

# FCC Radio Test Report

## FCC ID: 2AH4HMT4201

This report concerns: Original Grant

**Project No.** : 2104C020  
**Equipment** : LTE Cat-M1 Tracker  
**Brand Name** : Mobilogix  
**Test Model** : MT4201E  
**Series Model** : MT4201C  
**Applicant** : Mobilogix, Inc.  
**Address** : 5500 Trabuco Rd Suite 150 Irvine, CA, USA  
**Manufacturer** : Mobilogix, Inc.  
**Address** : 5500 Trabuco Rd Suite 150 Irvine, CA, USA  
**Factory** : Suga Electronics (Dongguan) Co., Ltd.  
**Address** : No.8 Fulong Road, Qingxi Town, Dongguan City  
**Date of Receipt** : Apr. 28, 2021  
**Date of Test** : Apr. 29, 2021 ~ May 21, 2021  
**Issued Date** : Jun. 07, 2021  
**Report Version** : R00  
**Test Sample** : Engineering Sample No.: DG2021050858  
**Standard(s)** : 47 CFR FCC Part 90 Subpart S  
47 CFR FCC Part 2  
ANSI/TIA/EIA-603-E-2016  
FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

*Vegeta Li*

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**Declaration**

**BTL** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

**BTL's** reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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**BTL** is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

**Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and is not use in determining the Pass/Fail results.

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**REPORT ISSUED HISTORY**

Report Version	Description	Issued Date
R00	Original Issue.	Jun. 07, 2021

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part 90 Subpart S & Part 2			
Standard(s) Section	Test Item	Judgment	Remark
2.1046 & 90.635 (b)	Effective Radiated Power	PASS	-----
2.1049 & 90.209	Occupied Bandwidth	PASS	-----
2.1053 & 90.669	Conducted Spurious Emissions	PASS	-----
2.1053 & 90.669	Radiated Spurious Emissions	PASS	-----
2.1053 & 90.691	Mask Measurements	PASS	-----
-	Peak To Average Ratio	PASS	Record Only
2.1055 & 90.213	Frequency Stability	PASS	-----

Note:

(1) "N/A" denotes test is not applicable in this test report.

### 1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

BTL's Test Firm Registration Number for FCC: 357015

BTL's Designation Number for FCC: CN1240

### 1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

The BTL measurement uncertainty as below table:

#### A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	9KHz ~ 30MHz	V	3.79
		9KHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	4.88
		30MHz ~ 200MHz	H	4.14
		200MHz ~ 1,000MHz	V	4.62
		200MHz ~ 1,000MHz	H	4.80

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB03 (3m)	CISPR	1GHz ~ 6GHz	4.58
		6GHz ~ 18GHz	5.18

#### B. Other Measurement:

Parameter	Uncertainty
Spectrum Bandwidth	±3.8 %
Maximum Output Power	±0.95 dB
Power Spectral Density	±0.86 dB
Frequency Stability	±0.16 dB
Temperature	±0.08 °C
Time	±0.58 %
Supply voltages	±0.3 %

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

### 1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
Output Power & ERP	21.3°C	46%	DC 3.7	Tate Liu
Occupied Bandwidth	21.3°C	46%	DC 3.7	Tate Liu
Conducted Spurious Emissions	21.3°C	46%	DC 3.7	Tate Liu
Radiated Spurious Emissions	26°C	52%	DC 3.7	Grani Zhou
Band Edge	21.3°C	46%	DC 3.7	Tate Liu
Peak to Average Ratio	21.3°C	46%	DC 3.7	Tate Liu
Frequency Stability	Normal & Extreme	46%	Normal & Extreme	Tate Liu

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	LTE Cat-M1 Tracker			
Brand Name	Mobilogix			
Test Model	MT4201E			
Series Model	MT4201C			
Model Difference(s)	Only differ in model name and Harness.			
Hardware Version	1.2			
Software Version	1.5.0.1			
Power Source	1# DC voltage supplied from external power supply. 2# Supplied from battery.			
Power Rating	1# DC 48V 2# DC 3.7V			
IEMI No.	864475040048497			
Category	NB2			
Sub-carrier Spacing	3.75KHz, 15KHz			
Modulation Type	UL: BPSK, QPSK DL: BPSK, QPSK			
Max. ERP	LTE	Sub-carrier Spacing (kHz)	BPSK (dBm)	QPSK (dBm)
	Band 26	3.75	16.11	16.18
		15	16.02	16.03

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Table for Filed Antenna:

Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
N/A	N/A	Internal	N/A	-3.8	LTE Band 26

Note: The antenna gain is provided by the manufacturer.

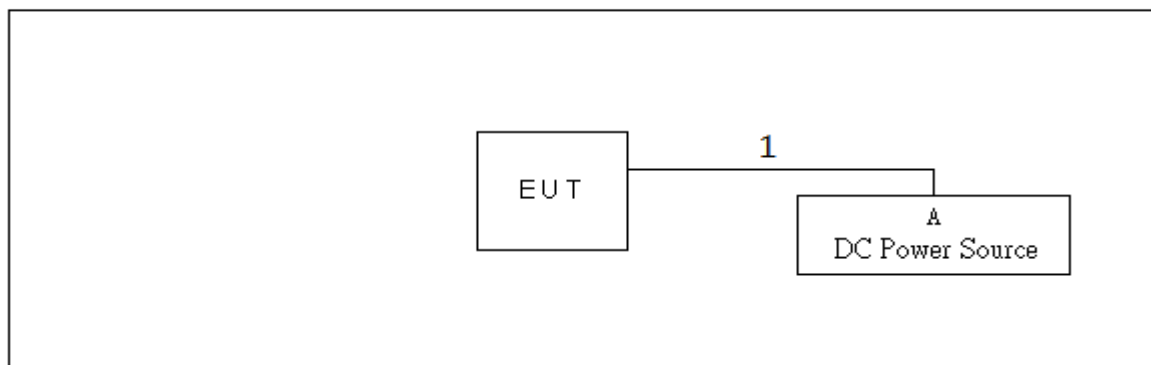


## 2.2 DESCRIPTION OF TEST MODES

Following mode(s) is (were) found to be the worst case(s) and selected for the final test.

LTE Band 26 MODE				
Test Item	Tested Channel	Sub-carrier Spacing(kHz)	Modulation	Mode
Output Power & ERP	26691, 26740, 26789	3.75	BPSK, QPSK	1RB
		15		
Occupied Bandwidth	26691, 26740, 26789	3.75	BPSK, QPSK	1RB
		15		1RB/12RB
Conducted Spurious Emissions	26740	3.75	BPSK, QPSK	1RB
		15		
Radiated Spurious Emissions	26740	3.75	BPSK, QPSK	1RB
		15		
Band Edge	26692, 26788	3.75	BPSK, QPSK	1RB
		15		1RB/12RB
Peak To Average Ratio	26691, 26740, 26789	3.75	BPSK, QPSK	1RB
		15		
Frequency Stability	20925	3.75	BPSK, QPSK	1RB
		15		

### 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



### 2.4 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	DC Power Source	TRUE-POWER	GPC30300N	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.5m

### 3. TEST RESULT

#### 3.1 OUTPUT POWER MEASUREMENT

##### 3.1.1 LIMIT

Mobile / Portable station are limited to 100 watts e.r.p.

##### 3.1.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.0.

##### ERP:

$EIRP = \text{Output Power} + \text{Antenan gain}$

$ERP = EIPR - 2.15\text{dBi}$ .

##### Output Power:

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

##### 3.1.3 TEST SETUP LAYOUT

###### Output Power Measurement



##### 3.1.4 TEST DEVIATION

No deviation

##### 3.1.5 TEST RESULTS

Please refer to the APPENDIX A.

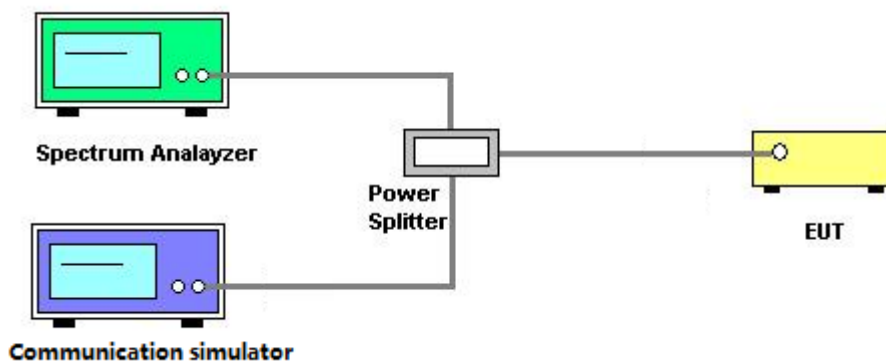
## 3.2 OCCUPIED BANDWIDTH MEASUREMENT

### 3.2.1 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 4.0.

1. The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth and 26dB bandwidth.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3.  $RBW=(1\% \sim 5\%)*EBW$   
 $VBW \geq 3* RBW$
4. Set spectrum analyzer with RMS detector.

### 3.2.2 TEST SETUP LAYOUT



### 3.2.3 TEST DEVIATION

No deviation

### 3.2.4 TEST RESULTS

Please refer to the APPENDIX B.

### 3.3 CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

#### 3.3.1 LIMIT

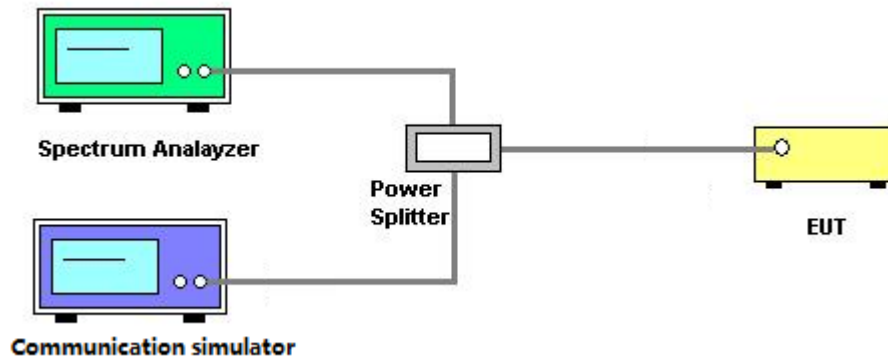
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to -13dBm.

#### 3.3.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set  $RBW \geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

#### 3.3.3 TEST SETUP LAYOUT



#### 3.3.4 TEST DEVIATION

No deviation

#### 3.3.5 TEST RESULTS

Please refer to the APPENDIX C.

### **3.4 RADIATED SPURIOUS EMISSIONS MEASUREMENT**

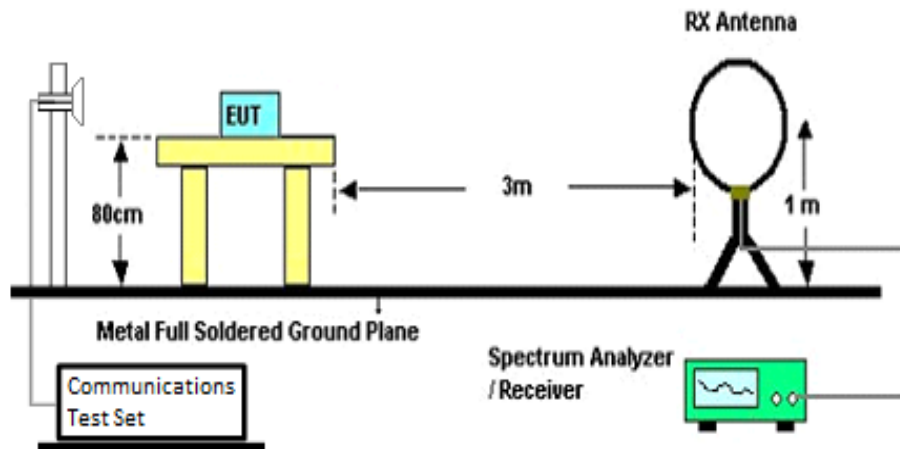
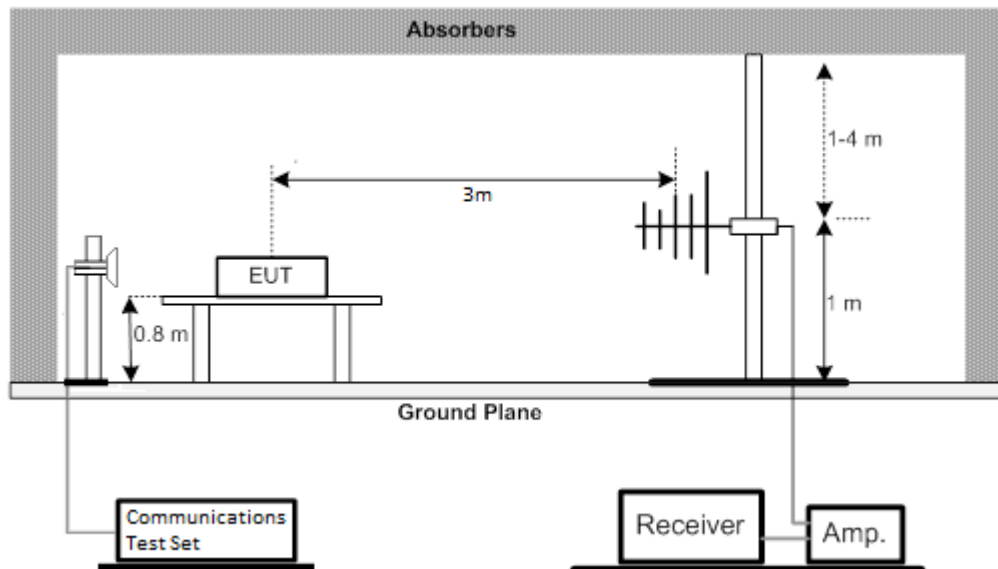
#### **3.4.1 LIMIT**

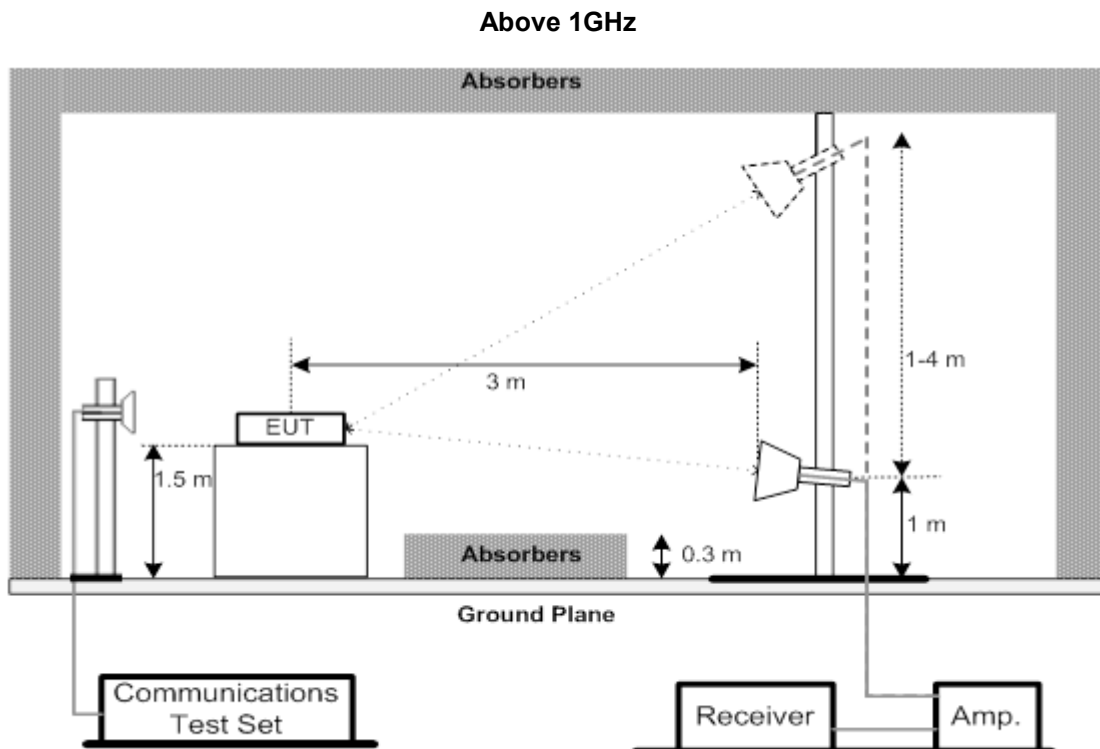
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to -13dBm.

