FCC TEST REPORT

FCC ID: 2ARN2-EM200

On Behalf of

Bizringer Inc

Smart Tail Light Tracker

Model No.: EM200

Prepared for	:	Bizringer Inc
Address	:	1221 E. Dyer Road Suite 250 Sant Ana. CA92705, USA

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	:	A2103153-C01-R02
Date of Receipt	:	March 18, 2021
Date of Test	:	March 18, 2021- April 13, 2021
Date of Report	:	April 14, 2021
Version Number	:	V0

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TEST REPORT DECLARATION

Applicant	:	Bizringer Inc
Address	:	1221 E. Dyer Road Suite 250 Sant Ana. CA92705, USA
Manufacturer	:	HuiZhou Cantrack Technology Co., Ltd
Address	:	2nd floor, Building 3, Changguang Maosen Industrial Park, Chayuan, Qiuchang Town, Huiyang District, Huizhou, Guangdong, China
EUT Description	:	Smart Tail Light Tracker
(A) Model No.	:	EM200
(B) Trademark	:	N/A

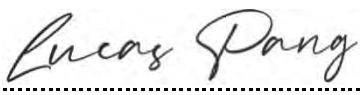
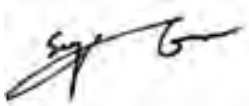
Measurement Standard Used:

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).....:	Lucas Pang Project Engineer	
Approved by (name + signature).....:	Simple Guan Project Manager	
Date of issue…… ……..:	April 14, 2021	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	April 14, 2021	Initial released Issue	Lucas Pang

1 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Pass* (Please refer to MPE assessment)
RF Output Power	Part 2.1046 Part 22.913(a) (5) Part 24.232 (c) Part 27.50 (d)(4)	Pass
Peak-To-Average Ratio	Part 2.1046	Pass
Effective Isotropic Radiated power	Part27.50 (b)(10) Part27.50 (c)(10) Part27.50 (d)(4) Part24.232 (c) Part22.913(a)	Pass
Modulation Characteristics	Part 2.1047	N/A
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.913(a) Part 24.238 Part 27.53(a)(m)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.913 (a) Part 24.238 (a) Part 27.53 (h)(m)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.913 (a) Part 24.238 (a) Part 27.53 (h)(m)	Pass
Out of band emission, Band Edge	Part 22.913 (a) Part 24.238 (a) Part 27.53(h) (m)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass

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

2 General Information

2.1 General Description of EUT

Description of Device (EUT)

Description	:	Smart Tail Light Tracker
Trademark	:	N/A
Model Number	:	EM200
DIFF.	:	N/A
Test Voltage	:	DC 3.7V by battery(Built in battery), DC 12V by battery(External battery)
Power supply	:	DC 9-24V
Support Networks	:	LTE
Support Bands		LTE Band 2/4/5/12/13
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 13: 5MHz, 10MHz
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 13: 777MHz ~ 787MHz.
Modulation type		QPSK, 16QAM
Antenna Type	:	Internal antenna, Maximum Gain is 0dBi
Software version	:	V1.0
Hardware version	:	V1.0

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)

Accessories1	:	/
Manufacturer	:	/
Model	:	/
Input	:	/
Output	:	/
Accessories 2	:	/
Manufacturer	:	/
Model	:	/
Ratings	:	/

2.5 Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1.	Power bank	--	--	--	--

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	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.16dB(Polarize: H)
	4.13dB(Polarize: V)
Uncertainty for radio frequency	5.4×10-8
Uncertainty for conducted RF Power	0.37dB
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.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2019.09.06	3Year
Spectrum analyzer	R&S	FSV40-N	102137	2020.09.02	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2020.09.02	1Year
Receiver	R&S	ESR	1316.3003K03-102082-Wa	2020.09.02	1Year
Receiver	R&S	ESCI	101165	2020.09.02	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2020.04.12	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2019.09.07	2Year
Cable	Resenberger	N/A	No.1	2020.09.02	1Year
Cable	Resenberger	N/A	No.2	2020.09.02	1Year
Cable	Resenberger	N/A	No.3	2020.09.02	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2020.09.02	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2020.09.02	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2020.09.02	1Year
L.I.S.N.#2	R&S	ENV216	101043	2020.09.02	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2020.09.02	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	00946	2019.09.07	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2020.09.02	1 Year
Power Meter	Agilent	E9300A	MY41496625	2020.09.02	1 Year
Temp. &Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2020.09.02	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2020.09.02	1 Year
CMW500	R&S	CMW500	1201.0002K50-117239-sM	2020.09.02	2021.09.01
Antenna	SCHWARZBECK	STLP9128E-	STLP9128E s#139	N/A	NCR

		special			

4 System test configuration

4.1 Test mode

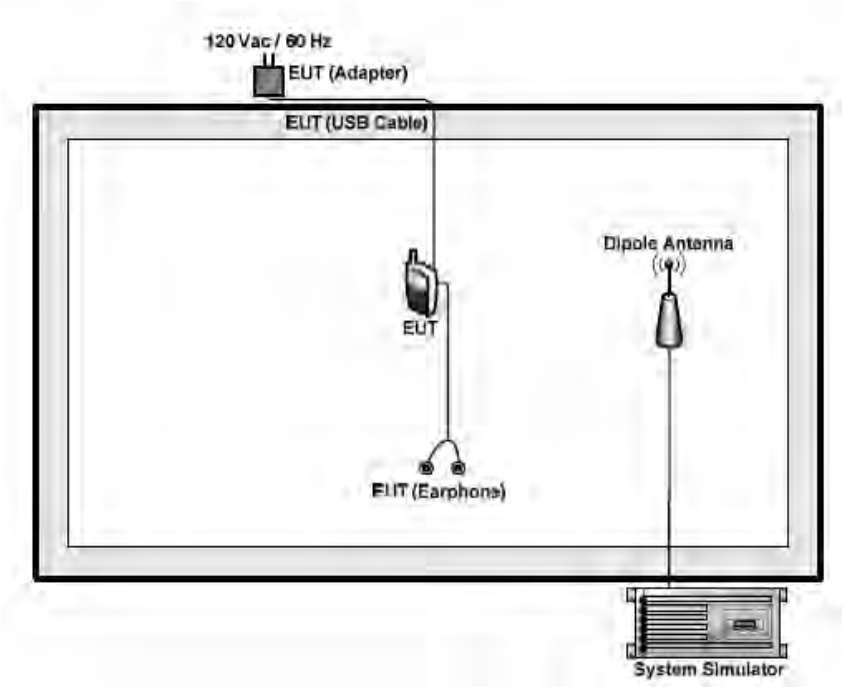
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

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 13	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link

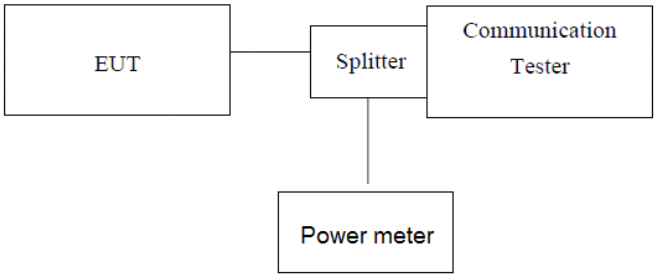
Note: Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03r1 with maximum output power.

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
Test Method:	ANSI C63.26:2015
Limit:	No specific RF power output requirements in part 2. 1046.
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	23.33	**24.13**
		1	3	22.82	23.31
		1	5	**24.46**	22.78
		3	0	24.04	22.62
		3	2	22.20	22.64
		3	3	22.24	22.61
		6	0	22.74	21.96
	1880.0	1	0	23.08	22.41
		1	3	23.37	21.78
		1	5	22.66	22.39
		3	0	22.33	20.92
		3	2	21.02	22.37
		3	3	22.53	20.61
		6	0	22.34	22.30
	1909.3	1	0	22.33	21.45
		1	3	22.40	22.67
		1	5	22.52	22.38
		3	0	20.90	21.50
		3	2	22.04	21.68
		3	3	22.04	22.84
		6	0	23.20	21.69
3	1851.5	1	0	23.80	23.44
		1	7	22.69	24.07
		1	14	23.69	23.28
		8	0	21.75	21.77
		8	4	22.04	22.27
		8	7	23.36	21.47
		15	0	21.54	21.30
	1880.0	1	0	23.00	21.42
		1	7	22.79	23.01
		1	14	22.94	21.57
		8	0	21.99	21.35
		8	4	21.01	21.13
		8	7	20.74	20.25
		15	0	21.74	20.71
	1908.5	1	0	21.52	22.37
		1	7	21.51	21.45
		1	14	22.02	21.30
		8	0	22.70	21.27
		8	4	22.36	21.94
		8	7	22.34	22.01
		15	0	21.95	22.18
5	1852.5	1	0	22.70	22.11
		1	12	22.75	21.55
		1	24	22.80	21.50

		12	0	22.61	21.24
		12	6	22.43	22.58
		12	13	21.83	21.50
		25	0	21.22	22.77
	1880.0	1	0	24.30	24.12
		1	12	22.31	23.18
		1	24	21.07	21.68
		12	0	21.85	20.90
		12	6	20.42	20.82
		12	13	21.60	21.69
		25	0	21.71	20.44
	1907.5	1	0	22.58	22.15
		1	12	22.47	21.50
		1	24	22.43	21.25
		12	0	22.35	22.59
		12	6	21.50	22.87
		12	13	21.40	21.67
		25	0	22.31	22.12
10	1855.0	1	0	24.01	22.48
		1	24	22.63	22.32
		1	49	23.11	23.36
		25	0	22.05	21.97
		25	12	22.00	21.23
		25	25	23.23	22.74
		50	0	22.76	21.69
	1880.0	1	0	22.61	23.70
		1	24	23.85	24.04
		1	49	21.57	21.62
		25	0	22.06	20.72
		25	12	21.87	21.84
		25	25	20.50	20.87
		50	0	21.23	21.27
	1905.0	1	0	22.83	21.70
		1	24	22.44	22.55
		1	49	22.98	21.87
		25	0	22.69	22.38
		25	12	22.15	22.05
		25	25	23.71	22.04
		50	0	22.27	22.37
15	1857.5	1	0	23.63	23.72
		1	37	22.58	23.64
		1	74	22.86	22.76
		37	0	22.64	21.35
		37	18	21.66	22.27
		37	38	21.14	21.41
		75	0	22.79	22.22
	1880.0	1	0	22.83	23.11
		1	37	24.43	22.07
		1	74	22.75	20.62
		37	0	21.52	20.84

