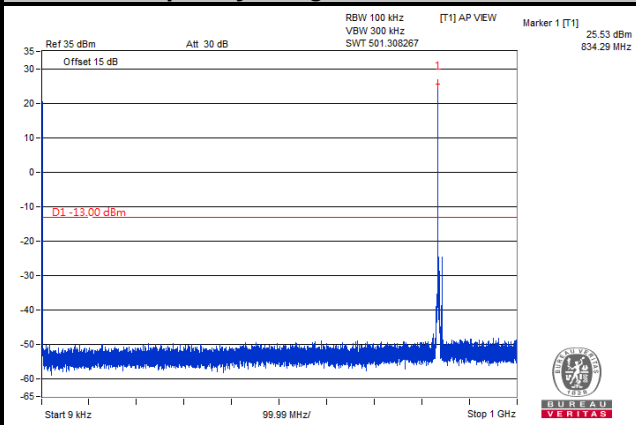


Frequency Range: 1 GHz ~ 10 GHz

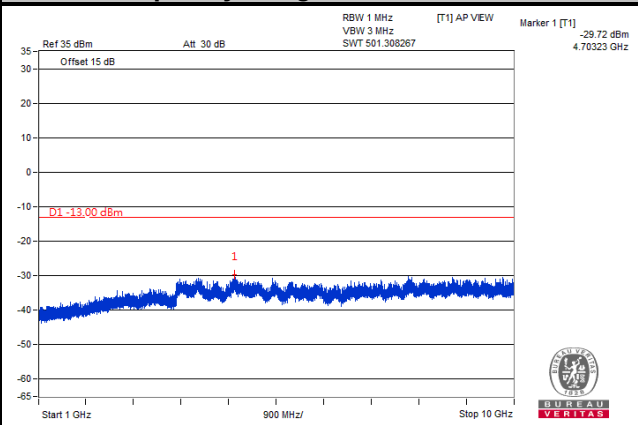


Channel 20525

Frequency Range: 9 kHz ~ 1 GHz

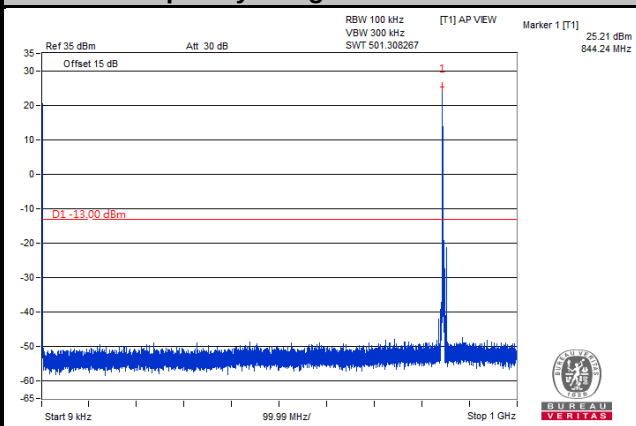


Frequency Range: 1 GHz ~ 10 GHz

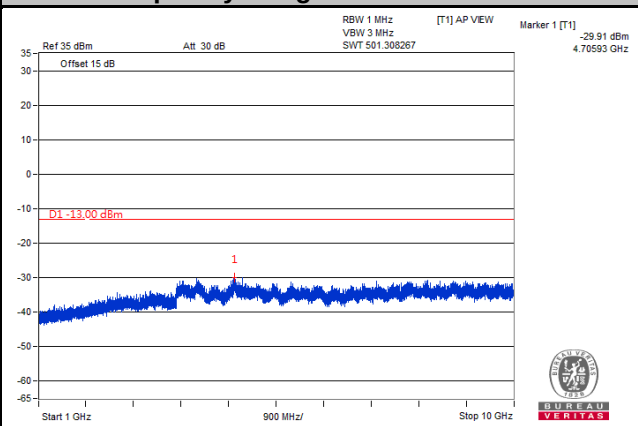


Channel 20625

Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



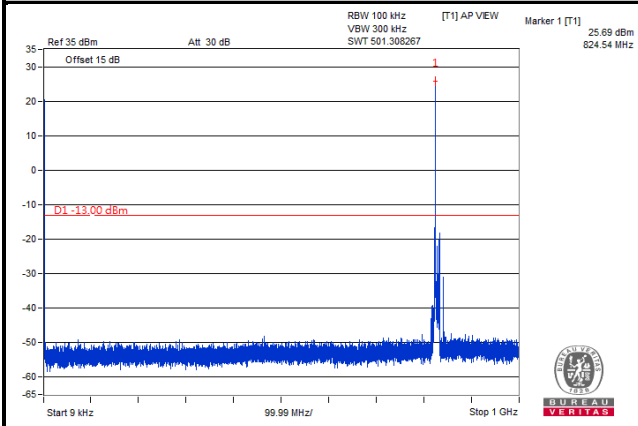
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 5

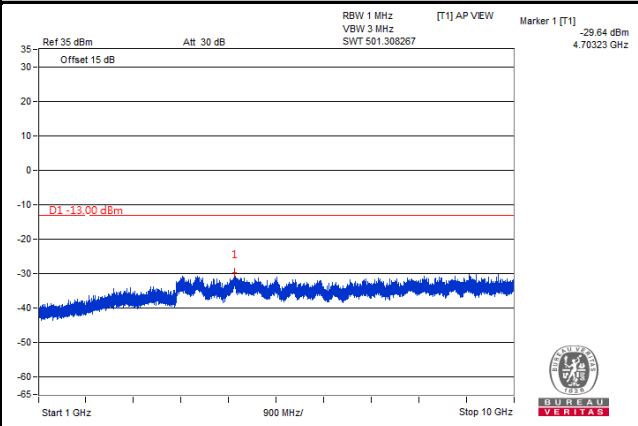
Channel Bandwidth: 10 MHz

Channel 20450

Frequency Range: 9 kHz ~ 1 GHz

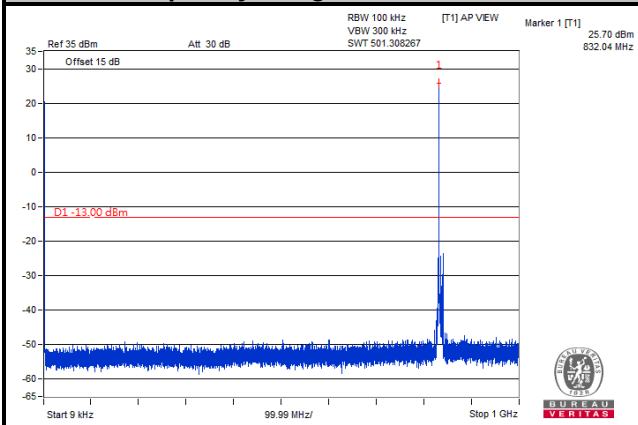


Frequency Range: 1 GHz ~ 10 GHz

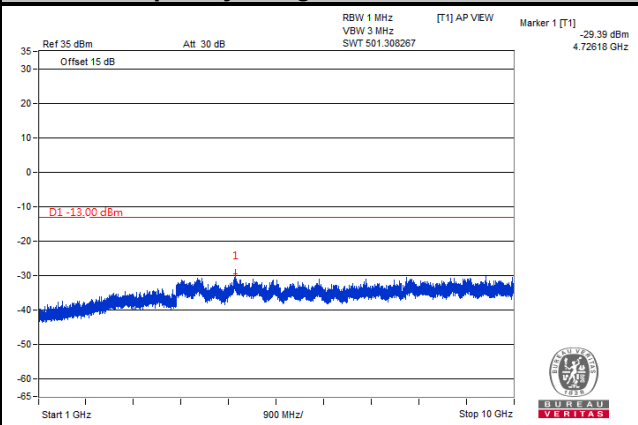


Channel 20525

Frequency Range: 9 kHz ~ 1 GHz

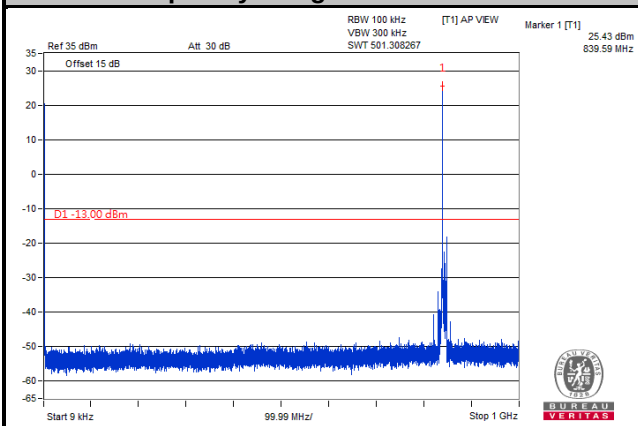


Frequency Range: 1 GHz ~ 10 GHz

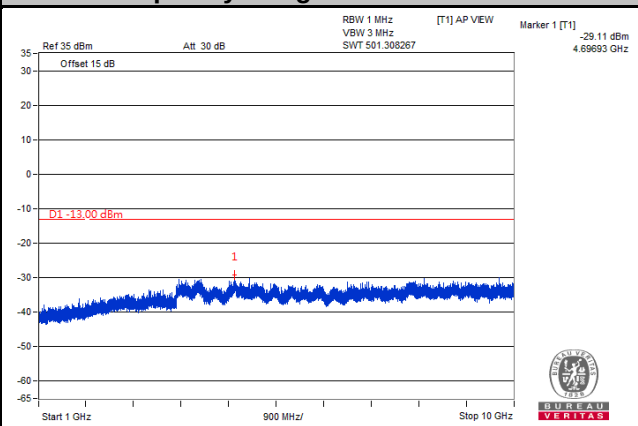


Channel 20600

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.

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.