#### **3.4.2 TEST PROCEDURES**

The testing follows FCC KDB 971168 v03r01 Section 5.8.

1. In the semi-anechoic chamber, EUT placed on the 0.8m 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.
2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
3.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ .
4. ERP can be calculated form EIRP by subtracting the gain of dipole,  $ERP = EIPR - 2.15\text{dBi}$ .
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

**3.4.3 TEST SETUP LAYOUT****Below 30MHz****30MHz to 1000MHz**



### 3.4.4 TEST DEVIATION

No deviation

### 3.4.5 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the APPENDIX D.

### 3.4.6 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the APPENDIX E.

### 3.4.7 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the APPENDIX F.



### 3.5 MASK MEASUREMENTS

#### 3.5.1 LIMIT

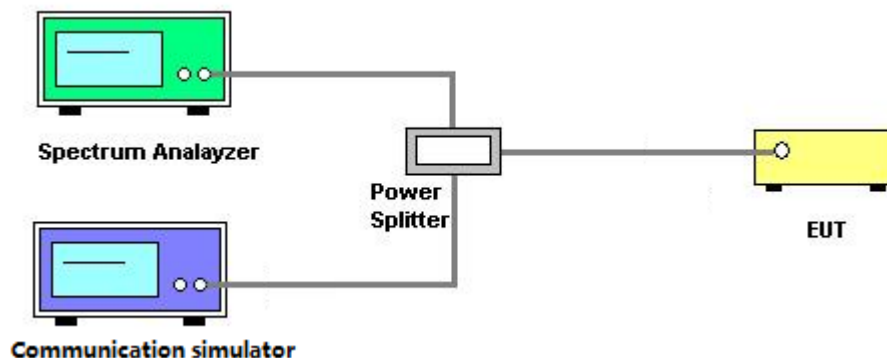
According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \text{ Log}_{10}(f/6.1)$  decibels 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.

#### 3.5.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.0.

1. All measurements were done at low and high operational frequency range.
2. Set RBW=1% of 26dBc bandwidth, VBW=3 X RBW, detector=RMS, Sweep time = Auto. For Section 90.691(a) compliance testing, use RBW = 300 Hz for offsets less than 37.5 kHz from a channel edge; RBW = 100 kHz for offsets greater than 37.5 kHz is allowed.
3. Record the max trace plot into the test report.

#### 3.5.3 TEST SETUP LAYOUT



#### 3.5.4 TEST DEVIATION

No deviation

#### 3.5.5 TEST RESULTS

Please refer to the APPENDIX G.

### 3.6 PEAK TO AVERAGE RATIO MEASUREMENT

#### 3.6.1 LIMIT

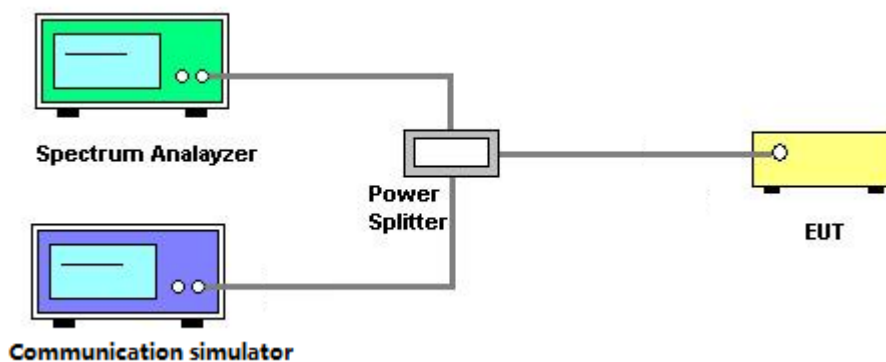
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

#### 3.6.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.7.

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

#### 3.6.3 TEST SETUP LAYOUT



#### 3.6.4 TEST DEVIATION

No deviation

#### 3.6.5 TEST RESULTS

Please refer to the APPENDIX H.

### 3.7 FREQUENCY STABILITY MEASUREMENT

#### 3.7.1 LIMIT

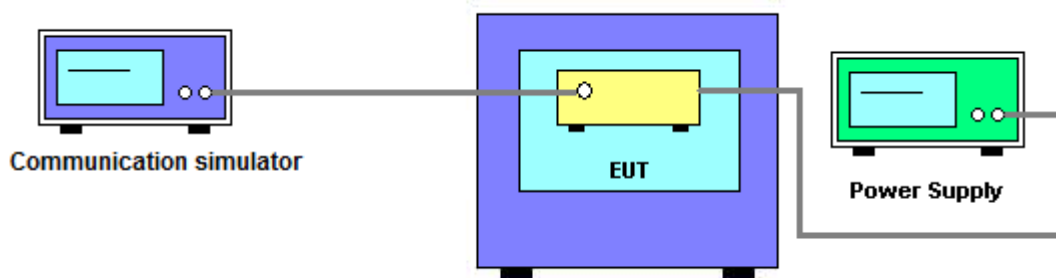
$\pm 1.5$  ppm is for base and fixed station.  $\pm 2.5$  ppm is for mobile station.

#### 3.7.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 9.0.

1. 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.
2. 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.
3. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
4. The frequency error was recorded frequency error from the communication simulator.

#### 3.7.3 TEST SETUP LAYOUT



#### 3.7.4 TEST DEVIATION

No deviation

#### 3.7.5 TEST RESULTS

Please refer to the APPENDIX I.

#### 4. LIST OF MEASUREMENT EQUIPMENTS

Radiated Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 15, 2022
2	Amplifier	Agilent	8449B	3008A02334	Feb. 27, 2022
3	HighPass Filter	Wairwright Instruments Gmbh	WHK 1.5/15G-10ST	11	Feb. 27, 2022
4	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 1710/1785-1690/1805-60/ 12SS	38	Feb. 27, 2022
5	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 824/849-810/863-60/9SS	7	Feb. 27, 2022
6	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 880/915-860/935-60/9SS	14	Feb. 27, 2022
7	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 1850/1910-1830/1930-60/ 10SS	17	Feb. 27, 2022
8	HighPass Filter	Wairwright Instruments Gmbh	WHK3.1/18G-10SS	24	Feb. 27, 2022
9	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
10	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Feb. 28, 2022
11	Receiver	Agilent	N9038A	MY52130039	Jul. 25, 2021
12	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
13	High pass filter	KANGMAIWEI	ZHPF-M3-12.75G-3869	B2015073763	Feb. 07, 2022
14	High pass filter	KANGMAIWEI	ZHPF-M1000-4000-1	B2015073762	Feb. 07, 2022
15	High pass filter	KANGMAIWEI	ZHPF-M6-186-1727	B2015073764	Feb. 07, 2022
16	Cable	emci	LMR-400(30MHz-1GHz) (8m+5m)	N/A	May 23, 2021
17	Cable	mitron	B10-01-01-12M	18072744	Jun. 28, 2021
18	Controller	ETS-Lindgren	2090	N/A	N/A
19	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
20	Loop Antenna	EM	EM-6876-1	230	Apr. 28, 2022
21	Double Ridged Guide Antenna	ETS	3115	75846	Mar. 17, 2022
22	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jul. 07, 2021

Conducted Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Feb. 28, 2022
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2*	Multi-output DC Power Supply	GW Instek	GPC-3030DN	EK880675	Jul. 25, 2023
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
5	Const Temp, & Humidity Chamber	Bell	BTH-50C	20170306001	Feb. 27, 2022

Remark: "N/A" denotes no model name, serial no. or calibration specified.

"\*" calibration period of equipment list is three year.

Except \* item, all calibration period of equipment list is one year.

## APPENDIX A - OUTPUT POWER

**Output Power (dBm):**

LTE Band	Sub-carrier Spacing (kHz)	Modulation	N <sub>tones</sub>	Tone offset	Low CH	Mid CH	High CH
					CH26691	CH26740	CH26789
					814.1MHz	819MHz	823.9MHz
26	3.75	BPSK	1	0	22.06	21.99	21.88
			1	47	21.98	21.95	21.90
		QPSK	1	0	22.10	22.13	22.03
			1	47	21.99	21.93	21.99
	15	BPSK	1	0	21.15	21.02	21.12
			1	11	21.05	21.97	21.04
		QPSK	1	0	21.23	21.22	21.18
			1	11	21.13	21.14	21.12

**ERP (dBm):**

LTE Band	Sub-carrier Spacing (kHz)	Modulation	N <sub>tones</sub>	Tone offset	Low CH	Mid CH	High CH
					CH26691	CH26740	CH26789
					814.1MHz	819MHz	823.9MHz
26	3.75	BPSK	1	0	16.11	16.04	15.93
			1	47	16.03	16.00	15.95
		QPSK	1	0	16.15	16.18	16.08
			1	47	16.04	15.98	16.04
	15	BPSK	1	0	15.20	15.07	15.17
			1	11	15.10	16.02	15.09
		QPSK	1	0	15.28	15.27	15.23
			1	11	15.18	15.19	15.17

## APPENDIX B - OCCUPIED BANDWIDTH

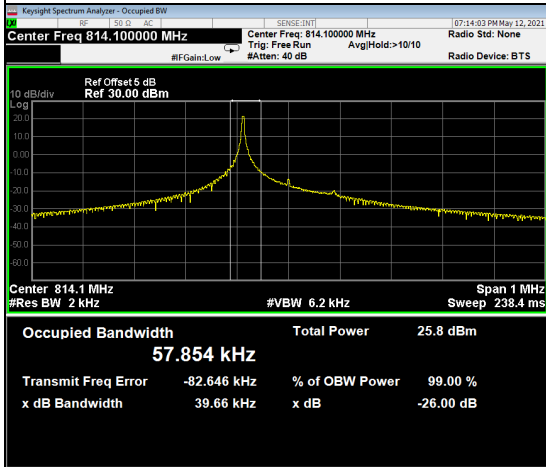


LTE Band 26_3.75KHz					
BPSK			1RB#0		
Channel	Frequency (MHz)	99% Occupied Bandwidth (KHz)	Channel	Frequency (MHz)	26dB Bandwidth (KHz)
26691	814.1	57.854	26691	814.1	39.66
26740	819	57.786	26740	819	40.70
20789	823.9	57.584	20789	823.9	41.25
QPSK			1RB#0		
Channel	Frequency (MHz)	99% Occupied Bandwidth (KHz)	Channel	Frequency (MHz)	26dB Bandwidth (KHz)
26691	814.1	64.141	26691	814.1	39.70
26740	819	68.039	26740	819	43.12
20789	823.9	63.310	20789	823.9	39.73

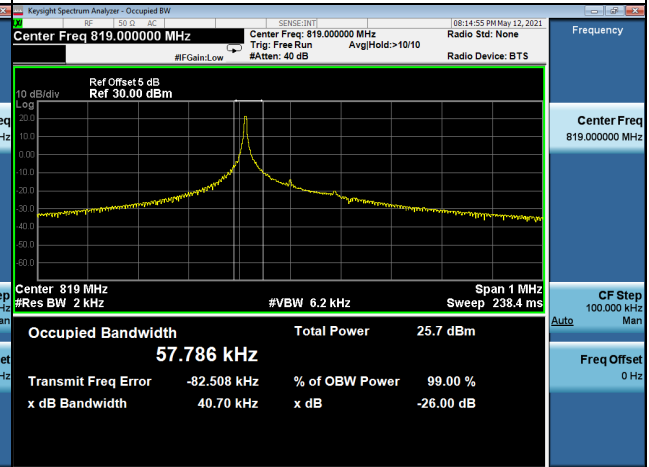
## Spectrum Plot

1RB#0

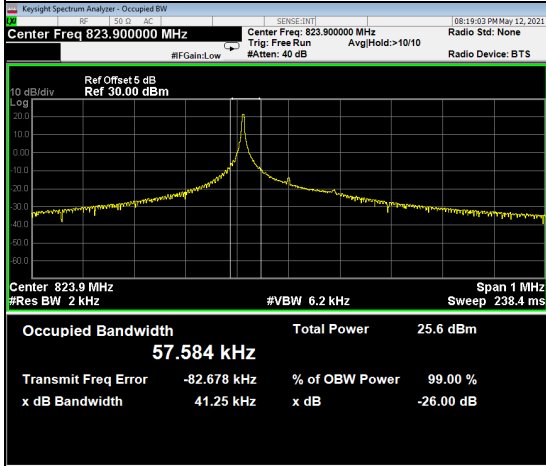
### BPSK-26691



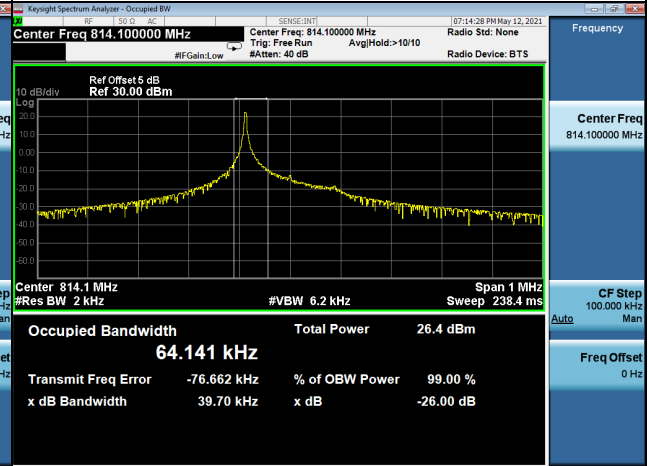
### BPSK-26740



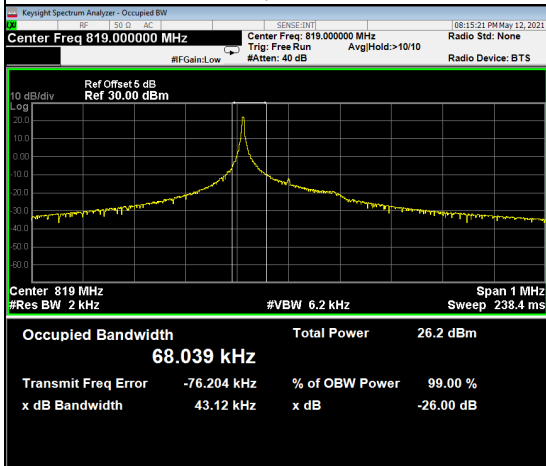
### BPSK-26789



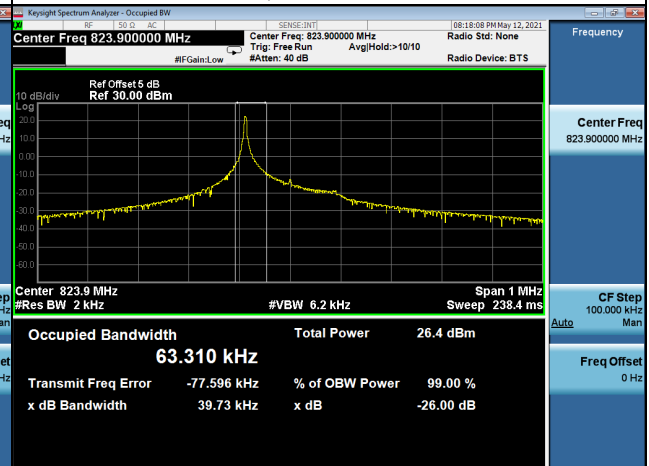
### QPSK-26691



### QPSK-26740



### QPSK-26789

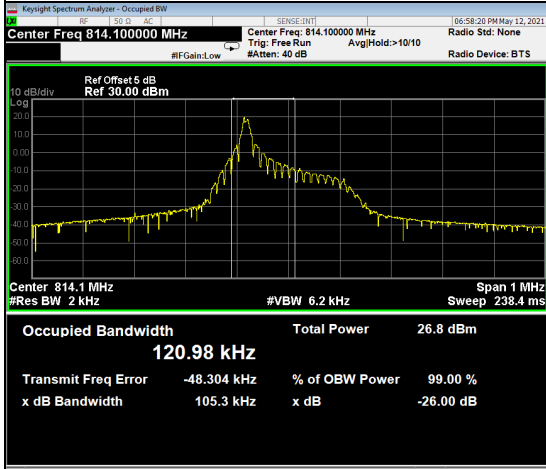


LTE Band 26_15KHz					
BPSK			1RB#0		
Channel	Frequency (MHz)	99% Occupied Bandwidth (KHz)	Channel	Frequency (MHz)	26dB Bandwidth (KHz)
26691	814.1	120.98	26691	814.1	105.3
26740	819	121.25	26740	819	106.7
20789	823.9	119.32	20789	823.9	104.6
QPSK			1RB#0		
Channel	Frequency (MHz)	99% Occupied Bandwidth (KHz)	Channel	Frequency (MHz)	26dB Bandwidth (KHz)
26691	814.1	116.04	26691	814.1	116.3
26740	819	118.52	26740	819	118.5
20789	823.9	118.28	20789	823.9	103.6
QPSK			12RB#0		
Channel	Frequency (MHz)	99% Occupied Bandwidth (KHz)	Channel	Frequency (MHz)	26dB Bandwidth (KHz)
26691	814.1	185.53	26691	814.1	257.6
26740	819	183.10	26740	819	223.8
20789	823.9	189.78	20789	823.9	250.4

