

## FCC Test Report (Part 90 – LTE B26)

**Report No.:** RFBEAD-WTW-P21060534-9

**FCC ID:** M82-AIM78S6

**Test Model:** AIM-78S-6

**Series Model:** AIM-78H-6, AIM-78H-6XXXXXXXXXXXXXXXXXX,  
AIM-78S-6XXXXXXXXXXXXXXXXXX (X: maybe 1-9, A-Z, or blank) (refer to  
item 3.1 for more details)

**Received Date:** Jun. 16, 2021

**Test Date:** Aug. 12 ~ Sep. 16, 2021

**Issued Date:** Dec. 27, 2021

**Applicant:** ADVANTECH CO., LTD

**Address:** No. 1, Alley 20, Lane 26, Rueiguang Rd, Neihu District, Taipei, Taiwan 114

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

**FCC Registration /  
Designation Number(1):** 788550 / TW0003

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

**FCC Registration /  
Designation Number(2):** 427177 / TW0011



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### Release Control Record

Issue No.	Description	Date Issued
RFBEAD-WTW-P21060534-9	Original release.	Dec. 27, 2021

## 1 Certificate of Conformity

**Product:** 10.1" Tablet PC

**Brand:** ADVANTECH

**Test Model:** AIM-78S-6

**Series Model:** AIM-78H-6, AIM-78H-6XXXXXXXXXXXXXXXXXX, AIM-78S-6XXXXXXXXXXXXXXXXXX  
(X: maybe 1-9, A-Z, or blank) (refer to item 3.1 for more details)

**Sample Status:** Engineering sample

**Applicant:** ADVANTECH CO., LTD

**Test Date:** Aug. 12 ~ Sep. 16, 2021

**Standards:** FCC Part 90, Subpart S

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 :** Celine Chou , **Date:** Dec. 27, 2021  
Celine Chou / Senior Specialist

**Approved by :** Jeremy Lin , **Date:** Dec. 27, 2021  
Jeremy Lin / Project Engineer

## 2 Summary of Test Results

Applied Standard: FCC Part 90 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 90.635 (b)	Effective Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
2.1055 90.213	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 90.209	Occupied Bandwidth	Pass	Meet the requirement of limit.
90.691	Emission Mask	Pass	Meet the requirement of limit.
2.1051 90.691	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 90.691	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -35.92dB at 1638.00MHz.

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) ( $\pm$ )
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	2.0153 dB
	200MHz ~ 1000MHz	2.0224 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.0121 dB
	18GHz ~ 40GHz	1.1508 dB

## 2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 24, 2020	Aug. 23, 2021
			Sep. 01, 2021	Aug. 31, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSW43	101582	Apr. 01, 2021	Mar. 31, 2022
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 09, 2020	Nov. 08, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 22, 2020	Nov. 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
Loop Antenna	EM-6879	269	Sep. 17, 2020	Sep. 16, 2021
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2020	Nov. 24, 2021
Preamplifier Agilent	310N	187226	Jun. 17, 2021	Jun. 16, 2022
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2021	Jun. 16, 2022
Preamplifier EMCI	EMC 184045	980116	Oct. 07, 2020	Oct. 06, 2021
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SM S-100-SMS-120+RFC-S MS-100-SMS-400)	Jun. 17, 2021	Jun. 16, 2022
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SM S-100-SMS-24)	Jun. 17, 2021	Jun. 16, 2022
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Dec. 24, 2020	Dec. 23, 2021
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	Jun. 02, 2021	Jun. 01, 2022
DC power supply Keysight	U8002A	MY56330015	NA	NA
Radio Communication Analyzer Anritsu	MT8820C	6201010284	Dec. 28, 2020	Dec. 27, 2021

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in Xindian Chamber 6.

### 3 General Information

#### 3.1 General Description of EUT

Product	10.1" Tablet PC			
Brand	ADVANTECH			
Test Model	AIM-78S-6			
Series Model	AIM-78H-6, AIM-78H-6XXXXXXXXXXXXXXXXXX, AIM-78S-6XXXXXXXXXXXXXXXXXX (X: maybe 1-9, A-Z, or blank)			
Model Difference	Refer to note			
Sample Status	Engineering sample			
Power Supply Rating	10.8Vdc (Battery) 19Vdc (Adapter)			
Modulation Type	QPSK, 16QAM, 64QAM			
Operating Frequency	LTE Band 26 (Channel Bandwidth 1.4MHz)	814.7MHz ~ 823.3MHz		
	LTE Band 26 (Channel Bandwidth 3MHz)	815.5MHz ~ 822.5MHz		
	LTE Band 26 (Channel Bandwidth 5MHz)	816.5MHz ~ 821.5MHz		
	LTE Band 26 (Channel Bandwidth 10MHz)	819.0MHz		
Max. ERP Power		QPSK	16QAM	64QAM
	LTE Band 26 (Channel Bandwidth 1.4MHz)	142.889mW (21.55dBm)	113.240mW (20.54dBm)	90.157mW (19.55dBm)
	LTE Band 26 (Channel Bandwidth 3MHz)	142.889mW (21.55dBm)	113.240mW (20.54dBm)	90.573mW (19.57dBm)
	LTE Band 26 (Channel Bandwidth 5MHz)	144.212mW (21.59dBm)	114.025mW (20.57dBm)	90.991mW (19.59dBm)
	LTE Band 26 (Channel Bandwidth 10MHz)	140.605mW (21.48dBm)	111.944mW (20.49dBm)	88.105mW (19.45dBm)
Emission Designator		QPSK	16QAM	64QAM
	LTE Band 26 (Channel Bandwidth 1.4MHz)	1M09G7D	1M09D7W	1M09D7W
	LTE Band 26 (Channel Bandwidth 3MHz)	2M70G7D	2M70D7W	2M70D7W
	LTE Band 26 (Channel Bandwidth 5MHz)	4M49G7D	4M50D7W	4M50D7W
	LTE Band 26 (Channel Bandwidth 10MHz)	8M97G7D	8M98D7W	8M98D7W
Antenna Type	Refer to note			
Antenna Connector	Refer to note			
Accessory Device	Refer to note			
Cable Supplied	Refer to note			

Note:

1. The following models are provided to this EUT. The model of the AIM-78S-6 was chosen for final test.

Model	Description
AIM-78S-6, AIM-78H-6, AIM-78H-6XXXXXXXXXXXXXXXXXX, AIM-78S-6XXXXXXXXXXXXXXXXXX (X: maybe 1-9, A-Z, or blank)	For marketing purpose

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	Tamura	XEW1934N	Input: 100-240Vac~1.5A , 50/60Hz Output: 19Vdc / 3.42A Power Line: AC: 1.5m cable without core DC: 1.2m cable without core
Adapter 2 (option)	FSP	FSP065-DBCM1	Input: 100-240Vac~ 2.0-1.0A, 50-60Hz Output: 19Vdc / 3.43A Power Line: AC: 1.5m cable without core DC: 1.5m cable with 1 core
Battery	Advantech	AIM-BAT-10	Rating: 10.8Vdc, 24.84Wh, 2300mAh
WWAN+WLAN module	USI	MS-01 Pro	-
Docking Station (option)	Advantech	AIM-DOC-0001	Rating: 19Vdc, 3.42A (VESA Dock)
Docking Station (option)	Advantech	AIM-VED0	Rating: 9 ~ 32Vdc (Vehicle Dock)
Docking Station (option)	Advantech	AIM-OFD-0000	Rating: 19Vdc (Office Dock)
Extension Modules-Barcode scanner (20° ) (option)	Advantech	AIM-EXT0-0040 (20 degree)	Sensor: 640 x 480 CMOS sensor
Extension Modules-Barcode scanner (70° ) (option)	Advantech	AIM-EXT0-0041 (70 degree)	Sensor: 640 x 480 CMOS sensor



3. The following antennas were provided to the EUT.

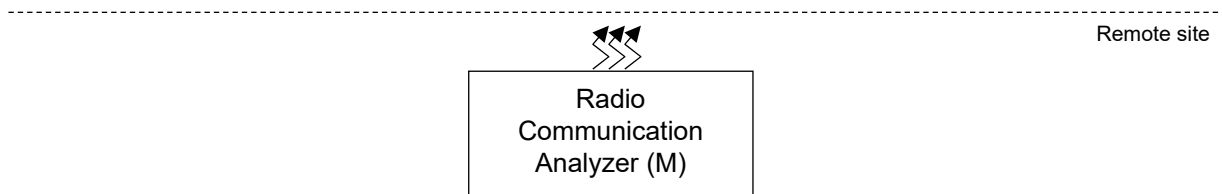
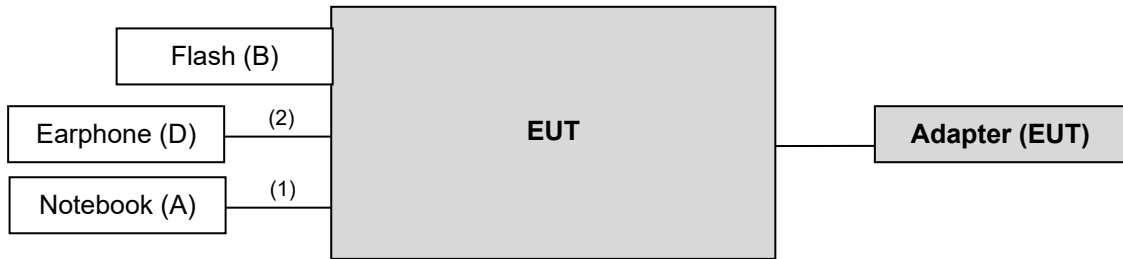
Ant. Type	PIFA														
Ant. Connector	I-PEX_IV														
WWAN_Main															
Frequency (MHz)	704	710	716	734	740	746	751	756	777	782	787	791	806	821	824
Gain (dBi)	-3.77	-3.47	-3.24	-1.68	-1.24	-0.99	-0.45	-0.07	0.40	0.44	0.57	0.52	0.76	0.51	0.37
Frequency (MHz)	836	849	862	869	880	894	900	915	925	940	960	1710	1730	1750	1770
Gain (dBi)	0.02	0.10	0.10	0.16	0.19	-0.35	-0.83	-1.68	-2.29	-2.41	-2.39	1.67	2.19	2.73	3.25
Frequency (MHz)	1785	1805	1840	1850	1880	1910	1920	1930	1950	1960	1980	1990	2010	2018	2025
Gain (dBi)	3.52	3.43	2.63	1.99	-0.63	-0.88	-0.47	-0.20	0.84	1.18	2.07	2.17	2.48	2.14	1.91
Frequency (MHz)	2110	2140	2170	2300	2325	2350	2375	2400	2500	2515	2535	2555	2570	2595	2620
Gain (dBi)	1.08	1.00	1.14	0.05	-0.28	0.23	0.70	1.43	0.57	0.31	0.05	0.51	0.86	1.38	1.37
Frequency (MHz)	2630	2655	2680	2690											
Gain (dBi)	1.47	1.92	1.95	1.87											
WWAN_Aux (only RX)															
Frequency (MHz)	704	710	716	734	740	746	751	756	777	782	787	791	806	821	824
Gain (dBi)	-11.59	-11.10	-11.03	-9.89	-9.75	-9.54	-9.49	-9.59	-9.46	-9.38	-9.51	-9.28	-8.58	-7.57	-7.56
Frequency (MHz)	836	849	862	869	880	894	900	915	925	940	960	1710	1730	1750	1770
Gain (dBi)	-7.09	-6.80	-6.17	-5.74	-5.00	-4.53	-4.54	-4.52	-4.55	-4.26	-3.49	1.68	1.77	2.06	2.35
Frequency (MHz)	1785	1805	1840	1850	1880	1910	1920	1930	1950	1960	1980	1990	2010	2018	2025
Gain (dBi)	2.73	2.82	2.96	3.11	3.31	3.84	4.01	4.13	4.51	4.59	4.37	4.23	4.09	4.06	3.90
Frequency (MHz)	2110	2140	2170	2300	2325	2350	2375	2400	2500	2515	2535	2555	2570	2595	2620
Gain (dBi)	3.30	3.55	3.24	2.93	2.63	2.47	2.11	2.67	3.99	3.94	3.96	3.89	3.48	3.40	3.31
Frequency (MHz)	2630	2655	2680	2690											
Gain (dBi)	3.01	3.16	3.57	3.27											

\* The max. gain (Main Antenna) was chosen for final tests.

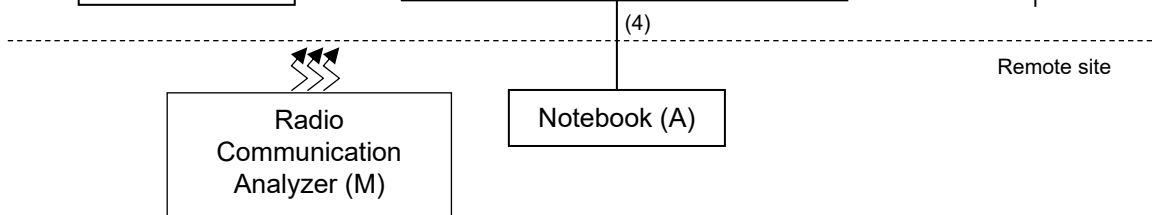
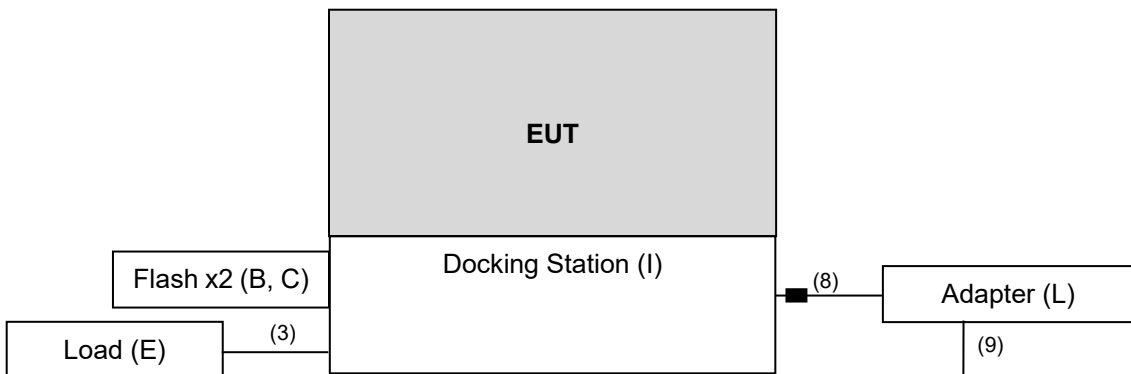
\* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

### 3.2 Configuration of System under Test

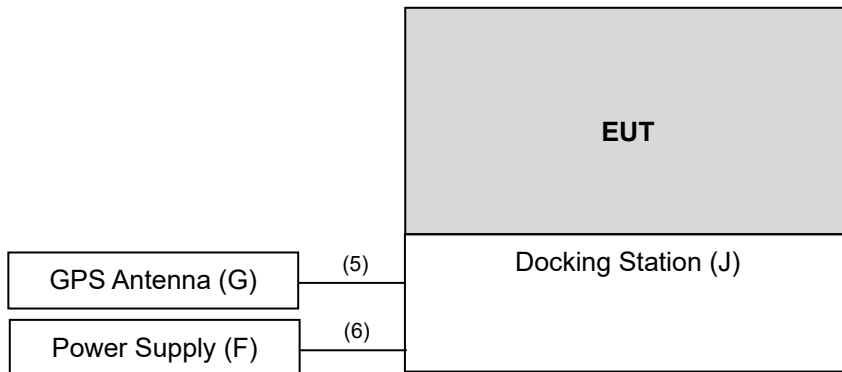
#### Test Mode A



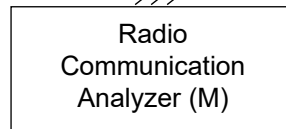
#### Test Mode B



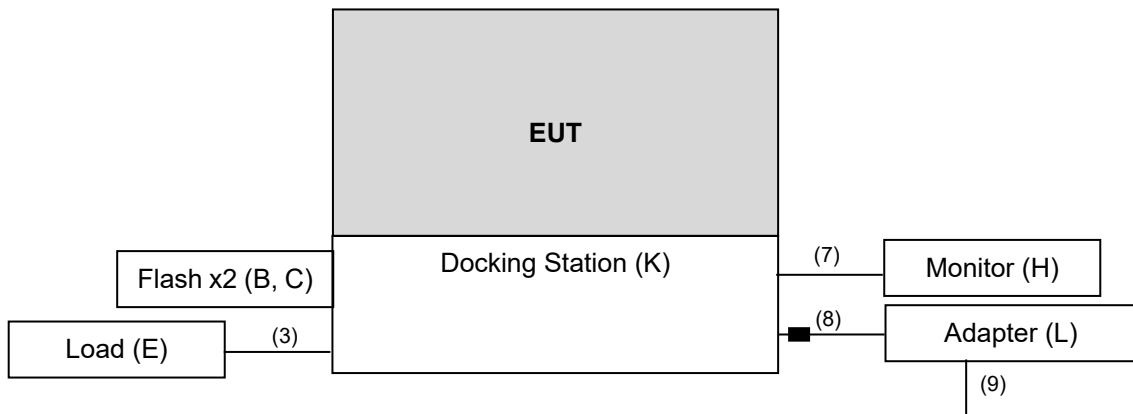
Test Mode C



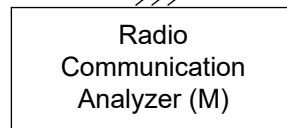
Remote site



Test Mode D



Remote site



### 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.	Notebook	Lenovo	20J4 MD A003TW	PF-11H9AK	FCC DoC Approved	-
B.	Flash	HP	v250W	05	NA	Type-A
C.	Flash	HP	v250W	03	NA	Type-A
D.	Earphone	APPLE	NA	NA	NA	-
E.	Load	NA	NA	NA	NA	-
F.	Power Supply	TOPWARD	6306D	809760	NA	-
G.	GPS Antenna	Connectec	SP070809-001	3-6004-031R0 00	NA	Provided by client
H.	Monitor	DELL	SE2416Hc	CN-OWJKMC- 64180-66D-01 3B-A00	NA	-
I.	Docking Station	Advantech	AIM-DOC-0001	NA	NA	Provided by client
J.	Docking Station	Advantech	AIM-VED0	NA	NA	Provided by client
K.	Docking Station	Advantech	AIM-OFD-0000	NA	NA	Provided by client
L.	Adapter	FSP	FSP065-DBCM1	NA	NA	Provided by client
M.	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	NA	-
			MT8820C	6201010284	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Type C cable	1	1	Y	0	-
2.	Audio cable	1	1.2	N	0	-
3.	RS232 cable	1	1.5	N	0	-
4.	LAN cable	1	7	N	0	RJ45, Cat.5e
5.	Antenna cable	1	5	N	0	Provided by client
6.	Power cable	1	1	N	0	Provided by client
7.	HDMI cable	1	2.0	Y	0	Provided by Lab. (Brand: Amber, Model: HDMI-AA120)
8.	DC Power cable	1	1.28	N	1	Provided by client
9.	AC Power cable	1	0.93	N	0	Provided by client

Note: The core(s) is(are) originally attached to the cable(s).

