

FCC RADIO TEST REPORT

FCC ID: 2AI2O-O301

Sample : Locator

Trade Name : Omni

Main Model : O301

Additional Model : N/A

Report No. : UNIA21122127ER-63

Prepared for

Shenzhen Omni Intelligent Technology Co., Ltd.

11th Floor, Building 31, Phase III, Lianchuang Technology Park, Nanwan street,
Longgang District, Shenzhen, China

Prepared by

Shenzhen United Testing Technology Co., Ltd.

2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang
Community, Xixiang Str, Bao'an District, Shenzhen, China

TEST RESULT CERTIFICATION

Applicant.....: Shenzhen Omni Intelligent Technology Co., Ltd.
Address.....: 11th Floor, Building 31, Phase III, Lianchuang Technology Park,
Nanwan street, Longgang District, Shenzhen, China
Manufacturer.....: Shenzhen Omni Intelligent Technology Co., Ltd.
Address.....: 11th Floor, Building 31, Phase III, Lianchuang Technology Park,
Nanwan street, Longgang District, Shenzhen, China

Product description

Product.....: Locator
Trade Name.....: Omni
Model Name.....: O301
FCC CFR Title 47 Part 2
FCC CFR Title 47 Part 22 Subpart H
Test Methods.....: FCC CFR Title 47 Part 24 Subpart E
FCC CFR Title 47 Part 27 Subpart L
FCC CFR Title 47 Part 27 Subpart H

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....:
Date (s) of performance of tests.....: Dec. 21, 2021 ~ Dec. 27, 2022
Date of Issue.....: Dec. 28, 2022
Test Result.....: Pass

Prepared by:

kahn.yang

Kahn yang/Supervisor

Reviewer:

kelly.cheng

Kelly Cheng/Supervisor

Approved & Authorized Signer:

liuze

Liuze/Manager

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1 TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST	STANDARD	RESULT
RF Output Power	Part 2.1046 Part 22.913 (a)(5) Part 24.232 (c) Part 27.50 (c)(10) Part 27.50 (d)(4)	COMPLIANT
Peak-to-Average Power Ratio	Part 24.232 (d) Part 22.913 (d) Part 27.50(d)(5)	COMPLIANT
Modulation Characteristics	Part 2.1047	COMPLIANT
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917(b) Part 24.238(b) Part 27.53(g) Part 27.53(h) Part 27.53(m)	COMPLIANT
Out of band emission at antenna terminals	Part 2.1053 Part 22.917(a) Part 24.238 (a) Part 27.53 (g) Part 27.53 (h)	COMPLIANT
Field strength of spurious radiation	Part 22.917(a) Part 24.238 (a) Part 27.53 (g) Part 27.53 (h)	COMPLIANT
Frequency stability vs. temperature	Part 22.355 Part 24.235 Part 27.54 Part 2.1055(a)(1)(b)	COMPLIANT
Frequency stability vs. voltage	Part 22.355 Part 24.235 Part 27.54 Part 2.1055(d)(2)	COMPLIANT

1.2 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.

Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

A2LA Certificate Number: 4747.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 0027159896

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 21947

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
UNI	ANSI	9kHz ~ 150kHz	2.96	
		150kHz ~ 30MHz	2.44	

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
UNI	ANSI	9kHz ~ 30MHz	2.50	
		30MHz ~ 1000MHz	4.80	
		Above 1000MHz	4.13	

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	Locator
Trade Name	Omni
Main Model	O301
Additional Model	N/A
Model Difference	N/A
FCC ID	2AI2O-O301
Antenna Type	Internal Antenna
Antenna Gain	LTE Band 2: -1.25dBi, LTE Band 4: -0.86dBi, LTE Band 5: -1.3dBi LTE Band 7: -0.52dBi, LTE Band 12: -0.93dBi, LTE Band 13: -0.81dBi
CAT-M1 Frequency Range	LTE Band 2: TX: 1850.7-1909.3MHz RX: 1930.7-1989.3MHz LTE Band 4: TX: 1710.7-1754.3MHz RX: 2110.7-2154.3MHz LTE Band 5: TX: 824.7-848.3MHzRX: 869.7-893.3MHz LTE Band 7: TX: 2502.5-2567.5MHzRX: 2622.5-2687.5MHz LTE Band 12: TX: 699.7-715.3MHz RX: 729.7-745.3MHz LTE Band 13: TX: 779.5-784.5MHz RX: 748.5-753.5MHz
CAT-M1 Frequency Band	BAND2/4/5/7/12/13
Modulation Type	☒ QPSK ☒ 16QAM
Battery	DC 3.7V, 1200mAh
Power Source	DC 3.7V from Li-battery or DC 5.0V from adapter with AC 120(240)V/60Hz
Adapter	N/A

2.2 Carrier Test frequency list

FDD Band 2	<table><tr><th>Test Frequency ID</th><th>Bandwidth [MHz]</th><th>N_{UL}</th><th>Frequency of Uplink [MHz]</th><th>N_{DL}</th><th>Frequency of Downlink [MHz]</th></tr><tr><td rowspan="6">Low Range</td><td>1.4</td><td>18607</td><td>1850.7</td><td>607</td><td>1930.7</td></tr><tr><td>3</td><td>18615</td><td>1851.5</td><td>615</td><td>1931.5</td></tr><tr><td>5</td><td>18625</td><td>1852.5</td><td>625</td><td>1932.5</td></tr><tr><td>10</td><td>18650</td><td>1855</td><td>650</td><td>1935</td></tr><tr><td>15^[1]</td><td>18675</td><td>1857.5</td><td>675</td><td>1937.5</td></tr><tr><td>20^[1]</td><td>18700</td><td>1860</td><td>700</td><td>1940</td></tr><tr><td>Mid Range</td><td>1.4/3/5/10/15^[1]/20^[1]</td><td>18900</td><td>1880</td><td>900</td><td>1960</td></tr><tr><td rowspan="6">High Range</td><td>1.4</td><td>19193</td><td>1909.3</td><td>1193</td><td>1989.3</td></tr><tr><td>3</td><td>19185</td><td>1908.5</td><td>1185</td><td>1988.5</td></tr><tr><td>5</td><td>19175</td><td>1907.5</td><td>1175</td><td>1987.5</td></tr><tr><td>10</td><td>19150</td><td>1905</td><td>1150</td><td>1985</td></tr><tr><td>15^[1]</td><td>19125</td><td>1902.5</td><td>1125</td><td>1982.5</td></tr><tr><td>20^[1]</td><td>19100</td><td>1900</td><td>1100</td><td>1980</td></tr><tr><td colspan="6">NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.</td></tr></table>	Test Frequency ID	Bandwidth [MHz]	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Low Range	1.4	18607	1850.7	607	1930.7	3	18615	1851.5	615	1931.5	5	18625	1852.5	625	1932.5	10	18650	1855	650	1935	15 ^[1]	18675	1857.5	675	1937.5	20 ^[1]	18700	1860	700	1940	Mid Range	1.4/3/5/10/15 ^[1] /20 ^[1]	18900	1880	900	1960	High Range	1.4	19193	1909.3	1193	1989.3	3	19185	1908.5	1185	1988.5	5	19175	1907.5	1175	1987.5	10	19150	1905	1150	1985	15 ^[1]	19125	1902.5	1125	1982.5	20 ^[1]	19100	1900	1100	1980	NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					
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FDD Band 7	<table><tr><th>Test Frequency ID</th><th>Bandwidth [MHz]</th><th>N_{UL}</th><th>Frequency of Uplink [MHz]</th><th>N_{DL}</th><th>Frequency of Downlink [MHz]</th></tr><tr><td rowspan="4">Low Range</td><td>5</td><td>20775</td><td>2502.5</td><td>2775</td><td>2622.5</td></tr><tr><td>10</td><td>20800</td><td>2505</td><td>2800</td><td>2625</td></tr><tr><td>15</td><td>20825</td><td>2507.5</td><td>2825</td><td>2627.5</td></tr><tr><td>20^[1]</td><td>20850</td><td>2510</td><td>2850</td><td>2630</td></tr><tr><td>Mid Range</td><td>5/10/15/20^[1]</td><td>21100</td><td>2535</td><td>3100</td><td>2655</td></tr><tr><td rowspan="4">High Range</td><td>5</td><td>21425</td><td>2567.5</td><td>3425</td><td>2687.5</td></tr><tr><td>10</td><td>21400</td><td>2565</td><td>3400</td><td>2685</td></tr><tr><td>15</td><td>21375</td><td>2562.5</td><td>3375</td><td>2682.5</td></tr><tr><td>20^[1]</td><td>21350</td><td>2560</td><td>3350</td><td>2680</td></tr><tr><td colspan="6">NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.</td></tr></table>	Test Frequency ID	Bandwidth [MHz]	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Low Range	5	20775	2502.5	2775	2622.5	10	20800	2505	2800	2625	15	20825	2507.5	2825	2627.5	20 ^[1]	20850	2510	2850	2630	Mid Range	5/10/15/20 ^[1]	21100	2535	3100	2655	High Range	5	21425	2567.5	3425	2687.5	10	21400	2565	3400	2685	15	21375	2562.5	3375	2682.5	20 ^[1]	21350	2560	3350	2680	NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.																									
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FDD Band 12	Table 4.3.1.1.12-1: Test frequencies for E-UTRA channel bandwidth for operating band 12 <table><tr><th>Test Frequency ID</th><th>Bandwidth [MHz]</th><th>N_{UL}</th><th>Frequency of Uplink [MHz]</th><th>N_{DL}</th><th>Frequency of Downlink [MHz]</th></tr><tr><td rowspan="4">Low Range</td><td>1.4</td><td>23017</td><td>699.7</td><td>5017</td><td>729.7</td></tr><tr><td>3</td><td>23025</td><td>700.5</td><td>5025</td><td>730.5</td></tr><tr><td>5 ^[1]</td><td>23035</td><td>701.5</td><td>5035</td><td>731.5</td></tr><tr><td>10 ^[1]</td><td>23060</td><td>704</td><td>5060</td><td>734</td></tr><tr><td>Mid Range</td><td>1.4/3 5 ^[1]/10 ^[1]</td><td>23095</td><td>707.5</td><td>5095</td><td>737.5</td></tr><tr><td rowspan="4">High Range</td><td>1.4</td><td>23173</td><td>715.3</td><td>5173</td><td>745.3</td></tr><tr><td>3</td><td>23165</td><td>714.5</td><td>5165</td><td>744.5</td></tr><tr><td>5 ^[1]</td><td>23155</td><td>713.5</td><td>5155</td><td>743.5</td></tr><tr><td>10 ^[1]</td><td>23130</td><td>711</td><td>5130</td><td>741</td></tr></table> NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.	Test Frequency ID	Bandwidth [MHz]	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Low Range	1.4	23017	699.7	5017	729.7	3	23025	700.5	5025	730.5	5 ^[1]	23035	701.5	5035	731.5	10 ^[1]	23060	704	5060	734	Mid Range	1.4/3 5 ^[1] /10 ^[1]	23095	707.5	5095	737.5	High Range	1.4	23173	715.3	5173	745.3	3	23165	714.5	5165	744.5	5 ^[1]	23155	713.5	5155	743.5	10 ^[1]	23130	711	5130	741
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	10 ^[1]	23060	704	5060	734																																																		
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High Range	1.4	23173	715.3	5173	745.3																																																		
	3	23165	714.5	5165	744.5																																																		
	5 ^[1]	23155	713.5	5155	743.5																																																		
	10 ^[1]	23130	711	5130	741																																																		
FDD Band 13	<table><tr><th>Test Frequency ID</th><th>Bandwidth [MHz]</th><th>N_{UL}</th><th>Frequency of Uplink [MHz]</th><th>N_{DL}</th><th>Frequency of Downlink [MHz]</th></tr><tr><td rowspan="2">Low Range</td><td>5 ^[1]</td><td>23205</td><td>779.5</td><td>5205</td><td>748.5</td></tr><tr><td>10 ^[1]</td><td>23230</td><td>782</td><td>5230</td><td>751</td></tr><tr><td>Mid Range</td><td>5 ^[1]/10 ^[1]</td><td>23230</td><td>782</td><td>5230</td><td>751</td></tr><tr><td rowspan="2">High Range</td><td>5 ^[1]</td><td>23255</td><td>784.5</td><td>5255</td><td>753.5</td></tr><tr><td>10 ^[1]</td><td>23230</td><td>782</td><td>5230</td><td>751</td></tr></table> NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.	Test Frequency ID	Bandwidth [MHz]	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Low Range	5 ^[1]	23205	779.5	5205	748.5	10 ^[1]	23230	782	5230	751	Mid Range	5 ^[1] /10 ^[1]	23230	782	5230	751	High Range	5 ^[1]	23255	784.5	5255	753.5	10 ^[1]	23230	782	5230	751																				
Test Frequency ID	Bandwidth [MHz]	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]																																																		
Low Range	5 ^[1]	23205	779.5	5205	748.5																																																		
	10 ^[1]	23230	782	5230	751																																																		
Mid Range	5 ^[1] /10 ^[1]	23230	782	5230	751																																																		
High Range	5 ^[1]	23255	784.5	5255	753.5																																																		
	10 ^[1]	23230	782	5230	751																																																		

2.3 Test environment and mode

Operating Environment:	
Temperature:	Normal: 15°C ~ 35°C, Extreme: -30°C ~ +50°C
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 3.7Vdc, Extreme: Low 3.33 Vdc, High 4.07 Vdc
Test mode:	
CAT M1 LTE QPSK mode	Keep the EUT communication with simulated station in QPSK mode
CAT M1 LTE 16-QAM mode	Keep the EUT communication with simulated station in 16-QAM mode
Remark: The EUT has been tested under continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing. The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for these modes. Just the worst case position (H mode) shown in report.	

2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during Radiation testing:



Table for auxiliary equipment:

Equipment Description	Manufacturer	Model	Calibration Due Date
Adapter	XIAOMI	MDY-08-EF	N/A
N/A	N/A	N/A	N/A

2.5 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
Conduction Emissions Measurement					
1	Conducted Emission Test Software	EZ-EMC	Ver.CCS-3A1-CE	N/A	N/A
2	AMN	Schwarzbeck	NNLK8121	8121370	2023.09.22
3	AAN	TESEQ	T8-Cat6	38888	2023.09.22
4	Pulse Limiter	CYBRTEK	EM5010	E115010056	2023.05.30
5	EMI Test Receiver	Rohde&Schwarz	ESCI	101210	2023.09.22
Radiated Emissions Measurement					
1	Radiated Emission Test Software	EZ-EMC	Ver.CCS-03A1	N/A	N/A
2	Horn Antenna	Sunol	DRH-118	A101415	2023.09.27
3	Broadband Hybrid Antenna	Sunol	JB1	A090215	2024.02.26
4	PREAMP	HP	8449B	3008A00160	2023.09.22
5	PREAMP	HP	8447D	2944A07999	2023.05.30
6	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2023.09.22
7	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2023.09.22
8	Signal Generator	Agilent	E4421B	MY4335105	2023.09.22
9	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2023.09.22
10	MXA Signal Analyzer	Keysight	N9020A	MY51110104	2023.09.22
11	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2023.05.30
12	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2023.05.30
13	RF power divider	Anritsu	K241B	992289	2023.09.22
14	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2023.09.22
15	Active Loop Antenna	Com-Power	AL-130R	10160009	2023.05.30
16	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2023.09.22
17	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2023.05.30
18	Horn Antenna	A-INFOMW	LB-180400-KF	J211060660	2023.09.27
19	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2023.09.22
20	Signal Generator	Agilent	N5183A	MY47420153	2023.09.22
21	Spectrum Analyzer	Rohde&Schwarz	FSP 40	100501	2023.09.22
22	Power Meter	KEYSIGHT	N1911A	MY50520168	2023.09.22
23	Frequency Meter	VICTOR	VC2000	997406086	2023.09.22
24	DC Power Source	HYELEC	HY5020E	055161818	2023.09.22

3 ERP AND EIRP

3.1 LIMIT

LTE Band 2/7: 2W(33dBm) EIRP

LTE Band 4: 1W(30dBm) EIRP

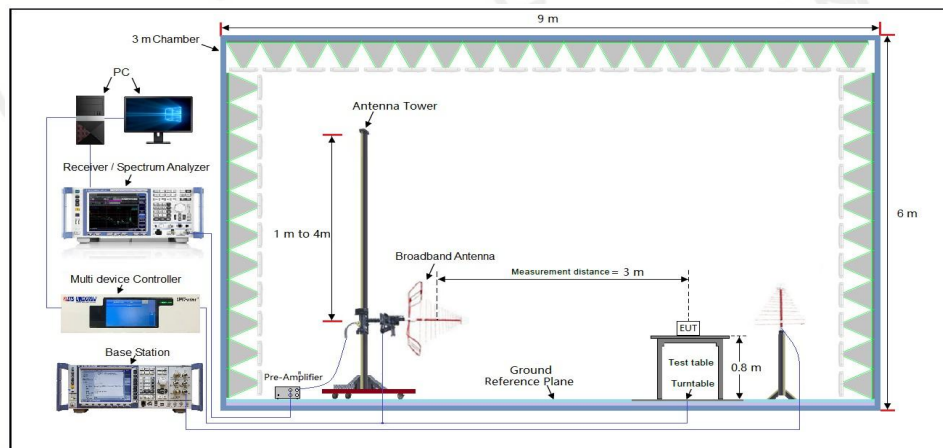
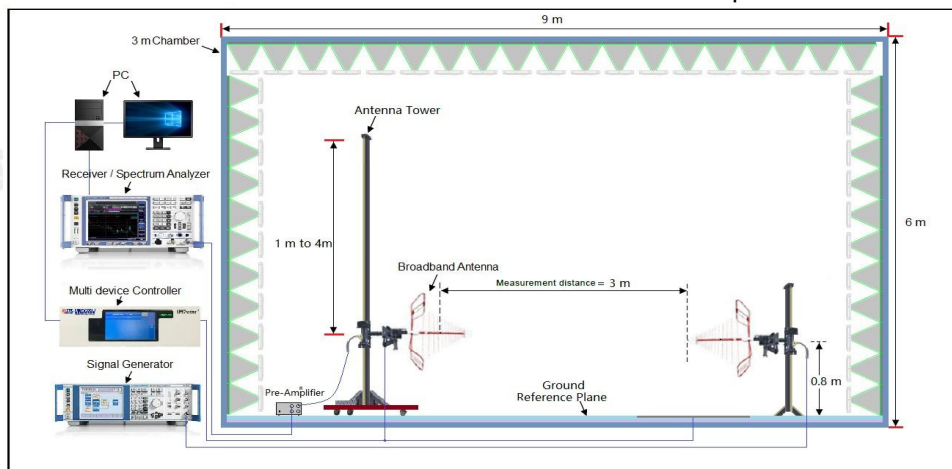
LTE Band 5: 7W(38.50dBm) ERP

LTE Band 12: 3W(34.77dBm) ERP

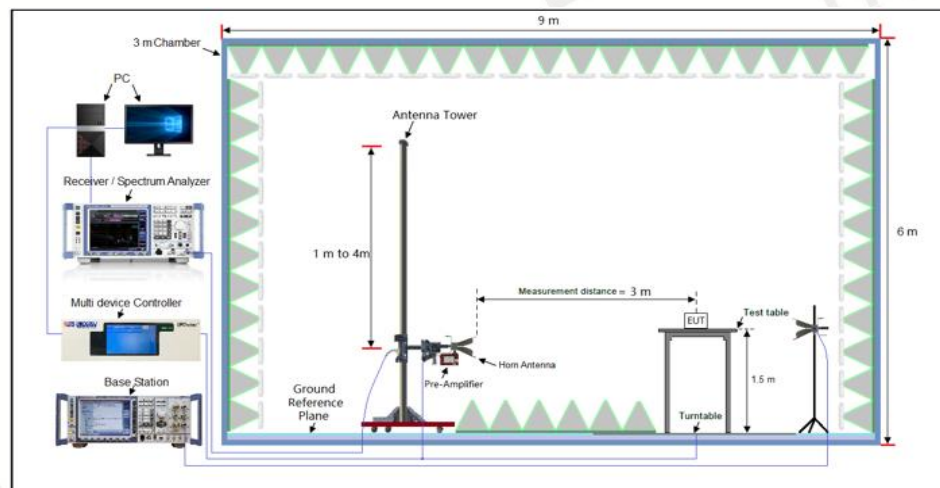
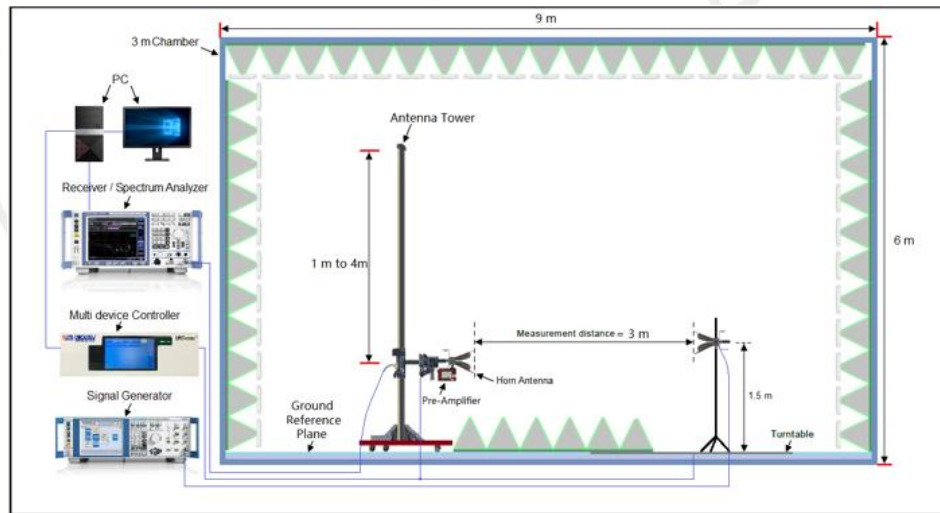
LTE Band 13: 3W(34.77dBm) ERP

3.2 TEST CONFIGURATION

Radiated Power 30MHz to 1GHz Test setup



Radiated Power Above 1GHz Test setup



3.3 TEST PROCEDURE

Radiated Test:

1. Place the EUT in the center of the turntable.
 - a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
 - b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
4. Receiver or Spectrum set as follow:

Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto

Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto
5. Each emission under consideration shall be evaluated:
 - a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
 - b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
 - c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
 - d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
- e) Record the measured emission amplitude level and frequency
8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.
10. For each emission that was detected and measured in the initial test
 - a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
 - b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.
 - c) Record the output power level of the signal generator when equivalence is achieved in step b).
11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

$$P_e = P_s(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

where

P_e = equivalent emission power in dBm

P_s = source (signal generator) power in dBm

NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.

13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from:

$$\text{gain (dBd)} = \text{gain (dBi)} - 2.15 \text{ dB.}$$

If necessary, the antenna gain can be calculated from calibrated antenna factor information

14. Provide the complete measurement results as a part of the test report.

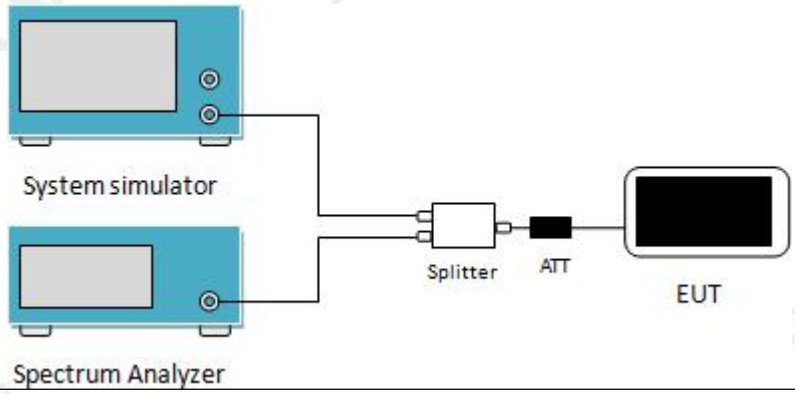
Conducted Test:

The EUT is coupled to the SS with attenuator through power splitter; the RF load attached to EUT antenna terminal is 50ohm, the path loss as the factor is calibrated to correct the reading. A system simulator was used to establish communication with the EUT , Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported. The measurements were performed on all modes at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

3.4 Test Result

Please refer to Appendix A

4 PEAK-TO-AVERAGE POWER RATIO

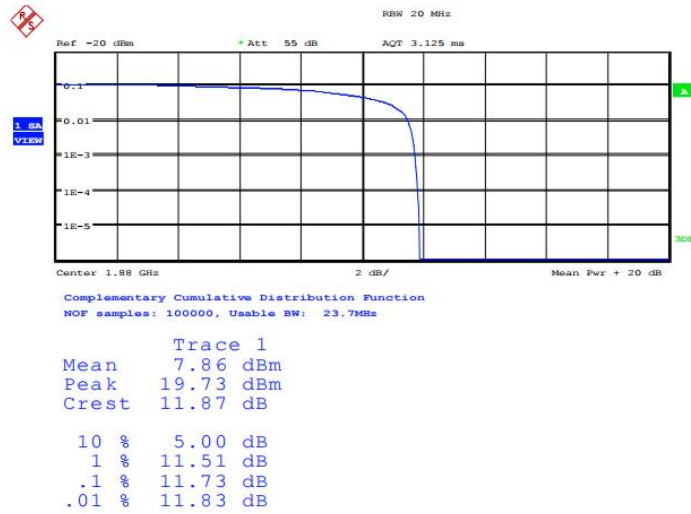
Test Requirement:	Part 24.232 (d), Part 27.50(d)(5)
Limit:	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
Test setup:	 The diagram illustrates the test setup. A System simulator and a Spectrum Analyzer are connected to a Splitter. The Splitter is connected to an ATT (Attenuator), which is then connected to the EUT (Equipment Under Test).
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 Set the CCDF option in spectrum analyzer, $RBW \geq OBW$, 3 Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level. 4 Repeat step 1~3 at other frequency and modulations.
Test Instruments:	Refer to section 2.5 for details
Test mode:	Refer to section 2.3 for details
Test results:	Passed

4.1 Test Result

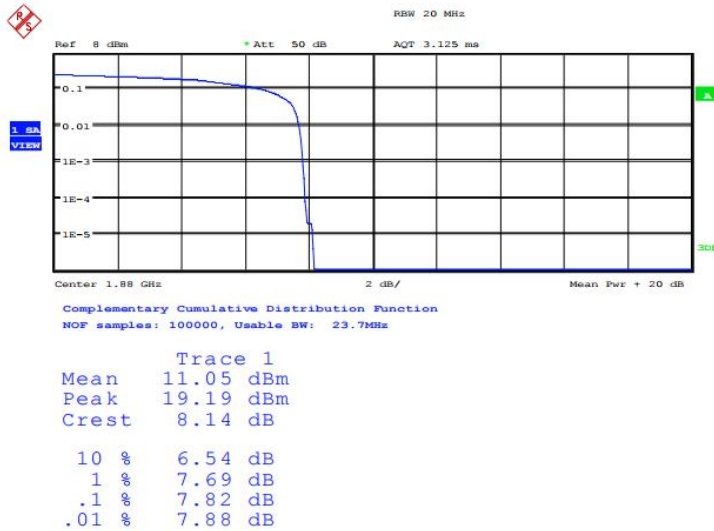
Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
Band2	20MHz	QPSK	18900	6RB#0	11.73	13	PASS
Band2	20MHz	16QAM	18900	6RB#0	7.82	13	PASS
Band4	20MHz	QPSK	20175	6RB#0	8.78	13	PASS
Band4	20MHz	16QAM	20175	6RB#0	7.98	13	PASS
Band5	10MHz	QPSK	20525	6RB#0	10.93	13	PASS
Band5	10MHz	16QAM	20525	6RB#0	10.58	13	PASS
Band7	20MHz	QPSK	21100	6RB#0	10.71	13	PASS
Band7	20MHz	16QAM	21100	6RB#0	10.45	13	PASS
Band12	10MHz	QPSK	23095	6RB#0	12.02	13	PASS
Band12	10MHz	16QAM	23095	6RB#0	10.83	13	PASS
Band13	10MHz	QPSK	23230	6RB#0	12.92	13	PASS
Band13	10MHz	16QAM	23230	6RB#0	11.92	13	PASS

Note: All modes have been tested and only the worst mode test data recorded in the test report.

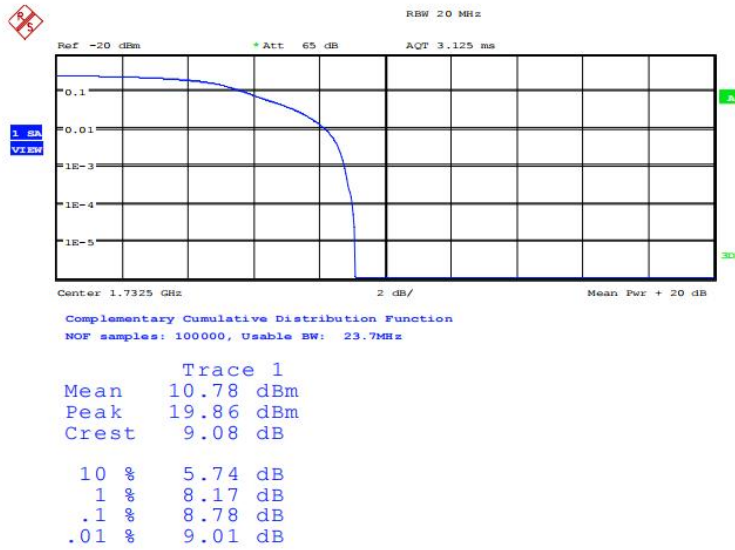
Band2-CH18900-1880MHz-20MHz Bandwidth-QPSK



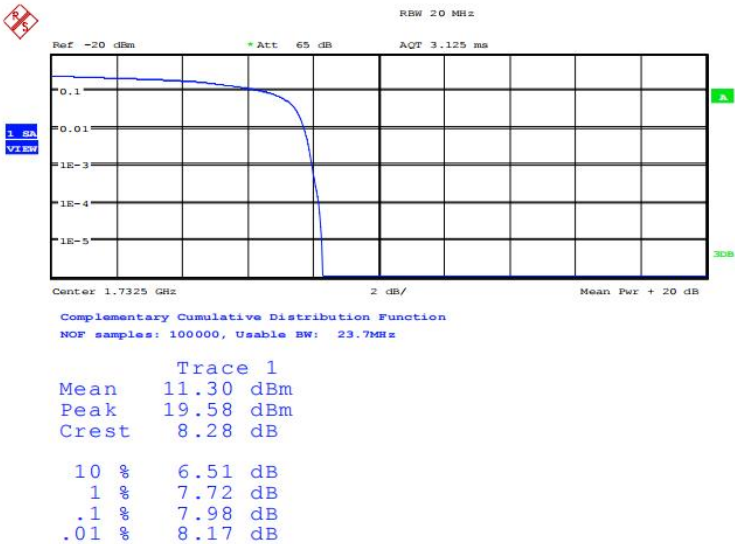
Band2-CH18900-1880MHz-20MHz Bandwidth-16QAM



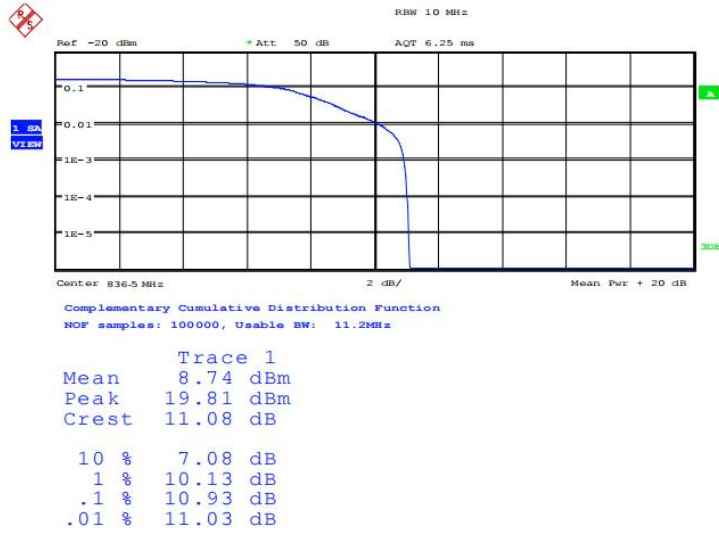
Band4-CH20175-1732.5MHz-20MHz Bandwidth-QPSK



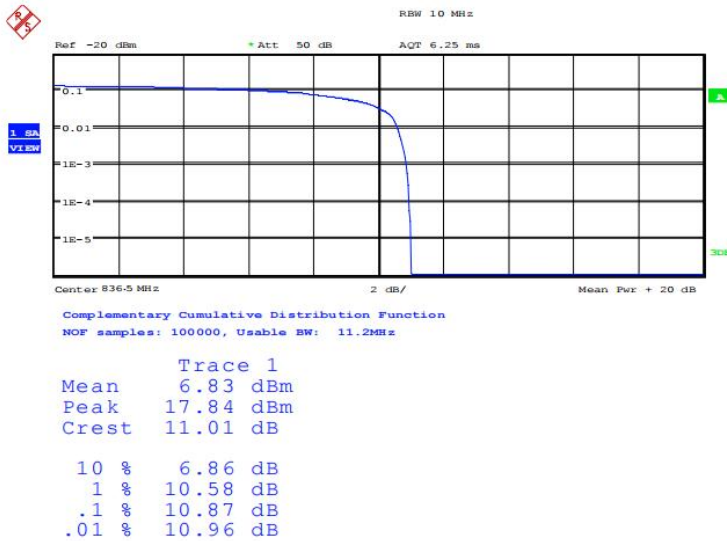
Band4-CH20175-1732.5MHz-20MHz Bandwidth-16QAM



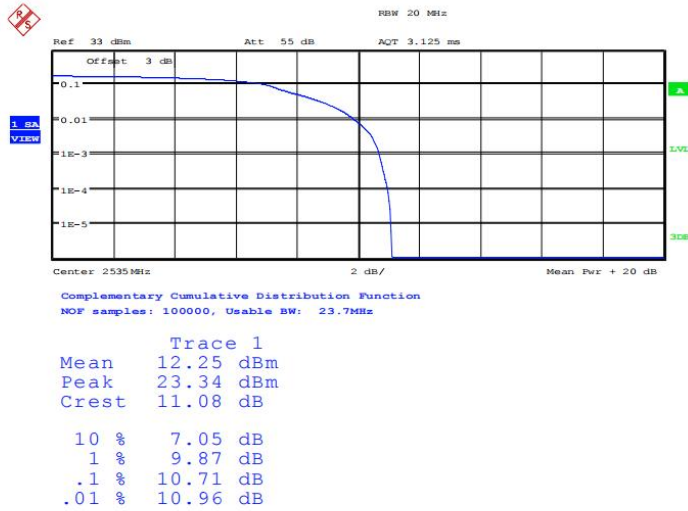
Band5-CH20525-836.5MHz-10MHz Bandwidth-16QAM



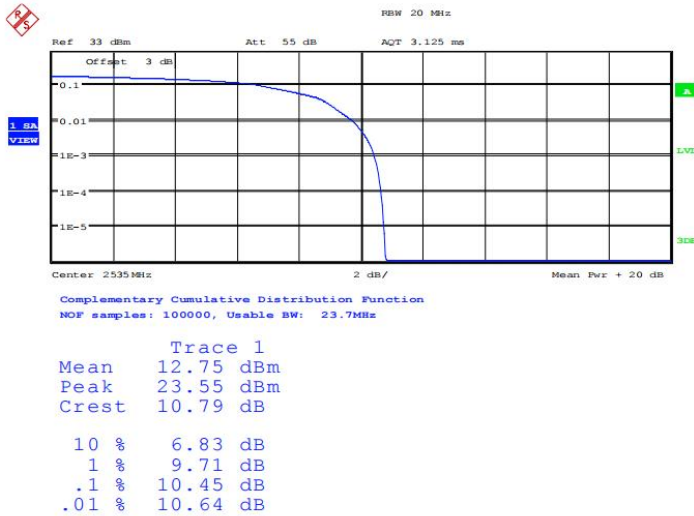
Band5-CH20525-836.5MHz-10MHz Bandwidth-16QAM



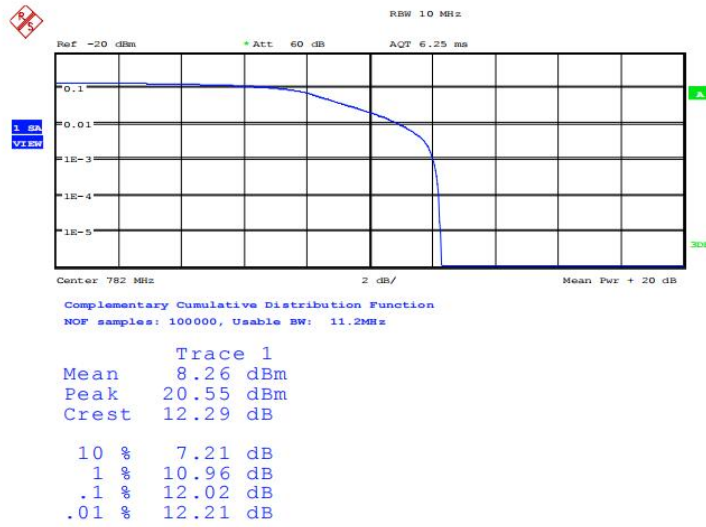
Band7-CH21100-2535MHz-20MHz Bandwidth-QPSK



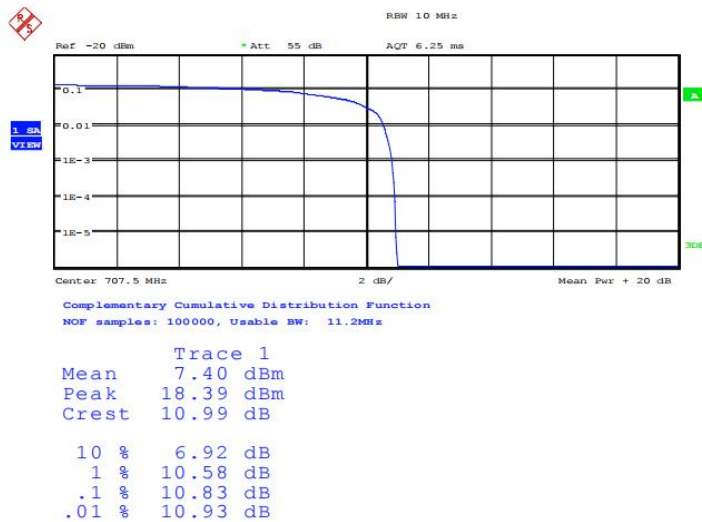
Band7-CH21100-2535MHz-20MHz Bandwidth-16QAM



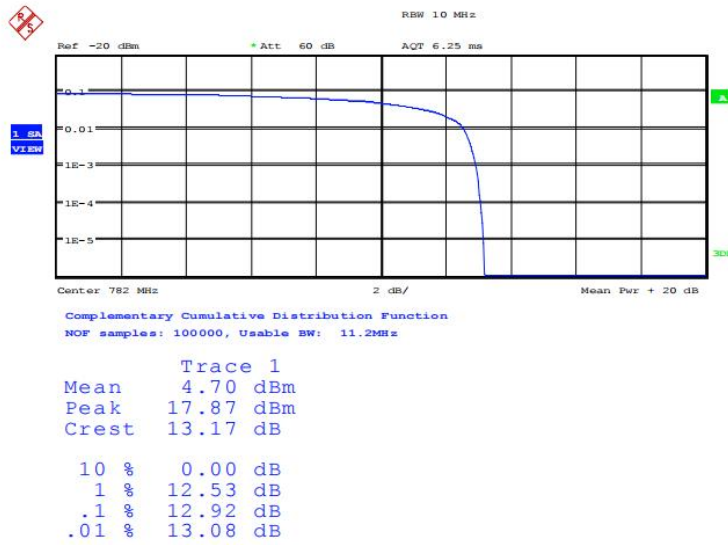
Band12-CH20175-707.5MHz-10MHz Bandwidth-QPSK



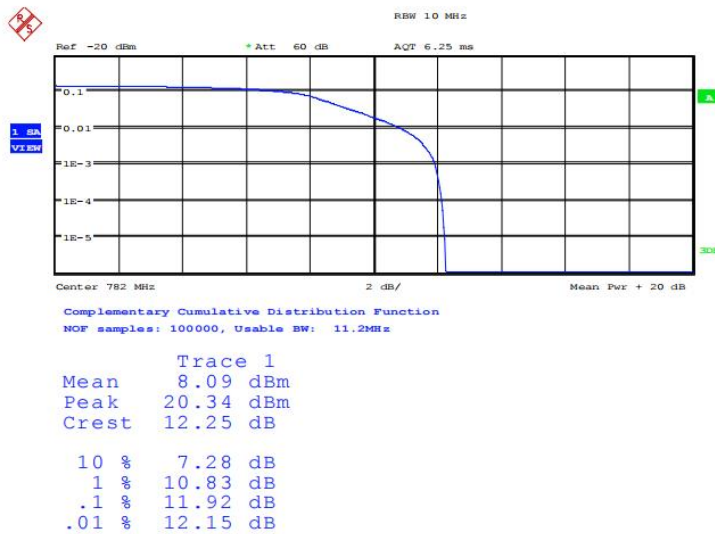
Band12-CH20175-707.5MHz-10MHz Bandwidth-16QAM



Band13-CH23230-782MHz-10MHz Bandwidth-QPSK

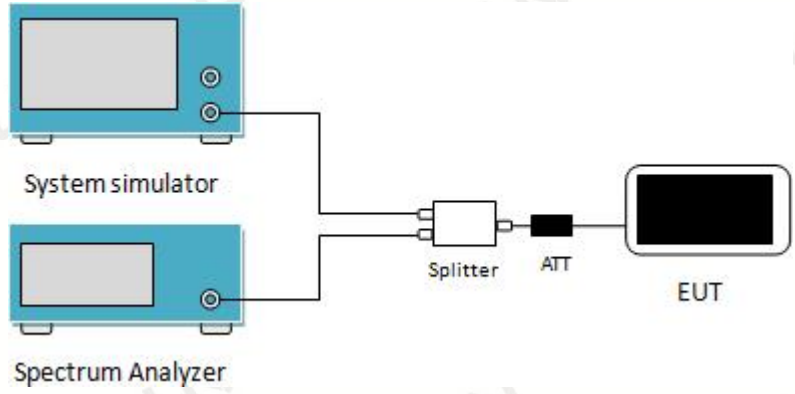


Band13-CH23230-782MHz-10MHz Bandwidth-16QAM



Note: All modes have been tested and only the worst mode test data recorded in the test report.

5 OCCUPY BANDWIDTH

Test Requirement:	Part 22.917(b), Part 24.238(b), Part 27.53(g), Part 27.53(h)
Test Setup:	 The diagram shows a test setup for measuring occupied bandwidth. A System simulator and a Spectrum Analyzer are connected to a Splitter. The Splitter is connected to an ATT (Attenuator) and then to the EUT (Equipment Under Test).
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% ~ 5% of emission BW, VBW= 3 times RBW. 3. -26dBc display line was placed on the screen (or 99%bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.
Test Instruments:	Refer to section 2.5 for details
Test mode:	Refer to section 2.3 for details
Test results:	Passed

5.1 Test Result

LTE Band 2

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.0916	1.260	PASS
	MCH	6	0	1.0907	1.269	PASS
	HCH	6	0	1.0917	1.267	PASS
16QAM	LCH	6	0	1.0929	1.256	PASS
	MCH	6	0	1.0899	1.279	PASS
	HCH	6	0	1.0917	1.261	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1300	1.406	PASS
	MCH	6	0	1.1252	1.388	PASS
	HCH	6	0	1.1248	1.404	PASS
16QAM	LCH	6	0	1.1285	1.406	PASS
	MCH	6	0	1.1217	1.383	PASS
	HCH	6	0	1.1263	1.386	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1777	1.754	PASS
	MCH	6	0	1.1560	1.659	PASS
	HCH	6	0	1.1771	1.719	PASS
16QAM	LCH	6	0	1.1750	1.683	PASS
	MCH	6	0	1.1549	1.632	PASS
	HCH	6	0	1.1618	1.695	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1716	1.766	PASS
	MCH	6	0	1.1475	1.733	PASS
	HCH	6	0	1.1653	1.791	PASS
16QAM	LCH	6	0	1.1818	1.805	PASS
	MCH	6	0	1.1653	1.735	PASS
	HCH	6	0	1.1589	1.849	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1587	1.864	PASS
	MCH	6	0	1.1760	1.827	PASS
	HCH	6	0	1.1673	1.865	PASS
16QAM	LCH	6	0	1.1863	1.733	PASS
	MCH	6	0	1.1649	1.940	PASS
	HCH	6	0	1.1802	1.810	PASS

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1663	1.685	PASS
	MCH	6	0	1.1541	1.670	PASS
	HCH	6	0	1.1576	1.848	PASS
16QAM	LCH	6	0	1.1798	1.756	PASS
	MCH	6	0	1.1638	1.832	PASS
	HCH	6	0	1.1789	1.744	PASS

LTE Band 4

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.0920	1.258	PASS
	MCH	6	0	1.0926	1.257	PASS
	HCH	6	0	1.0929	1.259	PASS
16QAM	LCH	6	0	1.0899	1.265	PASS
	MCH	6	0	1.0928	1.264	PASS
	HCH	6	0	1.0924	1.255	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1264	1.402	PASS
	MCH	6	0	1.1150	1.382	PASS
	HCH	6	0	1.1146	1.385	PASS
16QAM	LCH	6	0	1.1136	1.374	PASS
	MCH	6	0	1.1138	1.381	PASS
	HCH	6	0	1.1105	1.342	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1638	1.685	PASS
	MCH	6	0	1.1529	1.608	PASS
	HCH	6	0	1.1527	1.654	PASS
16QAM	LCH	6	0	1.1477	1.626	PASS
	MCH	6	0	1.1487	1.644	PASS
	HCH	6	0	1.1736	1.664	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1363	1.804	PASS
	MCH	6	0	1.1572	1.790	PASS
	HCH	6	0	1.1455	1.724	PASS
16QAM	LCH	6	0	1.1514	1.697	PASS
	MCH	6	0	1.1371	1.792	PASS
	HCH	6	0	1.1690	1.779	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1480	1.696	PASS
	MCH	6	0	1.1583	1.750	PASS
	HCH	6	0	1.1578	1.754	PASS
16QAM	LCH	6	0	1.1492	1.726	PASS
	MCH	6	0	1.1555	1.840	PASS
	HCH	6	0	1.1751	1.731	PASS

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1807	1.829	PASS
	MCH	6	0	1.1484	1.631	PASS
	HCH	6	0	1.1608	1.860	PASS
16QAM	LCH	6	0	1.1616	1.692	PASS
	MCH	6	0	1.1661	1.877	PASS
	HCH	6	0	1.1584	1.876	PASS

LTE Band 5

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.0897	1.254	PASS
	MCH	6	0	1.0900	1.253	PASS
	HCH	6	0	1.0904	1.250	PASS
16QAM	LCH	6	0	1.0892	1.255	PASS
	MCH	6	0	1.0881	1.261	PASS
	HCH	6	0	1.0906	1.260	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1180	1.373	PASS
	MCH	6	0	1.1230	1.392	PASS
	HCH	6	0	1.1310	1.403	PASS
16QAM	LCH	6	0	1.1257	1.382	PASS
	MCH	6	0	1.1222	1.392	PASS
	HCH	6	0	1.1161	1.380	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1827	1.745	PASS
	MCH	6	0	1.1714	1.697	PASS
	HCH	6	0	1.1673	1.806	PASS
16QAM	LCH	6	0	1.1548	1.776	PASS
	MCH	6	0	1.1668	1.709	PASS
	HCH	6	0	1.1756	1.684	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1725	2.103	PASS
	MCH	6	0	1.1599	1.759	PASS
	HCH	6	0	1.1487	1.660	PASS
16QAM	LCH	6	0	1.1792	1.754	PASS
	MCH	6	0	1.1602	1.726	PASS
	HCH	6	0	1.1809	1.767	PASS

LTE Band 7

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1527	1.716	PASS
	MCH	6	0	1.1684	1.719	PASS
	HCH	6	0	1.1717	1.696	PASS
16QAM	LCH	6	0	1.1650	1.751	PASS
	MCH	6	0	1.1777	1.736	PASS
	HCH	6	0	1.1567	1.658	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1484	1.814	PASS
	MCH	6	0	1.1767	1.830	PASS
	HCH	6	0	1.1340	1.652	PASS
16QAM	LCH	6	0	1.1767	1.799	PASS
	MCH	6	0	1.1493	1.834	PASS
	HCH	6	0	1.1668	1.749	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1426	1.613	PASS
	MCH	6	0	1.1585	1.832	PASS
	HCH	6	0	1.1583	1.809	PASS
16QAM	LCH	6	0	1.1663	1.792	PASS
	MCH	6	0	1.1564	1.743	PASS
	HCH	6	0	1.1550	1.917	PASS

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1645	1.767	PASS
	MCH	6	0	1.1586	1.694	PASS
	HCH	6	0	1.1556	1.844	PASS
16QAM	LCH	6	0	1.1619	1.713	PASS
	MCH	6	0	1.1551	1.810	PASS
	HCH	6	0	1.1526	1.589	PASS

LTE Band 12

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.0894	1.256	PASS
	MCH	6	0	1.0886	1.252	PASS
	HCH	6	0	1.0896	1.252	PASS
16QAM	LCH	6	0	1.0886	1.260	PASS
	MCH	6	0	1.0850	1.256	PASS
	HCH	6	0	1.0890	1.266	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1278	1.427	PASS
	MCH	6	0	1.1183	1.384	PASS
	HCH	6	0	1.1212	1.407	PASS
16QAM	LCH	6	0	1.1250	1.386	PASS
	MCH	6	0	1.1233	1.384	PASS
	HCH	6	0	1.1291	1.398	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1828	1.721	PASS
	MCH	6	0	1.1512	1.678	PASS
	HCH	6	0	1.1613	1.791	PASS
16QAM	LCH	6	0	1.1741	1.736	PASS
	MCH	6	0	1.1823	1.660	PASS
	HCH	6	0	1.1622	1.736	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1575	1.781	PASS
	MCH	6	0	1.1587	1.753	PASS
	HCH	6	0	1.1419	1.760	PASS
16QAM	LCH	6	0	1.1442	1.752	PASS
	MCH	6	0	1.1360	1.685	PASS
	HCH	6	0	1.1525	1.755	PASS

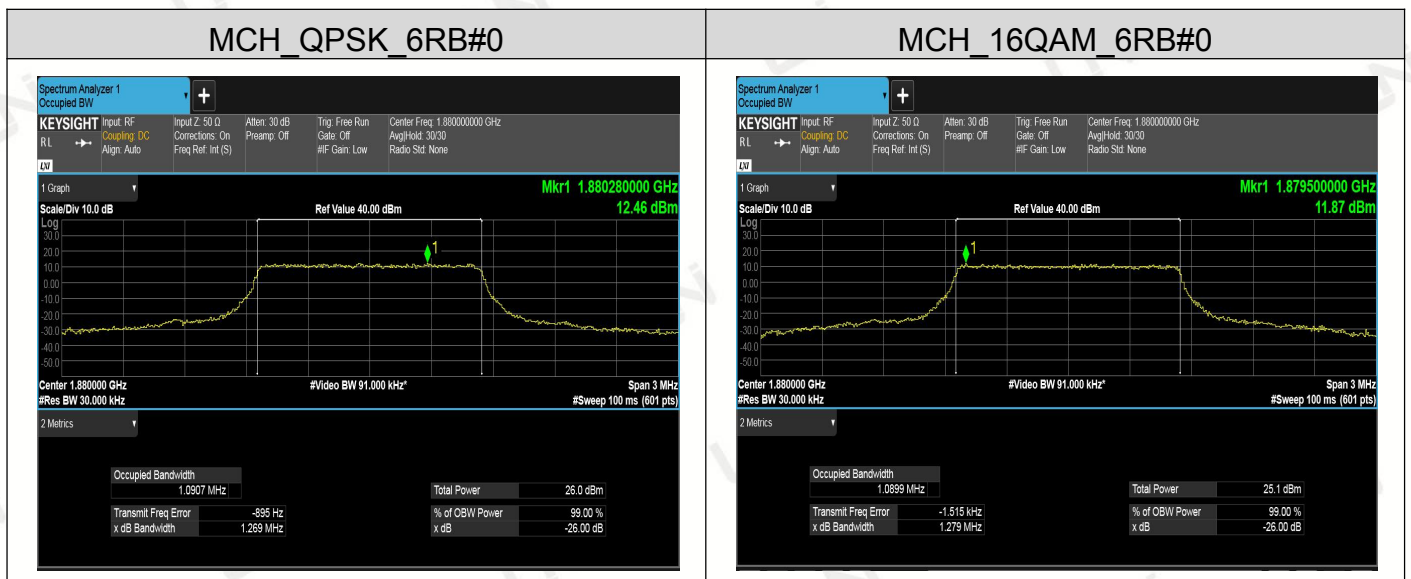
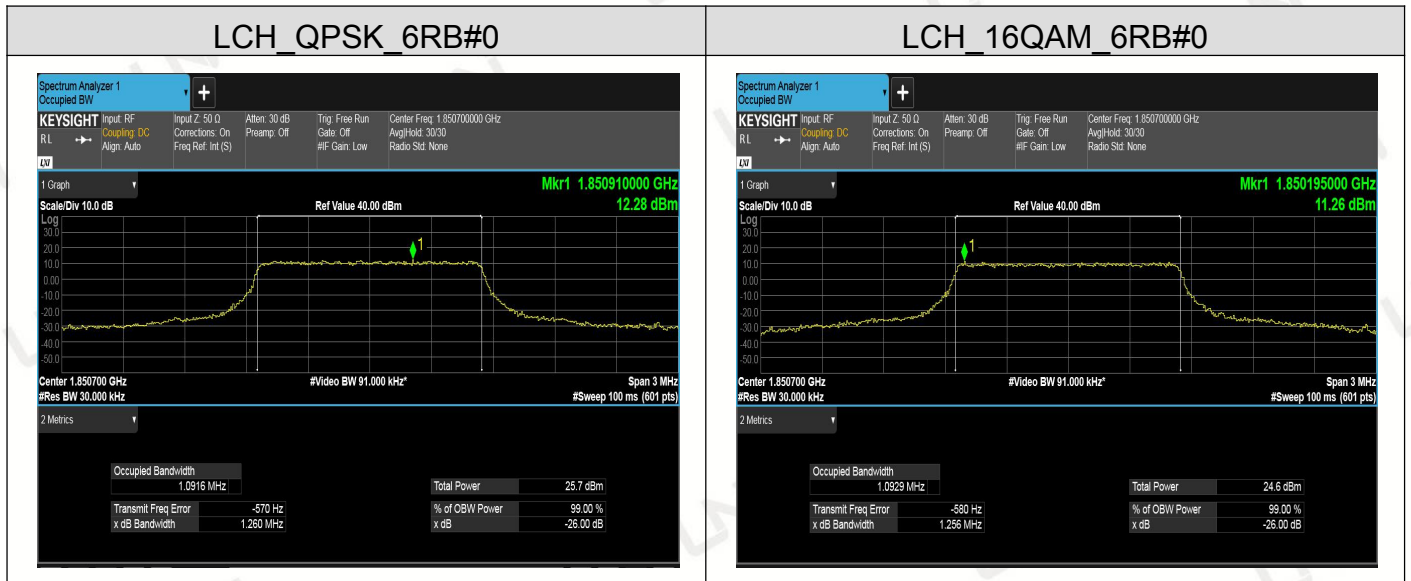
LTE Band 13

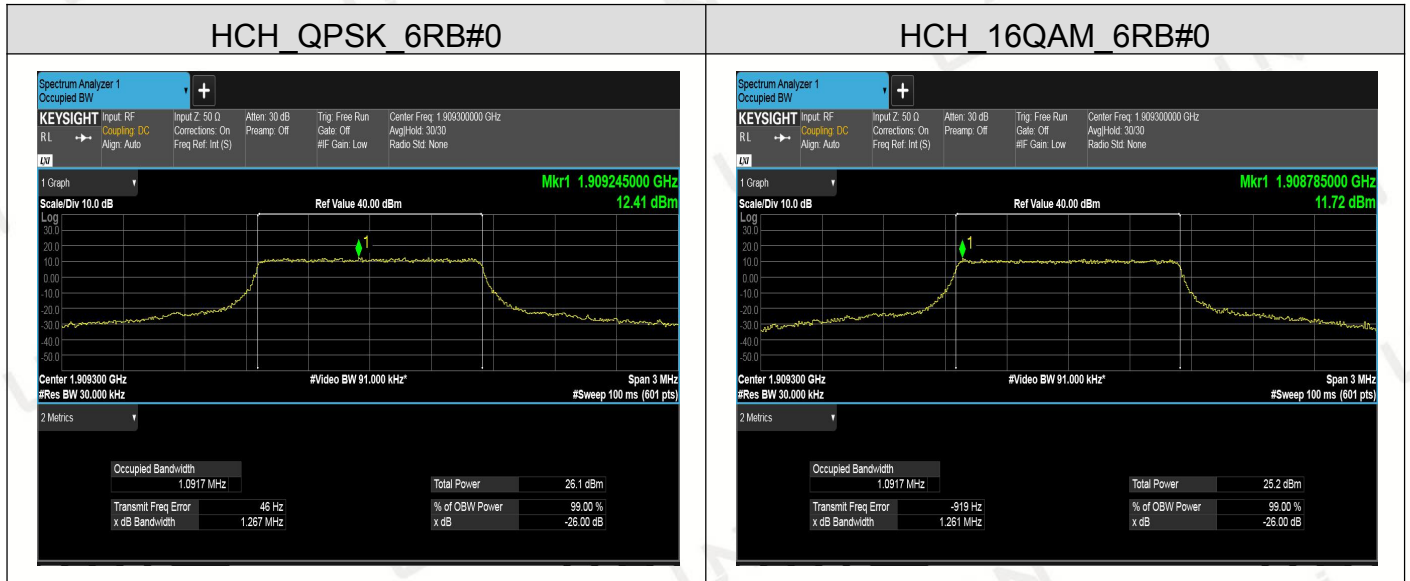
Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1608	1.662	PASS
	MCH	6	0	1.1714	1.698	PASS
	HCH	6	0	1.1582	1.762	PASS
16QAM	LCH	6	0	1.1501	1.672	PASS
	MCH	6	0	1.1607	1.707	PASS
	HCH	6	0	1.1515	1.705	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	MCH	6	0	1.1558	1.716	PASS
16QAM	MCH	6	0	1.1467	1.760	PASS

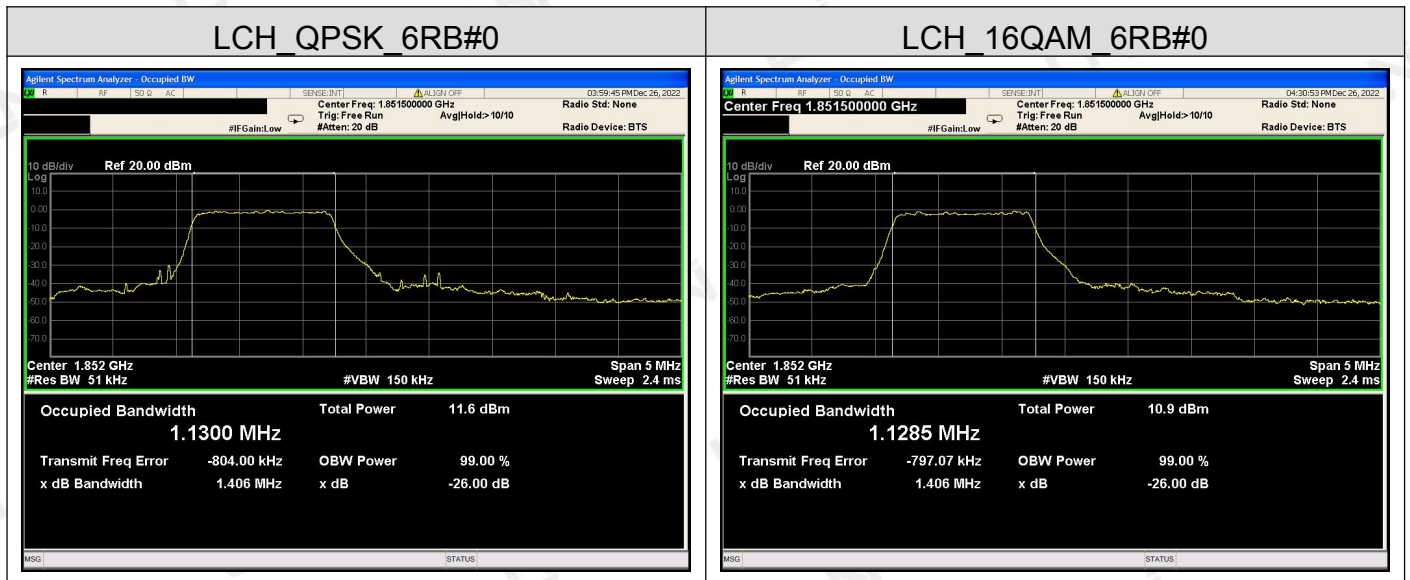
LTE Band 2

Channel Bandwidth: 1.4 MHz

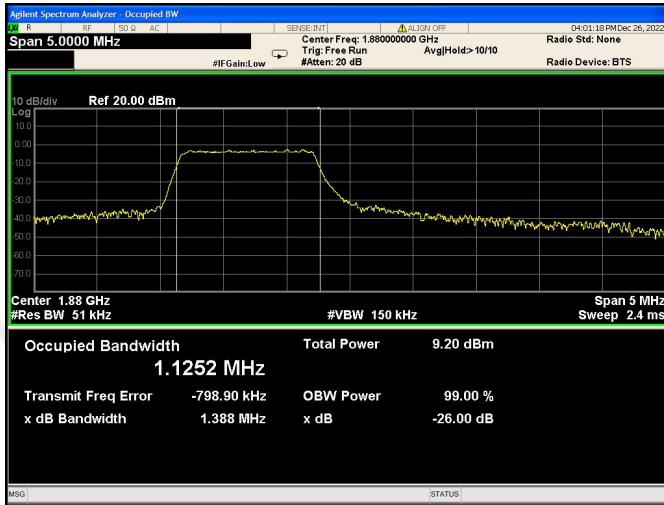




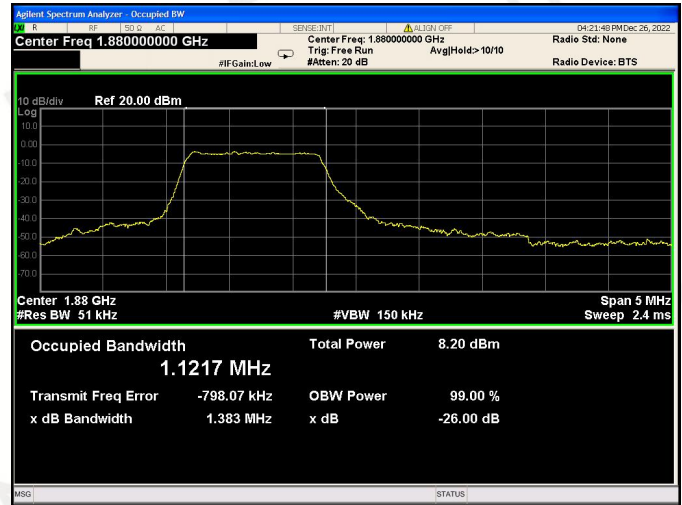
Channel Bandwidth: 3 MHz



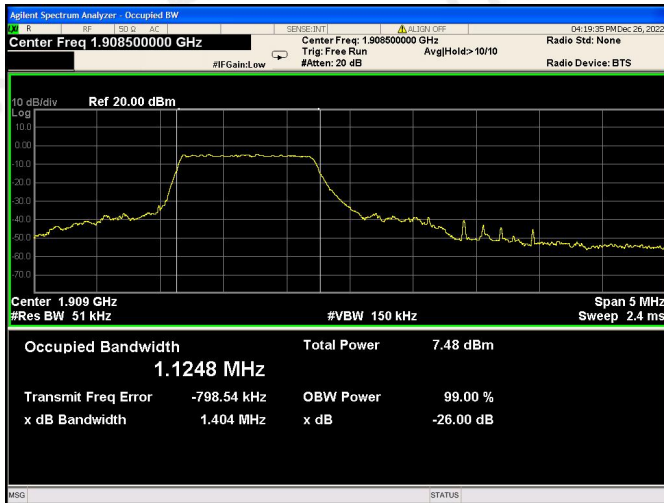
MCH_QPSK_6RB#0



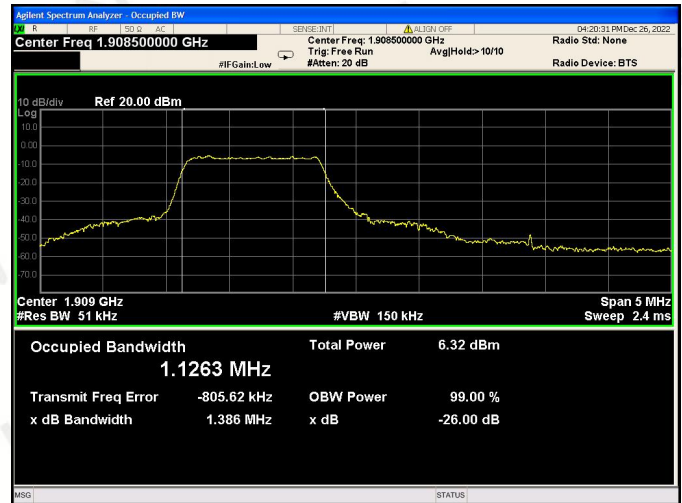
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HCH_QPSK_6RB#0

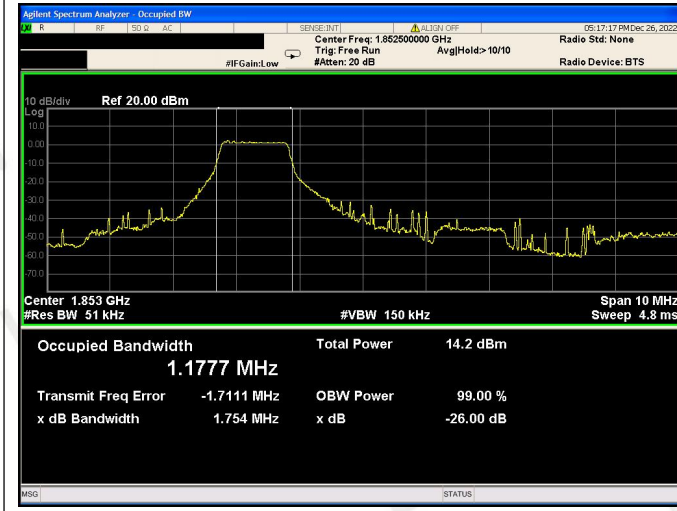


HCH_16QAM_6RB#0

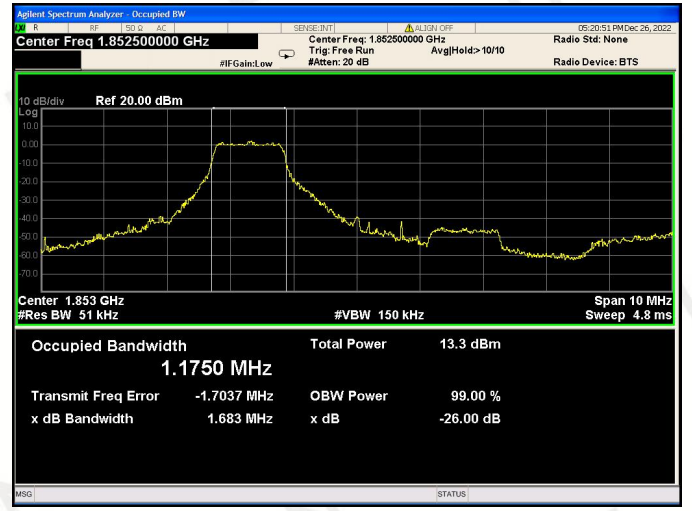


Channel Bandwidth: 5 MHz

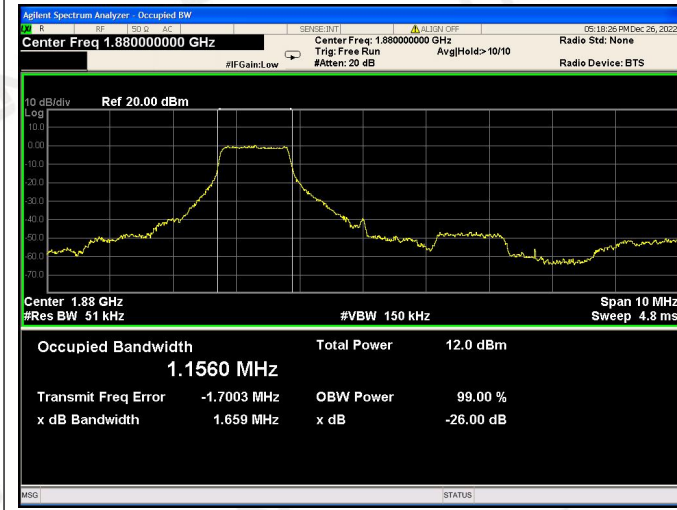
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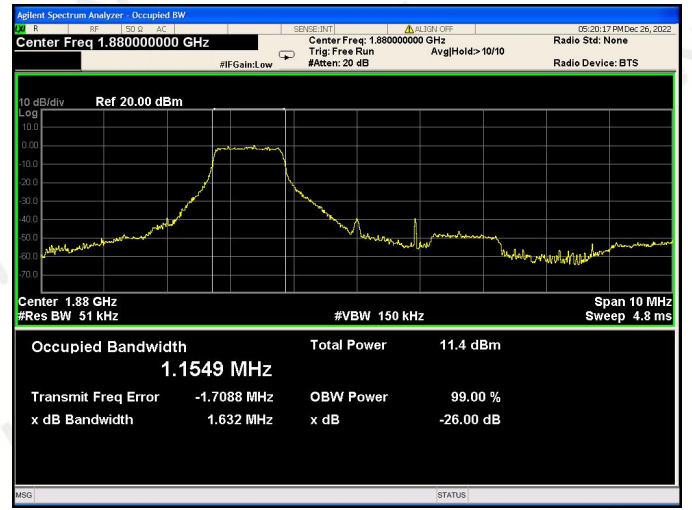
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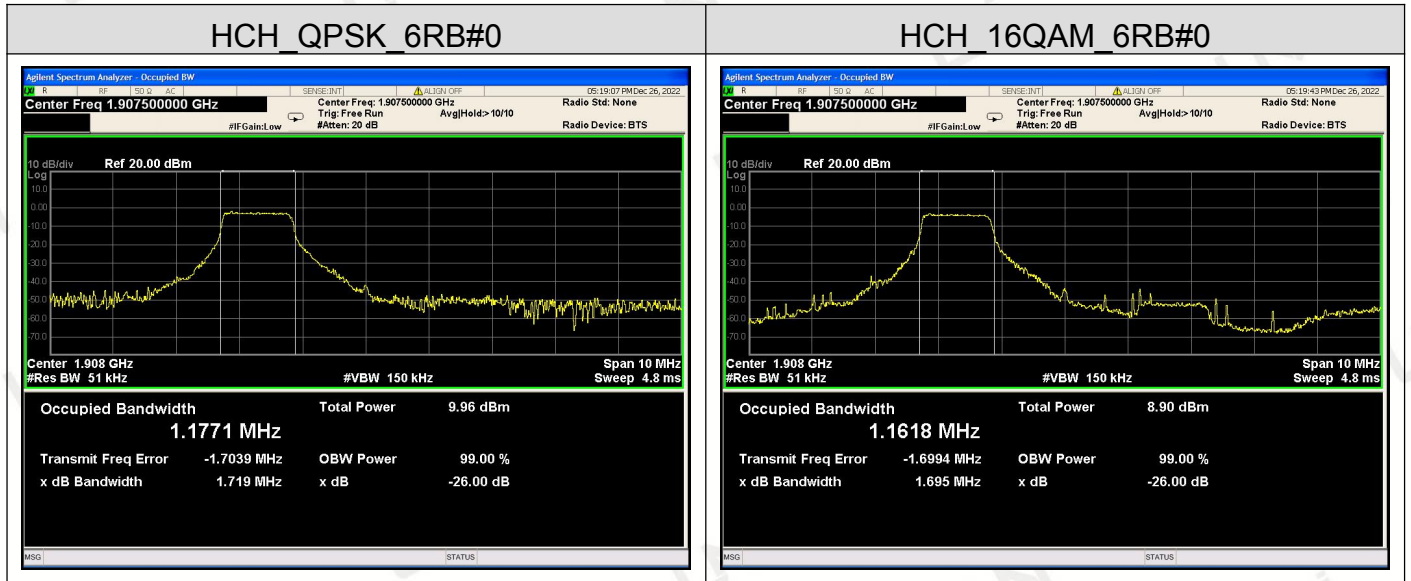


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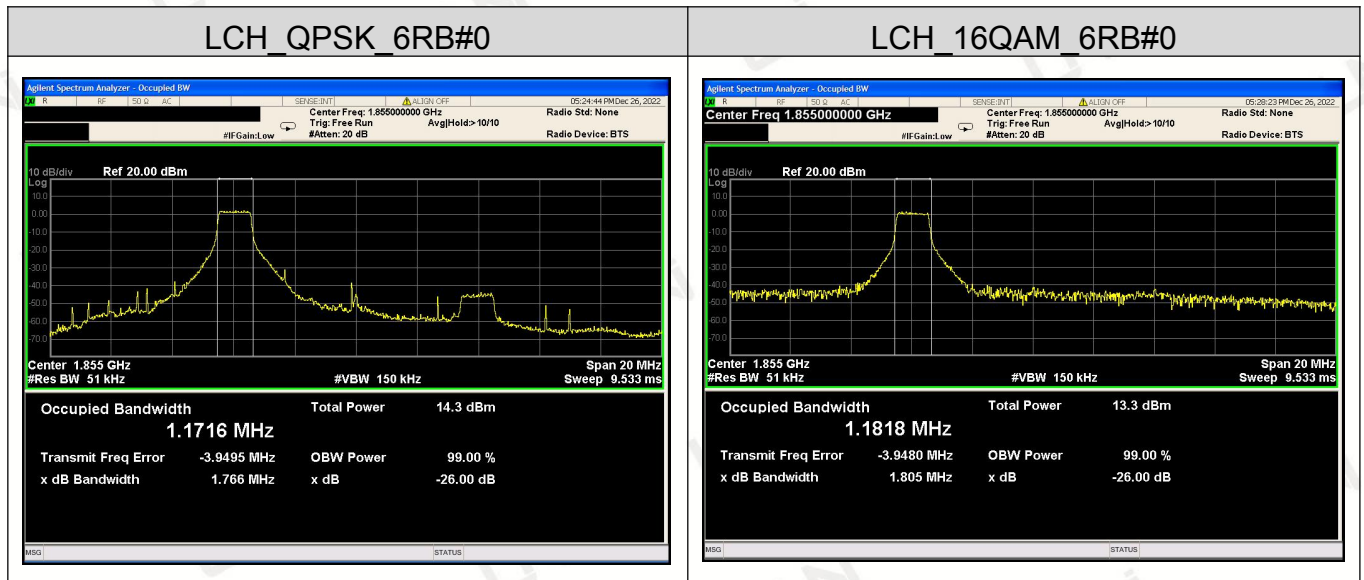


MCH_16QAM_6RB#0

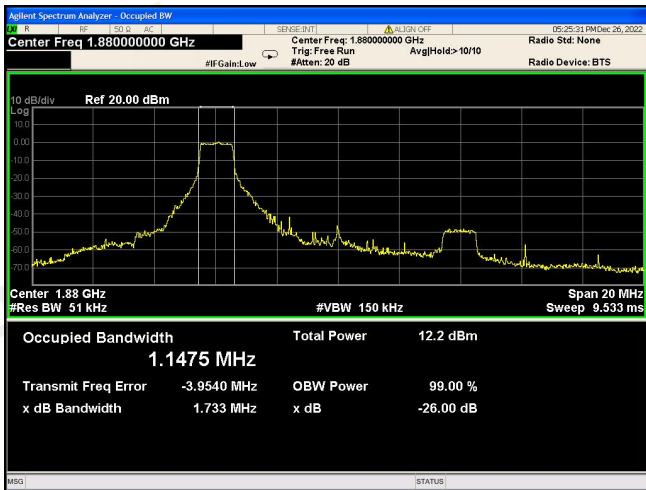




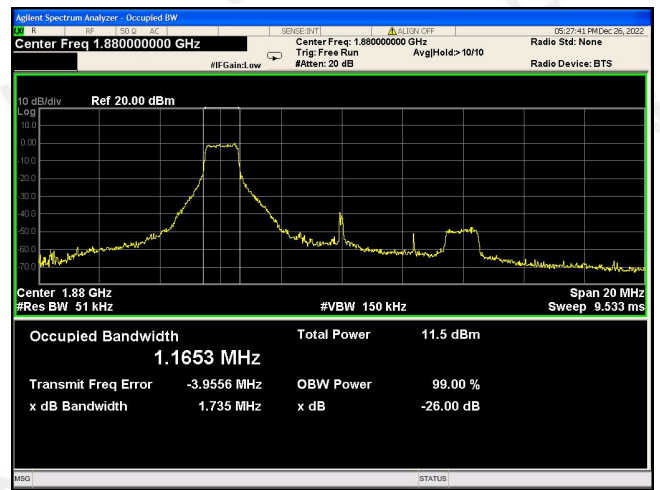
Channel Bandwidth: 10 MHz



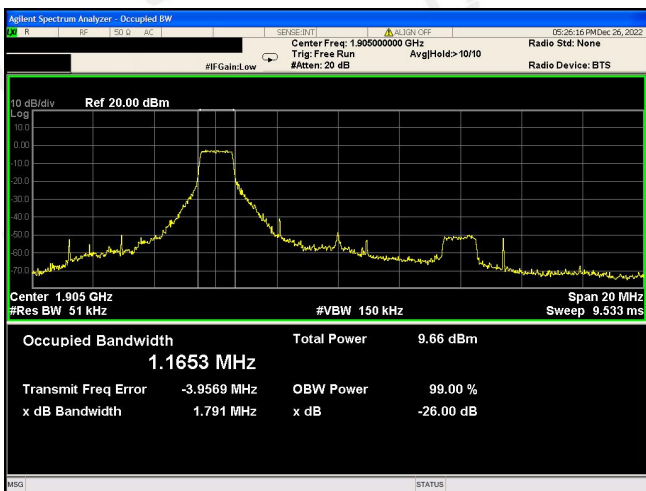
MCH_QPSK_6RB#0



MCH_16QAM_6RB#0



HCH_QPSK_6RB#0



HCH_16QAM_6RB#0