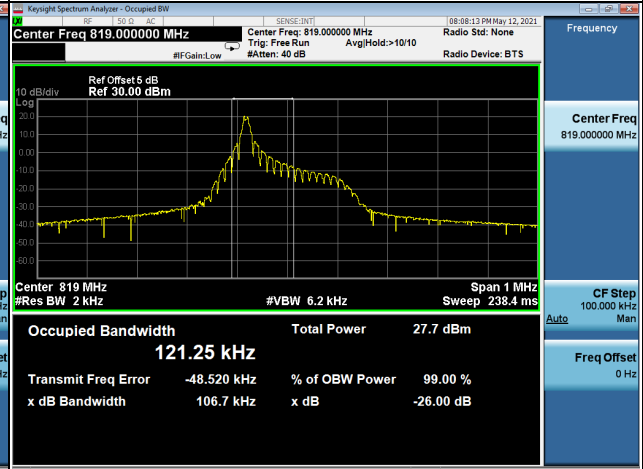
## Spectrum Plot

1RB#0

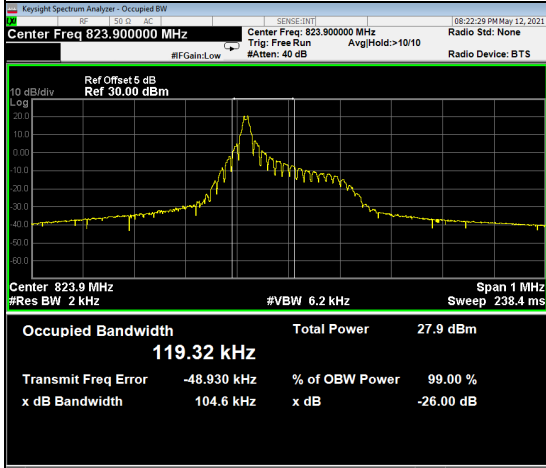
### BPSK-26691



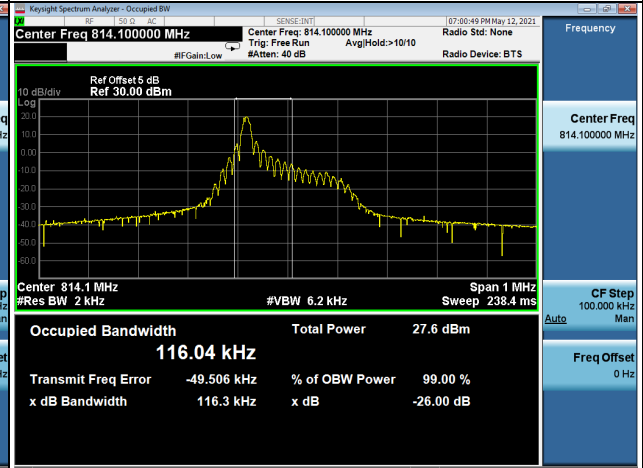
### BPSK-26740



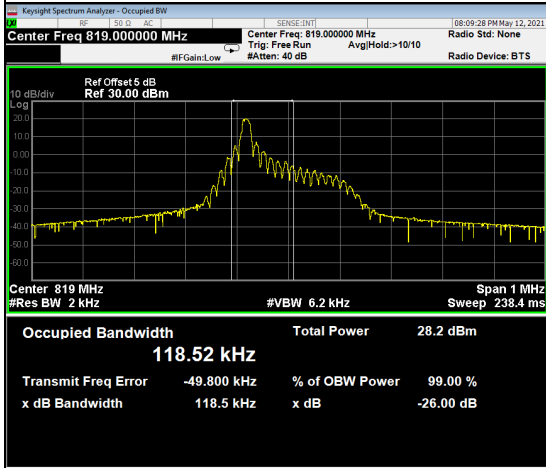
### BPSK-20789



### QPSK-26691



### QPSK-26740



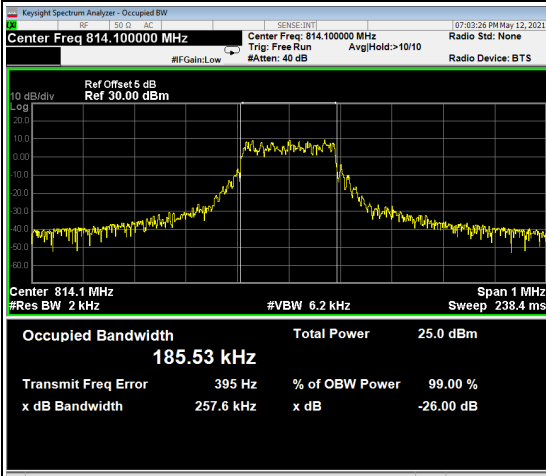
### QPSK-20789



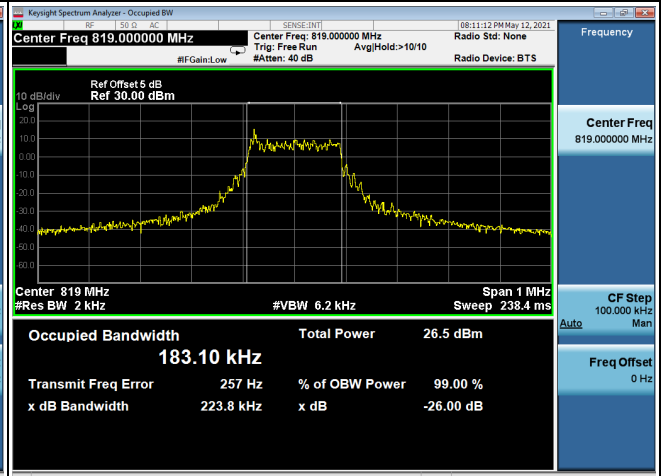
## Spectrum Plot

12RB#0

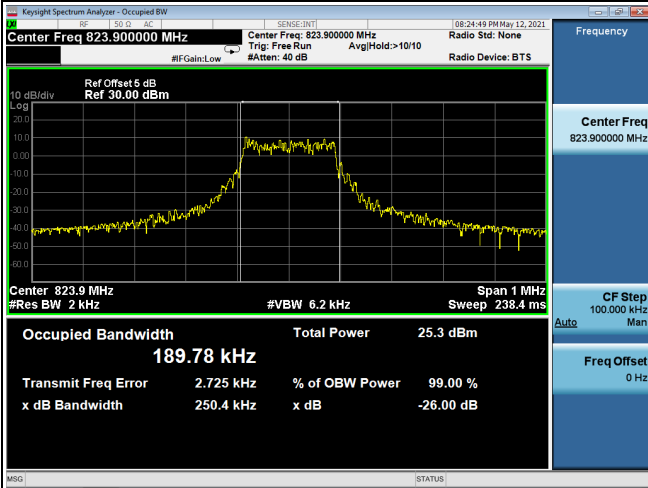
### QPSK-26691



### QPSK-26925



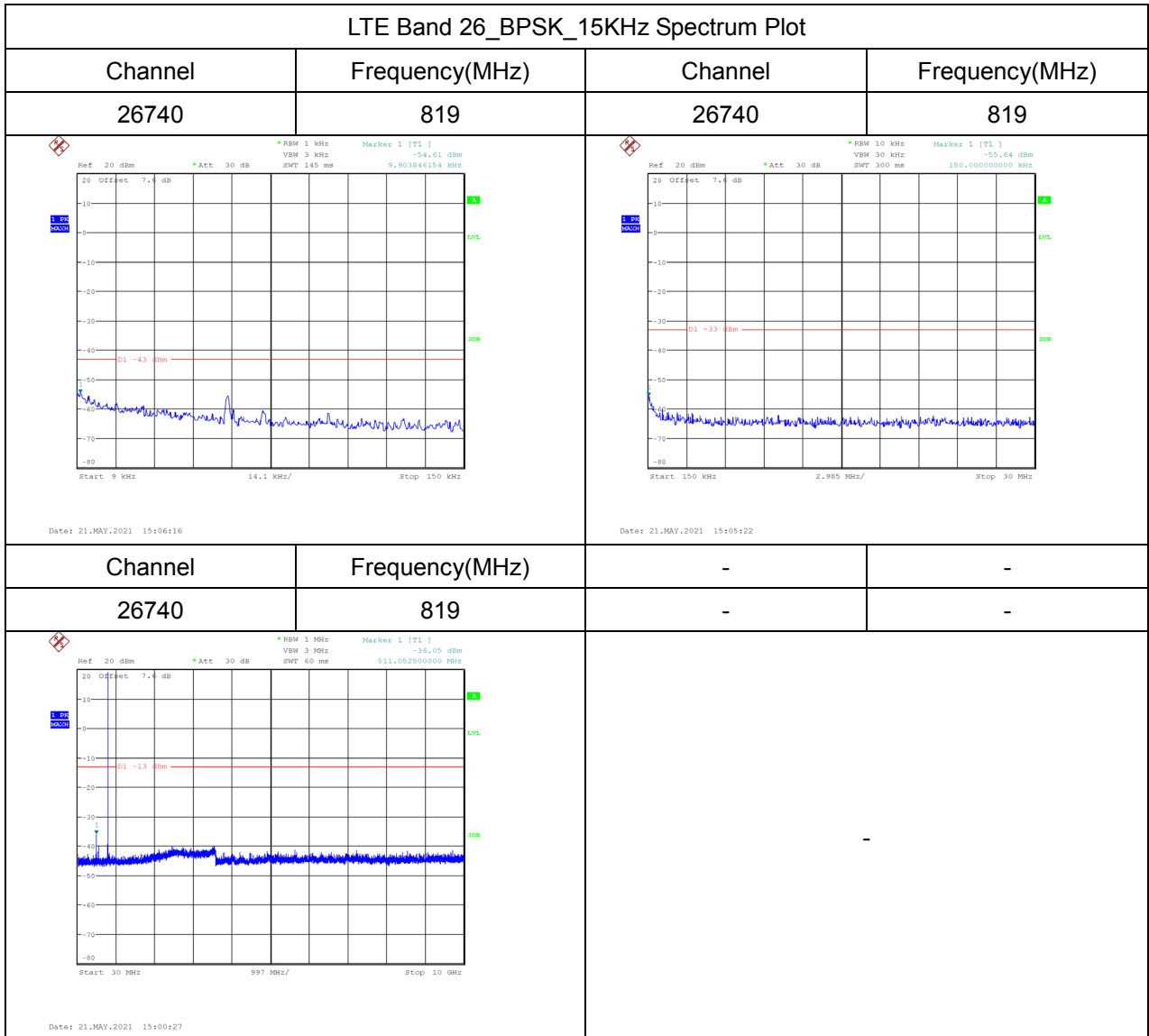
### QPSK-20789



## **APPENDIX C - CONDUCTED SPURIOUS EMISSIONS**

## LTE Band 26\_BPSK\_3.75KHz Spectrum Plot

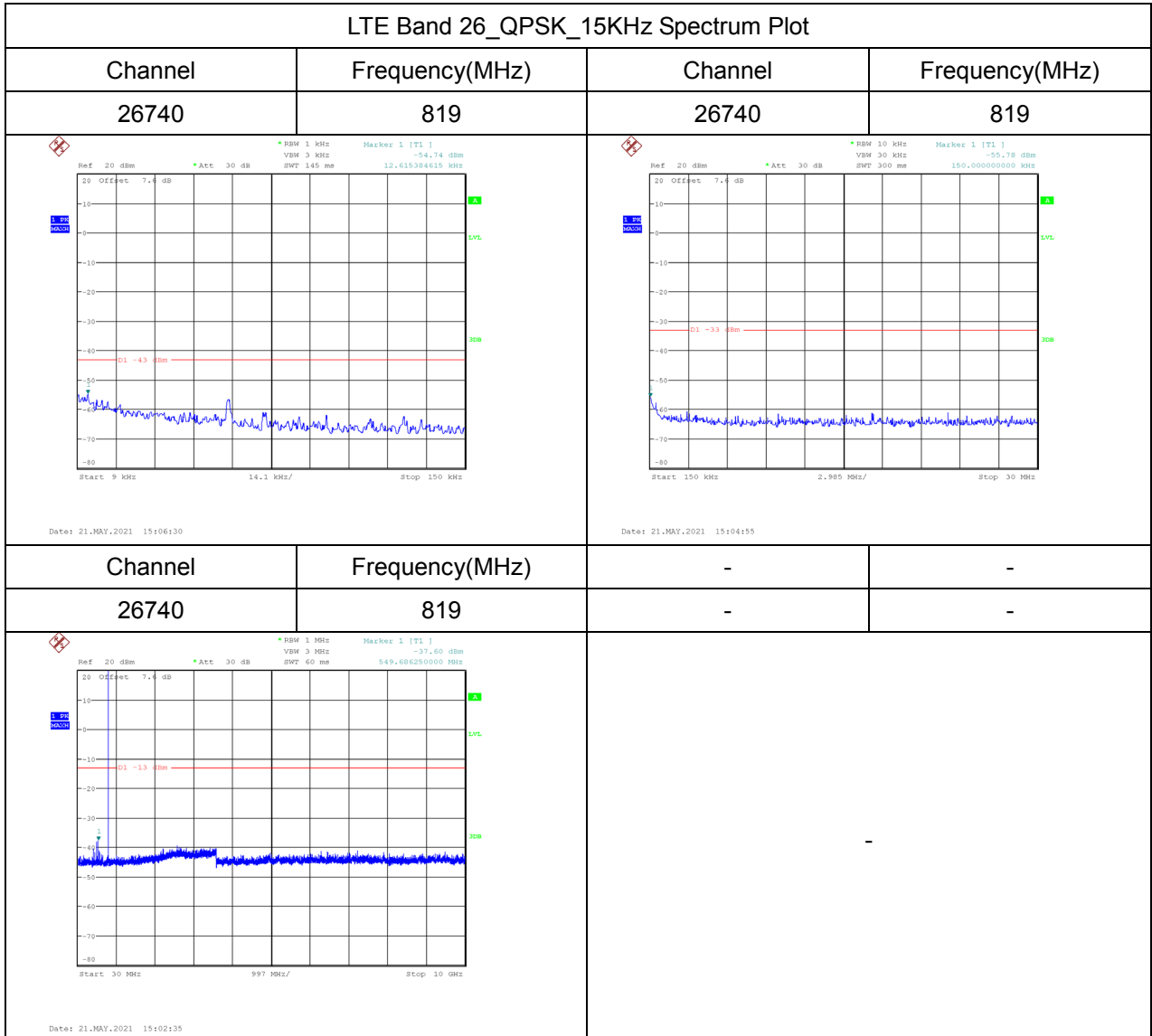
Channel	Frequency(MHz)	Channel	Frequency(MHz)
26740	819	26740	819
Channel	Frequency(MHz)	-	-
26740	819	-	-