### 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	Radiated Emission
LTE Band 26	X-plane

For radiated emission test item, the worst case (Test Mode A) was tested under radiated emission below 1GHz and above 1GHz. Test mode B, C and D were tested under radiated emission below 1GHz only.

Test Mode	Test Condition
A	EUT + Adapter
B	EUT + VESA Dock
C	EUT + Vehicle Dock
D	EUT + Office Dock

LTE Band 26

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset 1 RB / 2 RB Offset 1 RB / 5 RB Offset 3 RB / 0 RB Offset 3 RB / 1 RB Offset 3 RB / 3 RB Offset 6 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset 1 RB / 7 RB Offset 1 RB / 14 RB Offset 8 RB / 0 RB Offset 8 RB / 3 RB Offset 8 RB / 7 RB Offset 15 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
-	Modulation Characteristics	26740	26740 (819.0MHz)	10MHz	QPSK / 16QAM / 64QAM	50 RB / 0 RB Offset
-	Frequency Stability	26697 to 26783	26697 (814.7MHz), 26783 (823.3MHz)	1.4MHz	QPSK	6 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26775 (822.5MHz)	3MHz	QPSK	15 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26765 (821.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	50 RB / 0 RB Offset
-	Occupied Bandwidth	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	6 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK / 16QAM / 64QAM	15 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK / 16QAM / 64QAM	25 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK / 16QAM / 64QAM	50 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	Emission Masks	26697 to 26783	26697 (814.7MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26775 (822.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26765 (821.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
-	Conducted Emission	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1 RB / 3 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 49 RB Offset
-	Radiated Emission	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1 RB / 3 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 49 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

**Test Condition:**

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Modulation characteristics	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Frequency Stability	25deg. C, 60%RH	10.80Vdc	Willy Cheng
Occupied Bandwidth	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Emission Mask	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Conducted Emission	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Radiated Emission	22deg. C, 66%RH	120Vac, 60Hz	Harry Hsueh Charles Hsiao Karl Lee

**3.4 EUT Operating Conditions**

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

**3.5 General Description of Applied Standards 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:

**Test Standard:**

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 90**

**ANSI/TIA/EIA-603-E 2016**

ANSI 63.26-2015

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**

**KDB 971168 D02 Misc Rev Approv License Devices v02r01**

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 output power shall be according to the specific rule Part 90.635 that “Mobile station are limited to 100 watts e.r.p”.

#### 4.1.2 Test Procedures

##### Conducted Power Measurement:

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

##### Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$$\text{EIRP} = P_{\text{Meas}} + G_{\text{T}}$$

$$\text{ERP} = P_{\text{Meas}} + G_{\text{T}} - 2.15$$

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively  
(expressed in the same units as  $P_{\text{Meas}}$ , e.g., dBm or dBW)

$P_{\text{Meas}}$  measured transmitter output power or PSD, in dBm or dBW

$G_{\text{T}}$  gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

#### 4.1.3 Test Setup

Conducted Power Measurement:



#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

LTE Band 26				
BW	MCS Index	RB Size	RB Offset	Mid
		Channel		26740
		Frequency (MHz)		819
10M	QPSK	1	0	23.09
		1	24	22.96
		1	49	23.12
		25	0	22.05
		25	12	22.04
		25	25	21.96
		50	0	22.13
10M	16QAM	1	0	22.05
		1	24	22.13
		1	49	22.02
		25	0	21.10
		25	12	21.03
		25	25	21.06
		50	0	20.98
10M	64QAM	1	0	21.09
		1	24	20.90
		1	49	20.92
		25	0	20.13
		25	12	20.13
		25	25	20.00
		50	0	19.87

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26715	26740	26765
		Frequency (MHz)		816.5	819	821.5
5M	QPSK	1	0	23.16	23.09	23.23
		1	12	23.13	22.96	23.17
		1	24	23.02	23.12	23.20
		12	0	22.18	22.05	22.28
		12	6	22.14	22.04	22.24
		12	13	22.12	21.96	22.21
		25	0	22.14	22.13	22.19
5M	16QAM	1	0	22.04	22.05	22.21
		1	12	21.98	22.13	22.11
		1	24	22.01	22.02	22.10
		12	0	21.12	21.10	21.24
		12	6	21.09	21.03	21.22
		12	13	20.98	21.06	21.13
		25	0	20.93	20.98	21.09
5M	64QAM	1	0	21.10	21.09	21.23
		1	12	20.97	20.90	21.14
		1	24	20.96	20.92	21.20
		12	0	20.04	20.13	20.21
		12	6	20.09	20.13	20.14
		12	13	20.09	20.00	20.14
		25	0	19.97	19.87	20.10

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26705	26740	26775
		Frequency (MHz)		815.5	819	822.5
3M	QPSK	1	0	23.19	22.94	23.17
		1	7	23.13	22.92	23.16
		1	14	23.08	22.98	23.15
		8	0	22.16	22.04	22.20
		8	3	22.08	22.03	22.16
		8	7	22.13	21.82	22.11
		15	0	22.15	22.12	22.10
3M	16QAM	1	0	22.08	22.03	22.18
		1	7	22.08	22.09	21.96
		1	14	21.95	22.00	22.06
		8	0	21.14	20.96	21.17
		8	3	21.19	20.89	21.18
		8	7	21.09	20.95	21.12
		15	0	21.14	20.96	21.03
3M	64QAM	1	0	21.12	20.98	21.21
		1	7	20.90	20.81	20.99
		1	14	21.12	20.87	21.19
		8	0	20.18	20.10	20.09
		8	3	20.02	19.99	20.03
		8	7	20.03	19.92	20.11
		15	0	20.14	19.84	19.99

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26697	26740	26783
		Frequency (MHz)		814.7	819	823.3
1.4M	QPSK	1	0	23.10	23.05	23.17
		1	2	23.08	22.91	23.14
		1	5	23.12	23.00	23.07
		3	0	23.19	23.01	23.17
		3	1	23.11	22.89	23.16
		3	3	23.07	22.94	23.15
		6	0	21.99	22.09	22.15
1.4M	16QAM	1	0	22.09	21.95	22.10
		1	2	22.05	22.10	22.09
		1	5	22.06	21.90	22.02
		3	0	22.07	21.98	22.17
		3	1	22.11	21.92	22.18
		3	3	22.07	22.06	21.98
		6	0	21.09	20.89	21.09
1.4M	64QAM	1	0	21.03	20.97	21.19
		1	2	20.92	20.77	21.12
		1	5	21.11	20.83	21.17
		3	0	21.07	21.01	21.18
		3	1	20.97	21.10	21.09
		3	3	21.07	20.95	21.01
		6	0	20.01	19.82	19.97

**ERP Power (dBm)**

LTE Band 26				
BW	MCS Index	RB Size	RB Offset	Mid
		Channel		26740
		Frequency (MHz)		819
10M	QPSK	1	0	21.45
		1	24	21.32
		1	49	21.48
		25	0	20.41
		25	12	20.40
		25	25	20.32
		50	0	20.49
10M	16QAM	1	0	20.41
		1	24	20.49
		1	49	20.38
		25	0	19.46
		25	12	19.39
		25	25	19.42
		50	0	19.34
10M	64QAM	1	0	19.45
		1	24	19.26
		1	49	19.28
		25	0	18.49
		25	12	18.49
		25	25	18.36
		50	0	18.23

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26715	26740	26765
		Frequency (MHz)		816.5	819	821.5
5M	QPSK	1	0	21.52	21.45	21.59
		1	12	21.49	21.32	21.53
		1	24	21.38	21.48	21.56
		12	0	20.54	20.41	20.64
		12	6	20.50	20.40	20.60
		12	13	20.48	20.32	20.57
		25	0	20.50	20.49	20.55
5M	16QAM	1	0	20.40	20.41	20.57
		1	12	20.34	20.49	20.47
		1	24	20.37	20.38	20.46
		12	0	19.48	19.46	19.60
		12	6	19.45	19.39	19.58
		12	13	19.34	19.42	19.49
		25	0	19.29	19.34	19.45
5M	64QAM	1	0	19.46	19.45	19.59
		1	12	19.33	19.26	19.50
		1	24	19.32	19.28	19.56
		12	0	18.40	18.49	18.57
		12	6	18.45	18.49	18.50
		12	13	18.45	18.36	18.50
		25	0	18.33	18.23	18.46

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26705	26740	26775
		Frequency (MHz)		815.5	819	822.5
3M	QPSK	1	0	21.55	21.30	21.53
		1	7	21.49	21.28	21.52
		1	14	21.44	21.34	21.51
		8	0	20.52	20.40	20.56
		8	3	20.44	20.39	20.52
		8	7	20.49	20.18	20.47
		15	0	20.51	20.48	20.46
3M	16QAM	1	0	20.44	20.39	20.54
		1	7	20.44	20.45	20.32
		1	14	20.31	20.36	20.42
		8	0	19.50	19.32	19.53
		8	3	19.55	19.25	19.54
		8	7	19.45	19.31	19.48
		15	0	19.50	19.32	19.39
3M	64QAM	1	0	19.48	19.34	19.57
		1	7	19.26	19.17	19.35
		1	14	19.48	19.23	19.55
		8	0	18.54	18.46	18.45
		8	3	18.38	18.35	18.39
		8	7	18.39	18.28	18.47
		15	0	18.50	18.20	18.35



LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26697	26740	26783
		Frequency (MHz)		814.7	819	823.3
1.4M	QPSK	1	0	21.46	21.41	21.53
		1	2	21.44	21.27	21.50
		1	5	21.48	21.36	21.43
		3	0	21.55	21.37	21.53
		3	1	21.47	21.25	21.52
		3	3	21.43	21.30	21.51
		6	0	20.35	20.45	20.51
1.4M	16QAM	1	0	20.45	20.31	20.46
		1	2	20.41	20.46	20.45
		1	5	20.42	20.26	20.38
		3	0	20.43	20.34	20.53
		3	1	20.47	20.28	20.54
		3	3	20.43	20.42	20.34
		6	0	19.45	19.25	19.45
1.4M	64QAM	1	0	19.39	19.33	19.55
		1	2	19.28	19.13	19.48
		1	5	19.47	19.19	19.53
		3	0	19.43	19.37	19.54
		3	1	19.33	19.46	19.45
		3	3	19.43	19.31	19.37
		6	0	18.37	18.18	18.33

## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

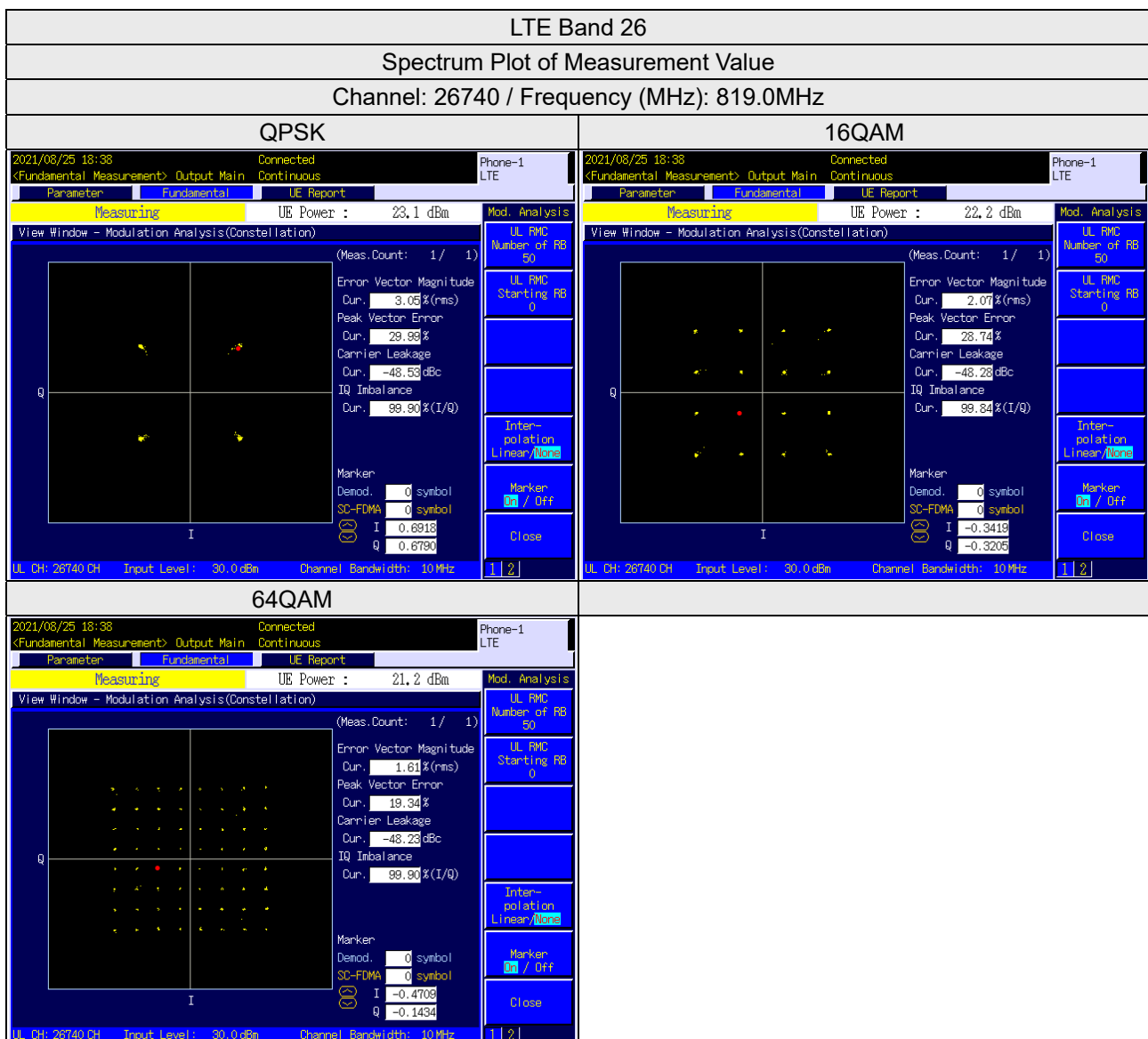
### 4.2.2 Test Procedure

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.

