FCC TEST REPORT

FCC ID: 2A7ZC-SG7

On Behalf of

GEOMATE POSITIONING PTE. LTD.

Geodetic GNSS Receiver

Model No.: SG7

Prepared for	:	GEOMATE POSITIONING PTE. LTD.
Address	:	71 LORONG 23 GEYLANG, #07-09, WORK + STORE (71G), SINGAPORE (388386)

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	A2204325-C01-R06
Date of Receipt	:	May 6, 2022
Date of Test	:	May 6, 2022 – July 8, 2022
Date of Report	:	July 12, 2022
Version Number	:	V0

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TEST REPORT DECLARATION

Applicant	:	GEOMATE POSITIONING PTE. LTD.
Address	:	71 LORONG 23 GEYLANG, #07-09, WORK + STORE (71G), SINGAPORE (388386)
Manufacturer	:	GEOMATE POSITIONING PTE. LTD.
Address	:	71 LORONG 23 GEYLANG, #07-09, WORK + STORE (71G), SINGAPORE (388386)
EUT Description	:	Geodetic GNSS Receiver
		(A) Model No. : SG7
		(B) Trademark : GEOMATE

Measurement Standard Used:

FCC CFR Title 47 Part 2
FCC CFR Title 47 Part22 Subpart H
FCC CFR Title 47 Part24 Subpart E
FCC CFR Title 47 Part27
ANSI C63.26:2015

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....:	Reak Yang Project Engineer	
Approved by (name + signature)…....:	Jack Xu Project Manager	
Date of issue……..:	July 12, 2022	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	July 12, 2022	Initial released Issue	Reak Yang

1 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1091	Pass* (Please refer to MPE Report)
RF Output Power	Part 2.1046 part22.913(a) (5) Part 24.232 (c) Part 27.50 (d)(4) Part 27.50 (h)/(c)	Pass
Peak-To-Average Ratio	Part 2.1046 Part 22.913(d) Part 24.232 (d) Part 27.50(d) Part 27.50 (c)	Pass
Modulation Characteristics	Part 2.1047	N/A
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238 Part 27.53(a)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)/(m)/(g)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)/(m)/(g)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a) Part 27.53(h)/(m)/(g)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) Part 27.54	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) Part 27.54	Pass

Note 1: Pass: The EUT complies with the essential requirements in the standard.

Note 2: The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

2 General Information

2.1 General Description of EUT

Description of Device (EUT)

Description	:	Geodetic GNSS Receiver
Trademark	:	GEOMATE
Model Number	:	SG7
DIFF.	:	N/A
Test Voltage	:	DC 5V from adapter, DC 7.2V from battery
Support Networks	:	LTE
Support Bands		LTE Band 2/4/5/12/41
Channel Bandwidth		LTE Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 12: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz
TX Frequency		LTE Band 2: 1850 ~ 1910 MHz LTE Band 4: 1710 ~ 1755 MHz LTE Band 5: 824 ~ 849 MHz LTE Band 12: 699MHz ~ 716MHz LTE Band 41: 2555MHz ~ 2655 MHz
Modulation type		QPSK, 16QAM
Antenna Type	:	Internal antenna, Maximum Gain is 1dBi. (Antenna information is provided by applicant.)
Software version	:	V1.0.0
Hardware version	:	V1.0.1

Remark 1: The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for 4G function, and there is no other transmitter involved.

2.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

2.3 Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

July 15, 2019 Certificated by IC
Registration Number: CN0085

2.4 Accessories of Device (EUT)

Accessories	:	AC Adapter
Manufacturer	:	EDAC POWER Electronics Co., Ltd
Model	:	EA1012AVRU-050
Ratings	:	Input: 100-240Vac~50/60Hz 1.0A Output: 5.0V⎓2.4A

2.5 Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
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2.6 Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	24℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7 Measurement Uncertainty

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for radio frequency	5.06×10-8GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

3 Test Instruments list

Equipment	Manufacture	Model No.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2020.09.02	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2021.08.25	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2021.08.25	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-102082-Wa	2021.08.25	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2021.08.25	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2021.08.30	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2021.08.30	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00059	2021.08.30	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2021.08.25	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2021.08.25	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2021.08.25	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2021.08.25	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2021.08.25	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2021.08.25	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2021.08.25	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	/	00946	2021.08.30	2 Year
Preamplifier	SKET	LNPA_1840-50	/	SK2018101801	2021.08.25	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2021.08.25	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2021.08.25	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	/	100631	2022.04.22	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2021.08.25	1 Year
Adjustable attenuator	MWRFtest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

4 System test configuration

4.1 Test mode

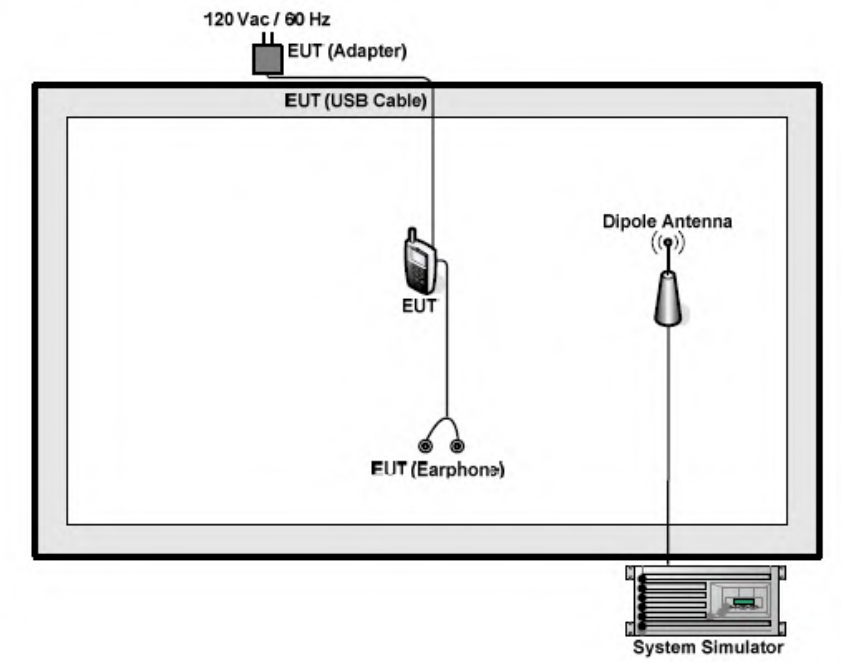
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
LTE Band 2	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 4	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 5	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 12	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 41	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link

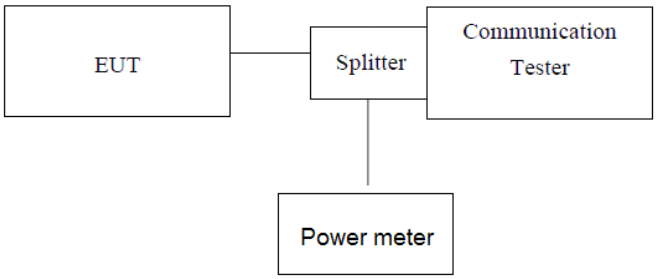
Note: Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03r1 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

4.2 Configuration of Tested System



4.3 Conducted Output Power

Test Requirement:	FCC part22.913(a) (5), FCC part24.232(b) and FCC Part 27.50 (d)(4)/(h)/(c)
Test Method:	ANSI C63.26:2015
Limit:	LTE Band 2: 2W LTE Band 4: 1W LTE Band 5: 7W LTE Band 12: 3W LTE Band 41: 2W
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The transmitter output port was connected to base station. 2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement. 3. Set EUT at maximum power through base station. 4. Select lowest, middle, and highest channels for each band and different modulation. 5. Measure the maximum burst average power.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

LTE Band2

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
1.4	1850.7	1	0	24.06	23.33
		1	3	23.63	23.61
		1	5	23.68	23.60
		3	0	23.00	23.41
		3	2	22.04	22.79
		3	3	22.22	21.93
		6	0	22.50	22.61
	1880.0	1	0	22.67	22.56
		1	3	22.78	23.14
		1	5	20.83	21.68
		3	0	21.97	21.85
		3	2	21.43	20.69
		3	3	22.98	23.28
		6	0	21.19	21.57
	1909.3	1	0	21.25	21.77
		1	3	21.65	22.49
		1	5	20.89	21.04
		3	0	21.54	22.28
		3	2	21.83	21.72
		3	3	21.32	21.48
		6	0	22.45	22.47
3	1851.5	1	0	23.10	23.22
		1	7	22.09	21.77
		1	14	23.63	23.97
		8	0	22.08	22.28
		8	4	21.80	21.12
		8	7	21.66	22.01
		15	0	21.15	20.92
	1880.0	1	0	21.77	21.46
		1	7	22.64	22.44
		1	14	22.38	22.42
		8	0	20.05	20.62
		8	4	20.13	20.36
		8	7	19.96	20.32
		15	0	21.71	21.61
	1908.5	1	0	21.91	22.43
		1	7	20.52	20.96
		1	14	21.35	21.44
		8	0	22.58	22.59
		8	4	21.81	22.16
		8	7	22.52	22.08
		15	0	20.07	19.99
5	1852.5	1	0	22.12	22.50
		1	12	22.51	23.02
		1	24	21.81	21.59

		12	0	22.54	22.48
		12	6	22.17	21.90
		12	13	21.92	22.64
		25	0	21.40	21.63
	1880.0	1	0	23.93	23.46
		1	12	21.05	21.00
		1	24	22.02	21.51
		12	0	20.90	21.39
		12	6	20.31	19.60
		12	13	21.27	21.20
		25	0	20.96	21.38
	1907.5	1	0	22.51	22.60
		1	12	21.99	21.72
		1	24	20.49	21.20
		12	0	21.81	21.79
		12	6	20.91	20.94
		12	13	21.04	21.34
		25	0	21.85	22.15
10	1855.0	1	0	23.42	23.32
		1	24	22.13	22.66
		1	49	22.07	22.45
		25	0	21.72	21.61
		25	12	20.81	21.04
		25	25	22.17	22.06
		50	0	22.79	22.55
	1880.0	1	0	21.91	22.36
		1	24	23.55	23.27
		1	49	21.97	21.56
		25	0	21.80	21.32
		25	12	21.49	21.42
		25	25	19.72	20.55
		50	0	20.86	20.26
	1905.0	1	0	23.06	23.30
		1	24	22.10	22.15
		1	49	22.42	22.86
		25	0	21.79	21.82
		25	12	21.25	21.26
		25	25	22.39	22.42
		50	0	22.03	21.20
15	1857.5	1	0	22.56	22.25
		1	37	22.21	22.08
		1	74	21.53	21.02
		37	0	23.57	23.13
		37	18	20.68	21.21
		37	38	20.56	20.97
		75	0	22.53	22.76
	1880.0	1	0	23.19	22.57
		1	37	23.57	23.54
		1	74	21.87	22.82
		37	0	21.34	20.46