## LTE Band 26\_QPSK\_3.75KHz Spectrum Plot

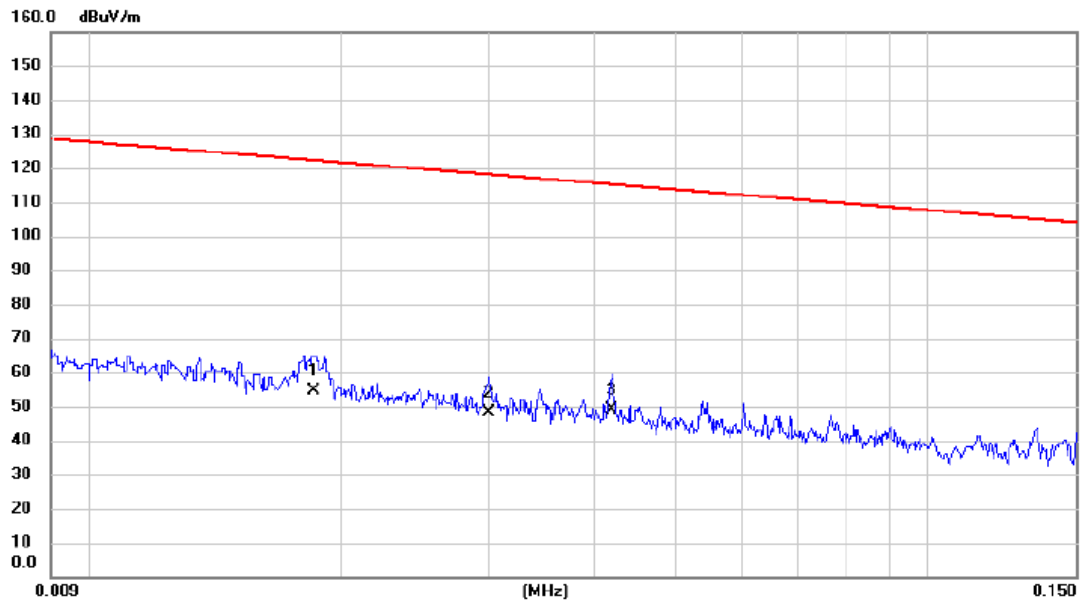
Channel	Frequency(MHz)	Channel	Frequency(MHz)
26740	819	26740	819
Date: 21.MAY.2021 14:50:49		Date: 21.MAY.2021 14:47:35	
Channel	Frequency(MHz)	-	-
26740	819	-	-
		-	
Date: 21.MAY.2021 14:58:06			



**APPENDIX D - RADIATED SPURIOUS EMISSIONS (9KHZ TO 30MHZ)**

Test Mode	TX Mode
-----------	---------

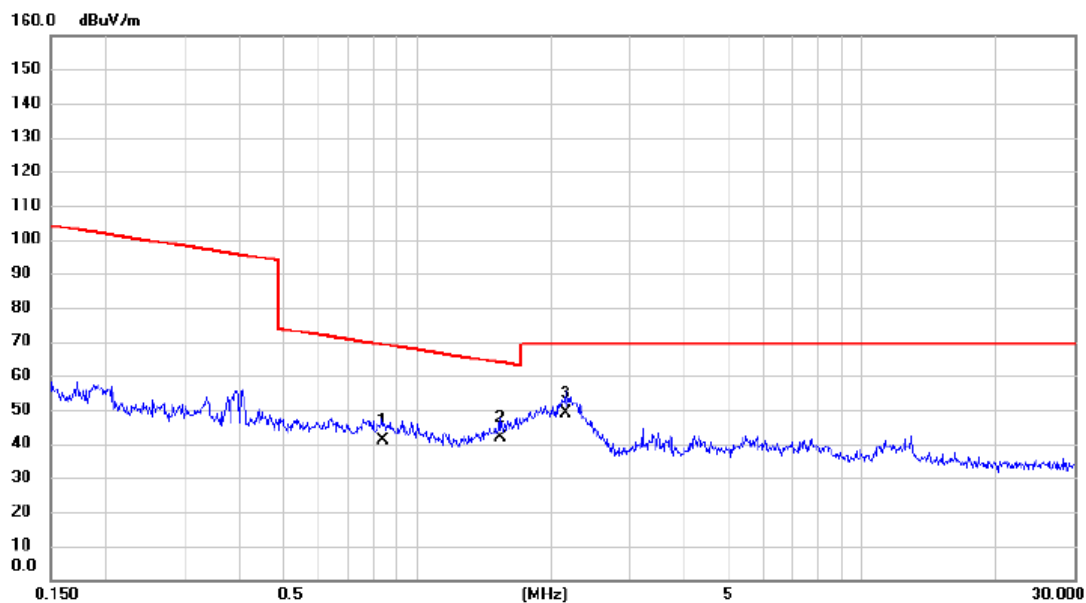
Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		0.0185	40.88	13.68	54.56	122.26	-67.70	AVG	
2		0.0300	35.19	12.95	48.14	118.06	-69.92	AVG	
3	*	0.0420	36.24	12.63	48.87	115.14	-66.27	AVG	

Test Mode	TX Mode
-----------	---------

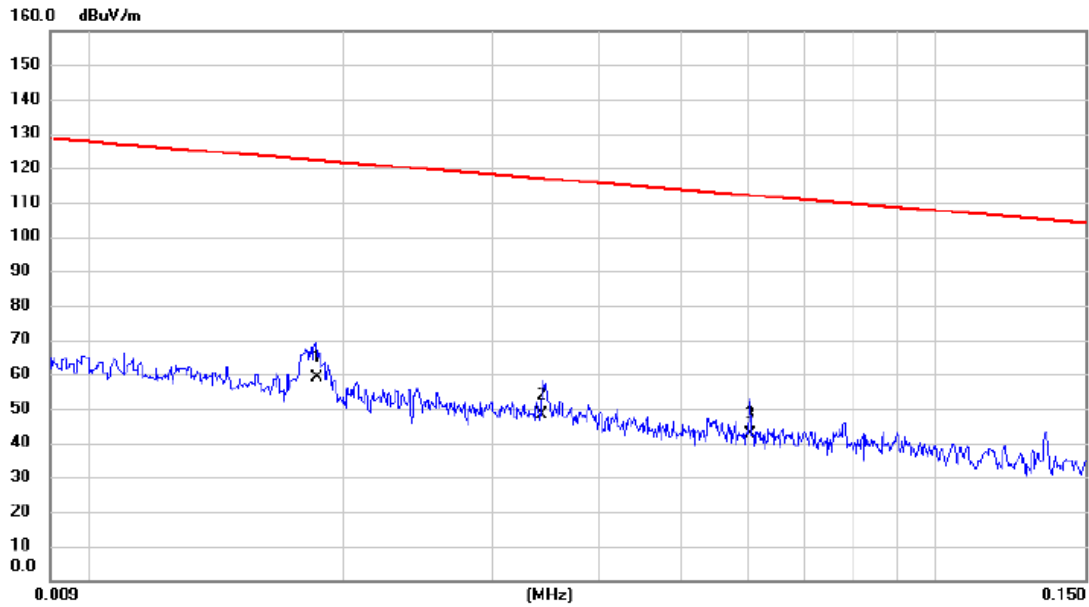
**Ant 0°**



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		0.8350	28.98	11.87	40.85	69.17	-28.32	QP	
2		1.5355	30.24	11.53	41.77	63.88	-22.11	QP	
3	*	2.1552	37.65	11.23	48.88	69.54	-20.66	QP	

Test Mode	TX Mode
-----------	---------

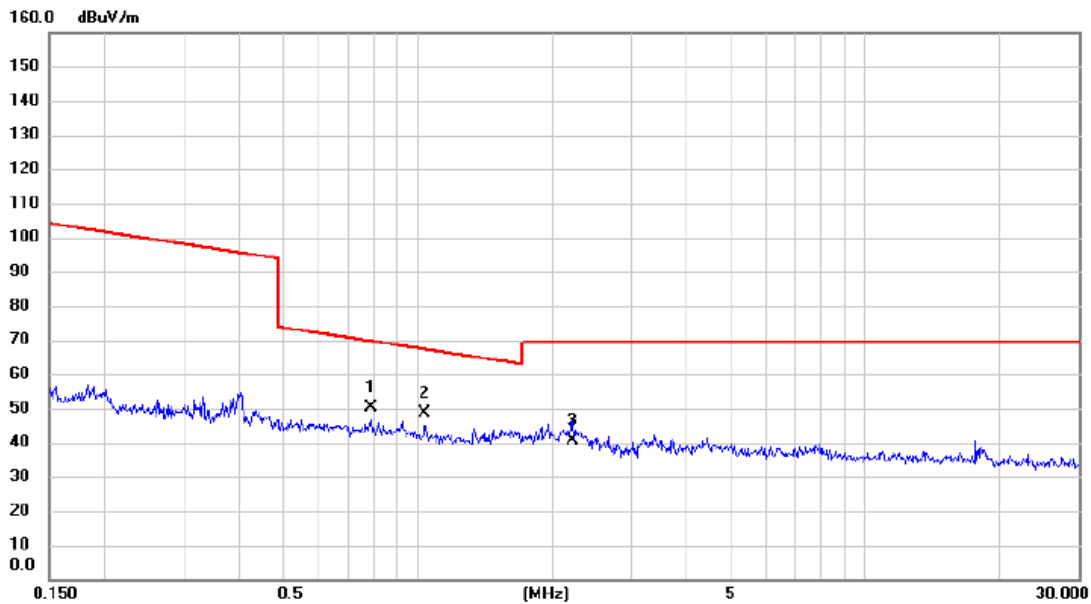
**Ant 90°**



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	0.0186	45.18	13.65	58.83	122.21	-63.38	AVG	
2		0.0343	35.27	12.84	48.11	116.90	-68.79	AVG	
3		0.0603	30.06	12.48	42.54	112.00	-69.46	AVG	

Test Mode	TX Mode
-----------	---------

**Ant 90°**

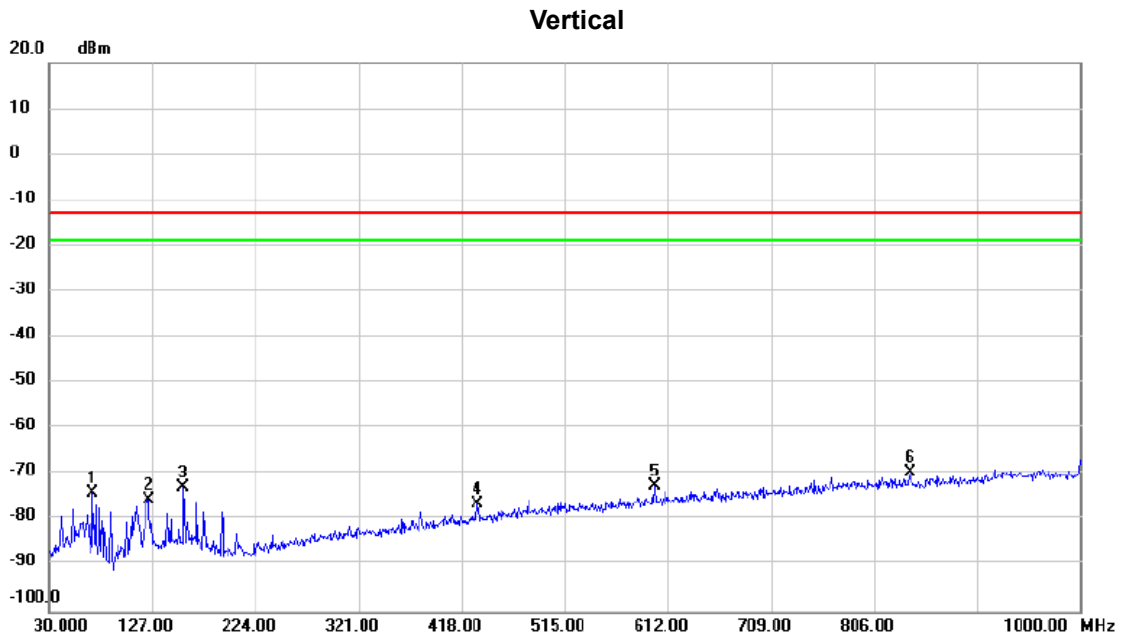


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		0.7876	38.41	11.88	50.29	69.68	-19.39	QP	
2	*	1.0374	36.74	11.78	48.52	67.29	-18.77	QP	
3		2.2250	29.25	11.20	40.45	69.54	-29.09	QP	

## **APPENDIX E - RADIATED SPURIOUS EMISSIONS (30MHZ TO 1000MHZ)**

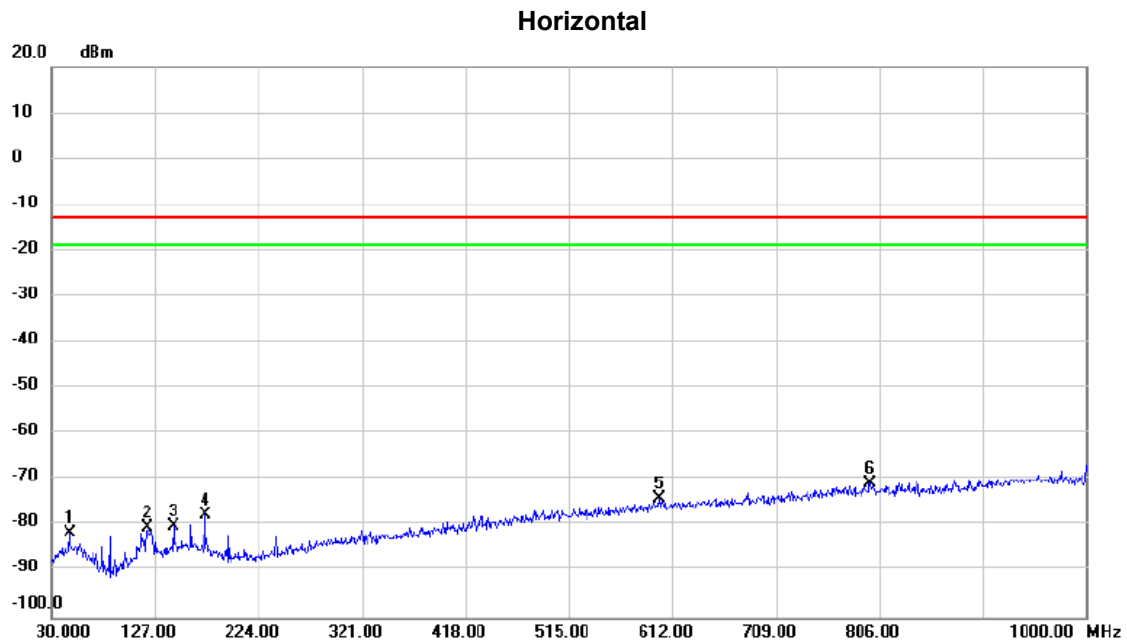


Test Mode LTE Band 26\_BPSK\_TX CH26740\_3.75KHz



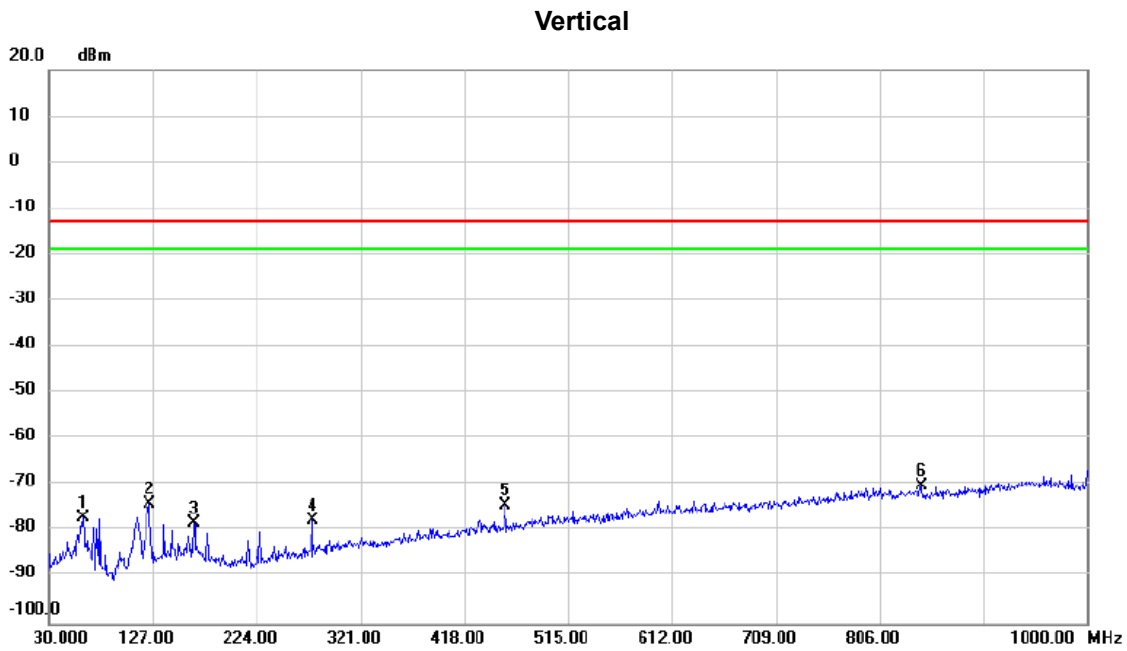
No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		70.255	-57.82	-16.27	-74.09	-13.00	-61.09	peak	
2		123.120	-61.57	-13.92	-75.49	-13.00	-62.49	peak	
3		156.585	-60.32	-12.45	-72.77	-13.00	-59.77	peak	
4		433.035	-68.47	-7.88	-76.35	-13.00	-63.35	peak	
5		599.875	-67.97	-4.55	-72.52	-13.00	-59.52	peak	
6	*	839.950	-68.87	-0.65	-69.52	-13.00	-56.52	peak	