### 4.2.3 Test Setup



### 4.2.4 Test Results



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

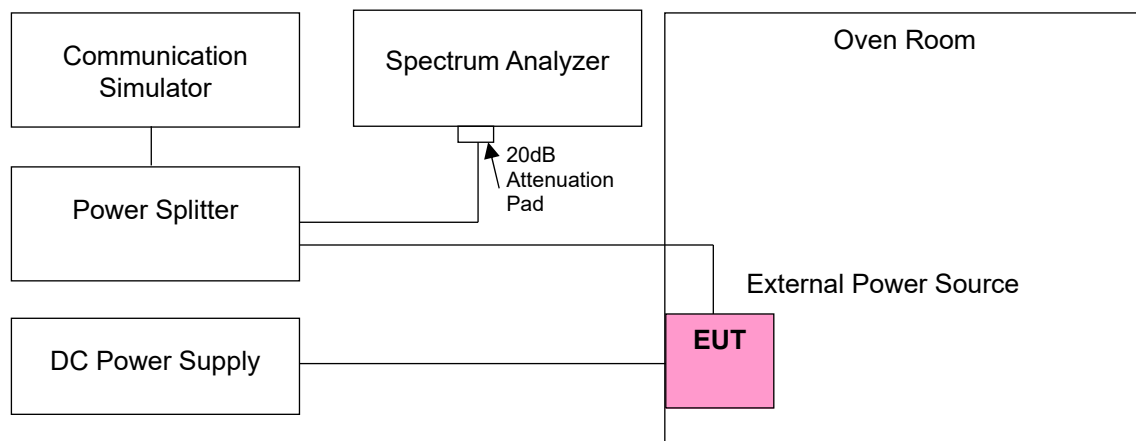
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

#### 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  $\pm 0.5$  °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 (Vdc)	LTE Band 26			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
9.18	814.700003	0.0037	823.300000	0.0049
10.80	814.700004	0.0049	823.300000	0.0049
12.42	814.700004	0.0049	823.300000	0.0036

Note: The applicant defined the normal working voltage is from 9.18Vdc to 12.42Vdc.

##### Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	814.700003	0.0037	823.300000	0.0024
-20	814.700002	0.0025	823.300000	0.0036
-10	814.700003	0.0037	823.300000	0.0024
0	814.700004	0.0049	823.300000	0.0036
10	814.700001	0.0012	823.300000	0.0036
20	814.699997	-0.0037	823.300000	-0.0036
30	814.699996	-0.0049	823.300000	-0.0024
40	814.699997	-0.0037	823.300000	-0.0036
50	814.699998	-0.0025	823.300000	-0.0036

### Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
9.18	815.500003	0.0037	822.500000	0.0024
10.80	815.500002	0.0025	822.500000	0.0049
12.42	815.500002	0.0025	822.500000	0.0024

Note: The applicant defined the normal working voltage is from 9.18Vdc to 12.42Vdc.

### Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26			
	Channel Bandwidth: 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	815.500001	0.0012	822.500000	0.0024
-20	815.500004	0.0049	822.500000	0.0024
-10	815.500002	0.0025	822.500000	0.0012
0	815.500003	0.0037	822.500000	0.0024
10	815.500003	0.0037	822.500000	0.0036
20	815.499998	-0.0025	822.500000	-0.0049
30	815.499999	-0.0012	822.500000	-0.0049
40	815.499998	-0.0025	822.500000	-0.0049
50	815.499997	-0.0037	822.500000	-0.0012

### Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
9.18	816.500001	0.0012	821.500000	0.0049
10.80	816.500004	0.0049	821.500000	0.0024
12.42	816.500002	0.0024	821.500000	0.0024

Note: The applicant defined the normal working voltage is from 9.18Vdc to 12.42Vdc.

### Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26			
	Channel Bandwidth: 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	816.500004	0.0049	821.500000	0.0049
-20	816.500004	0.0049	821.500000	0.0024
-10	816.500002	0.0024	821.500000	0.0049
0	816.500002	0.0024	821.500000	0.0037
10	816.500003	0.0037	821.500000	0.0024
20	816.499998	-0.0024	821.500000	-0.0037
30	816.499997	-0.0037	821.500000	-0.0024
40	816.499998	-0.0024	821.500000	-0.0049
50	816.499998	-0.0024	821.500000	-0.0024

### Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
9.18	819.000003	0.0037
10.80	819.000002	0.0024
12.42	819.000003	0.0037

Note: The applicant defined the normal working voltage is from 9.18Vdc to 12.42Vdc.

### Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
-30	819.000003	0.0037
-20	819.000003	0.0037
-10	819.000002	0.0024
0	819.000003	0.0037
10	819.000002	0.0024
20	818.999998	-0.0024
30	818.999997	-0.0037
40	818.999999	-0.0012
50	818.999997	-0.0037

## 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.

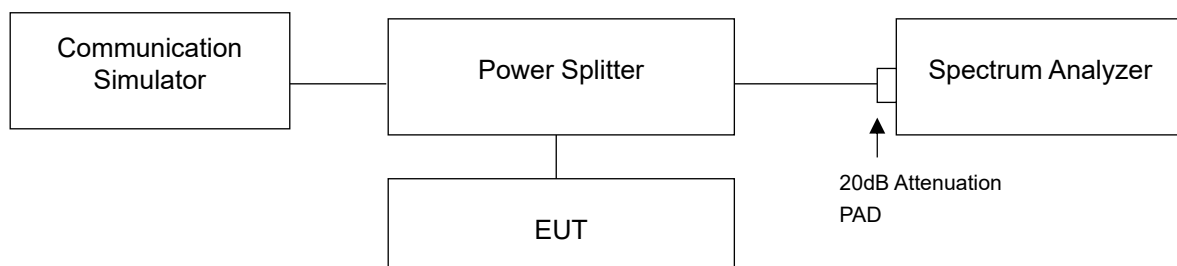
### 4.4.2 Test Procedure

For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set  $\geq 3 \times$  RBW.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- f) Determine the following reference values: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
- g) Determine the “-X dB amplitude” as equal to (Reference Value - X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
- h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB amplitude” determined in step f). If a marker is below this “-X dB amplitude” value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
- i) The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

For the occupied bandwidth measurement method, please refer to section 5.4.4 of ANSI C63.26.

### 4.4.3 Test Setup





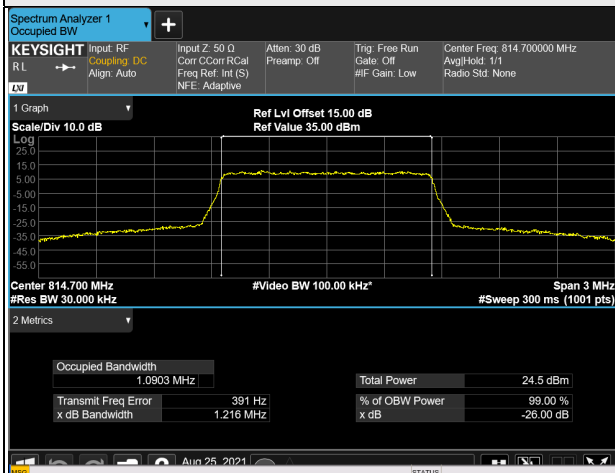
#### 4.4.4 Test Result

##### Occupied Bandwidth

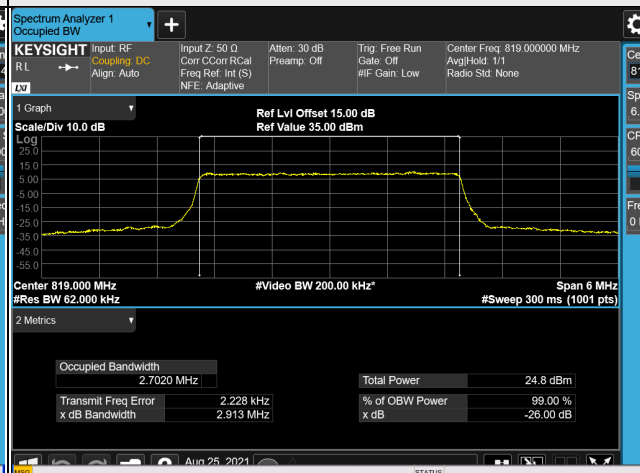
LTE Band 26, Channel Bandwidth 1.4MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26697	814.7	1.09	1.09	1.09
26740	819.0	1.09	1.09	1.09
26783	823.3	1.09	1.09	1.09
LTE Band 26, Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26705	815.5	2.70	2.70	2.70
26740	819.0	2.70	2.70	2.70
26775	822.5	2.70	2.70	2.70
LTE Band 26, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26715	816.5	4.49	4.50	4.50
26740	819.0	4.49	4.49	4.50
26765	821.5	4.49	4.49	4.49
LTE Band 26, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26740	819.0	8.97	8.98	8.98

### Spectrum Plot of Worst Value

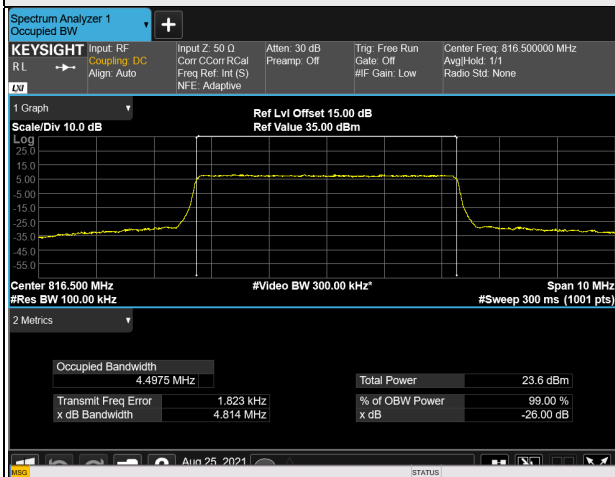
1.4MHz / 16QAM



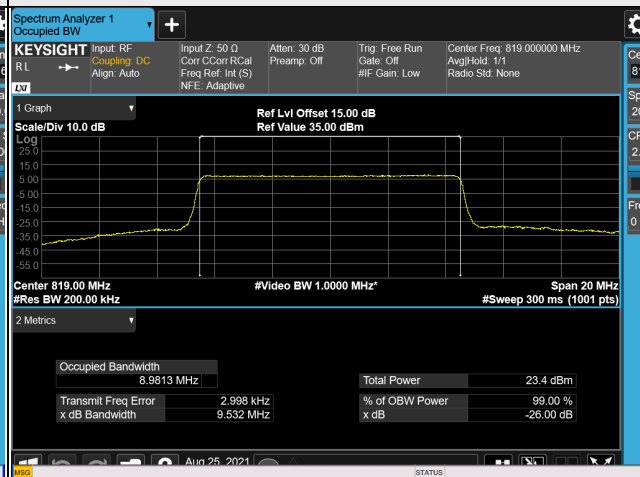
3MHz / QPSK



5MHz / 64QAM



10MHz / 16QAM

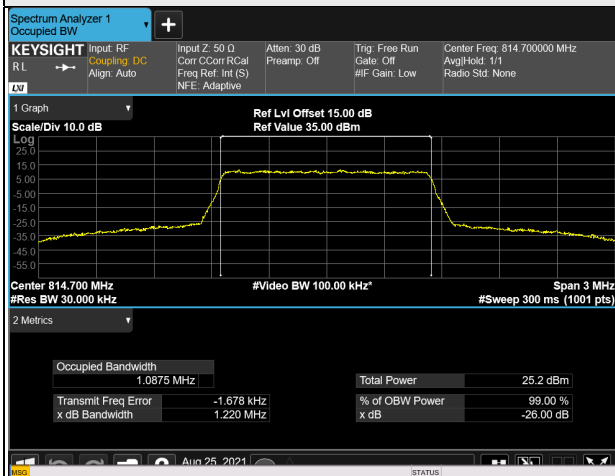


## 26dB Bandwidth

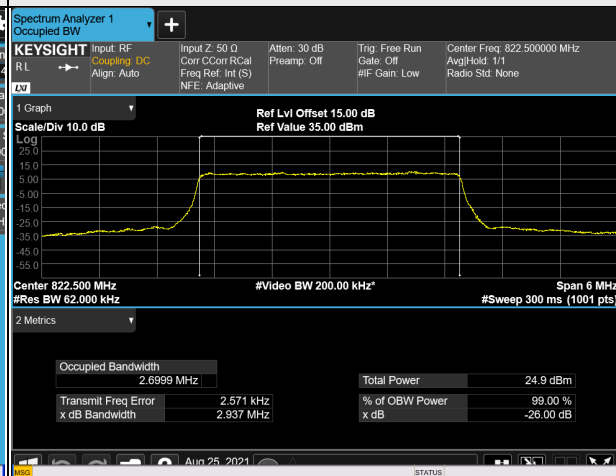
LTE Band 26, Channel Bandwidth 1.4MHz				
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26697	814.7	1.22	1.22	1.22
26740	819.0	1.22	1.21	1.21
26783	823.3	1.22	1.22	1.22
LTE Band 26, Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26705	815.5	2.93	2.93	2.92
26740	819.0	2.91	2.93	2.93
26775	822.5	2.94	2.93	2.92
LTE Band 26, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26715	816.5	4.82	4.82	4.81
26740	819.0	4.83	4.82	4.82
26765	821.5	4.83	4.80	4.81
LTE Band 26, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26740	819.0	9.54	9.53	9.53

### Spectrum Plot of Worst Value

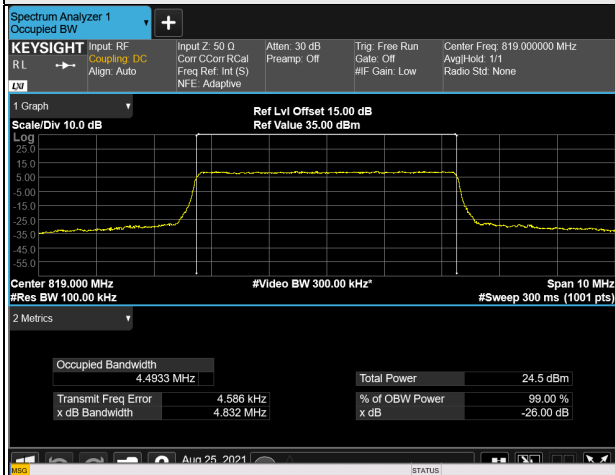
#### 1.4MHz / QPSK



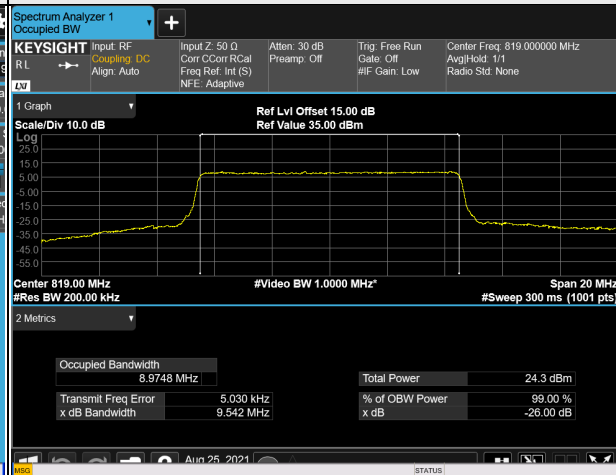
#### 3MHz / QPSK



#### 5MHz / QPSK



#### 10MHz / QPSK



## 4.5 Emission Mask Measurement

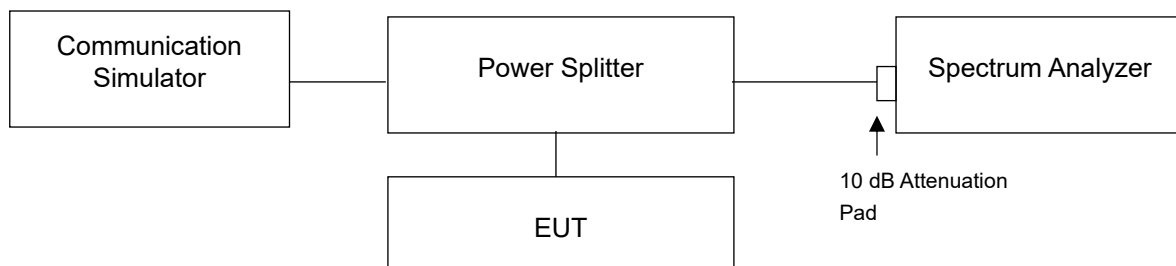
### 4.5.1 Limits of Emission Mask Measurement

According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \text{ Log}_{10}(f/6.1)$  decibels or  $50 + 10\text{Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10\text{Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

For § 90.691(a), RBW=300 Hz for offset less than 37.5 kHz from channel edge and RBW=100 kHz for offsets greater than 37.5 kHz is allowed, tested in accordance with FCC KDB 971168 D02 section VIII.

### 4.5.2 Test Setup



### 4.5.3 Test Procedures

- The measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Record the test plot.