		37	18	22.63	22.57
		37	38	21.91	21.56
		75	0	21.32	21.30
	1902.5	1	0	22.37	22.26
		1	37	22.36	22.46
		1	74	21.57	21.45
		37	0	21.06	20.72
		37	18	21.84	21.20
		37	38	22.41	21.95
		75	0	20.79	20.68
20	1860.0	1	0	22.73	22.75
		1	49	22.41	22.40
		1	99	22.07	22.17
		50	0	22.88	22.11
		50	25	22.14	21.95
		50	50	20.11	20.51
		100	0	21.26	21.30
	1880.0	1	0	24.69	24.03
		1	49	23.62	23.80
		1	99	24.02	24.03
		50	0	23.05	23.15
		50	25	**24.66**	**24.08**
		50	50	24.35	23.71
		100	0	23.53	23.44
	1900.0	1	0	21.94	21.75
		1	49	22.37	22.21
		1	99	21.42	20.64
		50	0	22.59	22.54
		50	25	23.00	23.03
		50	50	22.01	21.93
		100	0	22.76	22.29

LTE Band4

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
1.4	1710.7	1	0	23.52	23.60
		1	3	23.39	23.65
		1	5	23.13	23.31
		3	0	23.59	23.67
		3	2	23.66	23.61
		3	3	23.96	23.77
		6	0	20.86	21.16
	1732.5	1	0	23.20	23.55
		1	3	23.52	23.05
		1	5	21.40	21.95
		3	0	21.42	21.33
		3	2	22.21	21.62
		3	3	21.55	21.41
		6	0	21.57	21.92
	1754.3	1	0	21.76	21.03
		1	3	22.25	22.72
		1	5	22.80	22.86
		3	0	22.66	23.19
		3	2	22.23	22.07
		3	3	21.10	20.93
		6	0	20.48	21.11
3	1711.5	1	0	22.94	23.23
		1	7	23.06	23.12
		1	14	22.19	22.22
		8	0	23.05	23.29
		8	4	22.32	21.93
		8	7	22.45	22.86
		15	0	23.70	23.50
	1732.5	1	0	21.85	21.99
		1	7	23.67	23.79
		1	14	22.30	22.36
		8	0	21.61	21.40
		8	4	20.88	20.84
		8	7	22.10	21.97
		15	0	21.98	21.74
	1753.5	1	0	21.53	22.11
		1	7	22.33	22.48
		1	14	22.83	23.40
		8	0	20.72	21.52
		8	4	20.98	21.03
		8	7	21.46	20.79
		15	0	20.74	20.31
5	1712.5	1	0	22.66	22.84
		1	12	23.09	23.89
		1	24	23.96	23.37

		12	0	22.95	22.54
		12	6	22.65	22.78
		12	13	23.79	23.15
		25	0	23.17	23.73
	1732.5	1	0	22.81	22.85
		1	12	22.81	22.96
		1	24	21.51	22.27
		12	0	21.21	21.04
		12	6	22.42	21.50
		12	13	22.69	22.22
		25	0	21.93	22.65
	1752.5	1	0	22.58	21.62
		1	12	22.31	22.25
		1	24	22.51	22.06
		12	0	21.97	22.07
		12	6	21.76	21.02
		12	13	21.54	21.24
		25	0	21.52	20.93
10	1715.0	1	0	23.00	22.72
		1	24	23.55	23.73
		1	49	24.24	24.15
		25	0	21.80	22.06
		25	12	21.60	21.67
		25	25	22.57	22.78
		50	0	23.28	22.92
	1732.5	1	0	23.22	22.78
		1	24	22.87	23.33
		1	49	20.87	20.81
		25	0	21.57	22.39
		25	12	21.53	21.96
		25	25	21.93	21.48
		50	0	22.05	22.04
	1750.0	1	0	22.85	22.55
		1	24	21.19	21.74
		1	49	22.80	22.88
		25	0	20.15	20.65
		25	12	21.98	21.40
		25	25	20.89	21.23
		50	0	20.62	19.79
15	1717.5	1	0	24.32	24.49
		1	37	24.37	24.52
		1	74	23.02	22.89
		37	0	22.97	22.83
		37	18	21.62	22.37
		37	38	21.63	21.57
		75	0	21.74	21.26
	1732.5	1	0	24.09	24.61
		1	37	22.97	23.78
		1	74	22.53	22.39
		37	0	21.89	21.96

		37	18	20.94	20.65
		37	38	20.67	20.85
		75	0	21.10	21.34
	1747.5	1	0	22.40	22.90
		1	37	22.69	22.98
		1	74	22.26	22.45
		37	0	20.82	21.11
		37	18	20.46	20.26
		37	38	20.82	20.77
		75	0	22.03	21.80
20	1720.0	1	0	**24.75**	24.57
		1	49	24.24	24.38
		1	99	24.50	24.52
		50	0	24.21	**24.76**
		50	25	24.00	23.75
		50	50	24.28	24.44
		100	0	24.26	23.91
	1732.5	1	0	22.91	22.57
		1	49	23.96	24.30
		1	99	22.61	22.46
		50	0	21.63	21.67
		50	25	21.97	21.47
		50	50	21.09	21.32
		100	0	20.86	21.32
	1745.0	1	0	21.71	21.88
		1	49	23.05	22.86
		1	99	21.63	21.33
		50	0	21.87	21.61
		50	25	21.46	21.38
		50	50	20.78	20.50
		100	0	21.07	21.35

LTE Band5

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
1.4	824.7	1	0	22.42	21.86
		1	3	21.73	21.70
		1	5	21.73	21.91
		3	0	22.43	22.73
		3	2	21.50	21.82
		3	3	21.81	22.12
		6	0	22.72	23.05
	836.5	1	0	23.93	23.95
		1	3	22.94	23.30
		1	5	20.64	21.41
		3	0	23.35	22.93
		3	2	22.27	22.30
		3	3	20.22	20.50
		6	0	22.08	22.20
	848.3	1	0	20.88	20.93
		1	3	21.04	21.80
		1	5	22.67	22.42
		3	0	21.93	21.72
		3	2	21.13	21.35
		3	3	21.84	22.07
		6	0	21.39	20.54
3	825.5	1	0	22.75	22.94
		1	7	23.57	23.60
		1	14	21.96	21.95
		8	0	21.24	21.47
		8	4	23.32	23.47
		8	7	21.58	22.15
		15	0	22.35	22.53
	836.5	1	0	22.63	22.42
		1	7	22.54	22.51
		1	14	20.91	21.19
		8	0	22.32	22.97
		8	4	20.56	20.40
		8	7	21.46	20.82
		15	0	22.15	21.94
	847.5	1	0	21.92	22.13
		1	7	21.55	21.52
		1	14	21.02	21.02
		8	0	21.39	21.23
		8	4	21.55	22.03
		8	7	21.68	21.64
		15	0	21.55	21.06
5	826.5	1	0	23.25	23.16
		1	12	22.93	23.25
		1	24	22.27	22.26

		12	0	22.49	22.88
		12	6	22.59	22.95
		12	13	20.78	21.44
		25	0	23.42	23.66
	836.5	1	0	22.39	22.22
		1	12	21.29	20.88
		1	24	22.06	22.25
		12	0	20.79	20.43
		12	6	22.19	22.13
		12	13	21.35	22.15
		25	0	21.50	21.43
	846.5	1	0	21.44	20.58
		1	12	20.92	20.65
		1	24	21.55	21.10
		12	0	21.02	21.65
		12	6	21.91	21.49
		12	13	20.24	20.13
		25	0	22.02	22.28
10	829.0	1	0	24.11	**24.79**
		1	24	23.27	22.24
		1	49	24.06	22.48
		25	0	24.61	22.72
		25	12	23.64	21.45
		25	25	**24.64**	23.35
		50	0	24.02	24.14
	836.5	1	0	23.42	23.00
		1	24	21.75	20.35
		1	49	21.40	21.38
		25	0	22.85	21.49
		25	12	21.45	22.17
		25	25	22.61	21.93
		50	0	23.66	20.40
	844.0	1	0	21.90	22.21
		1	24	22.18	21.53
		1	49	21.16	22.44
		25	0	21.76	20.06
		25	12	22.70	20.61
		25	25	22.49	21.61
		50	0	20.49	21.28

LTE Band12

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
1.4	699.7	1	0	23.57	23.65
		1	3	23.32	23.17
		1	5	22.25	21.87
		3	0	23.49	23.55
		3	2	24.15	23.67
		3	3	22.85	22.65
		6	0	22.27	22.77
	707.5	1	0	22.57	22.64
		1	3	22.33	21.47
		1	5	21.41	21.18
		3	0	23.61	22.93
		3	2	21.35	21.68
		3	3	21.88	22.04
		6	0	21.06	21.56
	715.3	1	0	21.36	21.25
		1	3	21.43	21.38
		1	5	20.63	20.29
		3	0	20.61	20.53
		3	2	22.51	22.48
		3	3	21.53	21.23
		6	0	22.09	22.09
3	700.5	1	0	22.70	23.09
		1	7	22.23	21.82
		1	14	23.19	23.07
		8	0	23.35	23.18
		8	4	23.96	23.78
		8	7	22.15	22.65
		15	0	22.93	22.88
	707.5	1	0	22.96	23.01
		1	7	23.44	23.30
		1	14	22.98	22.51
		8	0	23.02	22.20
		8	4	21.34	21.02
		8	7	20.49	21.01
		15	0	22.18	22.35
	714.5	1	0	21.73	21.54
		1	7	21.92	22.75
		1	14	20.92	20.59
		8	0	21.55	21.99
		8	4	21.54	21.98
		8	7	22.21	22.12
		15	0	21.15	21.11
5	701.5	1	0	21.93	22.33
		1	12	23.21	23.10
		1	24	22.65	22.53