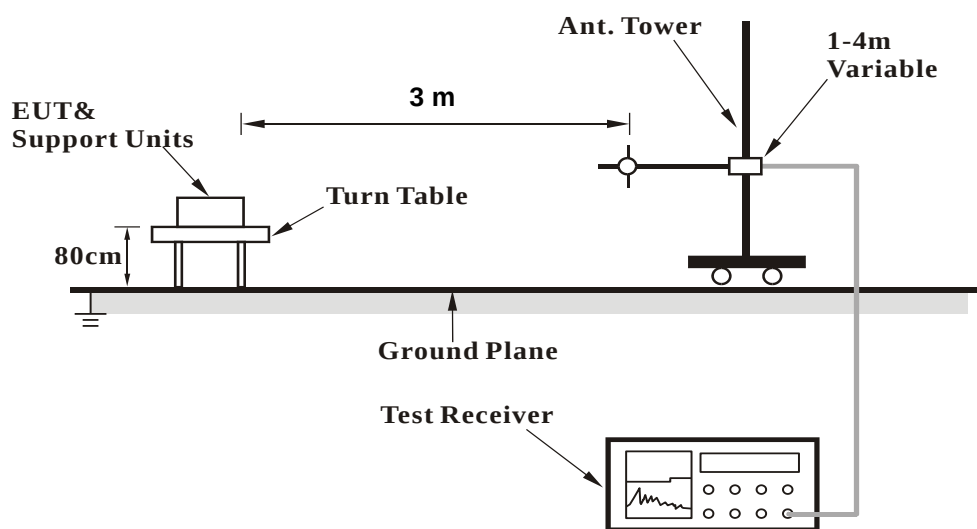
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.8.3 Deviation from Test Standard

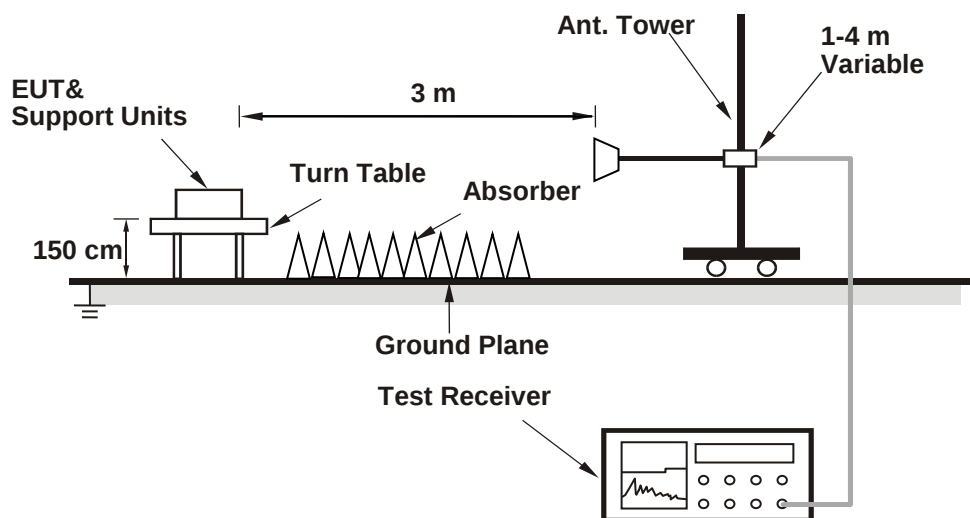
No deviation.

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:

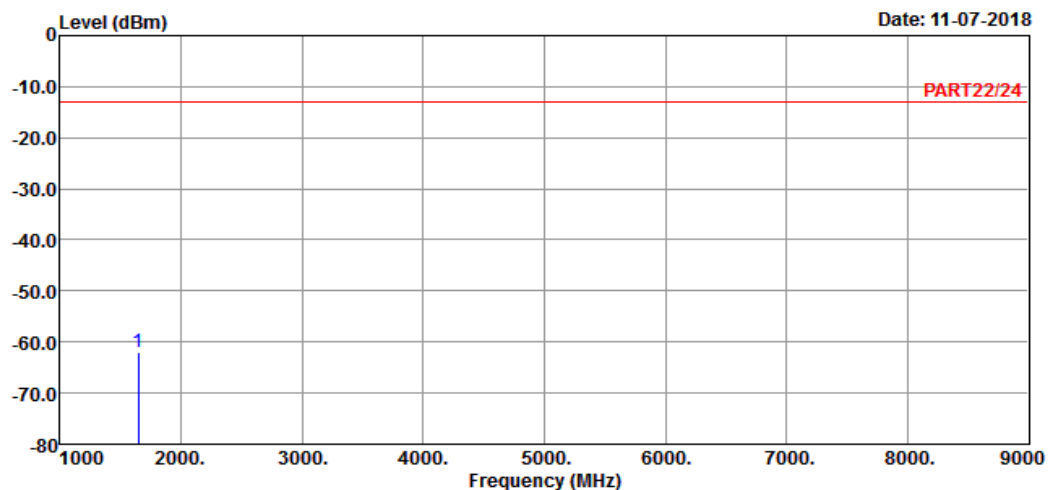
Low Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : GPRS 850 Link_L-CH

Tested by: Jisyong Wang

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

1 pp 1648.40 -61.85 -48.11 -13.00 -48.85 -13.74 Peak

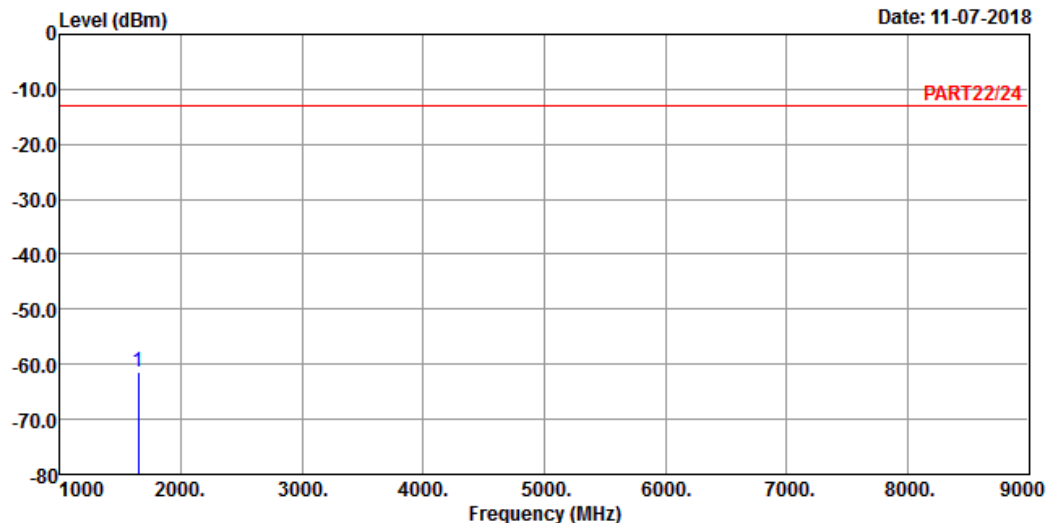


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : GPRS 850 Link_L-CH

Tested by: Jisyong Wang

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

1 pp 1648.40 -61.40 -47.66 -13.00 -48.40 -13.74 Peak

Middle Channel

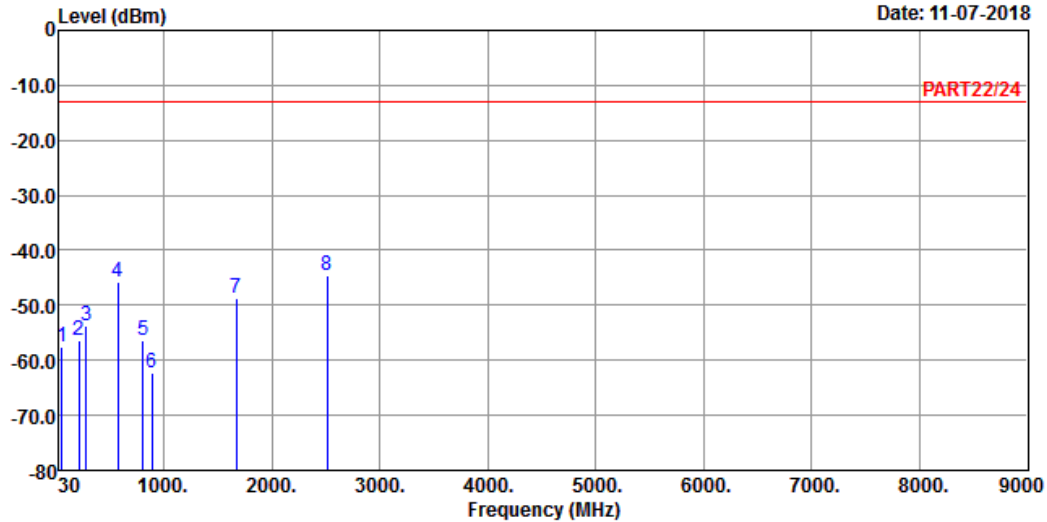


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 7

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : GPRS 850 Link_M-CH

Tested by: Jisyong Wang

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	53.28	-57.47	-51.66	-13.00	-44.47	-5.81	Peak
2	209.45	-56.34	-48.71	-13.00	-43.34	-7.63	Peak
3	282.20	-53.70	-47.05	-13.00	-40.70	-6.65	Peak
4	572.23	-45.80	-43.88	-13.00	-32.80	-1.92	Peak
5	806.97	-56.28	-56.95	-13.00	-43.28	0.67	Peak
6	890.39	-62.37	-62.89	-13.00	-49.37	0.52	Peak
7	1672.80	-48.68	-34.78	-13.00	-35.68	-13.90	Peak
8 pp	2509.20	-44.46	-34.38	-13.00	-31.46	-10.08	Peak

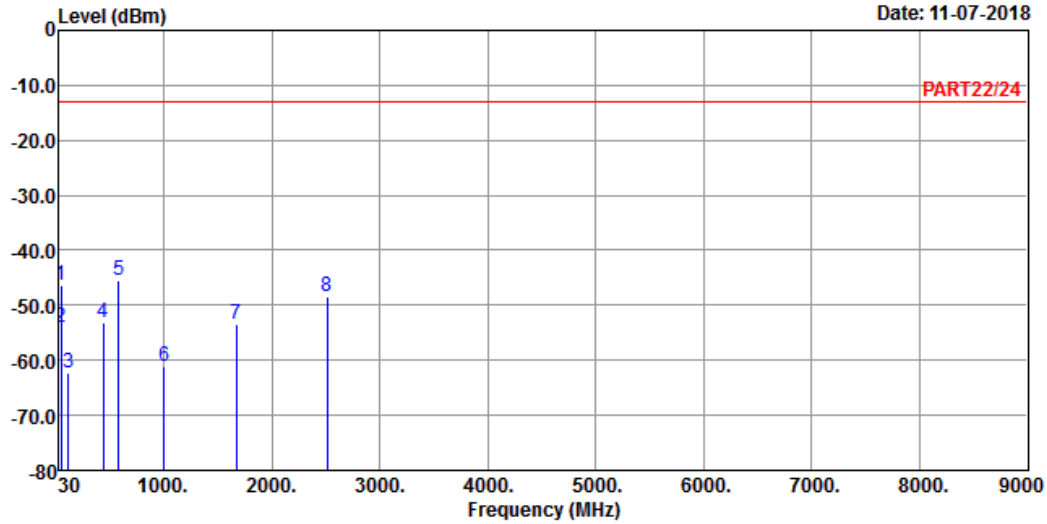


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 8

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : GPRS 850 Link_M-CH

Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	44.55	-46.20	-44.21	-13.00	-33.20	-1.99	Peak
2	46.49	-53.98	-50.98	-13.00	-40.98	-3.00	Peak
3	112.45	-62.26	-52.06	-13.00	-49.26	-10.20	Peak
4	439.34	-53.06	-47.43	-13.00	-40.06	-5.63	Peak
5 pp	580.96	-45.52	-43.96	-13.00	-32.52	-1.56	Peak
6	1000.00	-61.19	-64.77	-13.00	-48.19	3.58	Peak
7	1672.80	-53.39	-39.49	-13.00	-40.39	-13.90	Peak
8	2509.20	-48.51	-38.43	-13.00	-35.51	-10.08	Peak