### 4.5.4 Test Results



LTE Band 26, Channel Bandwidth 3MHz

Channel 26705  
(815.5MHz)

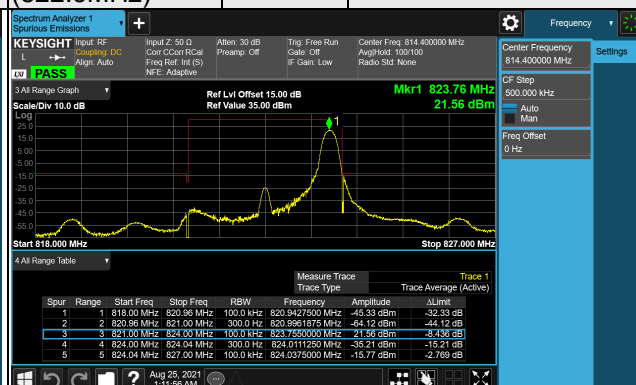
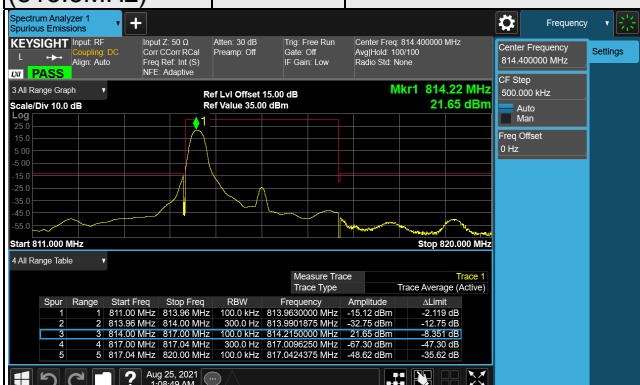
QPSK

1 RB / 0 RB Offset

Channel 26775  
(822.5MHz)

QPSK

1 RB / 14 RB Offset



Channel 26705  
(815.5MHz)

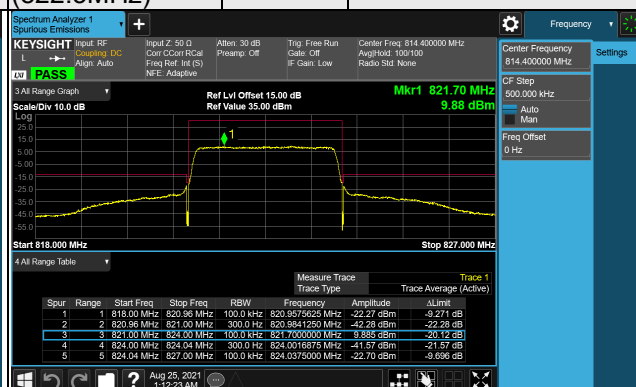
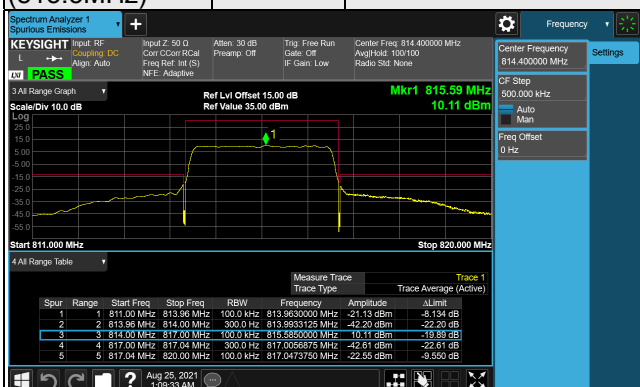
QPSK

15 RB / 0 RB Offset

Channel 26775  
(822.5MHz)

QPSK

15 RB / 0 RB Offset



LTE Band 26, Channel Bandwidth 5MHz

Channel 26715  
(816.5MHz)

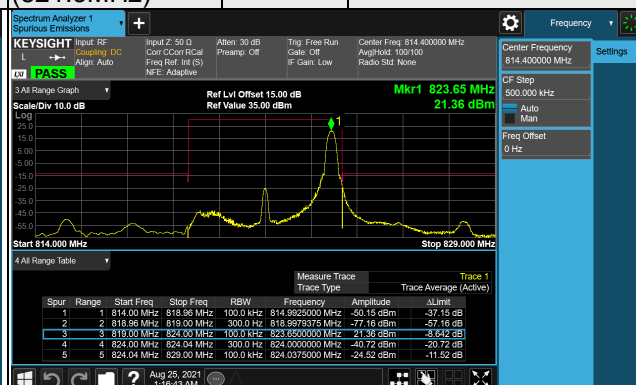
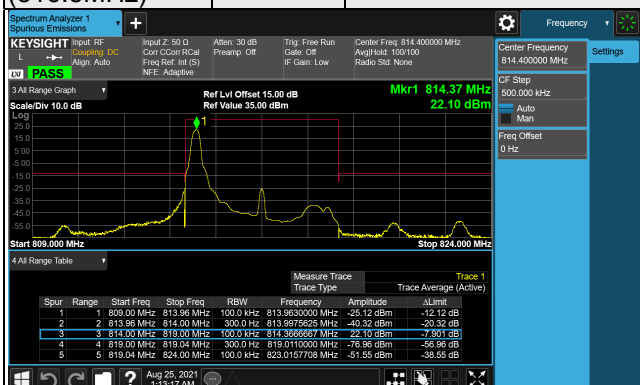
QPSK

1 RB / 0 RB Offset

Channel 26765  
(821.5MHz)

QPSK

1 RB / 24 RB Offset



Channel 26715  
(816.5MHz)

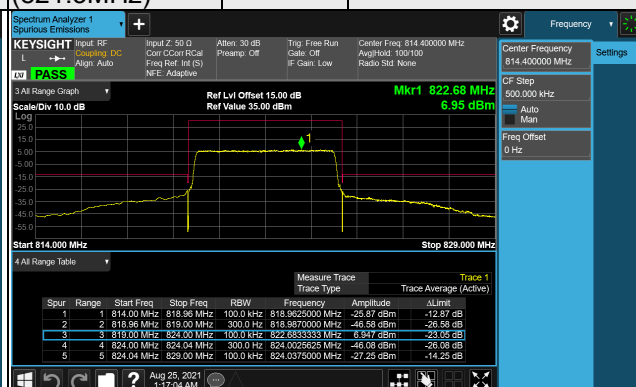
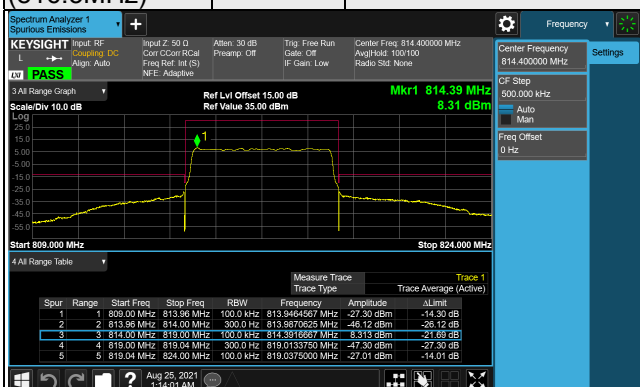
QPSK

25 RB / 0 RB Offset

Channel 26765  
(821.5MHz)

QPSK

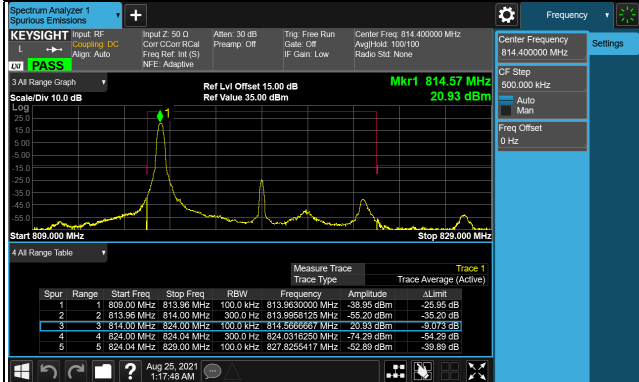
25 RB / 0 RB Offset



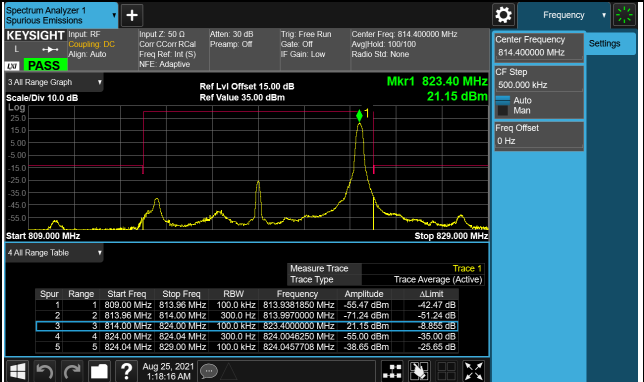


LTE Band 26, Channel Bandwidth 10MHz

Channel 26740 (819.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	QPSK	1 RB / 49 RB Offset
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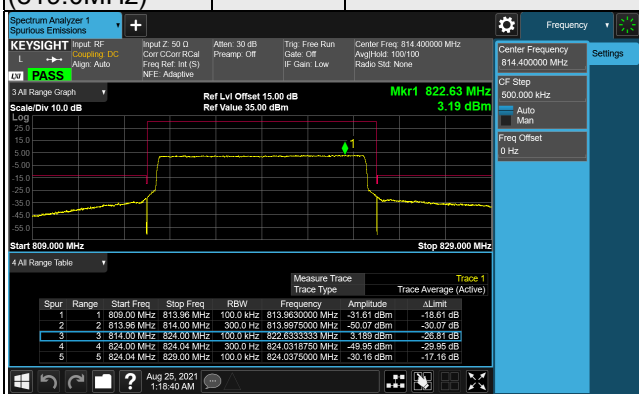


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔLimit
1	1	808.00 MHz	813.96 MHz	100.0 kHz	813.9630000 MHz	-38.95 dBm	-25.95 dB
2	2	813.96 MHz	814.00 MHz	300.0 kHz	813.9981125 MHz	-55.20 dBm	-35.20 dB
3	3	814.00 MHz	824.00 MHz	100.0 kHz	814.5696657 MHz	-20.93 dBm	-9.073 dB
4	4	824.00 MHz	824.04 MHz	300.0 kHz	824.0316250 MHz	-74.29 dBm	-54.29 dB
5	5	824.04 MHz	829.00 MHz	100.0 kHz	827.8225417 MHz	-52.89 dBm	-39.89 dB



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔLimit
1	1	808.00 MHz	813.96 MHz	100.0 kHz	813.9381850 MHz	-55.47 dBm	-42.47 dB
2	2	813.96 MHz	814.00 MHz	300.0 kHz	813.9970000 MHz	-71.24 dBm	-51.24 dB
3	3	814.00 MHz	824.00 MHz	100.0 kHz	823.2000000 MHz	-21.15 dBm	-3.895 dB
4	4	824.00 MHz	824.04 MHz	300.0 kHz	824.0046250 MHz	-55.00 dBm	-35.00 dB
5	5	824.04 MHz	829.00 MHz	100.0 kHz	824.0457708 MHz	-38.65 dBm	-26.65 dB

Channel 26740 (819.0MHz)	QPSK	50 RB / 0 RB Offset			
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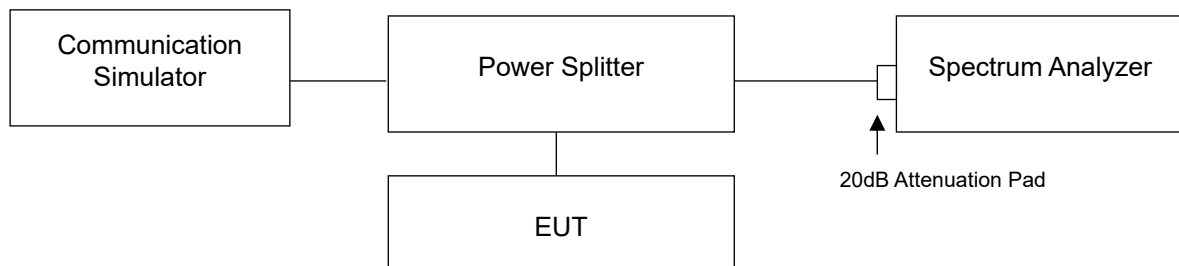
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔLimit
1	1	808.00 MHz	813.96 MHz	100.0 kHz	813.9630000 MHz	-31.61 dBm	-18.61 dB
2	2	813.96 MHz	814.00 MHz	300.0 kHz	813.9970000 MHz	-59.07 dBm	-30.07 dB
3	3	814.00 MHz	824.00 MHz	100.0 kHz	822.6333333 MHz	-3.19 dBm	-26.81 dB
4	4	824.00 MHz	824.04 MHz	300.0 kHz	824.0316750 MHz	-49.95 dBm	-29.95 dB
5	5	824.04 MHz	829.00 MHz	100.0 kHz	824.0375000 MHz	-39.16 dBm	-17.16 dB

## 4.6 Conducted Spurious Emissions

### 4.6.1 Limits of Conducted Spurious Emissions Measurement

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

### 4.6.2 Test Setup



### 4.6.3 Test Procedure

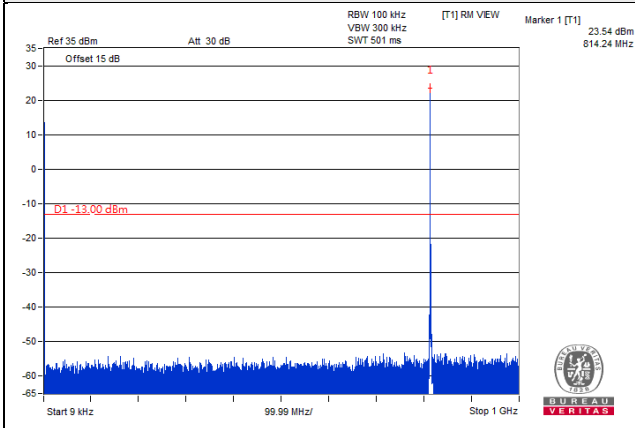
- a. All measurements were done at low, middle and high channels operational frequency range.
- a. Measuring frequency range is from 9kHz to 9GHz. 20dB attenuation pad is connected with spectrum. RBW=100kHz and VBW=300kHz for 9kHz to 1GHz and RBW=1MHz and VBW=3MHz for 1 GHz to 9GHz are used for conducted emission measurement.

### 4.6.4 Test Results

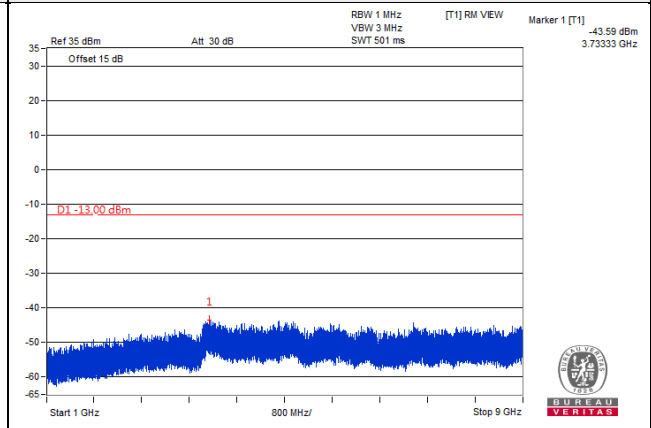
LTE Band 26, Channel Bandwidth 1.4MHz

Channel 26697 (814.7MHz)

Frequency Range : 9kHz ~ 1GHz

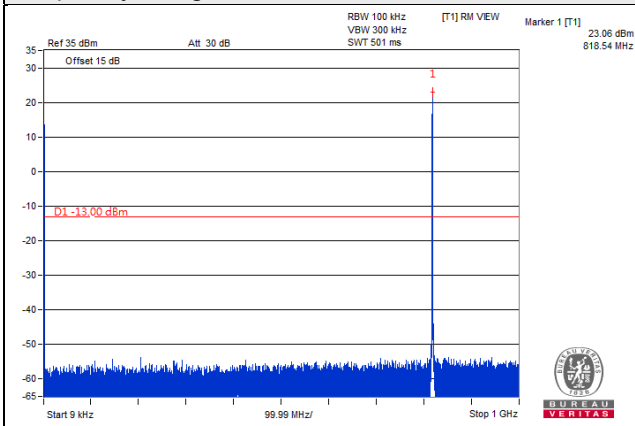


Frequency Range : 1GHz ~ 9GHz

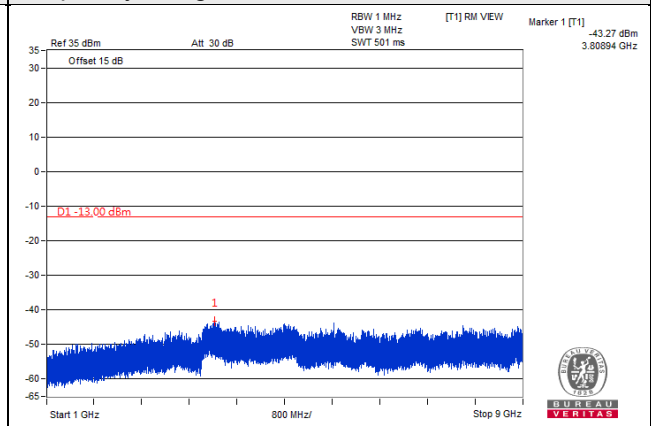


Channel 26740 (819.0MHz)