Test Mode | LTE Band 26\_BPSK\_TX CH26740\_3.75KHz



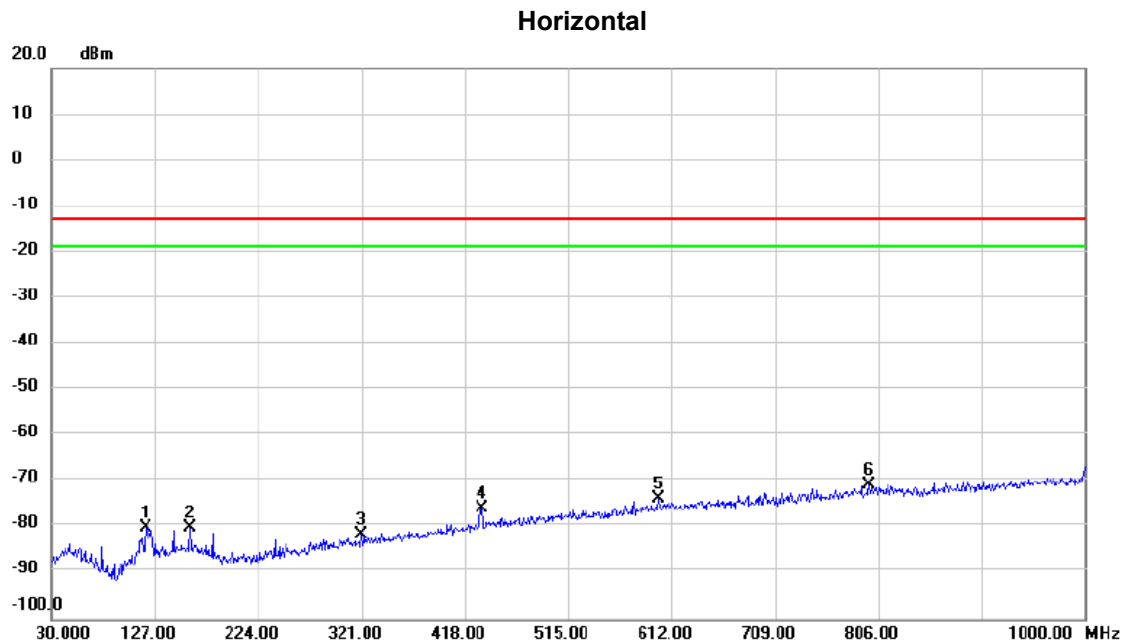
No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		46.975	-67.75	-13.89	-81.64	-13.00	-68.64	peak	
2		119.240	-66.11	-14.22	-80.33	-13.00	-67.33	peak	
3		143.975	-67.16	-12.78	-79.94	-13.00	-66.94	peak	
4		174.045	-64.69	-13.01	-77.70	-13.00	-64.70	peak	
5		599.875	-69.44	-4.55	-73.99	-13.00	-60.99	peak	
6	*	797.270	-70.01	-0.75	-70.76	-13.00	-57.76	peak	

Test Mode LTE Band 26\_BPSK\_TX CH26740\_15KHz



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		61.525	-62.27	-14.69	-76.96	-13.00	-63.96	peak	
2		123.605	-60.19	-13.89	-74.08	-13.00	-61.08	peak	
3		165.315	-65.91	-12.48	-78.39	-13.00	-65.39	peak	
4		275.895	-65.89	-11.81	-77.70	-13.00	-64.70	peak	
5		456.315	-67.20	-7.29	-74.49	-13.00	-61.49	peak	
6	*	844.800	-69.50	-0.64	-70.14	-13.00	-57.14	peak	

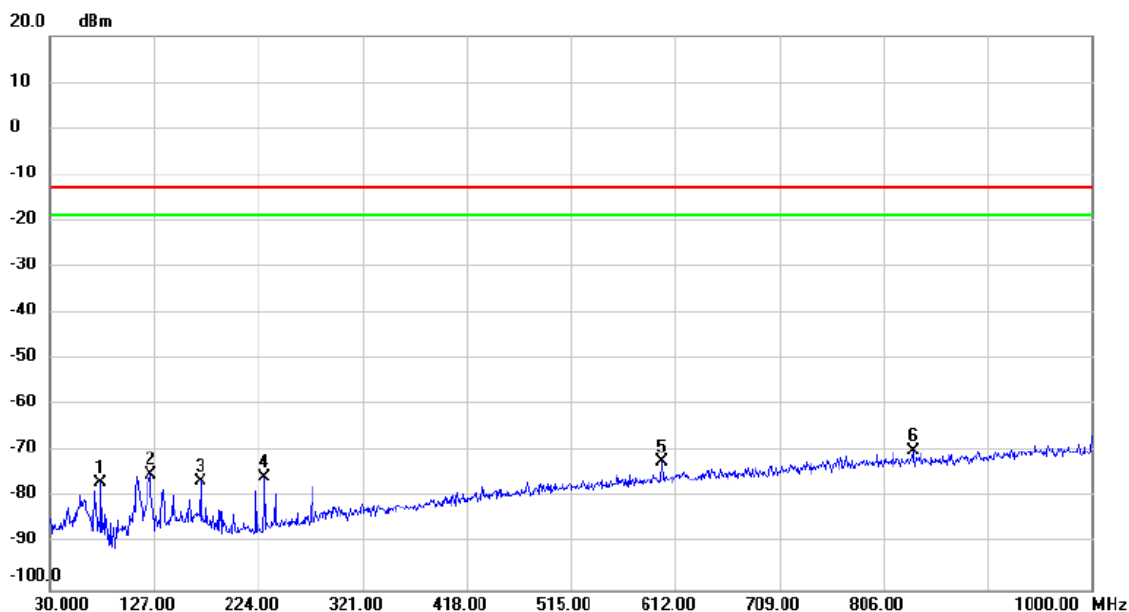
Test Mode | LTE Band 26\_BPSK\_TX CH26740\_15KHz



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		118.755	-65.73	-14.27	-80.00	-13.00	-67.00	peak	
2		159.980	-67.71	-12.37	-80.08	-13.00	-67.08	peak	
3		320.030	-71.02	-10.52	-81.54	-13.00	-68.54	peak	
4		433.520	-67.98	-7.86	-75.84	-13.00	-62.84	peak	
5		599.875	-69.14	-4.55	-73.69	-13.00	-60.69	peak	
6	*	797.755	-70.10	-0.74	-70.84	-13.00	-57.84	peak	

Test Mode | LTE Band 26\_QPSK\_TX CH26740\_3.75KHz

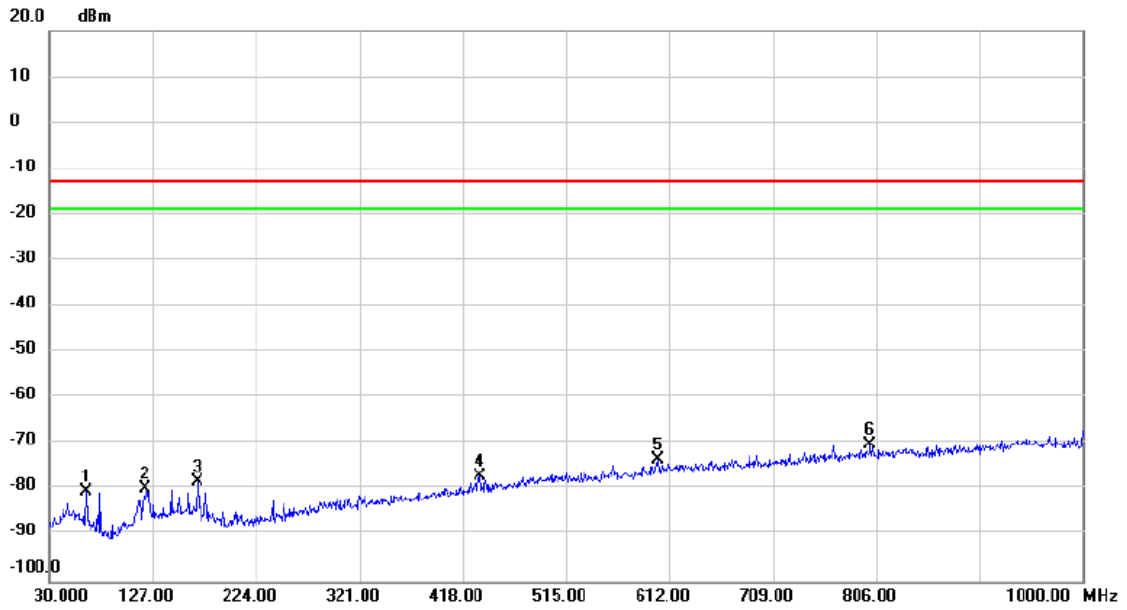
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		77.530	-59.02	-17.86	-76.88	-13.00	-63.88	peak	
2		123.120	-61.00	-13.92	-74.92	-13.00	-61.92	peak	
3		169.680	-63.87	-12.57	-76.44	-13.00	-63.44	peak	
4		229.820	-61.51	-13.94	-75.45	-13.00	-62.45	peak	
5		599.875	-67.70	-4.55	-72.25	-13.00	-59.25	peak	
6	*	833.160	-69.11	-0.66	-69.77	-13.00	-56.77	peak	

Test Mode | LTE Band 26\_QPSK\_TX CH26740\_3.75KHz

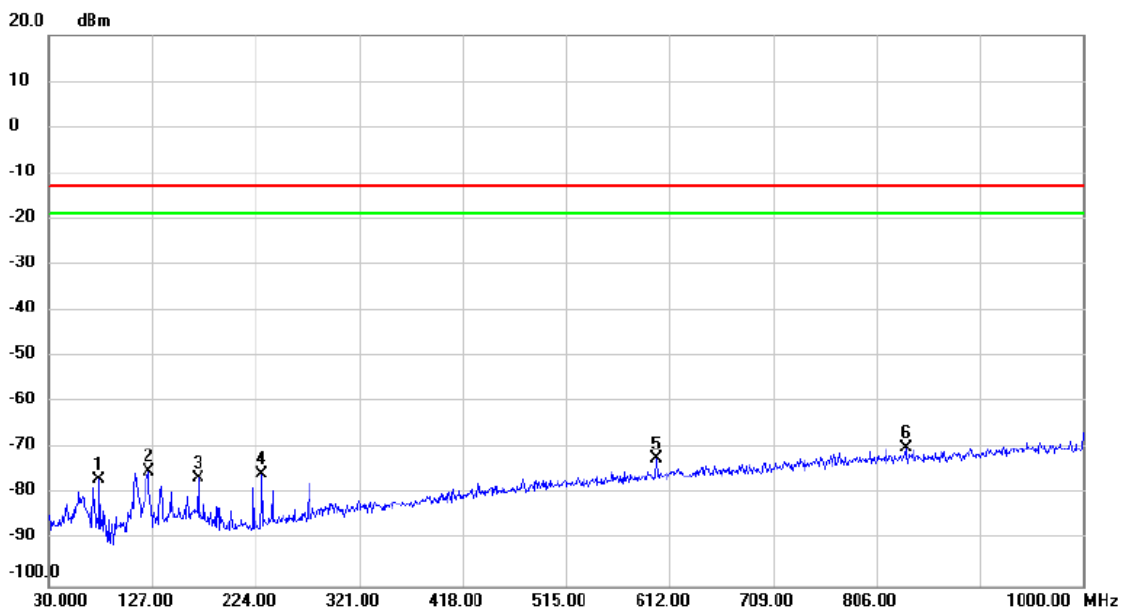
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		63.950	-65.18	-15.06	-80.24	-13.00	-67.24	peak	
2		120.210	-65.71	-14.15	-79.86	-13.00	-66.86	peak	
3		168.710	-65.77	-12.55	-78.32	-13.00	-65.32	peak	
4		433.520	-69.24	-7.86	-77.10	-13.00	-64.10	peak	
5		600.360	-68.89	-4.55	-73.44	-13.00	-60.44	peak	
6	*	800.180	-69.40	-0.68	-70.08	-13.00	-57.08	peak	

Test Mode LTE Band 26\_QPSK\_TX CH26740\_15KHz

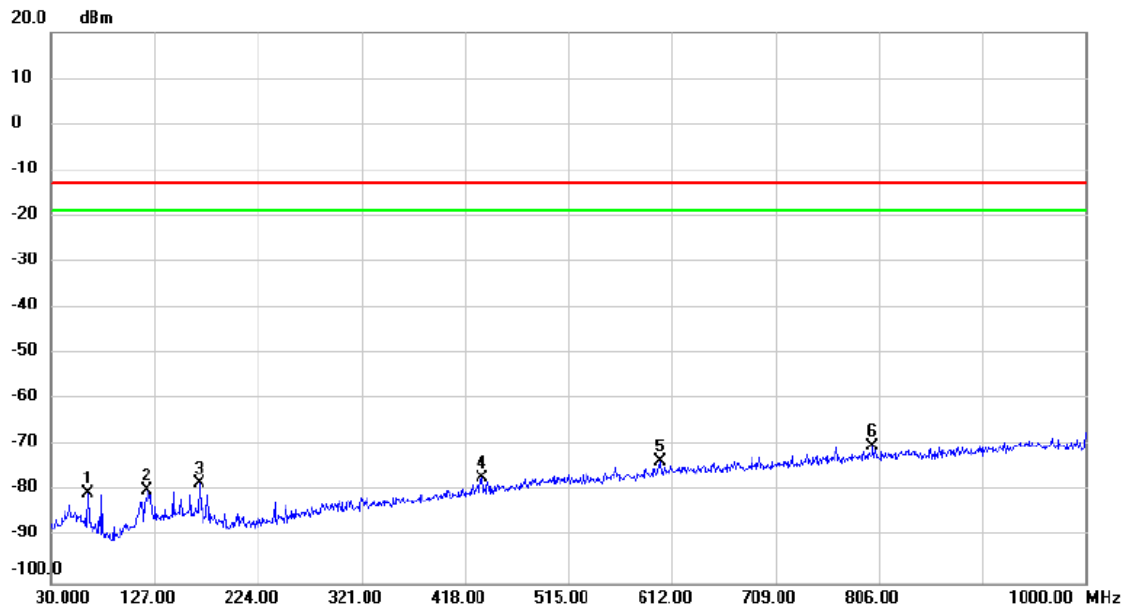
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		77.530	-59.02	-17.86	-76.88	-13.00	-63.88	peak	
2		123.120	-61.00	-13.92	-74.92	-13.00	-61.92	peak	
3		169.680	-63.87	-12.57	-76.44	-13.00	-63.44	peak	
4		229.820	-61.51	-13.94	-75.45	-13.00	-62.45	peak	
5		599.875	-67.70	-4.55	-72.25	-13.00	-59.25	peak	
6	*	833.160	-69.11	-0.66	-69.77	-13.00	-56.77	peak	

