

FCC Test Report

(PART 90)

Report No.: RF181001C14-11

FCC ID: A4RG020F

Test Model: G020F

Received Date: Oct. 01, 2018

Test Date: Oct. 13, 2018 ~ Oct. 27, 2018

Issued Date: Dec. 27, 2018

Applicant: Google LLC

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

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



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Release Control Record

Issue No.	Description	Date Issued
RF181001C14-11	Original Release	Dec. 27, 2018

1 Certificate of Conformity

Product: Smartphone

Test Model: G020F


Sample Status: Identical Prototype


Applicant: Google LLC

Test Date: Oct. 13, 2018 ~ Oct. 27, 2018

Standards: FCC Part 90, Subpart I, S
FCC Part 2

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : , **Date:** Dec. 27, 2018
Ivonne Wu / Supervisor

Approved by : , **Date:** Dec. 27, 2018
Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 90 & Part 2 (CDMA)			
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.
2.1055 90.213	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 90.209	Occupied Bandwidth	Pass	Meet the requirement of limit.
2.1051 90.210	Emission Masks	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 -38.75 dB at 1635.80 MHz.

Applied Standard: FCC Part 90 & Part 2 (LTE 26)			
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.
2.1055 90.213	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 90.209	Occupied Bandwidth	Pass	Meet the requirement of limit.
2.1051 90.210	Emission Masks	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 -33.50 dB at 2457.00 MHz.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 11, 2018	Oct. 10, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-616	Dec. 14, 2017	Dec. 13, 2018
HORN Antenna ETS-Lindgren	3117	00143293	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Dec. 12, 2017	Dec. 11, 2018
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
MXG Vector signal generator Agilent	N5182B	MY53052658	May 24, 2018	May 23, 2019
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC -SMS-100-SMS-12 0+RFC-SMS-100-S MS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC -SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jun. 28, 2017	Jun. 27, 2019
Universal Radio Communication Tester R&S	CMU200	123112	Dec. 28, 2017	Dec. 27, 2018
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 05, 2018	Sep. 04, 2019
DC Power Supply Topward	33010D	807748	NA	NA

- Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HsinTien Chamber 1.
 3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The IC Site Registration No. is 7450I-1.

3 General Information

3.1 General Description of EUT

Product	Smartphone	
Test Model	G020F	
Status of EUT	Identical Prototype	
Power Supply Rating	3.85 Vdc (Li-ion battery) 5.0 Vdc or 9 Vdc (adapter) 5.0 Vdc (host equipment)	
Modulation Type	CDMA	QPSK, OQPSK, HPSK
	LTE	QPSK, 16QAM, 64QAM
Frequency Range	CDMA BC10	817.9 ~ 823.1 MHz
	LTE Band 26 (Channel Bandwidth: 1.4 MHz)	814.7 ~ 823.3 MHz
	LTE Band 26 (Channel Bandwidth: 3 MHz)	815.5 ~ 822.5 MHz
	LTE Band 26 (Channel Bandwidth: 5 MHz)	816.5 ~ 821.5 MHz
	LTE Band 26 (Channel Bandwidth: 10 MHz)	819 MHz
Emission Designator	CDMA BC10	1M28F9W
	LTE Band 26 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE Band 26 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 26 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 26 (Channel Bandwidth: 10 MHz)	8M98W7D
Max. ERP Power	CDMA BC10	56.62 mW
	LTE Band 26 (Channel Bandwidth: 1.4 MHz)	51.64 mW
	LTE Band 26 (Channel Bandwidth: 3 MHz)	52.12 mW
	LTE Band 26 (Channel Bandwidth: 5 MHz)	52.36 mW
	LTE Band 26 (Channel Bandwidth: 10 MHz)	52.84 mW
Antenna Type	PIFA Antenna	
Antenna Gain	CDMA BC10	-5.5 dBi (Main) / -4.8 dBi (Aux.)
	LTE Band 26	-5.5 dBi (Main) / -5.3 dBi (Aux.)
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. There're 2 configurations for the EUT listed as below.

Main Sample: EUT + Battery 1

2nd Sample: EUT + Battery 2

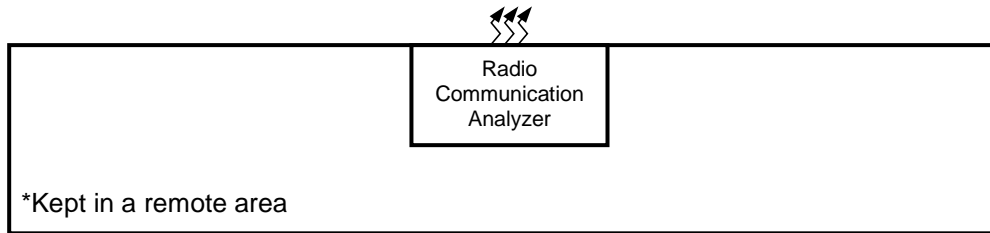
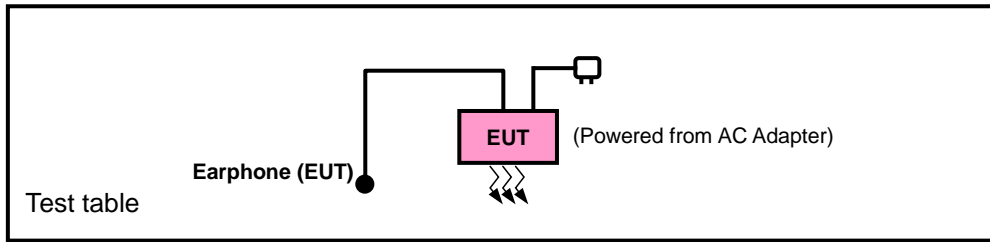
✧ After pre-tested with the EUT, only the worst configuration (main sample) was chosen for the final test.

2. The EUT's accessories list refers to Ext. Pho.

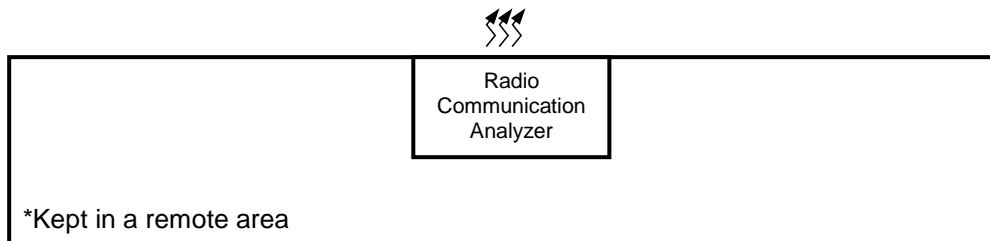
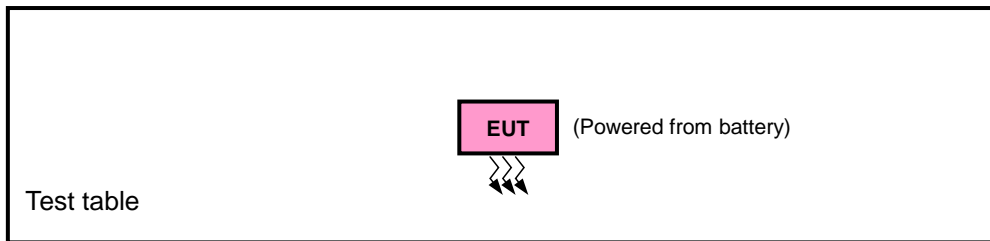
3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.R.P. Test>



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3 Test Mode Applicability and Tested Channel Detail

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

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

Band	ERP	Radiated Emission
CDMA	X-plane	Y-axis
LTE Band 26	X-plane	Y-axis

CDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	476 to 684	476, 580, 684	1xRTT
-	Modulation Characteristics	476 to 684	580	1xRTT
-	Frequency Stability	476 to 684	476, 684	1xRTT
-	Occupied Bandwidth	476 to 684	476, 580, 684	1xRTT
-	Emission Mask	476 to 684	476, 580, 684	1xRTT
-	Conducted Emission	476 to 684	476, 580, 684	1xRTT
-	Radiated Emission	476 to 684	476, 580, 684	1xRTT

LTE Band 26

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode		
-	ERP	26697 to 26783	26697, 26740, 26783	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 2 RB Offset		
		26705 to 26775	26705, 26740, 26775	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset		
		26715 to 26765	26715, 26740, 26765	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset		
		26740	26740	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset		
-	Modulation Characteristics	26715 to 26765	26740	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset		
-	Frequency Stability	26697 to 26783	26697, 26783	1.4 MHz	QPSK	1 RB / 0 RB Offset		
		26705 to 26775	26705, 26775	3 MHz	QPSK	1 RB / 0 RB Offset		
		26715 to 26765	26715, 26765	5 MHz	QPSK	1 RB / 0 RB Offset		
		26740	26740	10 MHz	QPSK	1 RB / 0 RB Offset		
-	Occupied Bandwidth	26697 to 26783	26697, 26740, 26783	1.4 MHz	QPSK, 16QAM, 64QAM	6 RB / 0 RB Offset		
		26705 to 26775	26705, 26740, 26775	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset		
		26715 to 26765	26715, 26740, 26765	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset		
		26740	26740	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset		
-	Emission Mask	26697 to 26783	26697	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset 6 RB / 0 RB Offset		
			26783	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 5 RB Offset 6 RB / 0 RB Offset		
		26705 to 26775	26705	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset 15 RB / 0 RB Offset		
			26775	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 14 RB Offset 15 RB / 0 RB Offset		
		26715 to 26765	26715	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset 25 RB / 0 RB Offset		
			26765	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset 25 RB / 0 RB Offset		
		26740	26740	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset		
		-	Conducted Emission	26697 to 26783	26697, 26740, 26783	1.4 MHz	QPSK	1 RB / 2 RB Offset
				26705 to 26775	26705, 26740, 26775	3 MHz	QPSK	1 RB / 0 RB Offset
				26715 to 26765	26715, 26740, 26765	5 MHz	QPSK	1 RB / 0 RB Offset
				26740	26740	10 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	26697 to 26783	26697, 26740, 26783	1.4 MHz	QPSK	1 RB / 2 RB Offset		
		26715 to 26765	26715, 26740, 26765	5 MHz	QPSK	1 RB / 0 RB Offset		
		26740	26740	10 MHz	QPSK	1 RB / 0 RB Offset		

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

Test Condition:

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

3.4 EUT Operating Conditions

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

3.5 General Description of Applied Standards

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

FCC 47 CFR Part 2

FCC 47 CFR Part 90

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 971168 D02 Misc Rev Approv License Devices v02r01

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

4.1.2 Test Procedures

EIRP / ERP Measurement:

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

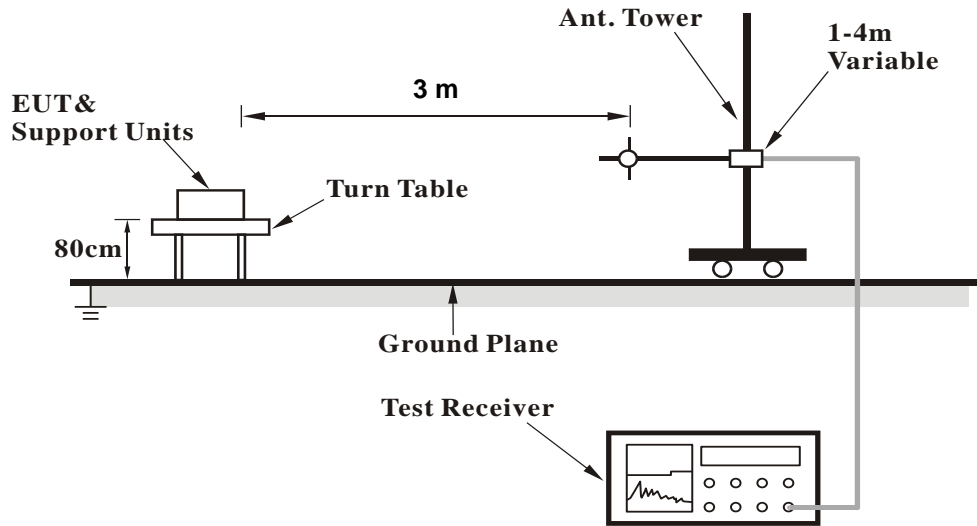
Conducted Power Measurement:

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

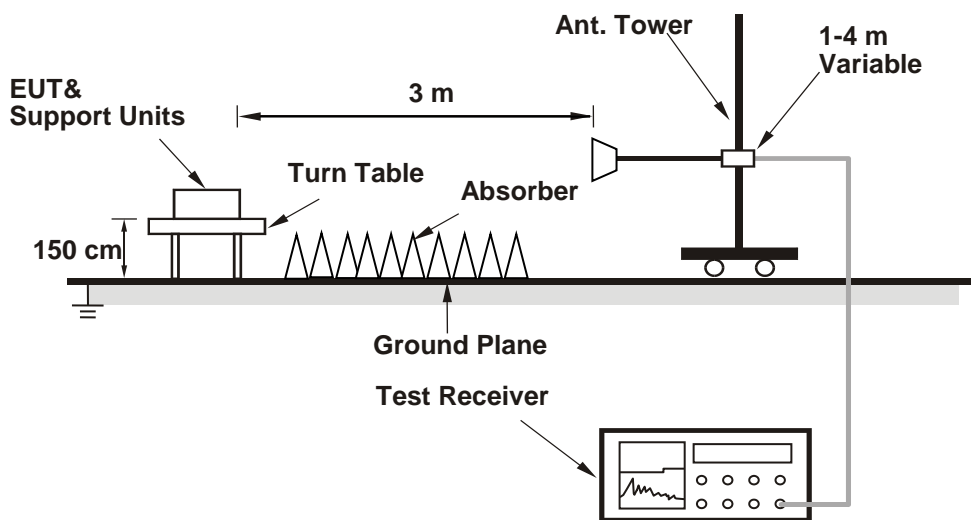
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

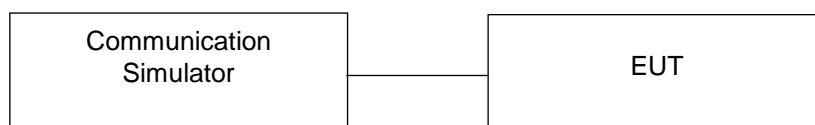


<Radiated Emission above 1 GHz>



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

Conducted Power Measurement:



4.1.4 Test Results

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

Band		TX Antenna	WLAN Function	Body-Worn/Hotspot
CDMA	BC10	Ant 0	WLAN-Off	Body-Worn/Hotspot
LTE	B26	Ant 0	WLAN-Off	Body-Worn/Hotspot

Conducted Output Power (dBm)

Band	CDMA BC10		
Mode	Body-Worn / Hotspot		
Tx Antenna	Ant-0		
Channel	476	580	684
Frequency (MHz)	817.9	820.5	823.1
RC1+SO55	24.81	24.78	24.88
RC3+SO55	24.86	24.83	24.93
RC3+SO32(+ F-SCH)	24.85	24.82	24.92
RC3+SO32(+SCH)	24.84	24.81	24.91
RTAP 153.6	24.83	24.80	24.90
RETAP 4096	24.82	24.79	24.89

LTE Band 26
Body-Worn / Hotspot
Ant-0

BW	MCS Index	RB Size	RB Offset	Mid			3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)		
				Channel	26740							26715	26740	26765			
				Frequency (MHz)	819.0							816.5	819.0	821.5			
10M	QPSK	1	0	24.43		0	5M	QPSK	1	0	24.40	24.43	24.48	0			
		1	24	24.40		0			1	12	24.37	24.40	24.45	0			
		1	49	24.30		0			1	24	24.27	24.30	24.35	0			
		25	0	23.51		1			12	0	23.48	23.51	23.56	1			
		25	12	23.50		1			12	6	23.47	23.50	23.55	1			
		25	25	23.43		1			12	13	23.40	23.43	23.48	1			
	16QAM	50	0	23.47		1		25	0	23.44	23.47	23.52	1				
		1	0	23.41		1		16QAM	1	0	23.38	23.41	23.46	1			
		1	24	23.38		1			1	12	23.35	23.38	23.43	1			
		1	49	23.28		1			1	24	23.25	23.28	23.33	1			
		25	0	22.49		2			12	0	22.46	22.49	22.54	2			
		25	12	22.48		2			12	6	22.45	22.48	22.53	2			
	25	25	22.41		2	12			13	22.38	22.41	22.46	2				
	64QAM	50	0	22.45		2		25	0	22.42	22.45	22.50	2				
		1	0	22.37		2		64QAM	1	0	22.34	22.37	22.42	2			
		1	24	22.34		2			1	12	22.31	22.34	22.39	2			
		1	49	22.24		2			1	24	22.21	22.24	22.29	2			
		25	0	21.45		3			12	0	21.42	21.45	21.50	3			
		25	12	21.44		3			12	6	21.41	21.44	21.49	3			
	25	25	21.37		3	12			13	21.34	21.37	21.42	3				
	3M	QPSK	50	0	21.41			3	25	0	21.38	21.41	21.46	3			
			1	0	24.34	24.43		24.46	0	1.4M	QPSK	1	0	24.42	24.38	24.42	0
			1	7	24.31	24.36		24.42	0			1	2	24.39	24.35	24.45	0
			1	14	24.21	24.23		24.24	0			1	5	24.29	24.23	24.34	0
8			0	23.42	23.41	23.50	1	3	0			24.35	24.42	24.41	0		
8			3	23.41	23.47	23.55	1	3	1			24.34	24.40	24.54	0		
8		7	23.34	23.32	23.42	1	3	3	24.27			24.37	24.35	0			
16QAM		15	0	23.38	23.39	23.48	1	6	0		23.46	23.44	23.44	1			
		1	0	23.32	23.41	23.41	1	16QAM	1		0	23.40	23.26	23.35	1		
		1	7	23.29	23.26	23.32	1		1		2	23.37	23.26	23.42	1		
		1	14	23.19	23.26	23.25	1		1		5	23.27	23.18	23.27	1		
		8	0	22.40	22.46	22.41	2		3		0	23.33	23.47	23.42	1		
		8	3	22.39	22.47	22.39	2		3		1	23.32	23.40	23.44	1		
8		7	22.32	22.40	22.36	2	3		3		23.25	23.28	23.37	1			
64QAM		15	0	22.36	22.34	22.49	2	6	0		22.44	22.34	22.42	2			
		1	0	22.28	22.24	22.28	2	64QAM	1		0	22.36	22.31	22.36	2		
		1	7	22.25	22.24	22.27	2		1		2	22.33	22.29	22.35	2		
		1	14	22.15	22.18	22.23	2		1		5	22.23	22.15	22.29	2		
		8	0	21.36	21.45	21.42	3		3		0	22.29	22.30	22.48	2		
		8	3	21.35	21.40	21.49	3		3		1	22.28	22.33	22.42	2		
8		7	21.28	21.29	21.33	3	3		3		22.21	22.26	22.28	2			
10M		QPSK	15	0	21.32	21.37	21.43	3	6		0	21.40	21.26	21.44	3		
			1	0	26705	26740	26775	0	1.4M		QPSK	1	0	26697	26740	26783	0
			1	7	26705	26740	26775	0				1	2	26697	26740	26783	0
	1		14	26705	26740	26775	0	1				5	26697	26740	26783	0	
	8		0	815.5	819.0	822.5	1	3		0		814.7	819.0	823.3	1		
	8		3	815.5	819.0	822.5	1	3		1		814.7	819.0	823.3	1		
	8	7	815.5	819.0	822.5	1	3	3		814.7		819.0	823.3	1			
	16QAM	15	0	815.5	819.0	822.5	2	6		0	814.7	819.0	823.3	2			
		1	0	26705	26740	26775	1	16QAM		1	0	26697	26740	26783	1		
		1	7	26705	26740	26775	1			1	2	26697	26740	26783	1		
		1	14	26705	26740	26775	1			1	5	26697	26740	26783	1		
		8	0	815.5	819.0	822.5	2			3	0	814.7	819.0	823.3	2		
		8	3	815.5	819.0	822.5	2			3	1	814.7	819.0	823.3	2		
	8	7	815.5	819.0	822.5	2	3			3	814.7	819.0	823.3	2			
	64QAM	15	0	815.5	819.0	822.5	2	6		0	814.7	819.0	823.3	2			
		1	0	26705	26740	26775	2	64QAM		1	0	26697	26740	26783	2		
		1	7	26705	26740	26775	2			1	2	26697	26740	26783	2		
		1	14	26705	26740	26775	2			1	5	26697	26740	26783	2		
		8	0	815.5	819.0	822.5	3			3	0	814.7	819.0	823.3	3		
		8	3	815.5	819.0	822.5	3			3	1	814.7	819.0	823.3	3		
	8	7	815.5	819.0	822.5	3	3			3	814.7	819.0	823.3	3			

ERP Power (dBm)

CDMA							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	476	817.9	-11.54	31.208	17.52	56.47	H
	580	820.5	-11.62	31.3	17.53	56.62	
	684	823.1	-11.57	31.222	17.50	56.26	
	476	817.9	-15.84	31.504	13.51	22.46	V
	580	820.5	-15.43	31.117	13.54	22.58	
	684	823.1	-16.29	31.922	13.48	22.29	

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

LTE Band 26							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26697	814.7	-12.04	31.208	17.02	50.33	H
	26740	819.0	-12.02	31.3	17.13	51.64	
	26783	823.3	-11.98	31.222	17.09	51.19	
	26697	814.7	-17.28	31.504	12.07	16.12	V
	26740	819.0	-16.83	31.117	12.14	16.36	
	26783	823.3	-17.66	31.922	12.11	16.26	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	26697	814.7	-13.05	31.208	16.01	39.88	H
	26740	819.0	-13.02	31.3	16.13	41.02	
	26783	823.3	-12.98	31.222	16.09	40.66	
	26697	814.7	-18.29	31.504	11.06	12.78	V
	26740	819.0	-17.84	31.117	11.13	12.96	
	26783	823.3	-18.66	31.922	11.11	12.92	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	26697	814.7	-14.06	31.208	15.00	31.61	H
	26740	819.0	-14.03	31.3	15.12	32.51	
	26783	823.3	-13.98	31.222	15.09	32.30	
	26697	814.7	-19.30	31.504	10.05	10.13	V
	26740	819.0	-18.84	31.117	10.13	10.30	
	26783	823.3	-19.67	31.922	10.10	10.24	