Frequency Range : 9kHz ~ 1GHz

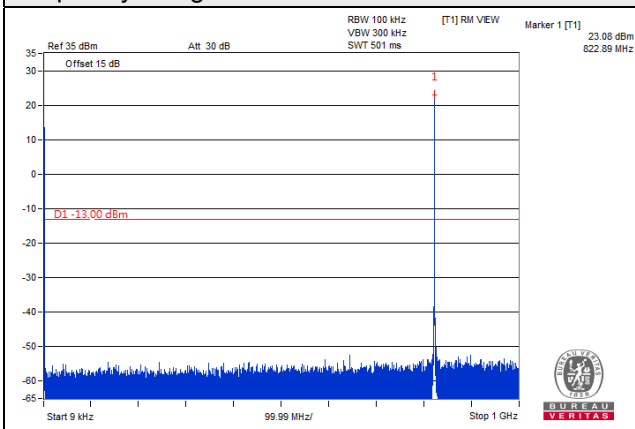


Frequency Range : 1GHz ~ 9GHz

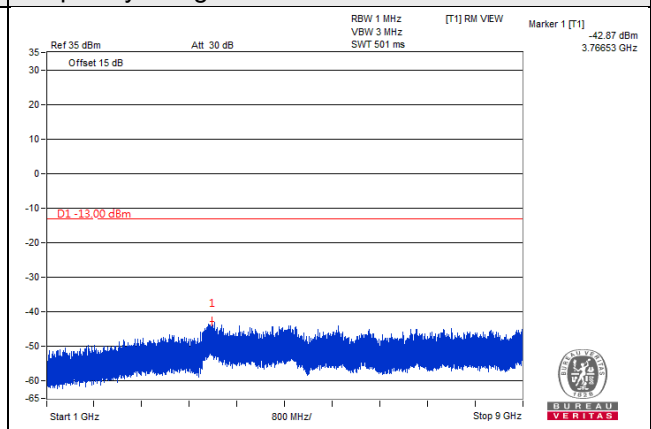


Channel 26783 (823.3MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 9GHz

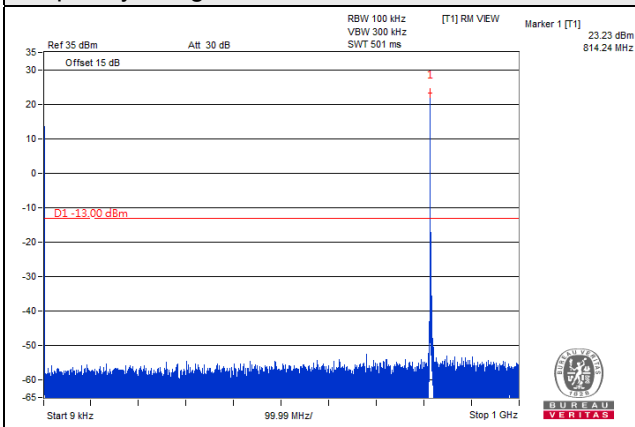


\*The 9kHz signal over the limit is from Spectrum.

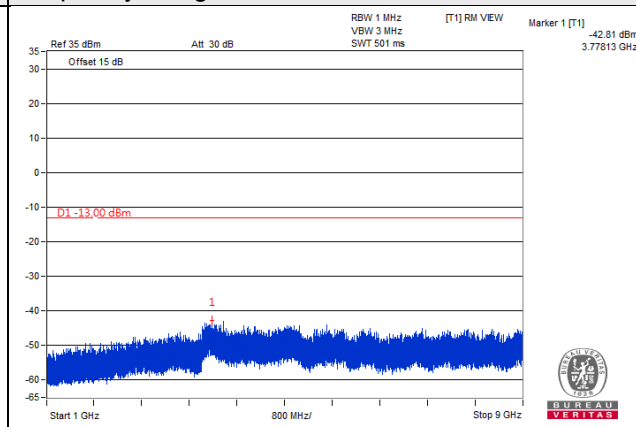
LTE Band 26, Channel Bandwidth 3MHz

Channel 26705 (815.5MHz)

Frequency Range : 9kHz ~ 1GHz

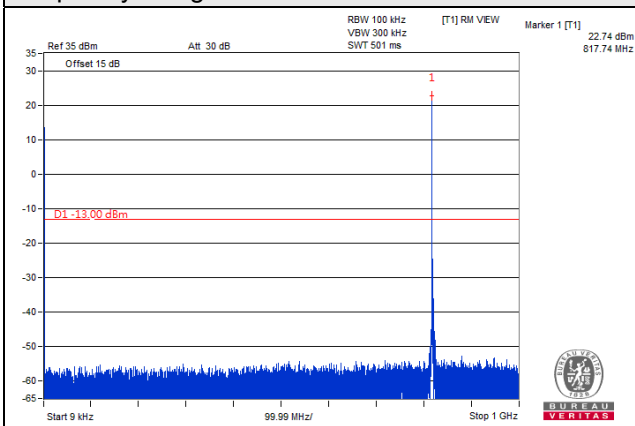


Frequency Range : 1GHz ~ 9GHz

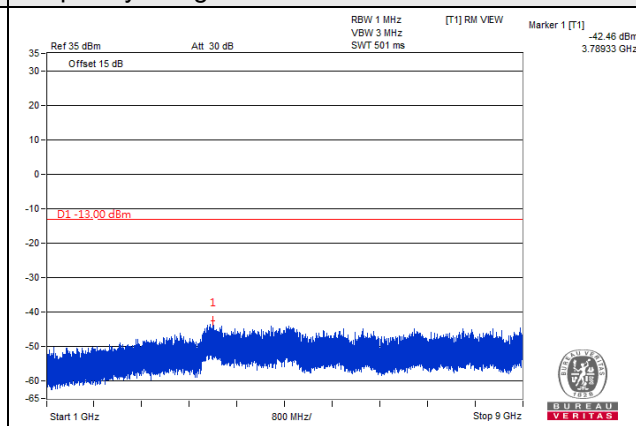


Channel 26740 (819.0MHz)

Frequency Range : 9kHz ~ 1GHz

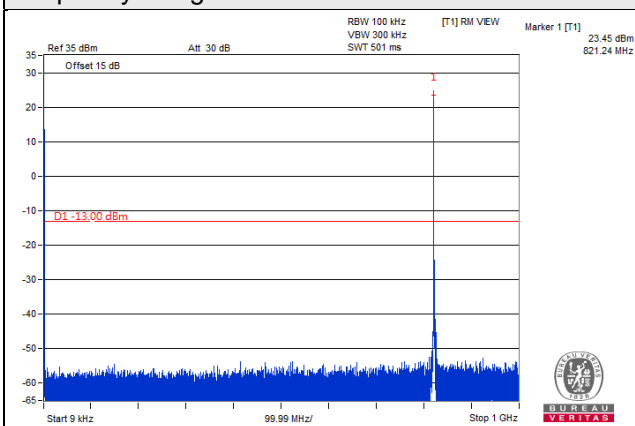


Frequency Range : 1GHz ~ 9GHz

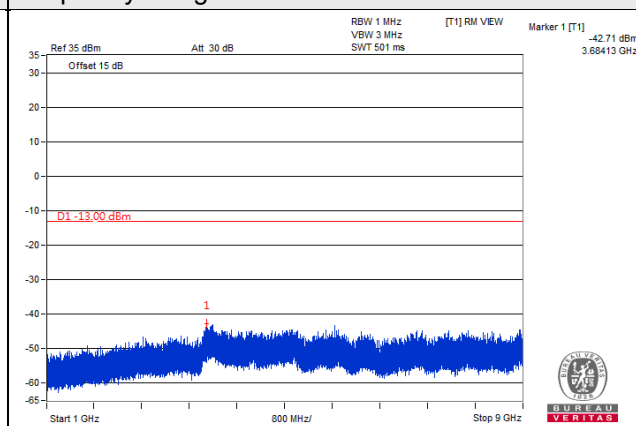


Channel 26775 (822.5MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 9GHz

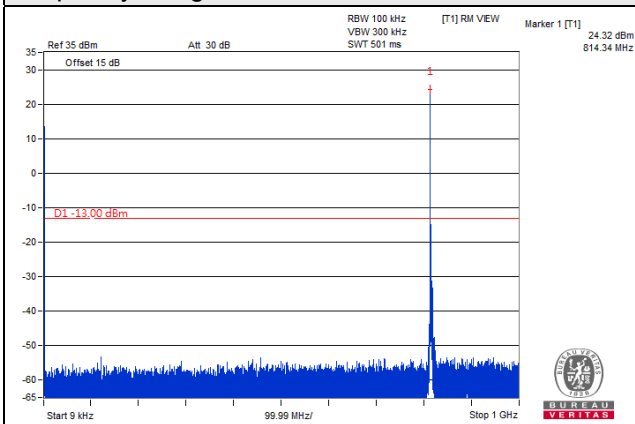


\*The 9kHz signal over the limit is from Spectrum.

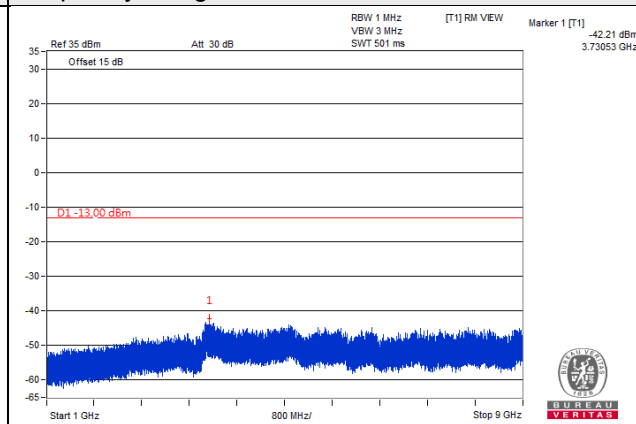
LTE Band 26, Channel Bandwidth 5MHz

Channel 26715 (816.5MHz)

Frequency Range : 9kHz ~ 1GHz

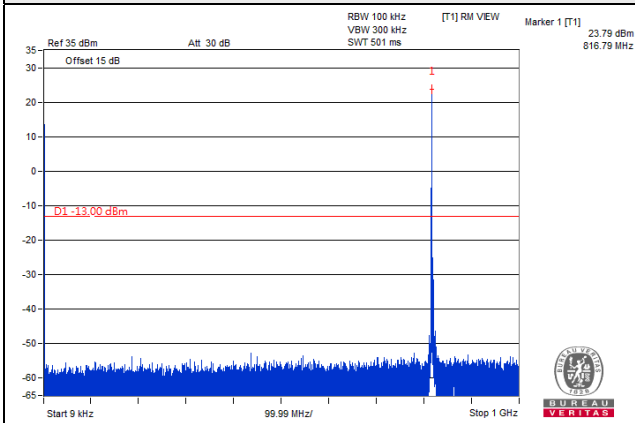


Frequency Range : 1GHz ~ 9GHz

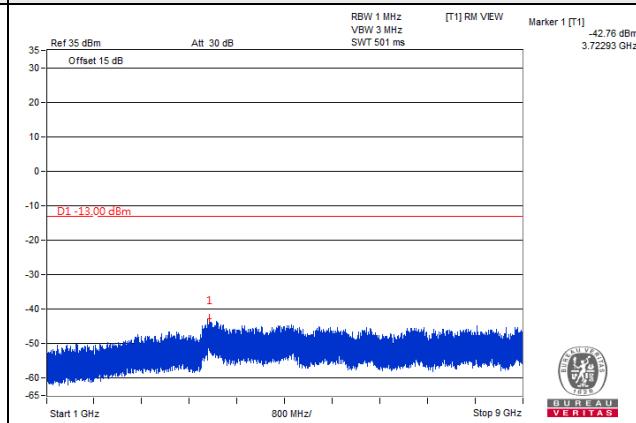


Channel 26740 (819.0MHz)

Frequency Range : 9kHz ~ 1GHz

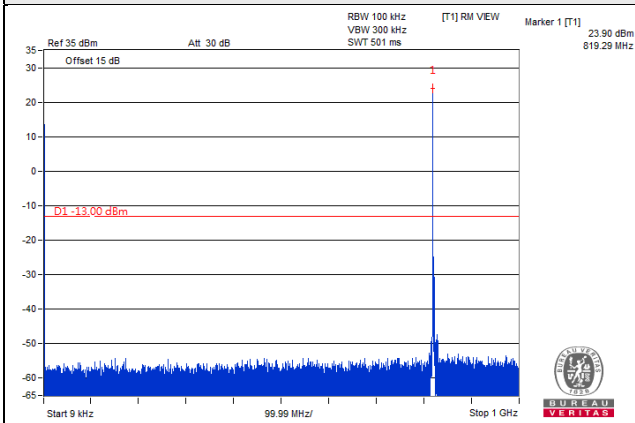


Frequency Range : 1GHz ~ 9GHz

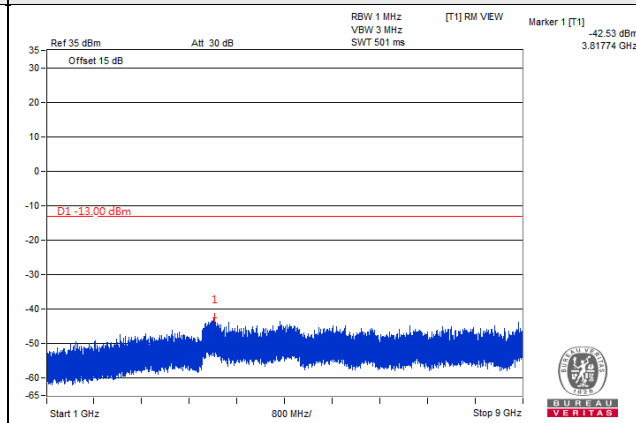


Channel 26765 (821.5MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 9GHz

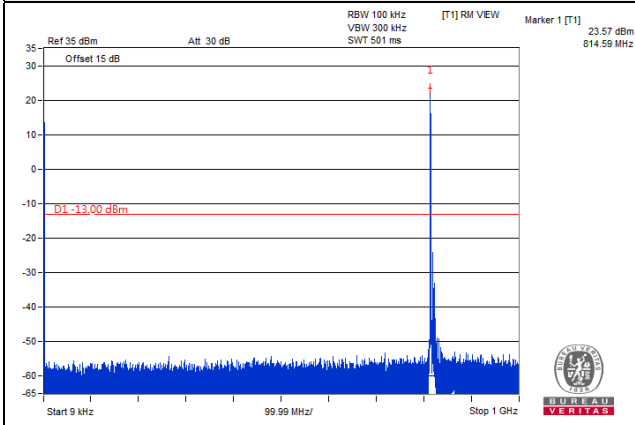


\*The 9kHz signal over the limit is from Spectrum.

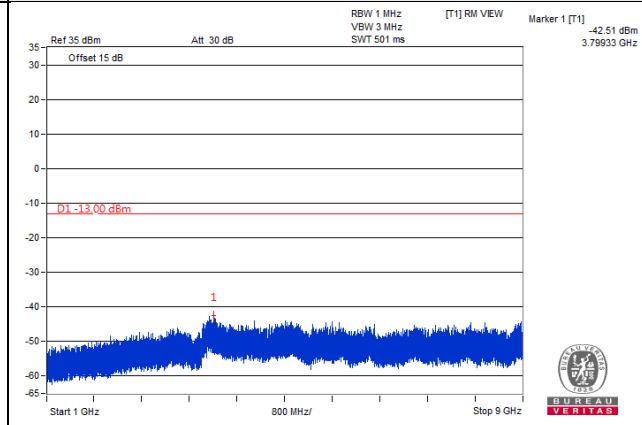
LTE Band 26, Channel Bandwidth 10MHz

Channel 26740 (819.0MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 9GHz



\*The 9kHz signal over the limit is from Spectrum.

## 4.7 Radiated Emission Measurement

### 4.7.1 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  $43 + 10 \log_{10}(P)$  dB. The limit of emission equal to  $-13$ dBm.