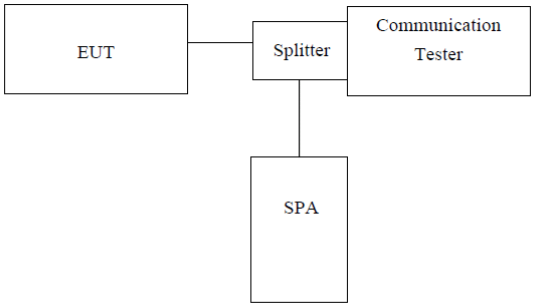
		12	0	23.01	22.10
		12	6	22.57	22.94
		12	13	22.38	22.26
		25	0	21.51	22.31
	707.5	1	0	21.63	21.50
		1	12	22.32	22.22
		1	24	20.33	20.43
		12	0	22.30	22.08
		12	6	21.31	21.04
		12	13	21.85	22.29
		25	0	20.50	20.36
	713.5	1	0	23.37	23.34
		1	12	21.32	21.43
		1	24	21.28	21.90
		12	0	20.80	21.04
		12	6	21.73	21.64
		12	13	20.53	20.47
		25	0	21.39	21.33
10	704	1	0	21.97	22.26
		1	24	22.84	22.87
		1	49	22.78	22.33
		25	0	22.53	22.60
		25	12	22.56	22.46
		25	25	21.44	21.13
		50	0	21.57	21.89
	707.5	1	0	24.07	24.04
		1	24	23.38	22.92
		1	49	24.38	24.03
		25	0	23.65	23.52
		25	12	22.93	23.64
		25	25	23.41	23.98
		50	0	**24.26**	**24.10**
	711.0	1	0	21.29	21.60
		1	24	20.89	20.88
		1	49	21.85	22.31
		25	0	21.09	20.70
		25	12	19.90	19.96
		25	25	20.29	19.94
		50	0	21.93	22.53

LTE Band41

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
5	2498.5	1	0	23.19	22.49
		1	12	22.71	22.51
		1	24	22.38	23.23
		12	0	22.38	22.39
		12	6	23.01	23.00
		12	13	22.72	22.13
		25	0	24.44	24.01
	2593.0	1	0	22.72	23.45
		1	12	22.18	22.90
		1	24	21.08	21.28
		12	0	22.89	22.85
		12	6	20.85	20.81
		12	13	23.30	23.24
		25	0	21.74	21.34
	2687.5	1	0	21.91	22.21
		1	12	22.27	22.28
		1	24	20.49	19.98
		12	0	21.85	21.15
		12	6	22.21	22.15
		12	13	20.57	21.13
		25	0	21.40	21.37
10	2501.0	1	0	21.98	22.64
		1	24	22.61	22.69
		1	49	21.58	22.20
		25	0	23.50	23.49
		25	12	23.20	23.24
		25	25	22.92	23.19
		50	0	23.50	23.81
	2593.0	1	0	22.13	22.10
		1	24	22.84	22.46
		1	49	22.13	22.21
		25	0	22.53	23.10
		25	12	21.54	21.96
		25	25	21.71	21.22
		50	0	21.58	22.37
	2685.0	1	0	22.47	22.79
		1	24	22.03	21.99
		1	49	21.09	21.81
		25	0	21.25	21.05
		25	12	21.28	20.62
		25	25	22.23	22.07
		50	0	21.36	21.94
15	2503.5	1	0	22.02	21.97
		1	37	22.87	23.02
		1	74	22.37	22.98

		37	0	22.71	22.22
		37	18	22.42	22.13
		37	38	22.19	22.28
		75	0	22.02	22.23
	2593.0	1	0	21.35	22.07
		1	37	23.57	23.77
		1	74	19.29	19.59
		37	0	22.28	22.89
		37	18	20.75	21.18
		37	38	22.50	22.13
		75	0	21.23	21.72
	2682.5	1	0	23.22	22.66
		1	37	21.34	21.17
		1	74	21.68	20.96
		37	0	20.65	21.04
		37	18	22.41	23.31
		37	38	22.02	22.00
		75	0	20.99	21.02
20	2506.0	1	0	23.36	23.58
		1	49	23.78	23.98
		1	99	23.38	23.42
		50	0	23.12	23.86
		50	25	**24.43**	23.61
		50	50	23.89	**24.24**
		100	0	23.94	23.79
	2593.0	1	0	23.00	22.37
		1	49	22.52	22.35
		1	99	22.34	21.87
		50	0	20.35	20.32
		50	25	21.97	21.67
		50	50	21.66	22.29
		100	0	22.13	22.07
	2680.0	1	0	21.83	21.31
		1	49	21.94	21.96
		1	99	22.37	21.99
		50	0	21.22	21.94
		50	25	21.17	21.17
		50	50	19.55	19.30
		100	0	21.93	21.92

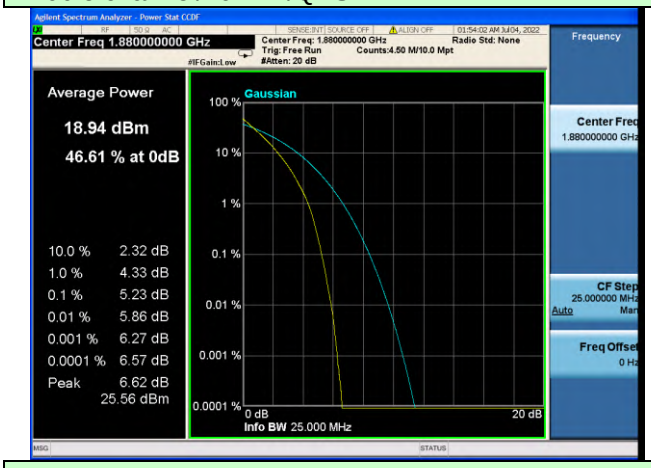
4.4 Peak-to-Average Ratio

Test Requirement:	Part 22.913(d), FCC part24.232(d) and FCC part27.50(d)(5)/(c)
Test Method:	ANSI C63.26:2015
Test Limit:	Used complementary cumulative distribution function (CCDF) of analyzer to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7.. 2. The EUT was connected to spectrum and system simulator via a power divider 3. Using the CCDF measurement of spectrum analyzer; 4. Set RBW≥OBW or specified reference bandwidth; 5. Set the number of counts to a value that stabilizes the measured CCDF curve; 6. Set the measurement interval as 1ms 7. Record the maximum PAPR level associated with a probability of 0.1%.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Test plots are listed as below:

Test mode	Peak to Average Ratio (dB)	Limit (dB)	Result
LTE Band 2 Middle channel/20MHz/QPSK	5.23	13	PASS
LTE Band 2 Middle channel/20MHz/16-QAM	6.06	13	PASS
LTE Band 4 Middle channel/20MHz/QPSK	5.12	13	PASS
LTE Band 4 Middle channel/20MHz/16-QAM	5.96	13	PASS
LTE Band 5 Middle channel/10MHz/QPSK	5.33	13	PASS
LTE Band 5 Middle channel/10MHz/16-QAM	6.17	13	PASS
LTE Band 12 Middle channel/10MHz/QPSK	5.31	13	PASS
LTE Band 12 Middle channel/10MHz/16-QAM	6.20	13	PASS
LTE Band 41 Middle channel/20MHz/QPSK	9.22	13	PASS
LTE Band 41 Middle channel/20MHz/16-QAM	10.01	13	PASS

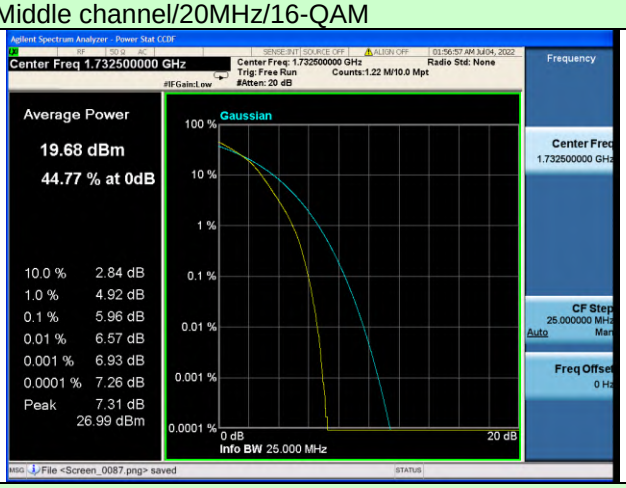
Test Mode: LTE Band 2
Middle channel/20MHz/QPSK



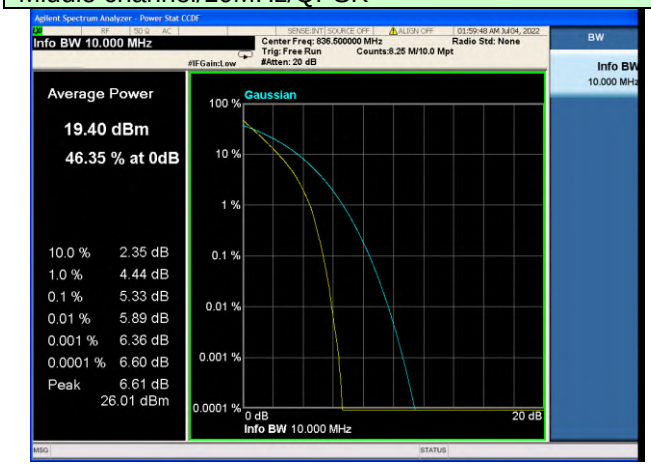
Test Mode: LTE Band 2
Middle channel/20MHz/16-QAM

Test Mode: LTE Band 4
Middle channel/20MHz/QPSK

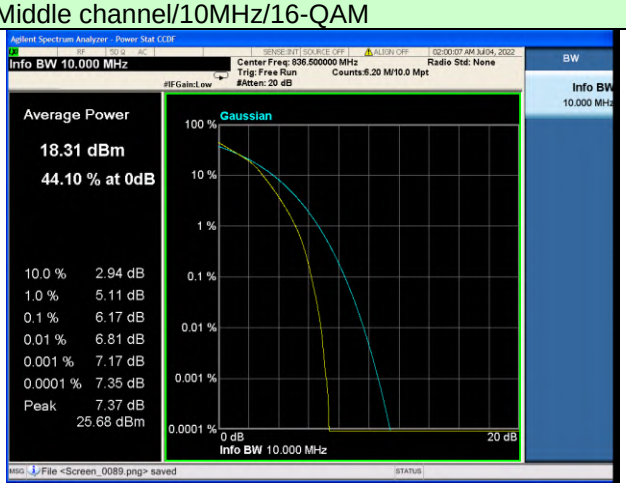
Test Mode: LTE Band 4
Middle channel/20MHz/16-QAM



Test Mode: LTE Band 5
Middle channel/10MHz/QPSK



Test Mode: LTE Band 5
Middle channel/10MHz/16-QAM

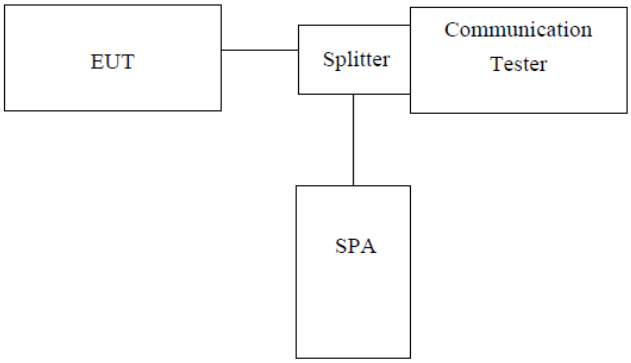


Test Mode: LTE Band 12 Middle channel/10MHz/QPSK	Test Mode: LTE Band 12 Middle channel/10MHz/16-QAM

Test Mode: LTE Band 41 Middle channel/20MHz/QPSK	Test Mode: LTE Band 41 Middle channel/20MHz/16-QAM

Note: All bandwidth and modulation are tested, only the worst results are reported.