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

LTE Band 26							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26705	815.5	-12.00	31.208	17.06	50.79	H
	26740	819.0	-11.98	31.3	17.17	52.12	
	26775	822.5	-11.95	31.222	17.12	51.55	
	26705	815.5	-17.24	31.504	12.11	16.27	V
	26740	819.0	-16.79	31.117	12.18	16.51	
	26775	822.5	-17.62	31.922	12.15	16.41	
Channel Bandwidth: 3 MHz / 16QAM							
X	26705	815.5	-13.01	31.208	16.05	40.25	H
	26740	819.0	-12.98	31.3	16.17	41.40	
	26775	822.5	-12.96	31.222	16.11	40.85	
	26705	815.5	-18.25	31.504	11.10	12.89	V
	26740	819.0	-17.80	31.117	11.17	13.08	
	26775	822.5	-18.62	31.922	11.15	13.04	
Channel Bandwidth: 3 MHz / 64QAM							
X	26705	815.5	-14.02	31.208	15.04	31.90	H
	26740	819.0	-13.99	31.3	15.16	32.81	
	26775	822.5	-13.96	31.222	15.11	32.45	
	26705	815.5	-19.26	31.504	10.09	10.22	V
	26740	819.0	-18.81	31.117	10.16	10.37	
	26775	822.5	-19.63	31.922	10.14	10.33	

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

LTE Band 26							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26715	816.5	-11.94	31.208	17.12	51.50	H
	26740	819.0	-11.96	31.3	17.19	52.36	
	26765	821.5	-11.91	31.222	17.16	52.02	
	26715	816.5	-17.20	31.504	12.15	16.42	V
	26740	819.0	-16.75	31.117	12.22	16.66	
	26765	821.5	-17.58	31.922	12.19	16.57	
Channel Bandwidth: 5 MHz / 16QAM							
X	26715	816.5	-12.95	31.208	16.11	40.81	H
	26740	819.0	-12.96	31.3	16.19	41.59	
	26765	821.5	-12.92	31.222	16.15	41.23	
	26715	816.5	-18.21	31.504	11.14	13.01	V
	26740	819.0	-17.76	31.117	11.21	13.20	
	26765	821.5	-18.59	31.922	11.18	13.13	
Channel Bandwidth: 5 MHz / 64QAM							
X	26715	816.5	-13.95	31.208	15.11	32.42	H
	26740	819.0	-13.96	31.3	15.19	33.04	
	26765	821.5	-13.93	31.222	15.14	32.67	
	26715	816.5	-19.22	31.504	10.13	10.31	V
	26740	819.0	-18.77	31.117	10.20	10.46	
	26765	821.5	-19.60	31.922	10.17	10.40	

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

LTE Band 26							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26740	819.0	-11.92	31.3	17.23	52.84	H
	26740	819.0	-16.72	31.117	12.25	16.78	V
Channel Bandwidth: 10 MHz / 16QAM							
X	26740	819.0	-12.93	31.3	16.22	41.88	H
	26740	819.0	-17.72	31.117	11.25	13.33	V
Channel Bandwidth: 10 MHz / 64QAM							
X	26740	819.0	-13.94	31.3	15.21	33.19	H
	26740	819.0	-18.73	31.117	10.24	10.56	V

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

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

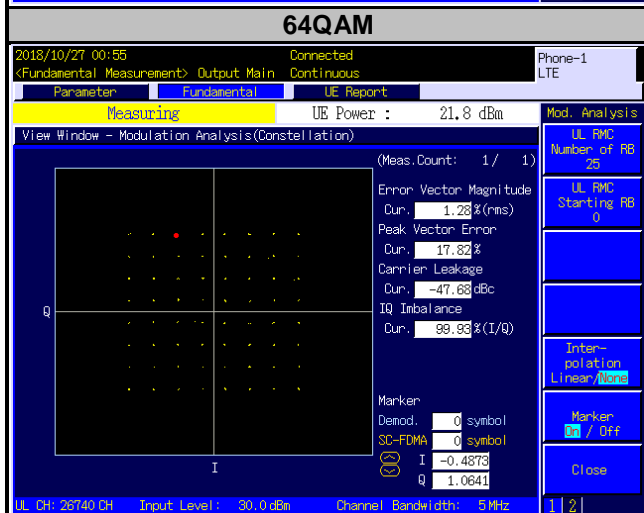
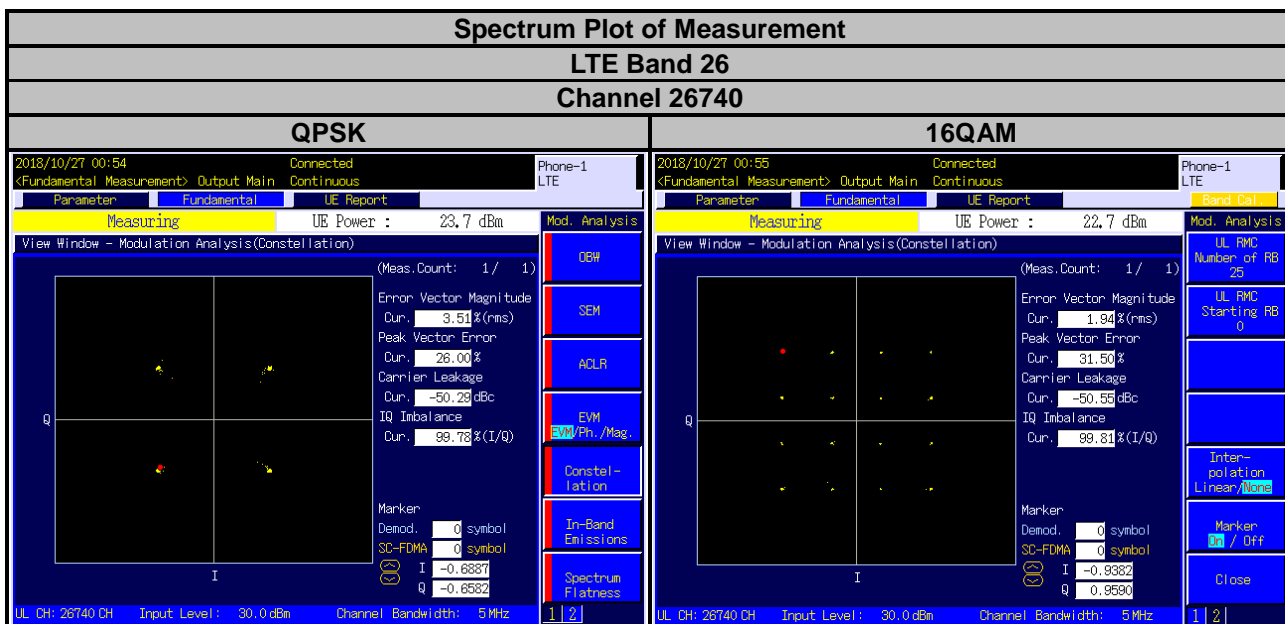
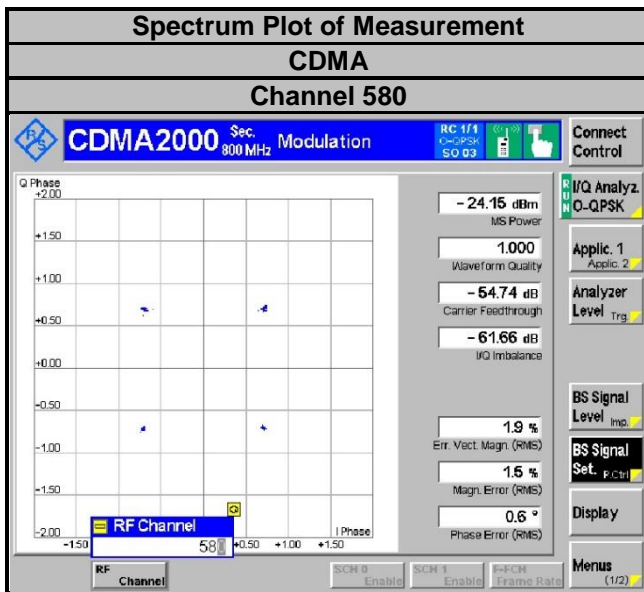
4.2.2 Test Setup



4.2.3 Test Procedure

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

4.2.4 Test Results



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

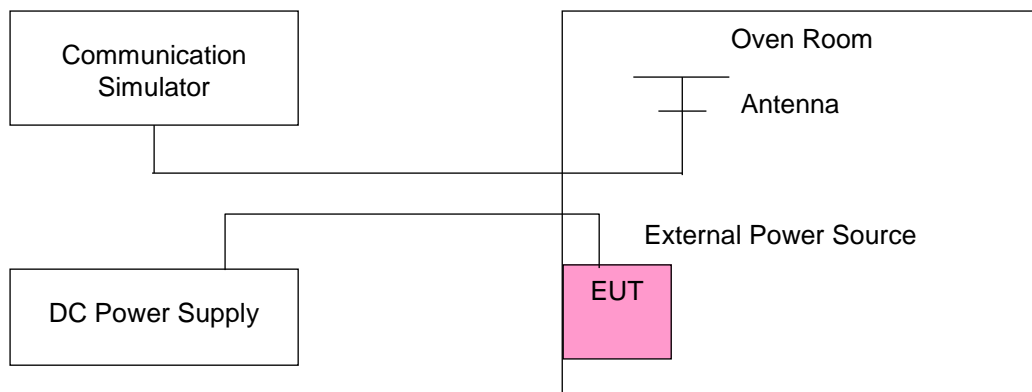
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.3.2 Test Procedure

- a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	CDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	817.900003	0.003	823.100004	0.005	2.5
3.6	817.900003	0.003	823.100004	0.005	2.5
4.4	817.900004	0.004	823.100002	0.003	2.5

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

Frequency Error vs. Temperature

Temp. (°C)	CDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	817.900004	0.005	823.100003	0.004	2.5
-20	817.900004	0.004	823.100002	0.002	2.5
-10	817.900004	0.005	823.100001	0.001	2.5
0	817.900001	0.002	823.100002	0.002	2.5
10	817.900004	0.004	823.100003	0.004	2.5
20	817.899998	-0.002	823.099997	-0.004	2.5
30	817.899998	-0.003	823.099997	-0.003	2.5
40	817.899999	-0.002	823.099999	-0.001	2.5
50	817.899997	-0.004	823.099998	-0.002	2.5
55	817.899998	-0.002	823.099996	-0.005	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	814.700001	0.002	823.300000	0.002	2.5
3.6	814.700001	0.001	823.300000	0.005	2.5
4.4	814.700003	0.003	823.300000	0.002	2.5

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

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	814.700004	0.004	823.300000	0.002	2.5
-20	814.700003	0.004	823.300000	0.003	2.5
-10	814.700004	0.004	823.300000	0.004	2.5
0	814.700002	0.003	823.300000	0.003	2.5
10	814.700002	0.002	823.300000	0.004	2.5
20	814.699998	-0.002	823.300000	-0.004	2.5
30	814.699997	-0.004	823.300000	-0.002	2.5
40	814.699996	-0.005	823.300000	-0.002	2.5
50	814.699999	-0.002	823.300000	-0.002	2.5
55	814.699999	-0.001	823.300000	-0.003	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	815.500002	0.002	822.500000	0.004	2.5
3.6	815.500002	0.002	822.500000	0.002	2.5
4.4	815.500003	0.003	822.500000	0.004	2.5

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

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	815.500003	0.004	822.500000	0.003	2.5
-20	815.500003	0.004	822.500000	0.005	2.5
-10	815.500001	0.001	822.500000	0.004	2.5
0	815.500004	0.004	822.500000	0.004	2.5
10	815.500004	0.005	822.500000	0.003	2.5
20	815.499997	-0.004	822.500000	-0.004	2.5
30	815.499996	-0.005	822.500000	-0.002	2.5
40	815.499996	-0.005	822.500000	-0.003	2.5
50	815.499996	-0.005	822.500000	-0.004	2.5
55	815.499997	-0.004	822.500000	-0.003	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	816.500003	0.003	821.500000	0.002	2.5
3.6	816.500004	0.005	821.500000	0.003	2.5
4.4	816.500004	0.005	821.500000	0.003	2.5

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

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	816.500002	0.003	821.500000	0.003	2.5
-20	816.500002	0.003	821.500000	0.002	2.5
-10	816.500004	0.005	821.500000	0.002	2.5
0	816.500003	0.003	821.500000	0.005	2.5
10	816.500002	0.002	821.500000	0.004	2.5
20	816.499998	-0.003	821.500000	-0.001	2.5
30	816.499996	-0.004	821.500000	-0.003	2.5
40	816.499997	-0.003	821.500000	-0.002	2.5
50	816.499996	-0.005	821.500000	-0.004	2.5
55	816.499997	-0.004	821.500000	-0.004	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26		Limit (ppm)
	Channel Bandwidth: 10 MHz		
	Frequency (MHz)	Frequency Error (ppm)	
3.85	819.000002	0.003	2.5
3.6	819.000001	0.001	2.5
4.4	819.000003	0.004	2.5

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

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26		Limit (ppm)
	Channel Bandwidth: 10 MHz		
	Frequency (MHz)	Frequency Error (ppm)	
-30	819.000003	0.004	2.5
-20	819.000003	0.004	2.5
-10	819.000001	0.002	2.5
0	819.000004	0.005	2.5
10	819.000004	0.005	2.5
20	818.999998	-0.002	2.5
30	818.999997	-0.004	2.5
40	818.999999	-0.002	2.5
50	818.999998	-0.003	2.5
55	818.999997	-0.004	2.5

4.4 Occupied Bandwidth Measurement

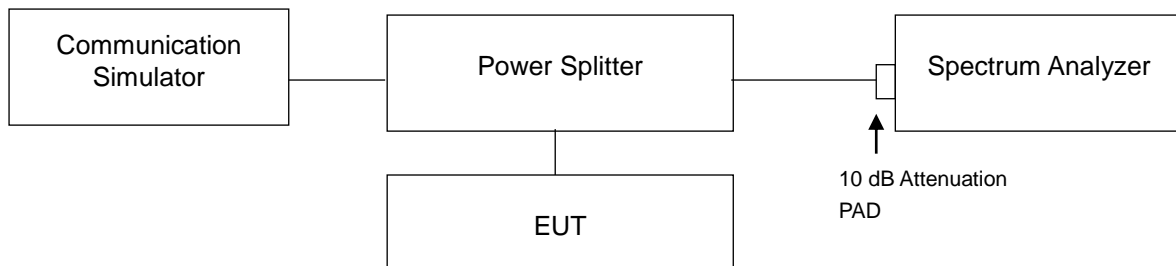
4.4.1 Limits of Occupied Bandwidth Measurement

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

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

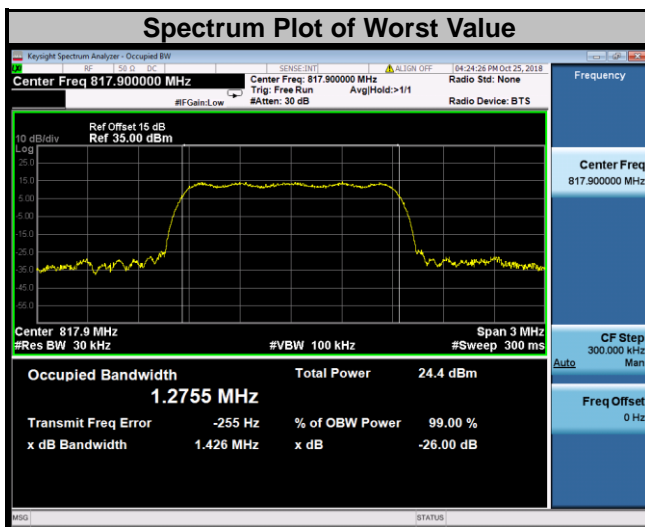
4.4.3 Test Setup



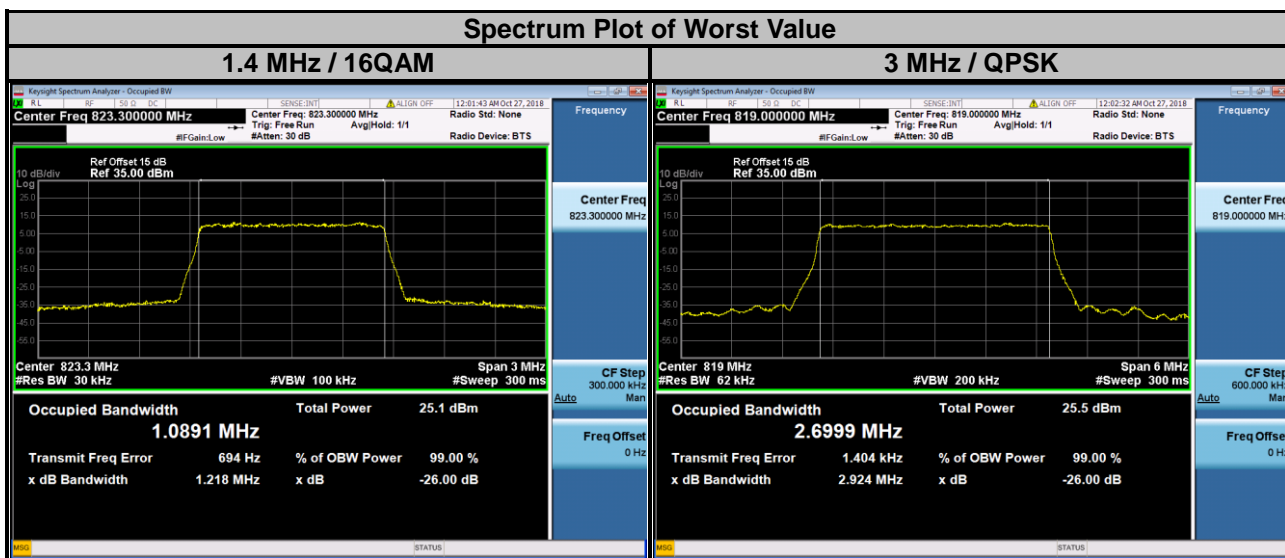
4.4.4 Test Results

<99 % Occupied Bandwidth>

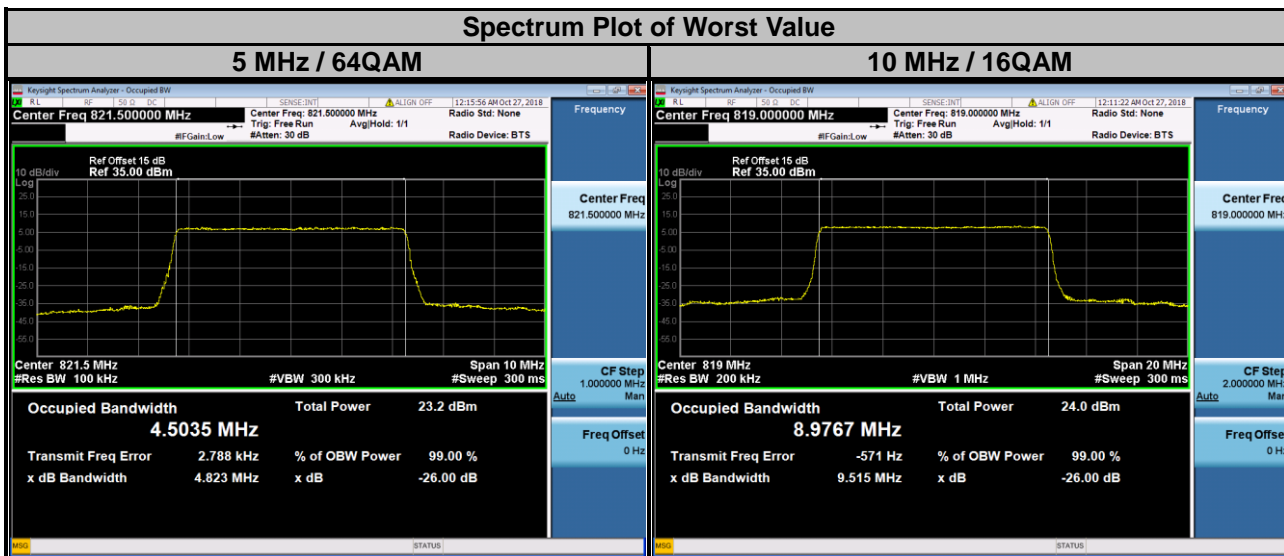
CDMA		
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)
476	817.9	1.2755
580	820.5	1.2727
684	823.1	1.2749



LTE Band 26									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26697	814.7	1.0866	1.0870	1.0890	26705	815.5	2.6992	2.6968	2.6976
26740	819.0	1.0851	1.0885	1.0885	26740	819.0	2.6999	2.6968	2.6979
26783	823.3	1.0856	1.0891	1.0881	26775	822.5	2.6996	2.6977	2.6972

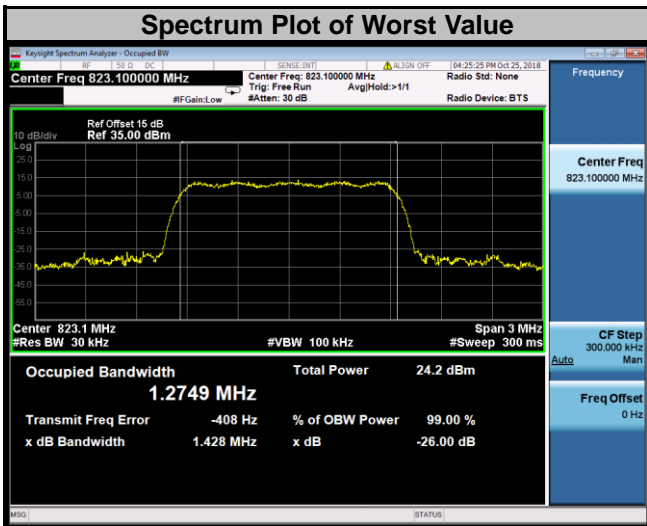


LTE Band 26									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26715	816.5	4.4901	4.4935	4.4968	26740	819.0	8.9720	8.9767	8.9737
26740	819.0	4.4913	4.4947	4.5011					
26765	821.5	4.4910	4.4923	4.5035					