### 4.7.2 Test Procedure

- a. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) 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 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- d. Following C63.26 section 5.5 and 5.2.7  
EIRP (dBm) = E (dB $\mu$ V/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.  
ERP (dBm) = E (dB $\mu$ V/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

#### Note:

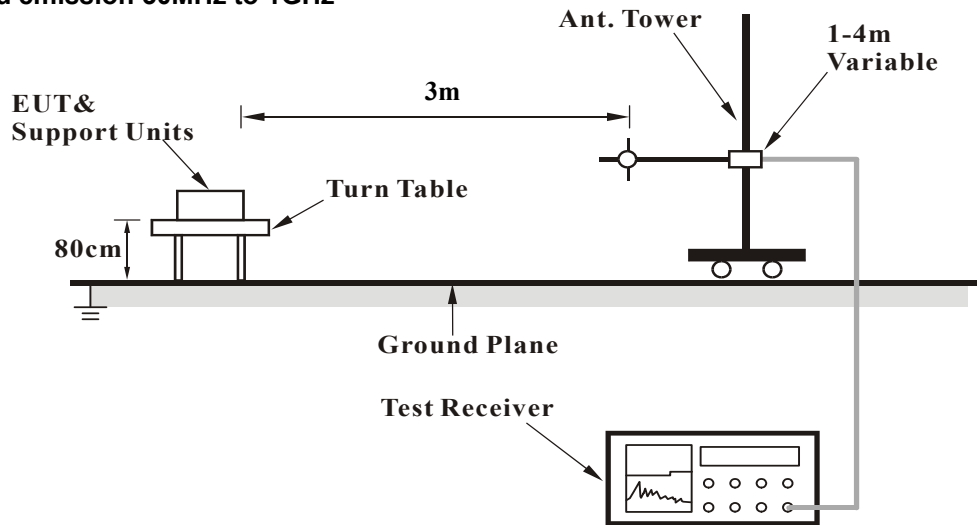
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:  
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

### 4.7.3 Deviation from Test Standard

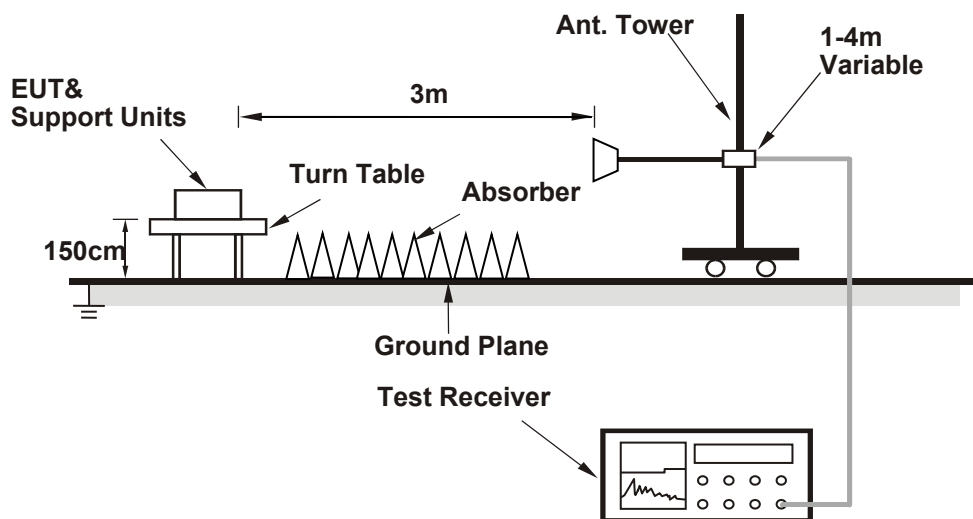
No deviation.

#### 4.7.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



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



#### 4.7.5 Test Results

##### Test Mode A

LTE Band 26, Channel Bandwidth 1.4MHz

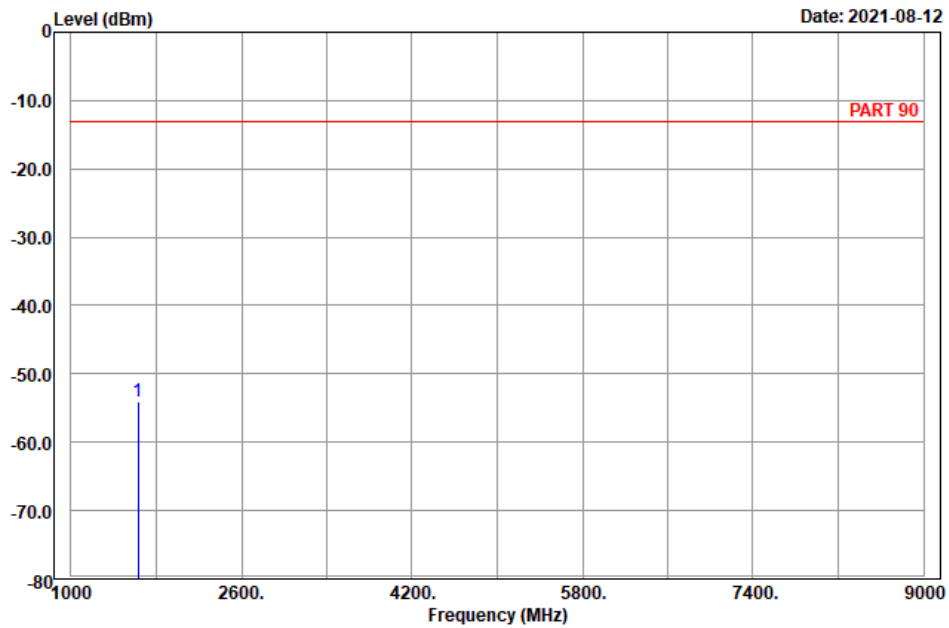
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_L-Ch  
 Tested by: Charles Hsiao

1	pp	Freq MHz	Level dBm	Read Level dBm	Factor dB	Limit Line dBm	Over Limit dB	Remark
1	pp	1629.40	-54.11	-61.67	7.56	-13.00	-41.11	Peak

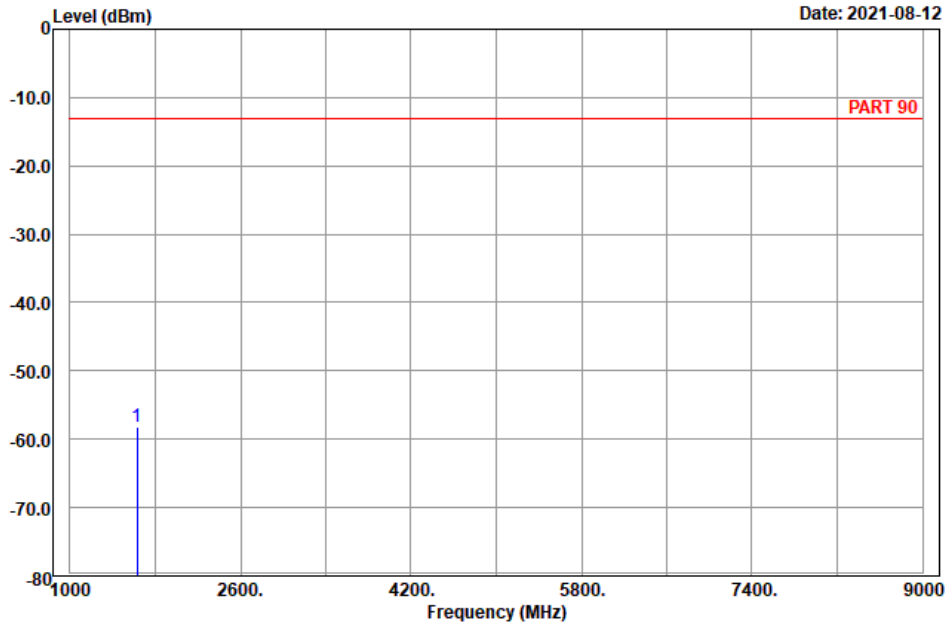


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_L-Ch  
 Tested by: Charles Hsiao

	Read	Limit	Over				
Freq	Level	Level	Factor	Line	Limit	Remark	
MHz	dBm	dBm	dB	dBm	dB		
1 pp 1629.40	-58.15	-65.71	7.56	-13.00	-45.15	Peak	

Mid Channel

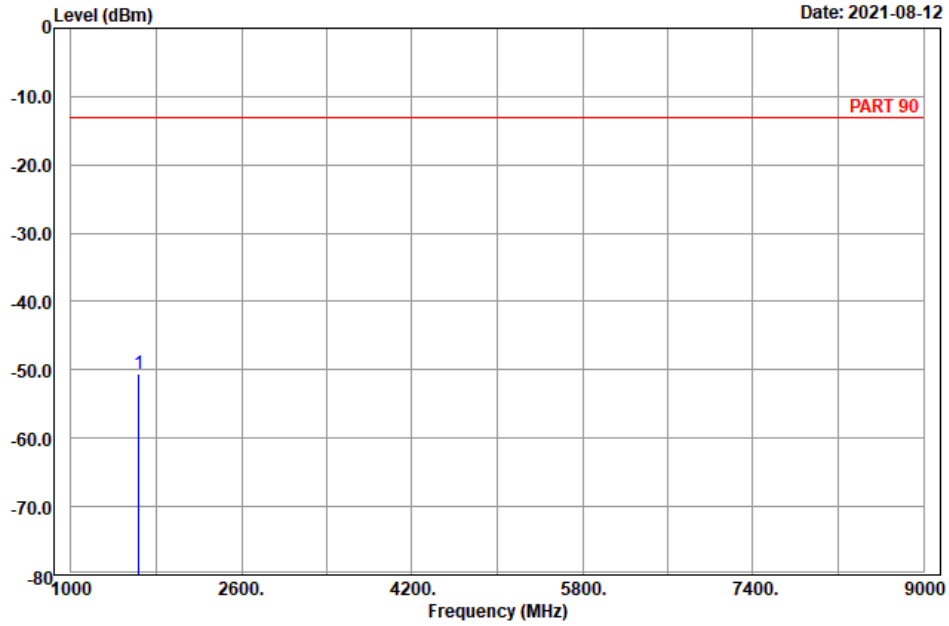


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A D T

Data: 5

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Harry Hsueh

	Read	Limit	Over	
Freq	Level	Level	Factor	Line
MHz	dBm	dBm	dB	dBm
1 pp 1638.00	-50.60	-58.16	7.56	-13.00
				-37.60 Peak

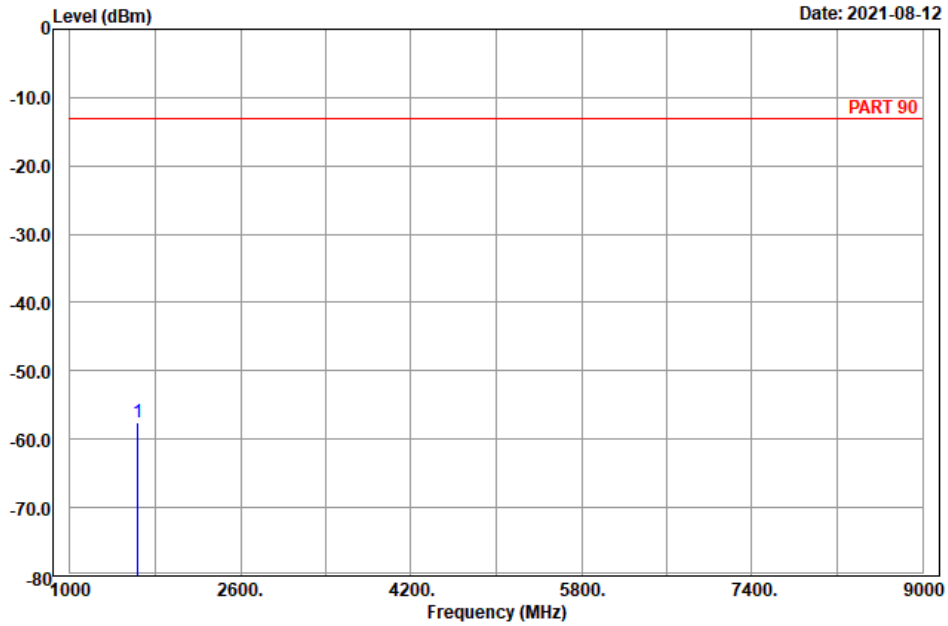


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Harry Hsueh

Read	Limit	Over		
Level	Line	Limit	Factor	Remark
dBm	dBm	dB		
-57.44	-13.00	-44.44	7.56	Peak

High Channel

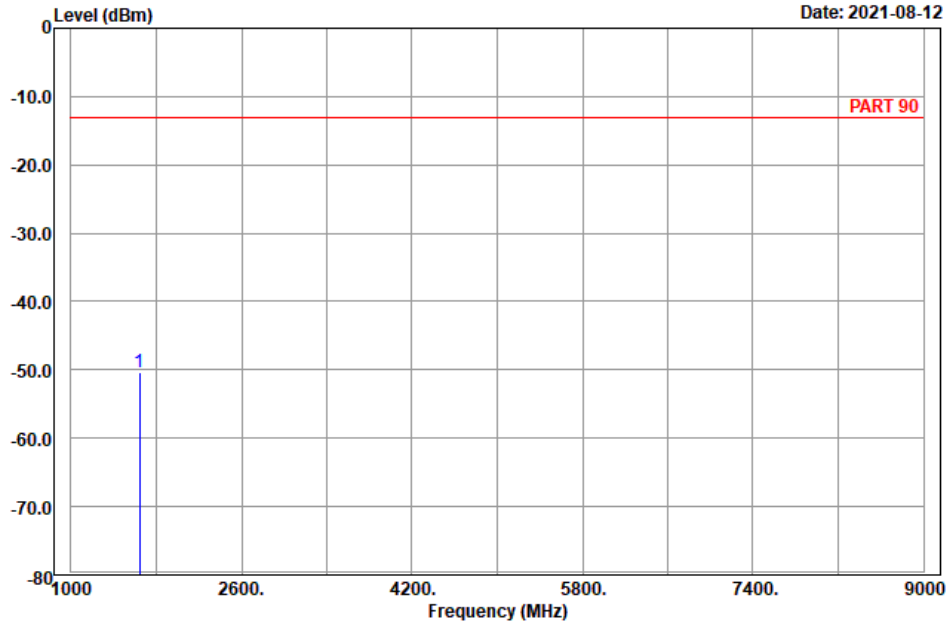


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_H-Ch  
 Tested by: Charles Hsiao

	Read	Limit	Over		
Freq	Level	Level	Factor	Line	Limit Remark
MHz	dBm	dBm	dB	dBm	dB
1 pp 1646.60	-50.44	-58.17	7.73	-13.00	-37.44 Peak

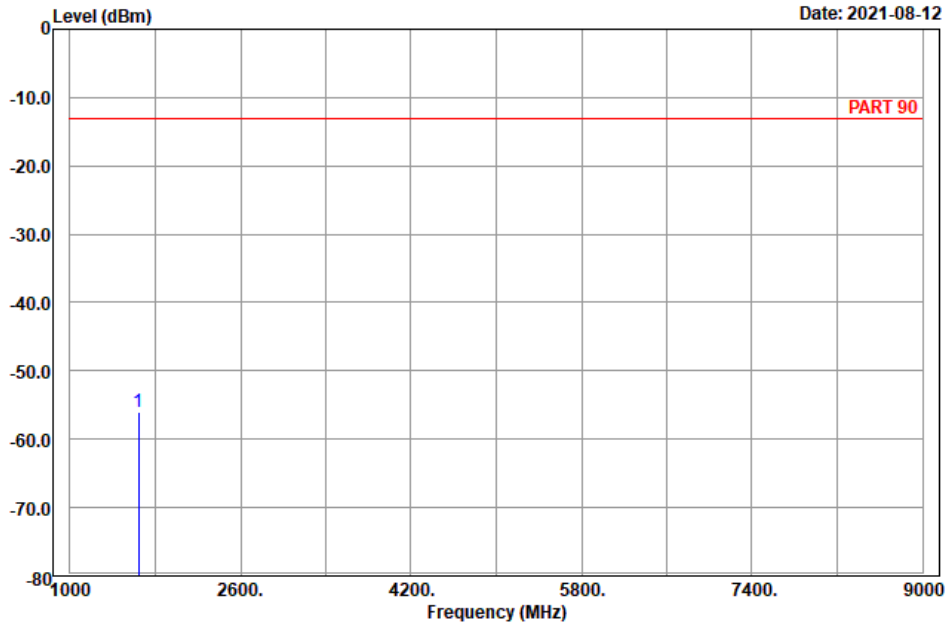


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_H-Ch  
 Tested by: Charles Hsiao

	Read	Limit	Over	
Freq	Level	Level	Factor	Line
MHz	dBm	dBm	dB	dBm
1 pp 1646.60	-55.97	-63.70	7.73	-13.00
				-42.97 Peak