4.5 Occupy Bandwidth

Test Requirement:	FCC part22.913(a), FCC part24.232(b) and FCC part27.53(a)
Test Method:	ANSI C63.26:2015
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1.The EUT's output RF connector was connected with a short cable to the spectrum analyzer, set center frequency to channel center frequency. 2.RBW was set to about 1%-5% of emission OBW, VBW≥ 3 X RBW. 3.Set spectrum analyzer detection mode to peak, and the trace mode to max hold. 4. Use the 99% OBW function, The 99% power OBW can be found on the plot, determine the "-26dB amplitude" as equal to reference value -26dB.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 2	1.4MHz	QPSK	6	0	1174.4	1422.0
		16-QAM	6	0	1185.7	1429.0
	3MHz	QPSK	15	0	2745.5	3052.0
		16-QAM	15	0	2731.3	3052.0
	5MHz	QPSK	25	0	4502.2	4989.0
		16-QAM	25	0	4519.2	5029.0
	10MHz	QPSK	50	0	8927.7	9593.0
		16-QAM	50	0	8934.8	9637.0
	15MHz	QPSK	75	0	13345.0	14230.0
		16-QAM	75	0	13374.0	14200.0
	20MHz	QPSK	100	0	17797.0	18800.0
		16-QAM	100	0	17824.0	18960.0

EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 4	1.4MHz	QPSK	6	0	1181.9	1422.0
		16-QAM	6	0	1180.5	1414.0
	3MHz	QPSK	15	0	2738.4	3054.0
		16-QAM	15	0	2734.9	3045.0
	5MHz	QPSK	25	0	4510.9	5040.0
		16-QAM	25	0	4530.7	5038.0
	10MHz	QPSK	50	0	8932.3	9661.0
		16-QAM	50	0	8918.1	9603.0
	15MHz	QPSK	75	0	13352.0	14210.0
		16-QAM	75	0	13348.0	14170.0
	20MHz	QPSK	100	0	17775.0	18820.0
		16-QAM	100	0	17770.0	18870.0

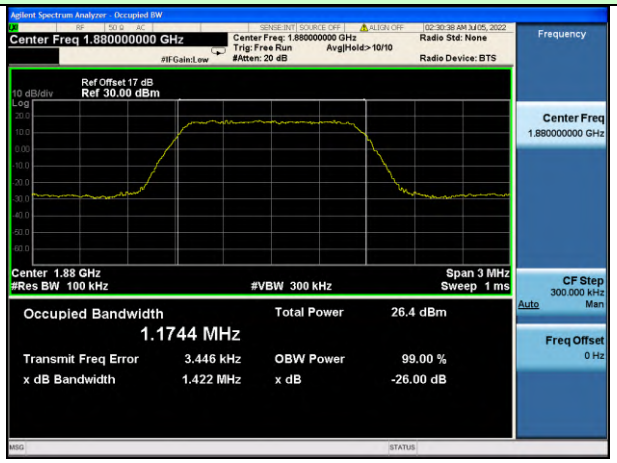
EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 5	1.4MHz	QPSK	6	0	1184.7	1421.0
		16-QAM	6	0	1173.1	1414.0
	3MHz	QPSK	15	0	2745.3	3041.0
		16-QAM	15	0	2734.6	3034.0
	5MHz	QPSK	25	0	4504.5	5006.0
		16-QAM	25	0	4509.2	4985.0
	10MHz	QPSK	50	0	8918.3	9641.0
		16-QAM	50	0	8932.1	9640.0

EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 12	1.4MHz	QPSK	25	0	1182.3	1419.0
		16-QAM	25	0	1181.4	1423.0
	3MHz	QPSK	50	0	2740.8	3051.0
		16-QAM	50	0	2743.3	3050.0
	5MHz	QPSK	25	0	4506.9	4995.0
		16-QAM	25	0	4497.6	5002.0
	10MHz	QPSK	50	0	8914.1	9643.0
		16-QAM	50	0	8929.2	9615.0

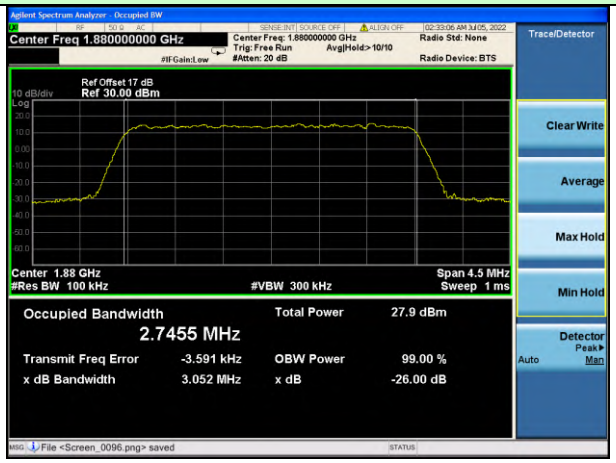
EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 41	5MHz	QPSK	25	0	4498.9	5102.0
		16-QAM	25	0	4505.3	5104.0
	10MHz	QPSK	50	0	8931.7	9746.0
		16-QAM	50	0	8935.0	9705.0
	15MHz	QPSK	75	0	13378.0	14970.0
		16-QAM	75	0	13379.0	14820.0
	20MHz	QPSK	100	0	17836.0	18870.0
		16-QAM	100	0	17850.0	18830.0

Test plot as follows:

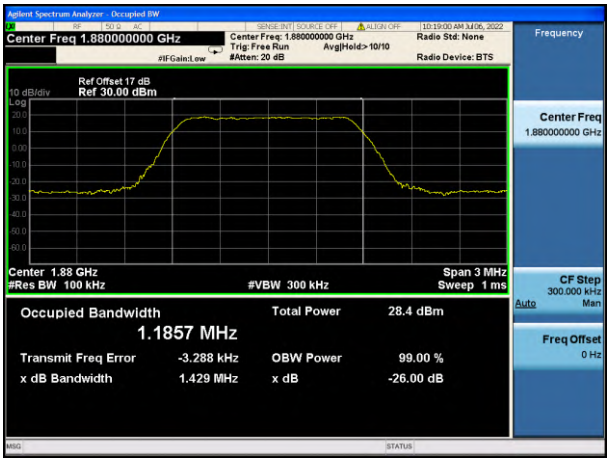
Test Mode: LTE Band 2 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 2 Channel Bandwidth: 3MHz



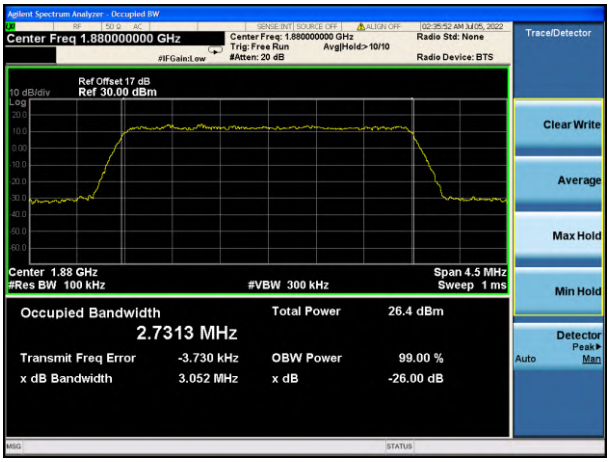
QPSK



QPSK

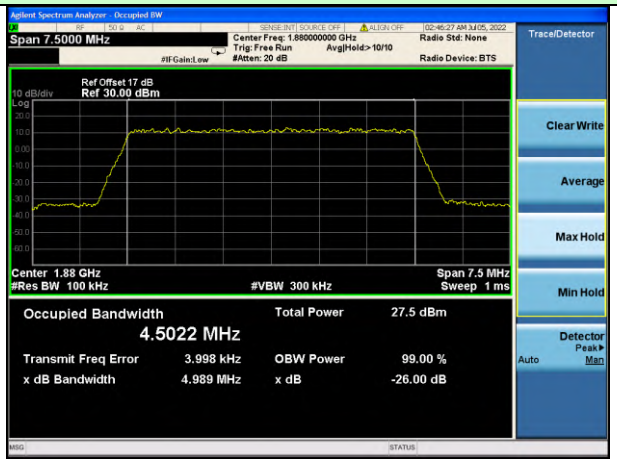


16-QAM

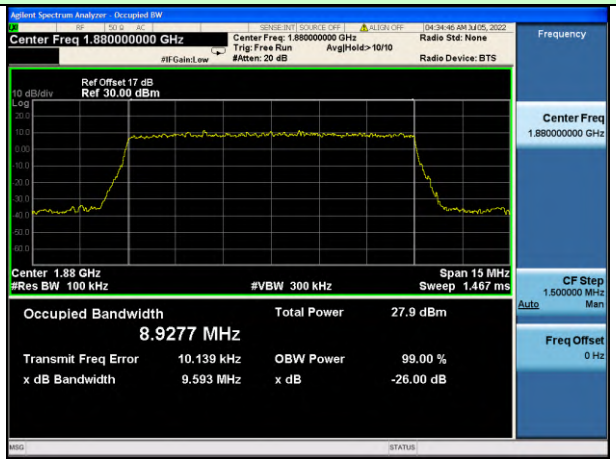


16-QAM

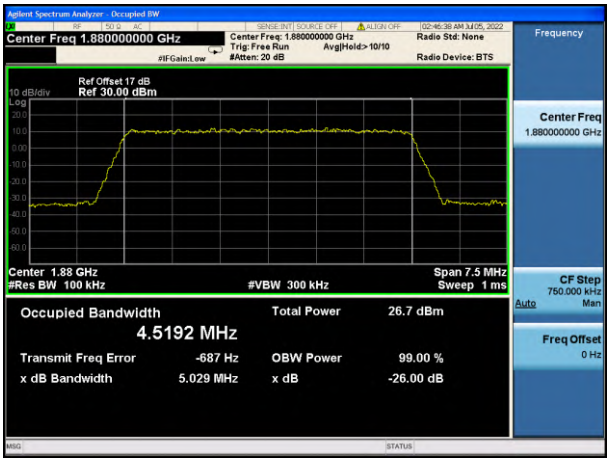
Test Mode: LTE Band 2 Channel Bandwidth: 5MHz	Test Mode: LTE Band 2 Channel Bandwidth: 10MHz