Test Mode | LTE Band 26\_QPSK\_TX CH26740\_15KHz

### Horizontal

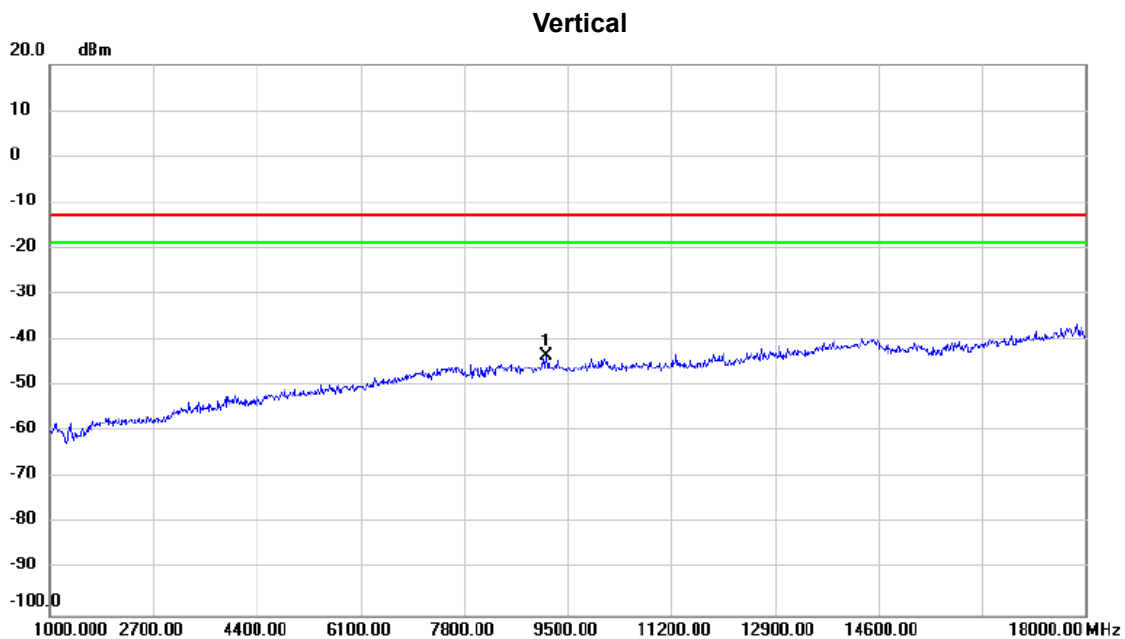


No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		63.950	-65.18	-15.06	-80.24	-13.00	-67.24	peak	
2		120.210	-65.71	-14.15	-79.86	-13.00	-66.86	peak	
3		168.710	-65.77	-12.55	-78.32	-13.00	-65.32	peak	
4		433.520	-69.24	-7.86	-77.10	-13.00	-64.10	peak	
5		600.360	-68.89	-4.55	-73.44	-13.00	-60.44	peak	
6	*	800.180	-69.40	-0.68	-70.08	-13.00	-57.08	peak	



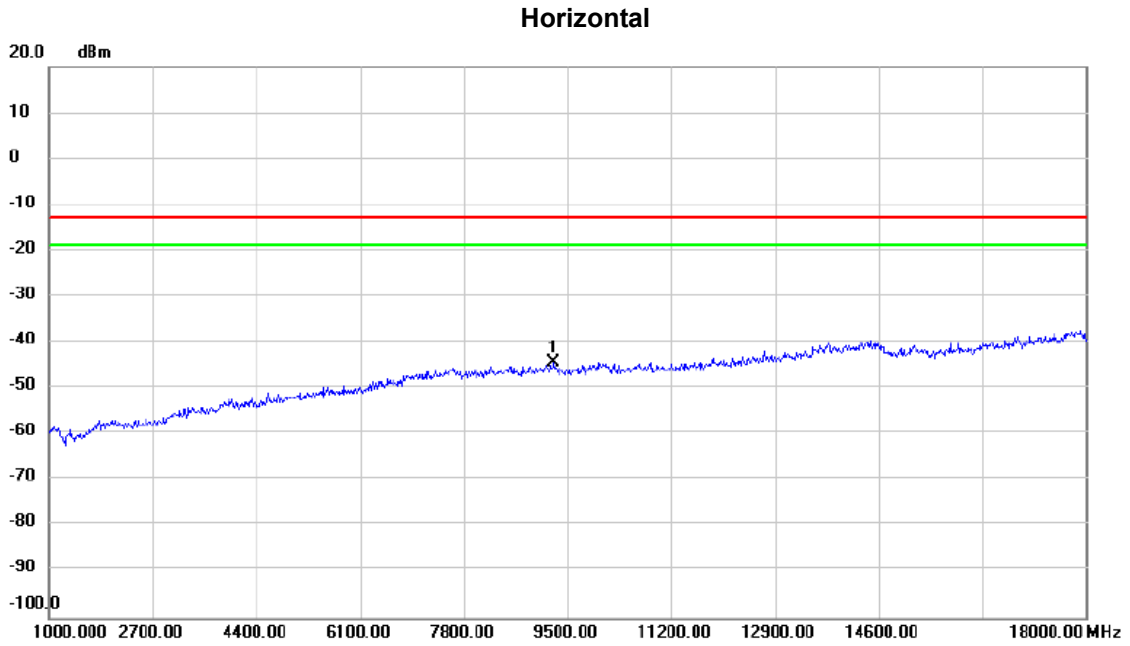
## **APPENDIX F - RADIATED SPURIOUS EMISSIONS (ABOVE 1000MHZ)**

Test Mode | LTE Band 26\_BPSK\_TX CH26740\_3.75KHz



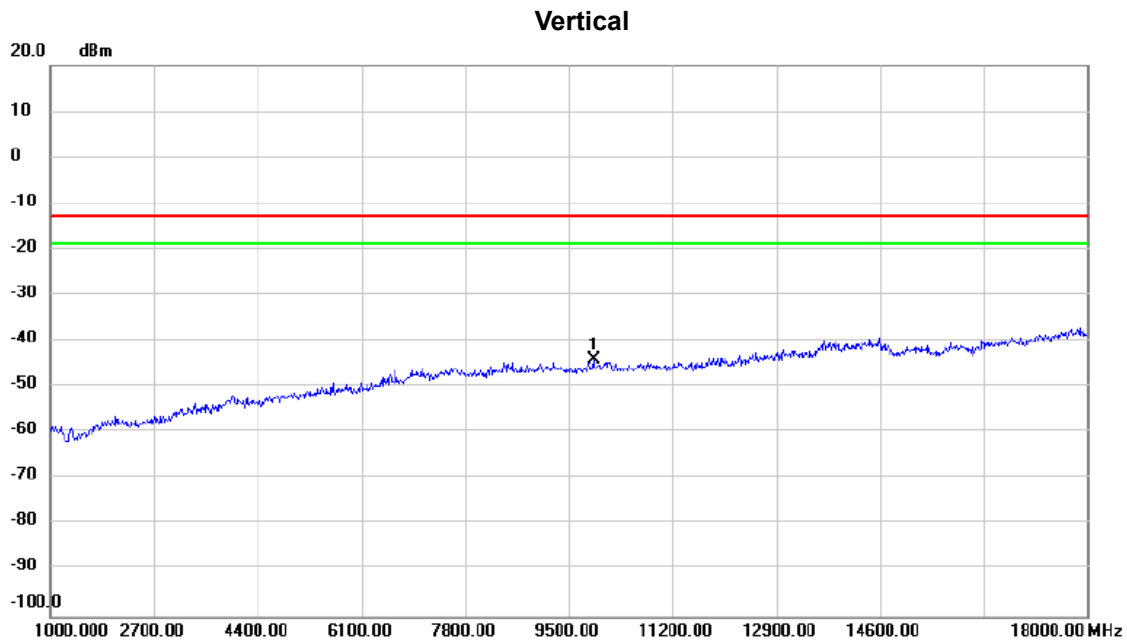
No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	9143.000	-54.97	11.43	-43.54	-13.00	-30.54	peak	

Test Mode | LTE Band 26\_BPSK\_TX CH26740\_3.75KHz



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	9262.000	-55.73	11.37	-44.36	-13.00	-31.36	peak	

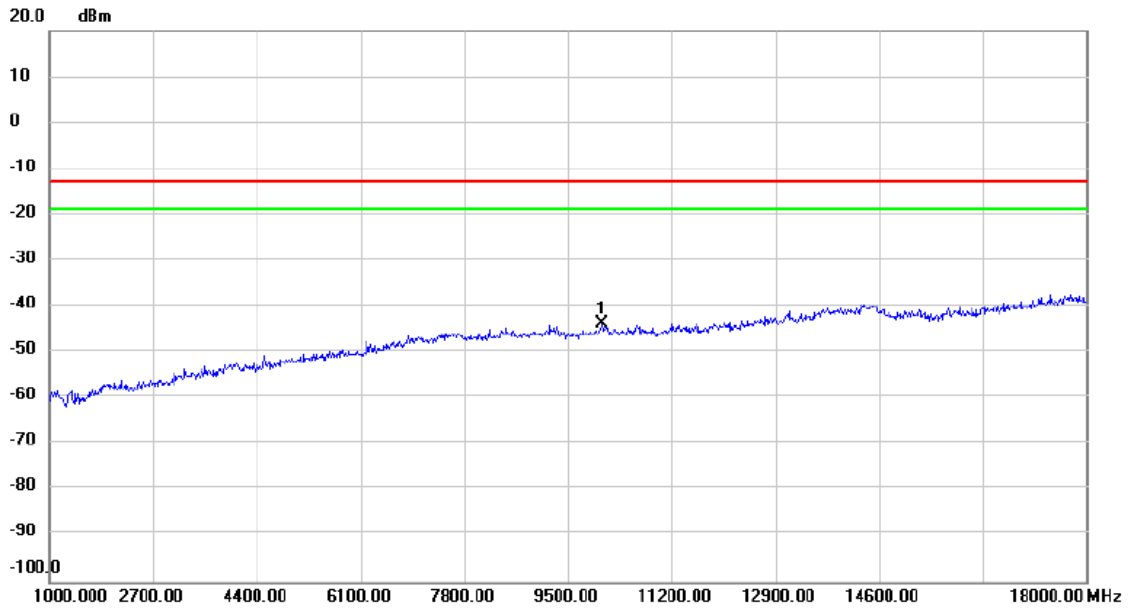
Test Mode | LTE Band 26\_BPSK\_TX CH26740\_15KHz



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	9908.000	-56.01	11.90	-44.11	-13.00	-31.11	peak	

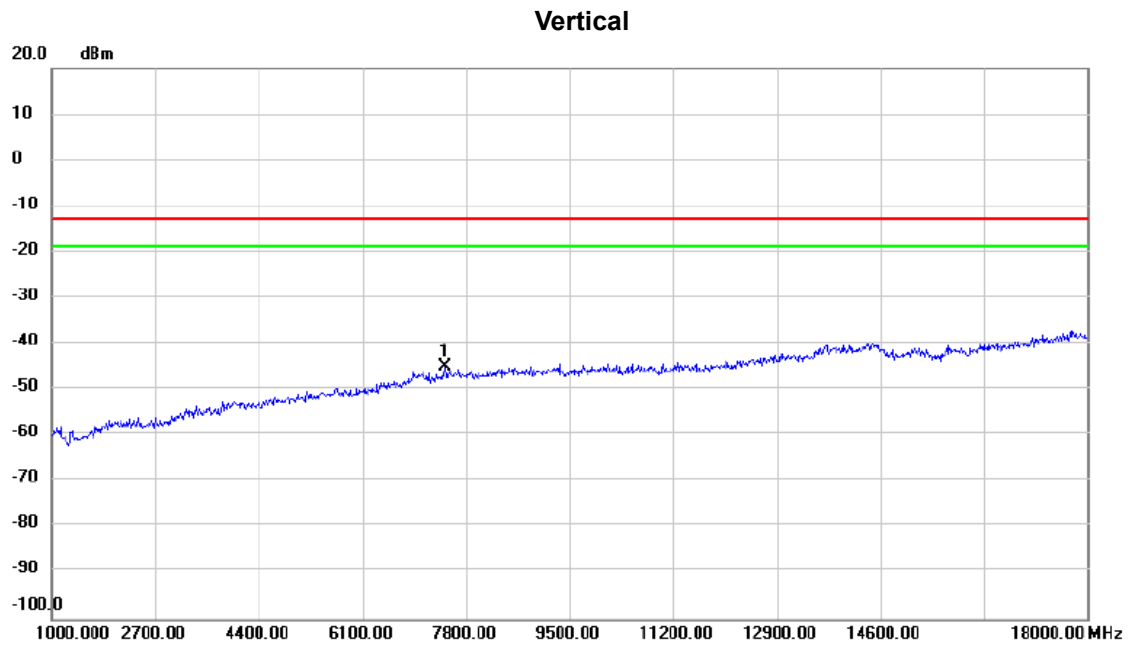
Test Mode | LTE Band 26\_BPSK\_TX CH26740\_15KHz

### Horizontal



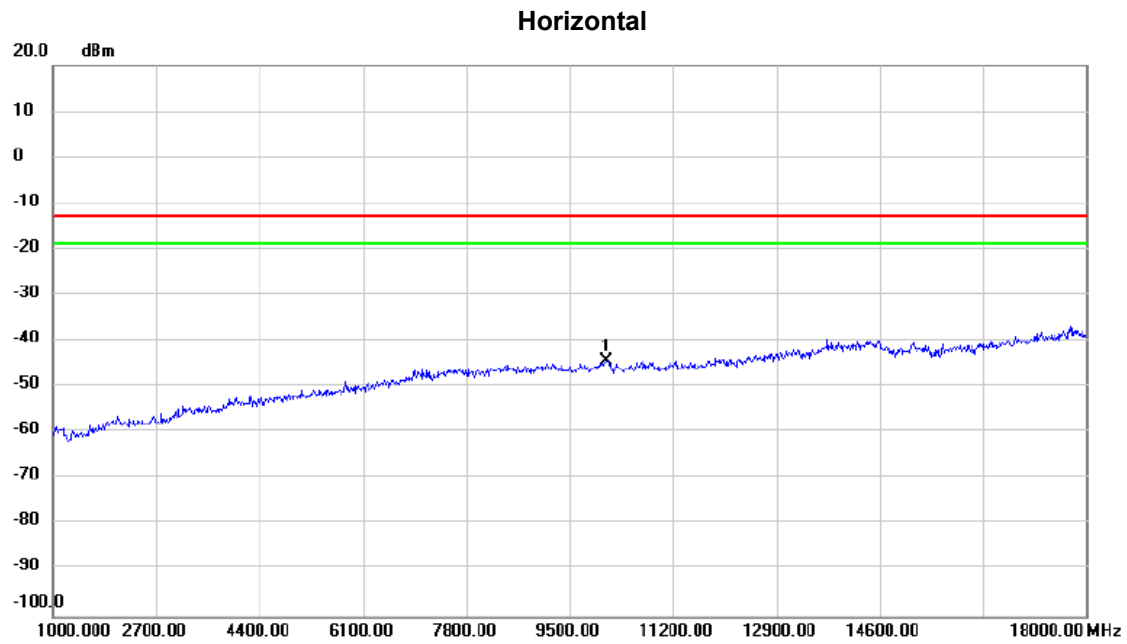
No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	10061.000	-55.88	12.10	-43.78	-13.00	-30.78	peak	

Test Mode | LTE Band 26\_QPSK\_TX CH26740\_3.75KHz



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	7451.500	-55.52	10.56	-44.96	-13.00	-31.96	peak	