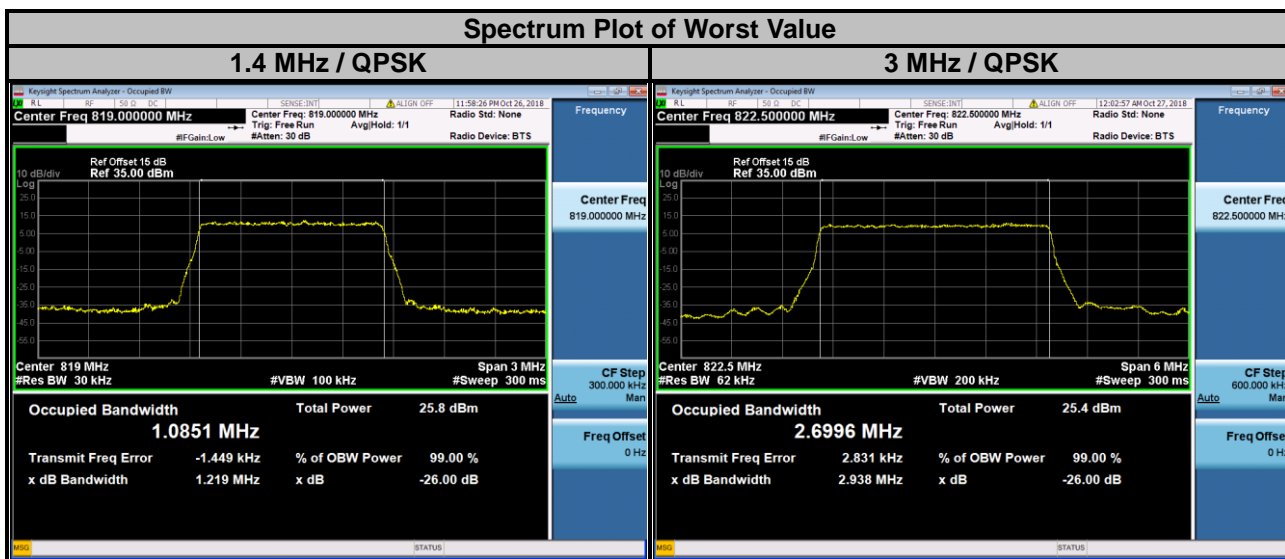


<26 dB Bandwidth>

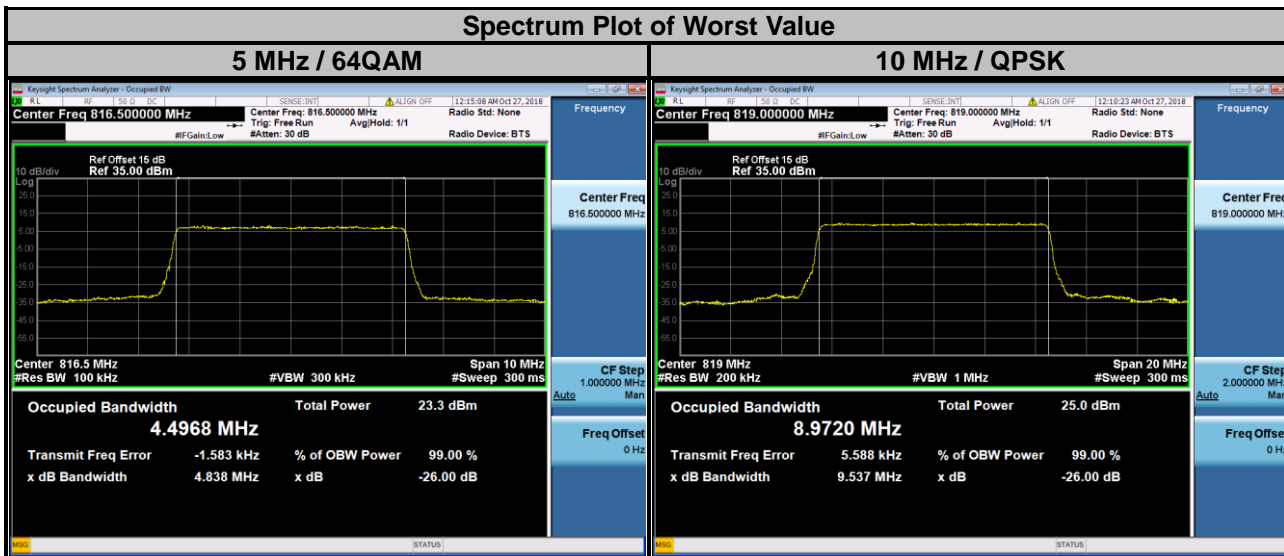
CDMA		
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
476	817.9	1.426
580	820.5	1.425
684	823.1	1.428



LTE Band 26									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26697	814.7	1.216	1.216	1.213	26705	815.5	2.919	2.932	2.926
26740	819.0	1.219	1.215	1.215	26740	819.0	2.924	2.937	2.931
26783	823.3	1.214	1.218	1.217	26775	822.5	2.938	2.927	2.928



LTE Band 26									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26715	816.5	4.805	4.814	4.838	26740	819.0	9.537	9.515	9.519
26740	819.0	4.814	4.800	4.827					
26765	821.5	4.837	4.799	4.823					



4.5 Emission Mask Measurement

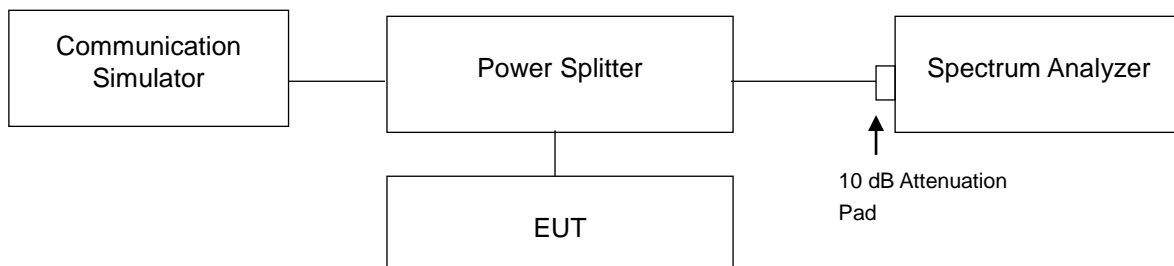
4.5.1 Limits of Emission Mask Measurement

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.

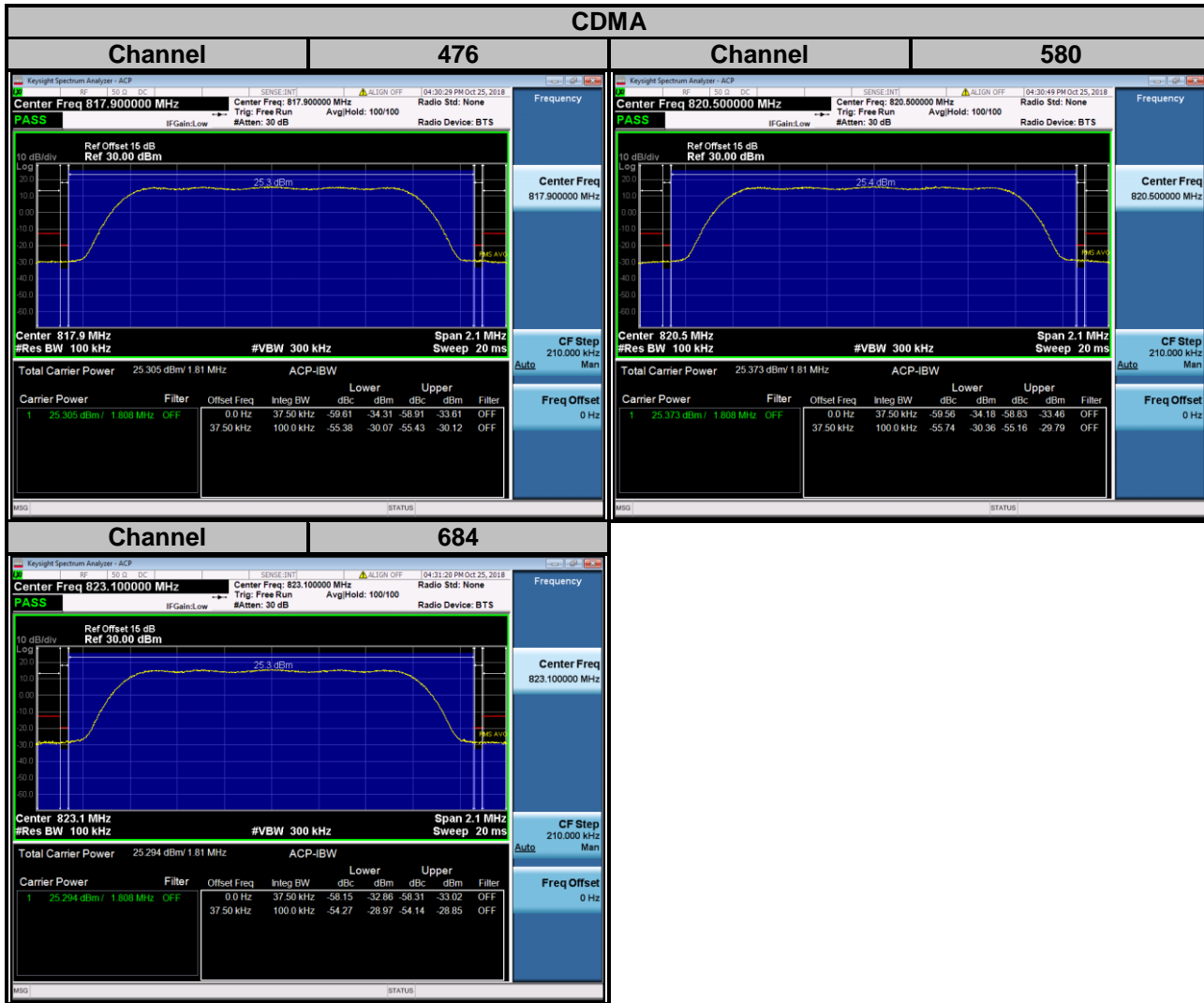
4.5.2 Test Setup



4.5.3 Test Procedures

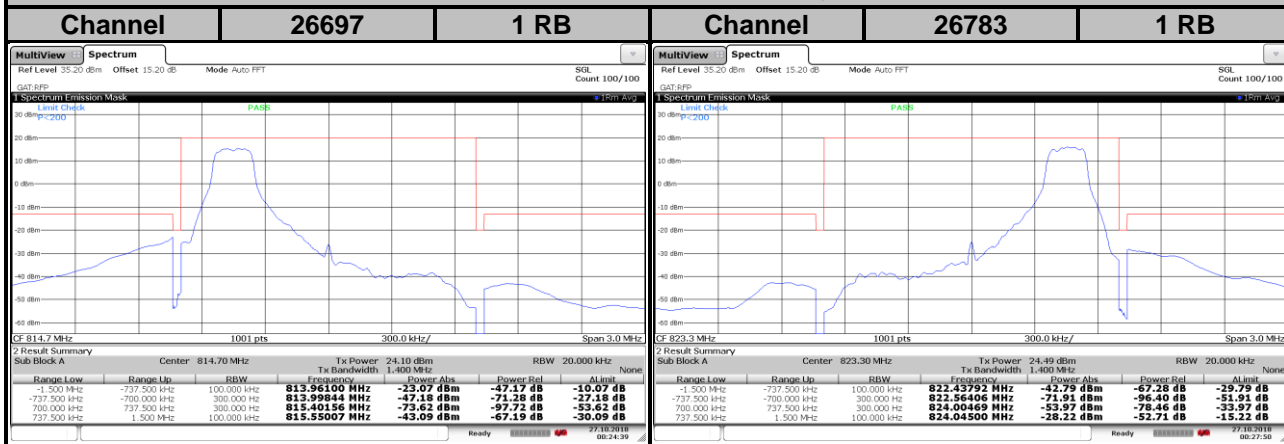
- The measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Record the test plot.

4.5.4 Test Results



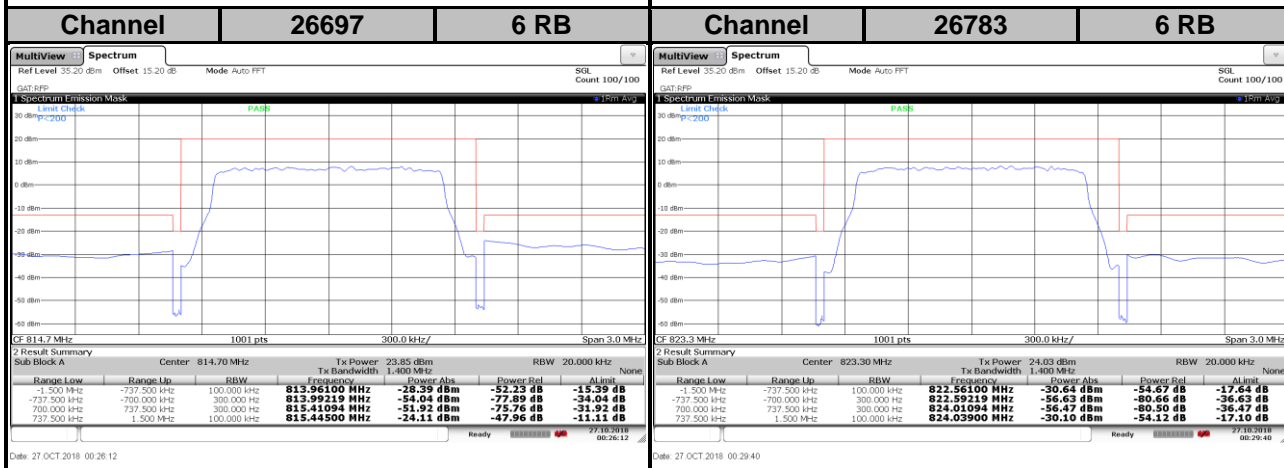
LTE Band 26

Channel Bandwidth: 1.4 MHz / QPSK



Date: 27 OCT 2018 00:24:40

Date: 27 OCT 2018 00:27:50

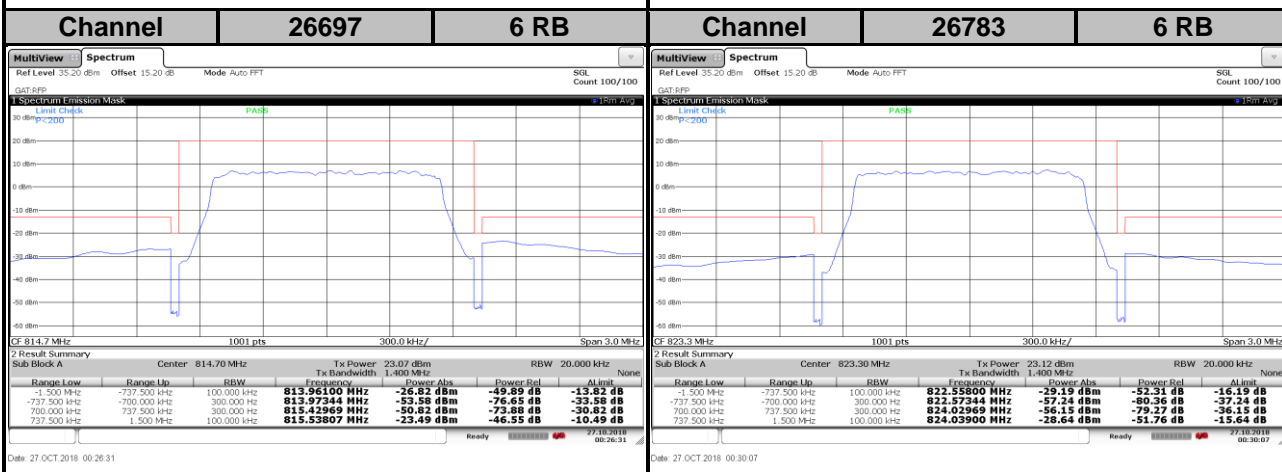
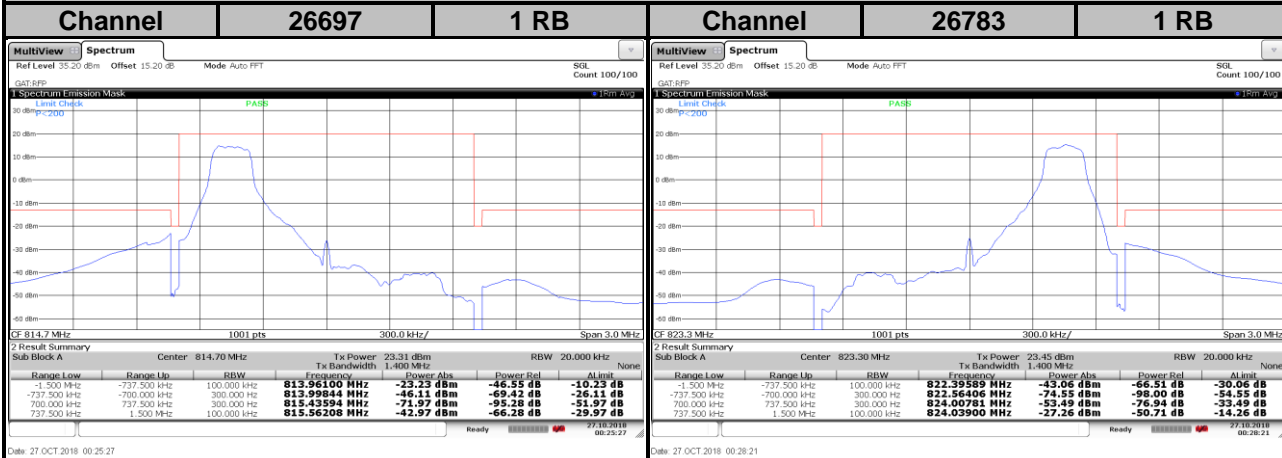