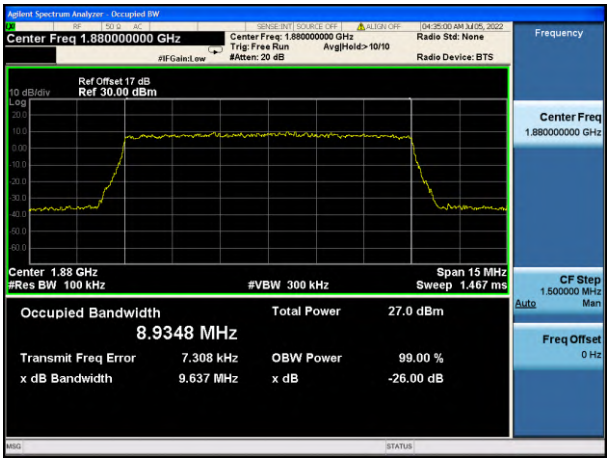
QPSK



QPSK

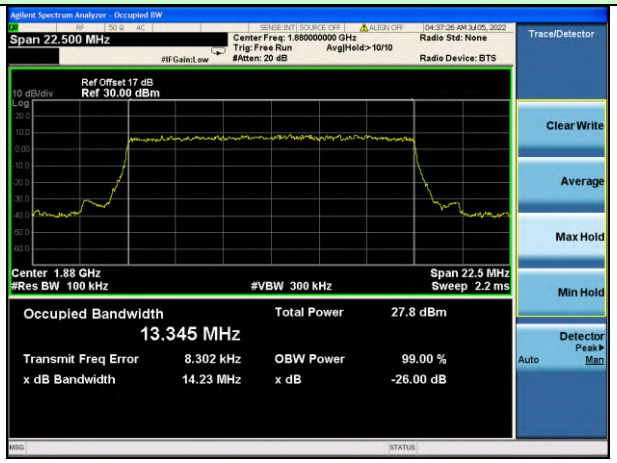


16-QAM



16-QAM

Test Mode: LTE Band 2 Channel Bandwidth: 15MHz	Test Mode: LTE Band 2 Channel Bandwidth: 20MHz



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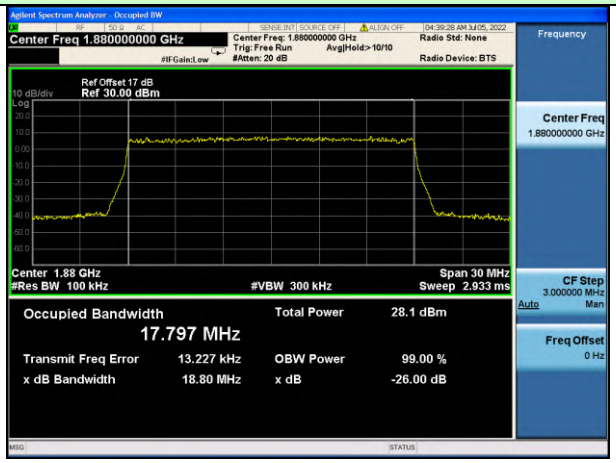

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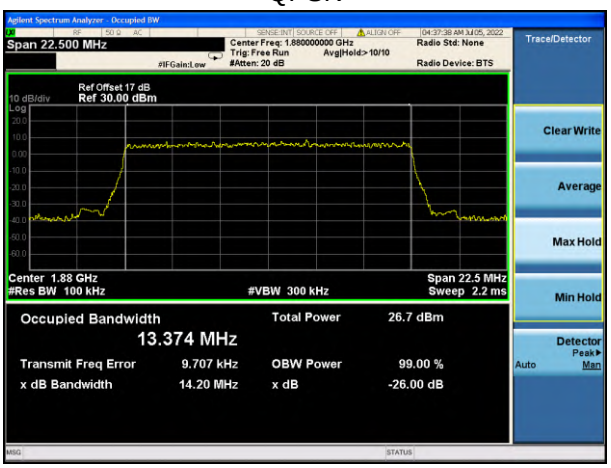

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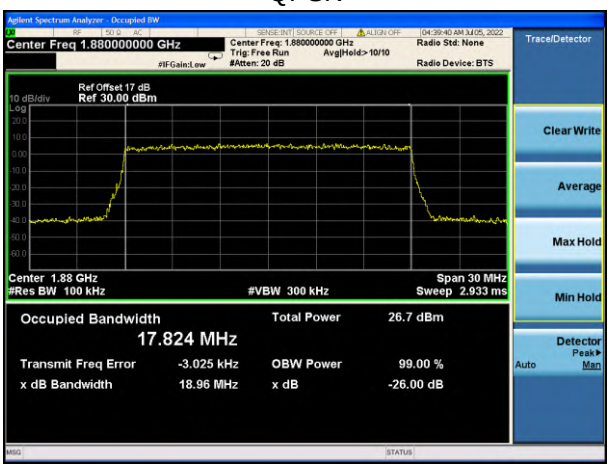
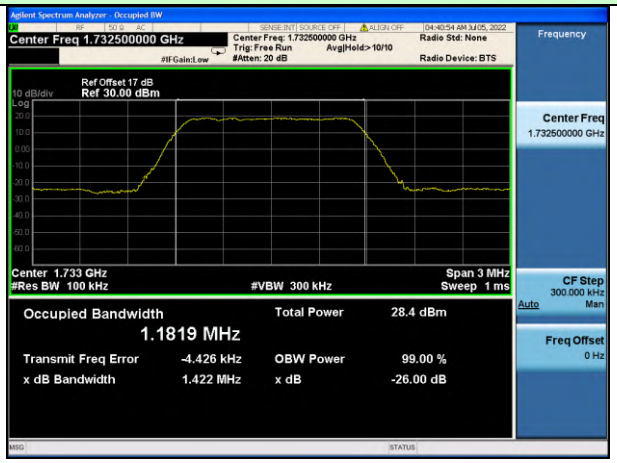


16-QAM

Test Mode: LTE Band 4 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 4 Channel Bandwidth: 3MHz



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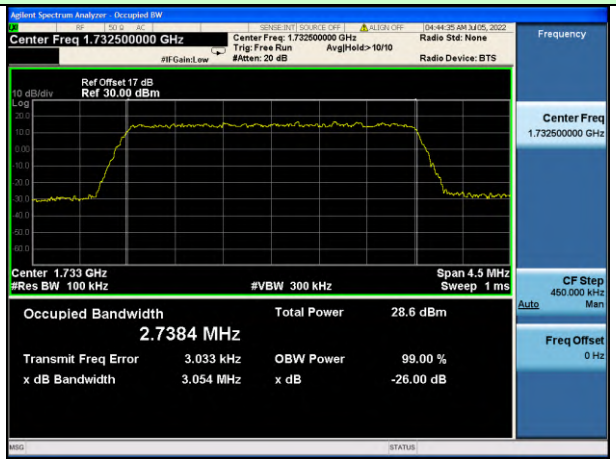

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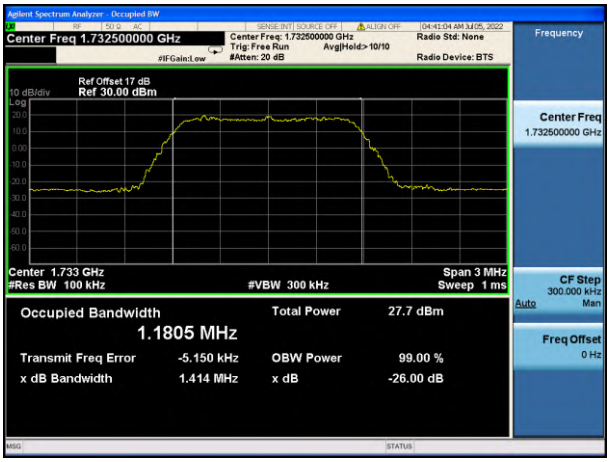
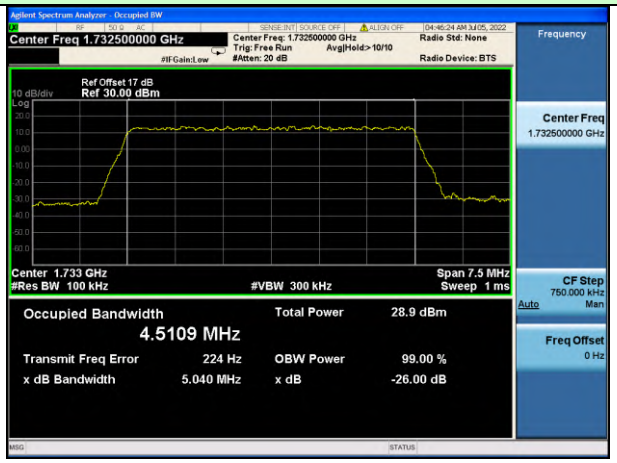


16-QAM

16-QAM

Test Mode: LTE Band 4 Channel Bandwidth: 5MHz	Test Mode: LTE Band 4 Channel Bandwidth: 10MHz