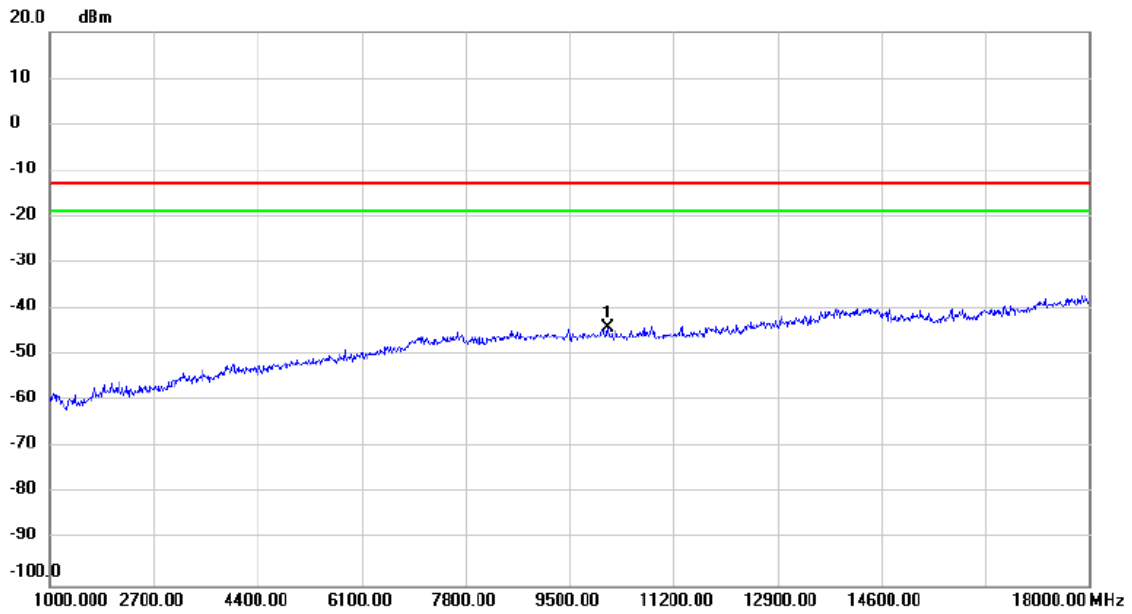
Test Mode | LTE Band 26\_QPSK\_TX CH26740\_3.75KHz



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	10103.500	-56.34	12.13	-44.21	-13.00	-31.21	peak	

Test Mode | LTE Band 26\_QPSK\_TX CH26740\_15KHz

### Vertical

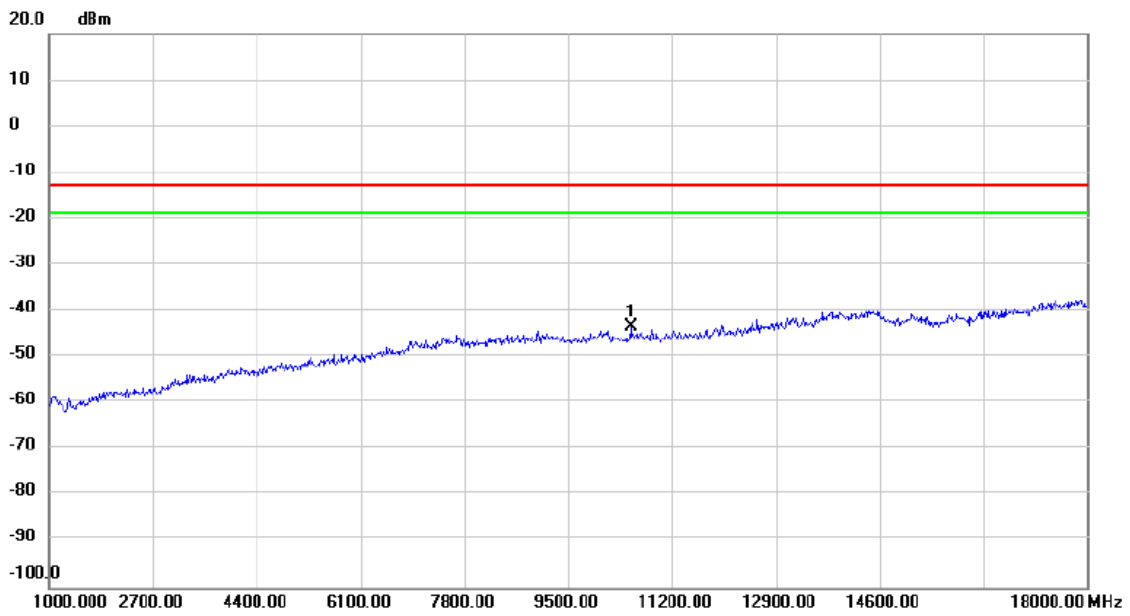


No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	10112.000	-56.31	12.14	-44.17	-13.00	-31.17	peak	



Test Mode | LTE Band 26\_QPSK\_TX CH26740\_15KHz

### Horizontal

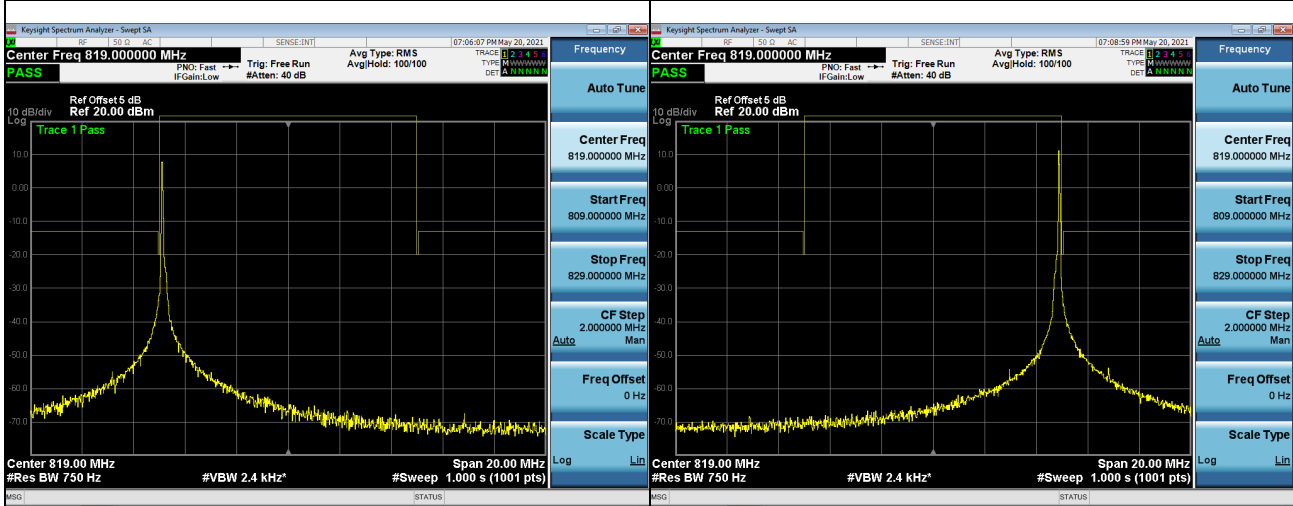


No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	10520.000	-55.92	12.39	-43.53	-13.00	-30.53	peak	

## APPENDIX G - MASK

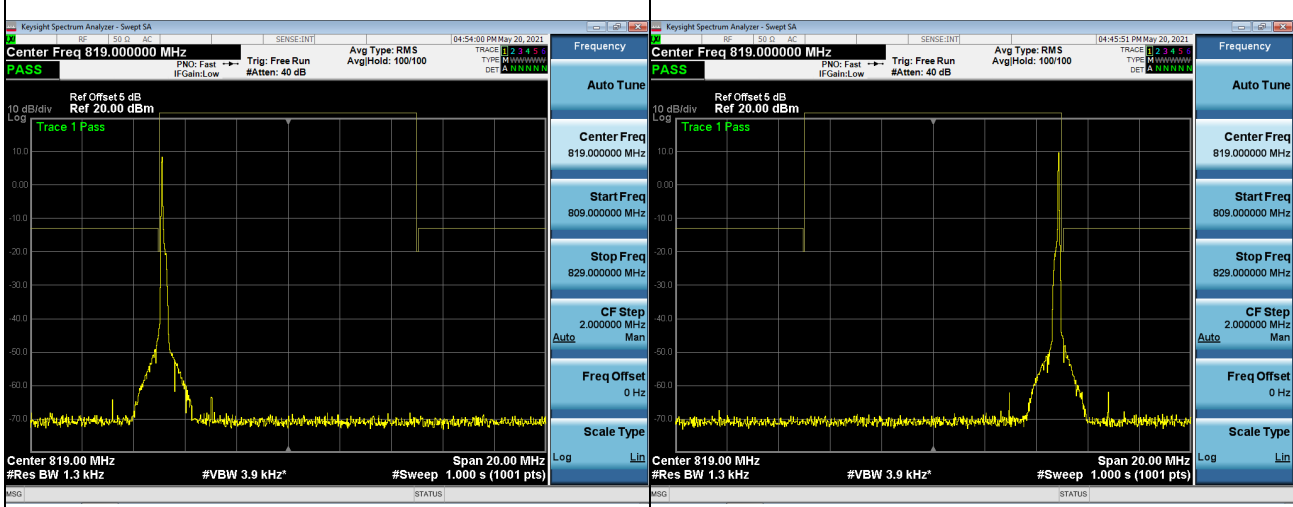
## LTE Band 26\_BPSK\_3.75KHz

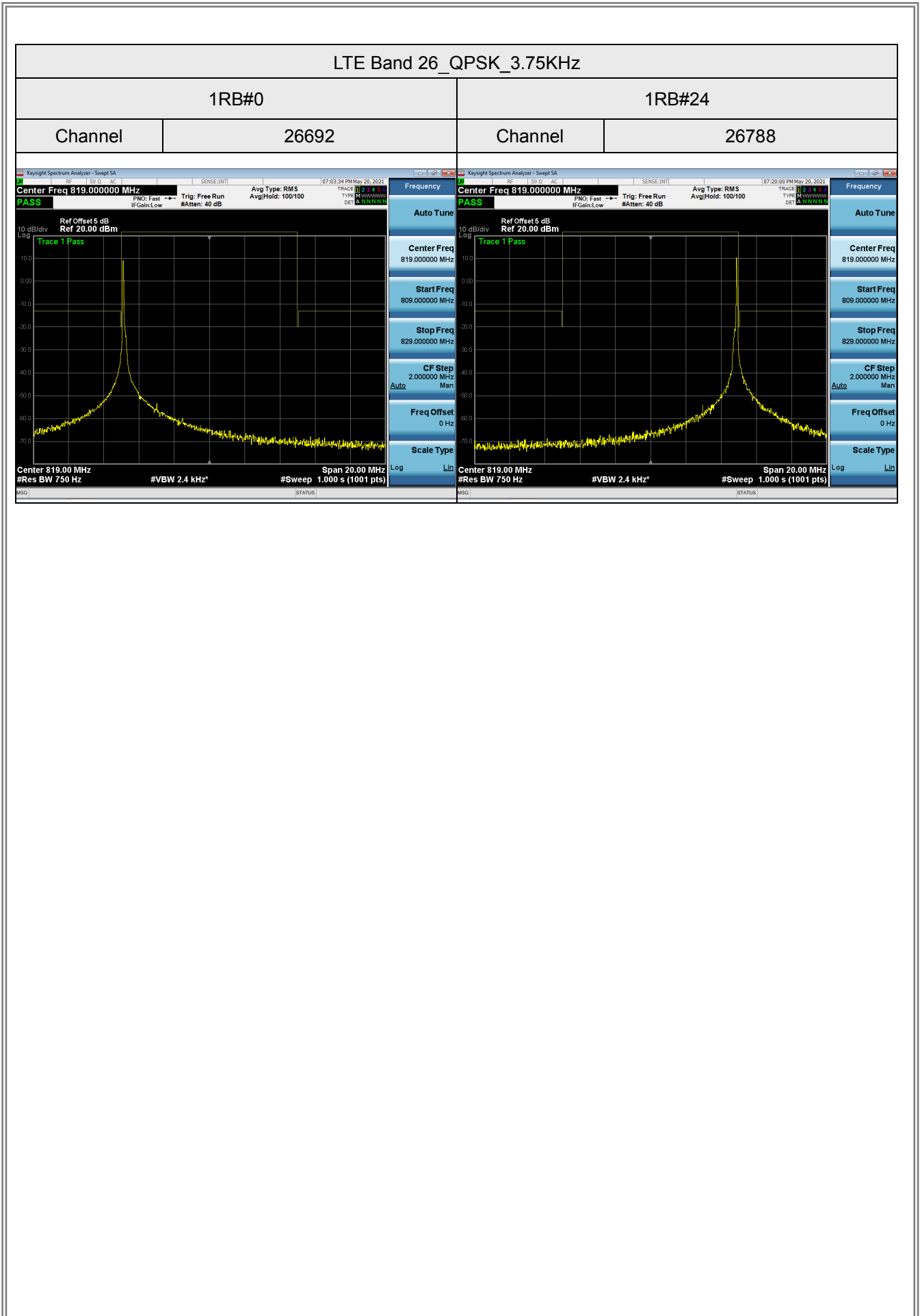
1RB#0		1RB#47	
Channel	26692	Channel	26788