Date: 27 OCT 2018 00:26:12

Date: 27 OCT 2018 00:29:40

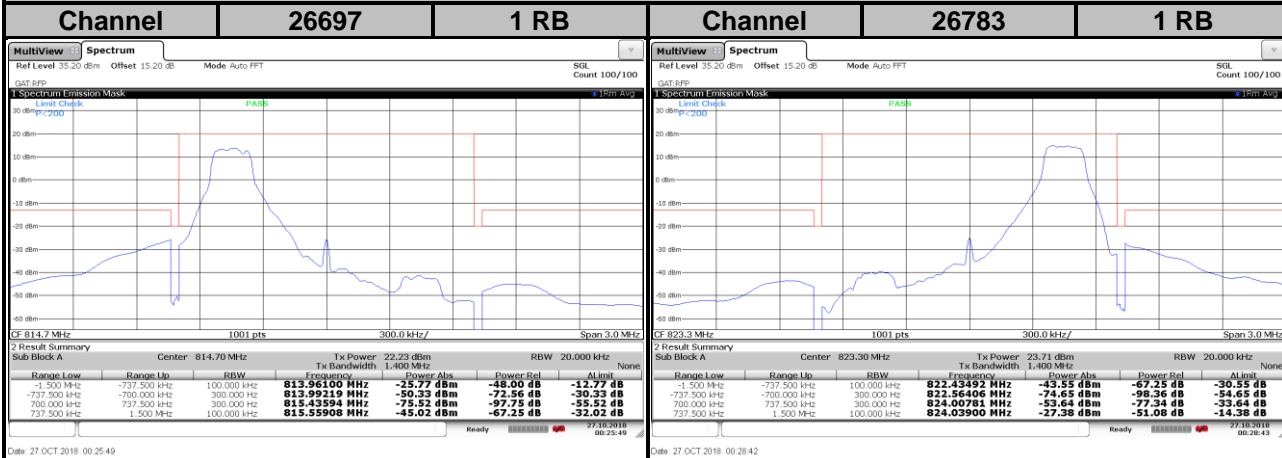
LTE Band 26

Channel Bandwidth: 1.4 MHz / 16QAM



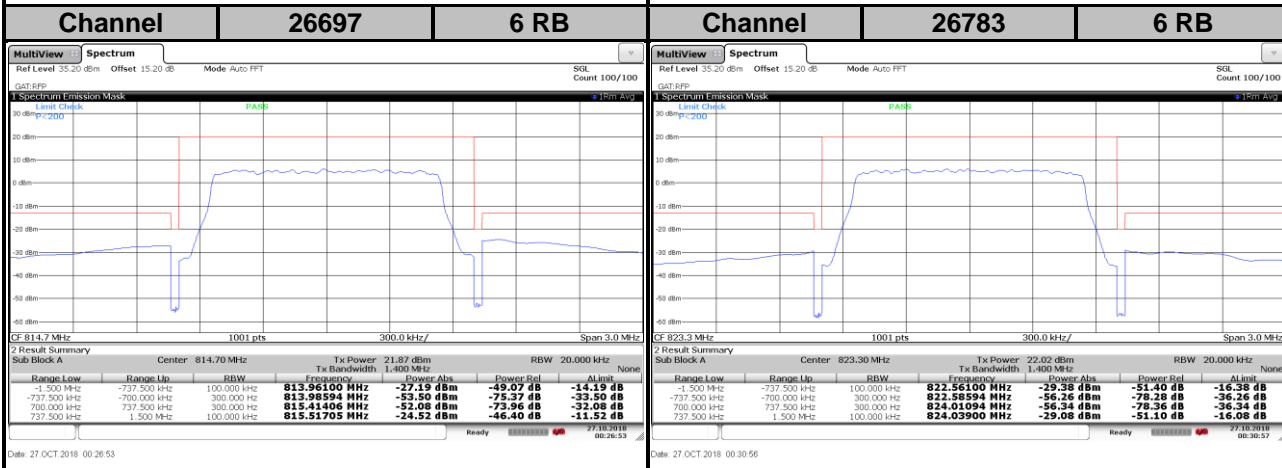
LTE Band 26

Channel Bandwidth: 1.4 MHz / 64QAM



Date: 27 OCT 2018 00:25:49

Date: 27 OCT 2018 00:28:42

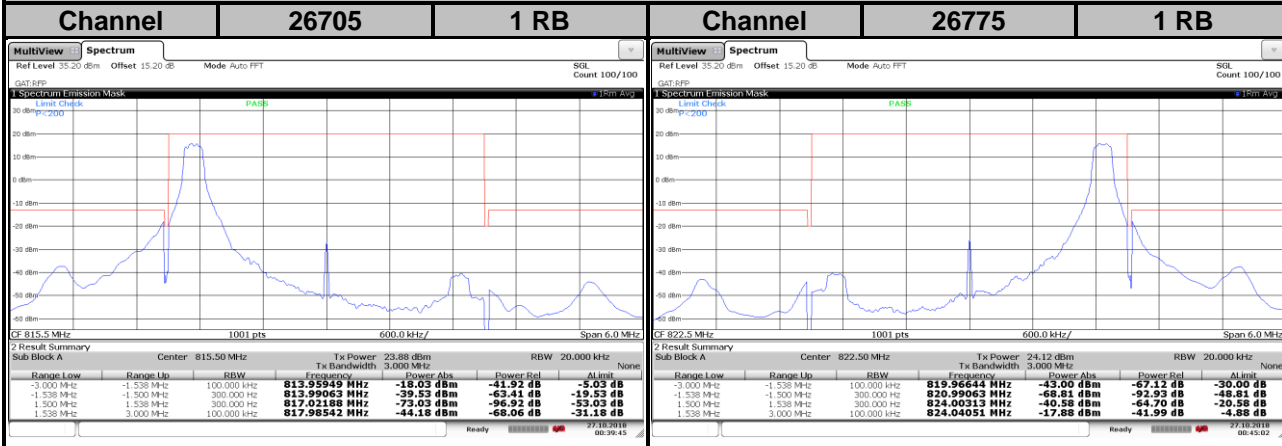


Date: 27 OCT 2018 00:26:53

Date: 27 OCT 2018 00:30:56

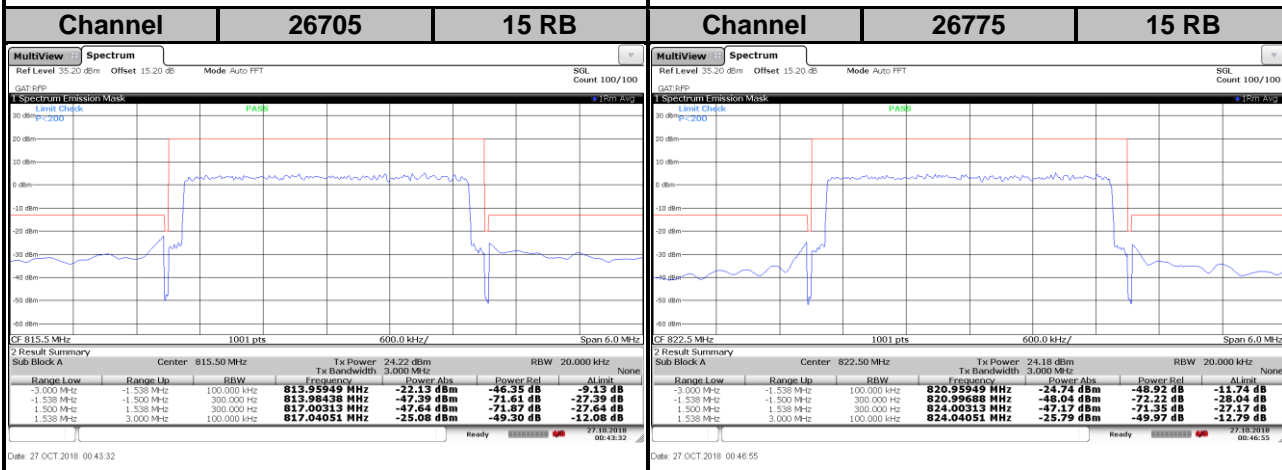
LTE Band 26

Channel Bandwidth: 3 MHz / QPSK



Date: 27 OCT 2018 00:39:45

Date: 27 OCT 2018 00:45:02



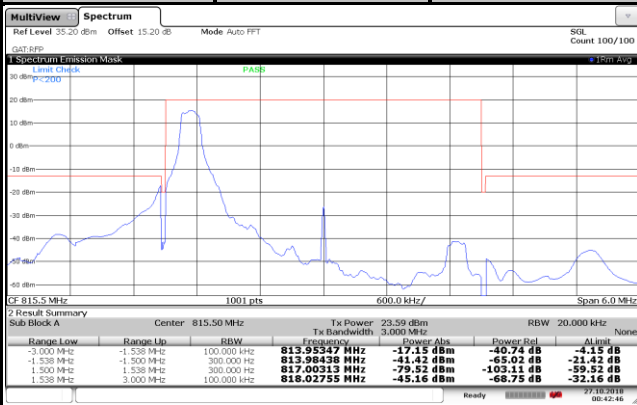
Date: 27 OCT 2018 00:43:32

Date: 27 OCT 2018 00:46:55

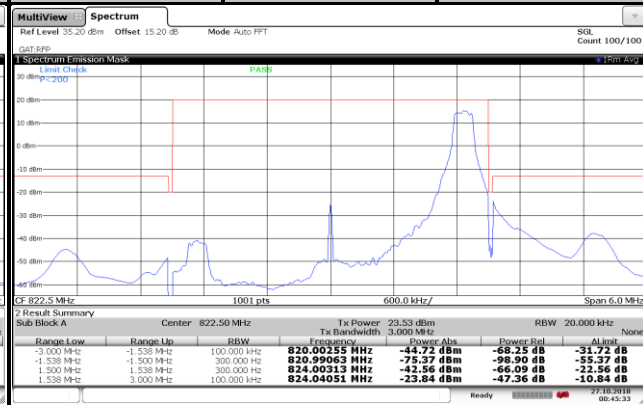
LTE Band 26

Channel Bandwidth: 3 MHz / 16QAM

Channel 26705 1 RB Channel 26775 1 RB

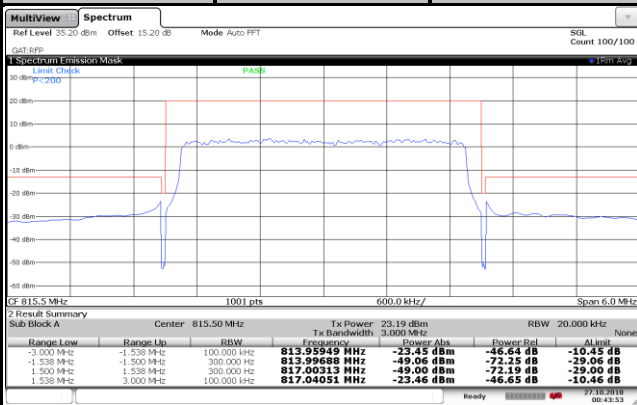


Date: 27 OCT 2018 00:42:47

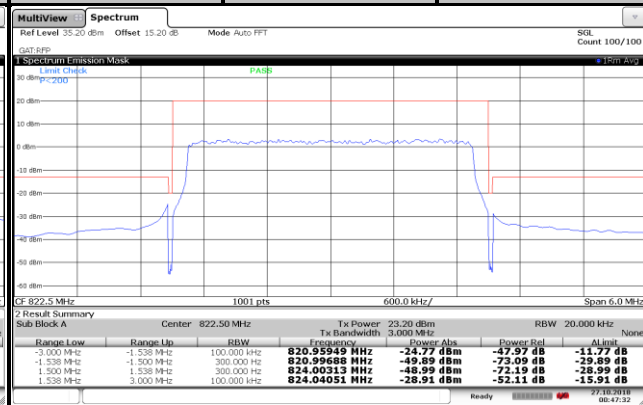


Date: 27 OCT 2018 00:45:33

Channel 26705 15 RB Channel 26775 15 RB



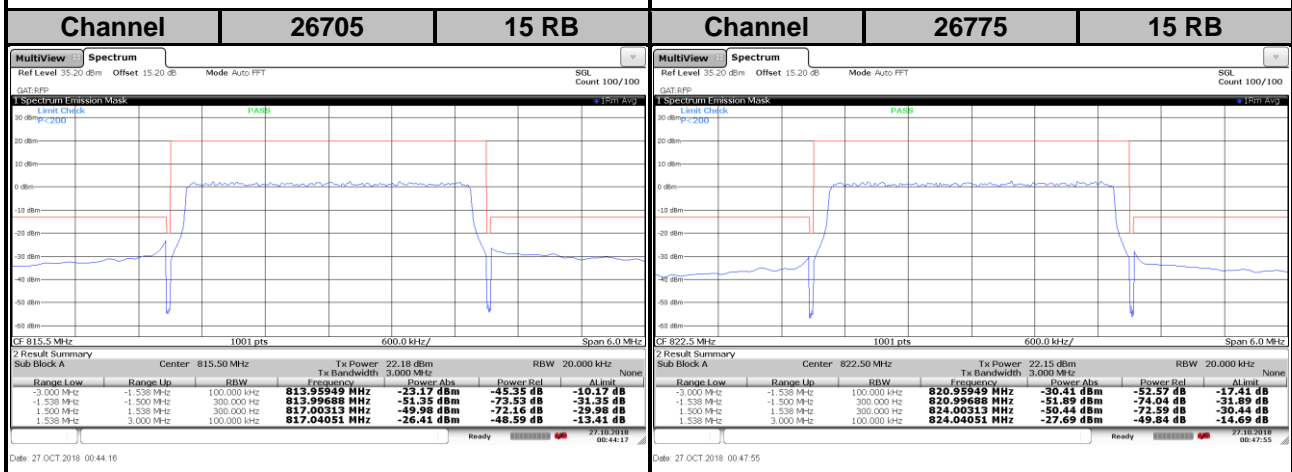
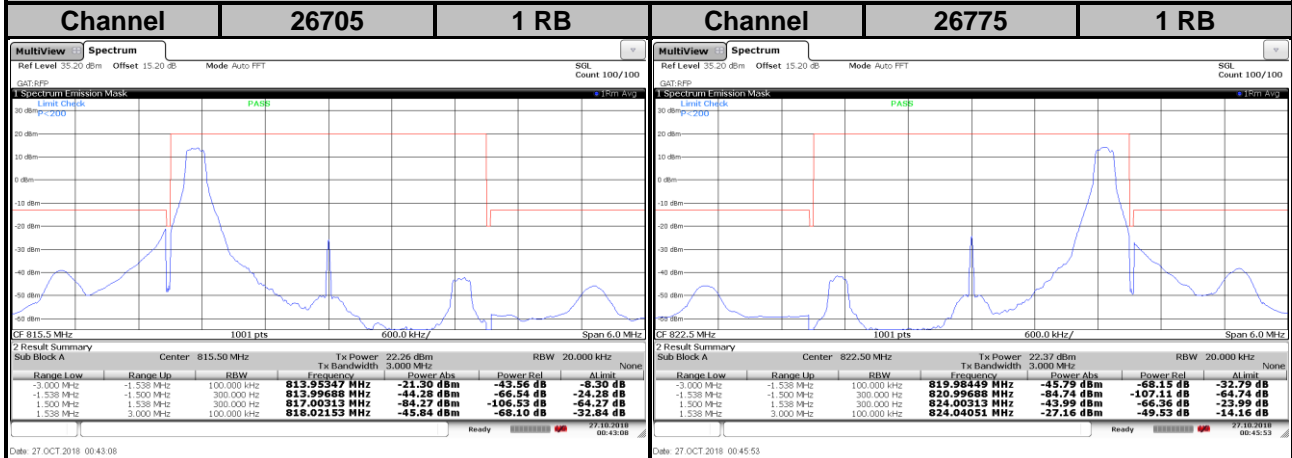
Date: 27 OCT 2018 00:43:54



Date: 27 OCT 2018 00:47:32

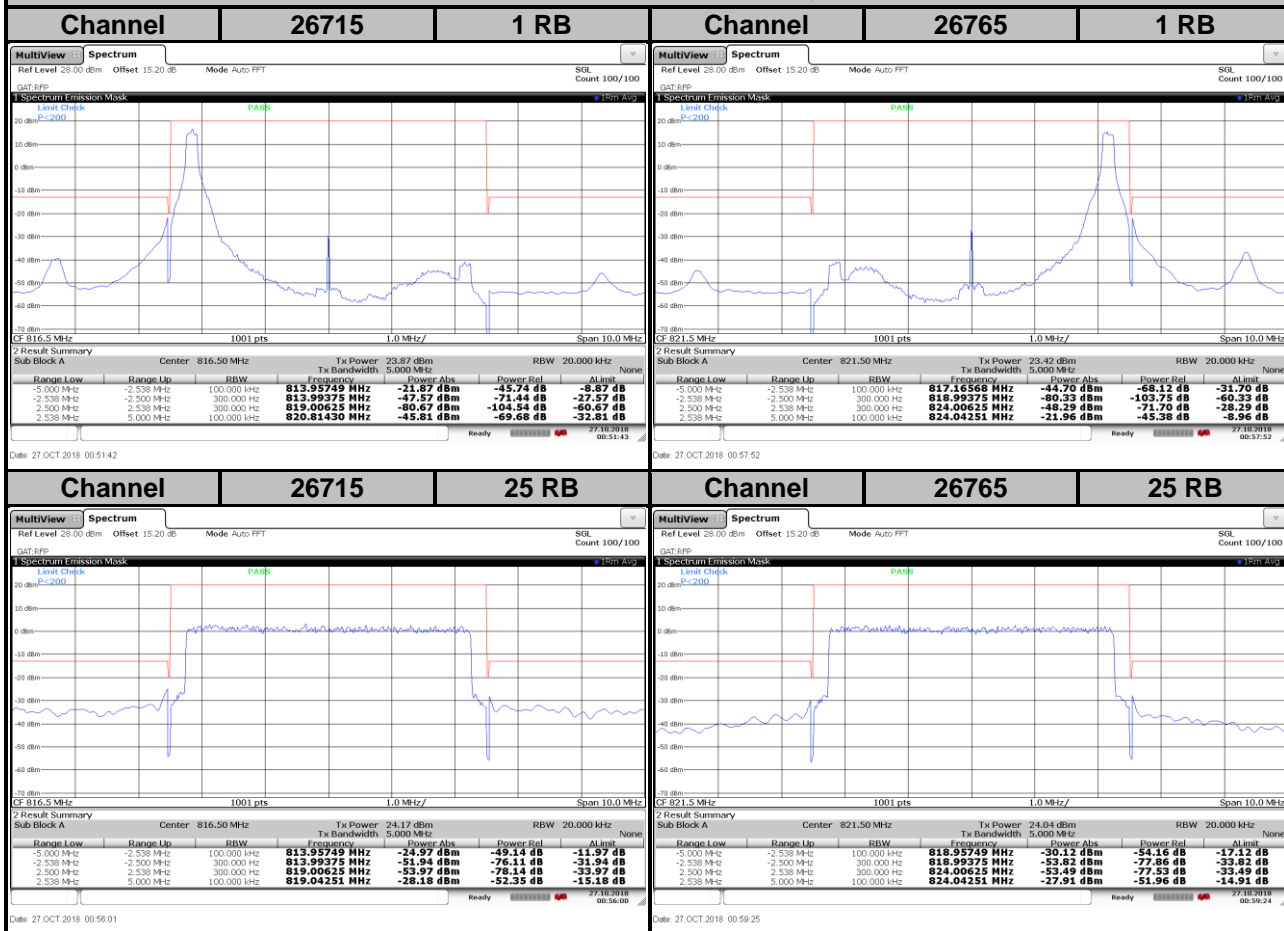
LTE Band 26

Channel Bandwidth: 3 MHz / 64QAM



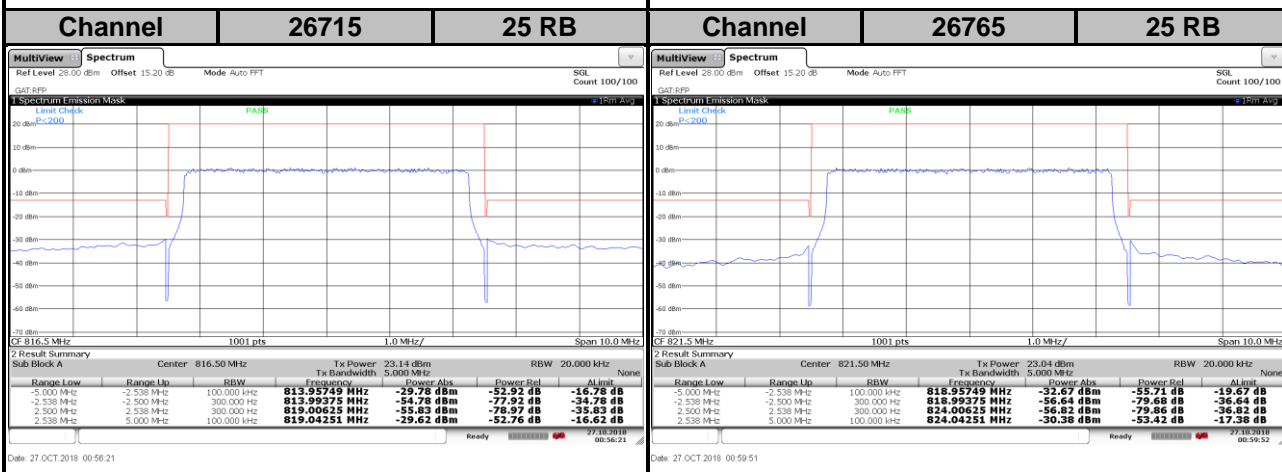
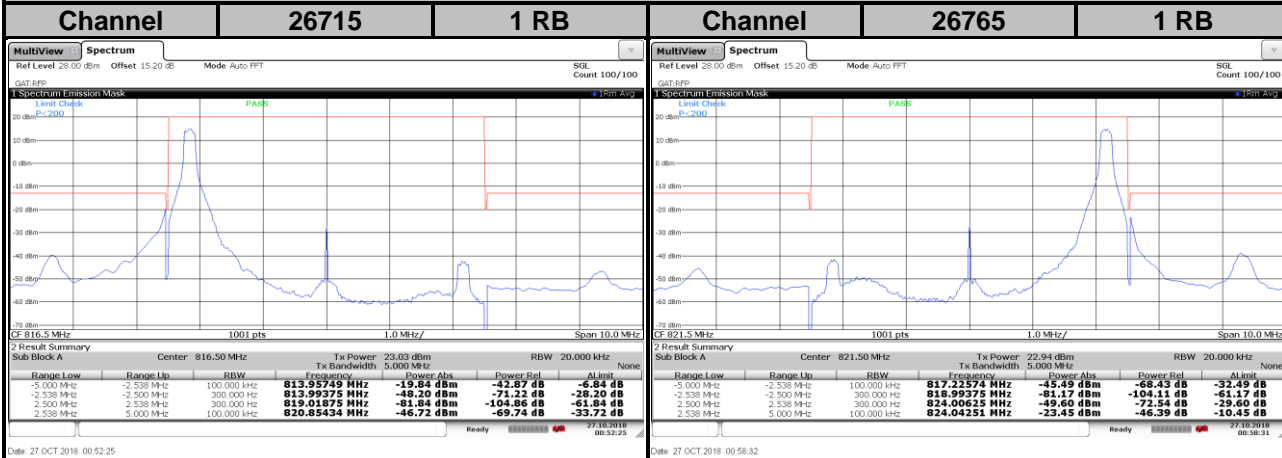
LTE Band 26