		37	18	22.95	23.26
		37	38	22.07	22.98
		75	0	22.55	21.36
	1902.5	1	0	22.29	21.98
		1	37	22.38	21.82
		1	74	23.33	22.39
		37	0	21.19	20.71
		37	18	21.83	20.75
		37	38	22.10	21.12
		75	0	20.72	22.51
20	1860.0	1	0	24.06	23.01
		1	49	23.08	23.22
		1	99	22.70	22.61
		50	0	22.03	21.39
		50	25	23.03	22.86
		50	50	20.56	21.19
		100	0	22.59	21.88
	1880.0	1	0	22.53	23.61
		1	49	23.19	23.22
		1	99	21.42	21.70
		50	0	21.79	21.84
		50	25	21.60	22.28
		50	50	22.14	22.14
		100	0	21.32	22.02
	1900.0	1	0	22.25	21.66
		1	49	22.30	21.88
		1	99	21.69	21.74
		50	0	22.39	22.05
		50	25	21.14	20.10
		50	50	21.27	20.01
		100	0	21.58	20.70

LTE Band4

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
1.4	1710.7	1	0	**25.41**	**24.68**
		1	3	23.98	22.99
		1	5	23.68	23.85
		3	0	24.70	23.24
		3	2	24.49	23.16
		3	3	23.45	23.13
		6	0	22.26	23.59
	1732.5	1	0	23.89	23.58
		1	3	23.70	23.34
		1	5	21.28	22.55
		3	0	22.89	21.95
		3	2	22.20	22.75
		3	3	22.31	22.84
		6	0	21.98	22.18
	1754.3	1	0	23.12	22.42
		1	3	23.09	22.04
		1	5	22.87	22.32
		3	0	23.07	21.71
		3	2	22.69	23.15
		3	3	21.16	23.82
		6	0	21.71	21.57
3	1711.5	1	0	24.56	23.05
		1	7	23.89	23.30
		1	14	23.46	23.69
		8	0	23.61	22.60
		8	4	22.67	21.95
		8	7	22.66	22.97
		15	0	23.86	23.14
	1732.5	1	0	23.09	23.64
		1	7	23.64	22.75
		1	14	22.37	23.04
		8	0	21.48	21.57
		8	4	21.28	20.66
		8	7	22.24	20.84
		15	0	22.16	20.41
	1753.5	1	0	23.15	21.79
		1	7	22.80	22.85
		1	14	23.19	21.98
		8	0	21.77	21.44
		8	4	21.61	20.31
		8	7	21.54	21.18
		15	0	21.23	22.54
5	1712.5	1	0	23.56	23.92
		1	12	23.32	23.47
		1	24	23.89	22.70

		12	0	24.33	24.25
		12	6	23.75	22.85
		12	13	23.85	23.64
		25	0	22.90	22.78
	1732.5	1	0	22.98	22.72
		1	12	23.35	23.44
		1	24	22.04	21.50
		12	0	20.90	21.16
		12	6	22.15	21.37
		12	13	22.13	22.01
		25	0	22.33	22.46
	1752.5	1	0	21.73	21.76
		1	12	23.14	21.98
		1	24	22.89	21.48
		12	0	22.30	21.81
		12	6	22.23	20.84
		12	13	21.15	21.71
		25	0	21.85	20.93
10	1715.0	1	0	22.89	22.93
		1	24	23.93	23.61
		1	49	25.00	23.59
		25	0	22.51	21.89
		25	12	21.67	22.28
		25	25	22.62	22.92
		50	0	22.87	22.19
	1732.5	1	0	23.82	24.11
		1	24	23.39	23.17
		1	49	21.90	22.25
		25	0	22.63	22.39
		25	12	22.33	22.70
		25	25	23.14	22.23
		50	0	22.05	21.65
	1750.0	1	0	22.50	21.61
		1	24	22.89	22.13
		1	49	23.06	23.00
		25	0	21.05	21.97
		25	12	22.04	21.79
		25	25	22.29	20.35
		50	0	20.69	20.52
15	1717.5	1	0	24.56	25.36
		1	37	24.39	23.34
		1	74	23.41	24.33
		37	0	23.16	22.64
		37	18	23.61	22.76
		37	38	23.04	22.67
		75	0	23.04	21.66
	1732.5	1	0	25.19	24.09
		1	37	22.99	23.28
		1	74	22.45	21.20
		37	0	22.97	22.15

		37	18	21.73	21.36
		37	38	21.41	21.48
		75	0	21.72	20.47
	1747.5	1	0	22.75	23.56
		1	37	23.70	22.16
		1	74	23.40	22.65
		37	0	20.92	22.24
		37	18	21.64	21.93
		37	38	21.05	20.97
		75	0	22.20	21.92
20	1720.0	1	0	24.68	23.34
		1	49	24.27	23.63
		1	99	24.93	23.53
		50	0	23.73	23.49
		50	25	22.65	21.94
		50	50	23.35	23.14
		100	0	23.19	21.91
	1732.5	1	0	23.95	23.78
		1	49	24.94	23.89
		1	99	22.39	21.39
		50	0	22.60	21.70
		50	25	21.04	21.51
		50	50	20.74	22.22
		100	0	22.24	22.04
	1745.0	1	0	22.71	22.00
		1	49	24.06	22.91
		1	99	22.64	22.97
		50	0	21.44	21.47
		50	25	21.91	21.69
		50	50	21.97	20.78
		100	0	22.25	21.63

LTE Band5

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
1.4	824.7	1	0	23.17	22.96
		1	3	**24.88**	**24.35**
		1	5	22.63	22.63
		3	0	23.41	22.08
		3	2	22.78	22.15
		3	3	22.85	22.06
		6	0	22.45	22.48
	836.5	1	0	23.54	23.66
		1	3	23.89	22.18
		1	5	22.24	22.59
		3	0	22.84	22.67
		3	2	22.26	21.95
		3	3	20.69	22.16
		6	0	21.86	22.02
	848.3	1	0	21.89	20.38
		1	3	21.83	20.66
		1	5	21.89	22.08
		3	0	21.86	21.81
		3	2	21.64	22.86
		3	3	23.17	20.84
		6	0	21.54	20.81
3	825.5	1	0	22.56	22.34
		1	7	22.86	22.49
		1	14	22.82	22.34
		8	0	22.65	22.30
		8	4	23.44	21.81
		8	7	23.47	22.16
		15	0	23.03	22.42
	836.5	1	0	23.67	21.50
		1	7	22.89	22.85
		1	14	21.33	21.36
		8	0	22.33	22.36
		8	4	21.79	21.17
		8	7	22.03	21.02
		15	0	21.31	21.47
	847.5	1	0	23.00	22.77
		1	7	21.04	22.65
		1	14	21.03	20.99
		8	0	22.07	22.03
		8	4	22.06	22.66
		8	7	21.95	22.39
		15	0	22.18	21.35
5	826.5	1	0	23.27	22.76
		1	12	23.29	22.62
		1	24	23.27	22.36

		12	0	22.79	22.75
		12	6	21.92	22.01
		12	13	22.53	22.54
		25	0	23.95	23.90
	836.5	1	0	22.91	22.88
		1	12	22.02	22.30
		1	24	22.21	22.91
		12	0	21.30	22.24
		12	6	23.32	21.85
		12	13	22.50	21.86
		25	0	21.40	21.83
	846.5	1	0	20.84	21.65
		1	12	21.52	21.59
		1	24	22.84	22.35
		12	0	21.35	22.69
		12	6	22.12	21.05
		12	13	20.85	20.84
		25	0	21.67	20.37
10	829.0	1	0	23.48	22.75
		1	24	22.82	22.36
		1	49	22.85	23.93
		25	0	22.56	22.72
		25	12	23.17	22.77
		25	25	23.88	23.03
		50	0	24.35	23.24
	836.5	1	0	23.91	23.17
		1	24	23.57	22.26
		1	49	21.48	21.58
		25	0	23.37	22.33
		25	12	21.91	22.29
		25	25	22.56	21.80
		50	0	21.79	20.73
	844.0	1	0	22.66	22.39
		1	24	22.28	23.11
		1	49	22.56	22.48
		25	0	21.14	21.86
		25	12	22.92	21.93
		25	25	23.04	21.78
		50	0	22.05	21.14

LTE Band12

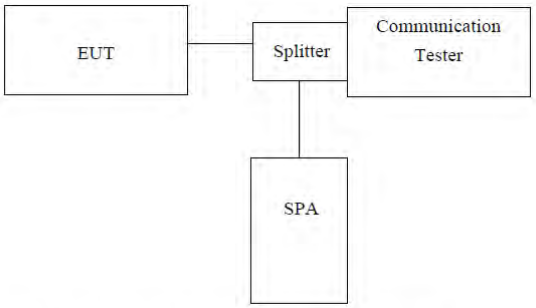
BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
1.4	699.7	1	0	22.90	23.27
		1	3	23.50	23.02
		1	5	23.02	**24.49**
		3	0	23.36	23.21
		3	2	23.89	23.30
		3	3	22.54	21.53
		6	0	24.19	21.91
	707.5	1	0	**24.24**	23.60
		1	3	23.10	22.46
		1	5	21.54	21.13
		3	0	22.73	20.90
		3	2	21.78	22.10
		3	3	22.55	20.74
		6	0	22.41	20.58
	715.3	1	0	21.75	21.29
		1	3	22.21	22.93
		1	5	21.23	19.77
		3	0	21.50	20.69
		3	2	22.43	21.22
		3	3	22.16	20.49
		6	0	22.37	20.41
4	700.5	1	0	23.55	23.46
		1	7	23.39	22.76
		1	14	22.92	23.07
		8	0	23.96	22.69
		8	4	23.88	22.22
		8	7	23.44	22.73
		15	0	23.79	23.17
	707.5	1	0	22.51	23.47
		1	7	23.55	23.29
		1	14	23.13	22.73
		8	0	23.08	21.56
		8	4	22.06	21.72
		8	7	21.87	20.87
		15	0	22.47	22.18
	714.5	1	0	23.18	22.88
		1	7	22.64	21.99
		1	14	22.25	22.72
		8	0	22.02	21.71
		8	4	21.90	22.74
		8	7	23.67	22.14
		15	0	21.82	20.66