High Channel

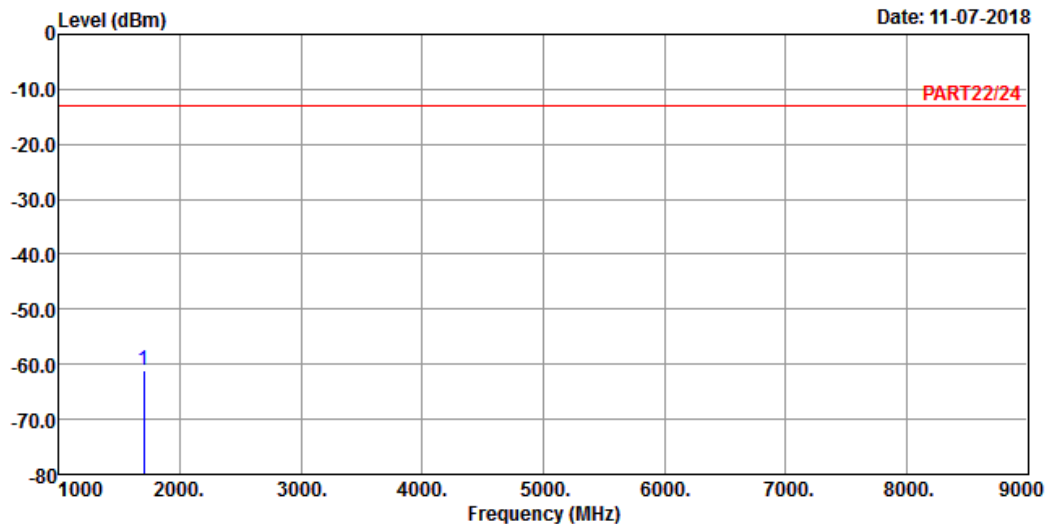


Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : GPRS 850 Link_H-CH

Tested by: Jisyong Wang

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

1 pp 1697.60 -60.99 -46.94 -13.00 -47.99 -14.05 Peak

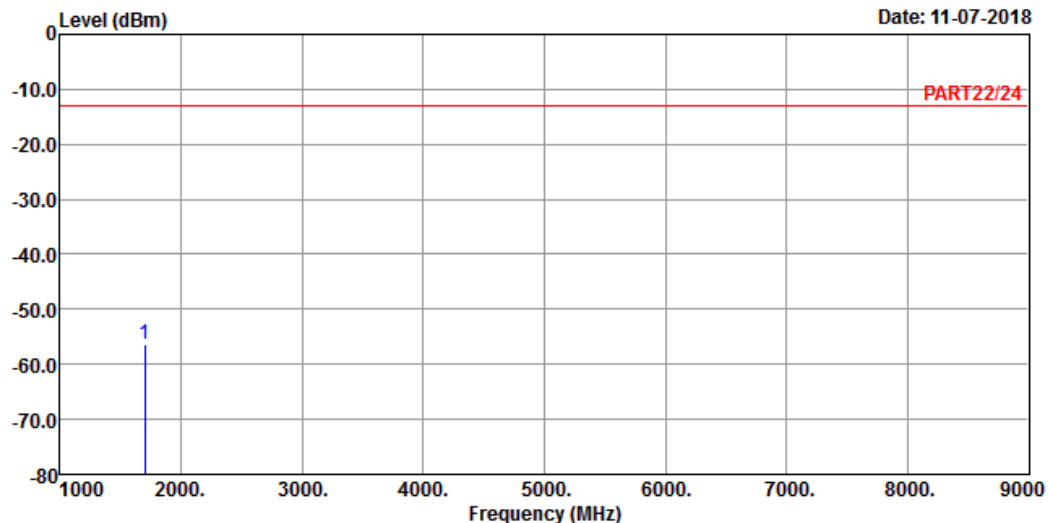


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : GPRS 850 Link_H-CH

Tested by: Jisyong Wang

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

1 pp 1697.60 -56.30 -42.25 -13.00 -43.30 -14.05 Peak

EDGE:
Low Channel

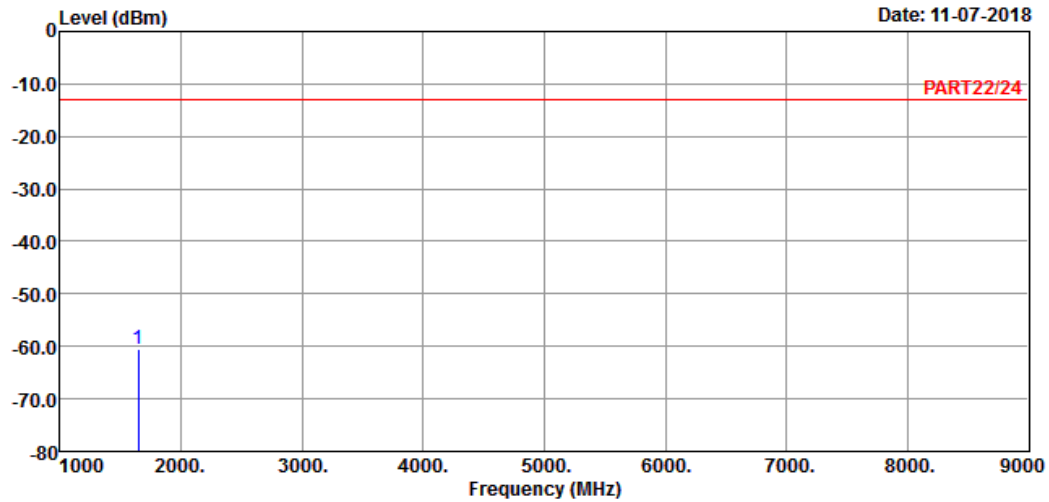


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 11-07-2018



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remark : EDGE 850 Link_L-CH
Tested by: Jisyong Wang

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

1 pp 1648.40 -60.66 -46.92 -13.00 -47.66 -13.74 Peak

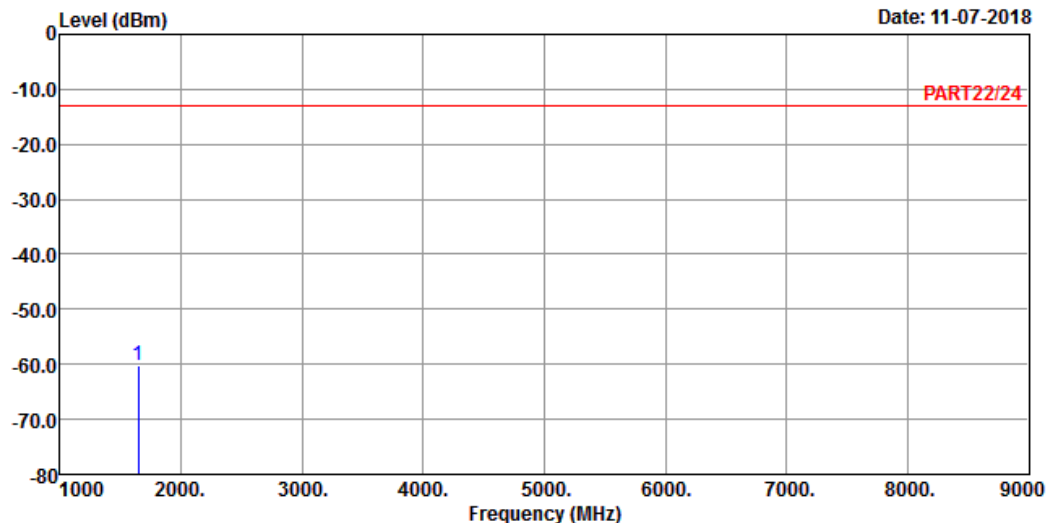


Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 4

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remark : EDGE 850 Link_L-CH

Tested by: Jisyong Wang

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

1 pp 1648.40 -60.21 -46.47 -13.00 -47.21 -13.74 Peak

Middle Channel

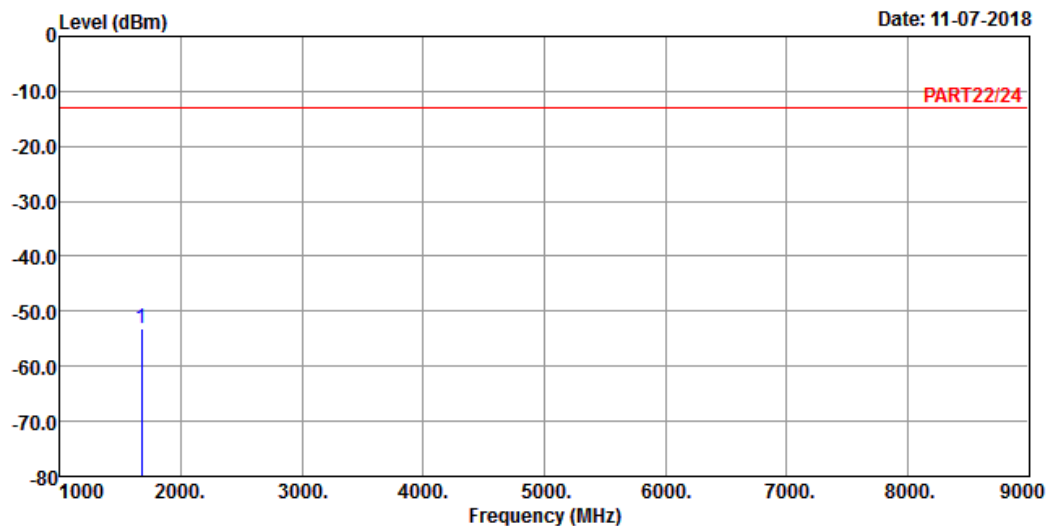


Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remark : EDGE 850 Link_M-CH

Tested by: Jisyong Wang

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

1 pp 1672.80 -53.20 -39.30 -13.00 -40.20 -13.90 Peak

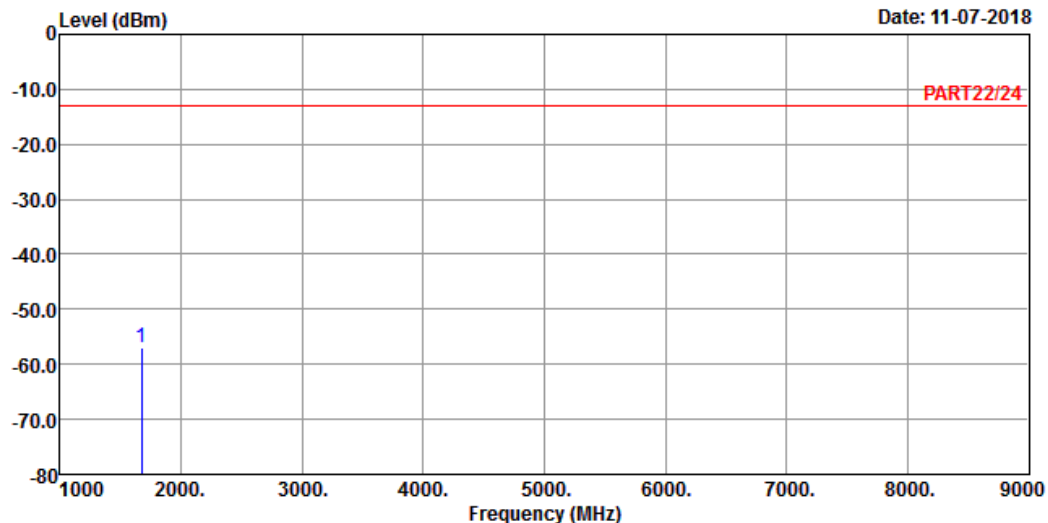


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remark : EDGE 850 Link_M-CH

Tested by: Jisyong Wang

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

1 pp 1672.80 -57.05 -43.15 -13.00 -44.05 -13.90 Peak

High Channel

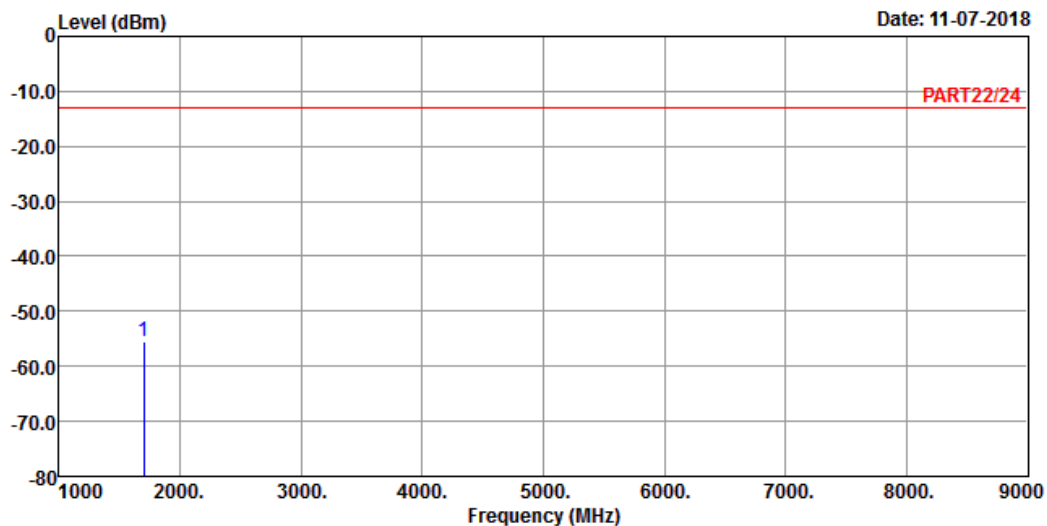


Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remark : EDGE 850 Link_H-CH

Tested by: Jisyong Wang

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

1 pp 1697.60 -55.52 -41.47 -13.00 -42.52 -14.05 Peak

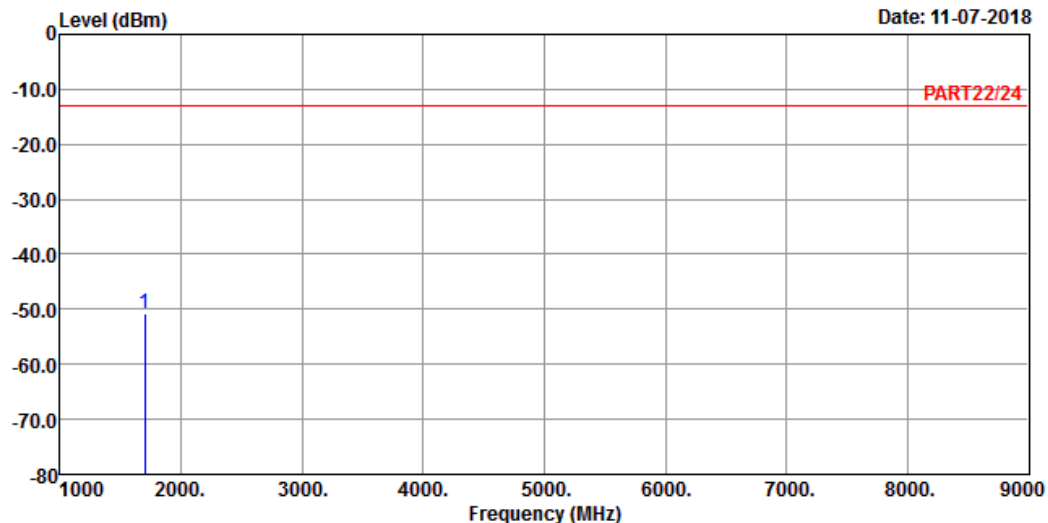


Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 4

Date: 11-07-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remark : EDGE 850 Link_H-CH

Tested by: Jisyong Wang

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

1 pp 1697.60 -50.69 -36.64 -13.00 -37.69 -14.05 Peak

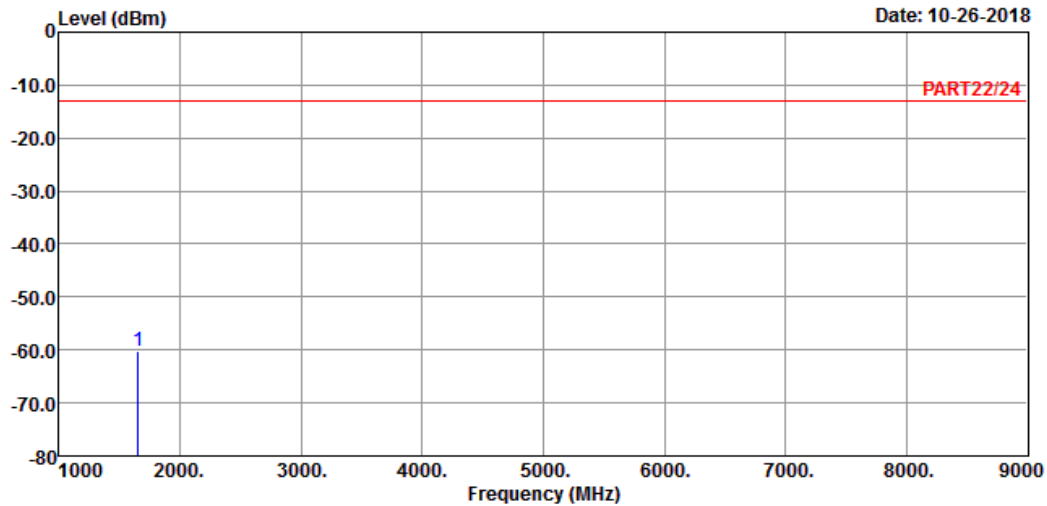
WCDMA:
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remark : WCDMA Band V Link_L-CH
Tested by: Thomas Wei

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

1 pp 1652.80 -60.16 -46.39 -13.00 -47.16 -13.77 Peak

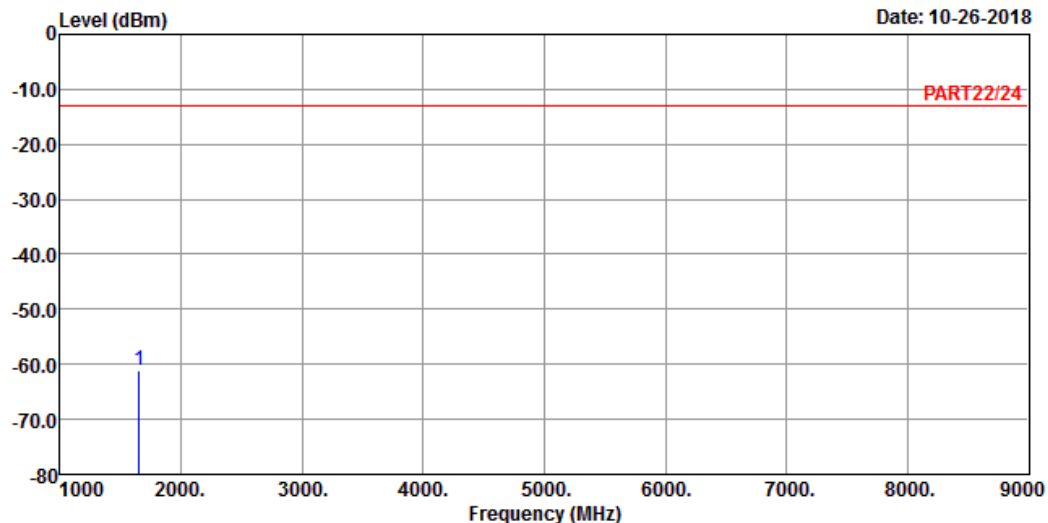


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-26-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remark : WCDMA Band V Link_L-CH

Tested by: Thomas Wei

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

1 pp 1652.80 -60.99 -47.22 -13.00 -47.99 -13.77 Peak

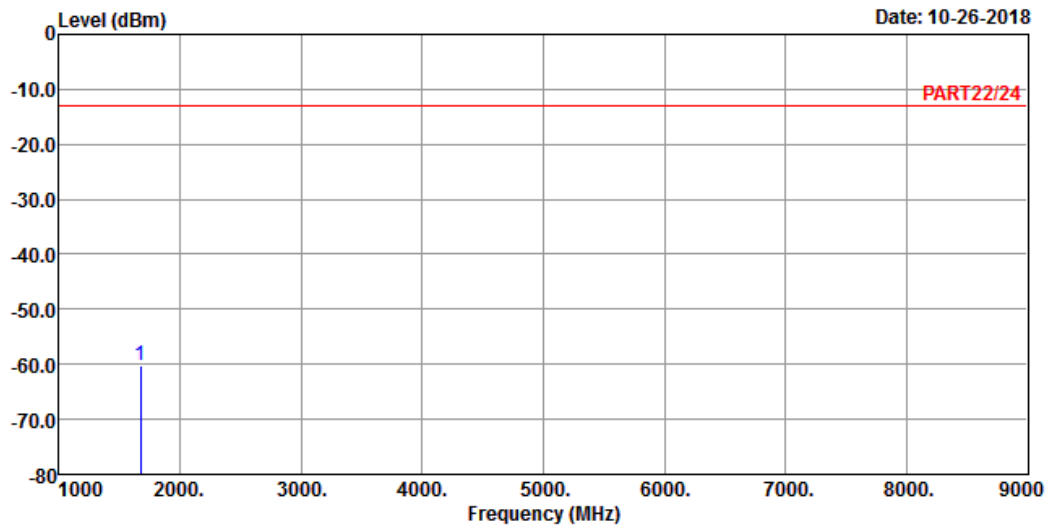
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remark : WCDMA Band V Link_M-CH
 Tested by: Thomas Wei

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

1 pp 1672.80 -60.29 -46.39 -13.00 -47.29 -13.90 Peak

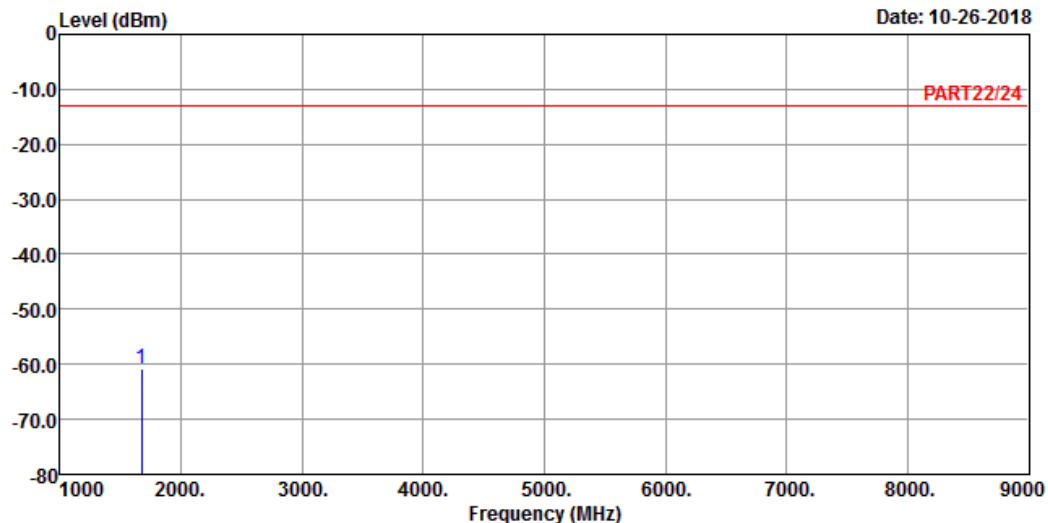


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-26-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remark : WCDMA Band V Link_M-CH

Tested by: Thomas Wei

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

1 pp 1672.80 -60.72 -46.82 -13.00 -47.72 -13.90 Peak

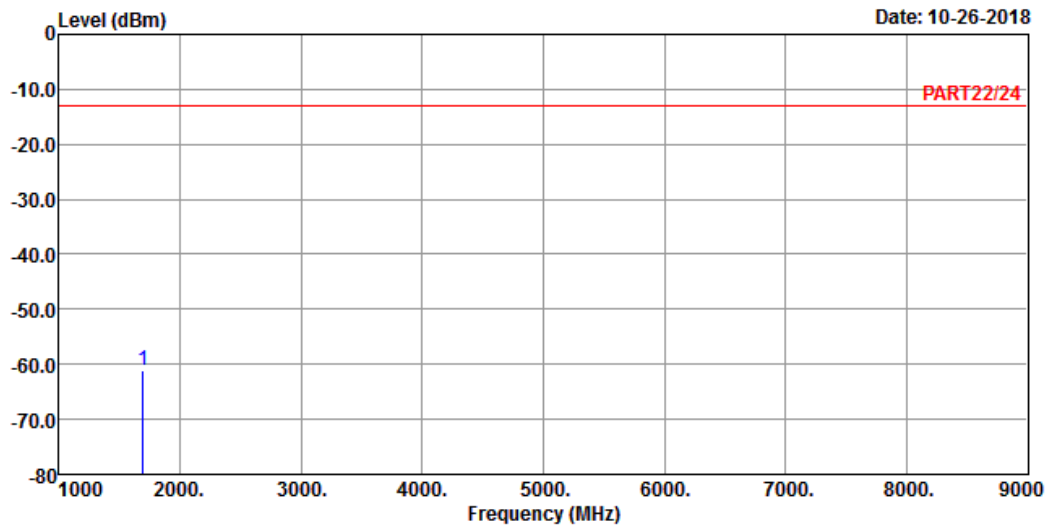
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remark : WCDMA Band V Link_H-CH
 Tested by: Thomas Wei

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

1 pp 1693.20 -61.15 -47.13 -13.00 -48.15 -14.02 Peak

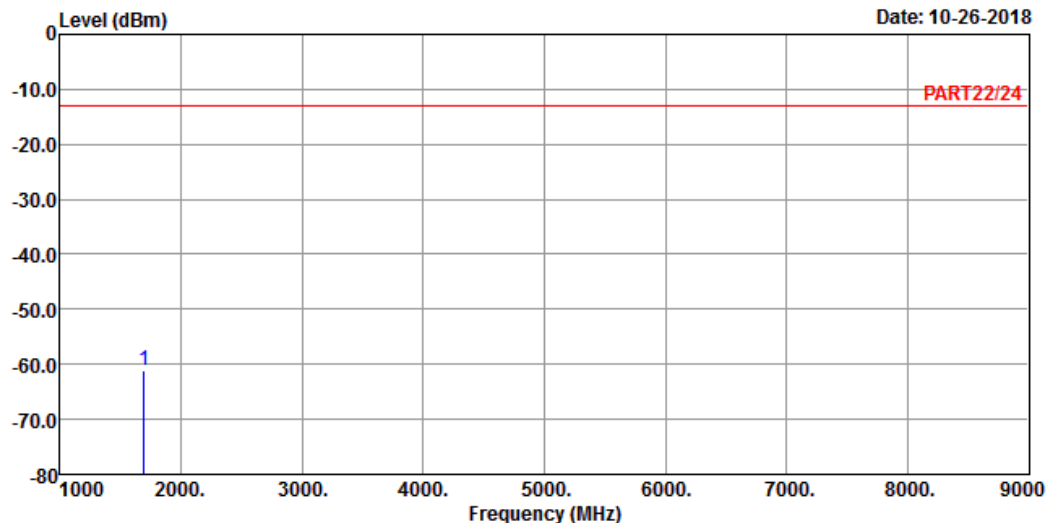


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-26-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remark : WCDMA Band V Link_H-CH

Tested by: Thomas Wei

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

1 pp 1693.20 -61.06 -47.04 -13.00 -48.06 -14.02 Peak

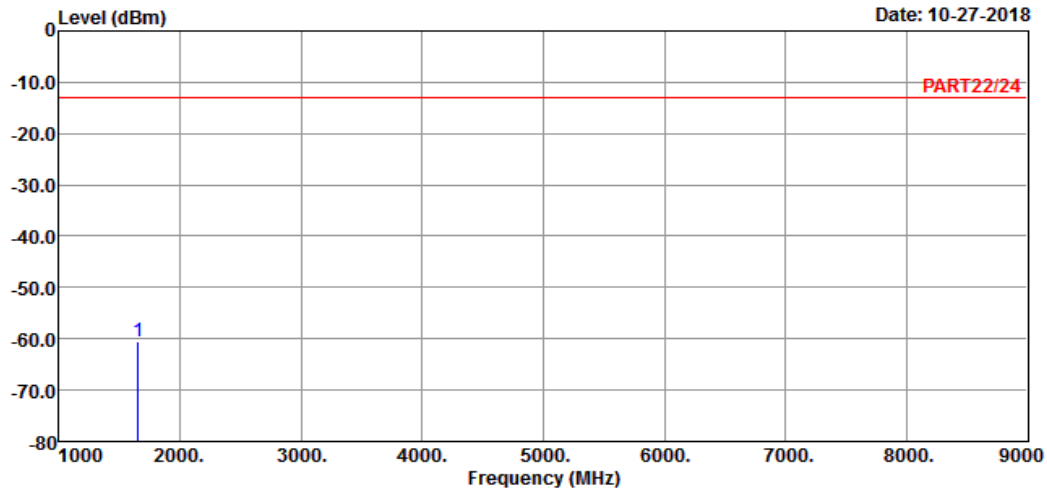
LTE Band 5
Channel Bandwidth: 1.4 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 5 QPSK_1.4M Link_L-CH
Tested by: Thomas Wei

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

1 pp 1649.40 -60.63 -46.89 -13.00 -47.63 -13.74 Peak

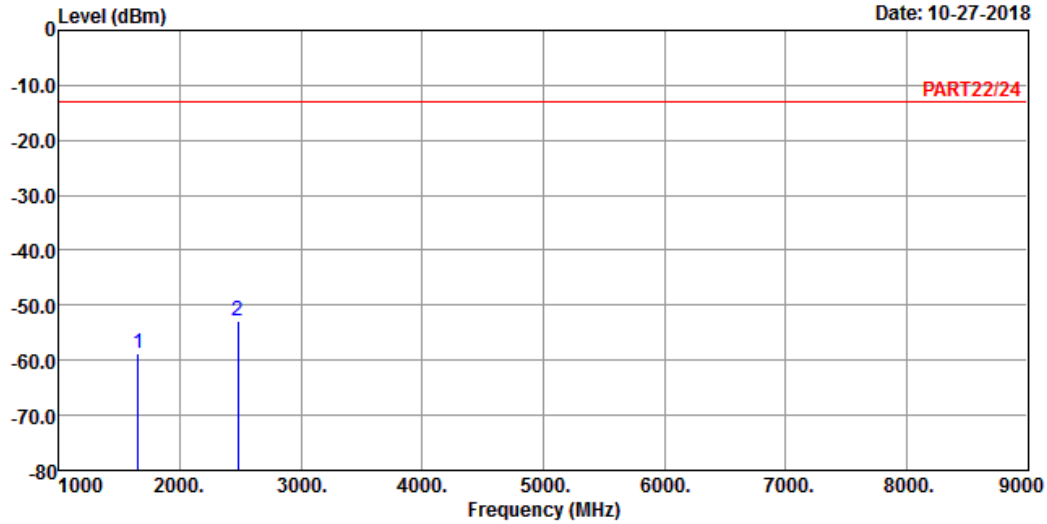


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 5 QPSK_1.4M Link_L-CH

Tested by: Thomas Wei

			Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark	
MHz	dBm	dBm	dBm	dB	dB		
1	1649.40	-58.77	-45.03	-13.00	-45.77	-13.74	Peak
2 pp	2474.10	-52.83	-42.81	-13.00	-39.83	-10.02	Peak

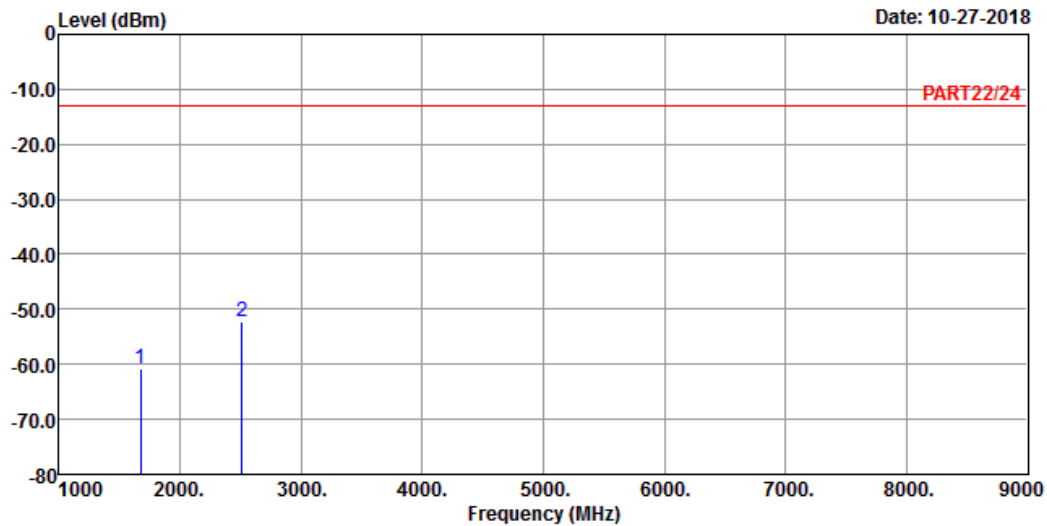
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : LTE Band 5 QPSK_1.4M Link_M-CH

Tested by: Thomas Wei

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-60.73	-46.83	-13.00	-47.73	-13.90	Peak
2 pp	2509.50	-52.12	-42.04	-13.00	-39.12	-10.08	Peak

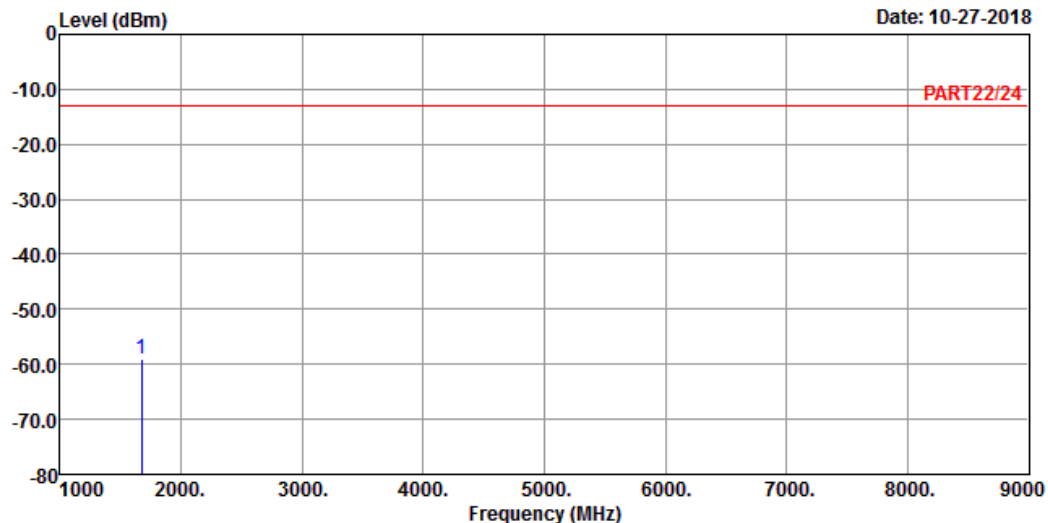


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 5 QPSK_1.4M Link_M-CH

Tested by: Thomas Wei

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

1 pp 1673.00 -58.92 -45.02 -13.00 -45.92 -13.90 Peak

High Channel

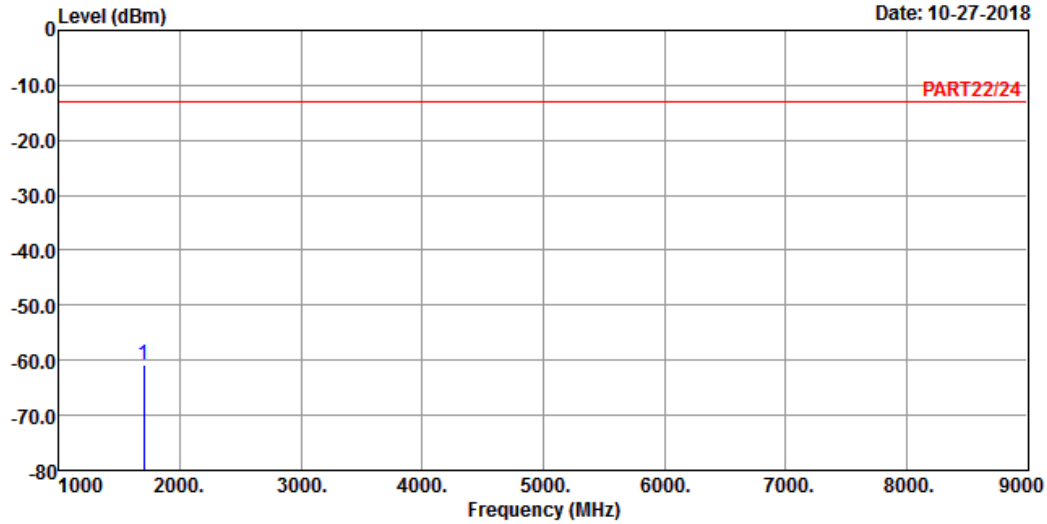


Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 1

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : LTE Band 5 QPSK_1.4M Link_H-CH

Tested by: Thomas Wei

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

1 pp 1696.60 -60.70 -46.68 -13.00 -47.70 -14.02 Peak

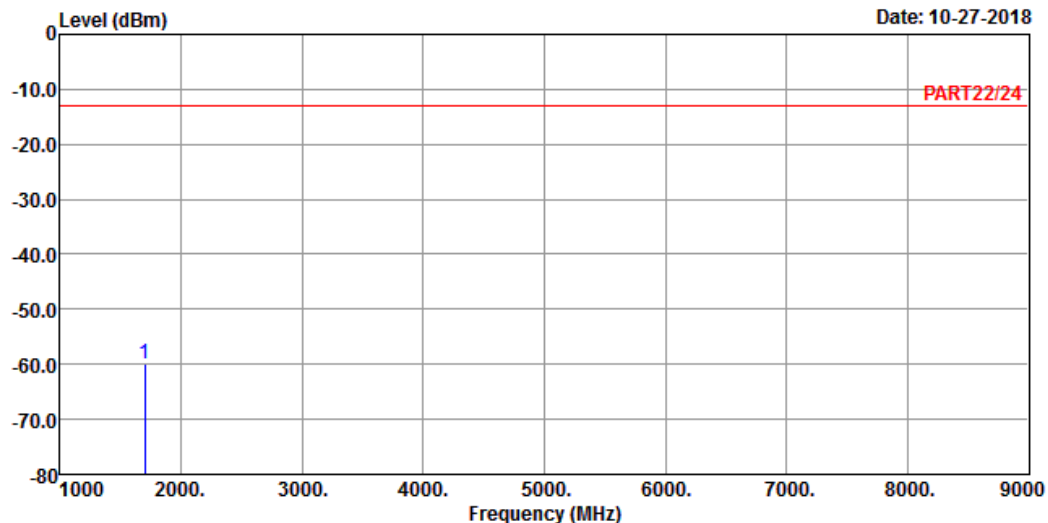


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 5 QPSK_1.4M Link_H-CH

Tested by: Thomas Wei

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

1 pp 1696.60 -59.92 -45.90 -13.00 -46.92 -14.02 Peak

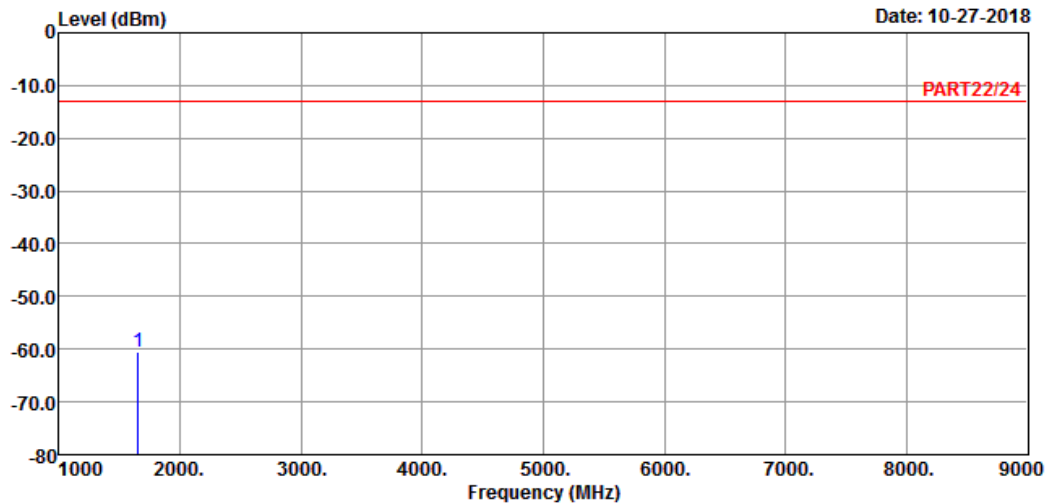
Channel Bandwidth: 5 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



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

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

1 pp 1653.00 -60.56 -46.79 -13.00 -47.56 -13.77 Peak

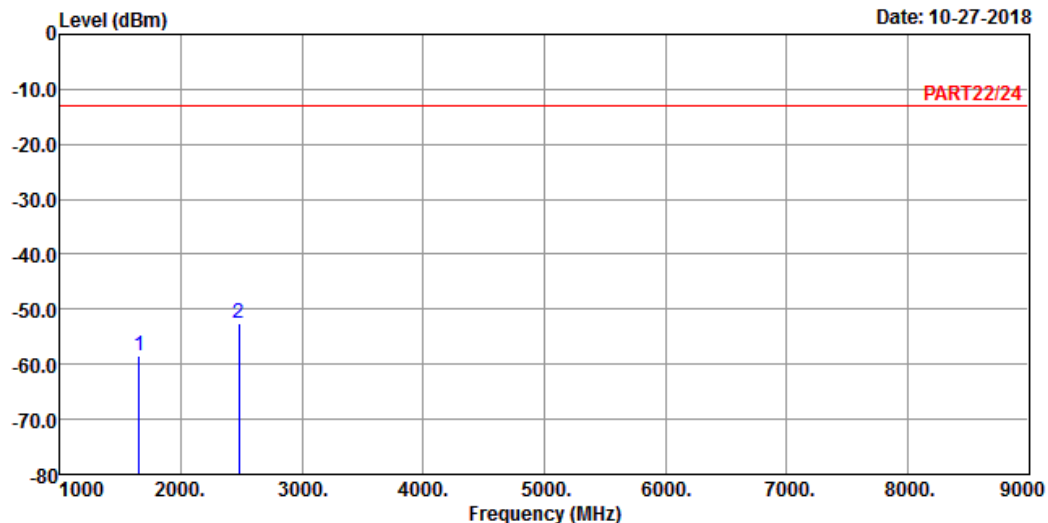


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 5 QPSK_5M Link_L-CH

Tested by: Thomas Wei

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1653.00	-58.34	-44.57	-13.00	-45.34	-13.77	Peak
2 pp	2479.50	-52.46	-42.43	-13.00	-39.46	-10.03	Peak

Middle Channel

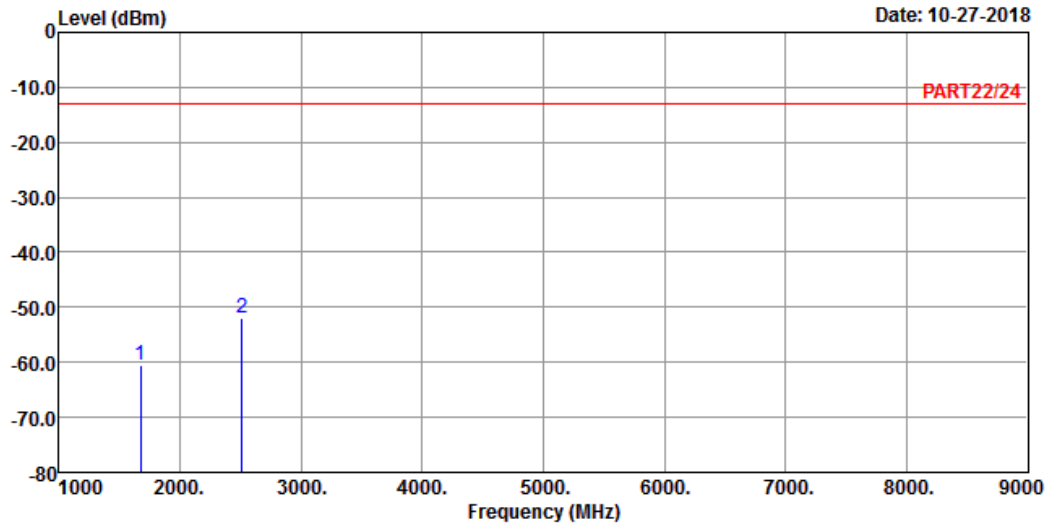


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : LTE Band 5 QPSK_5M Link_M-CH

Tested by: Thomas Wei

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-60.64	-46.74	-13.00	-47.64	-13.90	Peak
2 pp	2509.50	-51.90	-41.82	-13.00	-38.90	-10.08	Peak

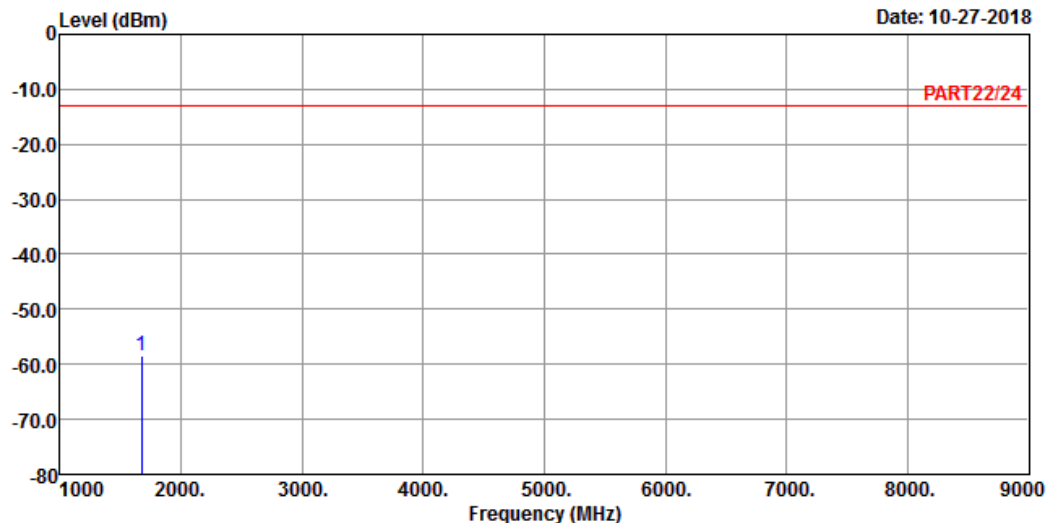


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 5 QPSK_5M Link_M-CH

Tested by: Thomas Wei

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

1 pp 1673.00 -58.53 -44.63 -13.00 -45.53 -13.90 Peak

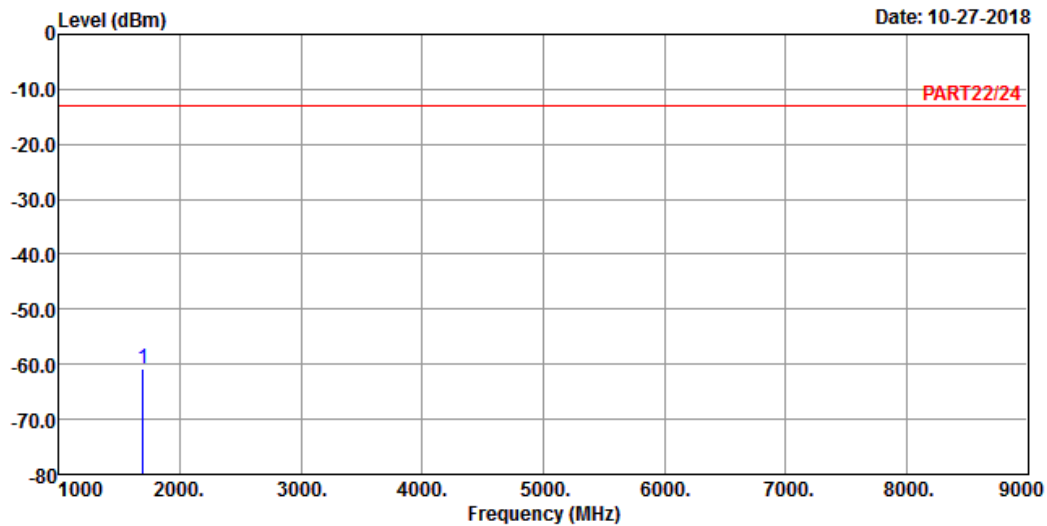
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : LTE Band 5 QPSK_5M Link_H-CH

Tested by: Thomas Wei

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

1 pp 1693.00 -60.77 -46.75 -13.00 -47.77 -14.02 Peak

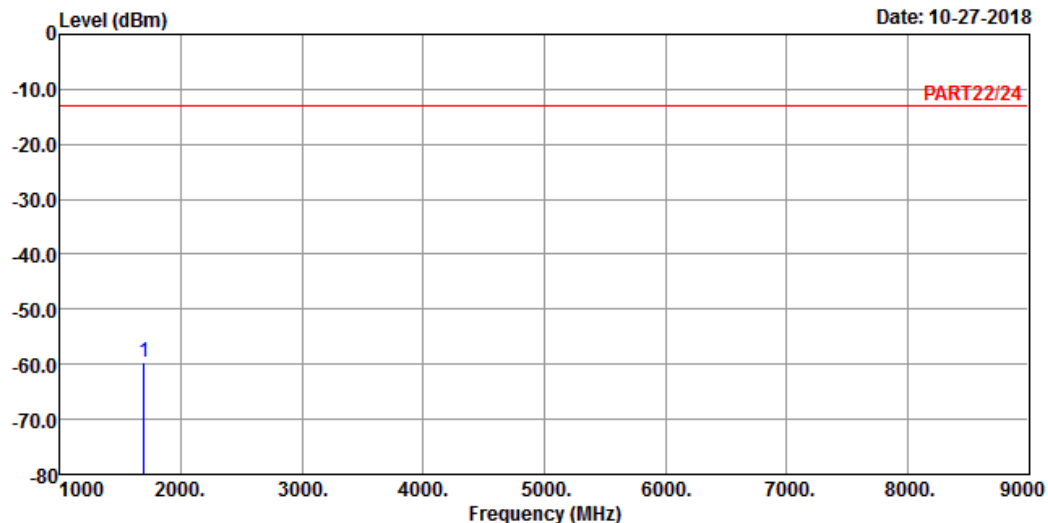


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 5 QPSK_5M Link_H-CH

Tested by: Thomas Wei

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

1 pp 1693.00 -59.49 -45.47 -13.00 -46.49 -14.02 Peak

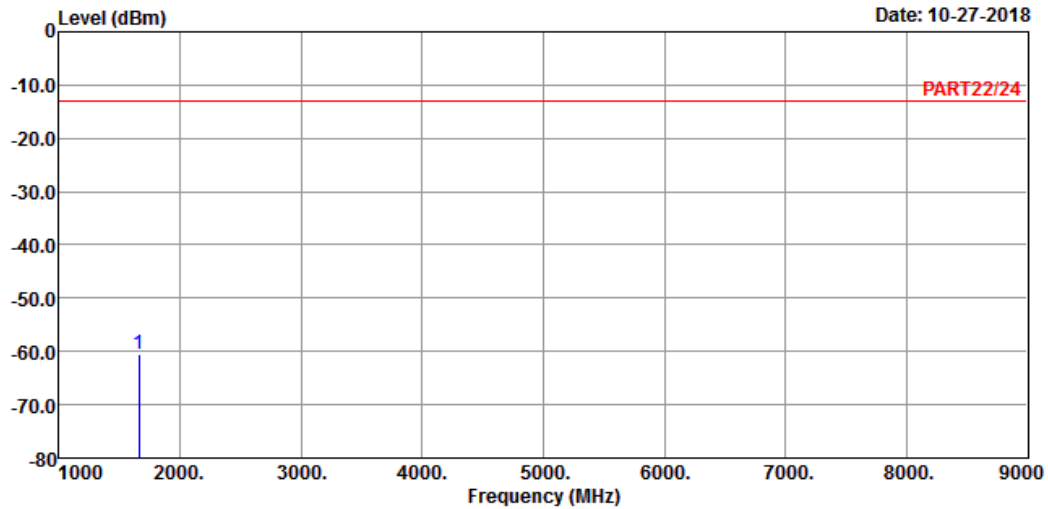
Channel Bandwidth: 10 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 5 QPSK_10M Link_L-CH
Tested by: Jisyong Wang

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

1 pp 1658.00 -60.41 -46.61 -13.00 -47.41 -13.80 Peak

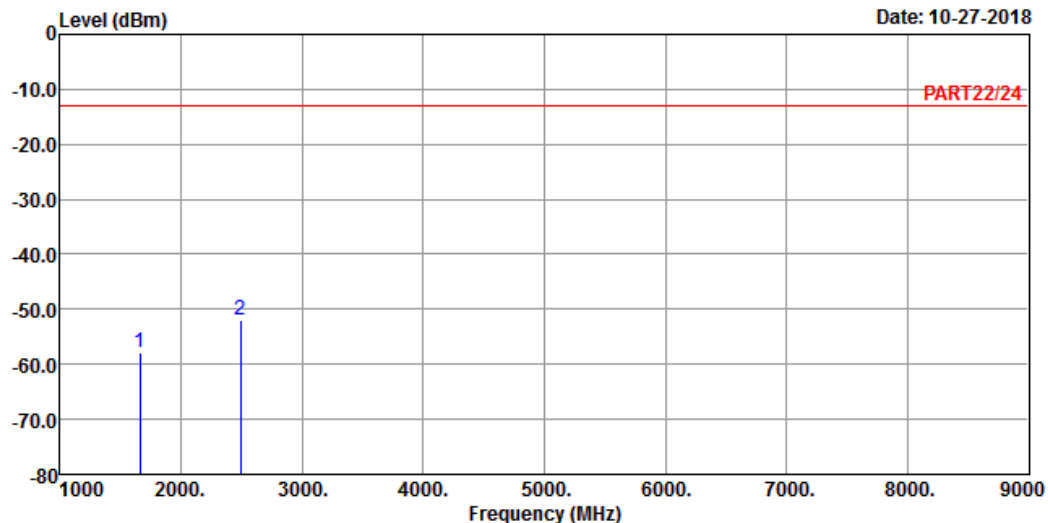


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 5 QPSK_10M Link_L-CH

Tested by: Jisyong Wang

			Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark	
MHz	dBm	dBm	dBm	dB	dB		
1	1658.00	-58.00	-44.20	-13.00	-45.00	-13.80	Peak
2 pp	2487.00	-51.93	-41.88	-13.00	-38.93	-10.05	Peak

Middle Channel

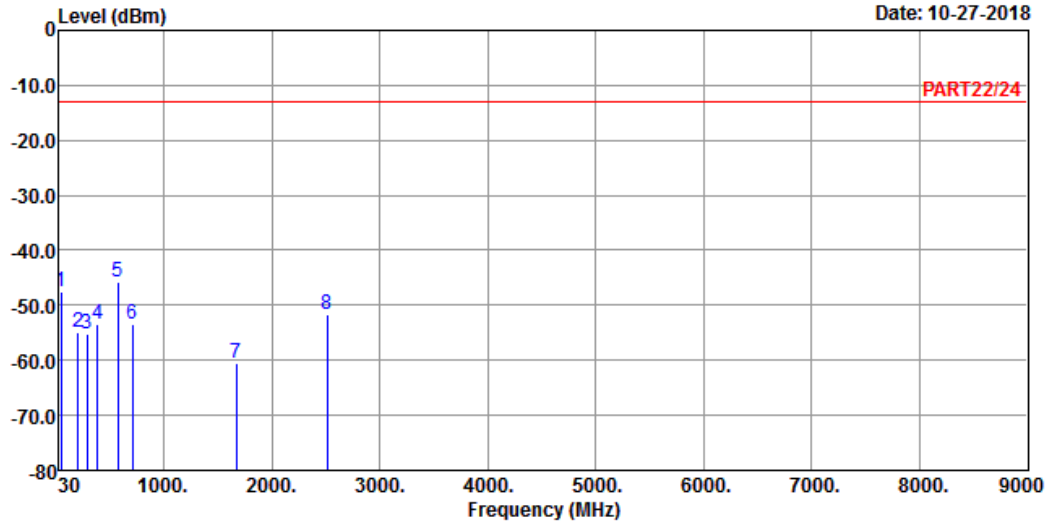


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : LTE Band 5 QPSK_10M Link_M-CH

Tested by: Thomas Wei

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	43.58	-47.65	-46.18	-13.00	-34.65	-1.47	Peak
2	208.48	-54.87	-47.20	-13.00	-41.87	-7.67	Peak
3	286.08	-55.30	-48.57	-13.00	-42.30	-6.73	Peak
4	382.11	-53.35	-47.30	-13.00	-40.35	-6.05	Peak
5 pp	576.11	-45.84	-44.08	-13.00	-32.84	-1.76	Peak
6	705.12	-53.39	-53.39	-13.00	-40.39	0.00	Peak
7	1673.00	-60.58	-46.68	-13.00	-47.58	-13.90	Peak
8	2509.50	-51.56	-41.48	-13.00	-38.56	-10.08	Peak

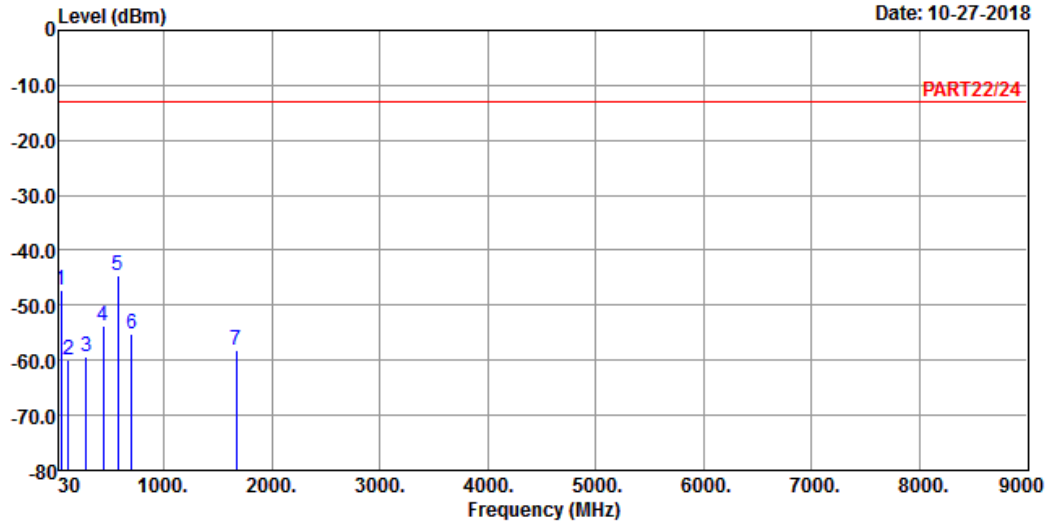


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 5 QPSK_10M Link_M-CH

Tested by: Thomas Wei

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	44.55	-47.27	-45.28	-13.00	-34.27	-1.99	Peak
2	112.45	-60.06	-49.86	-13.00	-47.06	-10.20	Peak
3	283.17	-59.22	-52.55	-13.00	-46.22	-6.67	Peak
4	440.31	-53.71	-48.08	-13.00	-40.71	-5.63	Peak
5 pp	574.17	-44.54	-42.70	-13.00	-31.54	-1.84	Peak
6	701.24	-55.23	-55.15	-13.00	-42.23	-0.08	Peak
7	1673.00	-58.24	-44.34	-13.00	-45.24	-13.90	Peak

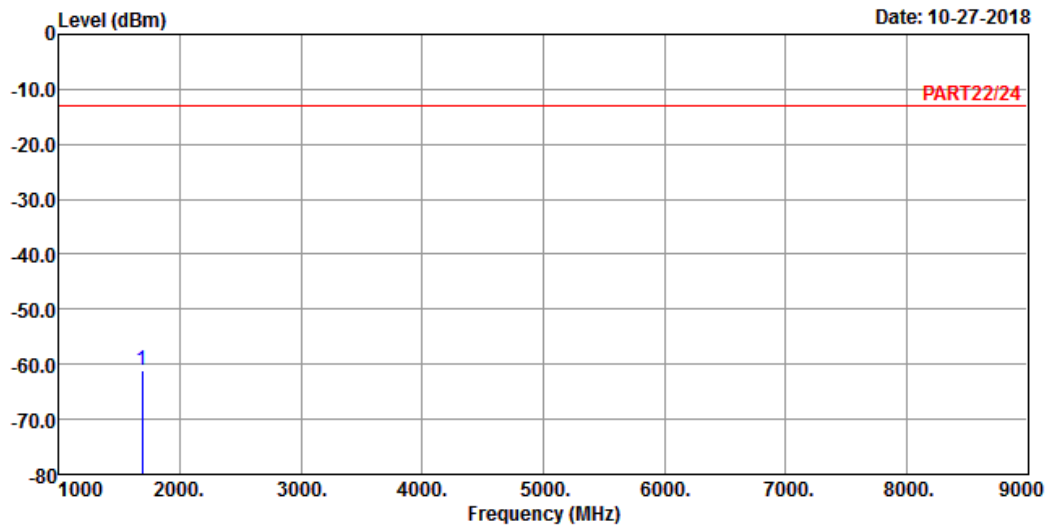
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : LTE Band 5 QPSK_10M Link_H-CH

Tested by: Thomas Wei

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

1 pp 1688.00 -61.04 -47.05 -13.00 -48.04 -13.99 Peak

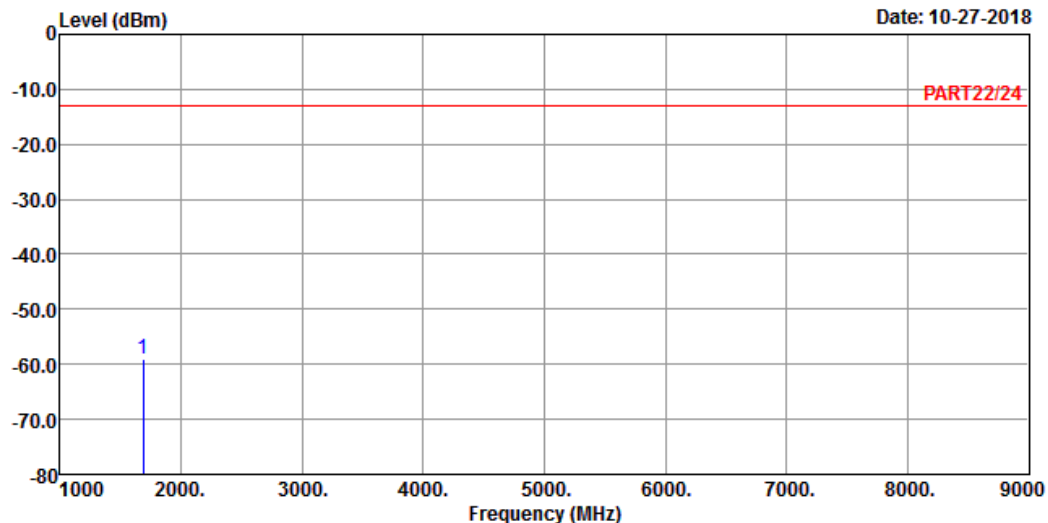


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2

Date: 10-27-2018



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 5 QPSK_10M Link_H-CH

Tested by: Thomas Wei

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

1 pp 1688.00 -59.10 -45.11 -13.00 -46.10 -13.99 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

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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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