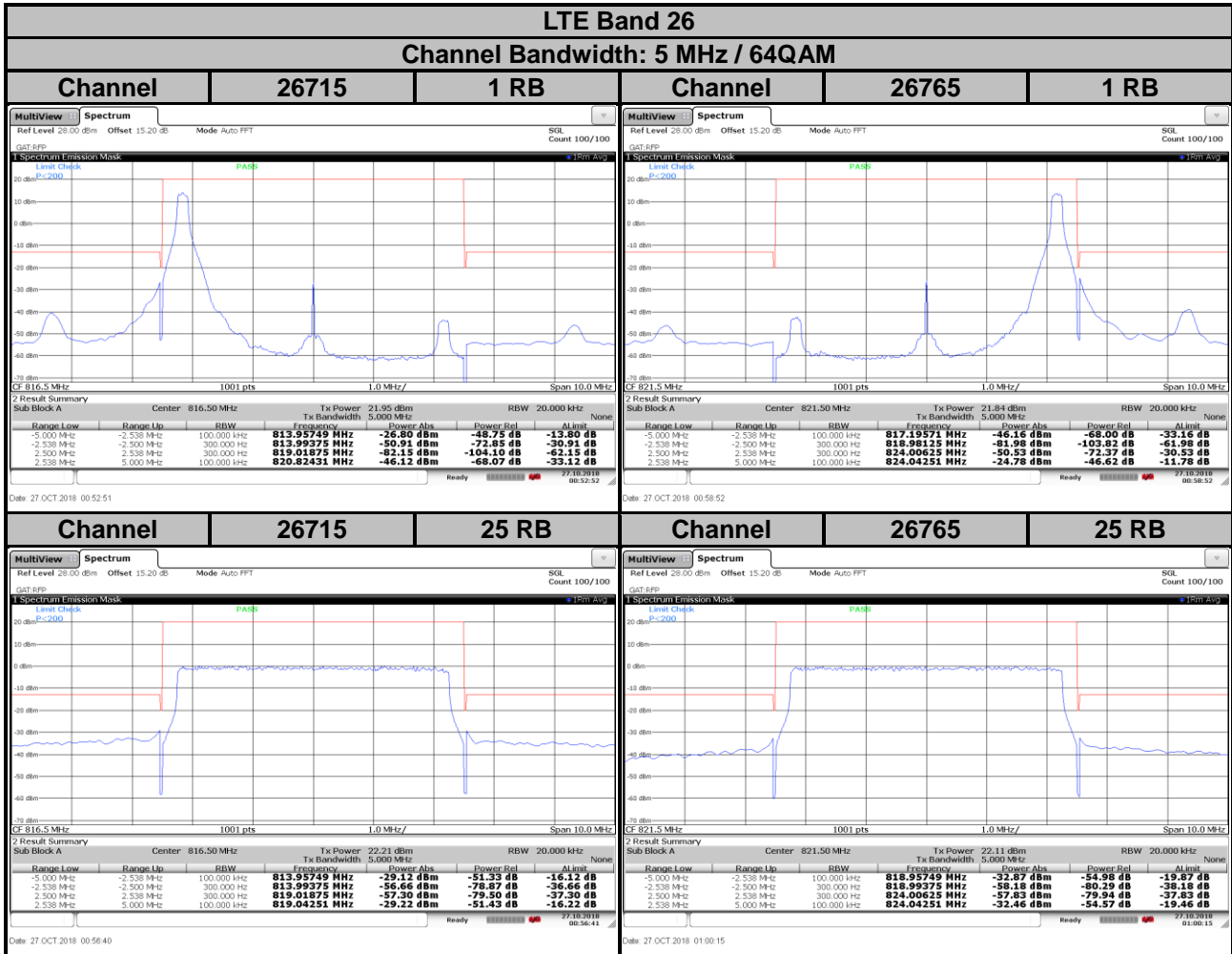
Channel Bandwidth: 5 MHz / QPSK



LTE Band 26

Channel Bandwidth: 5 MHz / 16QAM

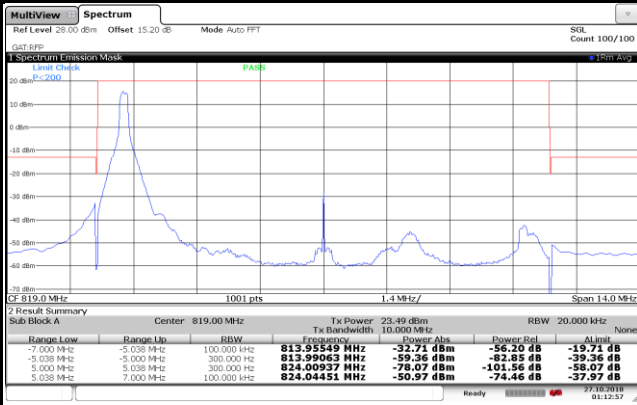




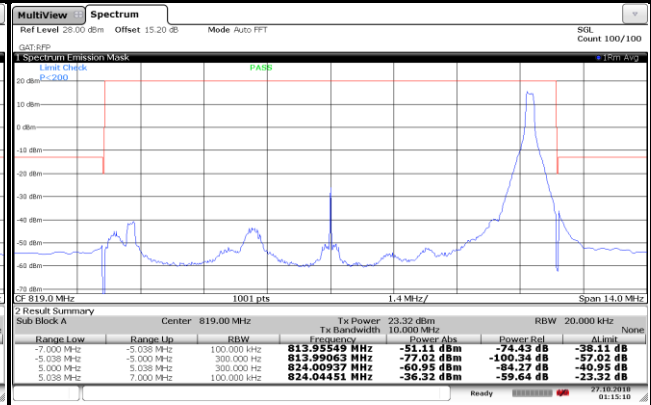
LTE Band 26

Channel Bandwidth: 10 MHz / QPSK

Channel 26740 1 RB Channel 26740 1 RB

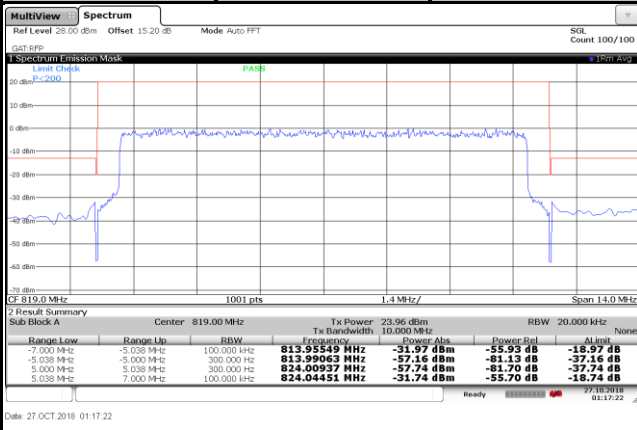


Date: 27.OCT.2018 01:12:58



Date: 27.OCT.2018 01:15:11

Channel 26740 50 RB

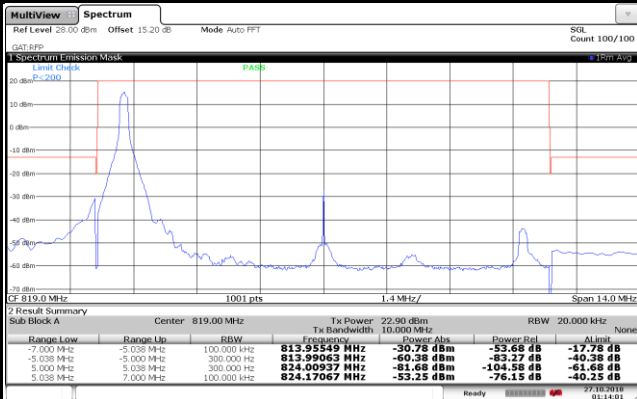


Date: 27.OCT.2018 01:17:22

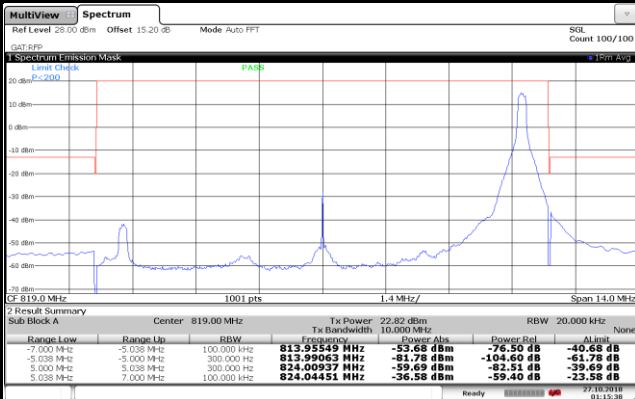
LTE Band 26

Channel Bandwidth: 10 MHz / 16QAM

Channel 26740 1 RB Channel 26740 1 RB

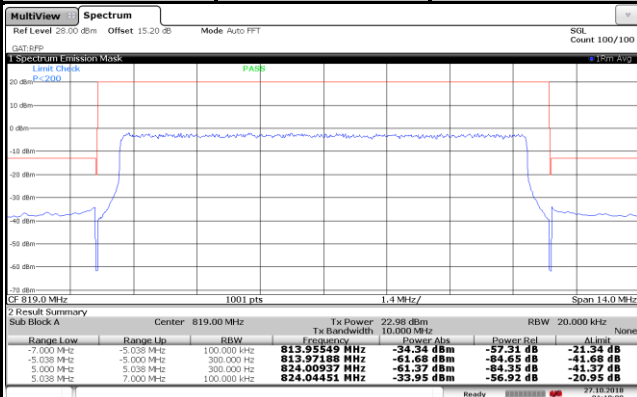


Date: 27.OCT.2018 01:14:01



Date: 27.OCT.2018 01:15:38

Channel 26740 50 RB

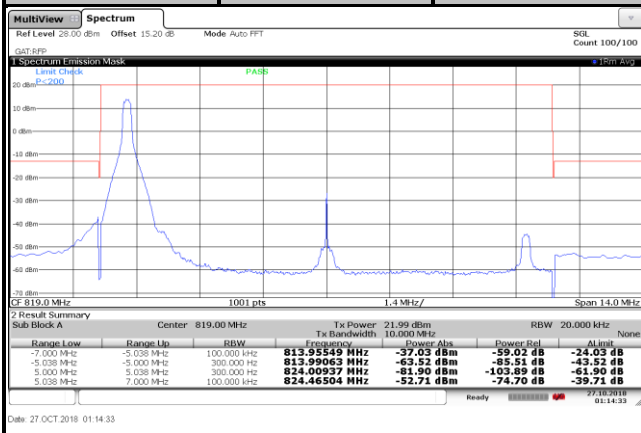


Date: 27.OCT.2018 01:18:08

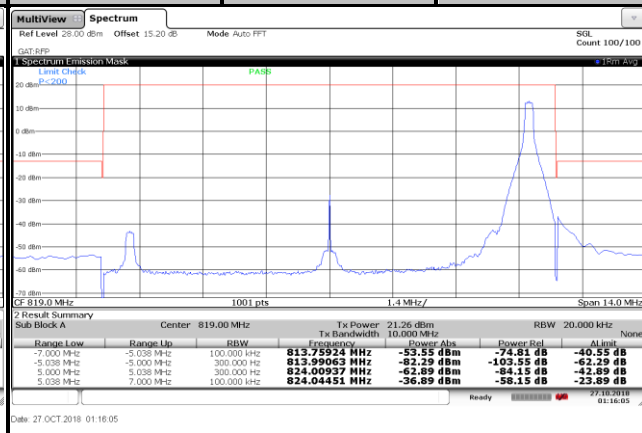
LTE Band 26

Channel Bandwidth: 10 MHz / 64QAM

Channel 26740 1 RB Channel 26740 1 RB

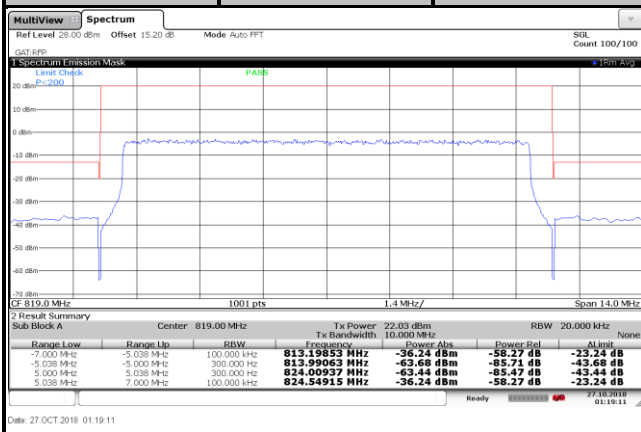


Date: 27.OCT.2018 01:14:33



Date: 27.OCT.2018 01:16:05

Channel 26740 1 RB



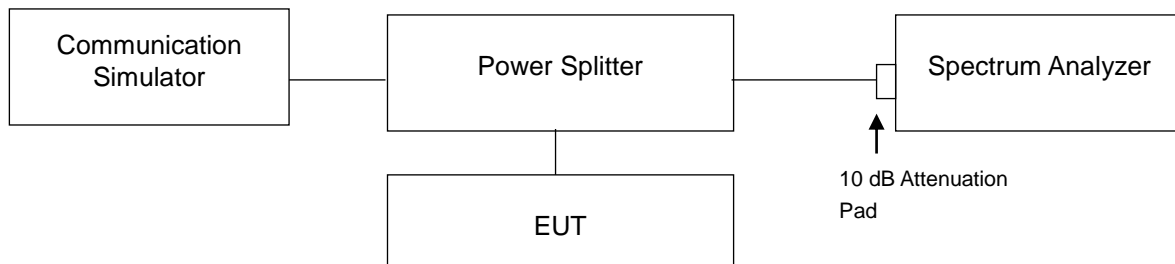
Date: 27.OCT.2018 01:19:11

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 is equal to -13 dBm.

4.6.2 Test Setup



4.6.3 Test Procedure

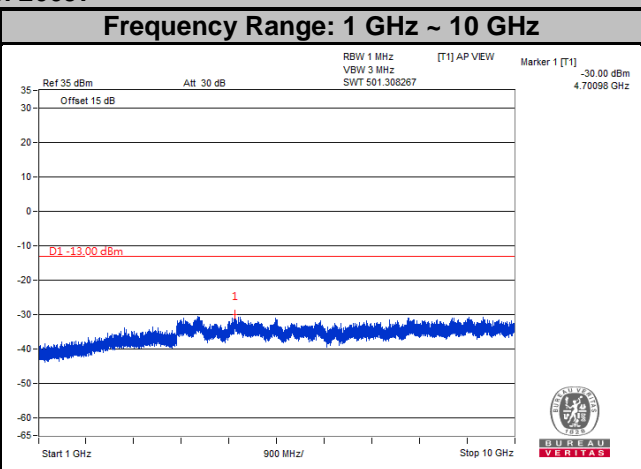
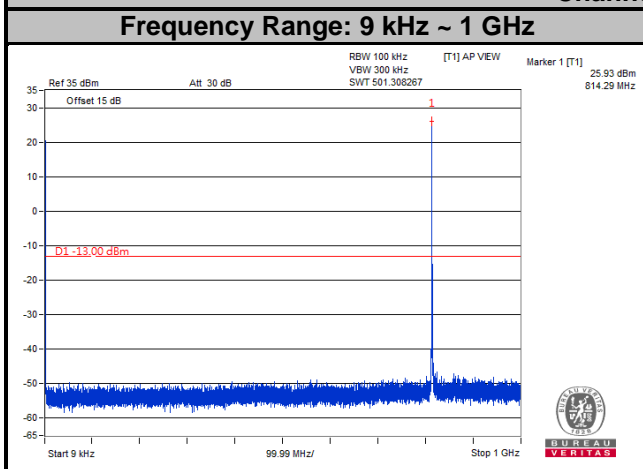
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 100 kHz and VBW = 300 kHz are used for conducted emission measurement.
- Measuring frequency range is from 1 GHz to 10 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz are used for conducted emission measurement.

4.6.4 Test Results

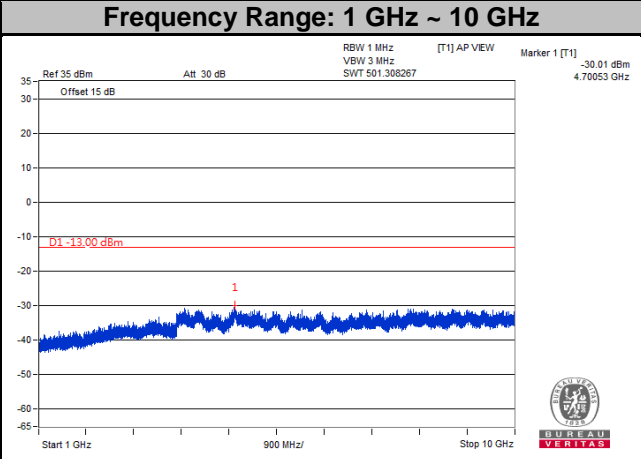
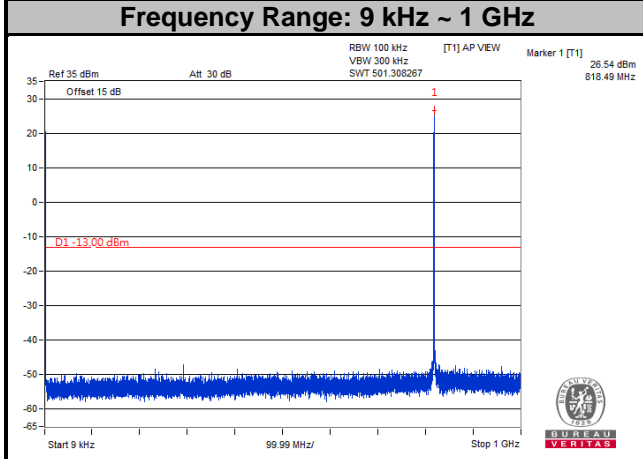


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

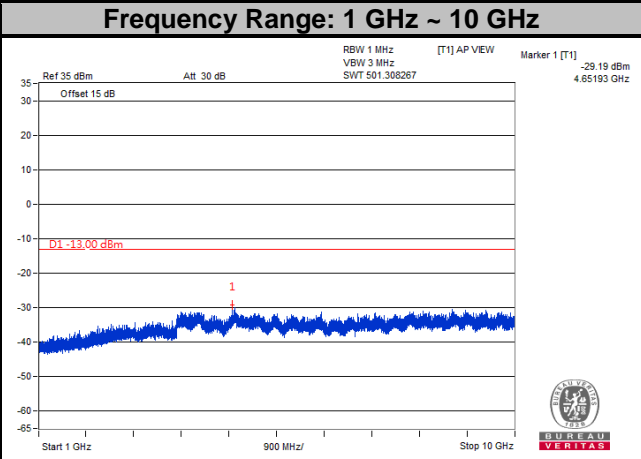
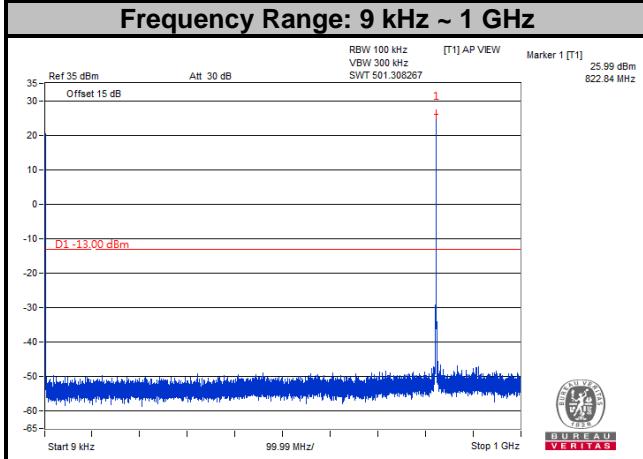
LTE Band 26
Channel Bandwidth: 1.4 MHz
Channel 26697



Channel 26740

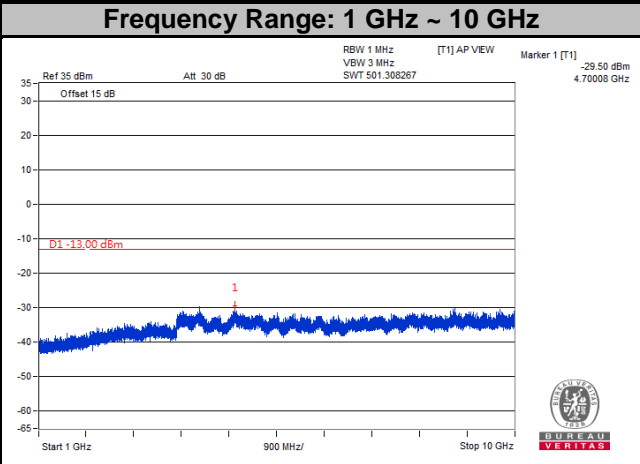
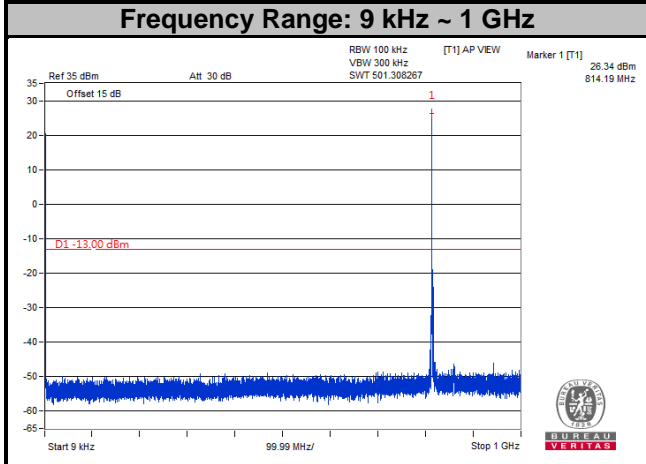


Channel 26783

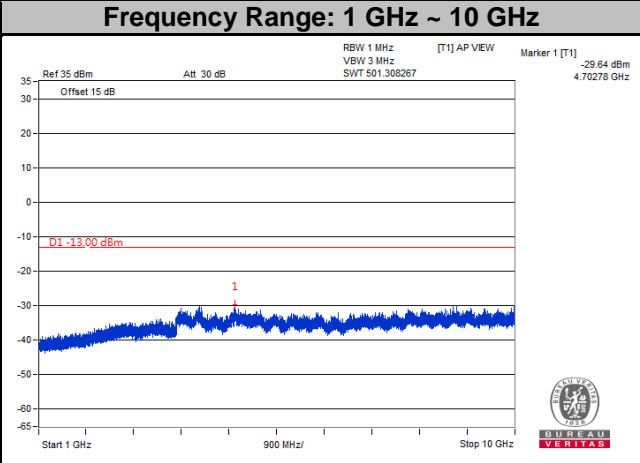
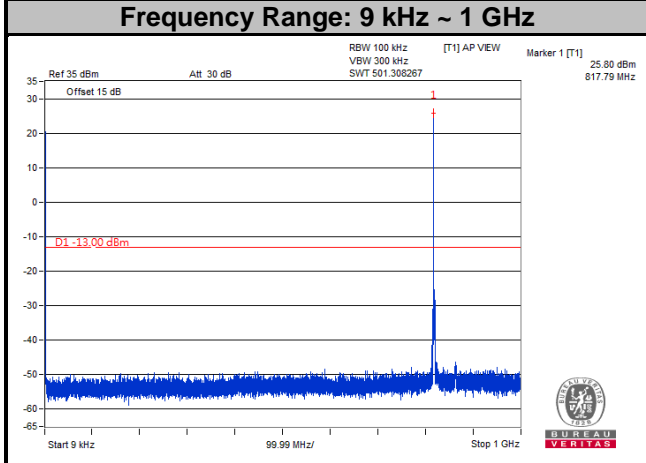


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

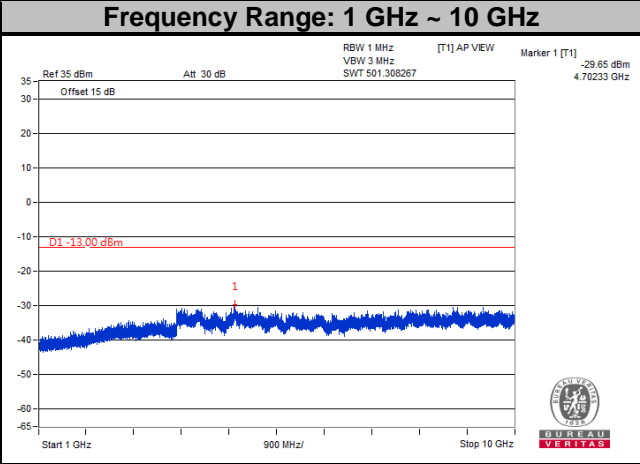
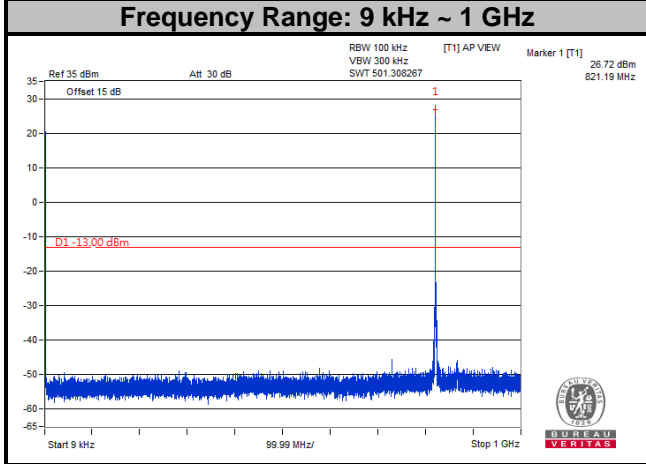
LTE Band 26
Channel Bandwidth: 3 MHz
Channel 26705



Channel 26740

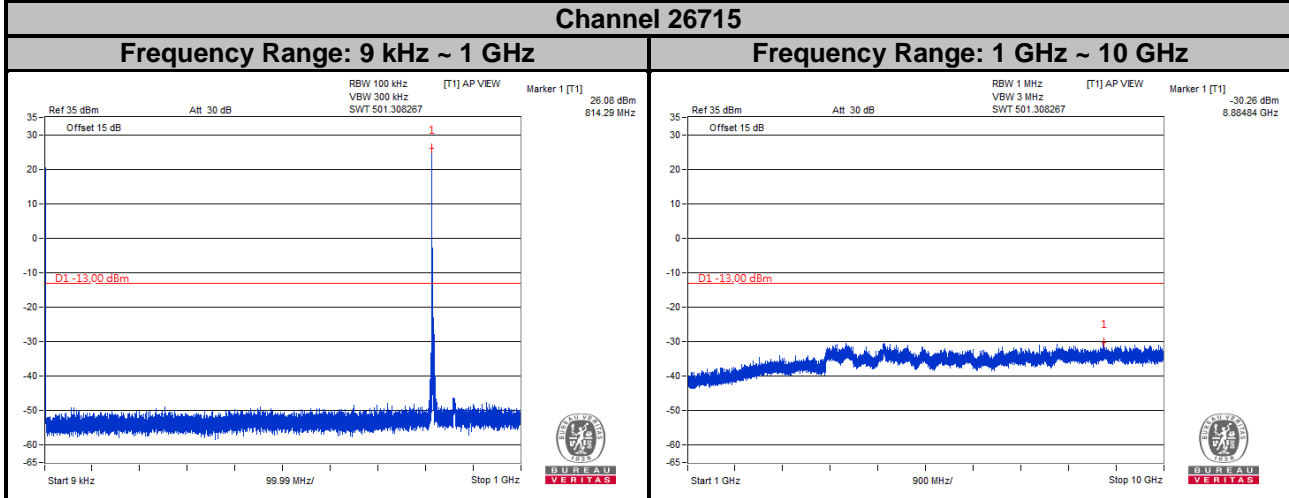


Channel 26775

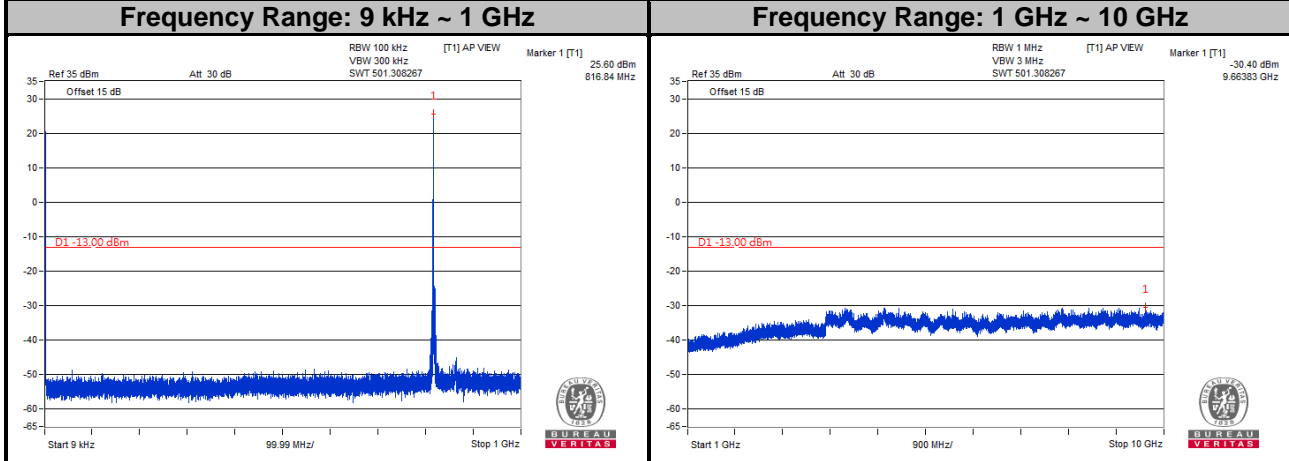


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

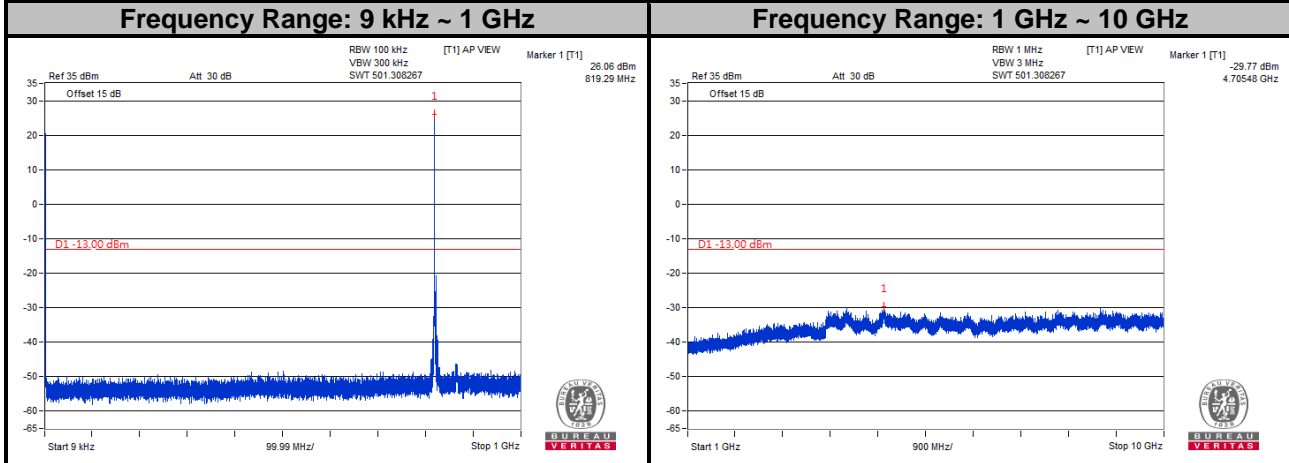
LTE Band 26
Channel Bandwidth: 5 MHz
Channel 26715



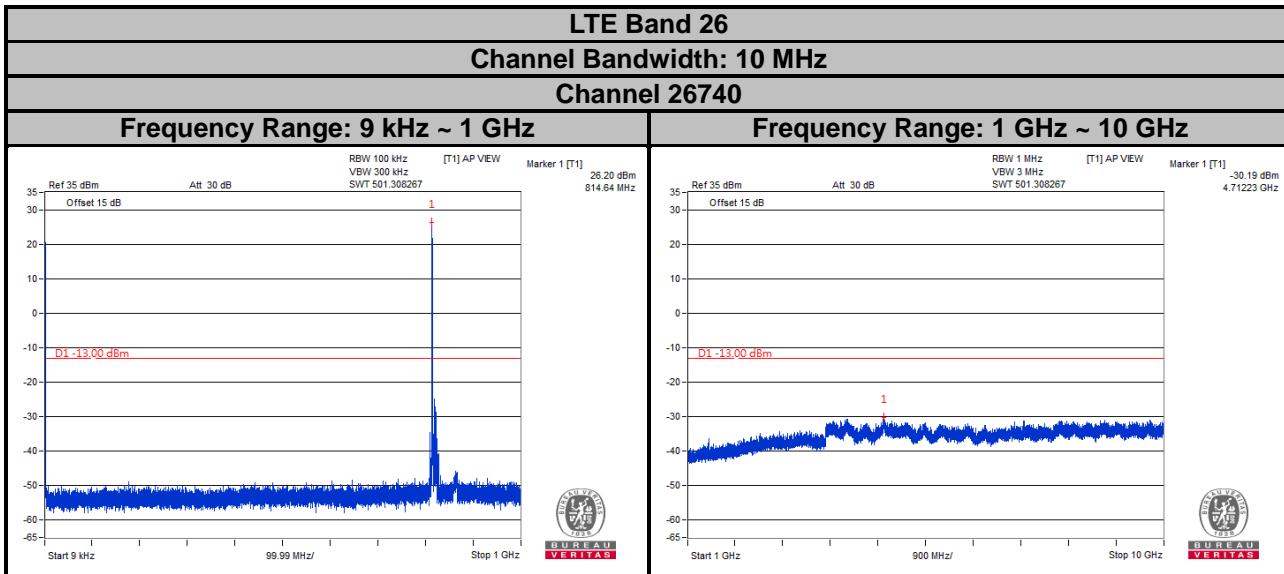
Channel 26740



Channel 26765



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



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

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 $43 + 10 \log (P)$ dB. The limit of emission is equal to -13 dBm.

4.7.2 Test Procedure

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

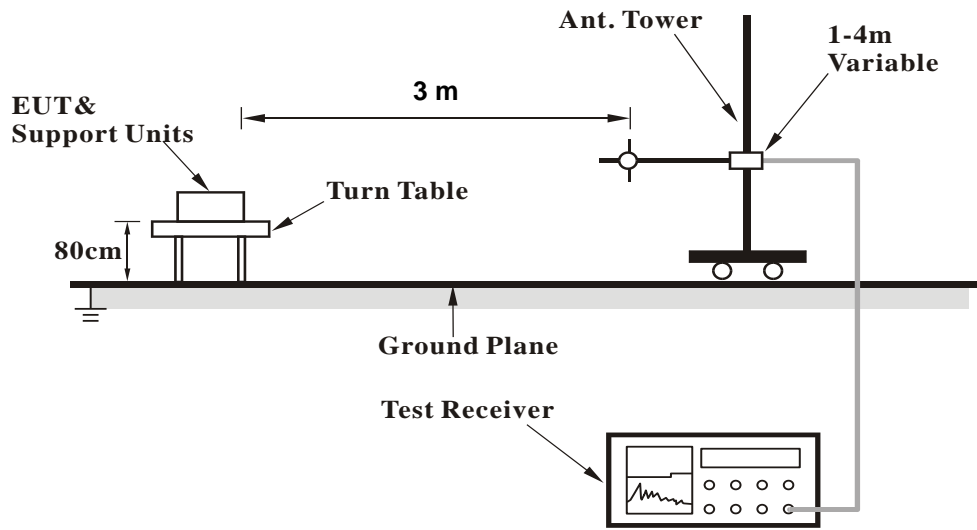
Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.7.3 Deviation from Test Standard

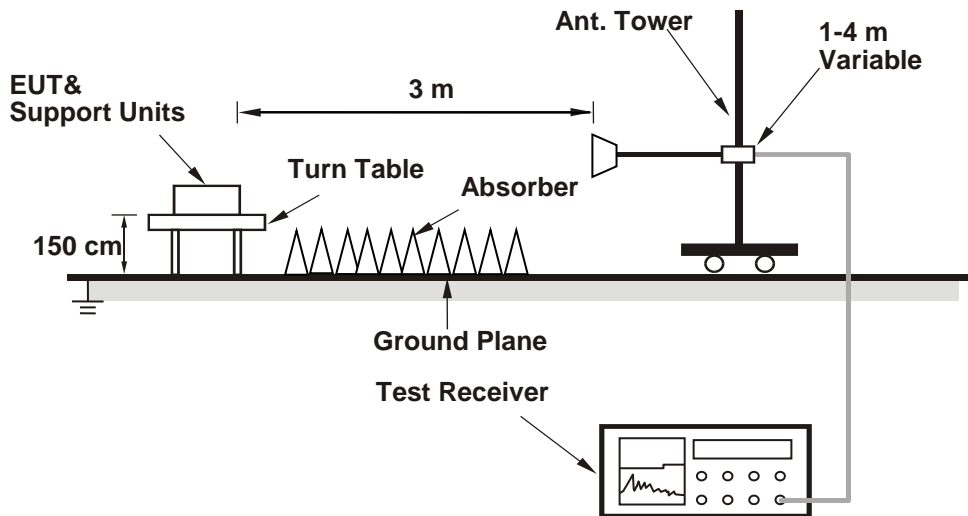
No deviation.

4.7.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

4.7.5 Test Results

CDMA:
Low Channel

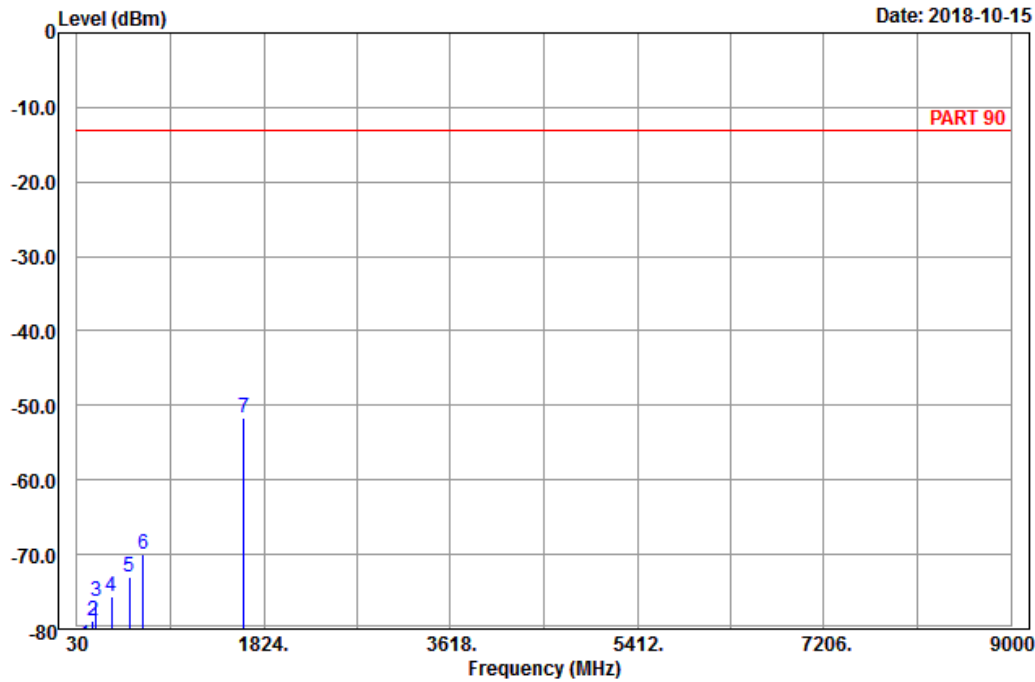


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9

Date: 2018-10-15



Site : 966 chamber 1
Condition: PART 90 Horizontal
Remark : BC 0_Link_CH476
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	110.46	-82.16	-73.28	-13.00	-69.16	-8.88	Peak
2	180.66	-78.98	-73.40	-13.00	-65.98	-5.58	Peak
3	214.14	-76.22	-70.23	-13.00	-63.22	-5.99	Peak
4	365.10	-75.68	-71.08	-13.00	-62.68	-4.60	Peak
5	530.30	-72.95	-69.87	-13.00	-59.95	-3.08	Peak
6	667.50	-69.87	-69.65	-13.00	-56.87	-0.22	Peak
7 pp	1635.80	-51.75	-59.31	-13.00	-38.75	7.56	Peak

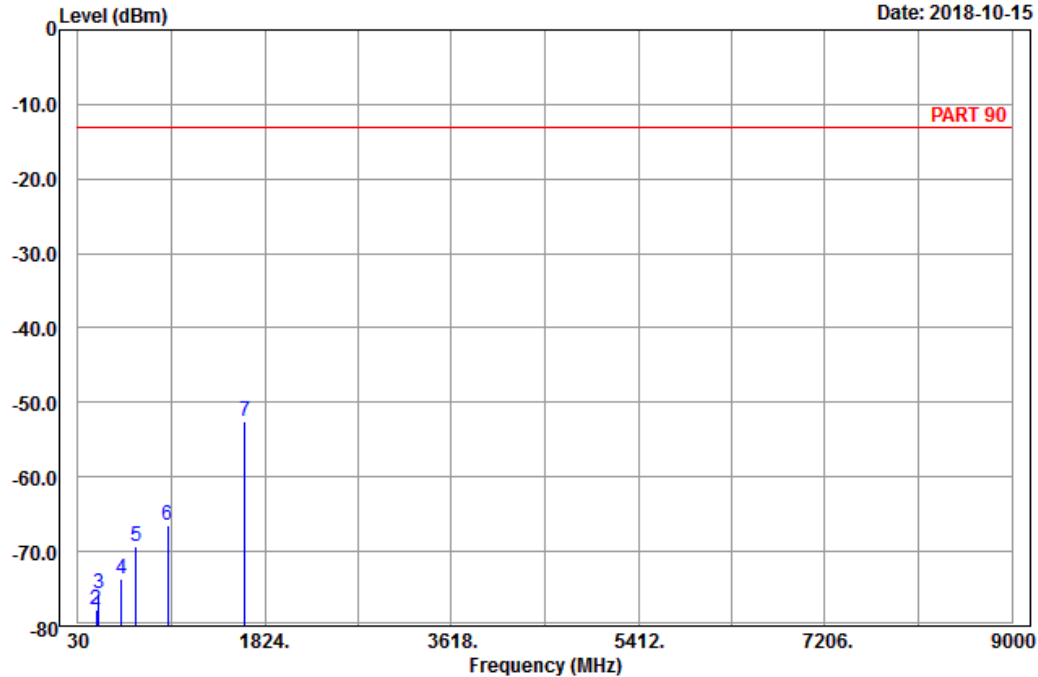


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2018-10-15



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : BC 0_Link_CH476
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	51.06	-85.75	-71.70	-13.00	-72.75	-14.05	Peak
2	201.72	-77.90	-71.74	-13.00	-64.90	-6.16	Peak
3	230.88	-75.64	-69.87	-13.00	-62.64	-5.77	Peak
4	449.10	-73.66	-69.84	-13.00	-60.66	-3.82	Peak
5	586.30	-69.39	-69.25	-13.00	-56.39	-0.14	Peak
6	890.10	-66.55	-69.16	-13.00	-53.55	2.61	Peak
7 pp	1635.80	-52.46	-60.02	-13.00	-39.46	7.56	Peak

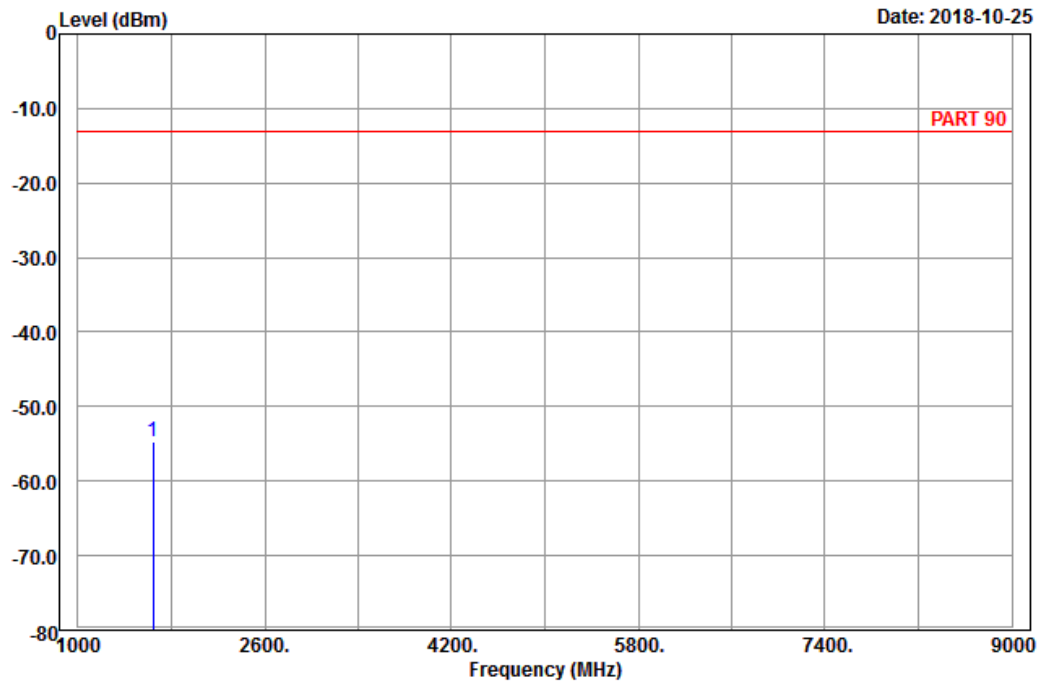
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
 Condition: PART 90 Horizontal
 Remark : BC 0_Link_CH580
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1641.00	-54.67	-62.40	-13.00	-41.67	7.73	Peak