5	701.5	1	0	22.90	23.27
		1	12	23.50	23.02
		1	24	23.02	21.79
		12	0	23.36	23.21
		12	6	23.89	23.30
		12	13	22.54	21.53
		25	0	24.19	21.91
	707.5	1	0	24.24	23.60
		1	12	23.10	22.46
		1	24	21.54	21.13
		12	0	22.73	20.90
		12	6	21.78	22.10
		12	13	22.55	20.74
		25	0	22.41	20.58
	713.5	1	0	21.75	21.29
		1	12	22.21	22.93
		1	24	21.23	19.77
		12	0	21.50	20.69
		12	6	22.43	21.22
		12	13	22.16	20.49
		25	0	22.37	20.41
10	704	1	0	23.55	23.46
		1	24	23.39	22.76
		1	49	22.92	23.07
		25	0	23.96	22.69
		25	12	23.88	22.22
		25	25	23.44	22.73
		50	0	23.79	23.17
	707.5	1	0	22.51	23.47
		1	24	23.55	23.29
		1	49	23.13	22.73
		25	0	23.08	21.56
		25	12	22.06	21.72
		25	25	21.87	20.87
		50	0	22.47	22.18
	711.0	1	0	23.18	22.88
		1	24	22.64	21.99
		1	49	22.25	22.72
		25	0	22.02	21.71
		25	12	21.90	22.74
		25	25	23.67	22.14
		50	0	21.82	20.66

LTE Band13

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
5	779.5	1	0	**25.51**	24.31
		1	12	24.29	24.56
		1	24	24.96	**25.44**
		12	0	23.73	23.92
		12	6	23.72	23.27
		12	13	23.51	22.79
		25	0	24.56	24.08
	782	1	0	24.89	24.71
		1	12	25.09	24.75
		1	24	24.00	24.01
		12	0	23.30	23.50
		12	6	22.85	22.16
		12	13	22.59	22.22
		25	0	22.84	23.40
	784.5	1	0	23.82	23.39
		1	12	23.92	23.52
		1	24	24.96	24.27
		12	0	23.00	22.75
		12	6	22.83	22.17
		12	13	23.27	23.17
		25	0	23.11	21.88
10	782	1	0	24.90	24.77
		1	0	24.90	24.77
		1	24	25.29	24.94
		1	49	23.53	24.57
		25	0	23.76	22.60
		25	12	22.80	22.21
		25	25	23.00	22.20
		50	0	23.20	22.94

4.4 Peak-to-Average Ratio

Test Requirement:	Part 22.913(d), FCC part24.232(d) and FCC part27.50(d)(5)
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	5.17	13	Pass
LTE Band 2 Middle channel/20MHz/16-QAM	5.17	13	Pass
LTE Band 4 Middle channel/20MHz/QPSK	4.69	13	Pass
LTE Band 4 Middle channel/20MHz/16-QAM	4.87	13	Pass
LTE Band 5 Middle channel/10MHz/QPSK	5.08	13	Pass
LTE Band 5 Middle channel/10MHz/16-QAM	5.08	13	Pass
LTE Band 12 Middle channel/10MHz/QPSK	4.69	13	Pass
LTE Band 12 Middle channel/10MHz/16-QAM	4.54	13	Pass
LTE Band 13 Middle channel/10MHz/QPSK	3.55	13	Pass
LTE Band 13 Middle channel/10MHz/16-QAM	3.54	13	Pass

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

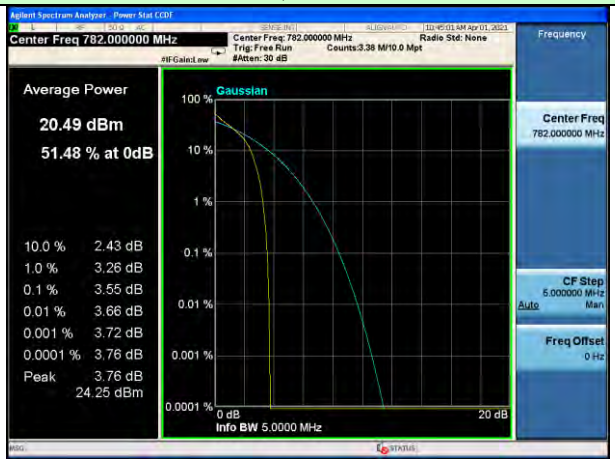
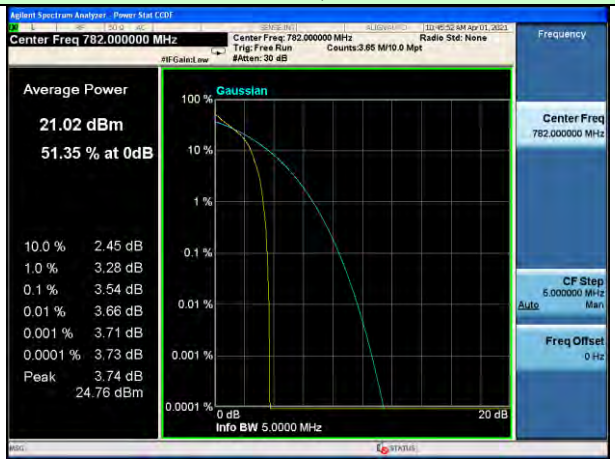
Test Mode: LTE Band 2
Middle channel/20MHz/16-QAM

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

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

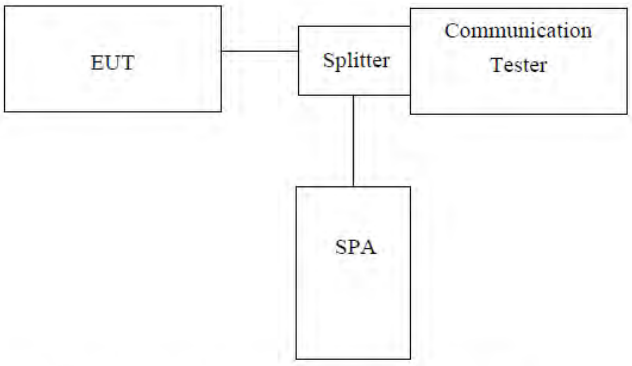
Test Mode: LTE Band 5
Middle channel/10MHz/QPSK

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

Test Mode: LTE Band 12 Middle channel/20MHz/QPSK	Test Mode: LTE Band 12 Middle channel/20MHz/16-QAM
	
Test Mode: LTE Band 13 Middle channel/10MHz/QPSK	Test Mode: LTE Band 13 Middle channel/10MHz/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	1093.4	1301
		16-QAM	6	0	1093.2	1305
	3MHz	QPSK	15	0	2734.0	3057
		16-QAM	15	0	2733.3	3046
	5MHz	QPSK	25	0	4509.6	5021
		16-QAM	25	0	4501.9	5016
	10MHz	QPSK	50	0	8929.6	9621
		16-QAM	50	0	8953.0	9712
	15MHz	QPSK	75	0	13373	14400
		16-QAM	75	0	13374	14290
	20MHz	QPSK	100	0	17842	18770
		16-QAM	100	0	17823	18720

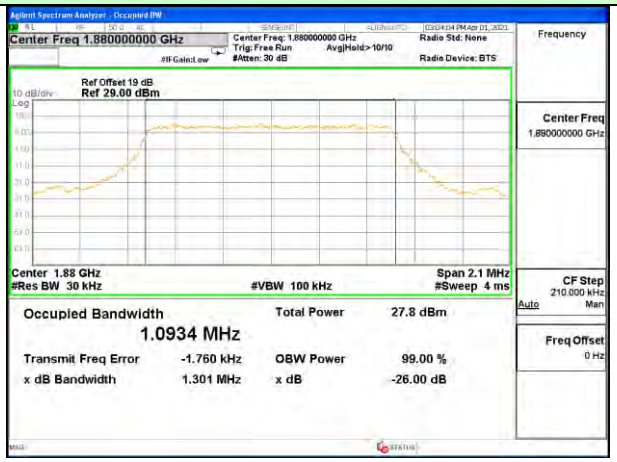
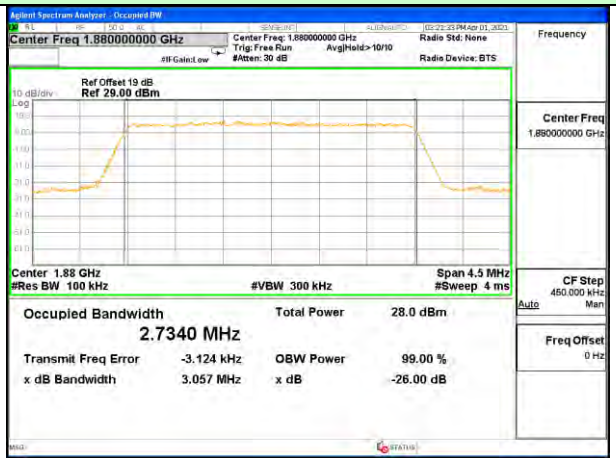
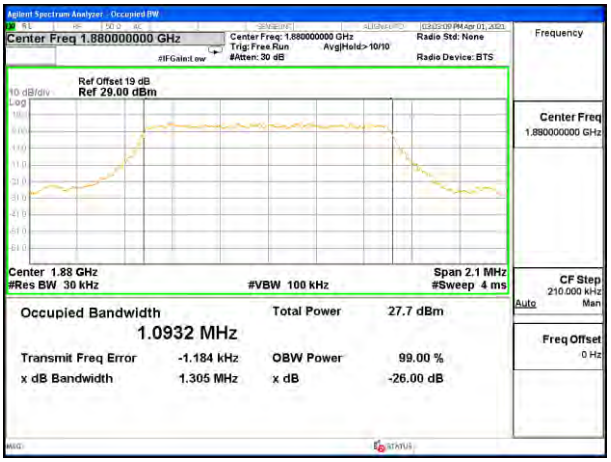
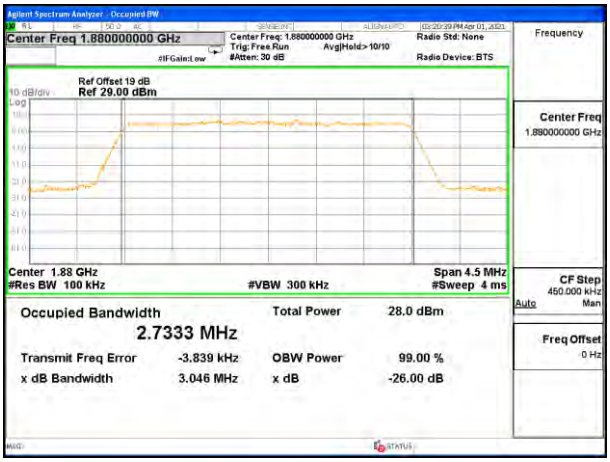
EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 4	1.4MHz	QPSK	6	0	1095.8	1325
		16-QAM	6	0	1096.9	1326
	3MHz	QPSK	15	0	2738.2	3060
		16-QAM	15	0	2740.0	3057
	5MHz	QPSK	25	0	4506.4	4956
		16-QAM	25	0	4507.3	4983
	10MHz	QPSK	50	0	8927.3	9724
		16-QAM	50	0	8932.7	9683
	15MHz	QPSK	75	0	13351	14320
		16-QAM	75	0	13347	14180
	20MHz	QPSK	100	0	17776	18830
		16-QAM	100	0	17782	18990

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	1093.8	1307
		16-QAM	6	0	1096.1	1300
	3MHz	QPSK	15	0	2736.1	3043
		16-QAM	15	0	2736.9	3068
	5MHz	QPSK	25	0	4492.9	4937
		16-QAM	25	0	4493.1	5001
	10MHz	QPSK	50	0	8938.0	9707
		16-QAM	50	0	8927.0	9628

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	1167.0	1399
		16-QAM	25	0	1170.1	1422
	3MHz	QPSK	50	0	2680.4	2921
		16-QAM	50	0	2684.0	2913
	5MHz	QPSK	25	0	4517.8	5096
		16-QAM	25	0	4519.0	5196
	10MHz	QPSK	50	0	8955.7	9885
		16-QAM	50	0	8944.6	9728

EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 13	5MHz	QPSK	25	0	4468.2	4920
		16-QAM	25	0	4465.9	4916
	10MHz	QPSK	50	0	8912.7	9749
		16-QAM	50	0	8912.5	9793

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

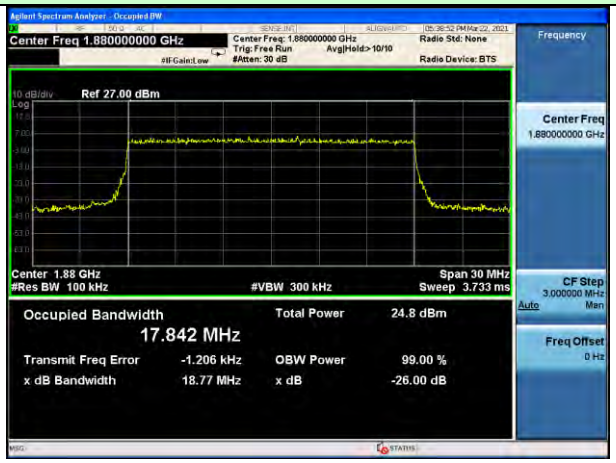
QPSK

16-QAM

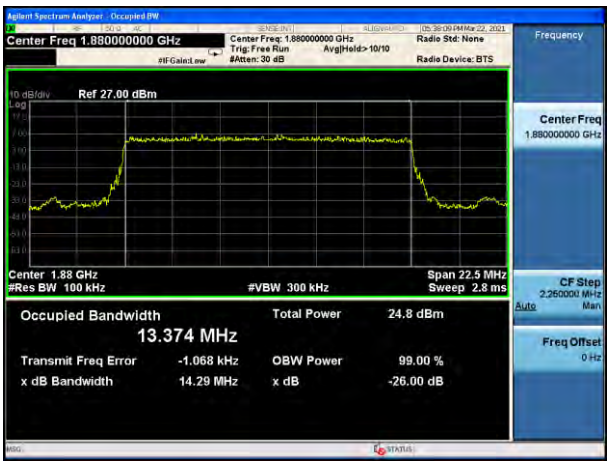
16-QAM

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

QPSK



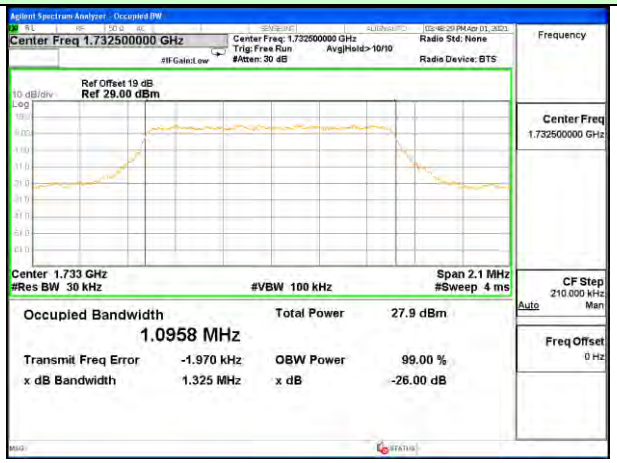
QPSK



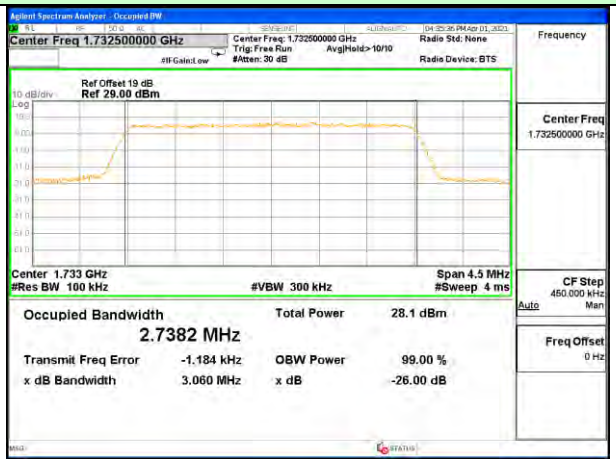
16-QAM

16-QAM

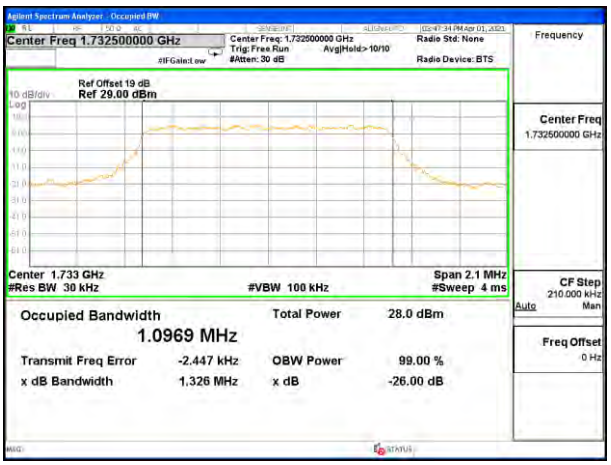
Test Mode: LTE Band 4 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 4 Channel Bandwidth: 3MHz



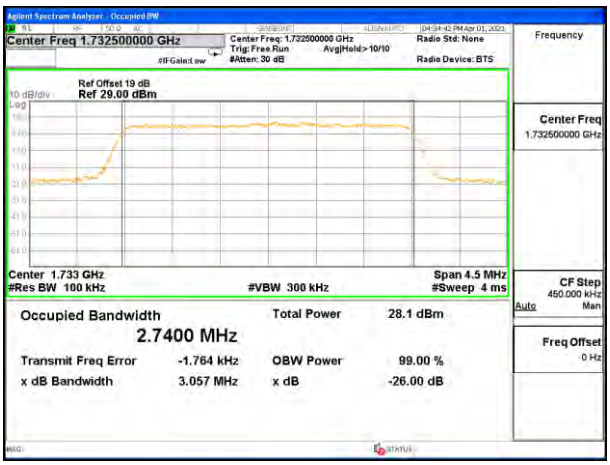
QPSK



QPSK



16-QAM



16-QAM

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

QPSK

QPSK

16-QAM

16-QAM

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

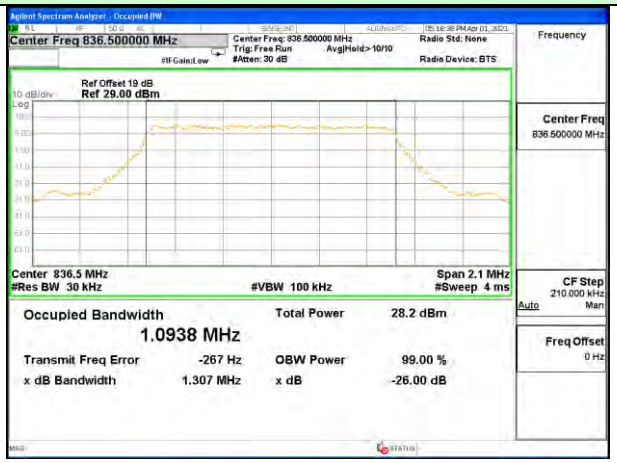
QPSK

QPSK

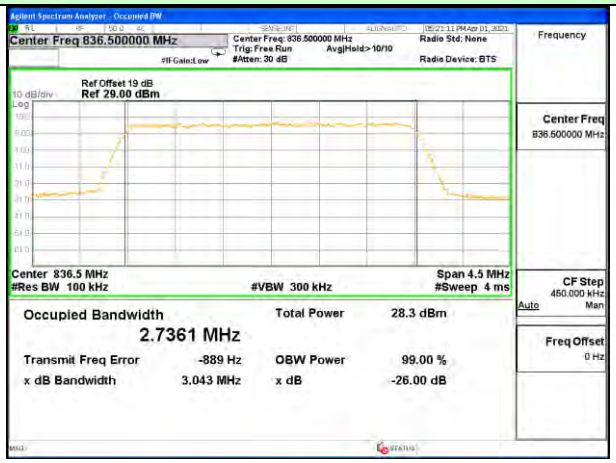
16-QAM

16-QAM

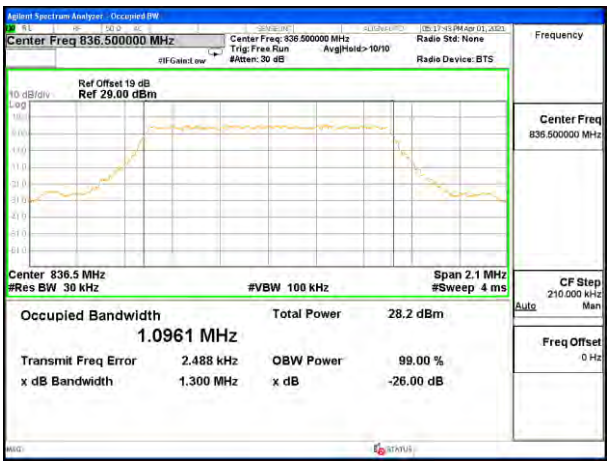
Test Mode: LTE Band 5 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 5 Channel Bandwidth: 3MHz



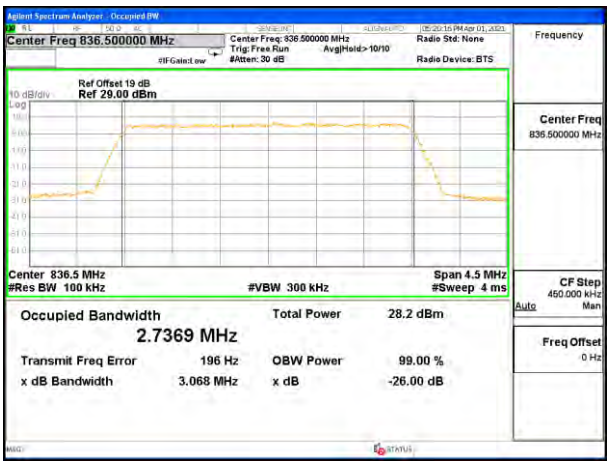
QPSK



QPSK

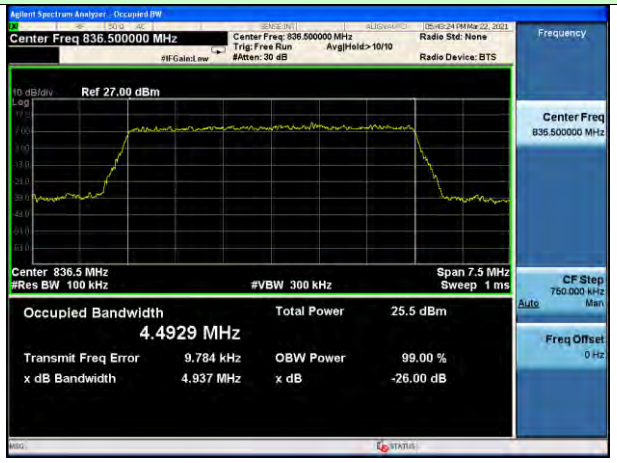


16-QAM



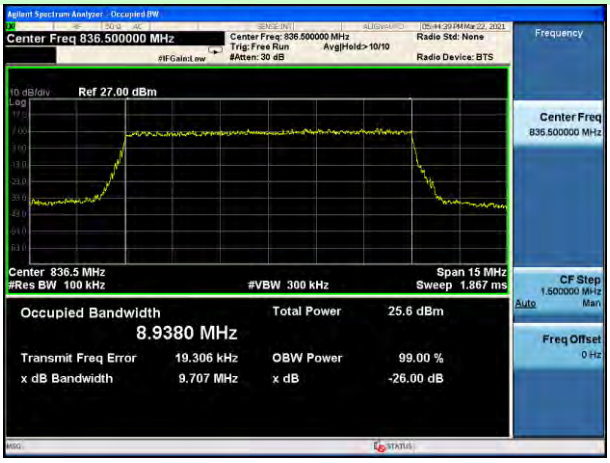
16-QAM

Test Mode: LTE Band 5
Channel Bandwidth: 5MHz



QPSK

Test Mode: LTE Band 5
Channel Bandwidth: 10MHz



QPSK

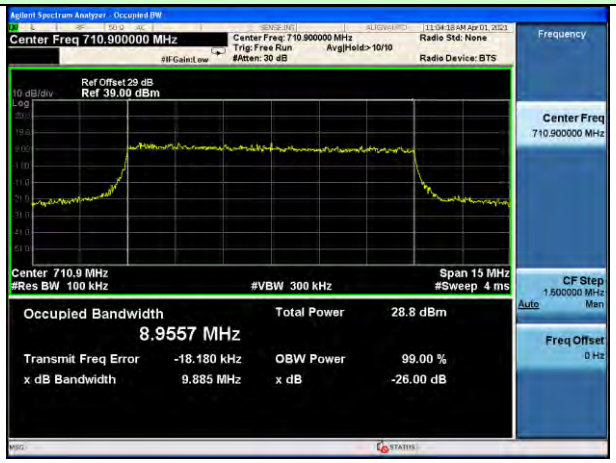
16-QAM

16-QAM

Test Mode: LTE Band 12 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 12 Channel Bandwidth: 3MHz
	
QPSK	QPSK
	
16-QAM	16-QAM

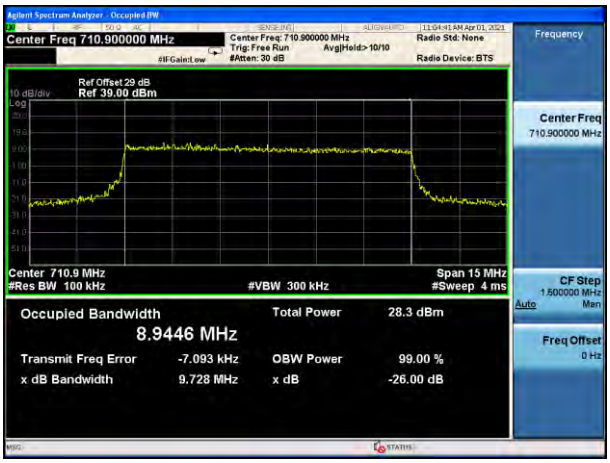
Test Mode: LTE Band 12 Channel Bandwidth: 5MHz	Test Mode: LTE Band 12 Channel Bandwidth: 10MHz

QPSK



QPSK

16-QAM

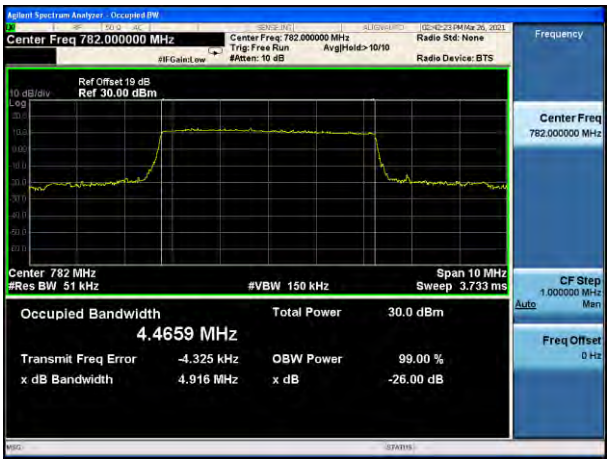


16-QAM

Test Mode: LTE Band 13 Channel Bandwidth: 5MHz	Test Mode: LTE Band 13 Channel Bandwidth: 10MHz

QPSK

QPSK



16-QAM

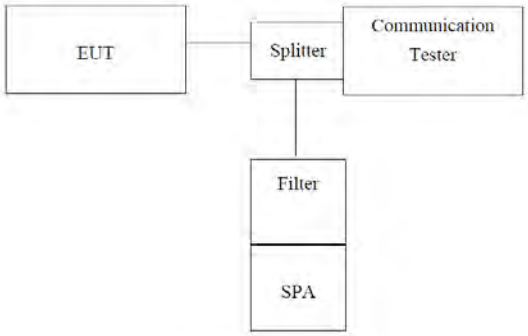
16-QAM

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

4.6 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H, 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

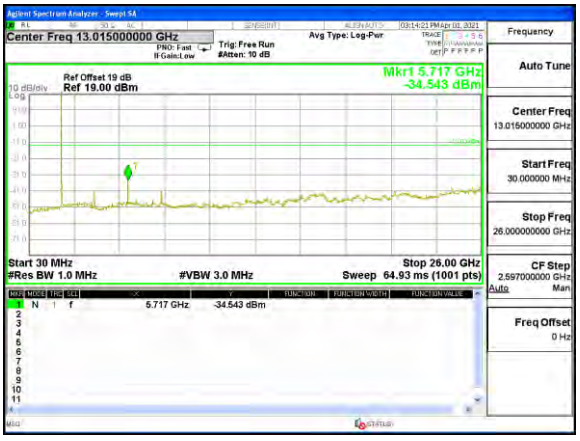
Test Requirement:	FCC part22.913(a), FCC part24.238(a) and FCC part27.53(h)
Test Method:	ANSI C63.26:2015
Limit:	-13dBm
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 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

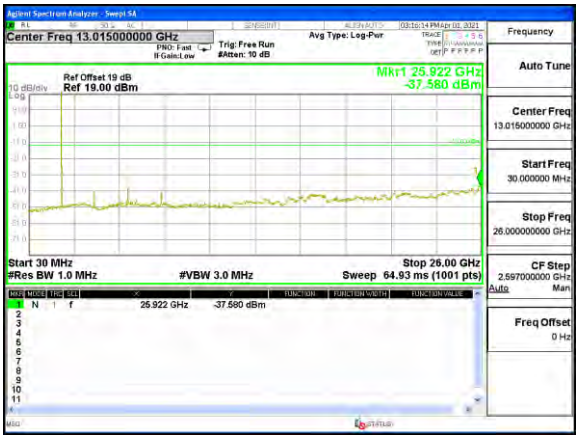
Test plot as follows:

Conducted Spurious Emission:

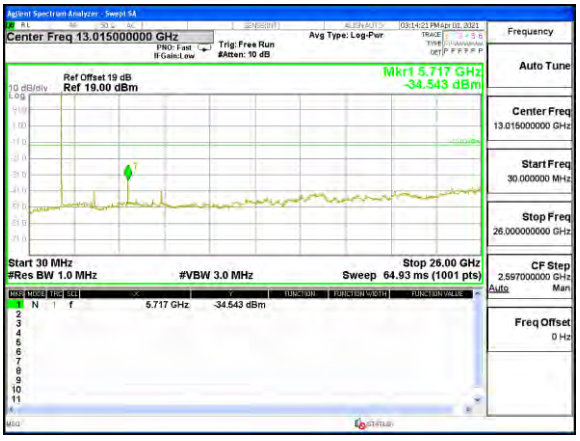
Test Mode: LTE Band 2 / 1.4MHz /1RB	Test Mode: LTE Band 2 / 1.4MHz /6RB

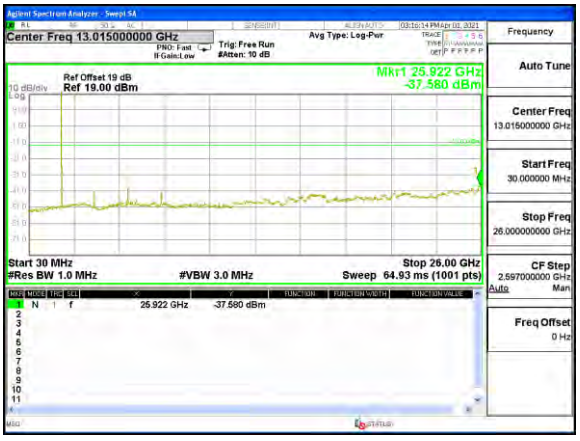
Lowest channel





Middle channel

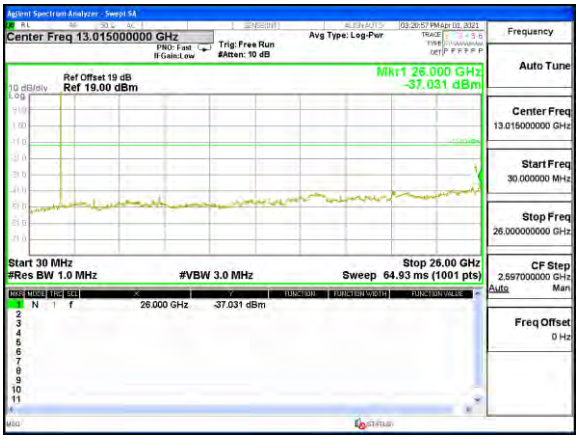




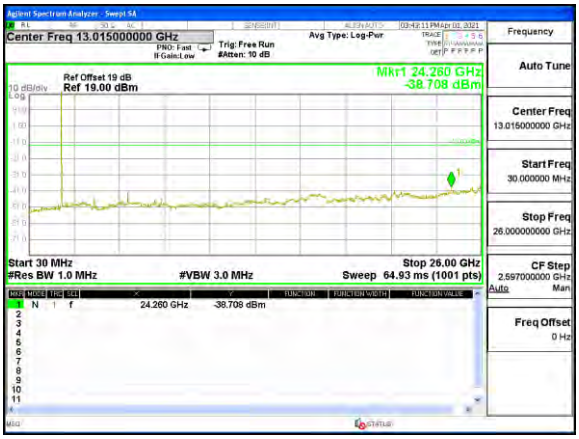
Highest channel

Test Mode: LTE Band 2 / 3MHz /1RB	Test Mode: LTE Band 2 / 3MHz /15RB

Lowest channel



Middle channel

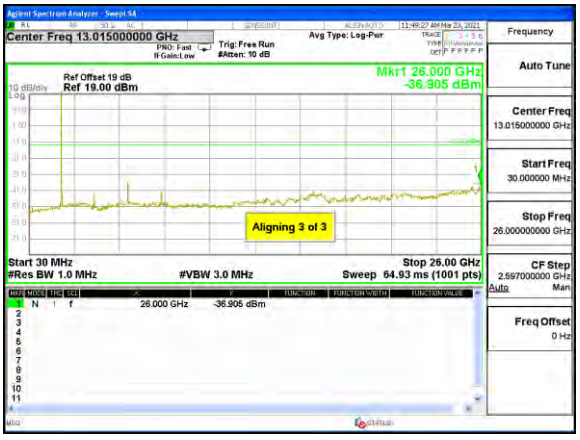


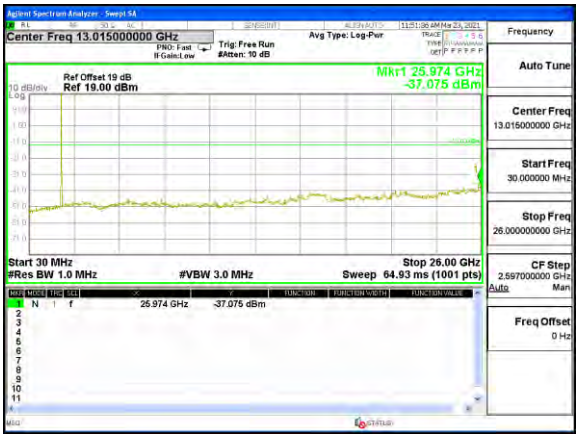
Highest channel

Test Mode: LTE Band 2 / 5MHz /1RB	Test Mode: LTE Band 2 / 5MHz /25RB

Lowest channel

Middle channel

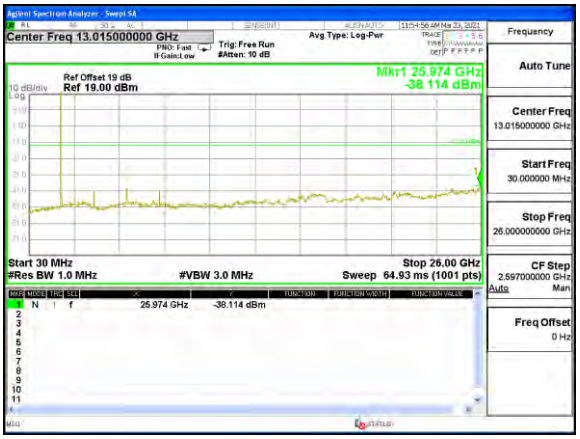




Highest channel

Test Mode: LTE Band 2 / 10MHz /1RB	Test Mode: LTE Band 2 / 10MHz /50RB

Lowest channel



Middle channel

Highest channel

Test Mode: LTE Band 2 / 15MHz /1RB	Test Mode: LTE Band 2 / 15MHz /75RB

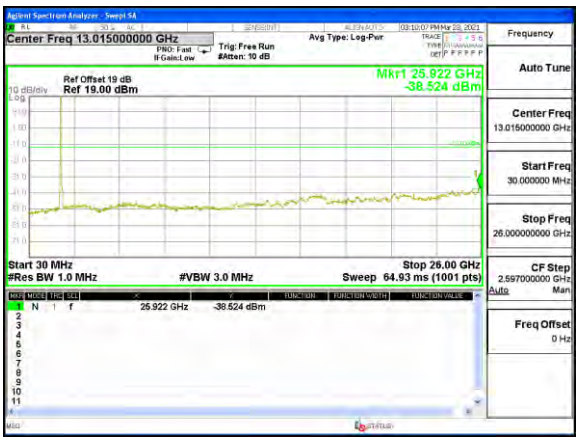
Lowest channel

Middle channel

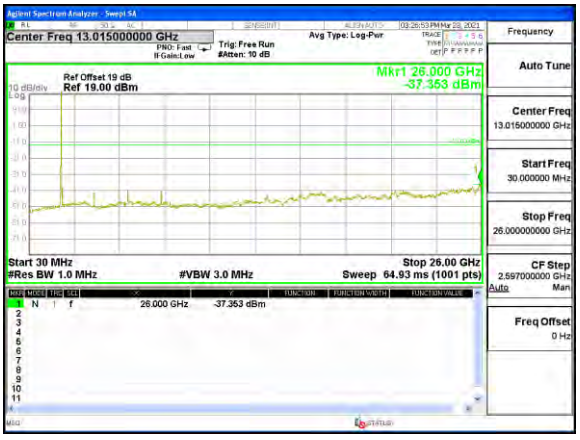
Highest channel

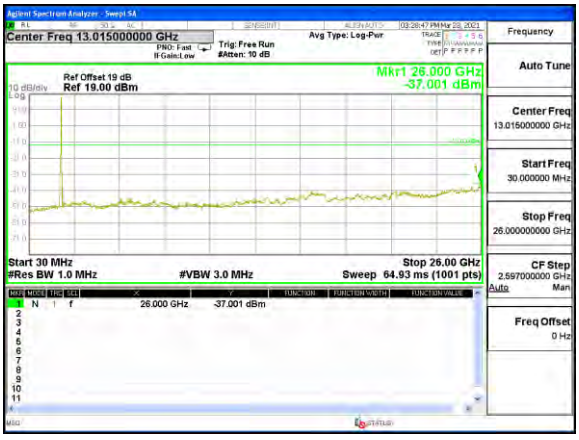
Test Mode: LTE Band 2 / 20MHz /1RB	Test Mode: LTE Band 2 / 20MHz /100RB

Lowest channel



Middle channel





Highest channel

Test Mode: LTE Band 4 / 1.4MHz /1RB	Test Mode: LTE Band 4 / 1.4MHz /6RB

Lowest channel

Middle channel

Highest channel

Test Mode: LTE Band 4 / 3MHz /1RB	Test Mode: LTE Band 4 / 3MHz /15RB

Lowest channel

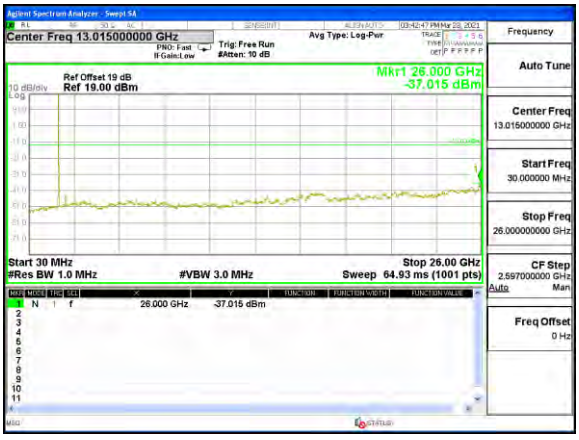
Middle channel

Highest channel

Test Mode: LTE Band 4 / 5MHz /1RB	Test Mode: LTE Band 4 / 5MHz /25RB

Lowest channel

Middle channel



Highest channel

Test Mode: LTE Band 4 / 10MHz /1RB	Test Mode: LTE Band 4 / 10MHz /50RB

Lowest channel

Middle channel

Highest channel

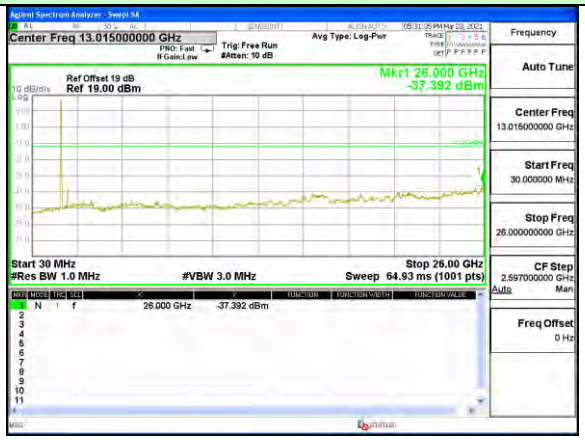
Test Mode: LTE Band 4 / 15MHz /1RB	Test Mode: LTE Band 4 / 15MHz /75RB

Lowest channel

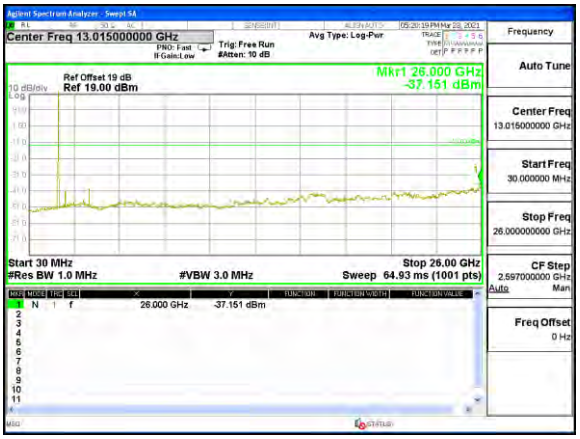
Middle channel

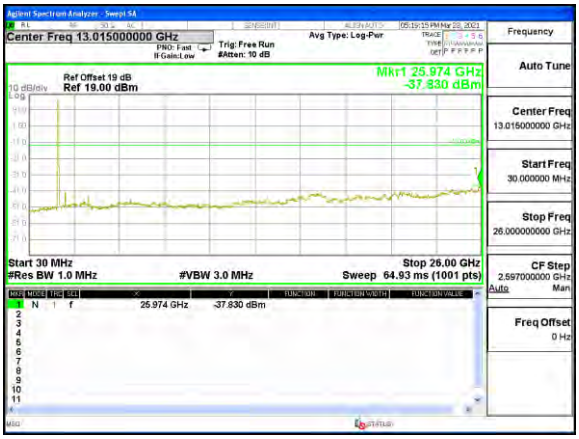
Highest channel

Test Mode: LTE Band 4 / 20MHz /1RB	Test Mode: LTE Band 4 / 20MHz /100RB



Lowest channel

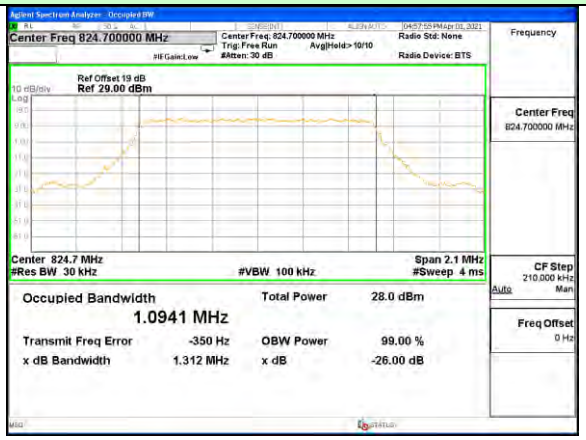




Middle channel

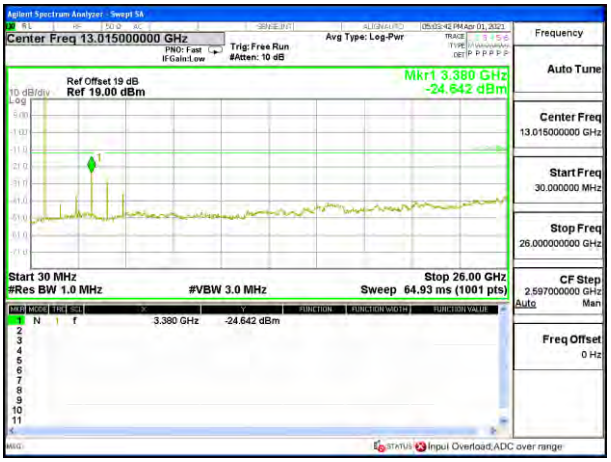
Highest channel

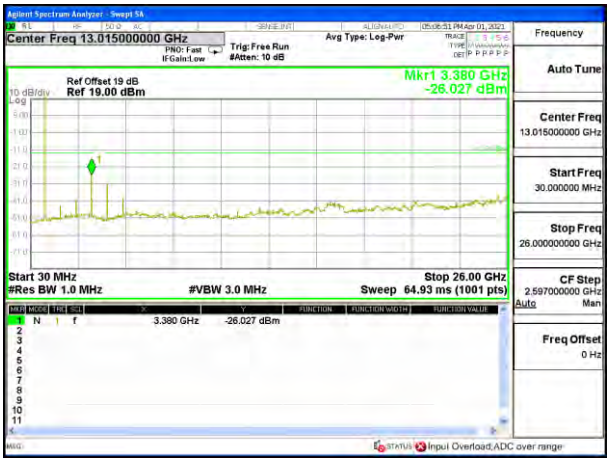
Test Mode: LTE Band 5 / 1.4MHz /1RB	Test Mode: LTE Band 5 / 1.4MHz /6RB



Lowest channel

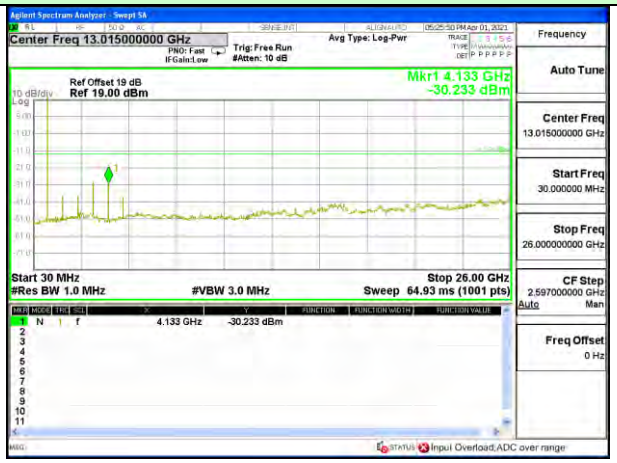
Middle channel

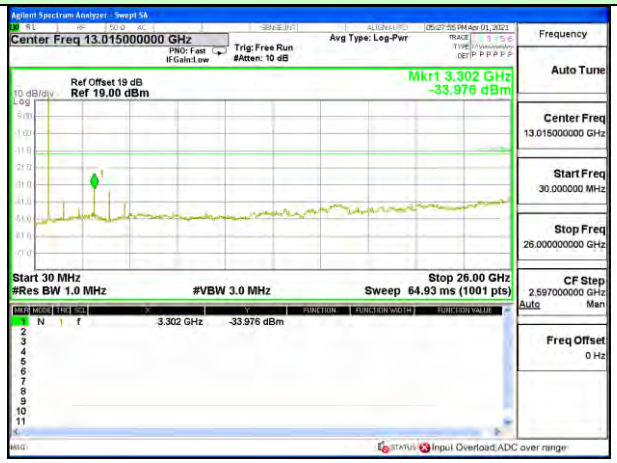




Highest channel

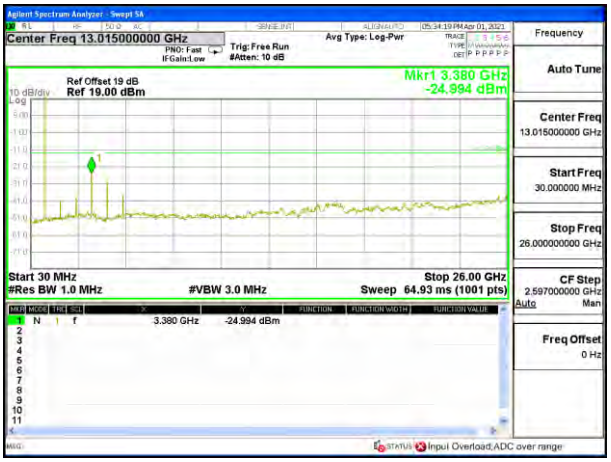
Test Mode: LTE Band 5 / 3MHz /1RB	Test Mode: LTE Band 5 / 3MHz /15RB

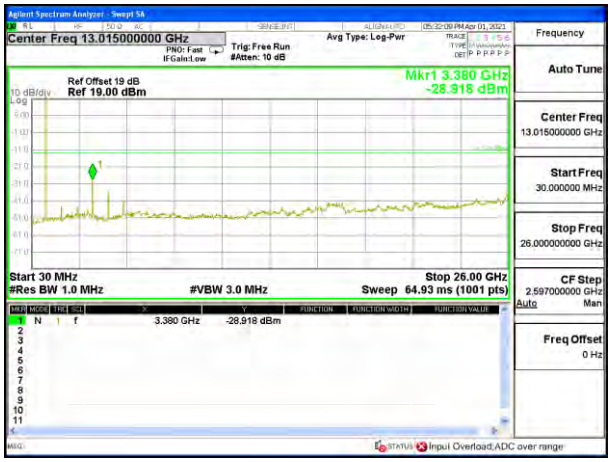




Lowest channel

Middle channel



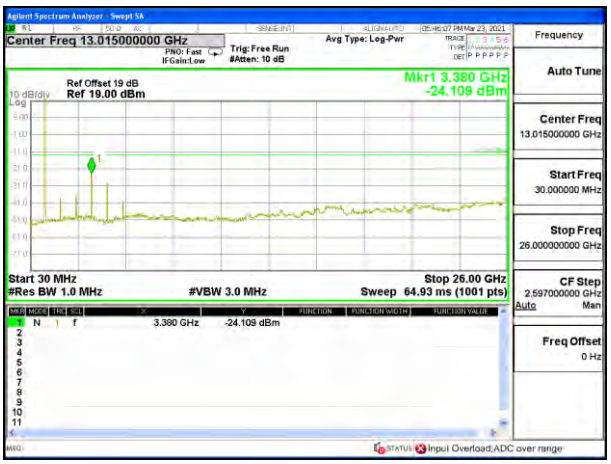


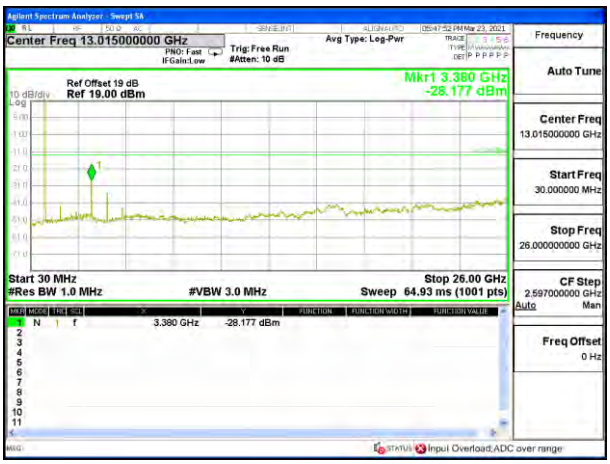
Highest channel

Test Mode: LTE Band 5/ 5MHz /1RB	Test Mode: LTE Band 5 / 5MHz /25RB

Lowest channel

Middle channel



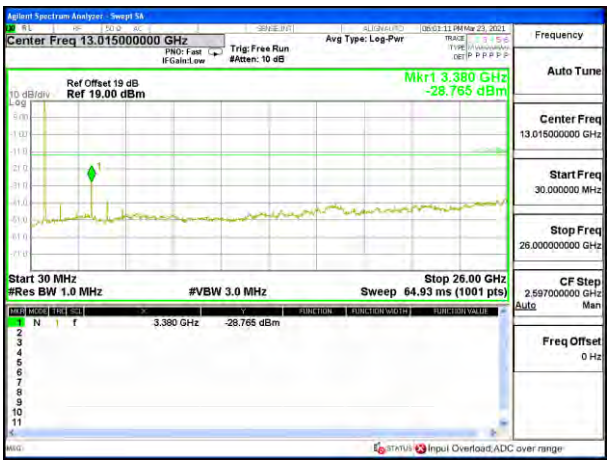


Highest channel

Test Mode: LTE Band 5/ 10MHz /1RB	Test Mode: LTE Band 5/ 10MHz /50RB

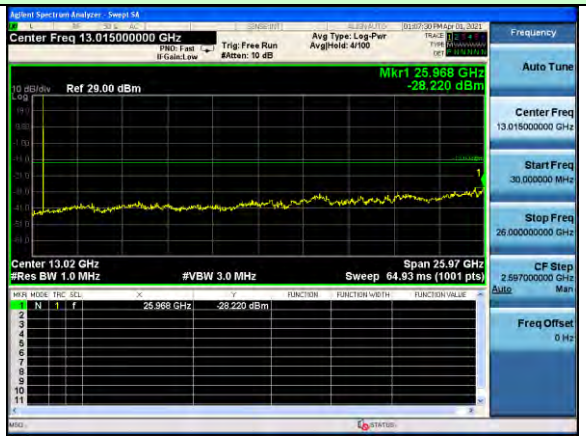
Lowest channel

Middle channel

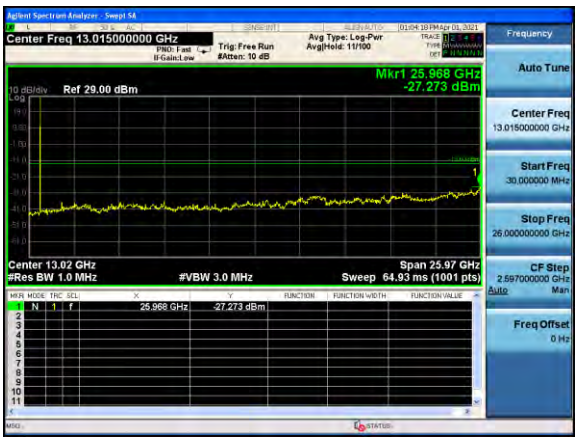


Highest channel

Test Mode: LTE Band 12 / 1.4MHz /1RB	Test Mode: LTE Band 12 / 1.4MHz /100RB



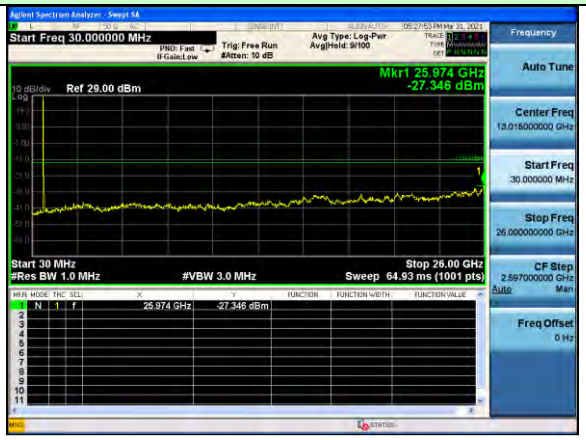
Lowest channel

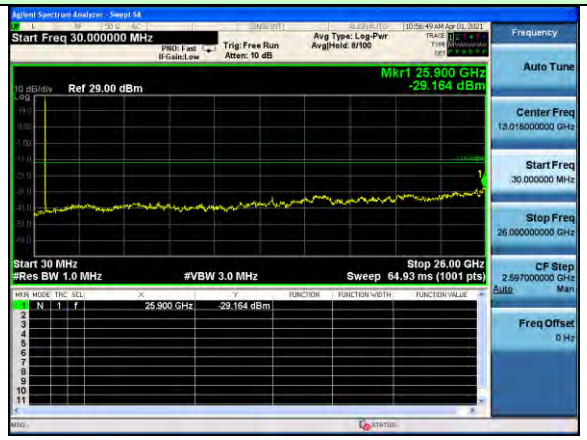


Middle channel

Highest channel

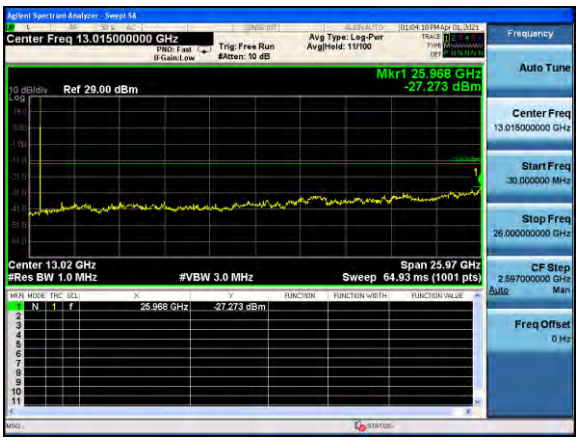
Test Mode: LTE Band 12 / 3MHz /1RB	Test Mode: LTE Band 12 / 3MHz /100RB





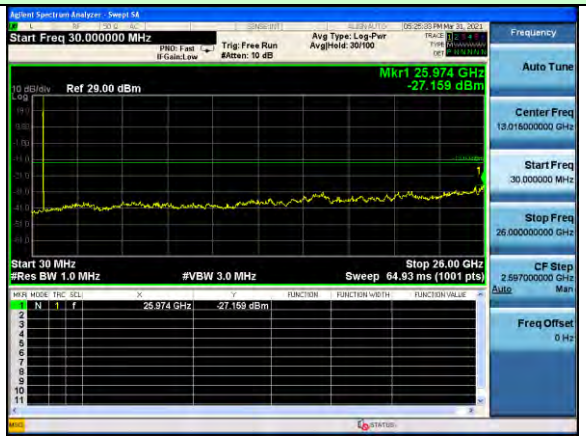
Lowest channel

Middle channel



Highest channel

Test Mode: LTE Band 12 / 5MHz /1RB	Test Mode: LTE Band 12 / 5MHz /100RB



Lowest channel

Middle channel

Highest channel