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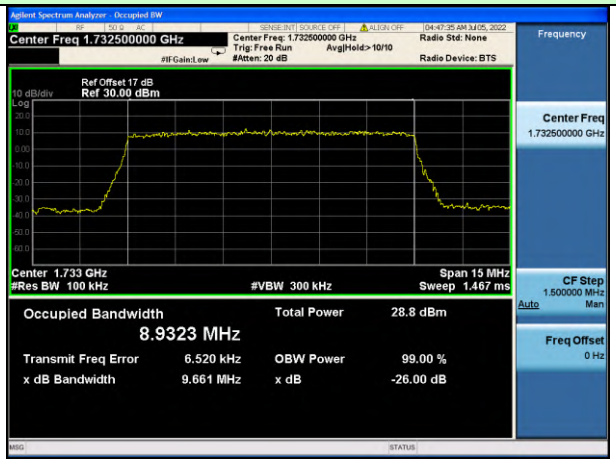

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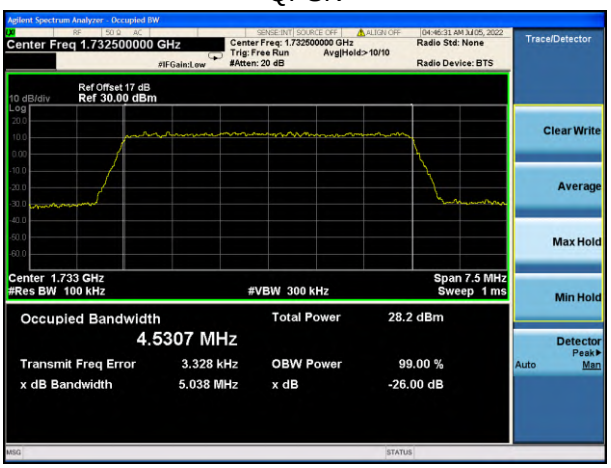

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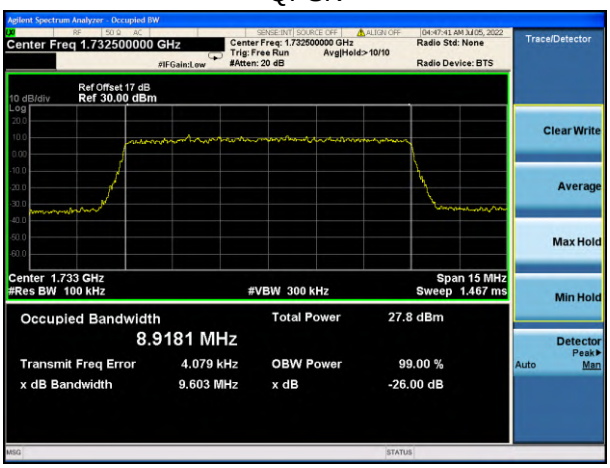
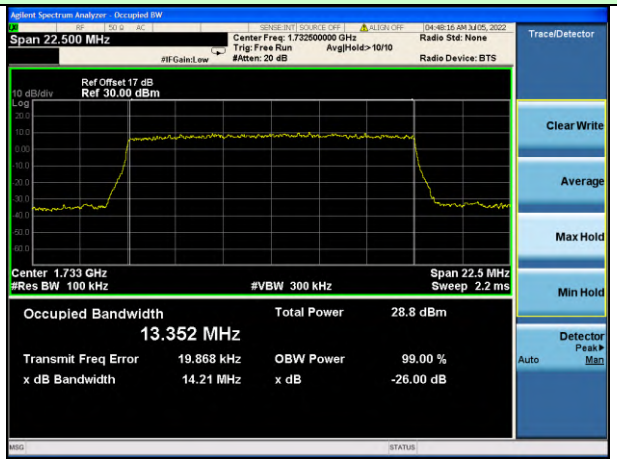


16-QAM

Test Mode: LTE Band 4 Channel Bandwidth: 15MHz	Test Mode: LTE Band 4 Channel Bandwidth: 20MHz



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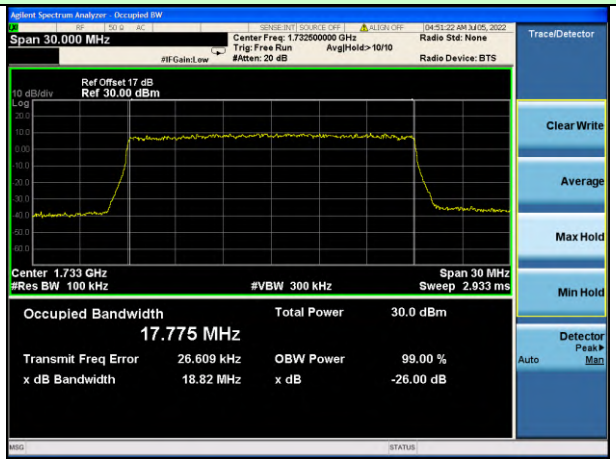

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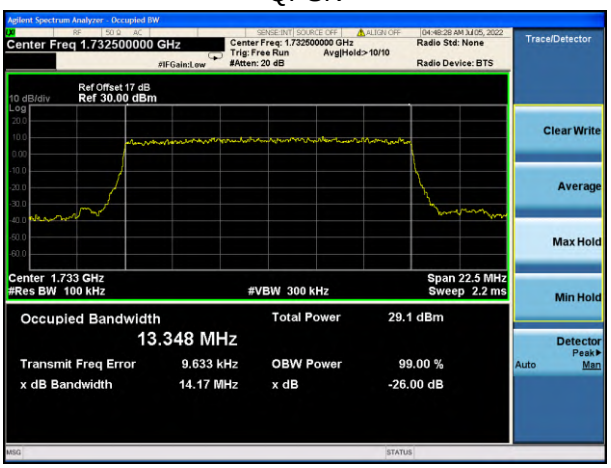

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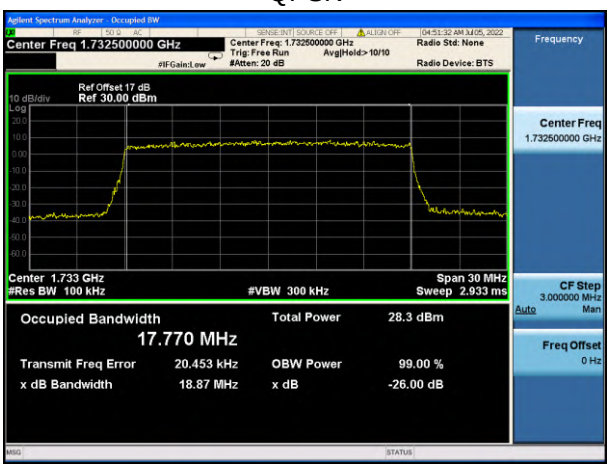
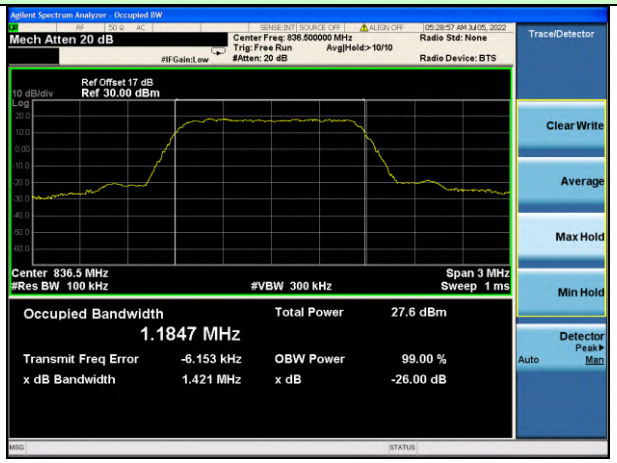


16-QAM

Test Mode: LTE Band 5 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 5 Channel Bandwidth: 3MHz



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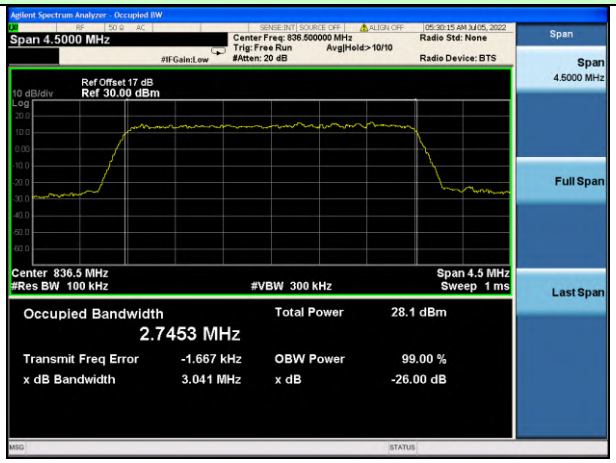

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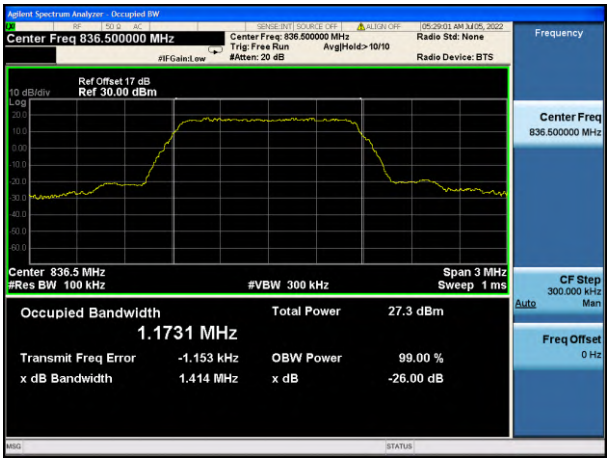
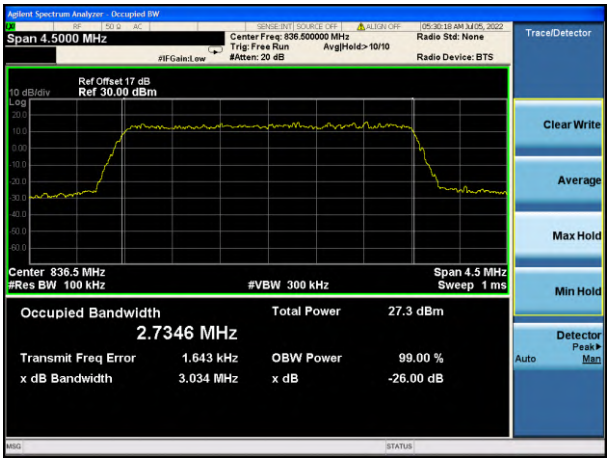
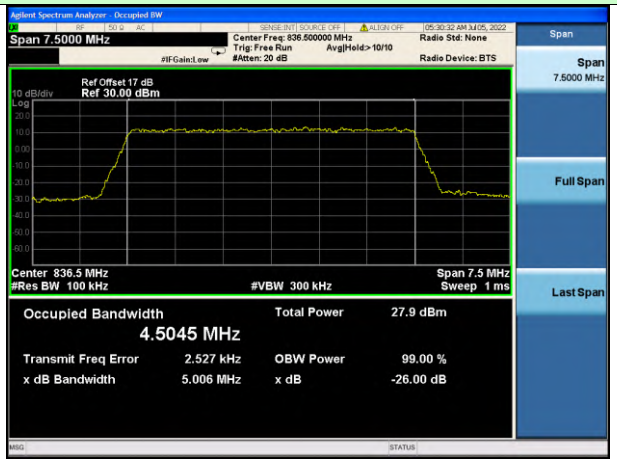