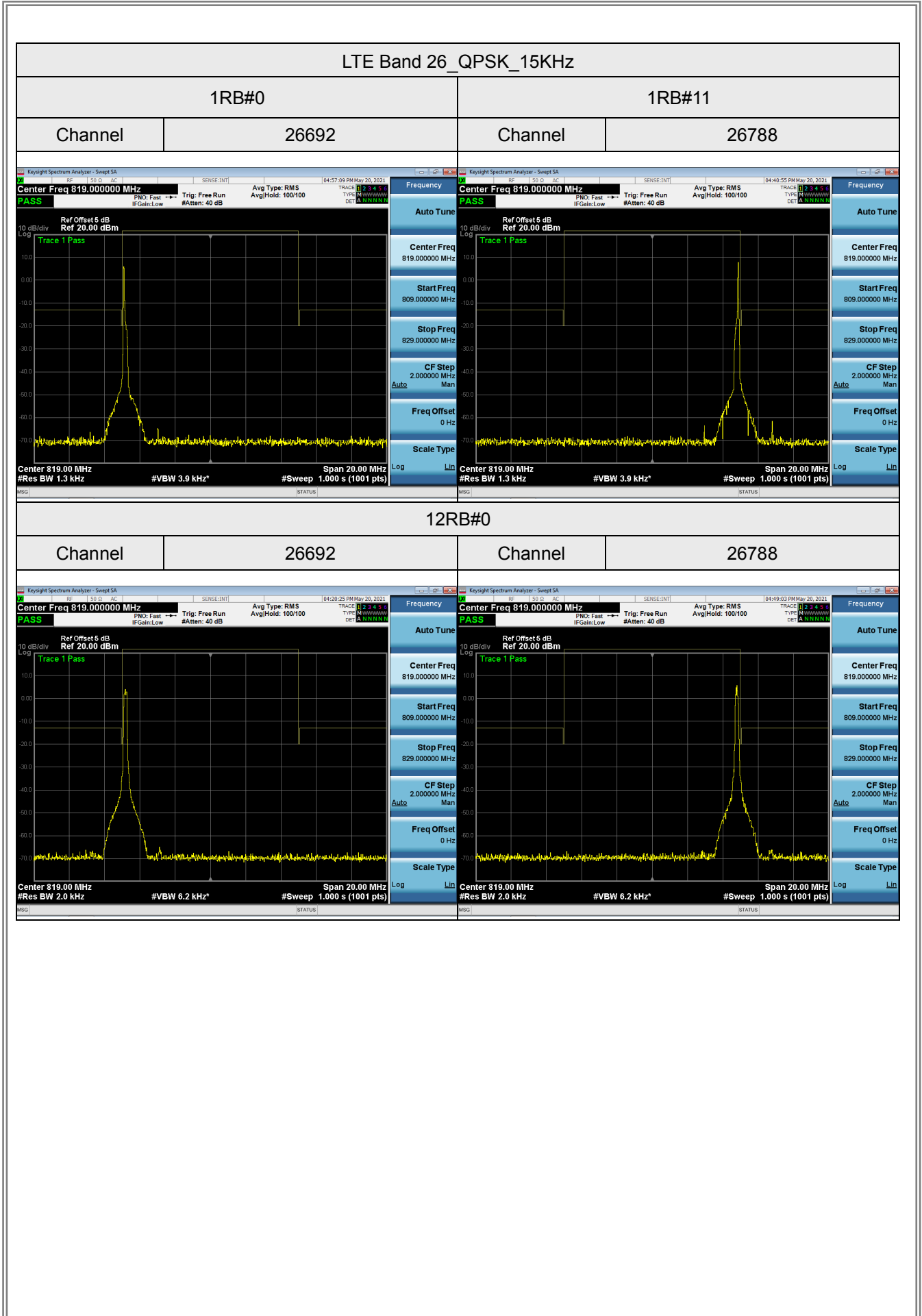


## LTE Band 26\_BPSK\_15KHz

1RB#0		1RB#11	
Channel	26692	Channel	26788



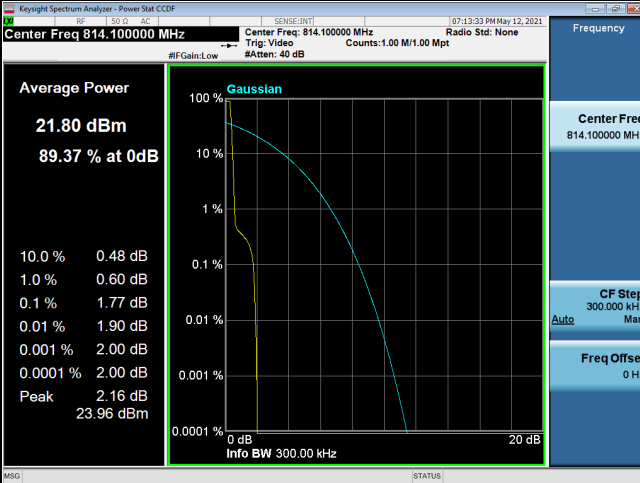




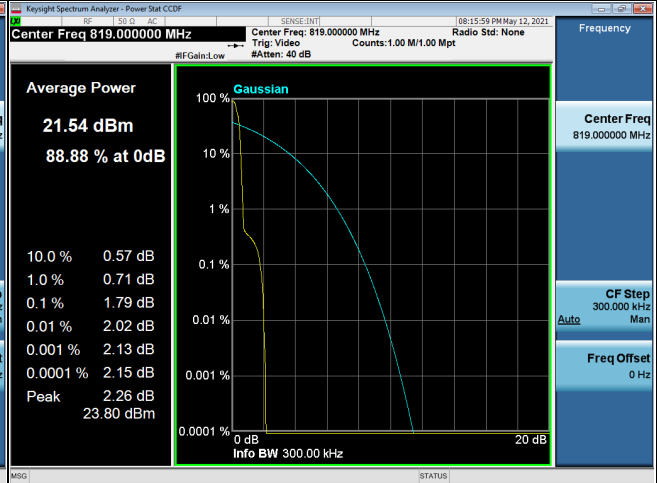
## APPENDIX H - PEAK TO AVERAGE RATIO

## LTE Band 26\_3.75KHz Spectrum Plot

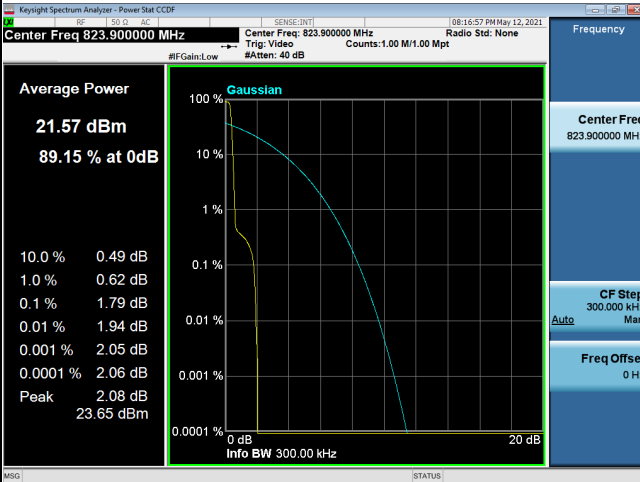
### BPSK-26691



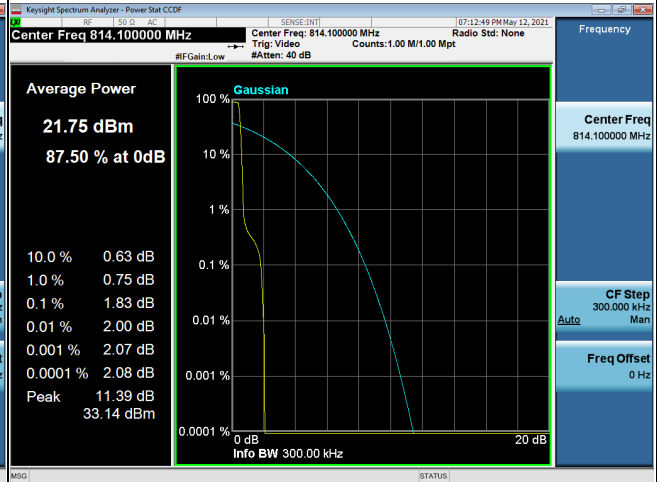
### BPSK-26740



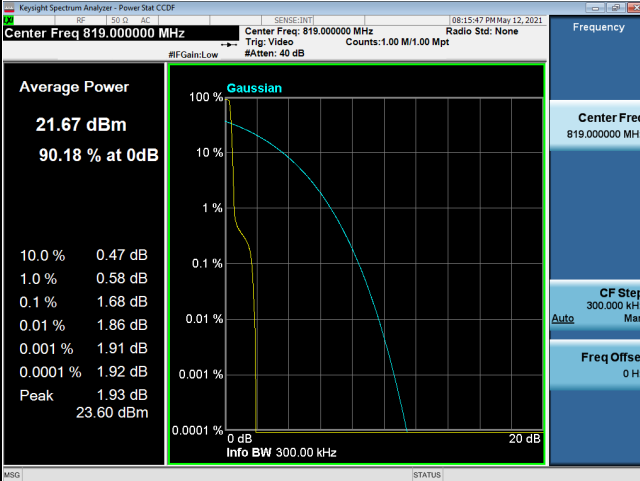
### BPSK-26789



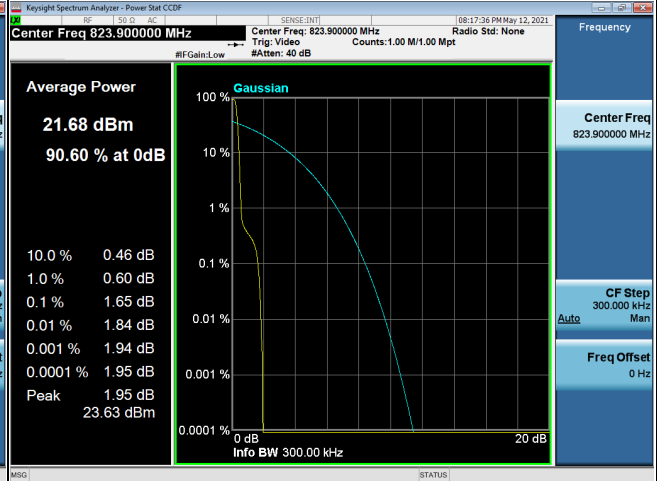
### QPSK-26691



### QPSK-26740

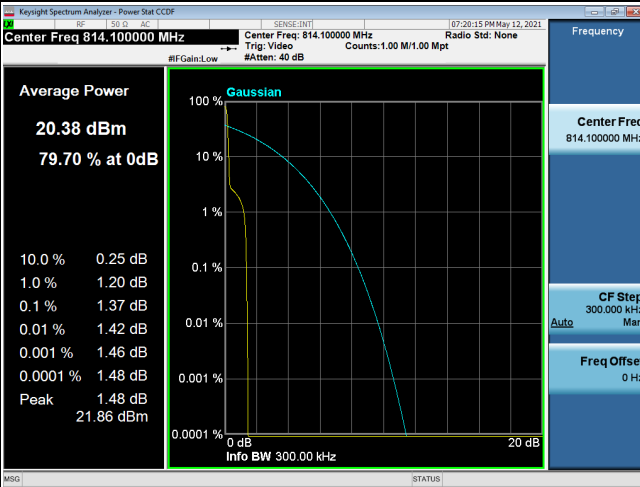


### QPSK-26789

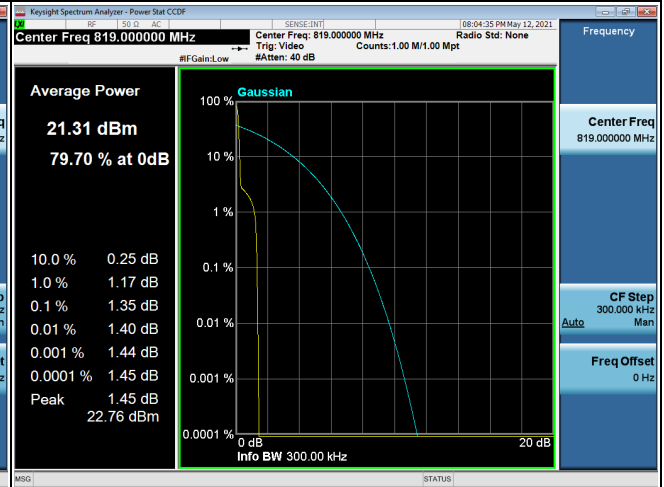


## LTE Band 26\_15KHz Spectrum Plot

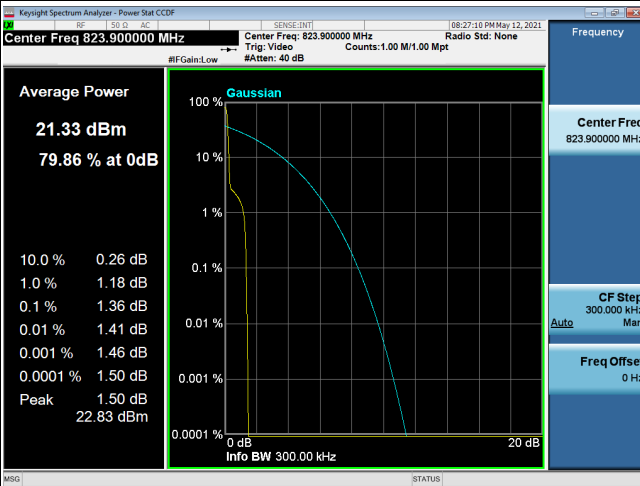
BPSK-26691



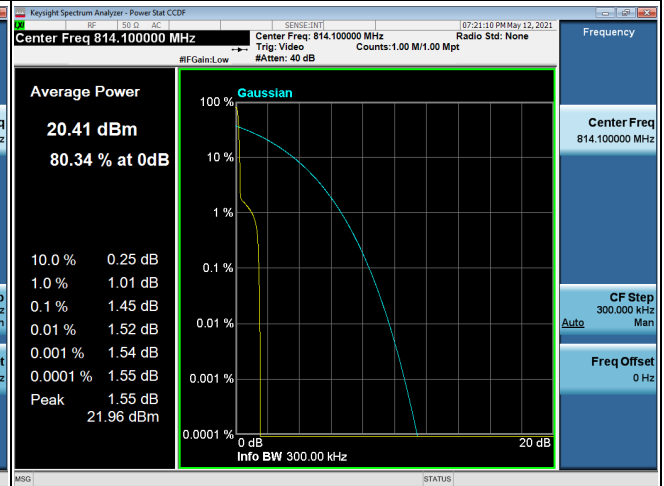
BPSK-26740



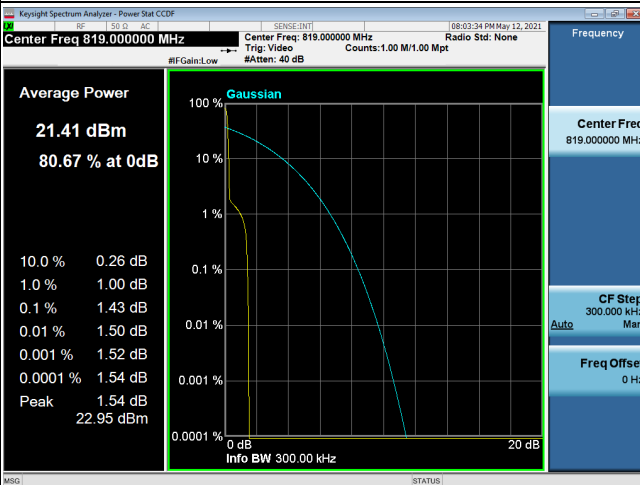
BPSK-26789



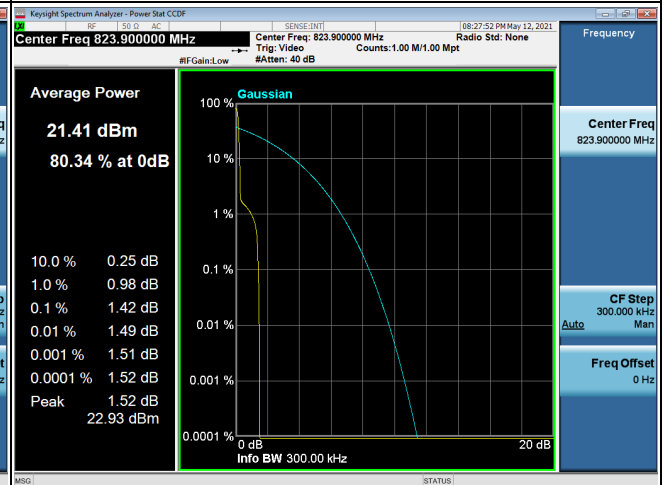
QPSK-26691



QPSK-26740



QPSK-26789





## APPENDIX I - FREQUENCY STABILITY

Test Mode	LTE Band 26_BPSK_CH26740_3.75KHz
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**Temperature vs. Frequency Stability**

Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-20	-14.10	-0.017216117	±2.5
-10	14.95	0.018253968	
0	0.98	0.001196581	
10	-8.95	-0.010927961	
20	-9.38	-0.011452991	
30	10.16	0.012405372	
40	5.79	0.007069597	
50	-1.40	-0.001709402	
60	4.55	0.005555556	
Max. Deviation (ppm)	14.95	0.018253968	

**Voltage vs. Frequency Stability**

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
4.2	7.35	0.008974359	±2.5
3.7	-12.57	-0.015347985	
3.3	-5.88	-0.007179487	
Max. Deviation (ppm)	-12.57	-0.015347985	

Test Mode	LTE Band 26_BPSK_CH26740_15KHz
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**Temperature vs. Frequency Stability**

Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-20	-7.49	-0.009145299	±2.5
-10	-5.77	-0.007045177	
0	12.73	0.015543346	
10	-7.95	-0.00970696	
20	-2.60	-0.003174603	
30	-13.04	-0.015921856	
40	-6.01	-0.007338217	
50	-5.28	-0.006446886	
60	-12.78	-0.015604396	
Max. Deviation (ppm)	-13.04	-0.015921856	

**Voltage vs. Frequency Stability**

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
4.2	10.75	0.013125763	±2.5
3.7	-7.77	-0.009487179	
3.3	10.94	0.013357753	
Max. Deviation (ppm)	10.94	0.013357753	

Test Mode	LTE Band 26_QPSK_CH26740_3.75KHz
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**Temperature vs. Frequency Stability**

Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-20	14.65	0.017887668	±2.5
-10	-9.50	-0.011599512	
0	-8.43	-0.01029304	
10	1.70	0.002075702	
20	-14.53	-0.017741148	
30	-8.05	-0.00982906	
40	0.46	0.000561661	
50	8.21	0.01002442	
60	-1.68	-0.002051282	
Max. Deviation (ppm)	14.65	0.017887668	

**Voltage vs. Frequency Stability**

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
4.2	4.13	0.005042735	±2.5
3.7	5.44	0.006642247	
3.3	-3.27	-0.003992674	
Max. Deviation (ppm)	5.44	0.006642247	

Test Mode	LTE Band 26_QPSK_CH26740_15KHz
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**Temperature vs. Frequency Stability**

Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-20	11.55	0.014102564	±2.5
-10	3.28	0.004004884	
0	9.14	0.011159951	
10	7.90	0.00964591	
20	-6.17	-0.007533578	
30	3.89	0.004749695	
40	2.29	0.002796093	
50	-11.77	-0.014371184	
60	7.38	0.009010989	
Max. Deviation (ppm)	-11.77	-0.014371184	

**Voltage vs. Frequency Stability**

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
4.2	-2.83	-0.003455433	±2.5
3.7	-0.61	-0.000744811	
3.3	13.62	0.016630037	
Max. Deviation (ppm)	13.62	0.016630037	

End of Test Report