LTE Band 26, Channel Bandwidth 5MHz  
Low Channel

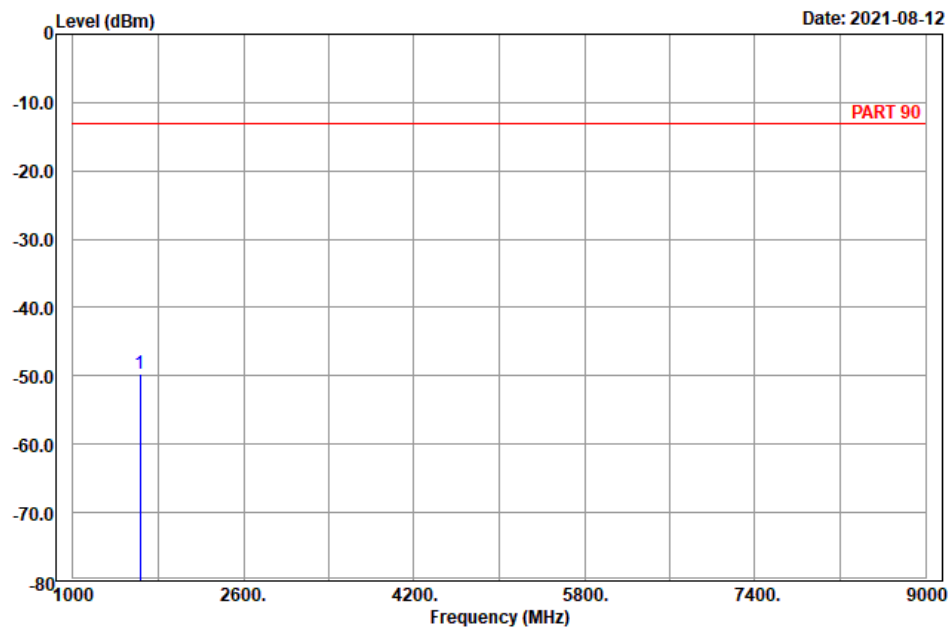


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2021-08-12



Site : 966 chamber 1  
Condition: PART 90 Horizontal  
Remark : LTE\_Band 26\_Link\_L-Ch  
Tested by: Harry Hsueh

	Read	Limit	Over	
Freq	Level	Level	Factor	Line
MHz	dBm	dBm	dB	dBm
1 pp 1633.00	-49.68	-57.24	7.56	-13.00
				-36.68 Peak

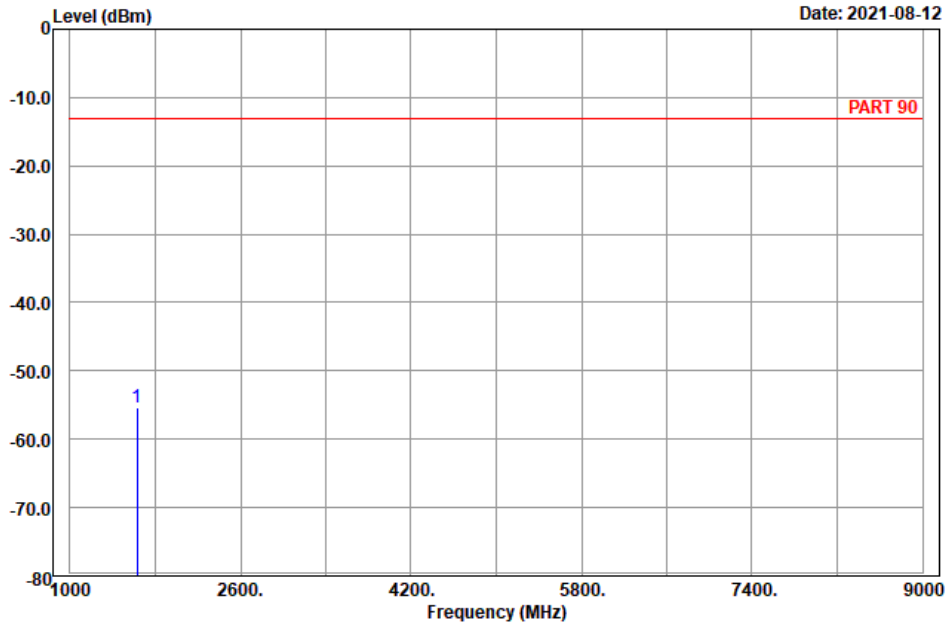


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_L-Ch  
 Tested by: Harry Hsueh

	Read	Limit	Over			
Freq	Level	Level	Factor	Line	Limit	Remark
MHz	dBm	dBm	dB	dBm	dB	
1 pp 1633.00	-55.39	-62.95	7.56	-13.00	-42.39	Peak



Mid Channel

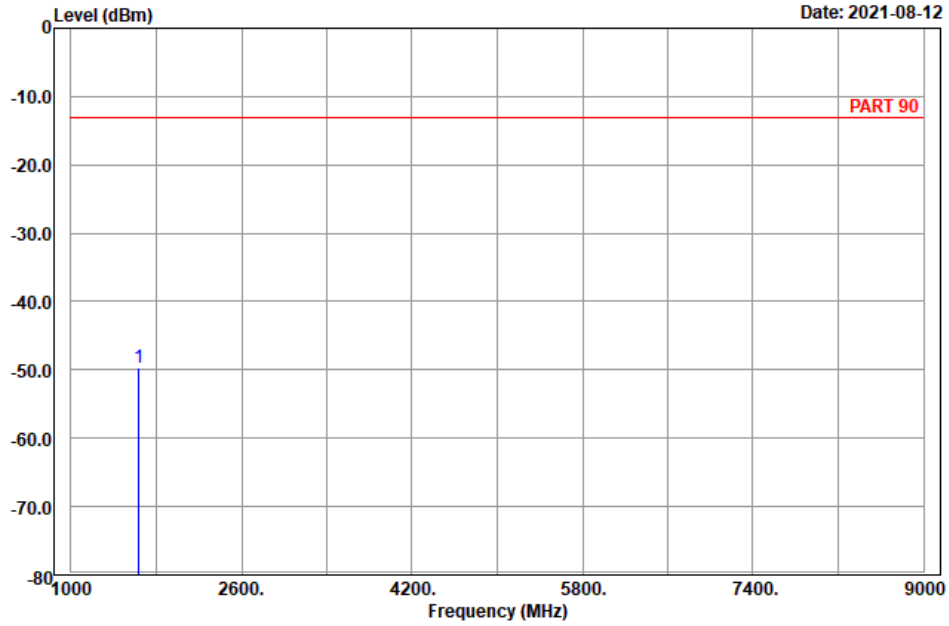


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Harry Hsueh

	Read	Limit	Over	
Freq	Level	Level	Factor	Line
MHz	dBm	dBm	dB	dBm
1 pp 1638.00	-49.66	-57.22	7.56	-13.00
				-36.66
				Peak

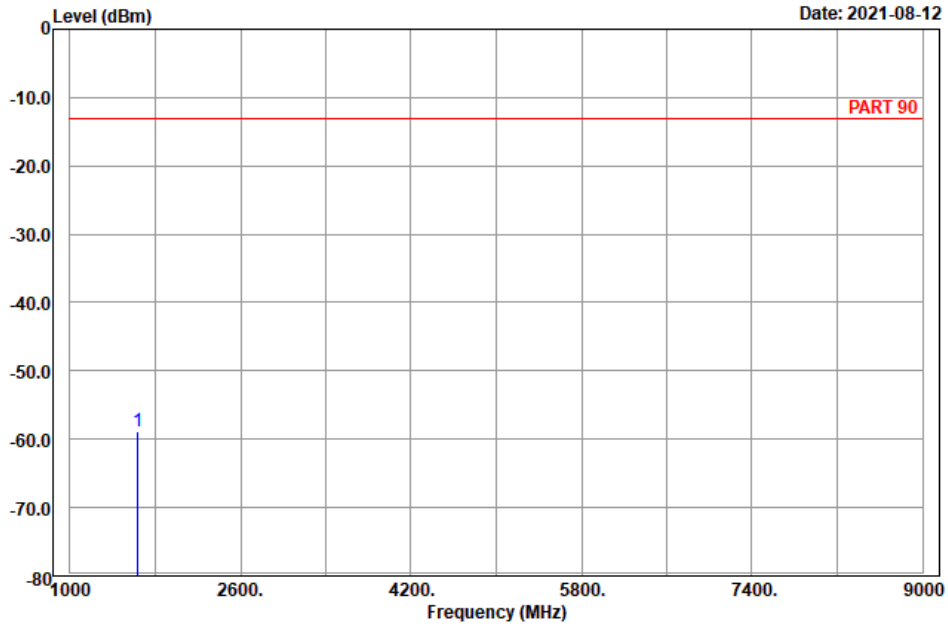


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Harry Hsueh

	Read	Limit	Over				
Freq	Level	Level	Factor	Line	Limit	Remark	
MHz	dBm	dBm	dB	dBm	dB		
1 pp 1638.00	-58.87	-66.43	7.56	-13.00	-45.87	Peak	

## High Channel

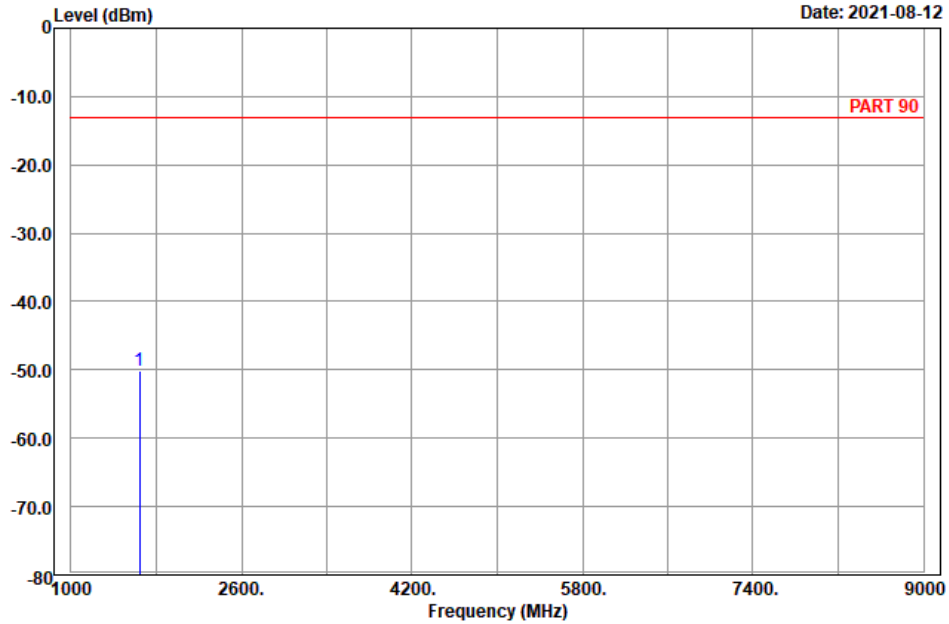


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_H-Ch  
 Tested by: Harry Hsueh

	Read	Limit	Over	
Freq	Level	Level	Factor	Line
MHz	dBm	dBm	dB	dBm
1 pp 1643.00	-50.08	-57.81	7.73	-13.00
				-37.08
				Peak

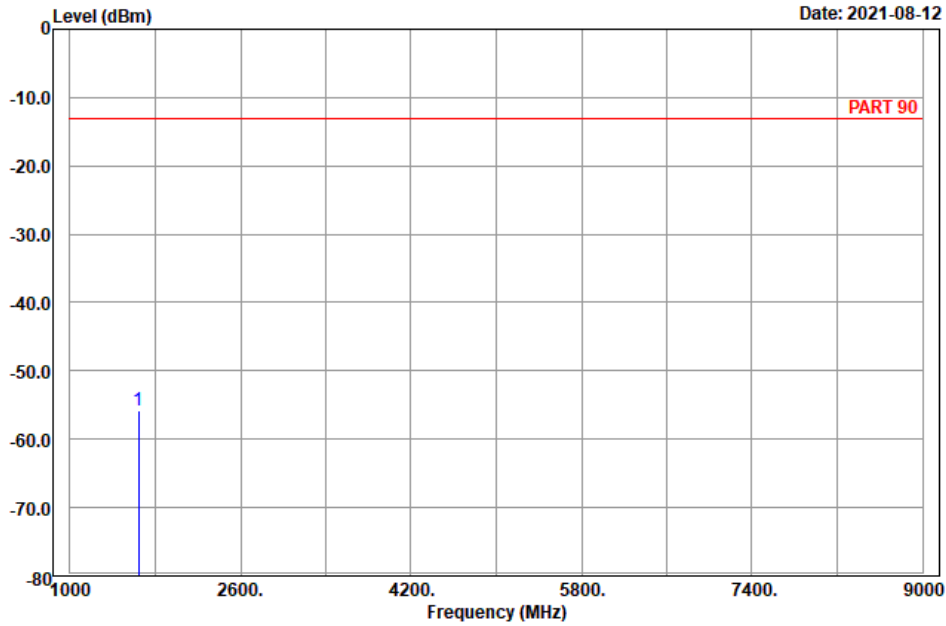


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_H-Ch  
 Tested by: Harry Hsueh

	Read	Limit	Over				
Freq	Level	Level	Factor	Line	Limit	Remark	
MHz	dBm	dBm	dB	dBm	dB		
1 pp 1643.00	-55.70	-63.43	7.73	-13.00	-42.70	Peak	

LTE Band 26, Channel Bandwidth 10MHz  
Mid Channel

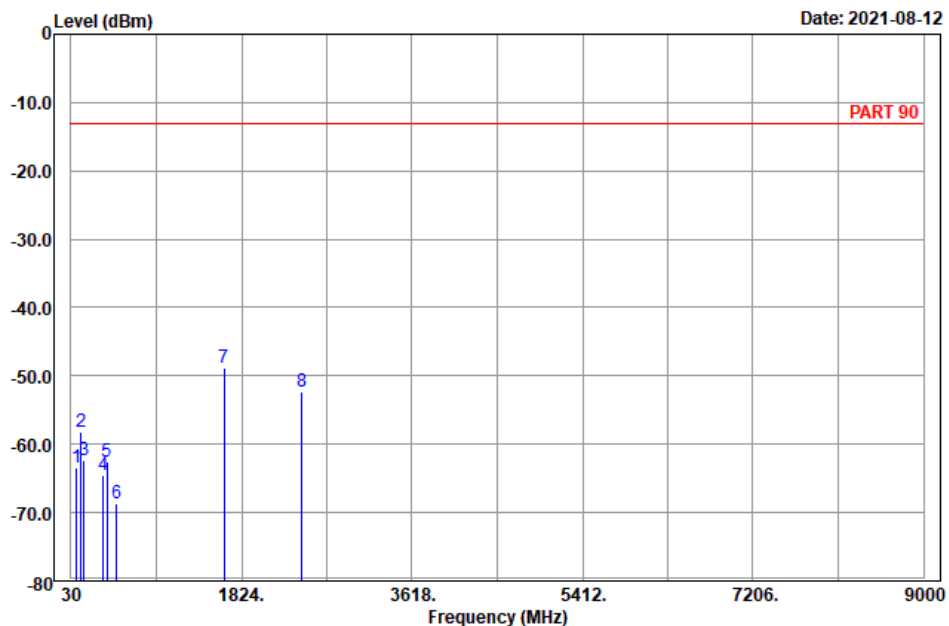


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9

Date: 2021-08-12



Site : 966 chamber 1  
Condition: PART 90 Horizontal  
Remark : LTE\_Band 26\_Link\_M-Ch  
Tested by: Harry Hsueh

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	85.35	-63.52	-52.30	-11.22	-13.00	-50.52	Peak
2	135.57	-58.28	-50.61	-7.67	-13.00	-45.28	Peak
3	166.62	-62.32	-55.33	-6.99	-13.00	-49.32	Peak
4	368.60	-64.51	-60.11	-4.40	-13.00	-51.51	Peak
5	405.70	-62.65	-59.78	-2.87	-13.00	-49.65	Peak
6	511.40	-68.68	-64.18	-4.50	-13.00	-55.68	Peak
7 pp	1638.00	-48.92	-56.48	7.56	-13.00	-35.92	Peak
8	2457.00	-52.23	-63.25	11.02	-13.00	-39.23	Peak

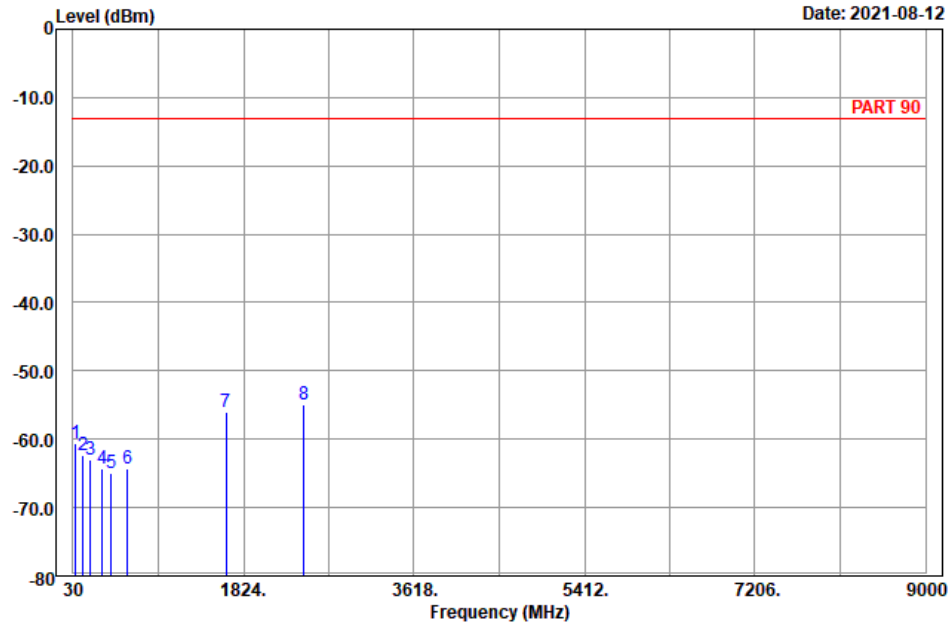


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2021-08-12



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Harry Hsueh

	Read	Limit	Over				
Freq	Level	Level	Factor	Line	Limit	Remark	
MHz	dBm	dBm	dB	dBm	dB		
1	56.46	-60.65	-46.59	-14.06	-13.00	-47.65	Peak
2	132.06	-62.25	-54.59	-7.66	-13.00	-49.25	Peak
3	216.57	-62.91	-56.95	-5.96	-13.00	-49.91	Peak
4	334.30	-64.25	-58.69	-5.56	-13.00	-51.25	Peak
5	428.80	-64.95	-61.57	-3.38	-13.00	-51.95	Peak
6	606.60	-64.25	-64.61	0.36	-13.00	-51.25	Peak
7	1638.00	-56.00	-63.56	7.56	-13.00	-43.00	Peak
8 pp	2457.00	-54.97	-65.99	11.02	-13.00	-41.97	Peak

**Test Mode B**  
**LTE Band 26, Channel Bandwidth 10MHz**  
**Mid Channel**

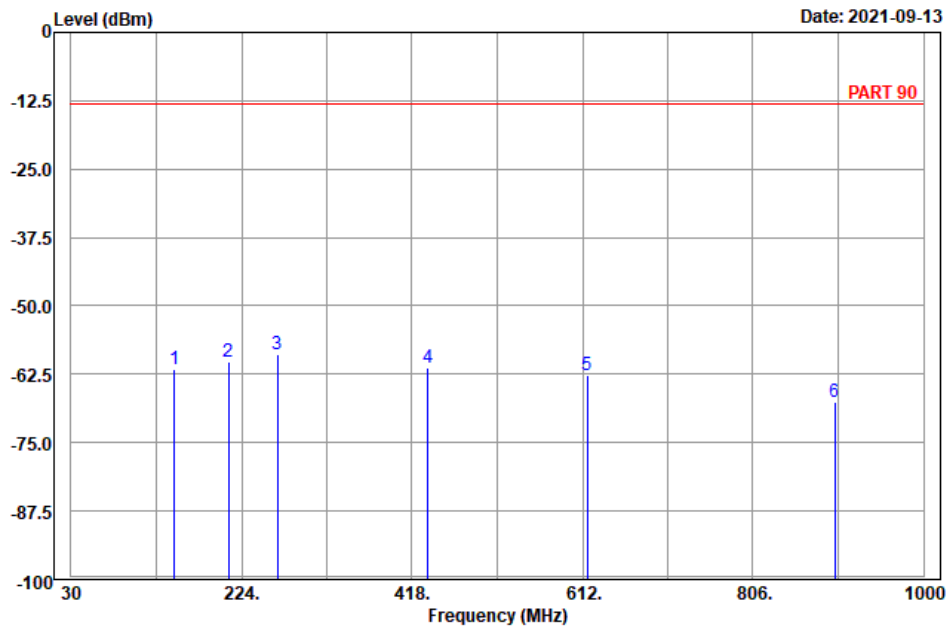


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2021-09-13



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	147.45	-61.64	-53.76	-13.00	-48.64	-7.88	Peak
2	209.28	-60.31	-54.26	-13.00	-47.31	-6.05	Peak
3	265.17	-58.79	-53.15	-13.00	-45.79	-5.64	Peak
4	436.50	-61.28	-57.73	-13.00	-48.28	-3.55	Peak
5	617.10	-62.64	-62.88	-13.00	-49.64	0.24	Peak
6	899.20	-67.70	-70.56	-13.00	-54.70	2.86	Peak

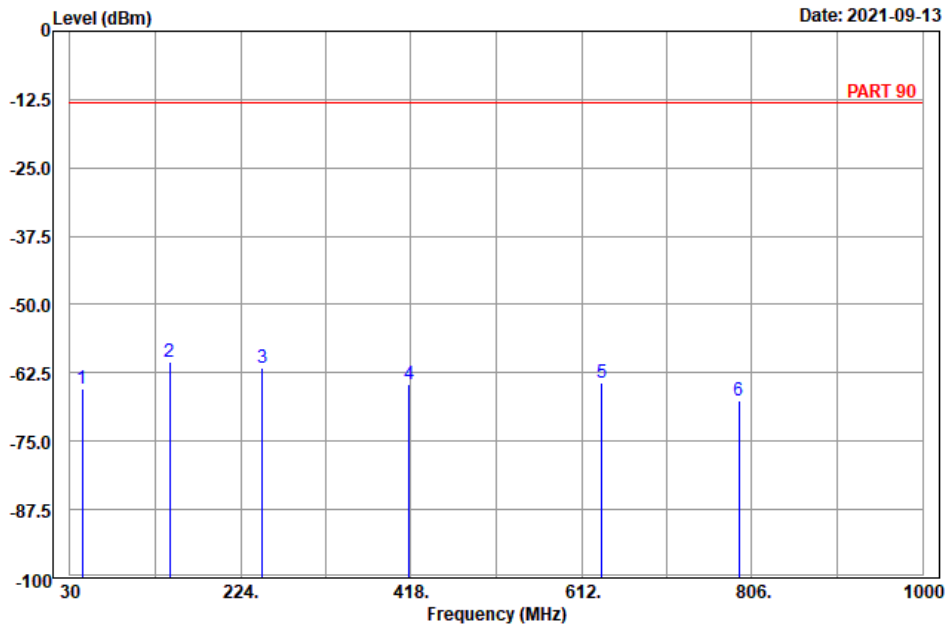


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2021-09-13



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Karl Lee

	Read Freq	Read Level	Limit Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	44.04	-65.38	-53.80	-13.00	-52.38	-11.58	Peak
2	143.40	-60.36	-52.57	-13.00	-47.36	-7.79	Peak
3	249.24	-61.69	-56.17	-13.00	-48.69	-5.52	Peak
4	415.50	-64.71	-61.63	-13.00	-51.71	-3.08	Peak
5	635.30	-64.17	-64.20	-13.00	-51.17	0.03	Peak
6	791.40	-67.57	-69.01	-13.00	-54.57	1.44	Peak



**Test Mode C**  
**LTE Band 26, Channel Bandwidth 10MHz**  
**Mid Channel**

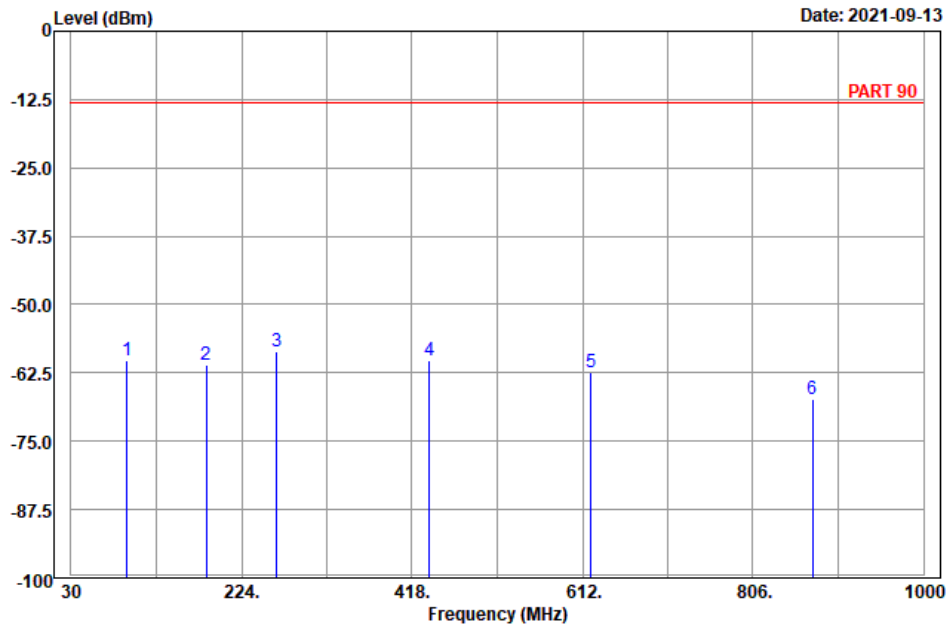


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2021-09-13



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	93.46	-60.27	-49.76	-13.00	-47.27	-10.51	Peak
2	183.62	-61.15	-55.53	-13.00	-48.15	-5.62	Peak
3	264.37	-58.64	-53.00	-13.00	-45.64	-5.64	Peak
4	437.65	-60.29	-56.72	-13.00	-47.29	-3.57	Peak
5	621.50	-62.39	-62.57	-13.00	-49.39	0.18	Peak
6	874.23	-67.19	-69.33	-13.00	-54.19	2.14	Peak

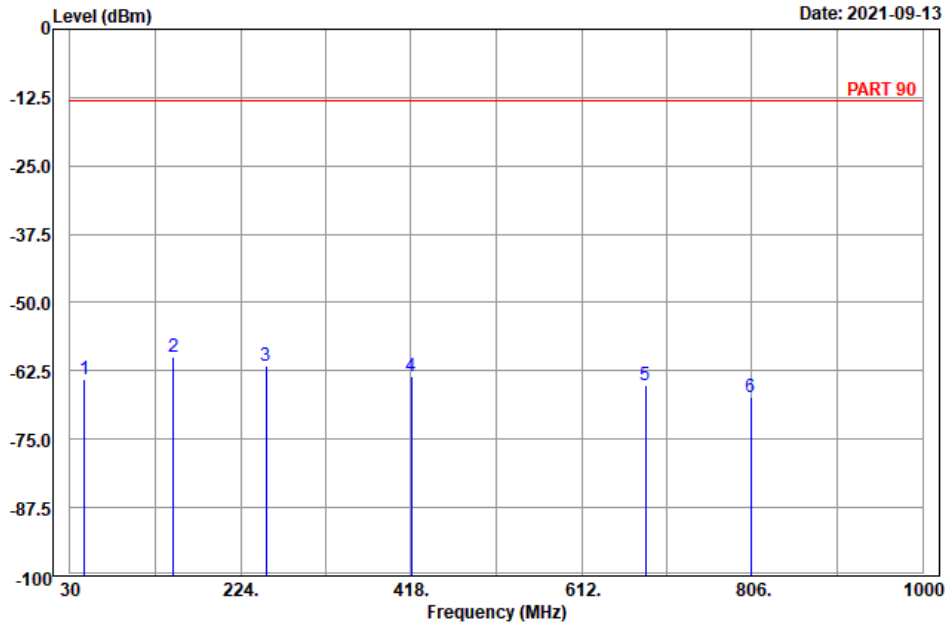


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2021-09-13



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Karl Lee

	Read Freq	Read Level	Limit Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	46.39	-64.08	-51.28	-13.00	-51.08	-12.80	Peak
2	147.26	-59.86	-51.98	-13.00	-46.86	-7.88	Peak
3	253.26	-61.49	-55.96	-13.00	-48.49	-5.53	Peak
4	418.64	-63.42	-60.25	-13.00	-50.42	-3.17	Peak
5	685.16	-65.23	-64.93	-13.00	-52.23	-0.30	Peak
6	804.52	-67.36	-69.33	-13.00	-54.36	1.97	Peak

**Test Mode D**  
**LTE Band 26, Channel Bandwidth 10MHz**  
**Mid Channel**

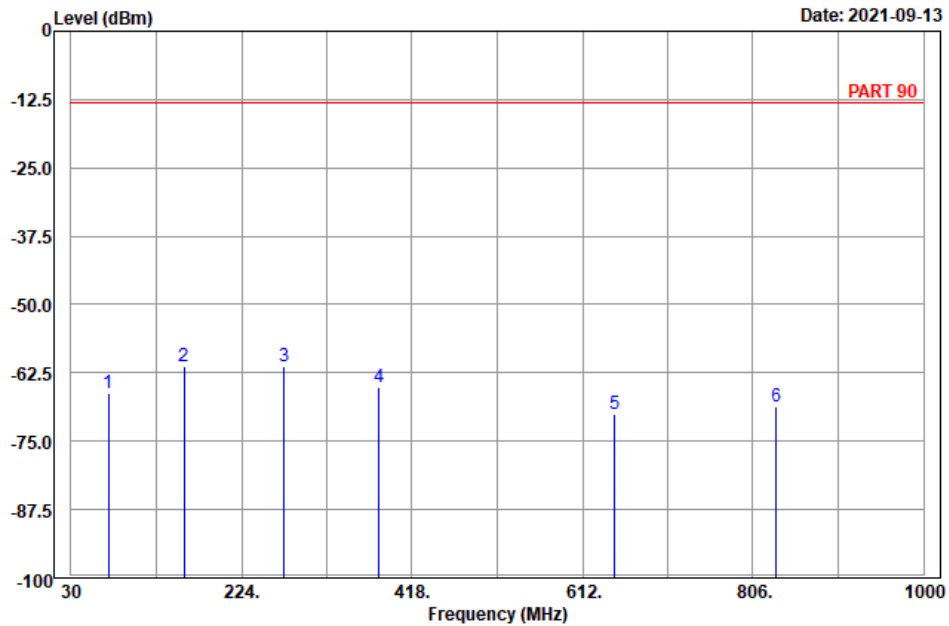


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2021-09-13



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	72.39	-66.29	-53.86	-13.00	-53.29	-12.43	Peak
2	158.52	-61.25	-53.53	-13.00	-48.25	-7.72	Peak
3	272.46	-61.31	-55.60	-13.00	-48.31	-5.71	Peak
4	380.50	-65.05	-61.28	-13.00	-52.05	-3.77	Peak
5	648.60	-69.94	-69.82	-13.00	-56.94	-0.12	Peak
6	832.70	-68.71	-70.35	-13.00	-55.71	1.64	Peak

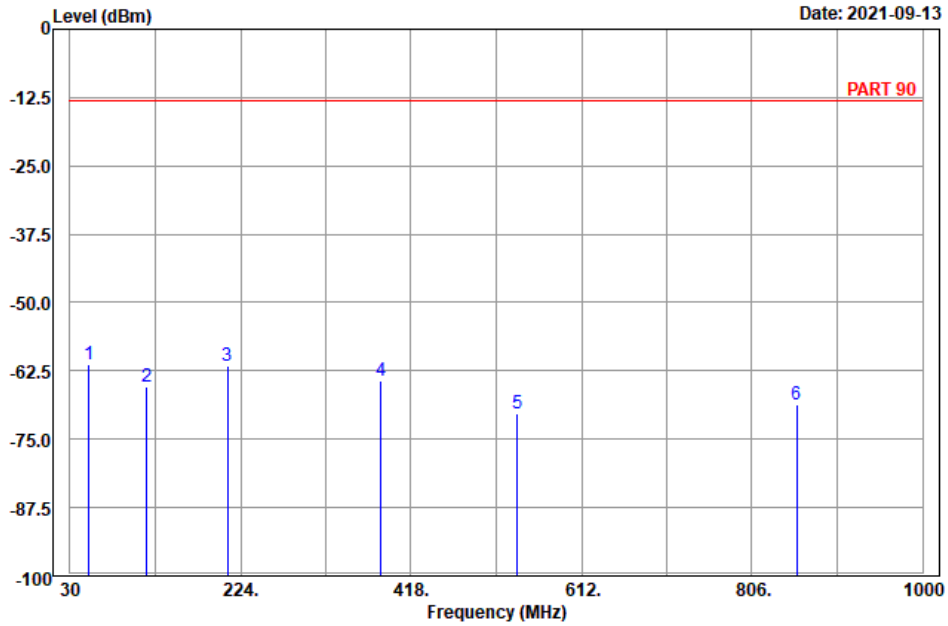


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2021-09-13



Site : 966 chamber 1  
 Condition: PART 90 Vertical  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Karl Lee

	Read Freq	Limit Level	Over Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	51.60	-61.38	-47.33	-13.00	-48.38	-14.05	Peak
2	117.21	-65.46	-57.02	-13.00	-52.46	-8.44	Peak
3	209.28	-61.55	-55.50	-13.00	-48.55	-6.05	Peak
4	384.00	-64.34	-60.77	-13.00	-51.34	-3.57	Peak
5	539.40	-70.24	-67.80	-13.00	-57.24	-2.44	Peak
6	857.20	-68.58	-70.25	-13.00	-55.58	1.67	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 and approved 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

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**Web Site:** [www.bureauveritas-adt.com](http://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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