16-QAM



16-QAM

Test Mode: LTE Band 5
Channel Bandwidth: 5MHz



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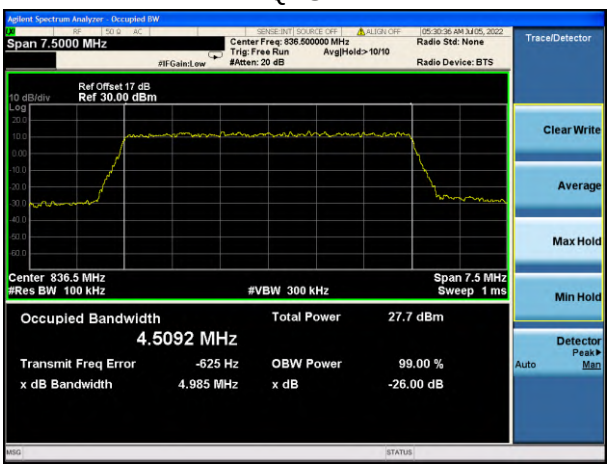
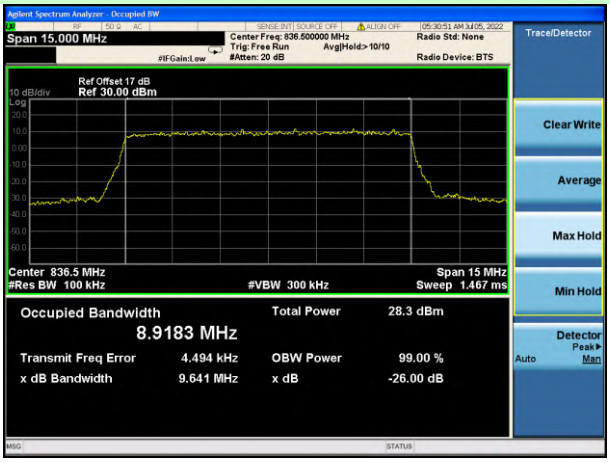


16-QAM

Test Mode: LTE Band 5
Channel Bandwidth: 10MHz



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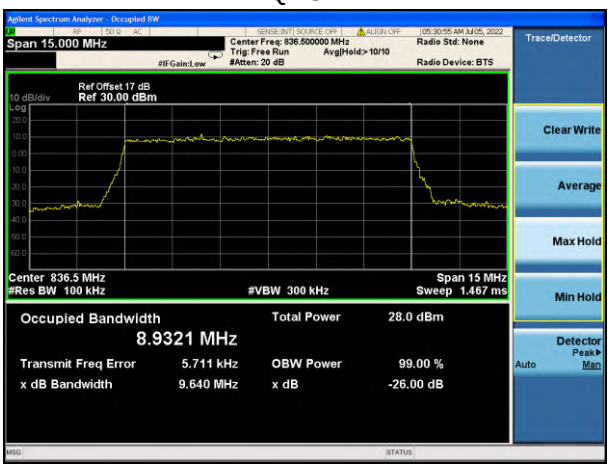
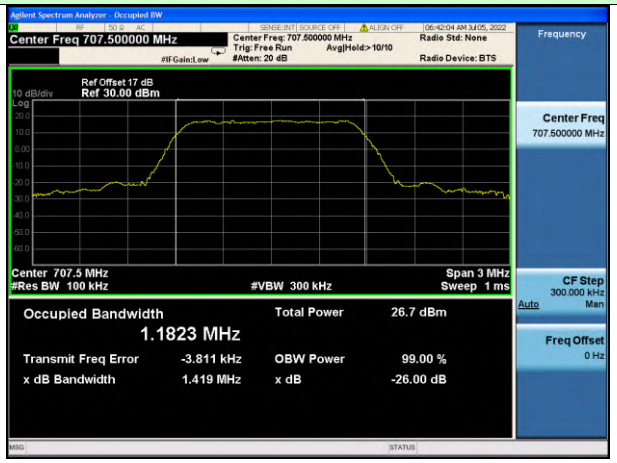


16-QAM

Test Mode: LTE Band 12
Channel Bandwidth: 1.4MHz



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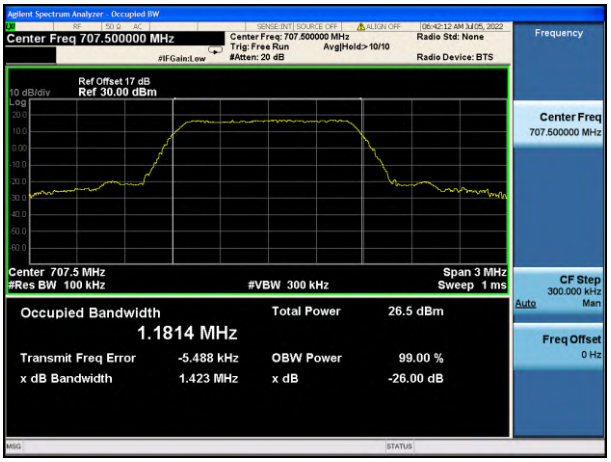
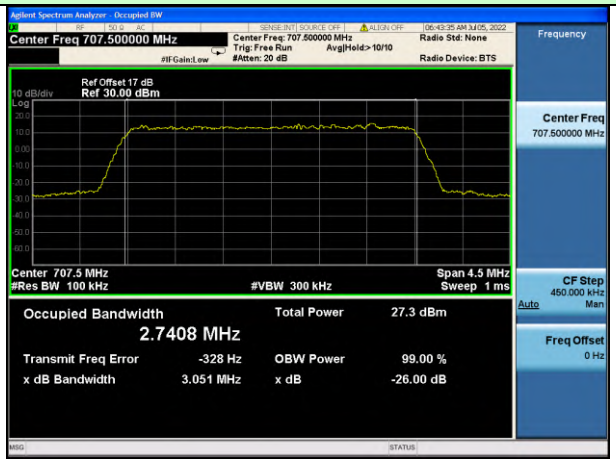


16-QAM

Test Mode: LTE Band 12
Channel Bandwidth: 3MHz



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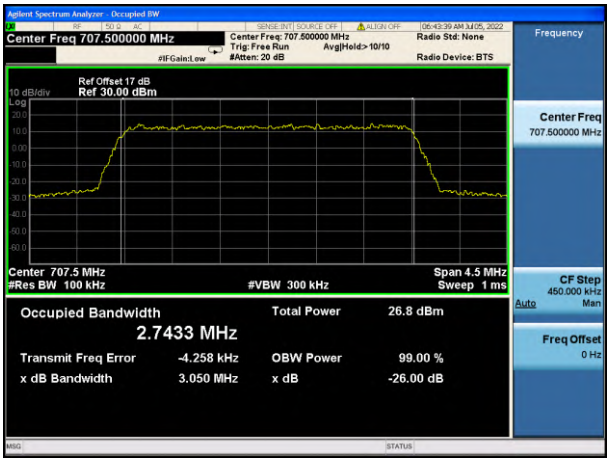
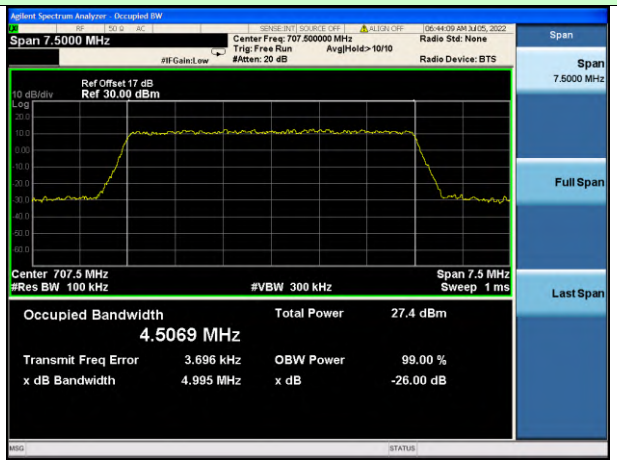


16-QAM

Test Mode: LTE Band 12
Channel Bandwidth: 5MHz



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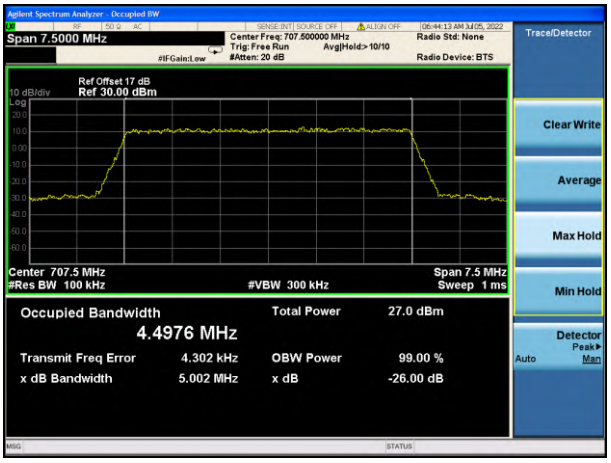
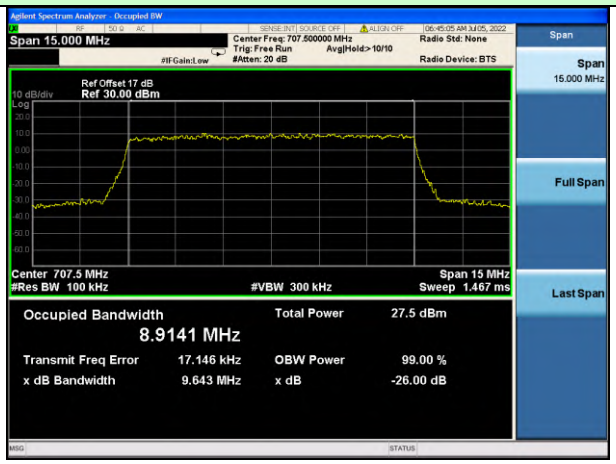