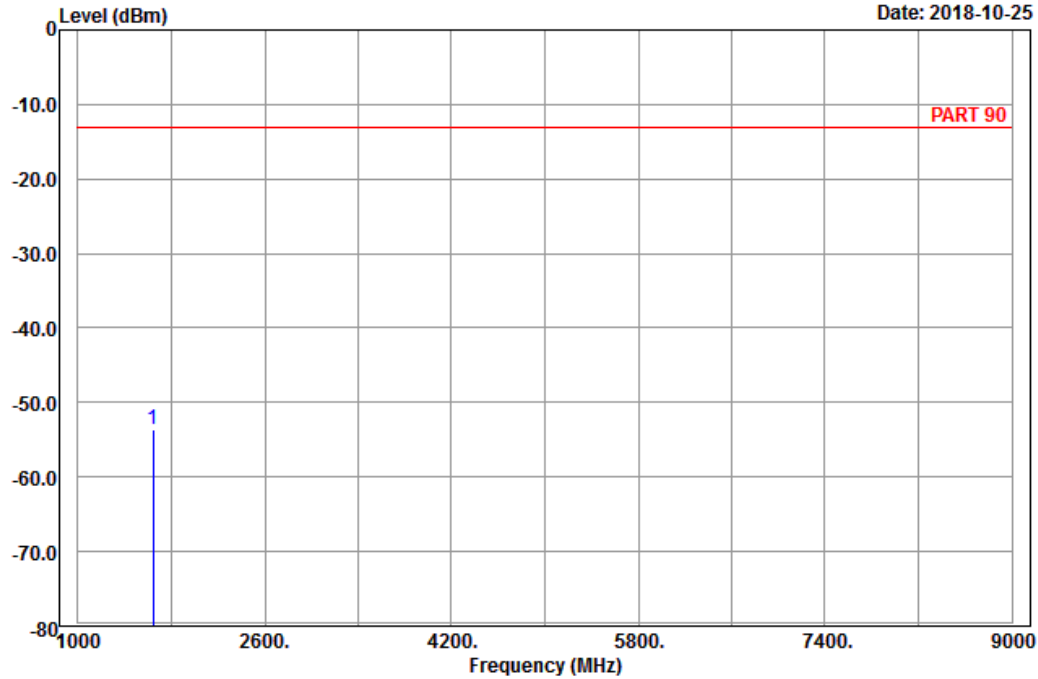


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A D T

Data: 6

Date: 2018-10-25



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : BC 0_Link_CH580
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1641.00	-53.55	-61.28	-13.00	-40.55	7.73	Peak

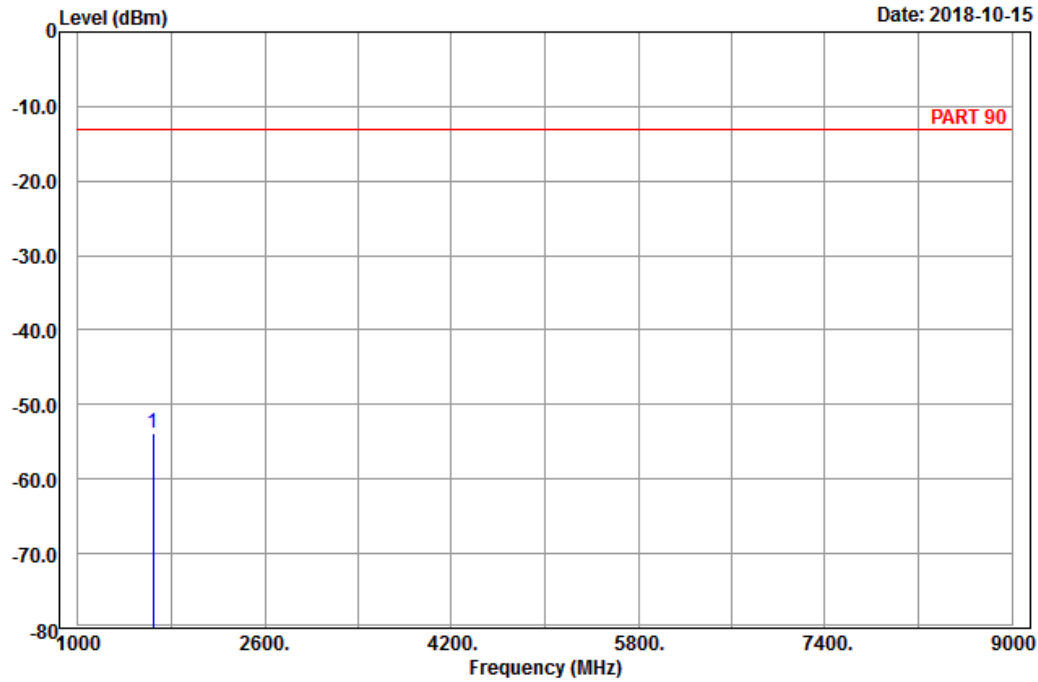
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
 Condition: PART 90 Horizontal
 Remark : BC 0_Link_CH684
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1646.20	-53.80	-61.53	-13.00	-40.80	7.73	Peak

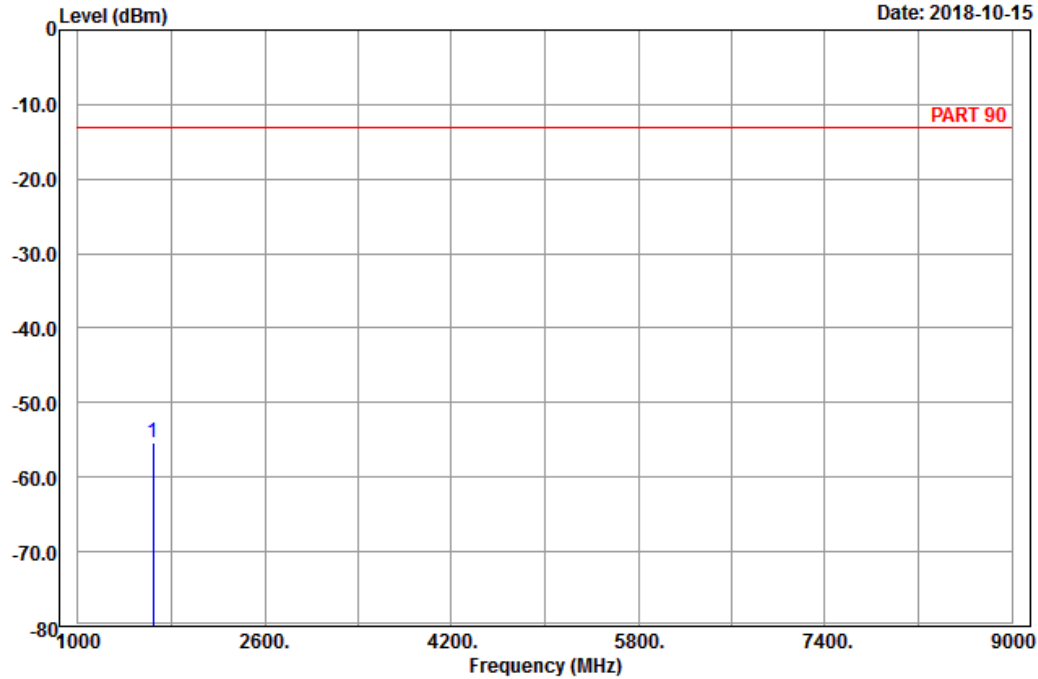


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-15



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : BC 0_Link_CH684
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1646.20	-55.42	-63.15	-13.00	-42.42	7.73	Peak

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

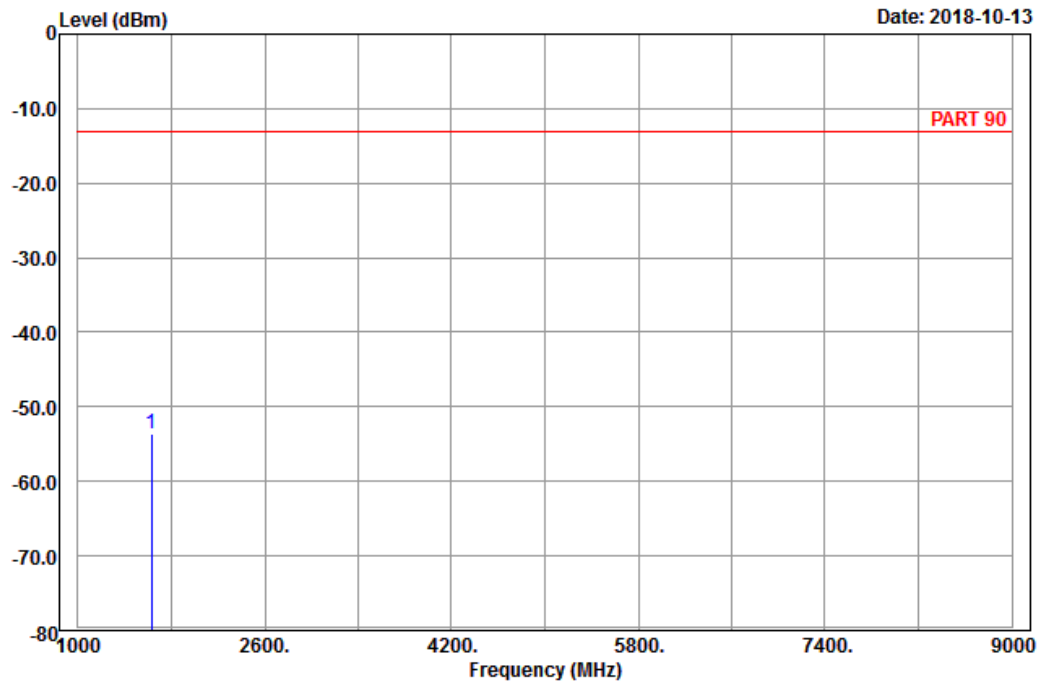


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Horizontal
 Remark : LTE_Band 26_Link_CH26697
 Tested by: Charles Hsiao

	Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 1629.40	-53.52	-61.08	-13.00	-40.52	7.56 Peak

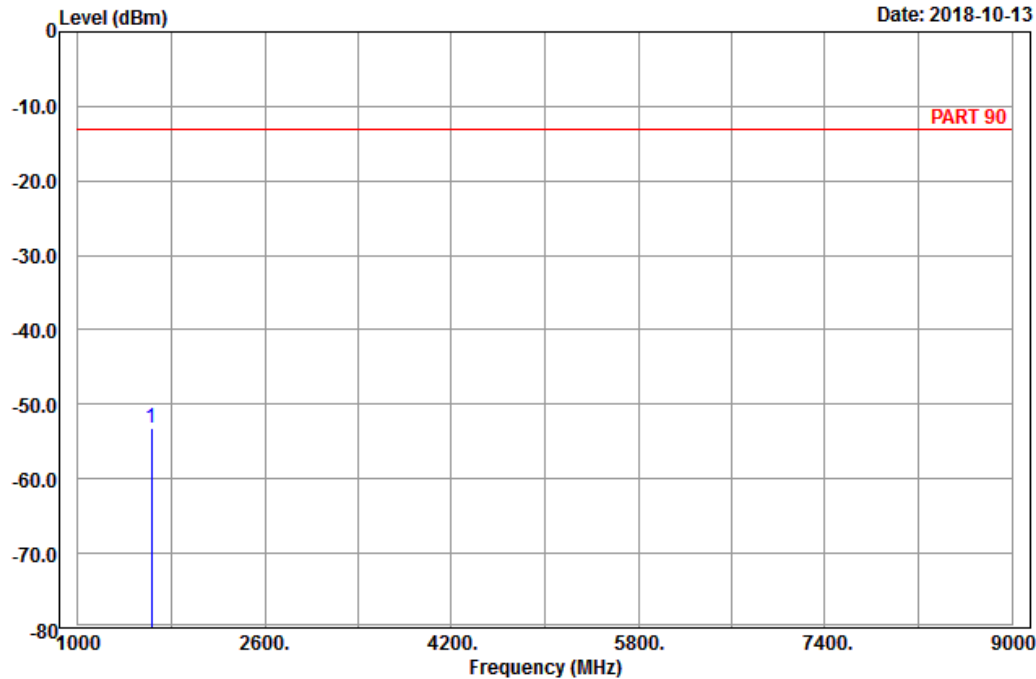


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : LTE_Band 26_Link_CH26697
 Tested by: Charles Hsiao

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1629.40	-53.19	-60.75	-13.00	-40.19	7.56	Peak

Middle Channel

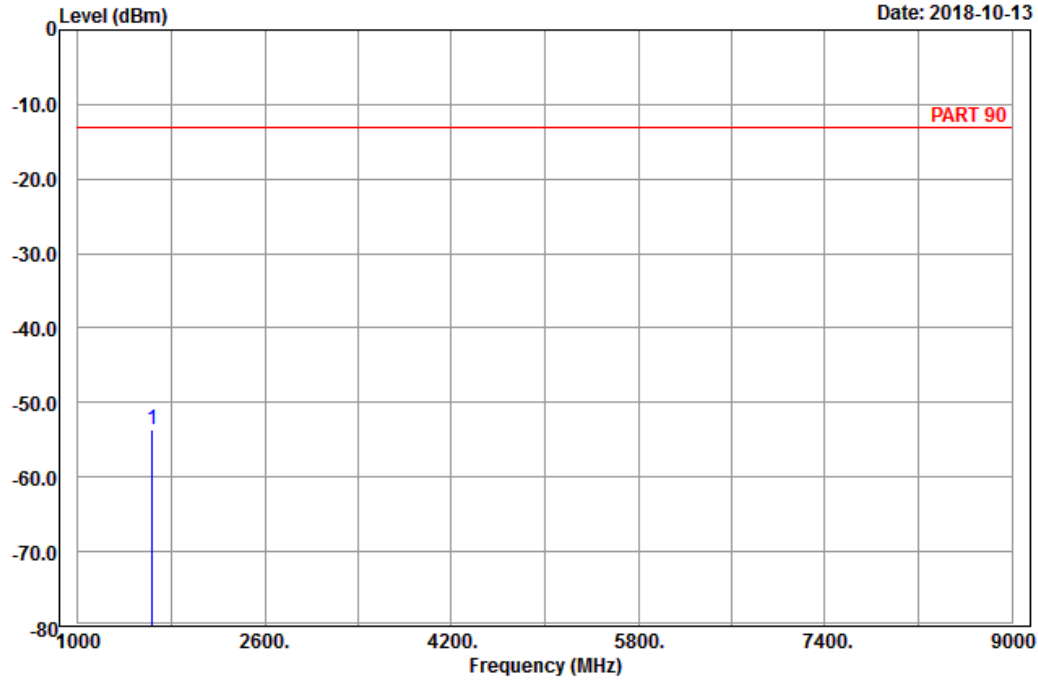


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Horizontal
 Remark : LTE_Band 26_Link_CH26740
 Tested by: Charles Hsiao

	Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 1638.00	-53.64	-61.20	-13.00	-40.64	7.56 Peak

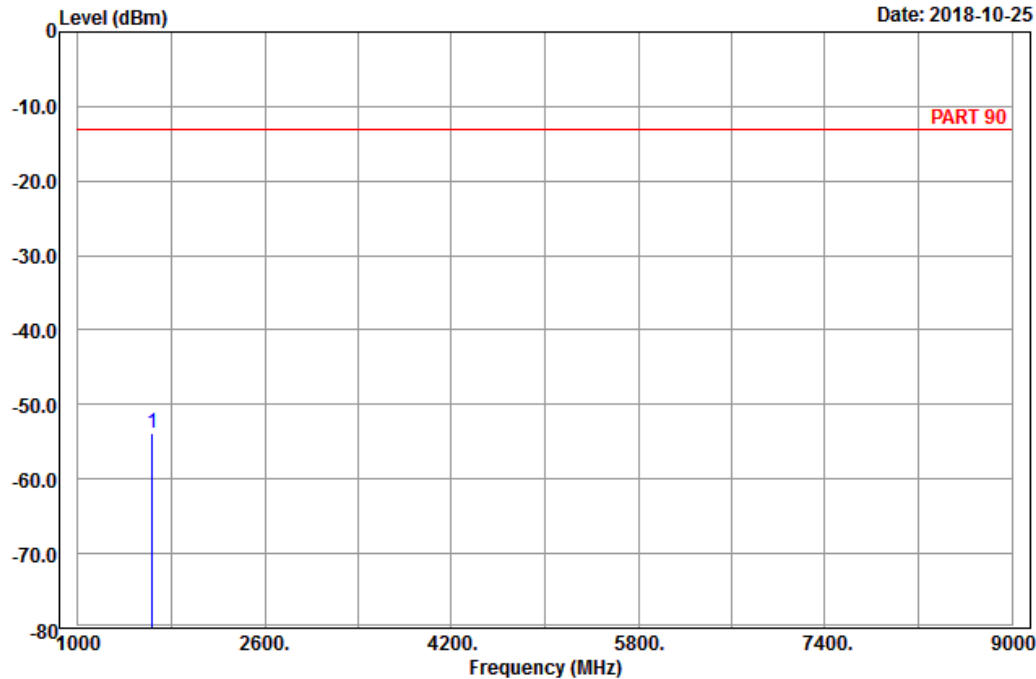


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-25



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : LTE_Band 26_Link_CH26740
 Tested by: Charles Hsiao

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1638.00	-53.88	-61.44	-13.00	-40.88	7.56	Peak

High Channel

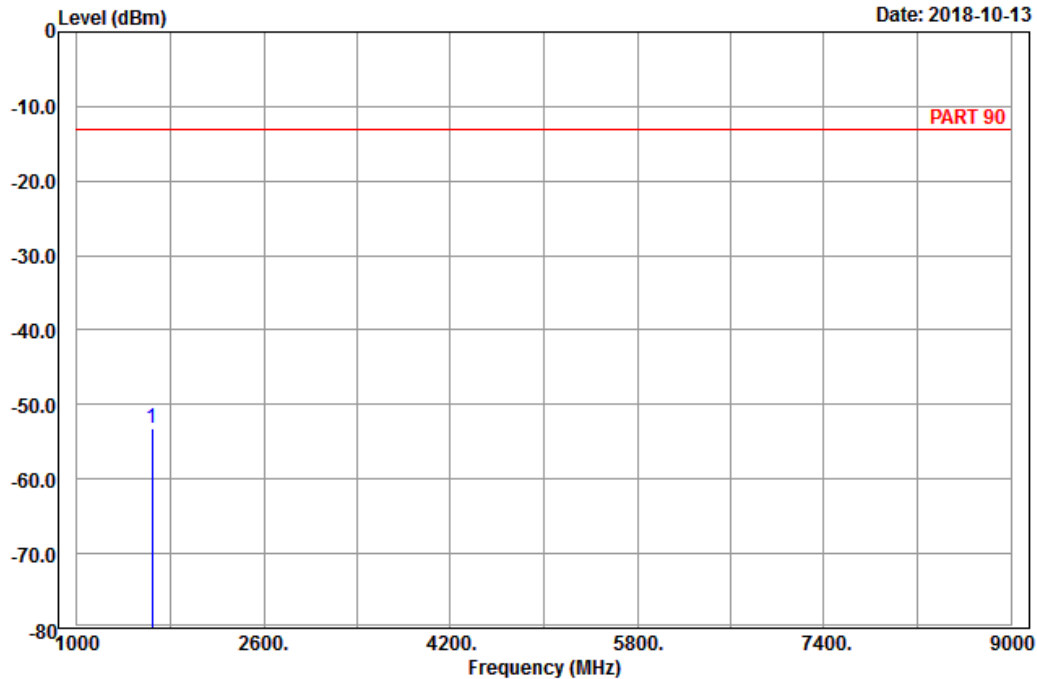


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Horizontal
 Remark : LTE_Band 26_Link_CH26783
 Tested by: Charles Hsiao

	Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 1646.60	-53.25	-60.98	-13.00	-40.25	7.73 Peak

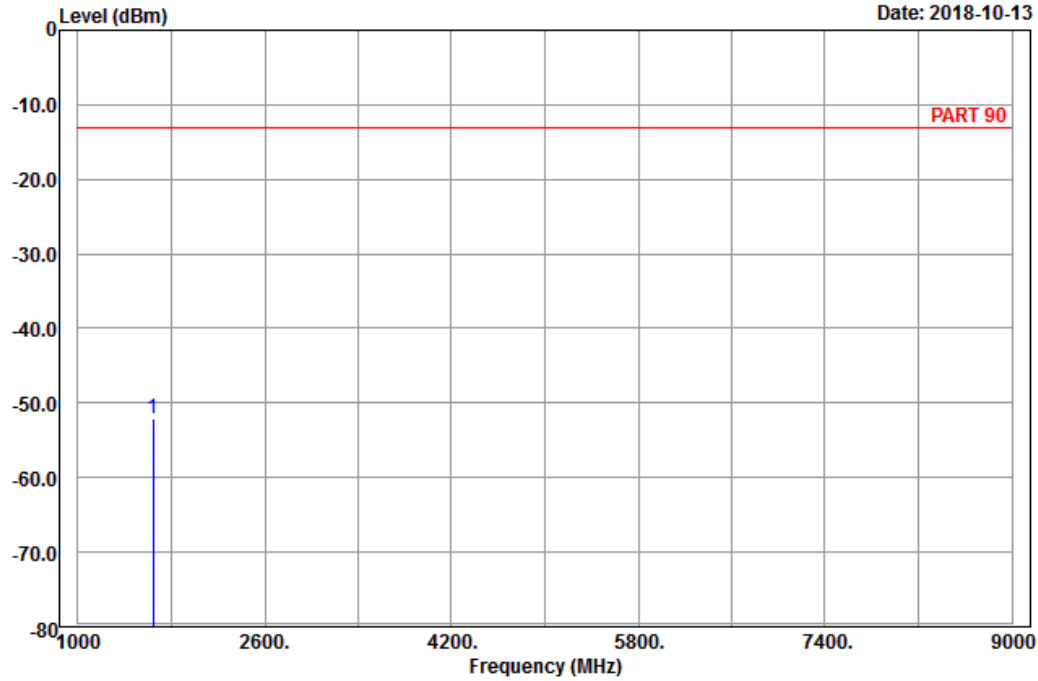


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : LTE_Band 26_Link_CH26783
 Tested by: Charles Hsiao

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1646.60	-52.12	-59.85	-13.00	-39.12	7.73	Peak

Channel Bandwidth: 5 MHz / QPSK
 Low Channel

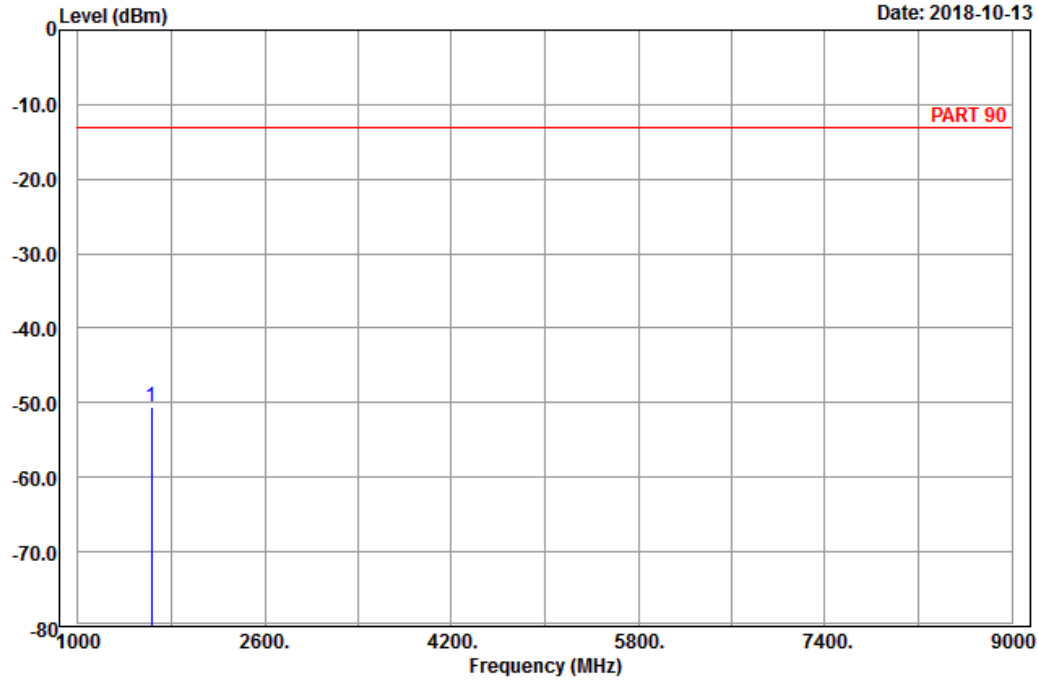


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Horizontal
 Remark : LTE_Band 26_Link_CH26715
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1633.00	-50.51	-58.07	-13.00	-37.51	7.56	Peak

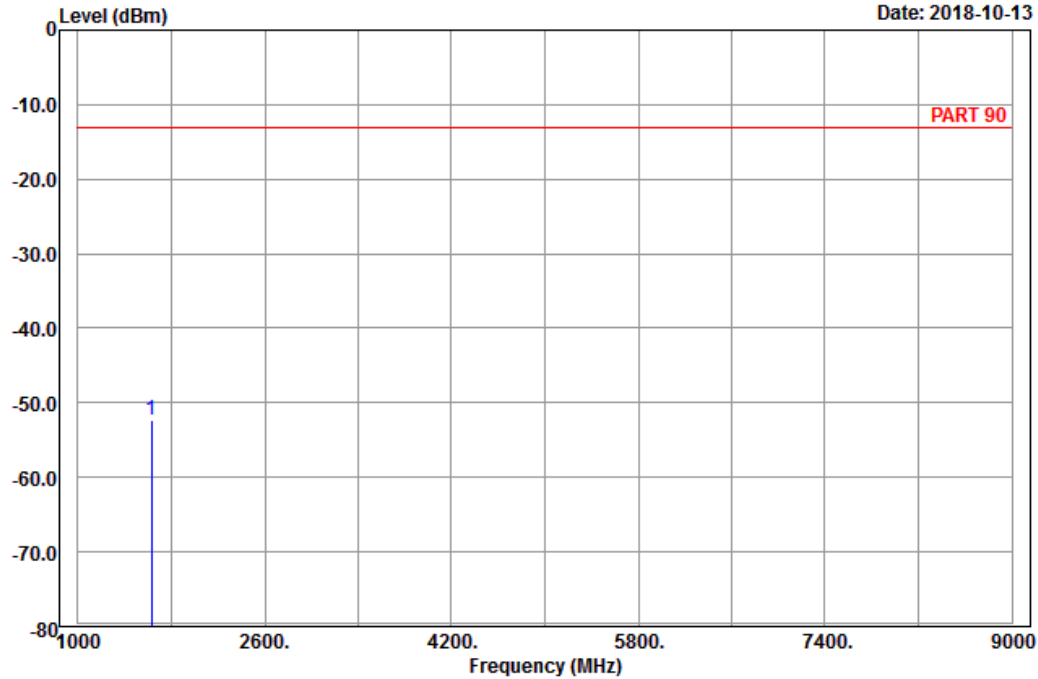


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : LTE_Band 26_Link_CH26715
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1633.00	-52.32	-59.88	-13.00	-39.32	7.56	Peak

Middle Channel

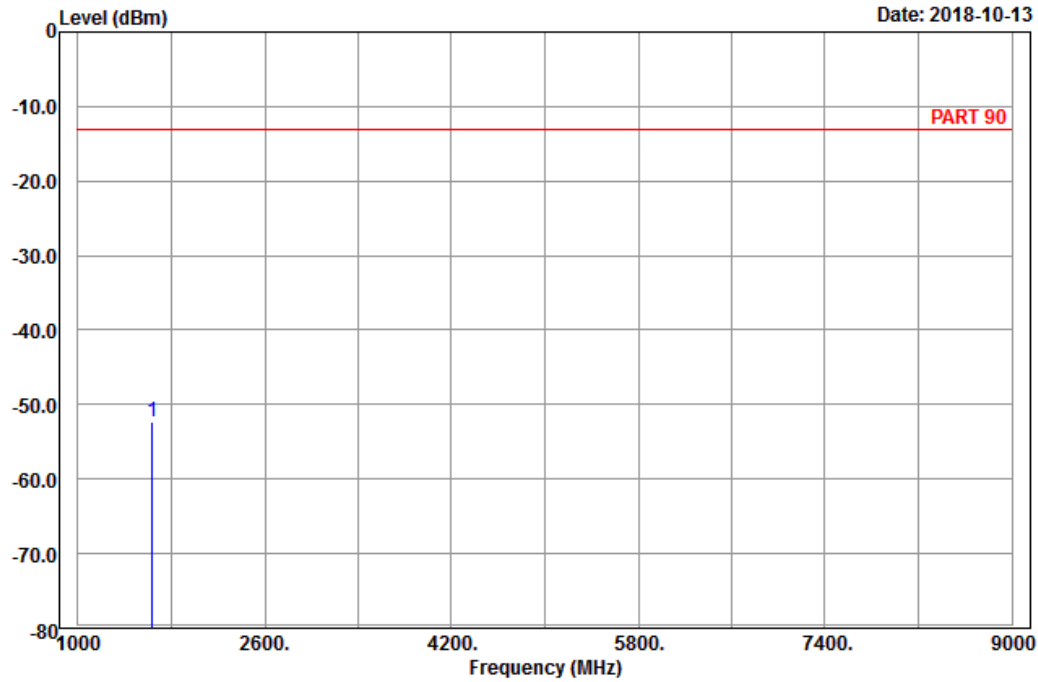


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Horizontal
 Remark : LTE_Band 26_Link_CH26740
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1638.00	-52.26	-59.82	-13.00	-39.26	7.56	Peak

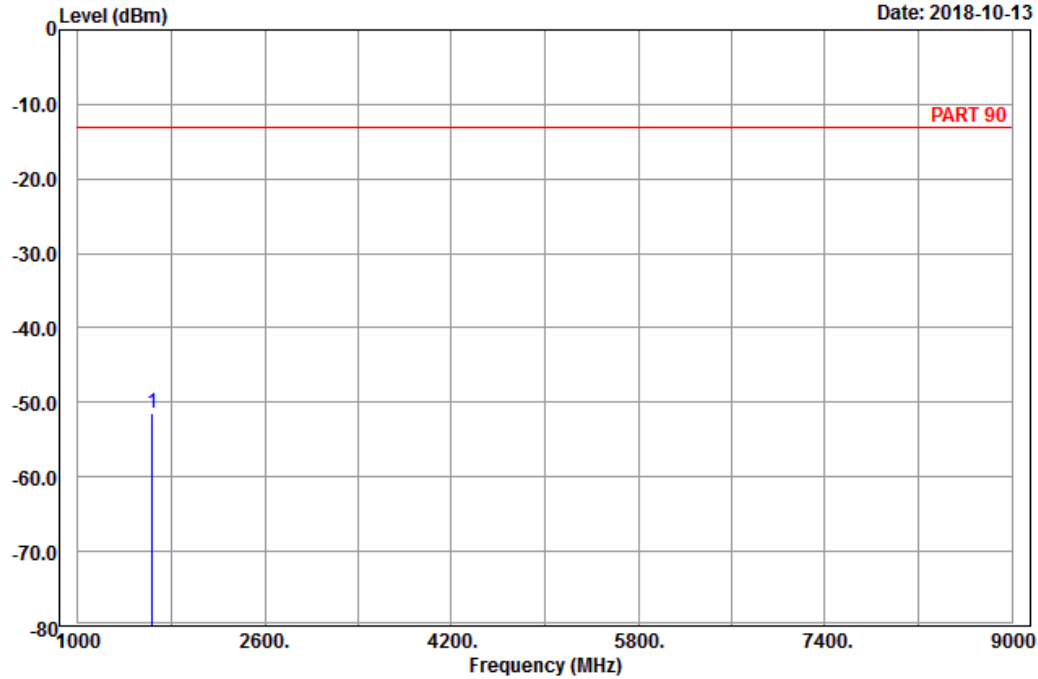


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : LTE_Band 26_Link_CH26740
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1638.00	-51.49	-59.05	-13.00	-38.49	7.56	Peak

High Channel

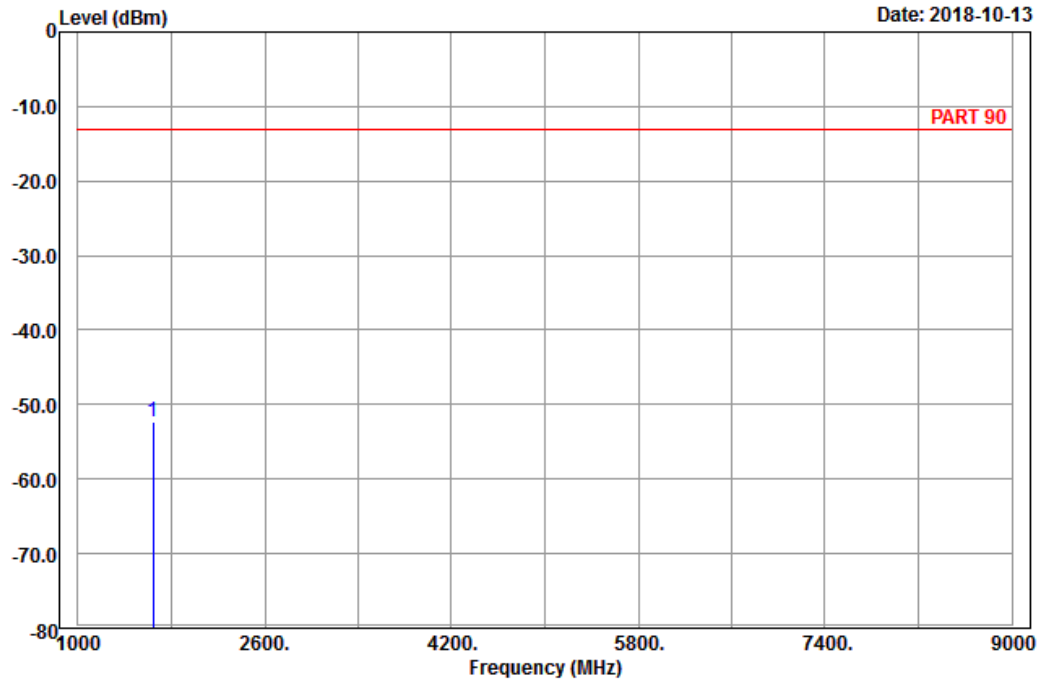


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Horizontal
 Remark : LTE_Band 26_Link_CH26765
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1643.00	-52.40	-60.13	-13.00	-39.40	7.73	Peak

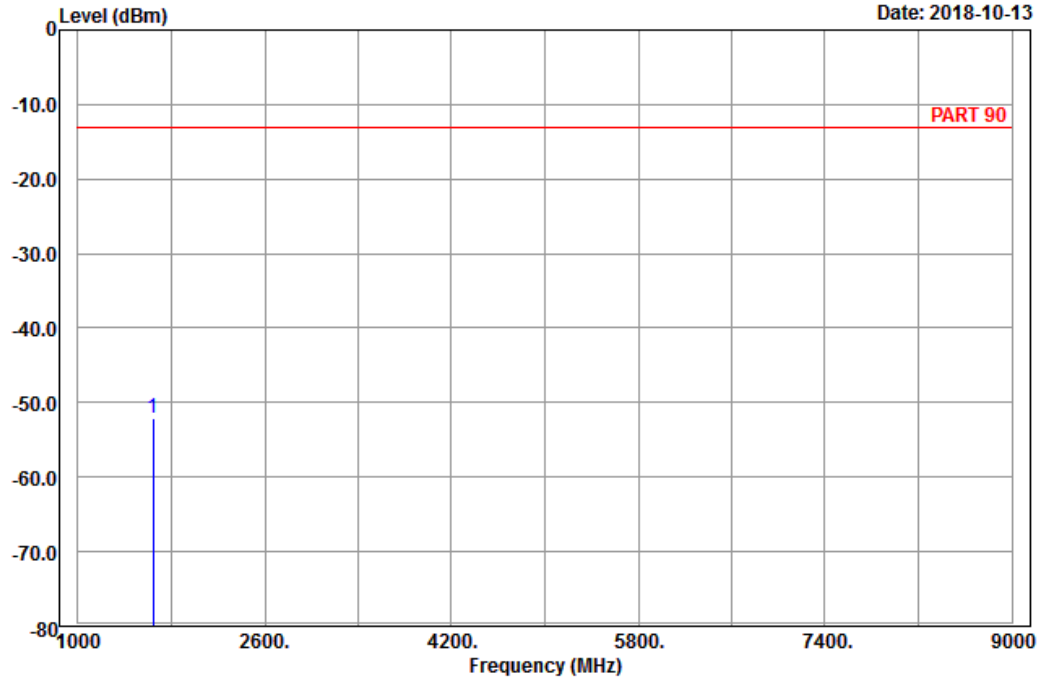


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : LTE_Band 26_Link_CH26765
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1643.00	-52.07	-59.80	-13.00	-39.07	7.73	Peak

Channel Bandwidth: 10 MHz / QPSK

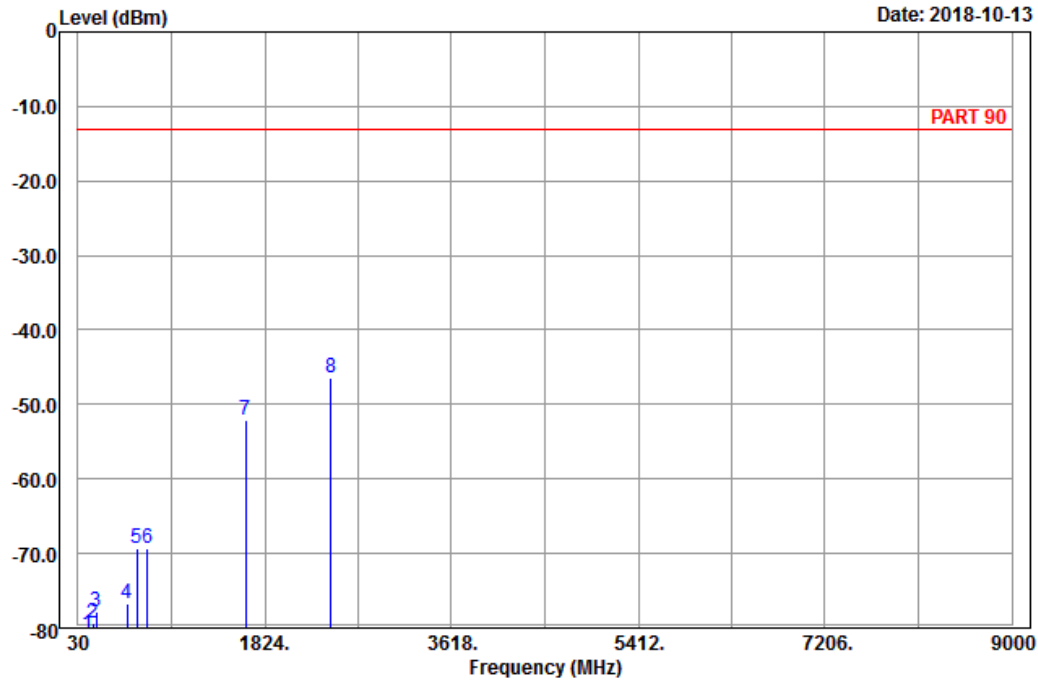


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Horizontal
 Remark : LTE_Band 26_Link_CH26740
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	119.91	-80.84	-72.59	-13.00	-67.84	-8.25	Peak
2	172.56	-79.34	-72.94	-13.00	-66.34	-6.40	Peak
3	208.74	-77.80	-71.73	-13.00	-64.80	-6.07	Peak
4	498.80	-76.81	-71.58	-13.00	-63.81	-5.23	Peak
5	596.10	-69.29	-69.56	-13.00	-56.29	0.27	Peak
6	699.70	-69.34	-68.97	-13.00	-56.34	-0.37	Peak
7	1638.00	-52.16	-59.72	-13.00	-39.16	7.56	Peak
8 pp	2457.00	-46.50	-57.52	-13.00	-33.50	11.02	Peak

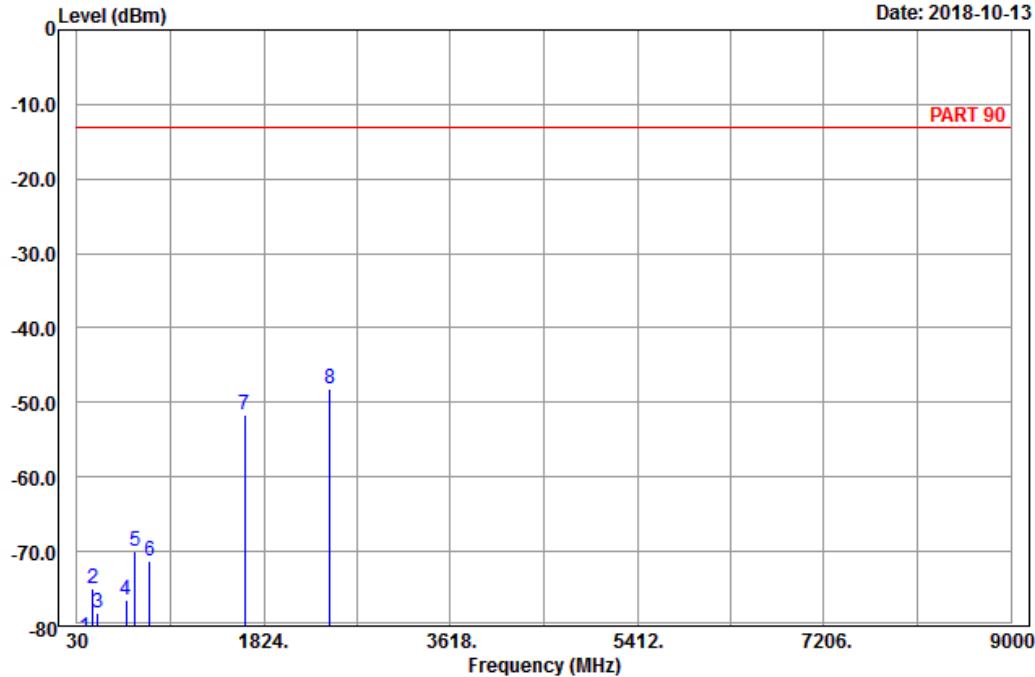


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2018-10-13



Site : 966 chamber 1
 Condition: PART 90 Vertical
 Remark : LTE_Band 26_Link_CH26740
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	103.17	-81.63	-71.86	-13.00	-68.63	-9.77	Peak
2	179.04	-75.09	-69.41	-13.00	-62.09	-5.68	Peak
3	226.02	-78.25	-72.42	-13.00	-65.25	-5.83	Peak
4	500.90	-76.46	-71.18	-13.00	-63.46	-5.28	Peak
5	584.20	-69.95	-69.69	-13.00	-56.95	-0.26	Peak
6	727.70	-71.24	-70.35	-13.00	-58.24	-0.89	Peak
7	1638.00	-51.69	-59.25	-13.00	-38.69	7.56	Peak
8 pp	2457.00	-48.07	-59.09	-13.00	-35.07	11.02	Peak

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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