FCC Test Report

(PART 27)

Report No.:	RFBGSN-WTW-P20070580-3
FCC ID:	2AX8C-3544
Test Model:	FL44TE
Received Date:	Jul. 29, 2020
Test Date:	Aug. 06, 2020 ~ Nov. 17, 2020
Issued Date:	Nov. 30, 2020
Applicant:	Amazon.com Services LLC
Address:	410 Terry Ave N Seattle, WA 98109 650 694 8333
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RFBGSN-WTW-P20070580-3	Original Release	Nov. 30, 2020

1 Certificate of Conformity

Product:	Fleet Edge
Brand:	N/A
Test Model:	FL44TE
Sample Status:	Engineering Sample
Applicant:	Amazon.com Services LLC
Test Date:	Aug. 06, 2020 ~ Nov. 17, 2020
Standards:	FCC Part 27, Subpart C, M

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 : Vera Huang , **Date:** Nov. 30, 2020

Vera Huang / Specialist

Approved by : , **Date:** Nov. 30, 2020

Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(h)(2)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 27.53(m)(6)	Occupied Bandwidth	Pass	Meet the requirement of limit.
--	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(m)(4)(6)	Out-of-Band Emissions Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(m)(4)(6)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(m)(4)(6)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -6.29 dB at 40.67 MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	**Frequency**	**Expanded Uncertainty (k=2) (±)**
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 18, 2020	Mar. 17, 2021
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 12, 2019	Dec. 11, 2020
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 24, 2019	Nov. 23, 2020
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 08, 2019	Nov. 07, 2020
			Nov. 06, 2020	Nov. 05, 2021
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
			Nov. 06, 2020	Nov. 05, 2021
HORN Antenna SCHWARZBECK	9120D	9120D-1169	Nov. 24, 2019	Nov. 23, 2020
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2019	Nov. 24, 2020
Preamplifier EMCI	EMC001340	980201	Oct. 14, 2019	Oct. 13, 2020
			Oct. 21, 2020	Oct. 20, 2021
Preamplifier EMCI	EMC 012645	980115	Oct. 08, 2019	Oct. 07, 2020
			Oct. 07, 2020	Oct. 06, 2021
Preamplifier EMCI	EMC 330H	980112	Oct. 08, 2019	Oct. 07, 2020
			Oct. 07, 2020	Oct. 06, 2021
RF Coaxial Cable EMCI	EMC104-SM-SM-8000	180409	Jan. 18, 2020	Jan. 17, 2021
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 08, 2019	Oct. 07, 2020
			Oct. 07, 2020	Oct. 06, 2021
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 08, 2019	Oct. 07, 2020
			Oct. 07, 2020	Oct. 06, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Feb. 13, 2020	Feb. 12, 2021
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 19, 2019	Aug. 18, 2021
Temperature & Humidity Chamber GIANT FORCE	GTH-120-40-CP-AR	MAA1306-019	Sep. 09, 2020	Sep. 08, 2021
DC power supply Keysight	U8002A	MY56330015	NA	NA
Digital Multimeter Fluke	87-III	70360742	Jun. 23, 2020	Jun. 22, 2021

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 10.

3 General Information

3.1 General Description of EUT

Product	Fleet Edge	
Brand	N/A	
Test Model	FL44TE	
Status of EUT	Engineering Sample	
Power Supply Rating	12 Vdc (Power Supply)	
Modulation Type	QPSK, 16QAM	
Frequency Range	LTE Band 7 (Channel Bandwidth: 5 MHz)	2502.5 ~ 2567.5 MHz
	LTE Band 7 (Channel Bandwidth: 10 MHz)	2505 ~ 2565 MHz
	LTE Band 7 (Channel Bandwidth: 15 MHz)	2507.5 ~ 2562.5 MHz
	LTE Band 7 (Channel Bandwidth: 20 MHz)	2510 ~ 2560 MHz
Max. EIRP Power	LTE Band 7 (Channel Bandwidth: 5 MHz)	119.40 mW
	LTE Band 7 (Channel Bandwidth: 10 MHz)	122.18 mW
	LTE Band 7 (Channel Bandwidth: 15 MHz)	123.88 mW
	LTE Band 7 (Channel Bandwidth: 20 MHz)	125.60 mW
Emission Designator	LTE Band 7 (Channel Bandwidth: 5 MHz)	4M49G7D
	LTE Band 7 (Channel Bandwidth: 10 MHz)	8M97G7D
	LTE Band 7 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 7 (Channel Bandwidth: 20 MHz)	18M0D7W
Antenna Type	Refer to Note as below	
Accessory Device	N/A	
Data Cable Supplied	N/A	

Note:

1. The information of module collocated in this EUT is listed as below.

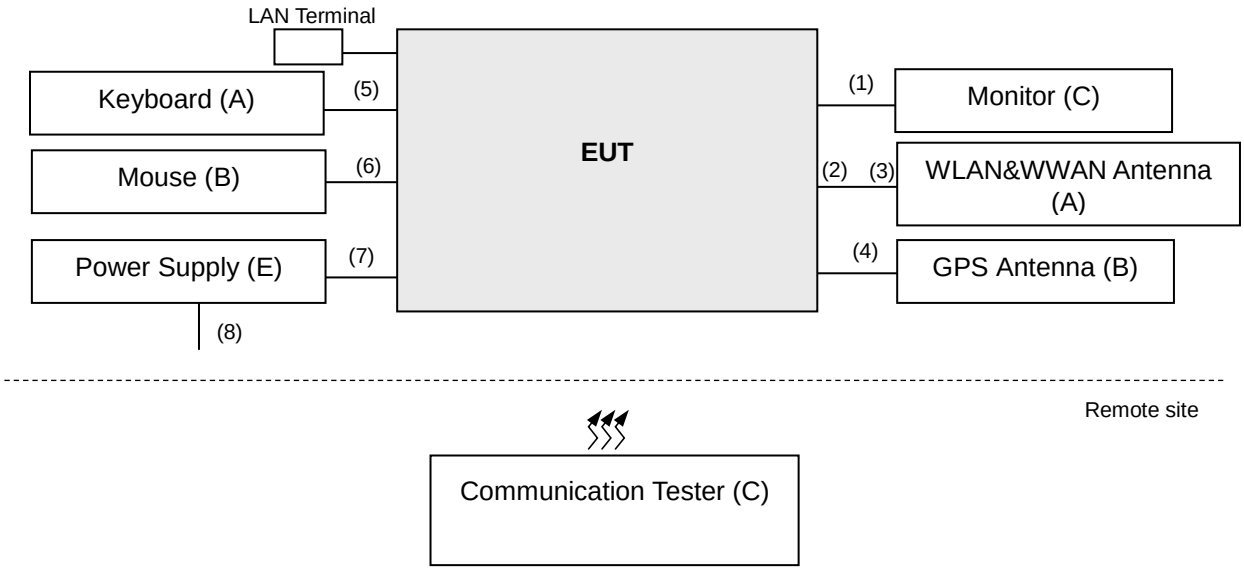
Product	Brand	Model
BT/WLAN Module	Intel	9560NGW
WWAN Module	Quectel	EM06-A

2. The antenna information is listed as below.

Ant.	Brand	Model	Antenna Type	Antenna Gain (dBi)	Remark
				LTE 7	
1	TAOGLAS	MA491.A.BICG.005.gb	Multiband Antennas	-2.6	Main Antenna
2	TAOGLAS	MA491.A.BICG.005.gb	Multiband Antennas	-1.9	Diversity Antenna

3. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
4. 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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Keyboard	DELL	RT7D50	CN-0J4624-37172-44T-000M	FCC DOC Approved	--
B	Mouse	DELL	MS111-L	N/A	N/A	--
C	Monitor	ViewSonic	VX2457-MHD	UG0182942333	N/A	--
D	Communication Tester	R&S	CMU200	123295	N/A	For WCDMA
		ANRITSU	MT8821C	6201502978	NA	For LTE
E	Power Supply	NA	NA	NA	NA	--
F	WLAN&WWAN Antenna	TAOGLAS	MA491.A.BICG.005.gb	NA	NA	Provided by client
G	GPS Antenna	NA	NA	NA	NA	Provided by client

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item D acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	HDMI Cable	1	2	N	0	-
2.	RF Cable	1	0.5	N	0	-
3.	RF Cable	1	0.5	N	0	-
4.	RF Cable	1	0.5	N	0	-
5.	USB Cable	1	2.4	N	0	-
6.	USB Cable	1	2.2	N	0	-
7.	DC power Cable	1	1.2	N	0	-
8.	Power Cord	1	1.8	N	0	-

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports.
The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	EIRP	Radiated Emission
LTE Band 7	X-plane	X-plane

LTE Band 7

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	20850 to 21350	21110	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Frequency Stability	20775 to 21425	20775, 21425	5 MHz	QPSK	25 RB / 0 RB Offset
		20800 to 21400	20800, 21400	10 MHz	QPSK	50 RB / 0 RB Offset
		20825 to 21375	20825, 21375	15 MHz	QPSK	75 RB / 0 RB Offset
		20850 to 21350	20850, 21350	20 MHz	QPSK	100 RB / 0 RB Offset
-	Occupied Bandwidth	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Out-of-Band Emissions	20775 to 21425	20775, 21425	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		20800 to 21400	20800, 21400	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		20825 to 21375	20825, 21375	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20850 to 21350	20850, 21350	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Conducted Emission	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK	1 RB / 0 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK	1 RB / 0 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK	1 RB / 0 RB Offset
		20850 to 21350	20850, 21100 21350	20 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK	1 RB / 0 RB Offset
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK	1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only EIRP, modulation characteristics, occupied bandwidth, out of band emissions and peak to average ratio items had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel (above 1GHz) for final testing.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	25 deg. C, 65 % RH	12 Vdc	Cyril Chen
Modulation Characteristics	25 deg. C, 65 % RH	12 Vdc	Getaz Yang
Frequency Stability	25 deg. C, 65 % RH	12 Vdc	Getaz Yang
Occupied Bandwidth	25 deg. C, 65 % RH	12 Vdc	Getaz Yang
Out-of-Band Emissions	25 deg. C, 65 % RH	12 Vdc	Getaz Yang
Peak to Average Ratio	25 deg. C, 65 % RH	12 Vdc	Getaz Yang
Conducted Emission	25 deg. C, 65 % RH	12 Vdc	Getaz Yang
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Cyril Chen

3.4 EUT Operating Conditions

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

3.5 General Description of Applied Standards and references

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

Test Standard:
FCC 47 CFR Part 2
FCC 47 CFR Part 27
ANSI 63.26-2015

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

References Test Guidance:
KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA-603-E 2016

Note: All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2 watts transmitter output power” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

4.1.2 Test Procedures

EIRP Measurement:

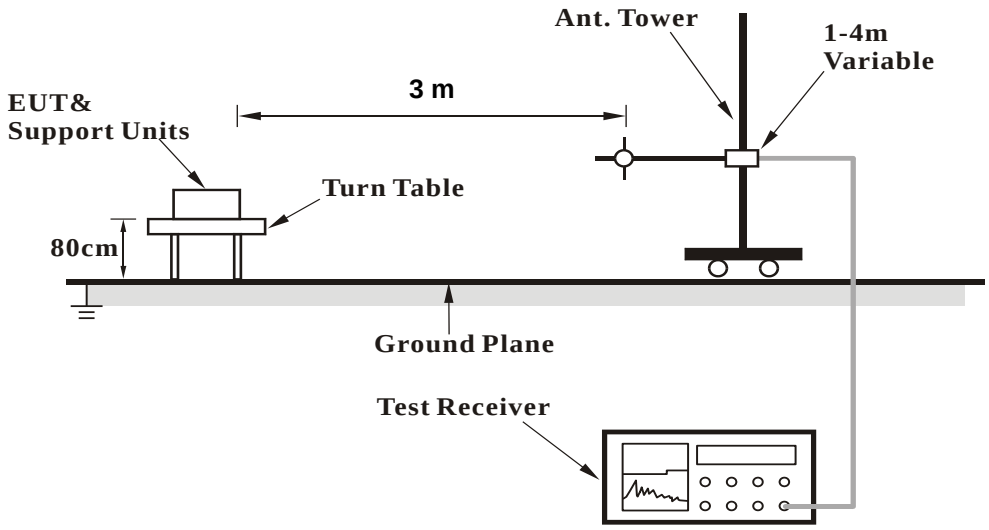
a. All measurements were done at low, middle and high operational frequency range. RBW is 5 MHz、10 MH、15 MH、20 MH for LTE mode, and VBW ≥ 3 x RBW.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 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. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
d. Correction Factor (includes EIRP and ERP unit conversion factor) = Antenna gain of substitution horn. – Tx cable loss. Measurement method refers to ANSI C63.26 section 5.2.7 & 5.2.4.

Conducted Power Measurement:

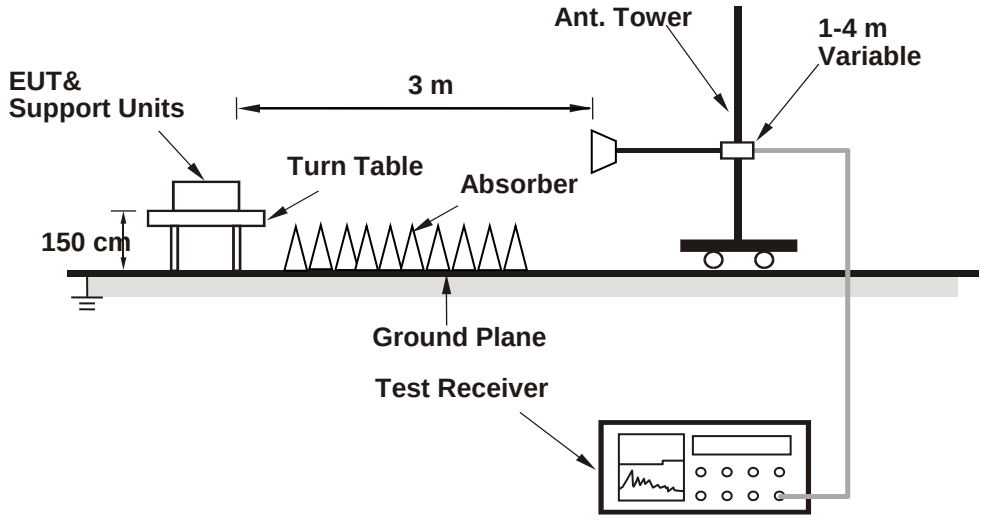
a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

4.1.3 Test Setup

EIRP / ERP Measurement:
<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

Conducted Power Measurement:

4.1.4 Test Results

Conducted Output Power (dBm)

LTE Band 7															
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		20850	21100	21350				Channel		20825	21100	21375	
		Frequency (MHz)		2510.0	2535.0	2560.0				Frequency (MHz)		2507.5	2535.0	2562.5	
20M	QPSK	1	0	23.16	23.45	23.14	0	15M	QPSK	1	0	23.12	23.41	23.11	0
		1	50	23.00	23.30	23.01	0			1	37	22.96	23.23	22.97	0
		1	99	22.94	23.19	22.93	0			1	74	22.88	23.15	22.89	0
		50	0	22.01	22.32	21.99	1			36	0	21.97	22.25	21.96	1
		50	25	21.84	22.13	21.82	1			36	19	21.81	22.07	21.76	1
		50	50	21.73	22.04	21.70	1			36	39	21.66	21.98	21.63	1
		100	0	21.98	22.30	21.94	1			75	0	21.95	22.23	21.86	1
	16QAM	1	0	22.14	22.42	22.08	1		16QAM	1	0	22.11	22.33	22.05	1
		1	50	21.98	22.21	21.93	1			1	37	21.93	22.20	21.92	1
		1	99	21.87	22.16	21.91	1			1	74	21.79	22.10	21.80	1
		50	0	20.82	21.21	20.95	2			36	0	20.81	21.23	20.80	2
		50	25	20.76	21.09	20.80	2			36	19	20.79	21.04	20.70	2
		50	50	20.64	21.00	20.68	2			36	39	20.62	20.91	20.60	2
		100	0	20.91	21.29	20.93	2			75	0	20.91	21.16	20.79	2
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		20800	21100	21400				Channel		20775	21100	21425	
		Frequency (MHz)		2505.0	2535.0	2565.0				Frequency (MHz)		2502.5	2535.0	2567.5	
10M	QPSK	1	0	23.06	23.38	23.06	0	5M	QPSK	1	0	23.03	23.32	23.01	0
		1	24	22.88	23.16	22.89	0			1	12	22.85	23.13	22.82	0
		1	49	22.80	23.10	22.84	0			1	24	22.74	23.03	22.76	0
		25	0	21.91	22.19	21.93	1			12	0	21.85	22.12	21.89	1
		25	12	21.76	21.99	21.73	1			12	6	21.73	21.94	21.69	1
		25	25	21.62	21.94	21.55	1			12	13	21.55	21.91	21.52	1
		50	0	21.92	22.15	21.79	1			25	0	21.88	22.09	21.73	1
	16QAM	1	0	22.00	22.30	22.00	1		16QAM	1	0	21.97	22.26	21.93	1
		1	24	21.87	22.08	21.85	1			1	12	21.84	22.04	21.77	1
		1	49	21.72	22.05	21.80	1			1	24	21.66	21.97	21.69	1
		25	0	20.73	21.05	20.88	2			12	0	20.72	21.03	20.79	2
		25	12	20.72	20.91	20.67	2			12	6	20.70	20.87	20.61	2
		25	25	20.61	20.89	20.47	2			12	13	20.50	20.82	20.44	2
		50	0	20.90	21.12	20.76	2			25	0	20.76	20.88	20.55	2

EIRP Power (dBm)

LTE Band 7							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	20775	2502.5	-18.14	38.52	20.38	109.14	H
	21100	2535.0	-17.59	38.36	20.77	119.40	
	21425	2567.5	-18.31	38.58	20.27	106.41	
	20775	2502.5	-22.82	38.92	16.10	40.74	V
	21100	2535.0	-22.69	39.26	16.57	45.39	
	21425	2567.5	-23.21	39.22	16.01	39.90	
Channel Bandwidth: 5 MHz / 16QAM							
X	20775	2502.5	-19.16	38.52	19.36	86.30	H
	21100	2535.0	-18.61	38.36	19.75	94.41	
	21425	2567.5	-19.42	38.58	19.16	82.41	
	20775	2502.5	-23.74	38.92	15.18	32.96	V
	21100	2535.0	-23.76	39.26	15.50	35.48	
	21425	2567.5	-24.22	39.22	15.00	31.62	

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

LTE Band 7							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	20800	2505.0	-18.19	38.65	20.46	111.17	H
	21100	2535.0	-17.49	38.36	20.87	122.18	
	21400	2565.0	-18.11	38.49	20.38	109.14	
	20800	2505.0	-22.67	38.84	16.17	41.40	V
	21100	2535.0	-22.62	39.26	16.64	46.13	
	21400	2565.0	-22.99	39.10	16.11	40.83	
Channel Bandwidth: 10 MHz / 16QAM							
X	20800	2505.0	-19.21	38.65	19.44	87.90	H
	21100	2535.0	-18.50	38.36	19.86	96.83	
	21400	2565.0	-19.26	38.49	19.23	83.75	
	20800	2505.0	-23.57	38.84	15.27	33.65	V
	21100	2535.0	-23.65	39.26	15.61	36.39	
	21400	2565.0	-23.99	39.10	15.11	32.43	

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

LTE Band 7							
Channel Bandwidth: 15 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	20825	2507.5	-18.00	38.52	20.52	112.72	H
	21100	2535.0	-17.43	38.36	20.93	123.88	
	21375	2562.5	-18.12	38.58	20.46	111.17	
	20825	2507.5	-22.67	38.92	16.25	42.17	V
	21100	2535.0	-22.55	39.26	16.71	46.88	
	21375	2562.5	-23.03	39.22	16.19	41.59	
Channel Bandwidth: 15 MHz / 16QAM							
X	20825	2507.5	-19.00	38.52	19.52	89.54	H
	21100	2535.0	-18.49	38.36	19.87	97.05	
	21375	2562.5	-19.17	38.58	19.41	87.30	
	20825	2507.5	-23.61	38.92	15.31	33.96	V
	21100	2535.0	-23.59	39.26	15.67	36.90	
	21375	2562.5	-24.02	39.22	15.20	33.11	

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

LTE Band 7							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	20850	2510.0	-17.94	38.52	20.58	114.29	H
	21100	2535.0	-17.37	38.36	20.99	125.60	
	21350	2560.0	-18.08	38.58	20.50	112.20	
	20850	2510.0	-22.61	38.92	16.31	42.76	V
	21100	2535.0	-22.48	39.26	16.78	47.64	
	21350	2560.0	-22.97	39.22	16.25	42.17	
Channel Bandwidth: 20 MHz / 16QAM							
X	20850	2510.0	-18.92	38.52	19.60	91.20	H
	21100	2535.0	-18.41	38.36	19.95	98.86	
	21350	2560.0	-19.07	38.58	19.51	89.33	
	20850	2510.0	-23.54	38.92	15.38	34.51	V
	21100	2535.0	-23.54	39.26	15.72	37.33	
	21350	2560.0	-23.96	39.22	15.26	33.57	

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

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

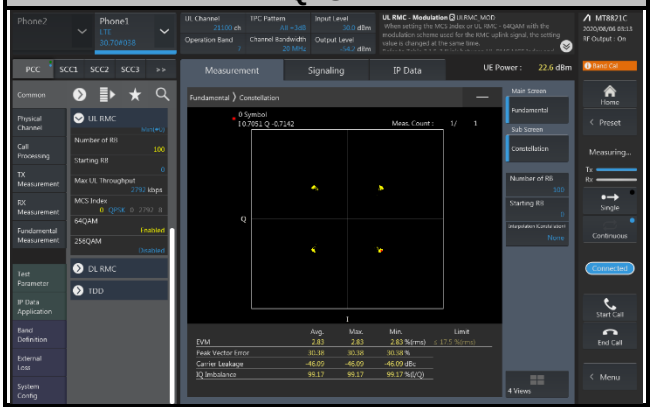
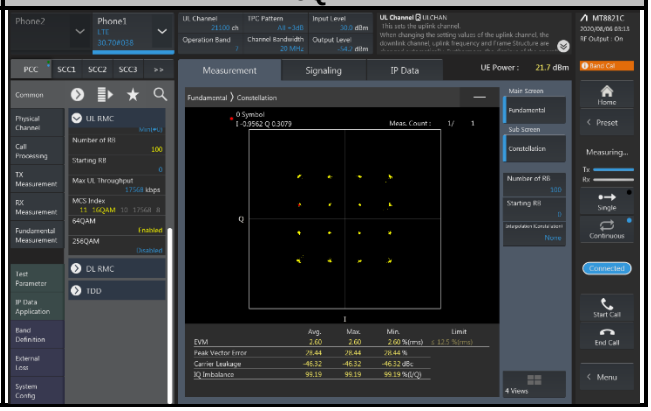
N/A

4.2.2 Test Setup

4.2.3 Test Procedure

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

4.2.4 Test Results

Spectrum Plot of Measurement	
LTE Band 7	
Channel 21110	
QPSK	16QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

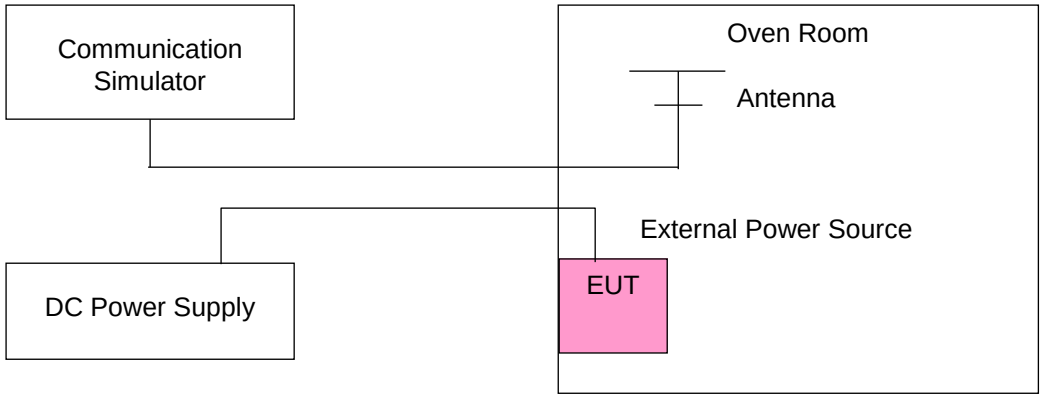
According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT -30℃~ 50℃.

4.3.2 Test Procedure

a. 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.
b. 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.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	2502.500003	0.001239	2567.499997	-0.001130
10.2	2502.500002	0.000799	2567.499999	-0.000584
13.8	2502.500002	0.000959	2567.499998	-0.000857

Note: The applicant defined the normal working voltage of the battery is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2502.500004	0.001558	2567.500004	0.001441
-20	2502.500004	0.001558	2567.500003	0.001285
-10	2502.500001	0.000400	2567.500001	0.000428
0	2502.500004	0.001598	2567.500003	0.001013
10	2502.499998	-0.000999	2567.500004	0.001363
20	2502.499998	-0.000879	2567.500003	0.001052
30	2502.499999	-0.000480	2567.500002	0.000935
40	2502.499998	-0.000839	2567.499996	-0.001558
50	2502.499999	-0.000480	2567.499998	-0.000740
60	2502.499998	-0.000639	2567.499997	-0.001207
70	2502.499999	-0.000480	2567.499998	-0.000779
80	2502.499997	-0.001399	2567.499996	-0.001402

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -30˚C to 80˚C.
2. The EUT would shut down automatically as below -30˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	2505.000004	0.001517	2564.999999	-0.000546
10.2	2505.000003	0.001198	2564.999997	-0.001092
13.8	2505.000002	0.000679	2564.999998	-0.000858

Note: The applicant defined the normal working voltage of the battery is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2505.000004	0.001477	2565.000004	0.001365
-20	2505.000003	0.001357	2565.000002	0.000663
-10	2505.000001	0.000559	2565.000003	0.001326
0	2505.000003	0.001357	2565.000003	0.001287
10	2504.999996	-0.001597	2565.000003	0.001053
20	2504.999998	-0.000838	2565.000002	0.000741
30	2504.999999	-0.000519	2565.000004	0.001559
40	2504.999997	-0.001078	2564.999998	-0.000858
50	2504.999998	-0.000998	2564.999997	-0.001326
60	2504.999999	-0.000439	2564.999997	-0.001014
70	2504.999999	-0.000399	2564.999998	-0.000975
80	2504.999999	-0.000479	2564.999998	-0.000702

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -30˚C to 80˚C.
2. The EUT would shut down automatically as below -30˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	2507.500002	0.000758	2562.499997	-0.001093
10.2	2507.500002	0.000917	2562.499998	-0.000663
13.8	2507.500004	0.001555	2562.499996	-0.001444

Note: The applicant defined the normal working voltage of the battery is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2507.500001	0.000558	2562.500002	0.000780
-20	2507.500002	0.000598	2562.500004	0.001522
-10	2507.500002	0.000598	2562.500004	0.001405
0	2507.500004	0.001476	2562.500003	0.001015
10	2507.499998	-0.000917	2562.500002	0.000624
20	2507.499997	-0.001236	2562.500003	0.001210
30	2507.499997	-0.001117	2562.500004	0.001561
40	2507.499997	-0.001196	2562.499998	-0.000976
50	2507.499999	-0.000439	2562.499998	-0.000898
60	2507.499996	-0.001555	2562.499997	-0.001132
70	2507.499999	-0.000598	2562.499997	-0.001132
80	2507.499998	-0.000917	2562.499996	-0.001561

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -30˚C to 80˚C.
2. The EUT would shut down automatically as below -30˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	2510.000003	0.001155	2559.999999	-0.000508
10.2	2510.000001	0.000478	2559.999996	-0.001445
13.8	2510.000002	0.000916	2559.999999	-0.000430

Note: The applicant defined the normal working voltage of the battery is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2510.000001	0.000558	2560.000004	0.001523
-20	2510.000001	0.000438	2560.000003	0.001055
-10	2510.000003	0.001195	2560.000002	0.000703
0	2510.000002	0.000637	2560.000002	0.000703
10	2509.999997	-0.001155	2560.000001	0.000469
20	2509.999998	-0.000717	2560.000004	0.001523
30	2509.999997	-0.001155	2560.000003	0.001055
40	2509.999996	-0.001434	2559.999999	-0.000547
50	2509.999997	-0.001235	2559.999999	-0.000586
60	2509.999996	-0.001514	2559.999997	-0.001328
70	2509.999998	-0.000637	2559.999996	-0.001563
80	2509.999998	-0.000677	2559.999996	-0.001445

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -30˚C to 80˚C.
2. The EUT would shut down automatically as below -30˚C.

4.4 Occupied Bandwidth Measurement

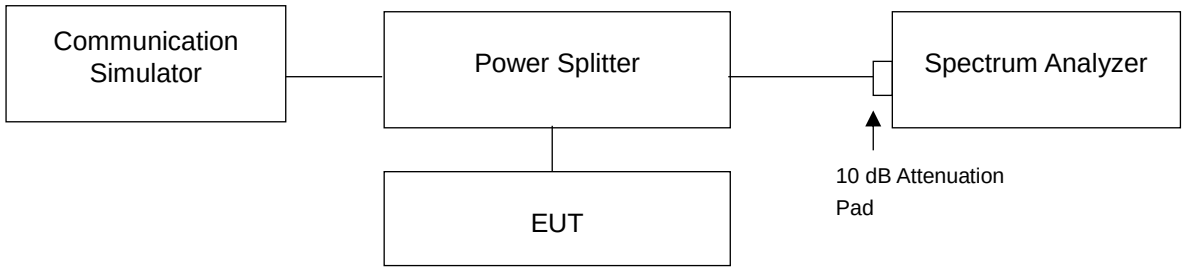
4.4.1 Limits of Occupied Bandwidth Measurement

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

4.4.2 Test Procedure

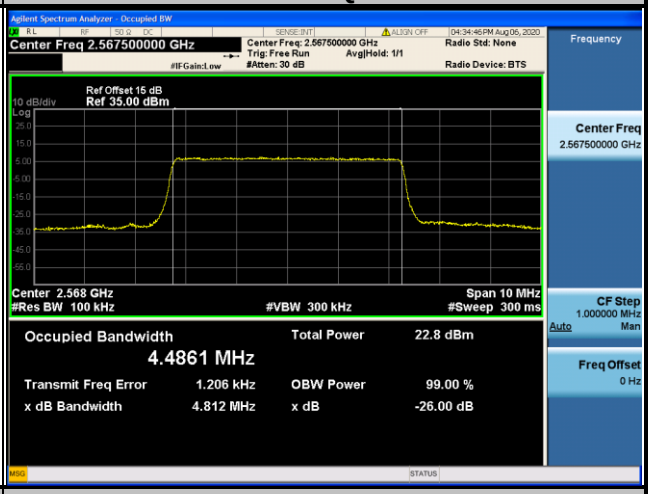
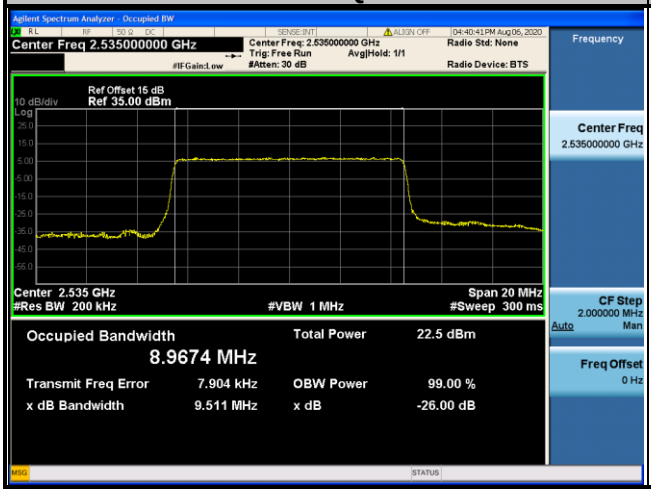
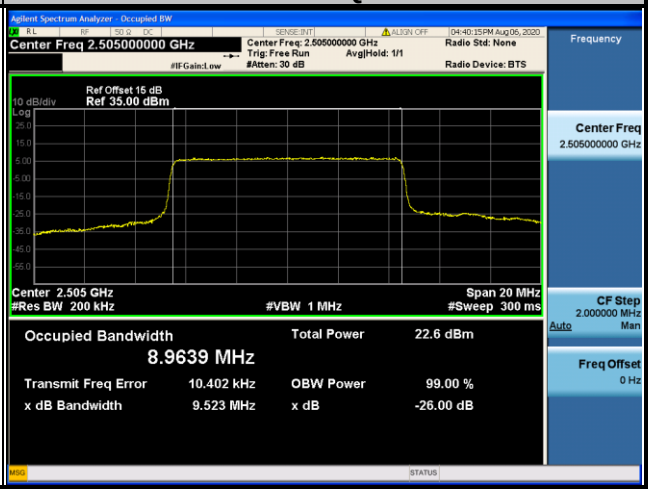
a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.3 Test Setup

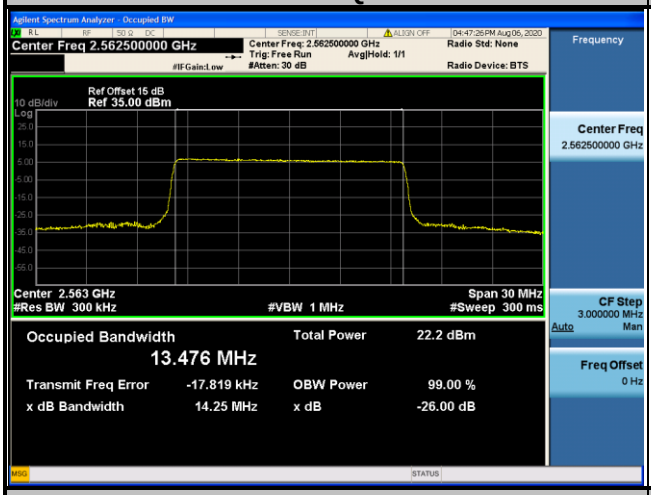
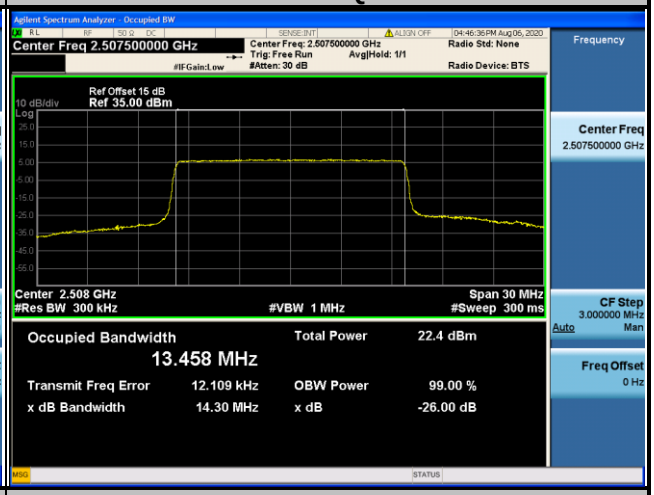
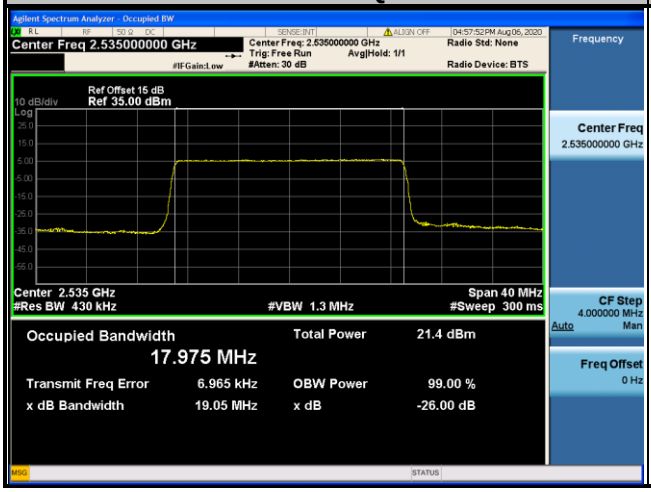
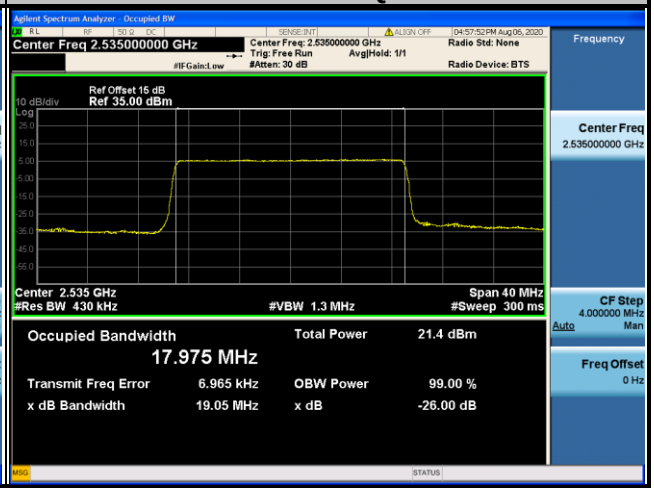


4.4.4 Test Results

LTE Band 7					
Channel Bandwidth: 5 MHz					
Channel	**Frequency (MHz)**	**99 % Occupied Bandwidth (MHz)**		**26 dB Bandwidth (MHz)**	
		QPSK	**16QAM**	**QPSK**	**16QAM**
20775	2502.5	4.49	4.49	4.81	4.80
21100	2535.0	4.49	4.49	4.81	4.80
21425	2567.5	4.49	4.49	4.81	4.80
Channel Bandwidth: 10 MHz					
Channel	**Frequency (MHz)**	**99 % Occupied Bandwidth (MHz)**		**26 dB Bandwidth (MHz)**	
		QPSK	**16QAM**	**QPSK**	**16QAM**
20800	2505.0	8.96	8.96	9.52	9.51
21100	2535.0	8.97	8.97	9.51	9.52
21400	2565.0	8.96	8.97	9.51	9.51

Spectrum Plot of Worst Value	
99 % Occupied Bandwidth	**26 dB Bandwidth**
5 MHz / QPSK	**5 MHz / QPSK**
	
10 MHz / QPSK	**10 MHz / QPSK**
	

LTE Band 7					
Channel Bandwidth: 15 MHz					
Channel	**Frequency (MHz)**	**99 % Occupied Bandwidth (MHz)**		**26 dB Bandwidth (MHz)**	
		QPSK	**16QAM**	**QPSK**	**16QAM**
20825	2507.5	13.46	13.44	14.30	14.25
21100	2535.0	13.47	13.46	14.28	14.27
21375	2562.5	13.48	13.46	14.25	14.25
Channel Bandwidth: 20 MHz					
Channel	**Frequency (MHz)**	**99 % Occupied Bandwidth (MHz)**		**26 dB Bandwidth (MHz)**	
		QPSK	**16QAM**	**QPSK**	**16QAM**
20850	2510.0	17.91	17.92	19.04	19.01
21100	2535.0	17.95	17.98	19.04	19.05
21350	2560.0	17.94	17.95	19.01	18.99

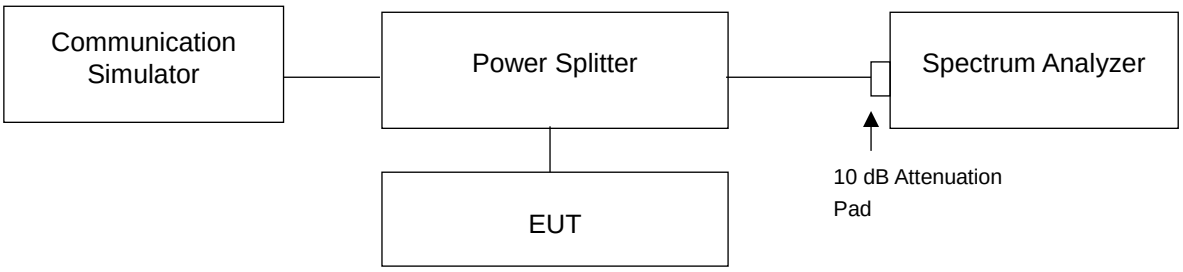
Spectrum Plot of Worst Value	
99 % Occupied Bandwidth	**26 dB Bandwidth**
15 MHz / QPSK	**15 MHz / QPSK**
	
20 MHz / 16QAM	**20 MHz / 16QAM**
	

4.5 Out-of-Band Emissions Measurement

4.5.1 Limits of Out-of-Band Emissions Measurement

According to FCC 27.53(m)(4)&(6) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

4.5.2 Test Setup

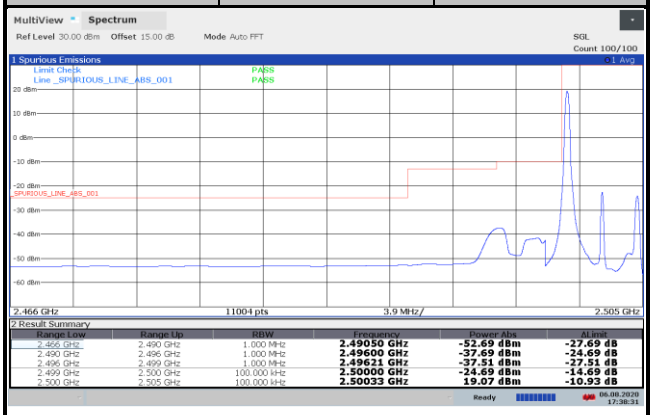


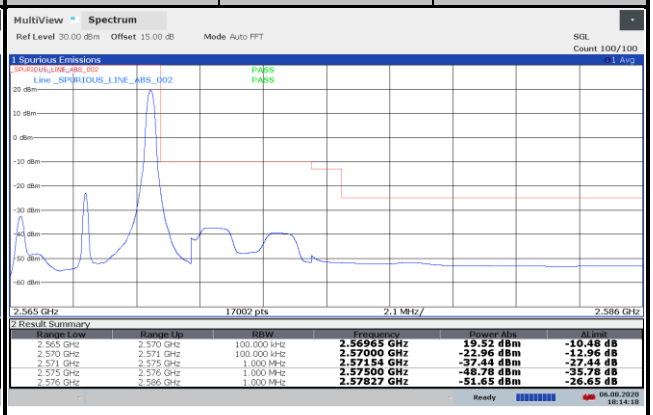
4.5.3 Test Procedures

a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
b. The out-of-band emissions measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
c. Record the max. trace plot into the test report.

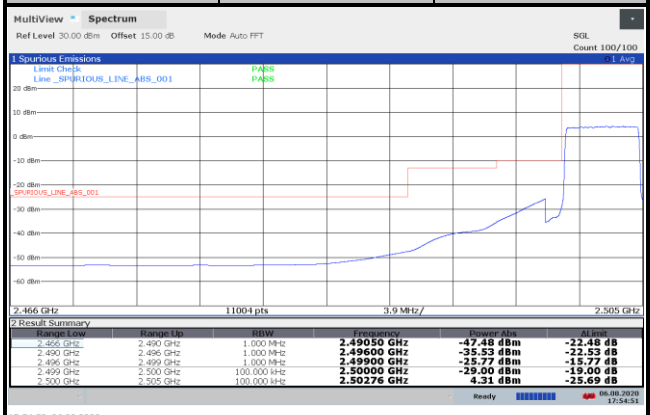
4.5.4 Test Results

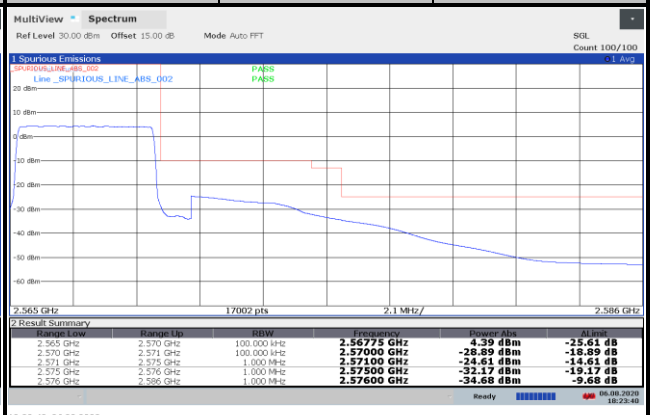
LTE Band 7					
Channel Bandwidth: 5 MHz / QPSK					
<Out-of-Band Emissions>					
Channel	20775	1 RB	Channel	21425	1 RB



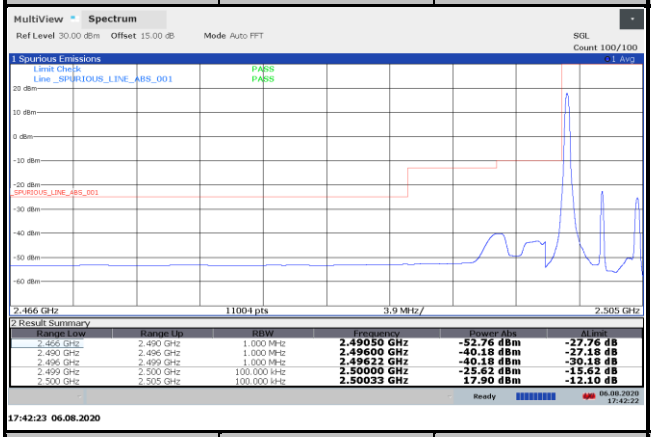


Channel	20775	25 RB	Channel	21425	25 RB

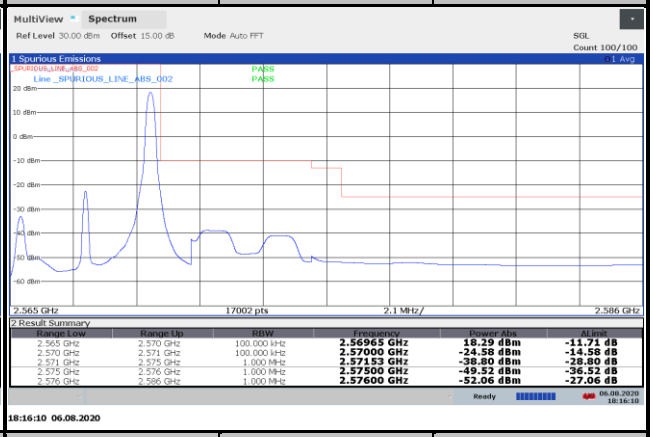




LTE Band 7					
Channel Bandwidth: 5 MHz / 16QAM					
<Out-of-Band Emissions>					
Channel	20775	1 RB	Channel	21425	1 RB



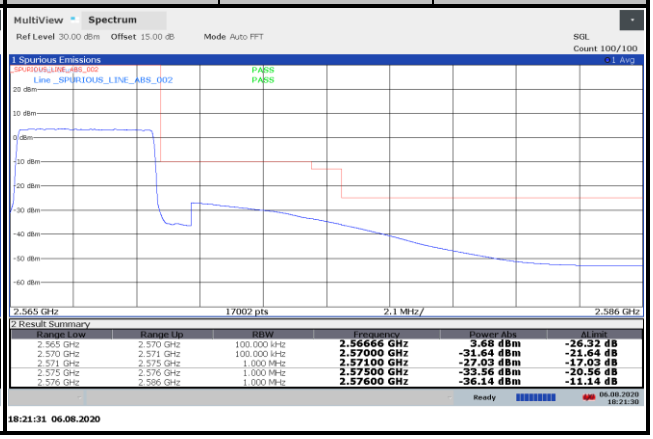
17:42:23 06.08.2020



18:16:10 06.08.2020

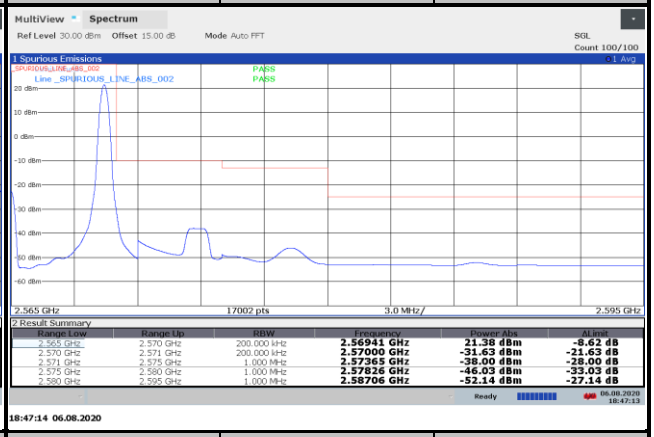
Channel	20775	25 RB	Channel	21425	25 RB

17:49:47 06.08.2020



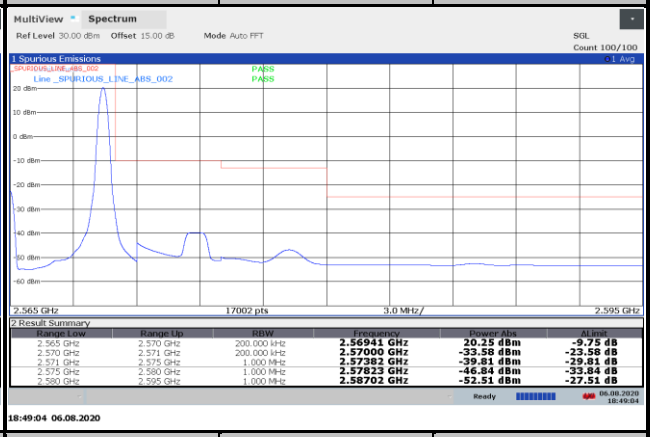
18:21:31 06.08.2020

LTE Band 7					
Channel Bandwidth: 10 MHz / QPSK					
<Out-of-Band Emissions>					
Channel	20800	1 RB	Channel	21400	1 RB

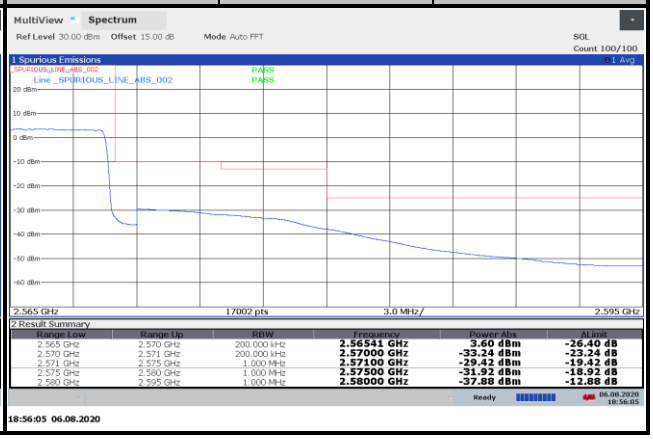


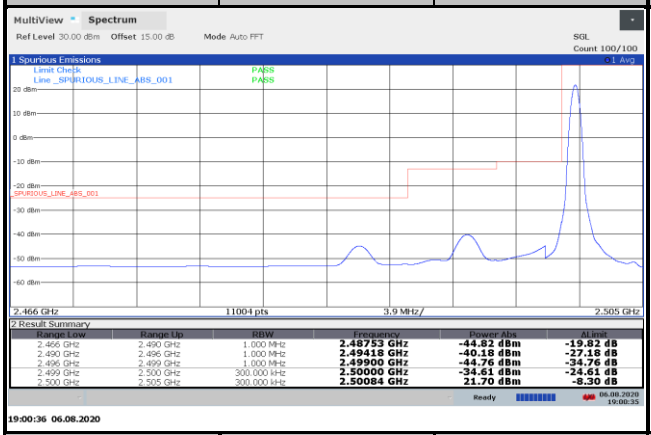
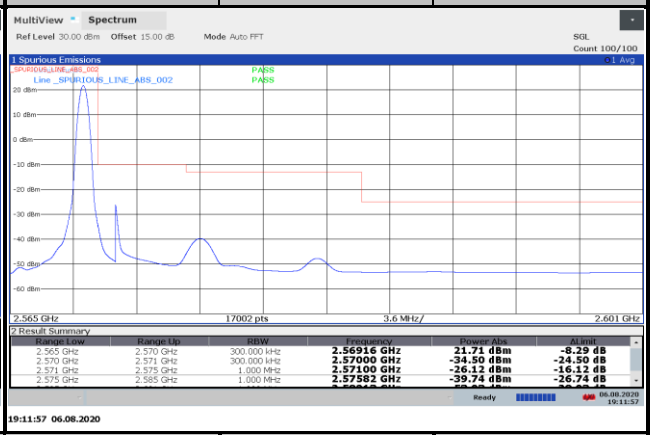
Channel	20800	50 RB	Channel	21400	50 RB

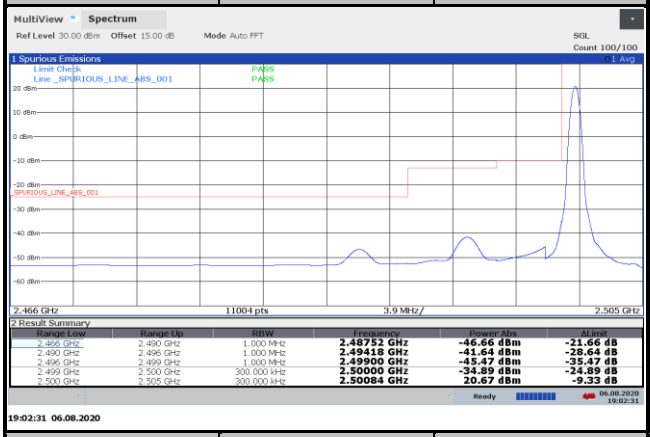
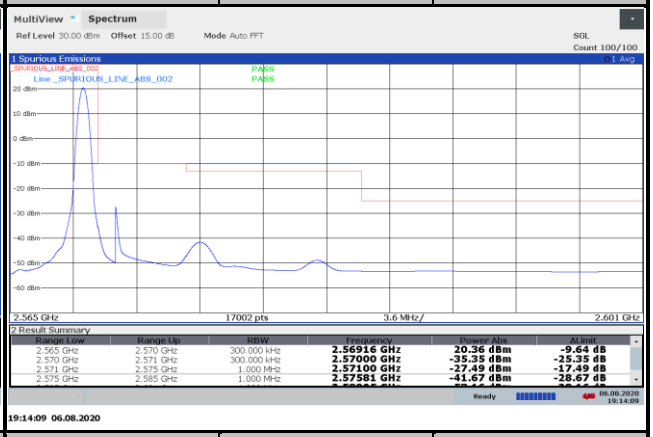
LTE Band 7					
Channel Bandwidth: 10 MHz / 16QAM					
<Out-of-Band Emissions>					
Channel	20800	1 RB	Channel	21400	1 RB

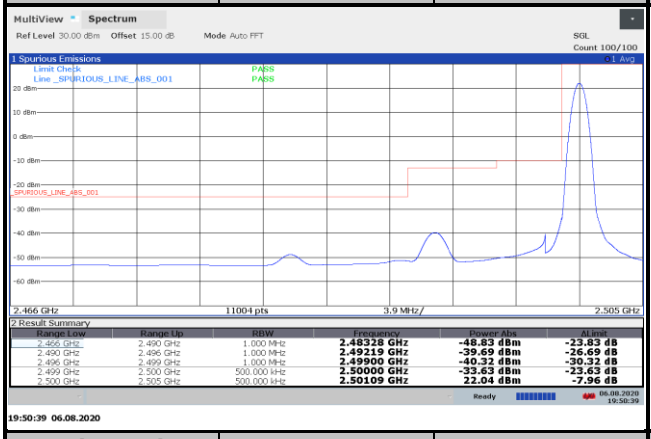
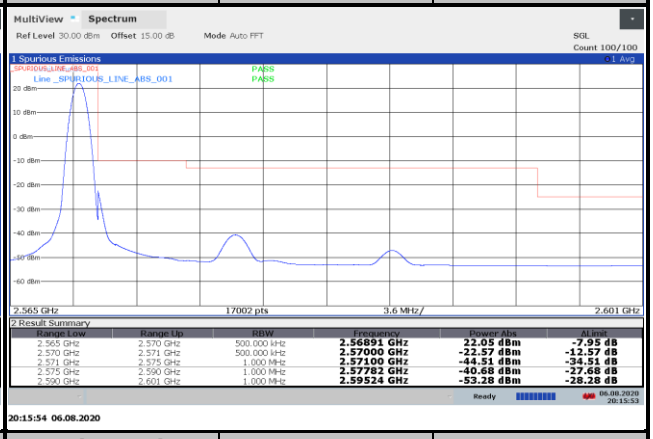
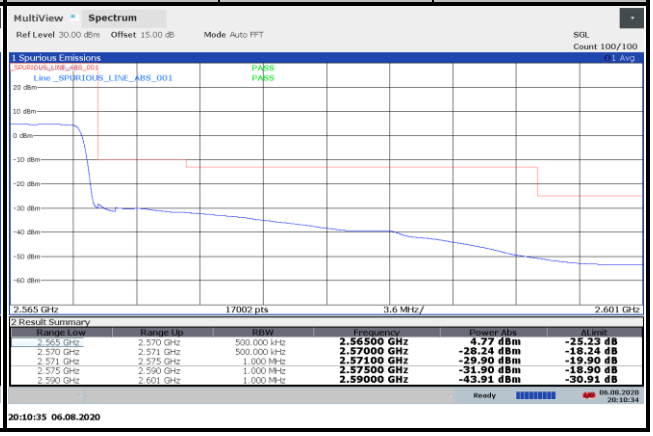


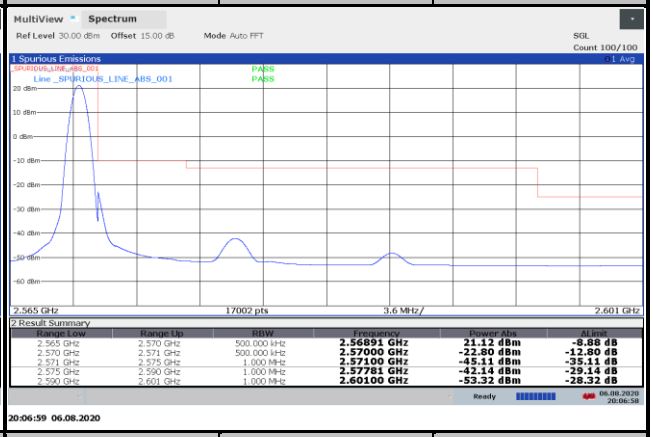
Channel	20800	50 RB	Channel	21400	50 RB



LTE Band 7					
Channel Bandwidth: 15 MHz / QPSK					
<Out-of-Band Emissions>					
Channel	20825	1 RB	Channel	21375	1 RB
					
Channel	20825	75 RB	Channel	21375	75 RB
					

LTE Band 7					
Channel Bandwidth: 15 MHz / 16QAM					
<Out-of-Band Emissions>					
Channel	20825	1 RB	Channel	21375	1 RB
					
Channel	20825	75 RB	Channel	21375	75 RB
					

LTE Band 7					
Channel Bandwidth: 20 MHz / QPSK					
<Out-of-Band Emissions>					
Channel	20850	1 RB	Channel	21350	1 RB
					
Channel	20850	100 RB	Channel	21350	100 RB
					

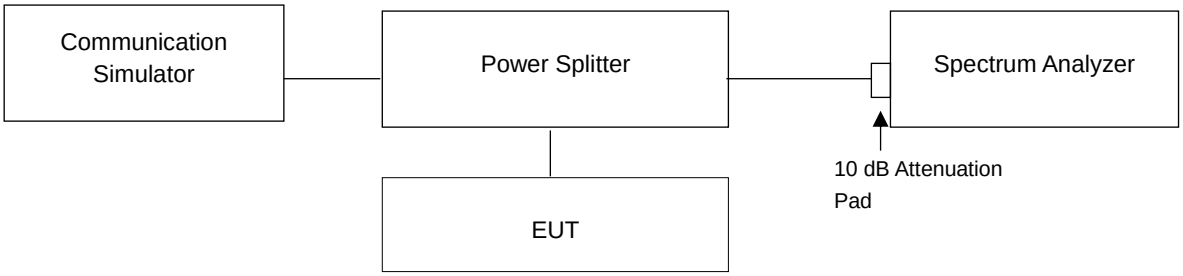
LTE Band 7					
Channel Bandwidth: 20 MHz / 16QAM					
<Out-of-Band Emissions>					
Channel	20850	1 RB	Channel	21350	1 RB
					
Channel	20850	100 RB	Channel	21350	100 RB
					

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

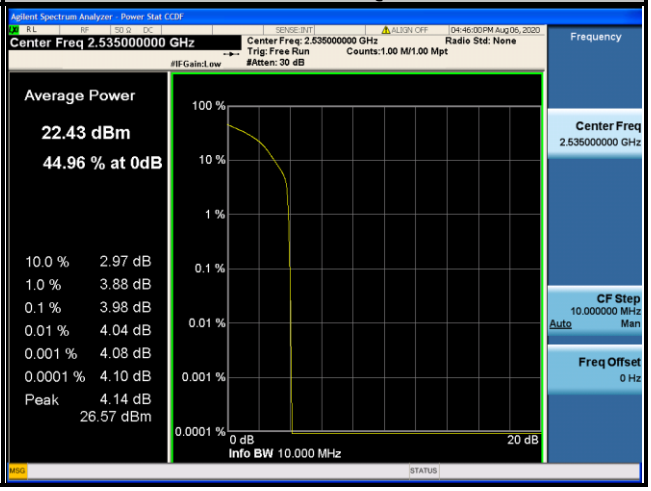
4.6.4 Test Results

LTE Band 7							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20775	2502.5	3.20	4.01	20800	2505.0	3.12	3.86
21100	2535.0	3.39	4.12	21100	2535.0	3.16	3.98
21425	2567.5	3.02	3.91	21400	2565.0	3.07	3.95

Spectrum Plot of Worst Value

5 MHz / 16QAM

10 MHz / 16QAM



LTE Band 7							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20825	2507.5	3.14	3.93	20850	2510.0	3.00	3.83
21100	2535.0	3.16	3.91	21100	2535.0	3.00	3.78
21375	2562.5	3.27	4.14	21350	2560.0	3.20	3.89

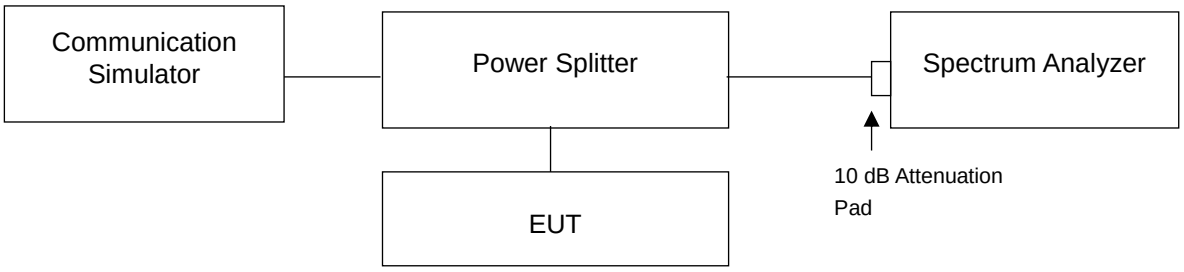
Spectrum Plot of Worst Value	
15 MHz / 16QAM	20 MHz / 16QAM
	

4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 55 + 10 log (P) dB. The limit of emission is equal to -25 dBm.

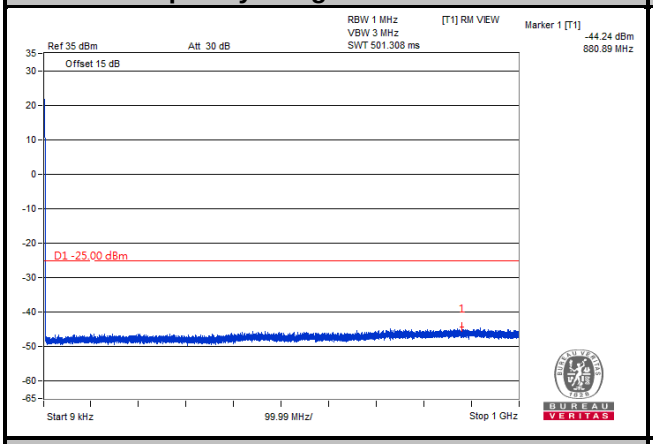
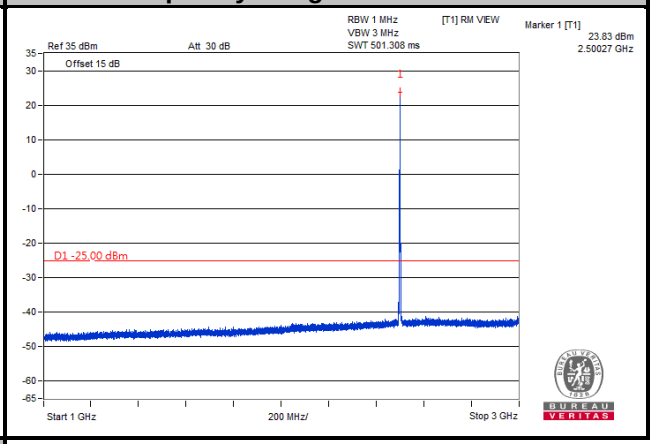
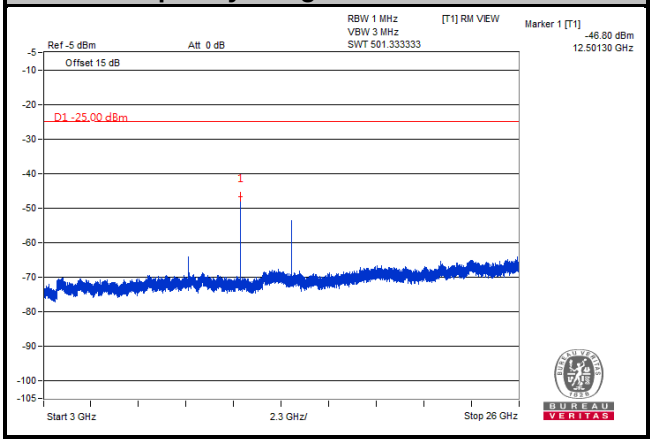
4.7.2 Test Setup



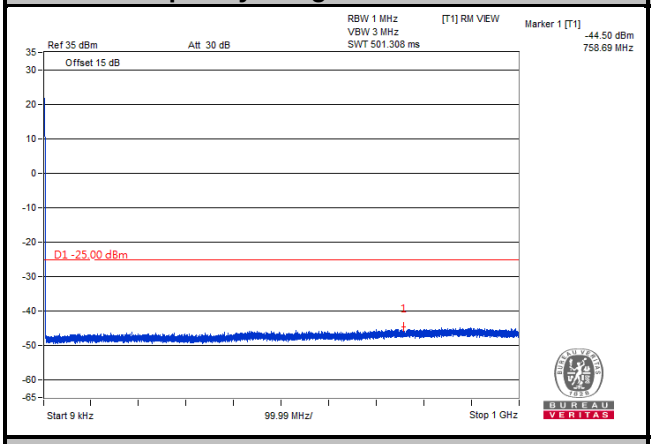
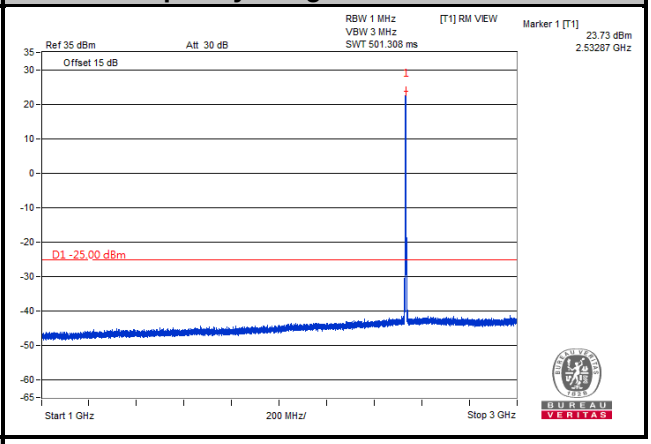
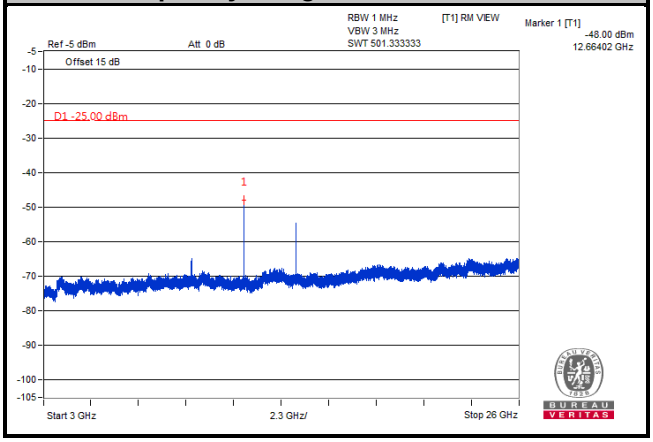
4.7.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz are used for conducted emission measurement.
c. Measuring frequency range is from 1 GHz to 26 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz are used for conducted emission measurement.
d. Spectrum RBW settings are referenced to ANSI C63.26 section 5.7.2.

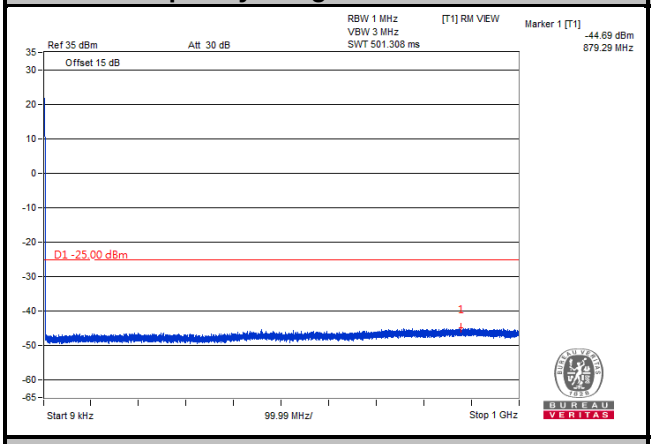
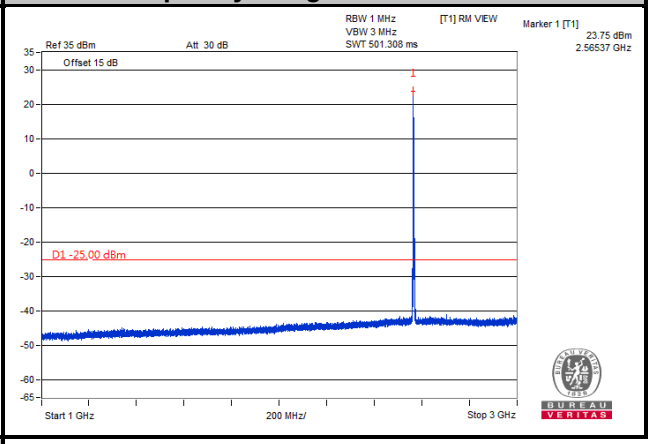
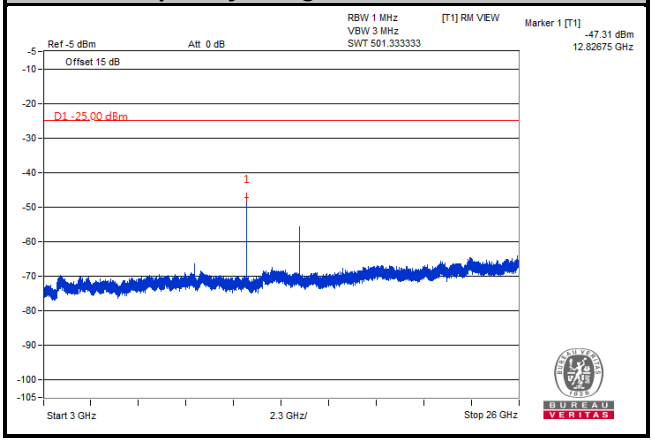
4.7.4 Test Results

LTE Band 7	
Channel Bandwidth: 5 MHz	
Channel 20775	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

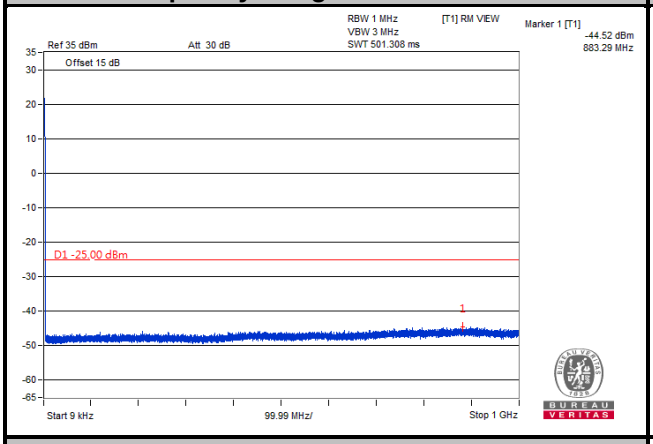
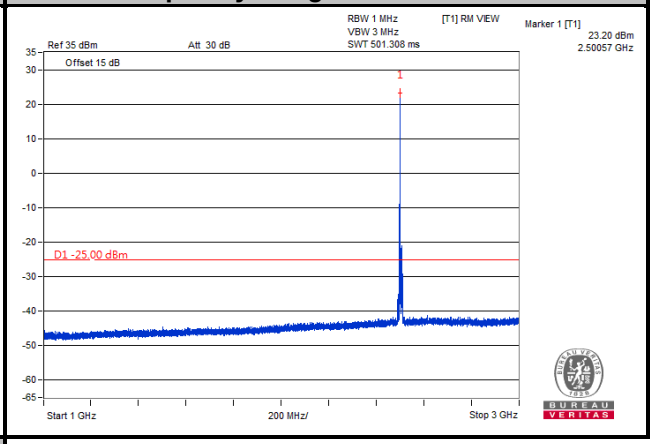
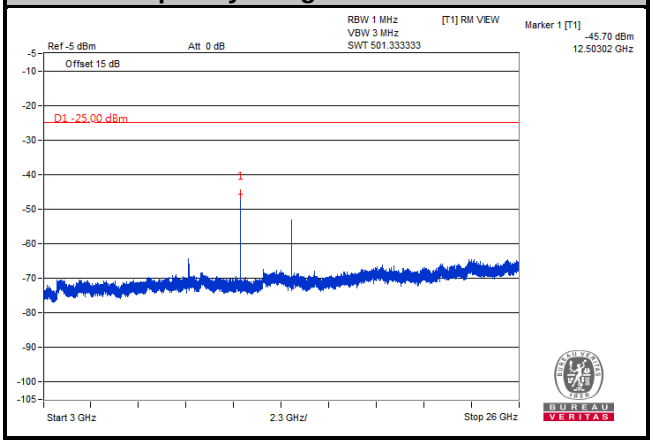
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 7	
Channel Bandwidth: 5 MHz	
Channel 21100	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

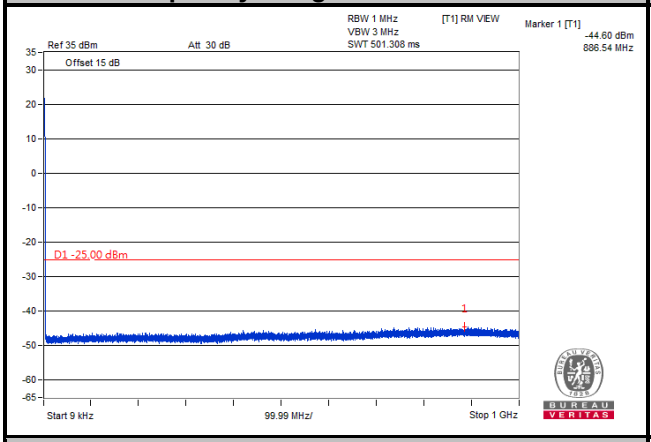
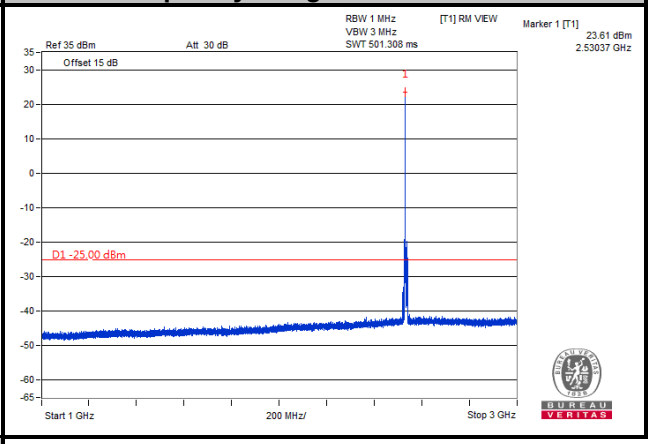
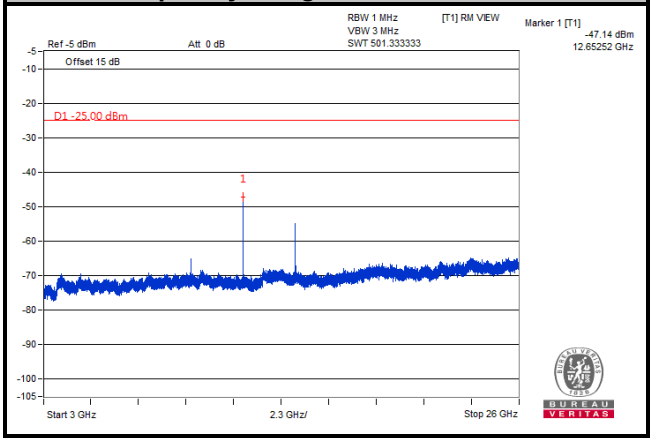
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 7	
Channel Bandwidth: 5 MHz	
Channel 21425	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

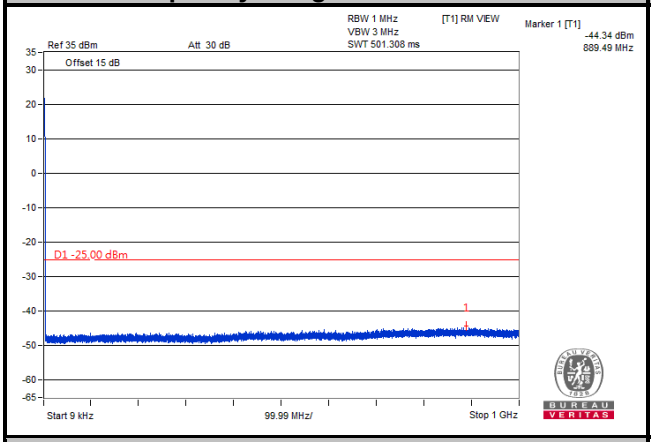
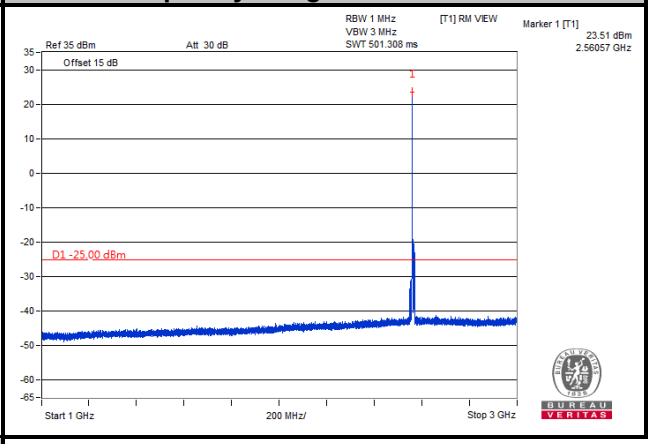
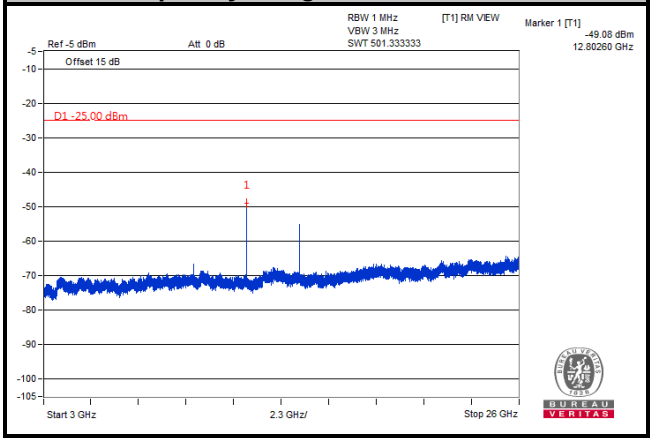
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 7	
Channel Bandwidth: 10 MHz	
Channel 20800	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

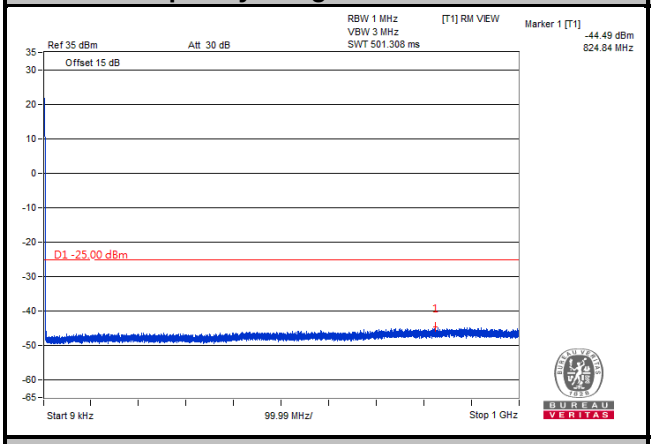
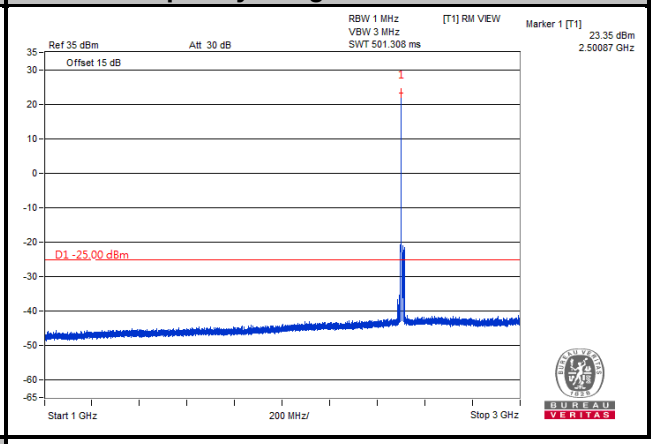
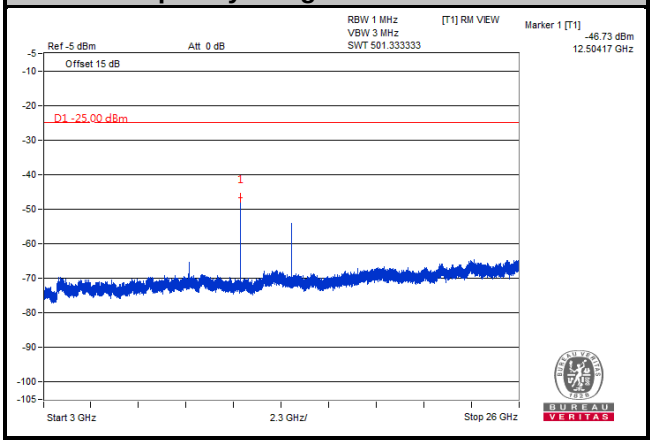
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 7	
Channel Bandwidth: 10 MHz	
Channel 21100	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

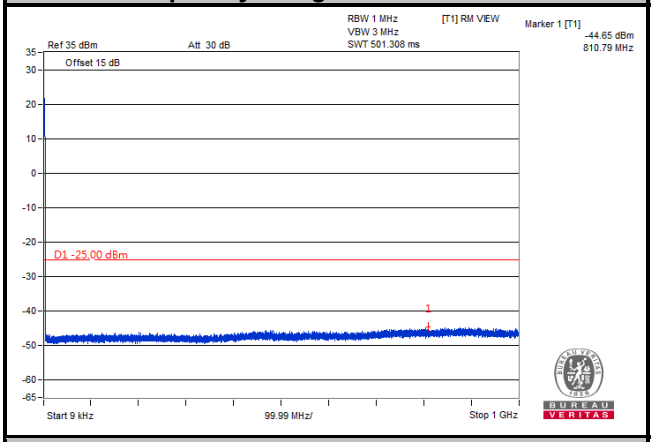
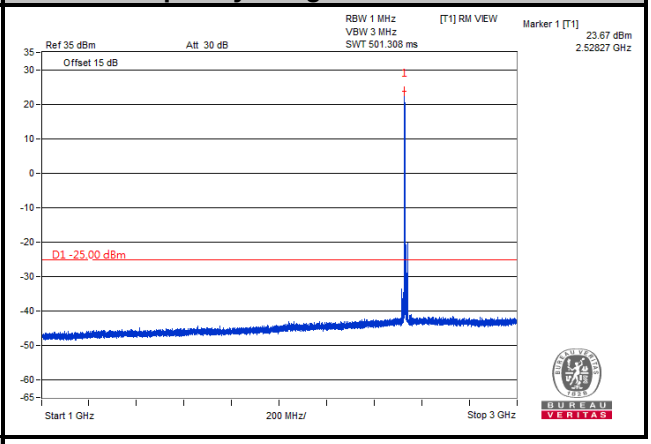
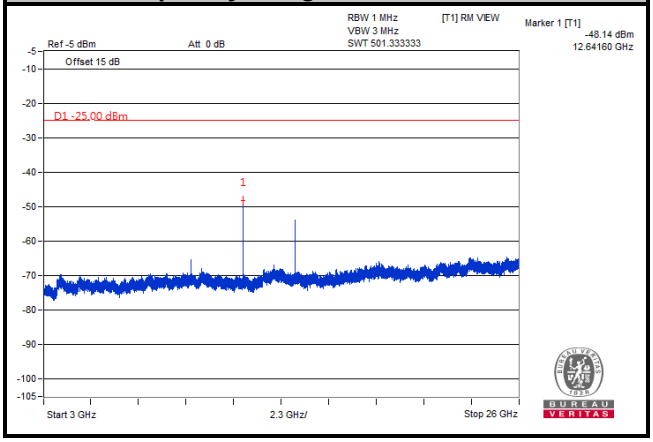
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 7	
Channel Bandwidth: 10 MHz	
Channel 21400	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

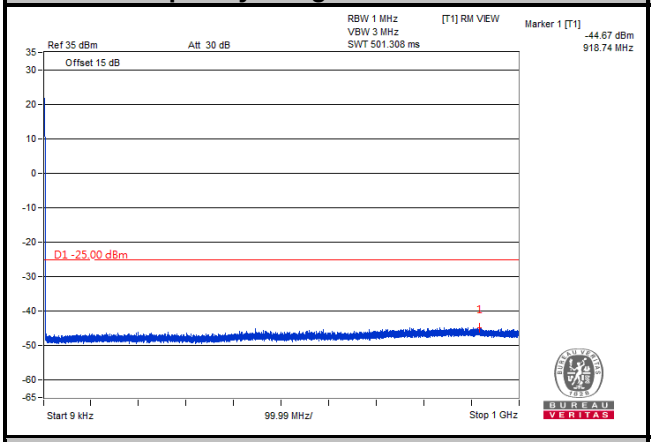
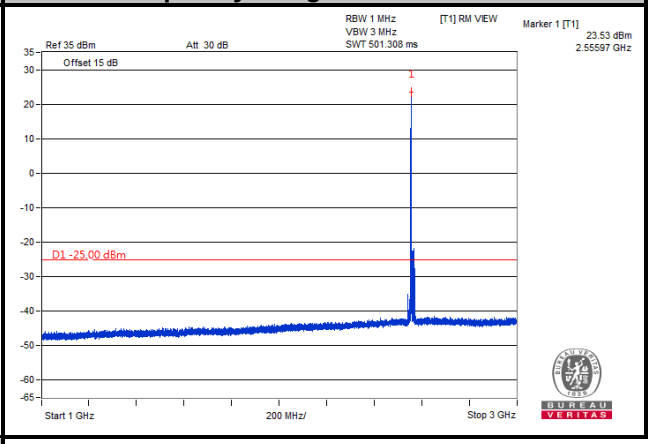
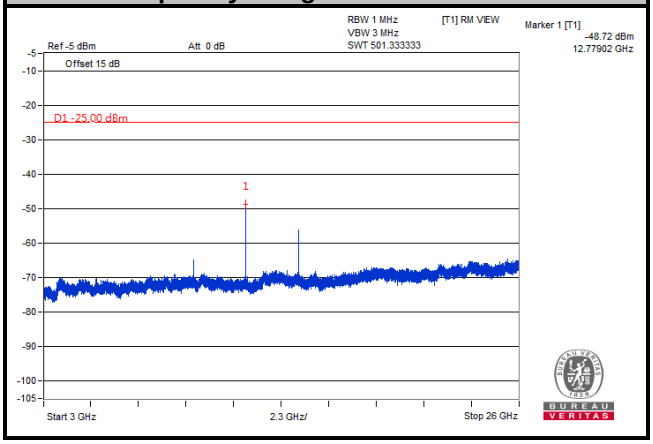
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 7	
Channel Bandwidth: 15 MHz	
Channel 20825	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

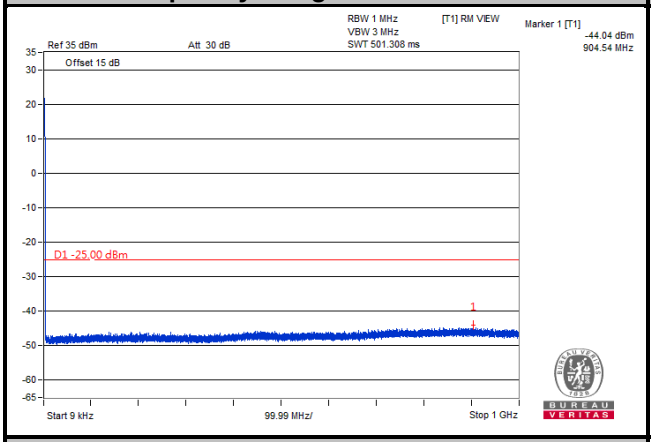
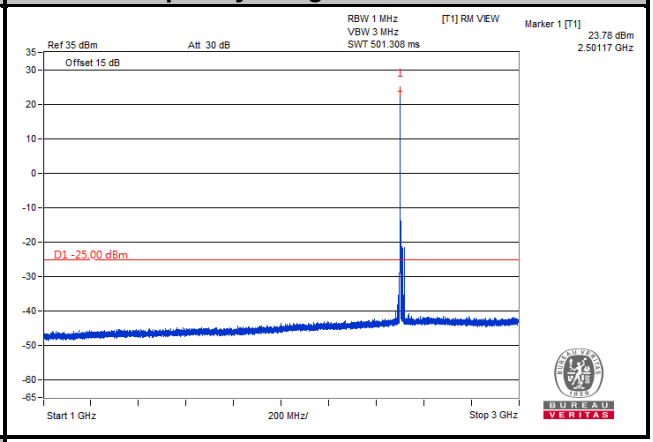
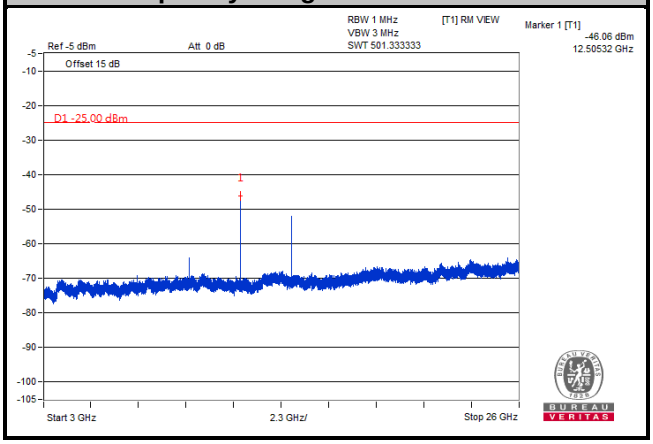
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 7	
Channel Bandwidth: 15 MHz	
Channel 21100	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

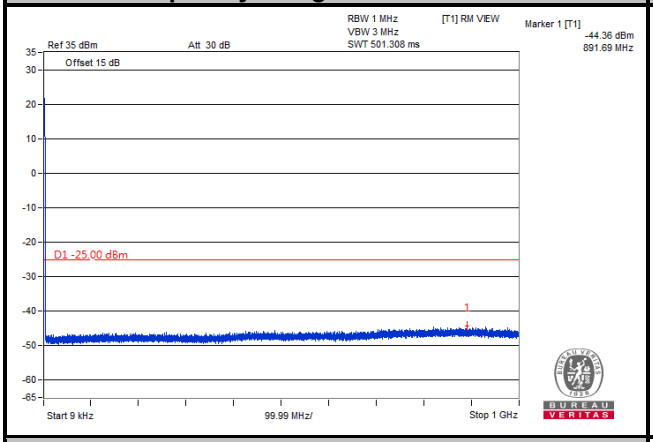
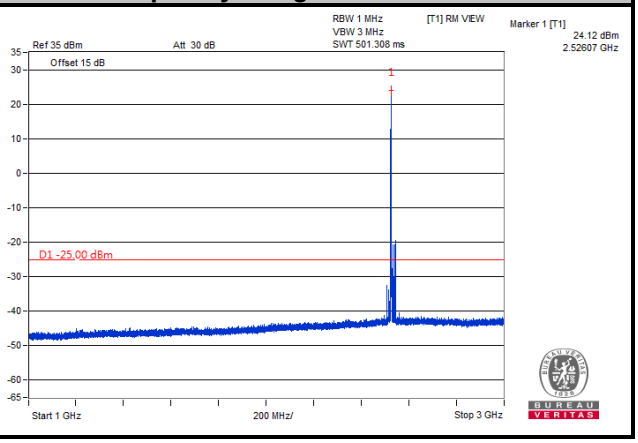
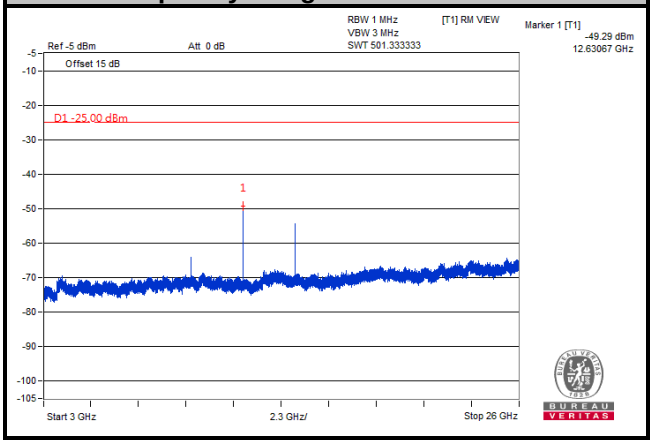
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 7	
Channel Bandwidth: 15 MHz	
Channel 21375	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

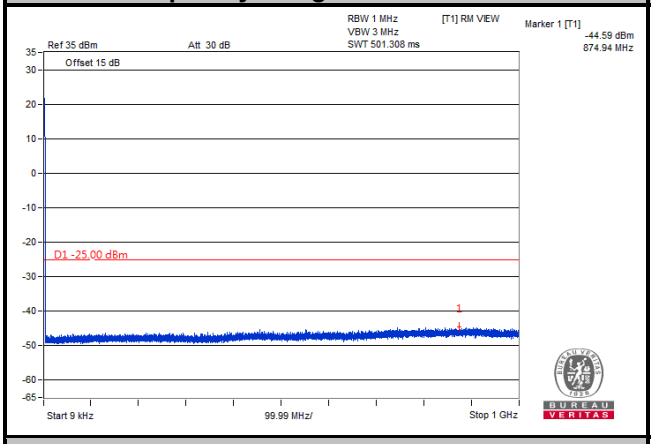
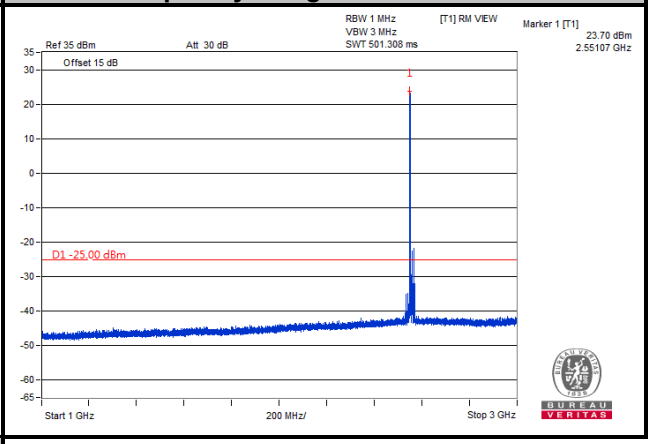
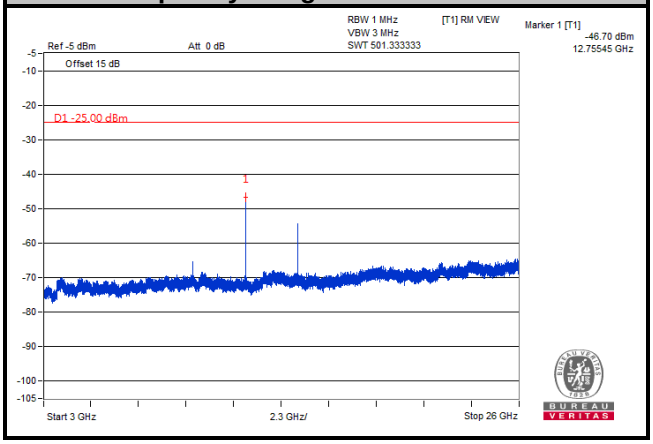
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 7	
Channel Bandwidth: 20 MHz	
Channel 20850	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

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

LTE Band 7	
Channel Bandwidth: 20 MHz	
Channel 21100	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 GHz	
	

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

LTE Band 7	
Channel Bandwidth: 20 MHz	
Channel 21350	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 3 GHz
	
Frequency Range: 3 GHz ~ 26 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 a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 55 + 10 log (P) dB. The limit of emission is equal to -25 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. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. Correction Factor (includes EIRP and ERP unit conversion factor) = Antenna gain of substitution horn. – Tx cable loss. Measurement method refers to ANSI C63.26 section 5.5.3.2.
c. 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:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:

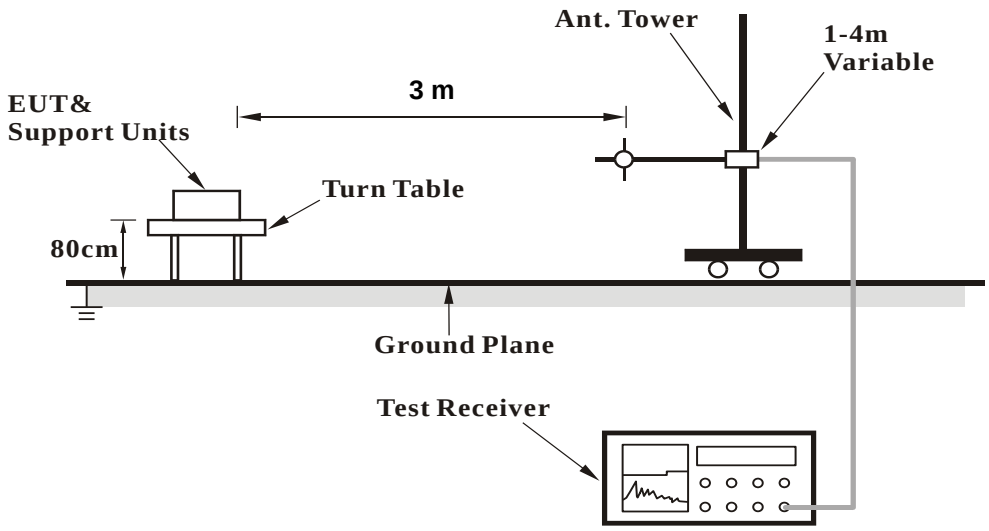
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

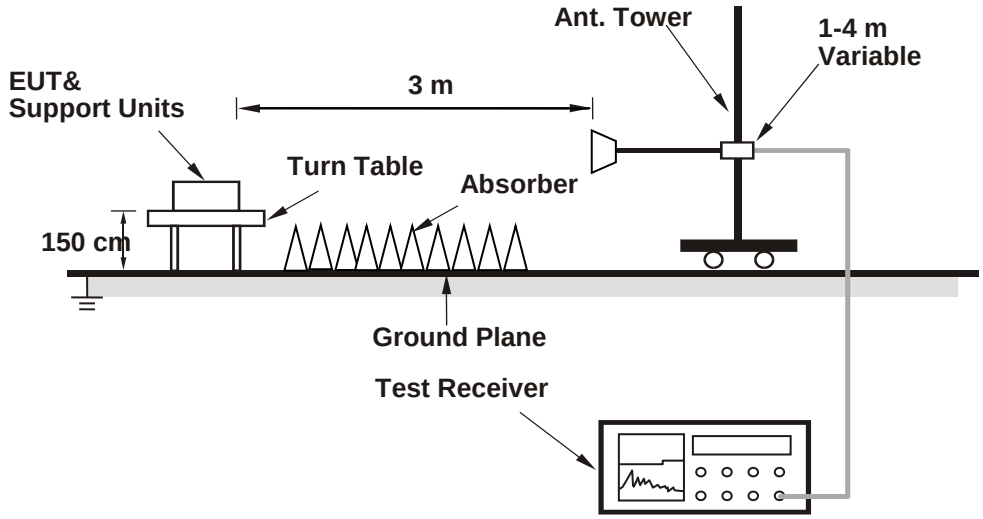
No deviation.

4.8.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>

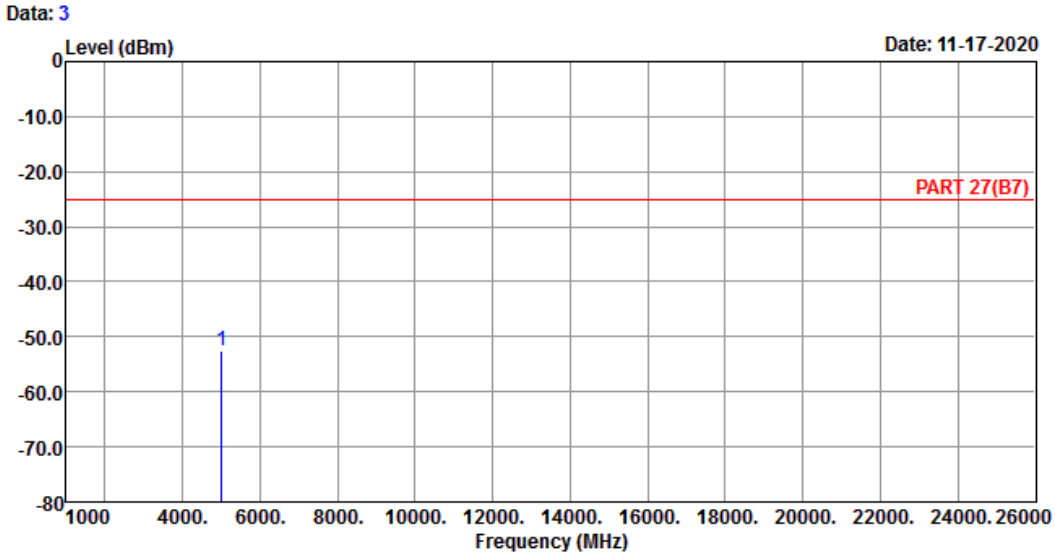


For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.8.5 Test Results

LTE Band 7
Channel Bandwidth: 5 MHz / QPSK
Low Channel

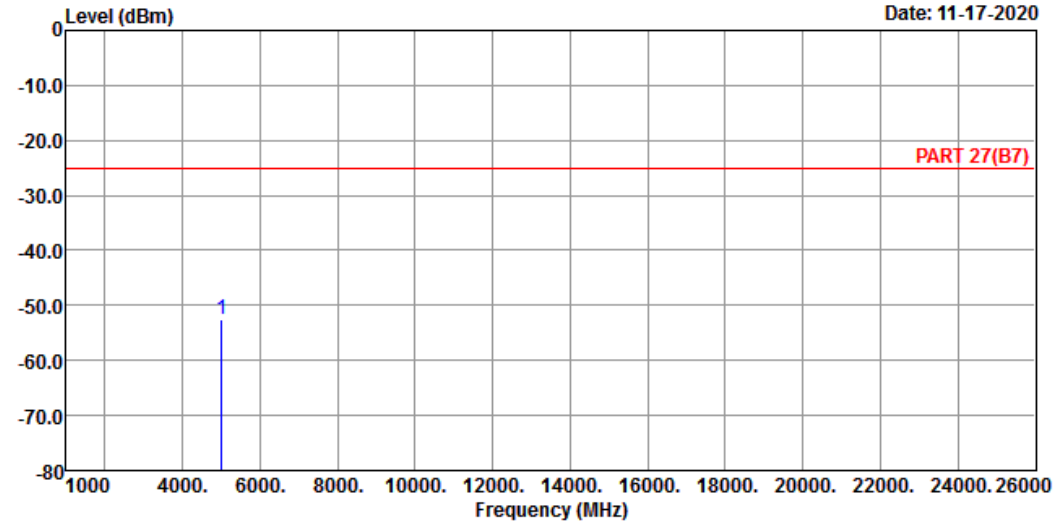
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5005.00	-52.62	-50.16	-25.00	-2.46	-27.62	Peak

Data: 4

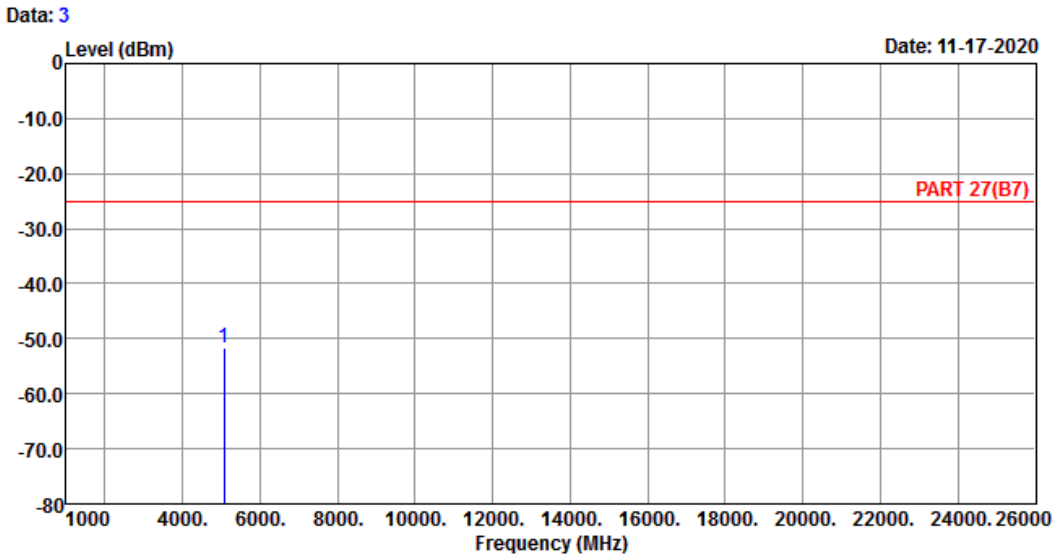


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5005.00	-52.63	-50.17	-25.00	-2.46	-27.63	Peak

Middle Channel

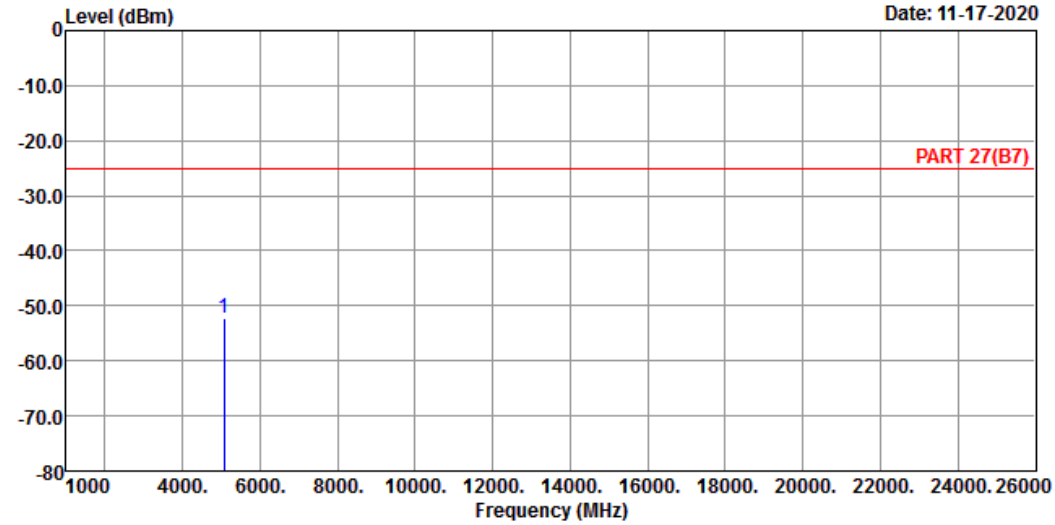
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5070.00	-51.78	-49.91	-25.00	-1.87	-26.78	Peak

Data: 4

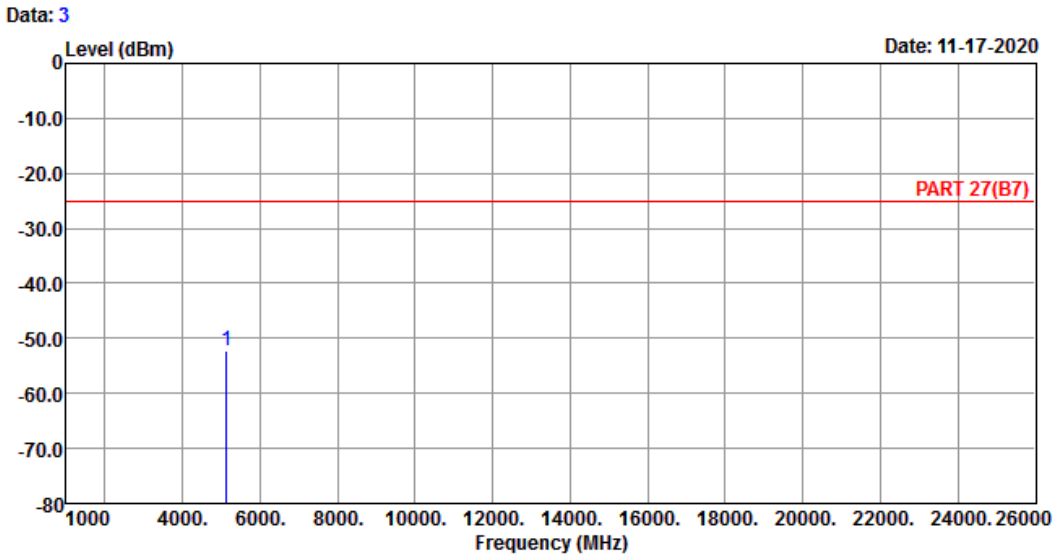


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5070.00	-52.11	-50.24	-25.00	-1.87	-27.11	Peak

High Channel

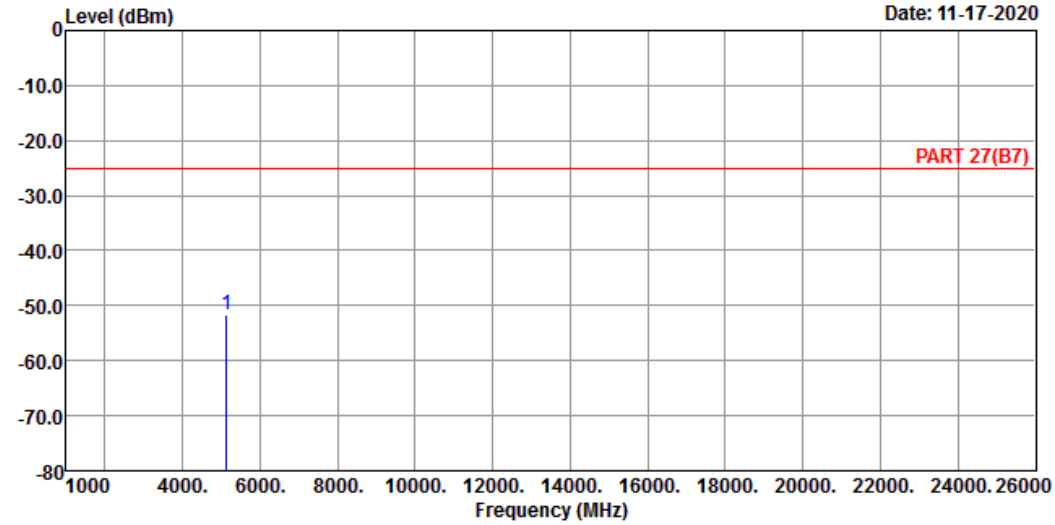
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5135.00	-52.23	-50.49	-25.00	-1.74	-27.23	Peak

Data: 4

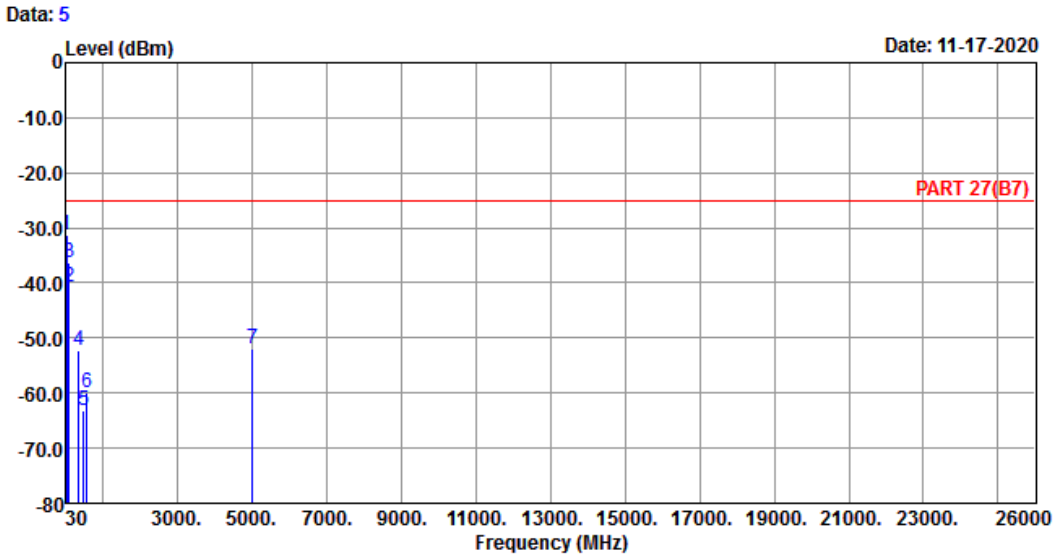


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5135.00	-51.76	-50.02	-25.00	-1.74	-26.76	Peak

Channel Bandwidth: 20 MHz / QPSK
Low Channel

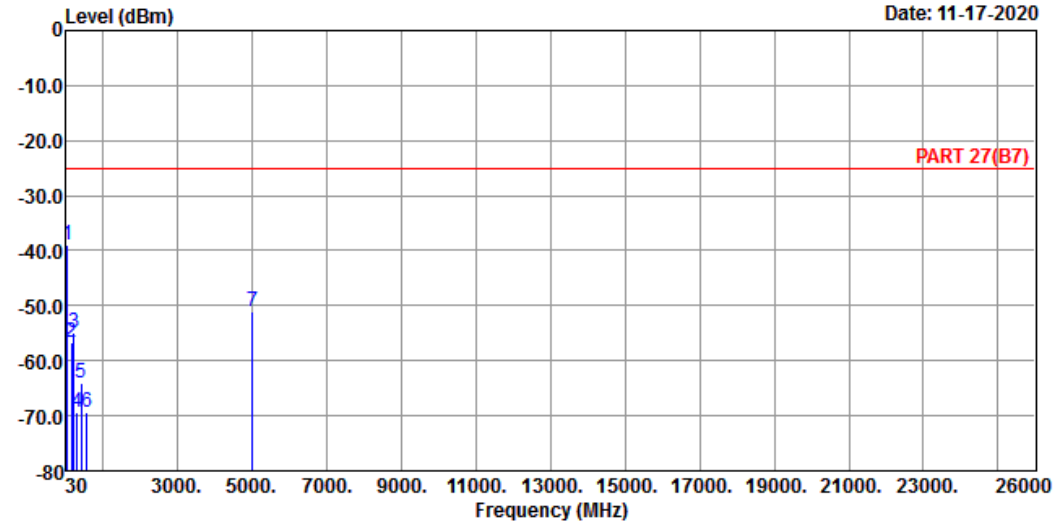
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_20M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	40.67	-31.29	-31.41	-25.00	0.12	-6.29	Peak
2	94.99	-40.84	-30.00	-25.00	-10.84	-15.84	Peak
3	97.90	-36.46	-25.79	-25.00	-10.67	-11.46	Peak
4	368.53	-52.10	-45.97	-25.00	-6.13	-27.10	Peak
5	485.90	-63.31	-58.43	-25.00	-4.88	-38.31	Peak
6	578.05	-60.02	-58.34	-25.00	-1.68	-35.02	Peak
7	5020.00	-51.86	-49.54	-25.00	-2.32	-26.86	Peak

Data: 6

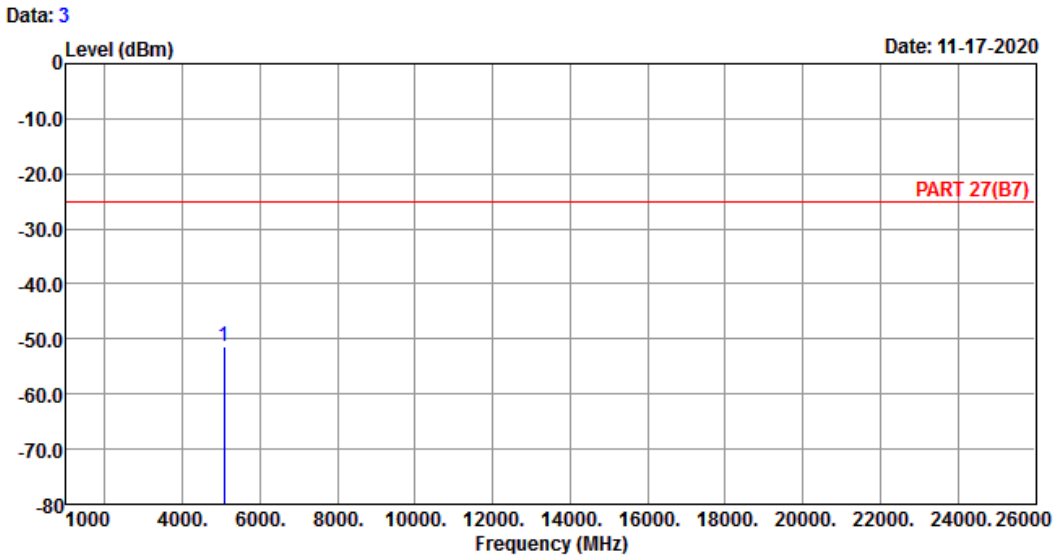


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_20M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	48.43	-38.86	-34.85	-25.00	-4.01	-13.86	Peak
2	162.89	-56.69	-51.64	-25.00	-5.05	-31.69	Peak
3	231.76	-54.90	-48.17	-25.00	-6.73	-29.90	Peak
4	311.30	-69.34	-62.51	-25.00	-6.83	-44.34	Peak
5	424.79	-64.08	-58.33	-25.00	-5.75	-39.08	Peak
6	574.17	-69.38	-67.54	-25.00	-1.84	-44.38	Peak
7	5020.00	-51.12	-48.80	-25.00	-2.32	-26.12	Peak

Middle Channel

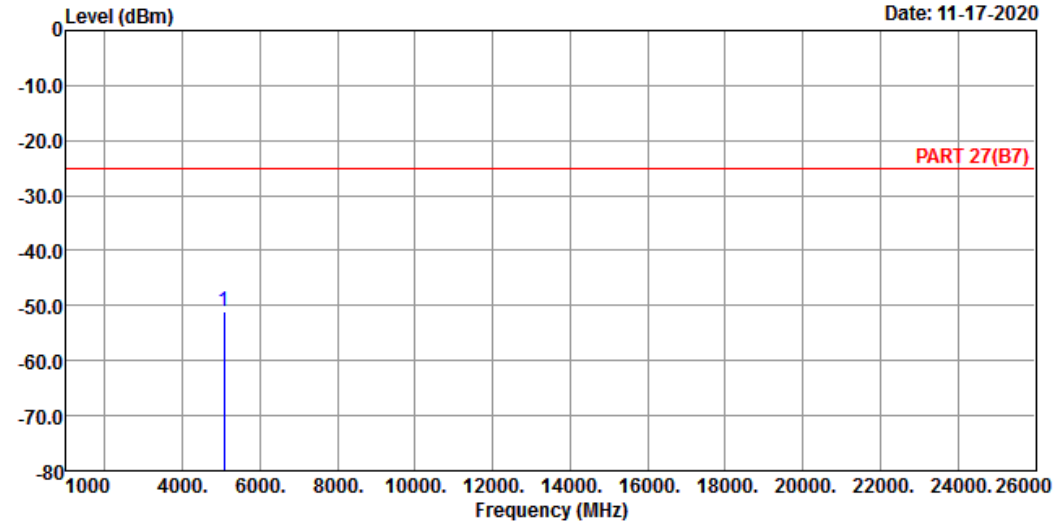
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_20M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5070.00	-51.25	-49.38	-25.00	-1.87	-26.25	Peak

Data: 4

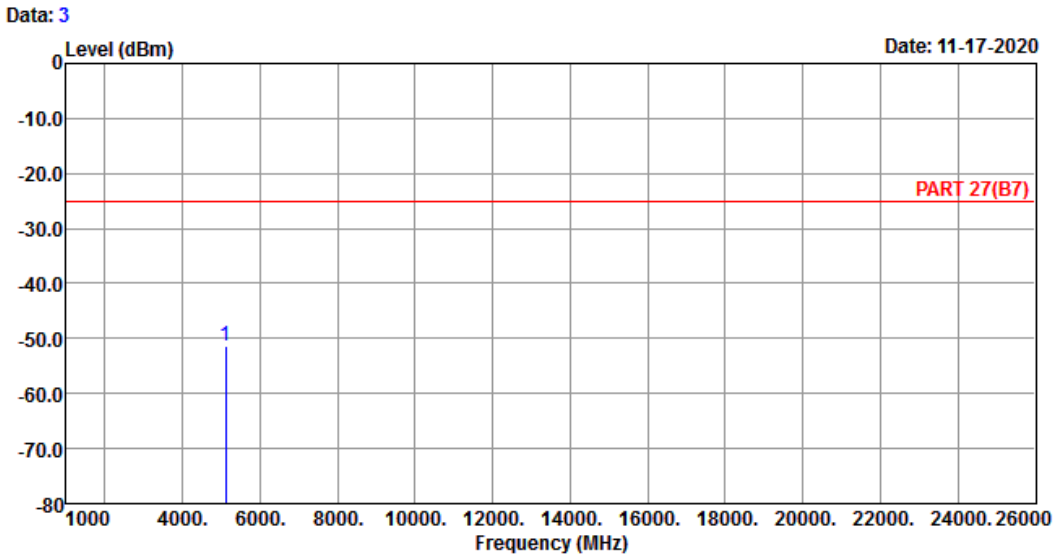


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_20M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5070.00	-50.95	-49.08	-25.00	-1.87	-25.95	Peak

High Channel

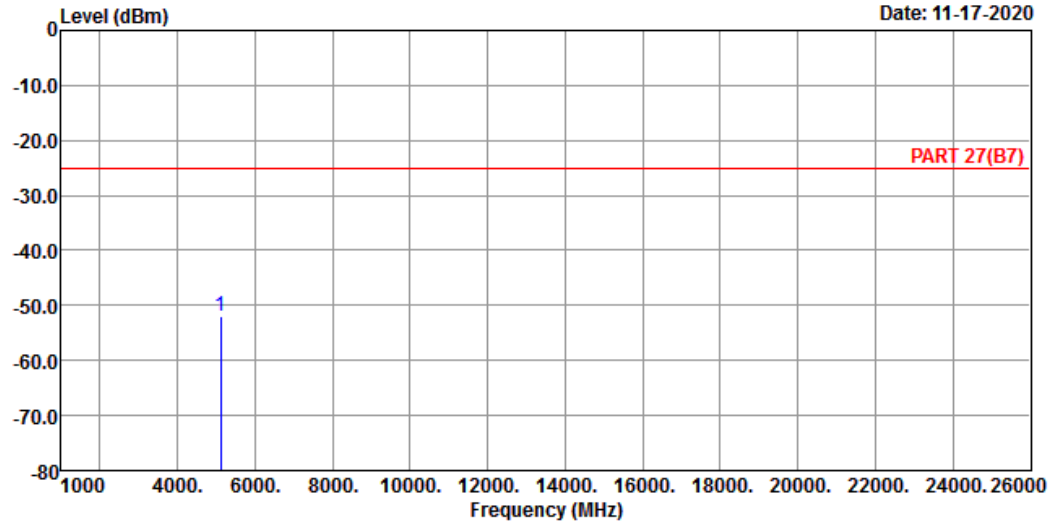
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_20M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5120.00	-51.39	-49.73	-25.00	-1.66	-26.39	Peak

Data: 4



Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_20M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5120.00	-52.08	-50.42	-25.00	-1.66	-27.08	Peak

5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

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

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

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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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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