16-QAM

Test Mode: LTE Band 12
Channel Bandwidth: 10MHz



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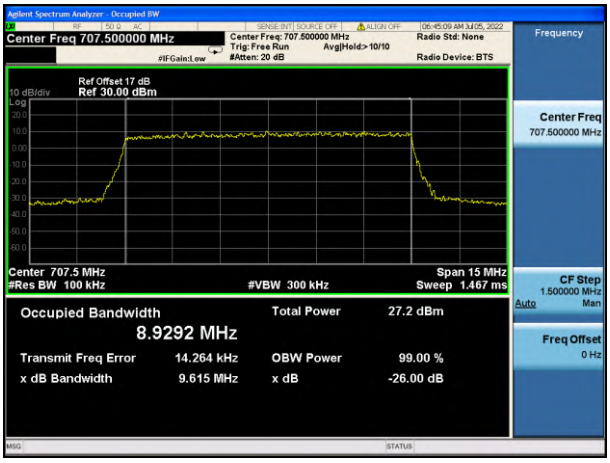
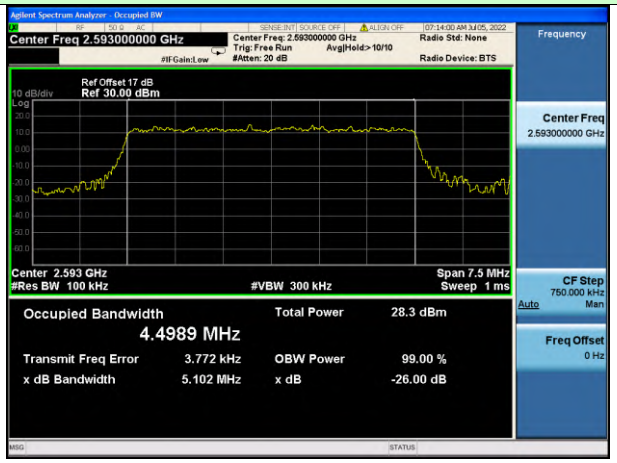


16-QAM

Test Mode: LTE Band 41
Channel Bandwidth: 5MHz



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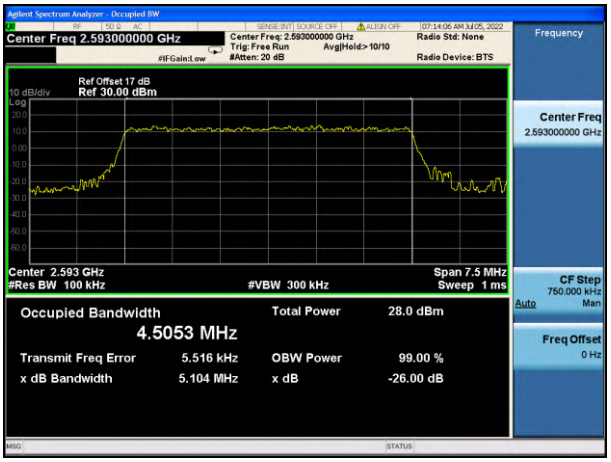
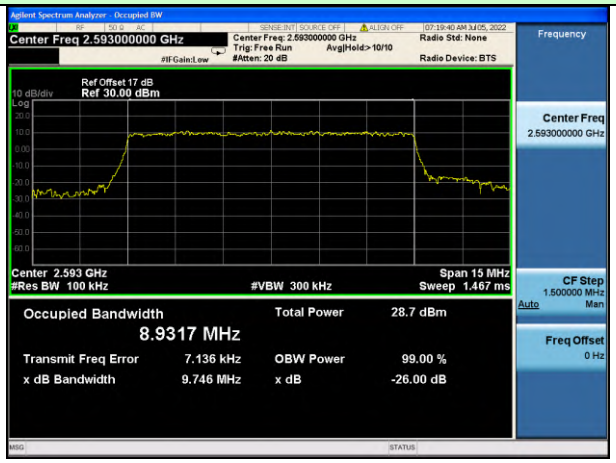


16-QAM

Test Mode: LTE Band 41
Channel Bandwidth: 10MHz



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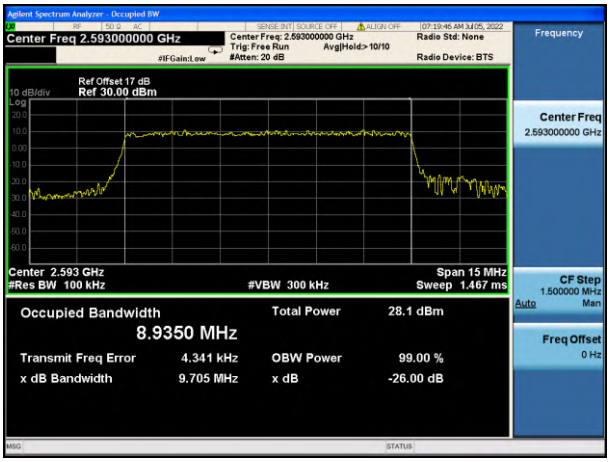
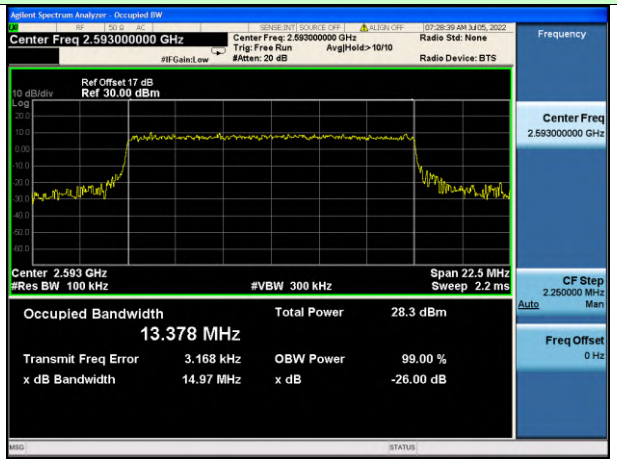


16-QAM

Test Mode: LTE Band 41
Channel Bandwidth: 15MHz



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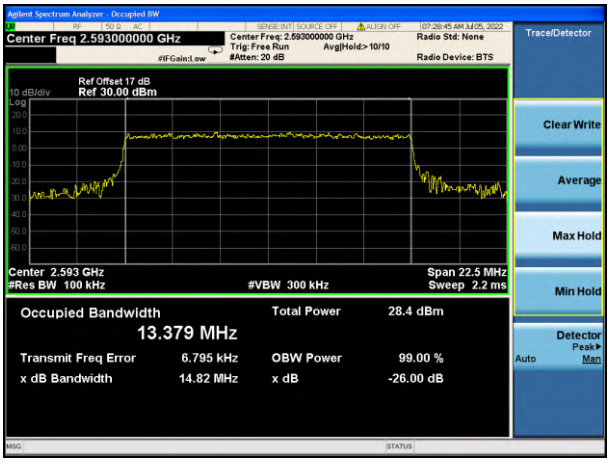
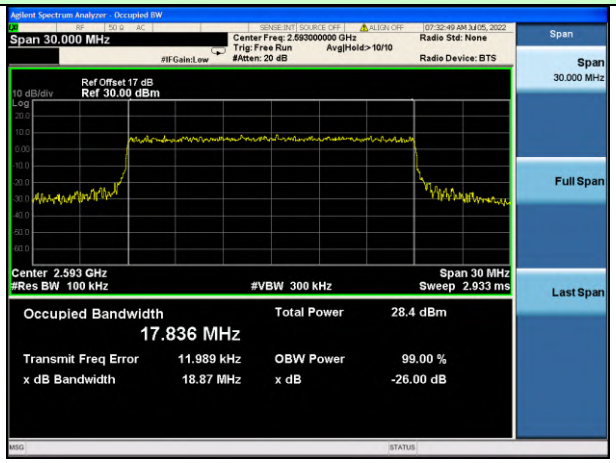


16-QAM

Test Mode: LTE Band 41
Channel Bandwidth: 20MHz



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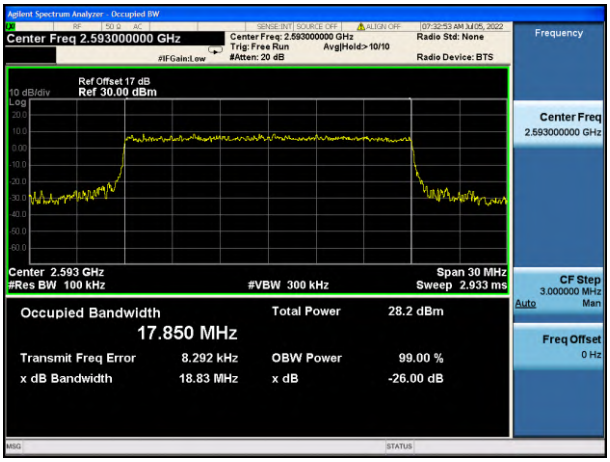


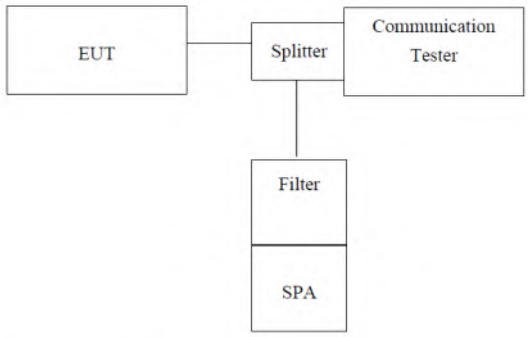
16-QAM

Note: All bandwidth and modulation are tested, only the worst results are reported.

4.6 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 24E & Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

4.7 Out of band emission at antenna terminals

Test Requirement:	FCC part22.913(a), FCC part24.238(a), FCC part27.53(h)/(m)/(g)
Test Method:	ANSI C63.26:2015
Limit:	-13dBm Band 41: -25dBm
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW=1MHz, VBW = 3MHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Test plot as follows: