TEST REPORT

Product Name:	Asset GPS Tracker
FCC ID:	2AUVX-KW06S
Trademark:	N/A
Model Number:	NT06EF, NT06E
Prepared For:	Shenzhen Kingwo IoT Co., Ltd.
Address:	Room 703, Block A, R&D Building, Tsinghua Information High-Tech Park, Nanshan, Shenzhen, Guangdong, China
Manufacturer:	Shenzhen Kingwo IoT Co., Ltd.
Address:	Room 703, Block A, R&D Building, Tsinghua Information High-Tech Park, Nanshan, Shenzhen, Guangdong, China
Prepared By:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China
Sample Received Date:	Apr. 20, 2020
Sample tested Date:	Apr. 20, 2020 to Apr. 28, 2020
Issue Date:	Apr. 28, 2020
Report No.:	CTB200429005RFX
Test Standards	47 CFR Part 2(2015) 47 CFR Part 27 subpart C(2015)
Test Results	PASS
Remark:	This is EMTC radio test report.

Compiled by:	Reviewed by:	Approved by:
Victory	Rita Xiao	Sherwin Qian
Victory	Rita Xiao	Sherwin Qian/ Director

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB200429005RFX	Apr. 28, 2020	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
Conducted output power	Part 2.1046(a) /Part 27.50(c)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Effective Radiated Power of Transmitter(EIRP)	Part 2.1046(a) / Part 27.50(c)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
peak-to-average ratio	Part 27.50(d)	KDB 971168 D01v02r02	PASS
99% & 26dB Occupied Bandwidth	Part 2.1049(h)	KDB 971168 D01v02r02	PASS
Band Edge at antenna terminals	Part 2.1051/ Part 27.53(g)	KDB 971168 D01v02r02	PASS
Spurious emissions at antenna terminals	Part 2.1051/ Part 27.53(g)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Field strength of spurious radiation	Part 2.1053/ Part 27.53(g)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Frequency stability	Part 2.1055/Part 27.54	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	U=±54.3Hz
Conducted output power Above 1G	U=±1.0dB
Conducted output power below 1G	U=±0.9dB
Power Spectral Density , Conduction	U=±1.0dB
Conduction spurious emissions	U=±2.8dB
Out of band emission	U=±54Hz
3m camber Radiated spurious emission(30MHz-1GHz)	U=±4.3dB
3m chamber Radiated spurious emission(1GHz-18GHz)	U=±4.5dB
humidity uncertainty	U=±5.3%
Temperature uncertainty	U=±0.59℃
Supply voltages	U=±3%
Time	U=±5%

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	NT06EF, NT06E
Model Description:	All model's the function, software and electric circuit are the same, only with the product Battery capacity and model named different. Test sample model: NT06EF
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	GPRS/EDGE 850: Tx:824.20 -848.80MHz; Rx: 869.20 – 893.80MHz GPRS/EDGE 1900: Tx:1850.20 – 1909.80MHz; Rx:1930.20 – 1989.80MHz eMTC Band 2: TX:1850 MHz to 1910 MHz, RX:1930 MHz to 1990 MHz. eMTC Band 4: TX:1710 MHz to 1755 MHz, RX:2110 MHz to 2170 MHz. eMTC band 12: TX: 699 MHz to 716 MHz, RX: 729 MHz to746 MHz. eMTC band 13: TX:777 MHz to 787 MHz, RX: 746 MHz to 756 MHz. GPS:1575.42MHz
GSM/GPRS Power Class:	GSM850:Power Class 4/ PCS1900:Power Class 1
GPRS/EDGE Multislot Class:	EGPRS/GPRS: Multi-slot Class 12
GSM Release Version:	N/A
GPRS operation mode:	Class B
LTE Power Class:	Class 3
Type of Modulation:	GPRS Mode with GMSK Modulation EDGE Mode with 8PSK Modulation eMTC Mode with QPSK,16QAM Modulation
Antenna installation:	Internal antenna
Antenna Gain:	GSM 850: 1dBi, GSM 1900: 2.4dBi, eMTC Band 2: 2.5dBi, eMTC Band 4: 2.3dBi eMTC Band 12: 0.8dBi, eMTC Band 13: 0.9dBi
Ratings:	Battery AA 3.6V

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1	Laptop	DELL	Inspiron5570	JR4G1A00DPC	AE
2	AC Adaptor	DELL	HA45NM140	CN-00285K-CH200-88V-OEYC-A06	AE

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)	Number [DL]	Frequency of Downlink(MHz)
LTE band 12 TX:699 to 716 MHz RX 729 to746 MHz	Low Range	1.4	23017	699.7	5017	729.7
		3	23025	700.5	5025	730.5
		5	23035	701.5	5035	731.5
		10	23060	704	5060	734
	Mid Range	1.4/3/5/10	23095	707.5	5095	737.5
	High Range	1.4	23173	715.3	5173	745.3
		3	23165	714.5	5165	744.5
		5	23155	713.5	5155	743.5
		10	23130	711	5130	741

Test Mode	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)	Number [DL]	Frequency of Downlink(MHz)
LTE band 13 TX:777 to 787 MHz RX 746 to 756 MHz	Low Range	5	23205	779.5	5205	748.5
		10	23230	782	5230	751
	Mid Range	5/10	23230	782	5230	751
	High Range	5	23255	784.5	5255	753.5
		10	23230	782	5230	751

4.5 Test Environment

Humidity(%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(DC):	3.7
Low Voltage(DC):	3.33
High Voltage(DC):	4.07
Normal Temperature(℃)	25
Low Temperature(℃)	0
High Temperature(℃)	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

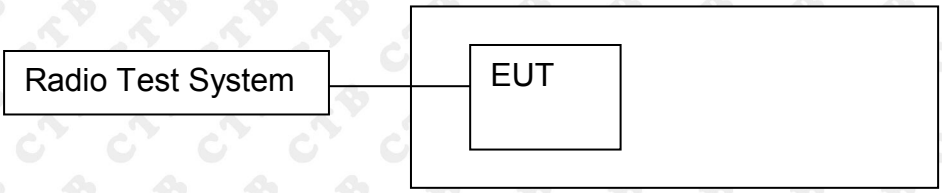
5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	Oct. 17, 2019	Oct. 16, 2020
2	Power Sensor	Agilent	U2021XA	MY56120032	Nov. 02, 2019	Nov. 01, 2020
3	Power Sensor	Agilent	U2021XA	MY56120034	Nov. 02, 2019	Nov. 01, 2020
4	Communication test set	R&S	CMW500	118735	Nov. 02, 2019	Nov. 01, 2020
5	Spectrum Analyzer	R&S	FSP40	100550	Nov. 02, 2019	Nov. 01, 2020
6	Signal Generator	Agilent	N5181A	MY49060920	Nov. 03, 2019	Nov. 02, 2020
7	Signal Generator	Agilent	N5182A	MY47420195	Nov. 03, 2019	Nov. 02, 2020
8	Communication test set	R&S	CMU200	119978	Nov. 02, 2019	Nov. 01, 2020
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	Nov. 02, 2019	Nov. 01, 2020
10	band rejection filter	Shenxiang	MSF5150-5850MS-1155	20181015001	Nov. 02, 2019	Nov. 01, 2020
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	Nov. 02, 2019	Nov. 01, 2020
12	BT&WI-FI Automatic test software	Micowave	MTS8310	Ver. 2.0.0.0	\	\
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	Nov. 02, 2019	Nov. 01, 2020
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	Nov. 02, 2019	Nov. 01, 2020
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	\	\
16	966 chamber	C.R.T.	966 Room	966	Nov. 10, 2019	Nov. 09, 2020
17	Receiver	R&S	ESPI	100362	Nov. 02, 2019	Nov. 01, 2020

18	Amplifier	HP	8447E	2945A02747	Nov. 03, 2019	Nov. 02, 2020
19	Amplifier	Agilent	8449B	3008A01838	Nov. 03, 2019	Nov. 02, 2020
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	869	Nov. 02, 2019	Nov. 01, 2020
21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	Nov. 02, 2019	Nov. 01, 2020
22	Software	Fala	EZ-EMC	FA-03A2 RE	\	\
23	3-Loop Antenna	Daze	ZN30401	17014	Nov. 02, 2019	Nov. 01, 2020
24	loop antenna	ZHINAN	ZN30900A	/	Nov. 02, 2019	Nov. 01, 2020
25	Horn antenna	A/H/System	SAS-574	588	Nov. 02, 2019	Nov. 01, 2020
26	Amplifier	AEROFLEX	/	S/N/ 097	Nov. 02, 2019	Nov. 01, 2020

6. CONDUCTED OUTPUT POWER

6.1 Block Diagram Of Test Setup



6.2 Limit

Mode	LTE band 2
Limit	33.01dBm（2W）

6.3 Test procedure

The transmitter output was connected to a calibrated coaxial cable, attenuator and power meter, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the power reading. The tests were performed at three frequencies (low channel, middle channel and high channel) and on the highest power levels, which can be setup on the transmitters.

6.4 Test Result

Band 12
Channel Bandwidth: 1.4 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	23.99	PASS
		1	3	23.96	PASS
		1	5	23.68	PASS
		3	0	22.96	PASS
		3	2	23.23	PASS
		3	3	23.00	PASS
		6	0	22.74	PASS
	MCH	1	0	23.94	PASS
		1	3	23.59	PASS
		1	5	23.87	PASS
		3	0	23.07	PASS
		3	2	22.78	PASS
		3	3	22.82	PASS
		6	0	22.72	PASS
	HCH	1	0	23.91	PASS
		1	3	23.65	PASS
		1	5	23.98	PASS
		3	0	23.21	PASS
		3	2	22.95	PASS
		3	3	23.30	PASS
		6	0	23.55	PASS
16QAM	LCH	1	0	24.37	PASS
		1	3	23.69	PASS
		1	5	24.47	PASS
		3	0	23.29	PASS
		3	2	22.98	PASS
		3	3	22.73	PASS
		5	0	23.06	PASS
	MCH	1	0	23.60	PASS
		1	3	23.28	PASS
		1	5	23.78	PASS
		3	0	22.67	PASS
		3	2	22.63	PASS
		3	3	22.76	PASS
		5	0	22.71	PASS
	HCH	1	0	23.76	PASS
		1	3	23.61	PASS
		1	5	24.40	PASS
		3	0	22.75	PASS
		3	2	23.07	PASS
		3	3	23.52	PASS
		5	0	23.37	PASS

Channel Bandwidth: 3 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	23.89	PASS
		1	3	23.53	PASS
		1	5	23.83	PASS
		3	0	22.91	PASS

		3	2	23.30	PASS
		3	3	23.04	PASS
		6	0	22.83	PASS
	MCH	1	0	24.08	PASS
		1	3	23.58	PASS
		1	5	23.72	PASS
		3	0	22.80	PASS
		3	2	22.54	PASS
		3	3	23.08	PASS
		6	0	22.32	PASS
	HCH	1	0	23.60	PASS
		1	3	23.67	PASS
		1	5	24.40	PASS
		3	0	23.27	PASS
		3	2	23.25	PASS
		3	3	23.09	PASS
		6	0	23.08	PASS
16QAM	LCH	1	0	23.78	PASS
		1	3	24.02	PASS
		1	5	23.83	PASS
		3	0	22.88	PASS
		3	2	22.83	PASS
		3	3	23.15	PASS
		5	0	22.96	PASS
	MCH	1	0	23.66	PASS
		1	3	23.36	PASS
		1	5	23.76	PASS
		3	0	23.03	PASS
		3	2	23.08	PASS
		3	3	22.79	PASS
		5	0	22.59	PASS
	HCH	1	0	23.90	PASS
		1	3	23.82	PASS
		1	5	23.88	PASS
		3	0	23.27	PASS
		3	2	23.04	PASS
		3	3	22.95	PASS
		5	0	23.17	PASS

Channel Bandwidth: 5 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	24.05	PASS
		1	3	23.87	PASS
		1	5	24.01	PASS
		3	0	22.67	PASS
		3	2	22.73	PASS
		3	3	22.63	PASS
		6	0	23.11	PASS

	MCH	1	0	24.14	PASS
		1	3	23.26	PASS
		1	5	23.74	PASS
		3	0	22.48	PASS
		3	2	22.49	PASS
		3	3	23.03	PASS
		6	0	22.86	PASS
	HCH	1	0	23.87	PASS
		1	3	23.50	PASS
		1	5	24.27	PASS
		3	0	23.11	PASS
		3	2	23.39	PASS
		3	3	23.08	PASS
		6	0	23.49	PASS
16QAM	LCH	1	0	23.85	PASS
		1	3	23.69	PASS
		1	5	23.68	PASS
		3	0	23.07	PASS
		3	2	23.04	PASS
		3	3	23.30	PASS
		5	0	22.93	PASS
	MCH	1	0	23.63	PASS
		1	3	23.25	PASS
		1	5	23.80	PASS
		3	0	22.57	PASS
		3	2	22.62	PASS
		3	3	22.87	PASS
		5	0	22.74	PASS
	HCH	1	0	23.77	PASS
		1	3	24.19	PASS
		1	5	24.14	PASS
		3	0	23.32	PASS
		3	2	23.20	PASS
		3	3	23.51	PASS
		5	0	23.08	PASS

Channel Bandwidth: 10 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	23.88	PASS
		1	3	23.76	PASS
		1	5	23.91	PASS
		3	0	23.22	PASS
		3	2	23.27	PASS
		3	3	22.88	PASS
		6	0	23.10	PASS
	MCH	1	0	23.48	PASS
		1	3	23.71	PASS
		1	5	23.99	PASS
		3	0	22.45	PASS
		3	2	22.60	PASS
		3	3	22.59	PASS
		6	0	22.80	PASS
	HCH	1	0	23.98	PASS
		1	3	24.00	PASS
		1	5	24.15	PASS
		3	0	22.76	PASS
		3	2	23.09	PASS
		3	3	22.90	PASS
		6	0	23.37	PASS
16QAM	LCH	1	0	24.13	PASS
		1	3	23.36	PASS
		1	5	23.95	PASS
		3	0	23.46	PASS
		3	2	23.13	PASS
		3	3	23.01	PASS
		5	0	22.70	PASS
	MCH	1	0	23.91	PASS
		1	3	23.85	PASS
		1	5	23.86	PASS
		3	0	22.84	PASS
		3	2	23.10	PASS
		3	3	23.02	PASS
		5	0	22.76	PASS
	HCH	1	0	23.43	PASS
		1	3	23.59	PASS
		1	5	24.31	PASS
		3	0	23.18	PASS
		3	2	23.07	PASS
		3	3	22.93	PASS
		5	0	23.26	PASS

Band 13
Channel Bandwidth: 5 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	24.57	PASS
		1	3	24.15	PASS
		1	5	24.14	PASS
		3	0	23.33	PASS
		3	2	23.34	PASS
		3	3	23.47	PASS
		6	0	23.40	PASS
	MCH	1	0	24.19	PASS
		1	3	23.78	PASS
		1	5	24.10	PASS
		3	0	22.94	PASS
		3	2	23.12	PASS
		3	3	22.81	PASS
		6	0	22.78	PASS
	HCH	1	0	24.16	PASS
		1	3	23.97	PASS
		1	5	24.51	PASS
		3	0	23.39	PASS
		3	2	23.23	PASS
		3	3	23.58	PASS
		6	0	23.18	PASS
16QAM	LCH	1	0	24.20	PASS
		1	3	23.91	PASS
		1	5	23.73	PASS
		3	0	22.80	PASS
		3	2	22.62	PASS
		3	3	22.87	PASS
		5	0	23.28	PASS
	MCH	1	0	23.50	PASS
		1	3	23.32	PASS
		1	5	23.92	PASS
		3	0	22.54	PASS
		3	2	22.42	PASS
		3	3	22.93	PASS
		5	0	22.83	PASS
	HCH	1	0	23.73	PASS
		1	3	24.13	PASS
		1	5	24.09	PASS
		3	0	22.95	PASS
		3	2	22.90	PASS
		3	3	23.21	PASS
		5	0	22.94	PASS

Channel Bandwidth: 10 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	24.25	PASS
		1	3	23.81	PASS
		1	5	23.89	PASS
		3	0	22.80	PASS
		3	2	23.15	PASS
		3	3	23.15	PASS
		6	0	23.21	PASS
	MCH	1	0	24.20	PASS
		1	3	23.57	PASS
		1	5	23.76	PASS
		3	0	22.54	PASS
		3	2	22.73	PASS
		3	3	22.68	PASS
		6	0	23.08	PASS
	HCH	1	0	23.84	PASS
		1	3	23.86	PASS
		1	5	24.04	PASS
		3	0	23.44	PASS
		3	2	23.02	PASS
		3	3	23.33	PASS
		6	0	23.19	PASS
16QAM	LCH	1	0	24.10	PASS
		1	3	24.14	PASS
		1	5	24.11	PASS
		3	0	23.37	PASS
		3	2	22.97	PASS
		3	3	23.15	PASS
		5	0	22.89	PASS
	MCH	1	0	24.24	PASS
		1	3	24.04	PASS
		1	5	24.06	PASS
		3	0	22.51	PASS
		3	2	22.73	PASS
		3	3	23.06	PASS
		5	0	22.51	PASS
	HCH	1	0	23.65	PASS
		1	3	24.01	PASS
		1	5	24.09	PASS
		3	0	23.41	PASS
		3	2	22.80	PASS
		3	3	23.08	PASS
		5	0	23.36	PASS

7. EFFECTIVE RADIATED POWER OF TRANSMITTER

7.1 Block Diagram Of Test Setup

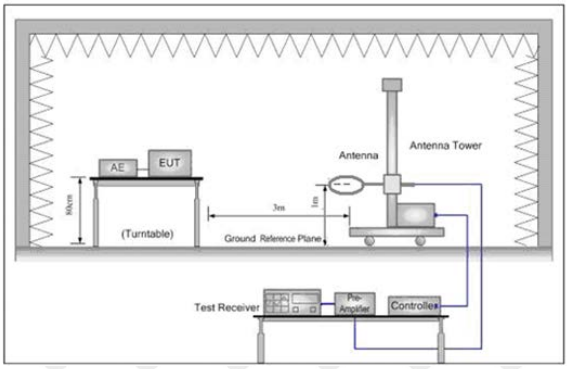


Figure 1. Below 30MHz

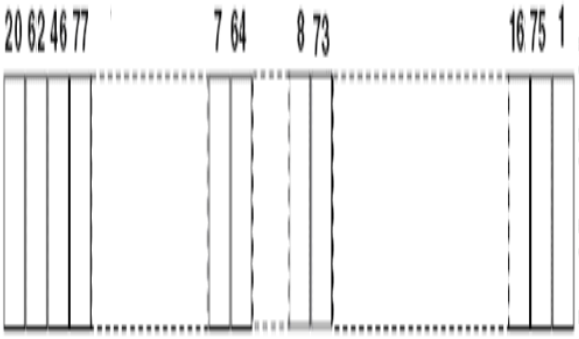


Figure 2. 30MHz to 1GHz

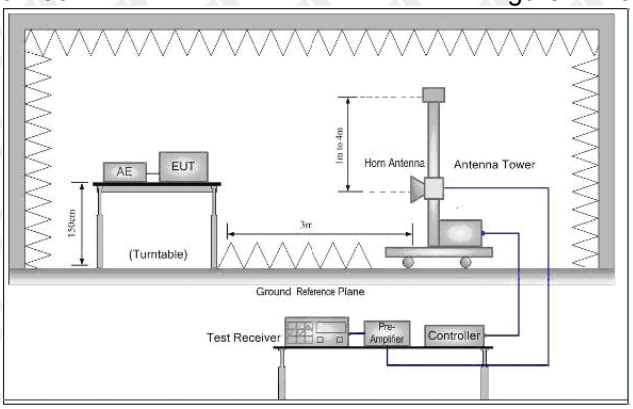


Figure 3. Above 1GHz

7.2 Limit

Rule Part 27.50(b) (10) specifies that “Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP”
Rule Part 27.50(c) (10) specifies that “Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP”
Rule Part 27.50(d) (4) specifies that “Fixed, mobile and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP”

Part 27.50(b)(10)Limit (ERP) :Band13	⩽ 3 W (34.77 dBm)
Part 27.50(c)(10)Limit (ERP):Band12	⩽ 3 W (34.77 dBm)

7.3 Test procedure

1. Scan up to 10th harmonic, find the maximum radiation frequency to measure.
2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

Test procedure as below:

1) The EUT was powered ON and placed on a 1.5m hight table at a 3 meter fully Anechoic Chamber. The antenna of the transmitter was extended to its maximum length. modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.

2) The EUT was set 3 meters(above 18GHz the distance is 1 meter) away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
4) Steps 1) to 3) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
5) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
6) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 3) is obtained for this set of conditions.
7) The output power into the substitution antenna was then measured.
8) Steps 6) and 7)were repeated with both antennas polarized.
9) Calculate power in dBm by the following formula:
   ERP(dBm) = Pg(dBm) - cable loss (dB)- + antenna gain (dBd)
   EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)
   EIRP=ERP+2.15dB
   where:
   Pg is the generator output power into the substitution antenna.
10) Test the EUT in the lowest channel, the middle channel the Highest channel
11) The radiation measurements are performed in X, Y, Z axis positioning for EUT operation mode,And found the X axis positioning which it is worse case.

Repeat above procedures until all frequencies measured was complete.

7.4 Test Result

Band 12

Channel Bandwidth: 1.4 MHz							
Frequency (MHz)	Height (cm)	Azimuth (deg)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
699.7	150	316	25.36	34.77	9.41	Pass	H
707.5	152	96	25.00	34.77	9.77	Pass	H
715.3	153	146	26.99	34.77	7.78	Pass	H
699.7	151	234	28.11	34.77	6.66	Pass	V
707.5	152	147	27.67	34.77	7.10	Pass	V
715.3	150	25	24.66	34.77	10.11	Pass	V

Channel Bandwidth: 3 MHz							
Frequency (MHz)	Height (cm)	Azimuth (deg)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
700.5	150	316	29.31	34.77	5.46	Pass	H
707.5	152	96	29.19	34.77	5.58	Pass	H
714.5	153	146	24.53	34.77	10.24	Pass	H
700.5	151	234	24.80	34.77	9.97	Pass	V
707.5	152	147	28.74	34.77	6.03	Pass	V
714.5	150	25	25.11	34.77	9.66	Pass	V

Channel Bandwidth: 5 MHz							
Frequency (MHz)	Height (cm)	Azimuth (deg)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.

701.5	150	316	28.15	34.77	6.62	Pass	H
707.5	152	96	25.64	34.77	9.13	Pass	H
713.5	153	146	26.46	34.77	8.31	Pass	H
701.5	151	234	25.06	34.77	9.71	Pass	V
707.5	152	147	25.44	34.77	9.33	Pass	V
713.5	150	25	25.68	34.77	9.09	Pass	V

Channel Bandwidth: 10 MHz							
Frequency (MHz)	Height (cm)	Azimuth (deg)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
704	150	316	27.88	34.77	6.89	Pass	H
707.5	152	96	28.76	34.77	6.01	Pass	H
711	153	146	25.60	34.77	9.17	Pass	H
704	151	234	24.48	34.77	10.29	Pass	V
707.5	152	147	27.45	34.77	7.32	Pass	V
711	150	25	28.42	34.77	6.35	Pass	V

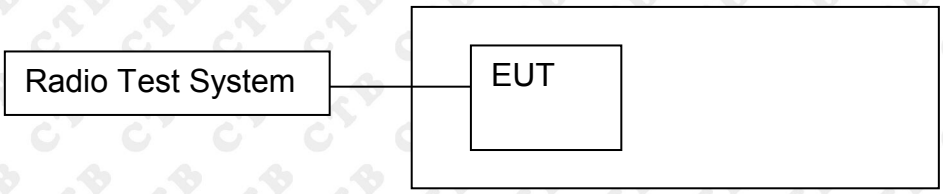
Band 13

Channel Bandwidth: 5 MHz							
Frequency (MHz)	Height (cm)	Azimuth (deg)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
779.5	150	316	28.61	34.77	6.16	Pass	H
782	152	96	24.52	34.77	10.25	Pass	H
784.5	153	146	28.93	34.77	5.84	Pass	H
779.5	151	234	24.77	34.77	10.00	Pass	V
782	152	147	29.38	34.77	5.39	Pass	V
784.5	150	25	25.74	34.77	9.03	Pass	V

Channel Bandwidth: 10 MHz							
Frequency (MHz)	Height (cm)	Azimuth (deg)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
782	150	316	24.54	34.77	10.23	Pass	H
782	152	96	26.74	34.77	8.03	Pass	H
782	153	146	25.26	34.77	9.51	Pass	H
782	151	234	27.94	34.77	6.83	Pass	V
782	152	147	25.69	34.77	9.08	Pass	V
782	150	25	27.59	34.77	7.18	Pass	V

8. PEAK-TO-AVERAGE RATIO

8.1 Block Diagram Of Test Setup



8.2 Limit

13dBm

8.3 Test procedure

Use one of the procedures to measure the total peak power and record as PPk. Use one of the applicable procedures to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

PAPR (dB) = PPk (dBm) - PAvg (dBm)

7.4 Test Result

Band 12
Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio (dB)	Limit (dB)	Verdict
		Size	Offset			
QPSK	LCH	6	0	10.31	<13	PASS
	MCH	6	0	10.07	<13	PASS
	HCH	6	0	11.65	<13	PASS
16QAM	LCH	5	0	10.42	<13	PASS
	MCH	5	0	9.98	<13	PASS
	HCH	5	0	12.07	<13	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	11.57	<13	PASS
	MCH	6	0	9.95	<13	PASS
	HCH	6	0	9.53	<13	PASS
16QAM	LCH	5	0	11.86	<13	PASS
	MCH	5	0	11.35	<13	PASS
	HCH	5	0	10.35	<13	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	10.30	<13	PASS
	MCH	6	0	9.73	<13	PASS
	HCH	6	0	9.33	<13	PASS
16QAM	LCH	5	0	11.20	<13	PASS
	MCH	5	0	10.43	<13	PASS
	HCH	5	0	10.03	<13	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	8.85	<13	PASS
	MCH	6	0	10.06	<13	PASS
	HCH	6	0	10.34	<13	PASS
16QAM	LCH	5	0	10.07	<13	PASS
	MCH	5	0	10.91	<13	PASS
	HCH	5	0	9.34	<13	PASS

Band 13
Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	9.40	<13	PASS
	MCH	6	0	10.46	<13	PASS
	HCH	6	0	10.11	<13	PASS
16QAM	LCH	5	0	10.19	<13	PASS
	MCH	5	0	10.23	<13	PASS
	HCH	5	0	10.34	<13	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	10.23	<13	PASS
	MCH	6	0	10.02	<13	PASS
	HCH	6	0	10.41	<13	PASS
16QAM	LCH	5	0	9.91	<13	PASS
	MCH	5	0	8.79	<13	PASS
	HCH	5	0	9.59	<13	PASS

Test Graphs Band 12
Channel Bandwidth: 1.4 MHz

(Channel Bandwidth: 1.4 MHz)_LCH_QPSK_6RB#0

(Channel Bandwidth: 1.4 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 1.4 MHz)_HCH_QPSK_6RB#0

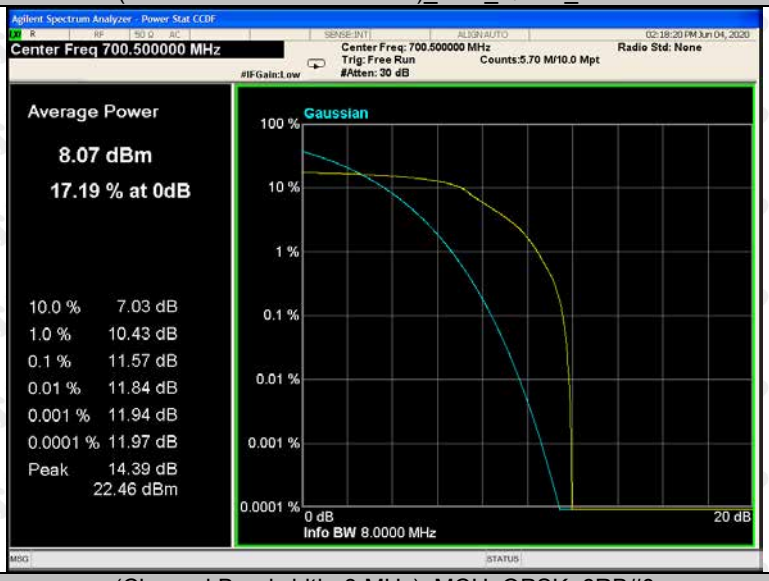
(Channel Bandwidth: 1.4 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 1.4 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 1.4 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 3 MHz

(Channel Bandwidth: 3 MHz)_LCH_QPSK_6RB#0



(Channel Bandwidth: 3 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 3 MHz)_HCH_QPSK_6RB#0

(Channel Bandwidth: 3 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 3 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 3 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 5 MHz

(Channel Bandwidth: 5 MHz)_LCH_QPSK_6RB#0

(Channel Bandwidth: 5 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 5 MHz)_HCH_QPSK_6RB#0

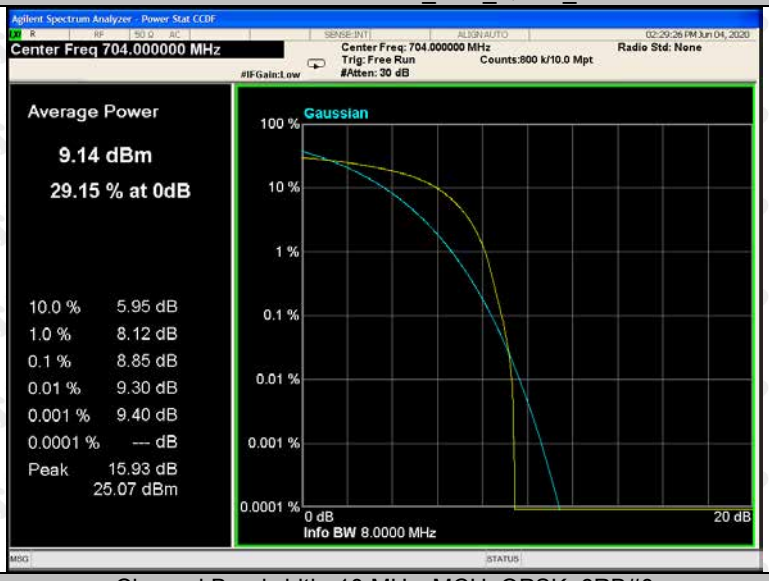
(Channel Bandwidth: 5 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 5 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 5 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz_LCH_QPSK_6RB#0



Channel Bandwidth: 10 MHz_MCH_QPSK_6RB#0

Channel Bandwidth: 10 MHz_HCH_QPSK_6RB#0

Channel Bandwidth: 10 MHz_LCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_MCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_HCH_16QAM_5RB#0

Band 13
Channel Bandwidth: 5 MHz

(Channel Bandwidth: 5 MHz)_LCH_QPSK_6RB#0

(Channel Bandwidth: 5 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 5 MHz)_HCH_QPSK_6RB#0

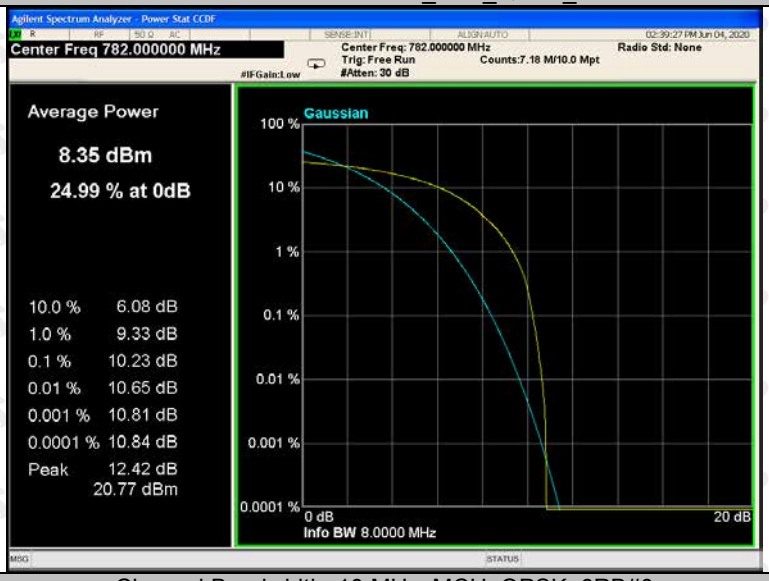
(Channel Bandwidth: 5 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 5 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 5 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz_LCH_QPSK_6RB#0



Channel Bandwidth: 10 MHz_MCH_QPSK_6RB#0

Channel Bandwidth: 10 MHz_HCH_QPSK_6RB#0

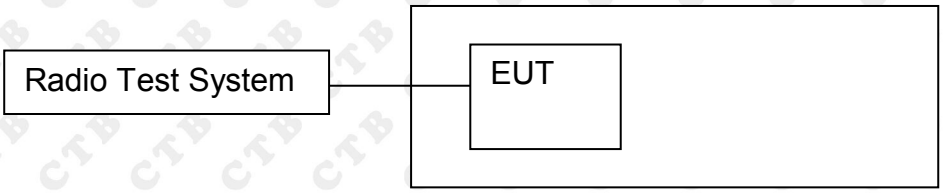
Channel Bandwidth: 10 MHz_LCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_MCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_HCH_16QAM_5RB#0

9. 99% &26DBOCCUPIED BANDWIDTH

9.1 Block Diagram Of Test Setup



9.2 Limit

N/A

9.3 Test procedure

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12/13 .
99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

9.4 Test Result

Band 12

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1045	1.320	PASS
	MCH	6	0	1.1094	1.313	PASS
	HCH	6	0	1.1031	1.311	PASS
16QAM	LCH	5	0	0.9401	1.182	PASS
	MCH	5	0	0.9332	1.191	PASS
	HCH	5	0	0.9400	1.158	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1305	1.611	PASS
	MCH	6	0	1.1257	1.568	PASS
	HCH	6	0	1.1427	1.645	PASS
16QAM	LCH	5	0	0.9672	1.315	PASS
	MCH	5	0	0.9532	1.313	PASS
	HCH	5	0	0.9700	1.335	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1300	1.563	PASS
	MCH	6	0	1.1253	1.465	PASS
	HCH	6	0	1.1268	1.415	PASS
16QAM	LCH	5	0	0.9748	1.388	PASS
	MCH	5	0	0.9587	1.353	PASS
	HCH	5	0	0.9718	1.352	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1421	1.648	PASS
	MCH	6	0	1.1422	1.669	PASS
	HCH	6	0	1.1460	1.625	PASS
16QAM	LCH	5	0	1.0204	1.601	PASS
	MCH	5	0	1.0139	1.645	PASS
	HCH	5	0	1.0222	1.570	PASS

Band 13
Channel Bandwidth: 5 MHz

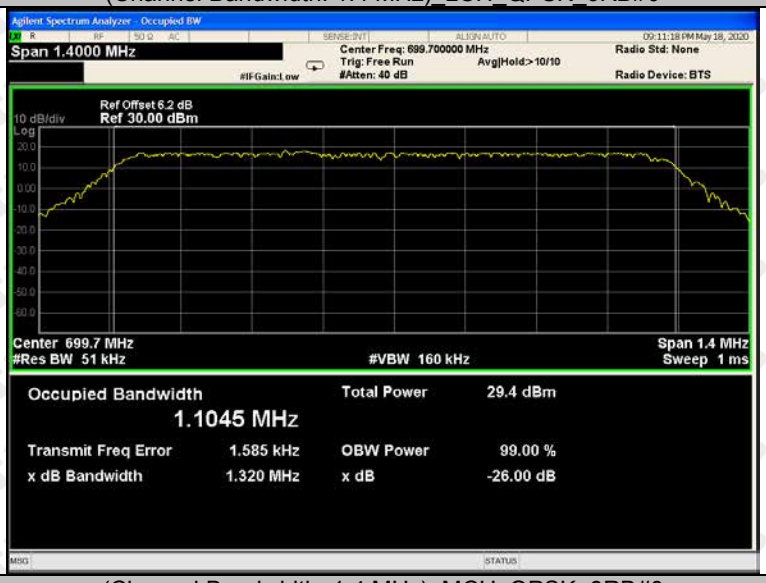
Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1328	1.478	PASS
	MCH	6	0	1.1354	1.455	PASS
	HCH	6	0	1.1365	1.472	PASS
16QAM	LCH	5	0	0.9722	1.374	PASS
	MCH	5	0	0.9740	1.397	PASS
	HCH	5	0	0.9611	1.338	PASS

Channel Bandwidth: 10 MHz

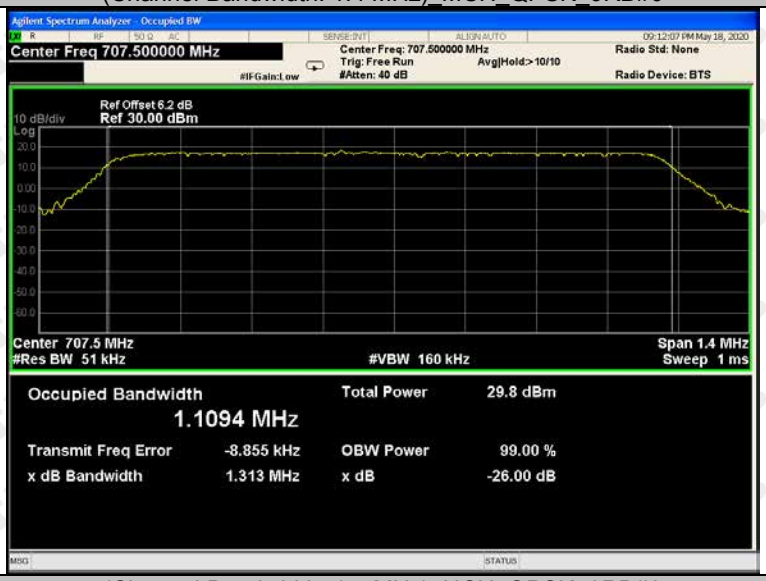
Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1418	1.690	PASS
	MCH	6	0	1.1424	1.672	PASS
	HCH	6	0	1.1412	1.619	PASS
16QAM	LCH	5	0	1.0137	1.497	PASS
	MCH	5	0	1.0260	1.592	PASS
	HCH	5	0	1.0318	1.569	PASS

Test Graphs Band 12
Channel Bandwidth: 1.4 MHz

(Channel Bandwidth: 1.4 MHz)_LCH_QPSK_6RB#0



(Channel Bandwidth: 1.4 MHz)_MCH_QPSK_6RB#0



(Channel Bandwidth: 1.4 MHz)_HCH_QPSK_6RB#0

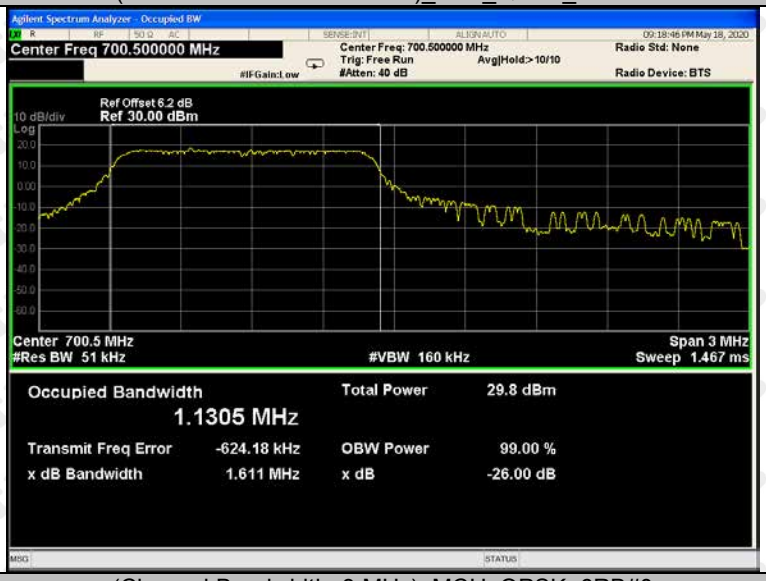
(Channel Bandwidth: 1.4 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 1.4 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 1.4 MHz)_HCH_16QAM_5RB#0

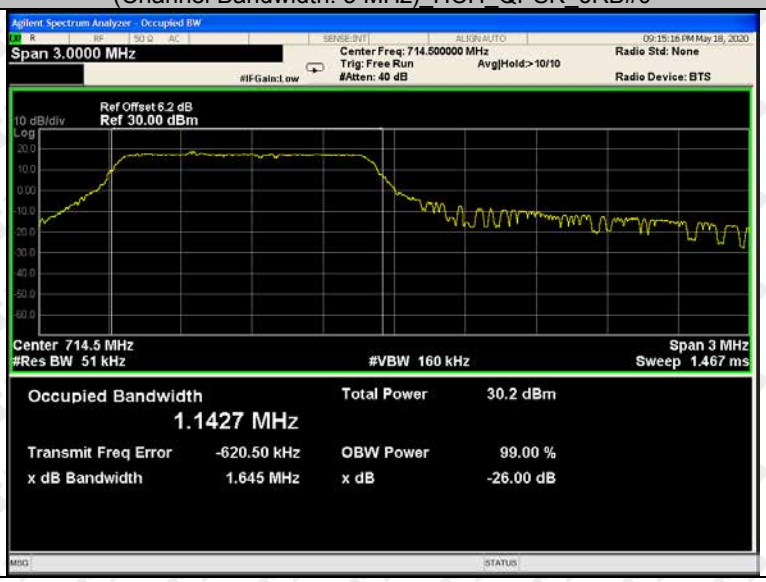
Channel Bandwidth: 3 MHz

(Channel Bandwidth: 3 MHz)_LCH_QPSK_6RB#0



(Channel Bandwidth: 3 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 3 MHz)_HCH_QPSK_6RB#0



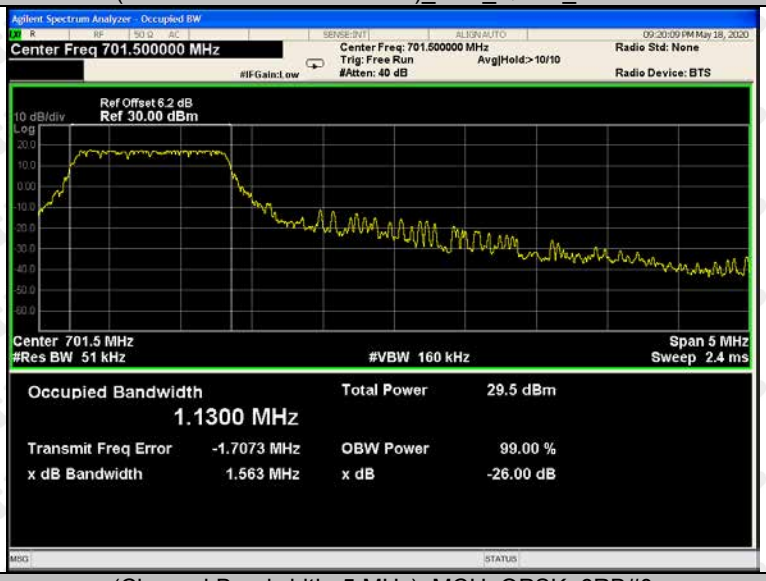
(Channel Bandwidth: 3 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 3 MHz)_MCH_16QAM_5RB#0

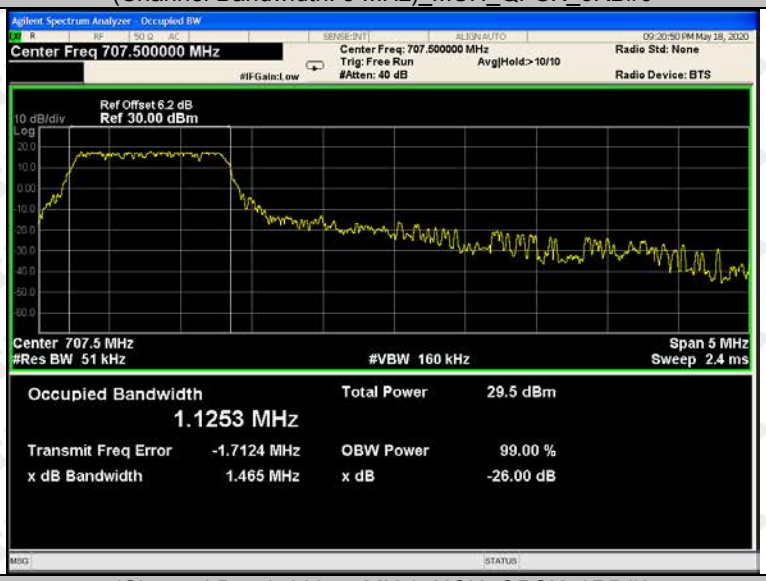
(Channel Bandwidth: 3 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 5 MHz

(Channel Bandwidth: 5 MHz)_LCH_QPSK_6RB#0



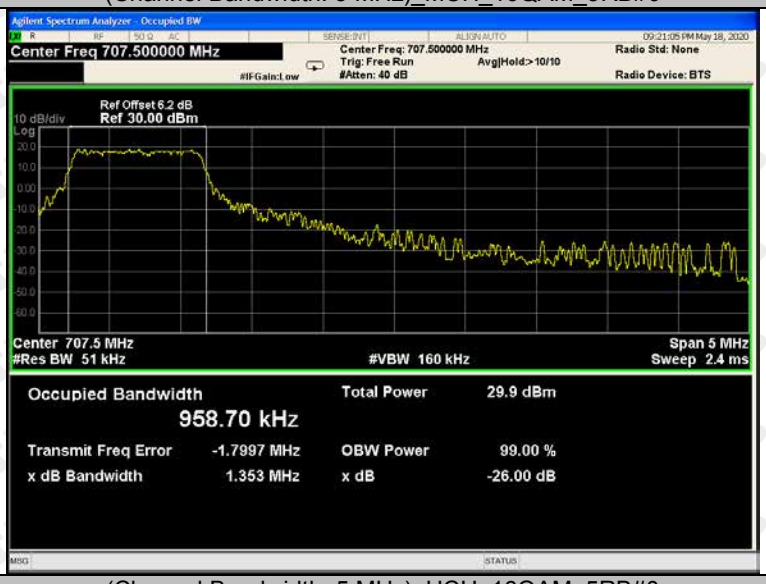
(Channel Bandwidth: 5 MHz)_MCH_QPSK_6RB#0



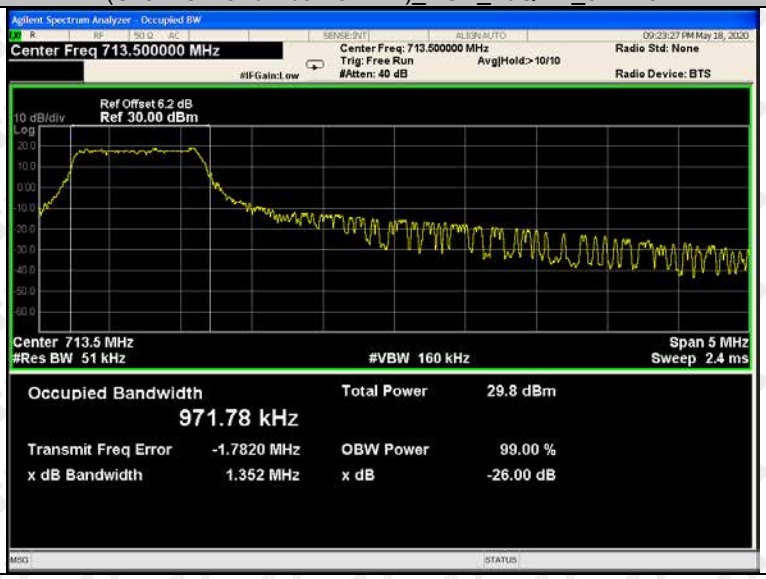
(Channel Bandwidth: 5 MHz)_HCH_QPSK_6RB#0

(Channel Bandwidth: 5 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 5 MHz)_MCH_16QAM_5RB#0



(Channel Bandwidth: 5 MHz)_HCH_16QAM_5RB#0



Channel Bandwidth: 10 MHz

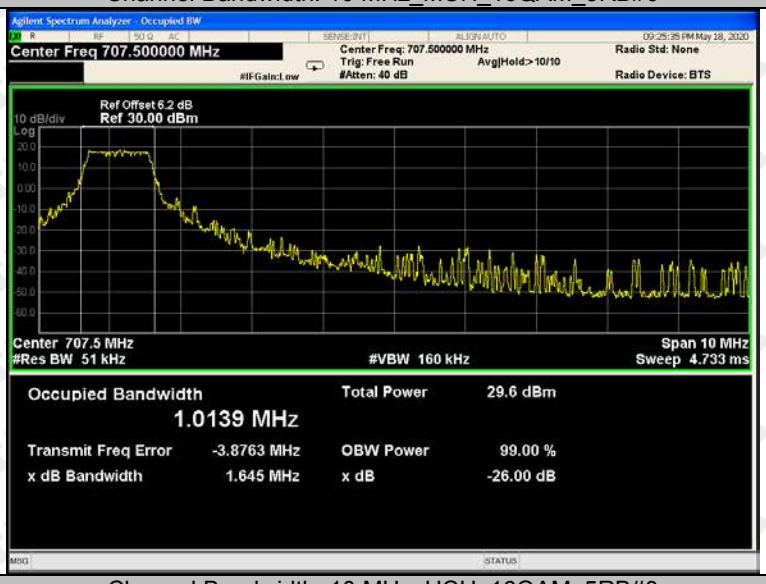
Channel Bandwidth: 10 MHz_LCH_QPSK_6RB#0

Channel Bandwidth: 10 MHz_MCH_QPSK_6RB#0

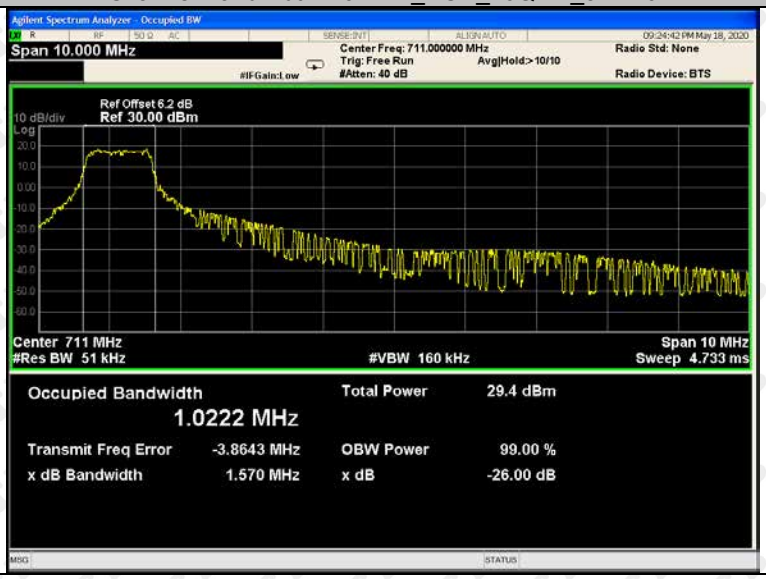
Channel Bandwidth: 10 MHz_HCH_QPSK_6RB#0

Channel Bandwidth: 10 MHz_LCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_MCH_16QAM_5RB#0



Channel Bandwidth: 10 MHz_HCH_16QAM_5RB#0



Band 13
Channel Bandwidth: 5 MHz

(Channel Bandwidth: 5 MHz)_LCH_QPSK_6RB#0

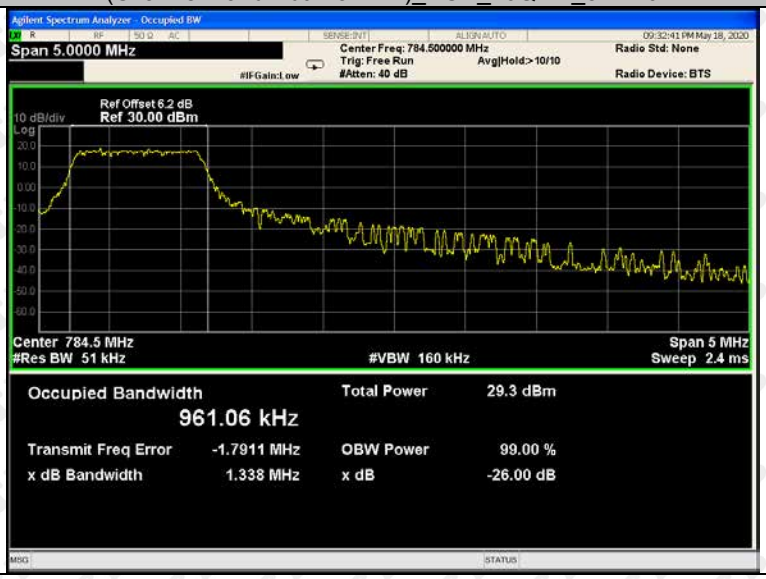
(Channel Bandwidth: 5 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 5 MHz)_HCH_QPSK_6RB#0

(Channel Bandwidth: 5 MHz)_LCH_16QAM_5RB#0

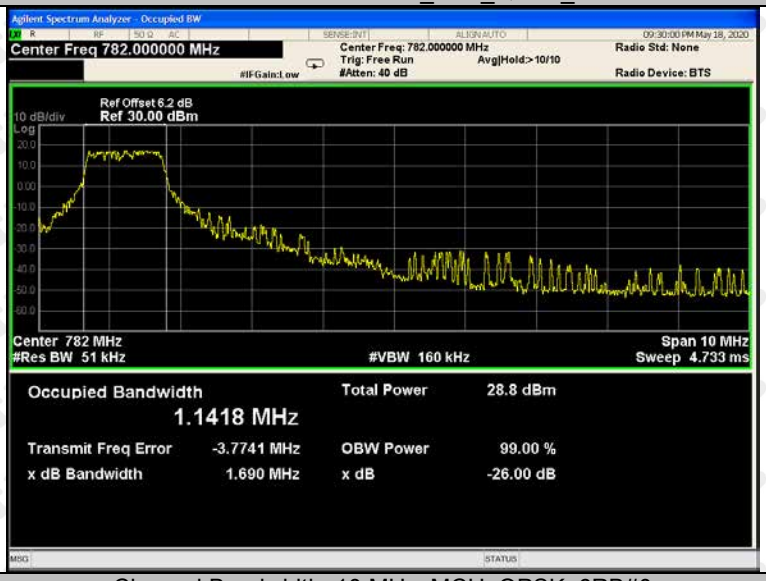
(Channel Bandwidth: 5 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 5 MHz)_HCH_16QAM_5RB#0



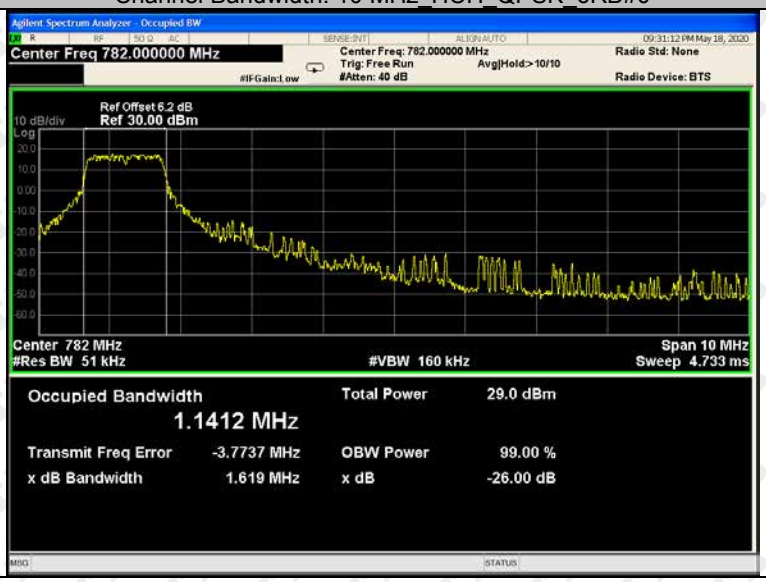
Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz_LCH_QPSK_6RB#0



Channel Bandwidth: 10 MHz_MCH_QPSK_6RB#0

Channel Bandwidth: 10 MHz_HCH_QPSK_6RB#0



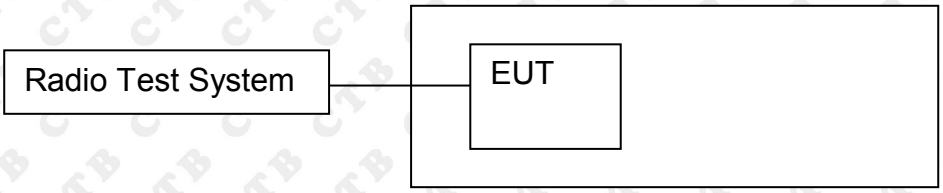
Channel Bandwidth: 10 MHz_LCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_MCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_HCH_16QAM_5RB#0

10. BAND EDGE AT ANTENNA TERMINALS

10.1 Block Diagram Of Test Setup



10.2 Limit

(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Example:
The limit line is derived from 43 + 10log (P) dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB)
= [30 + 10log (P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.

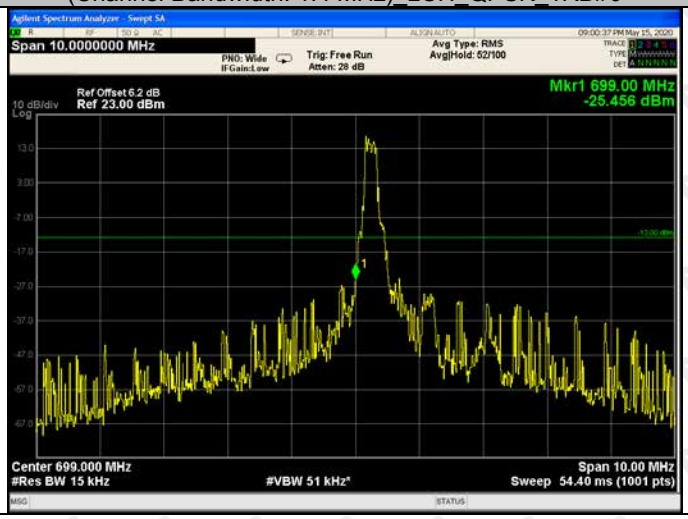
10.3 Test procedure

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured.
The testing follows KDB 971168 v02r02 Section 6.0
1.The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. For LTE Band 41 Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
RBW is set to 51 kHz, VBW is set to 51 kHz for LTE Band 4/12/13 on spectrum analyzer.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. Checked that all the results comply with the emission limit line.

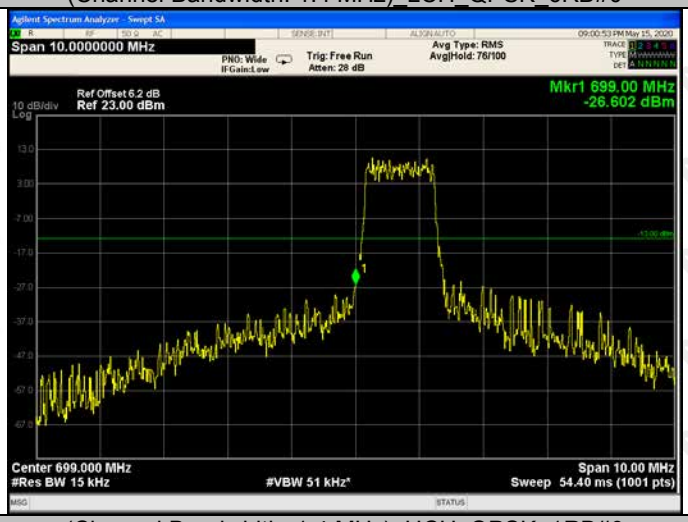
10.4 Test Result

Test Graphs Band 12 Channel Bandwidth: 1.4 MHz

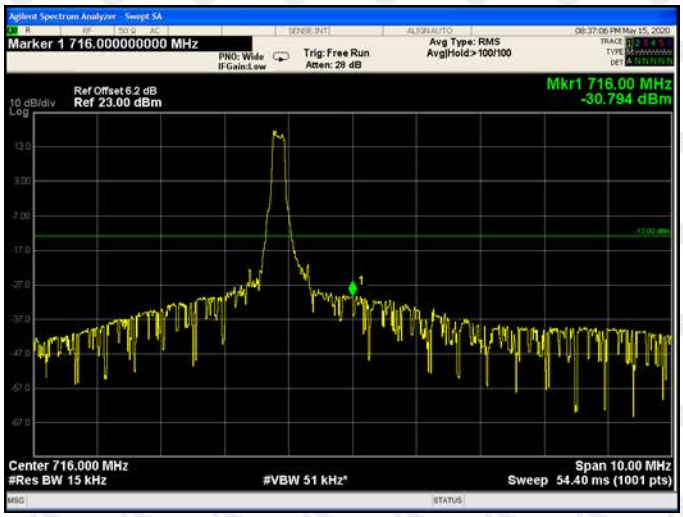
(Channel Bandwidth: 1.4 MHz)_LCH_QPSK_1RB#0



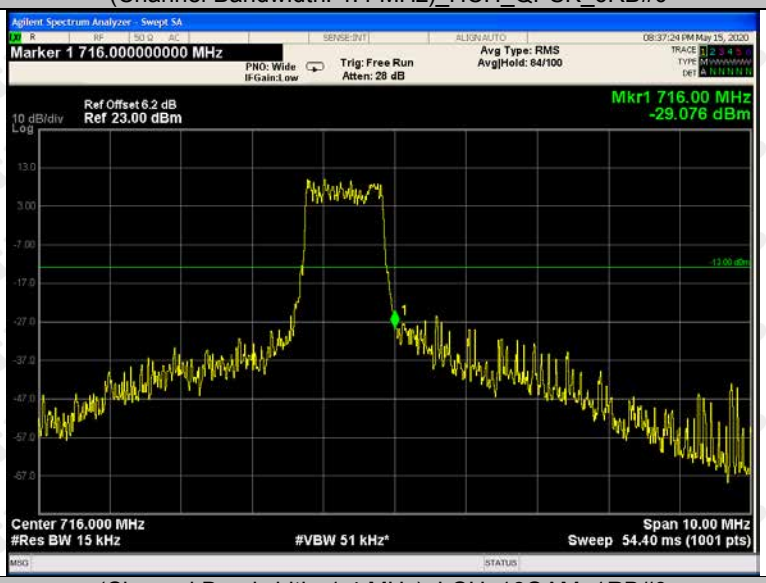
(Channel Bandwidth: 1.4 MHz)_LCH_QPSK_6RB#0



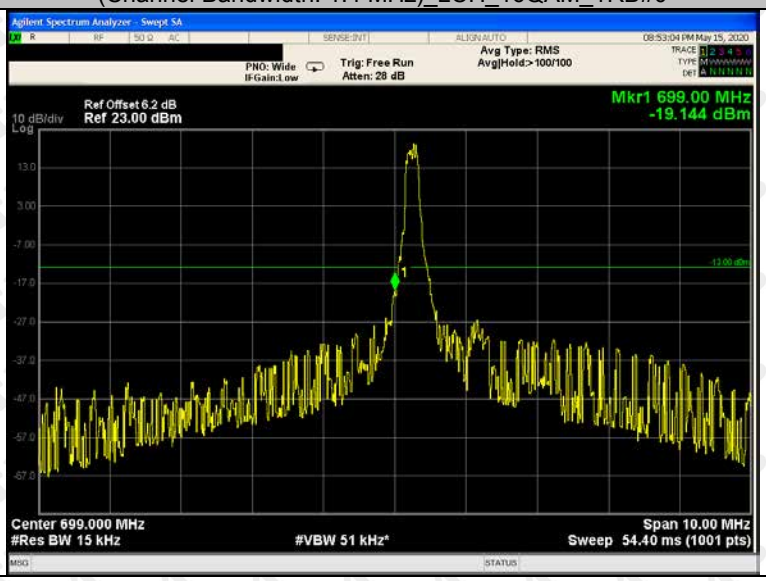
(Channel Bandwidth: 1.4 MHz)_HCH_QPSK_1RB#0



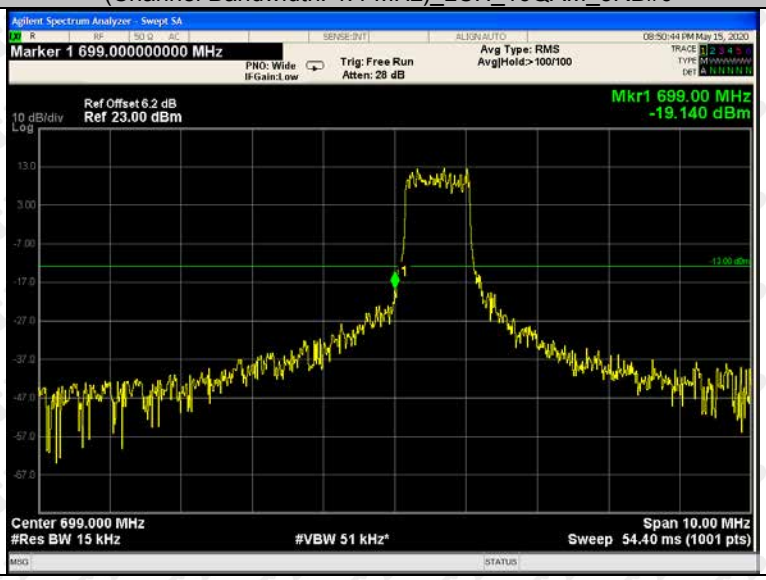
(Channel Bandwidth: 1.4 MHz)_HCH_QPSK_6RB#0



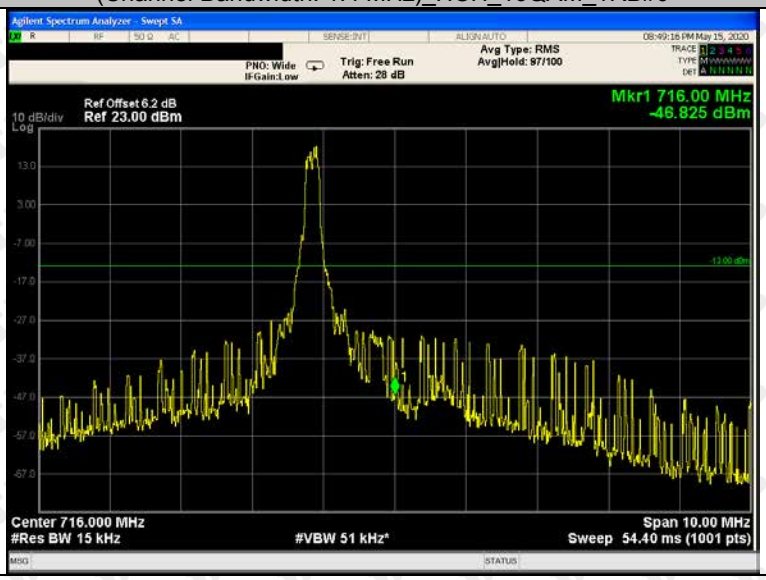
(Channel Bandwidth: 1.4 MHz)_LCH_16QAM_1RB#0



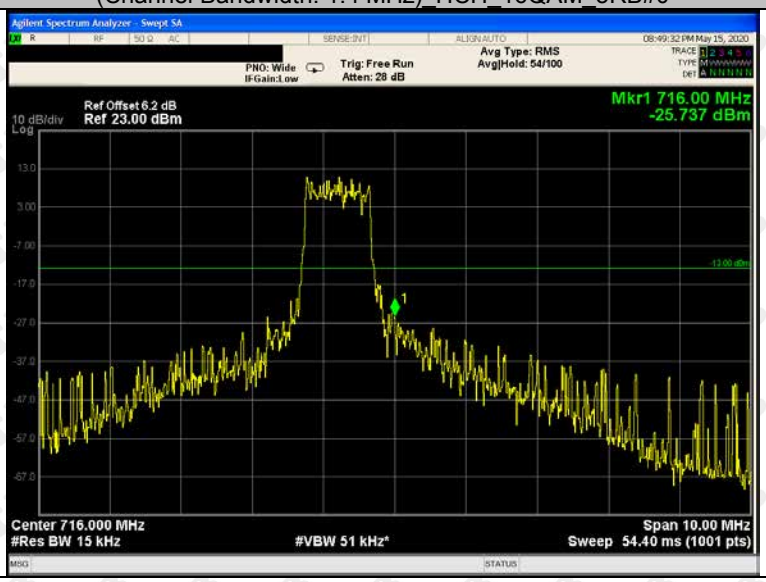
(Channel Bandwidth: 1.4 MHz)_LCH_16QAM_5RB#0



(Channel Bandwidth: 1.4 MHz)_HCH_16QAM_1RB#0

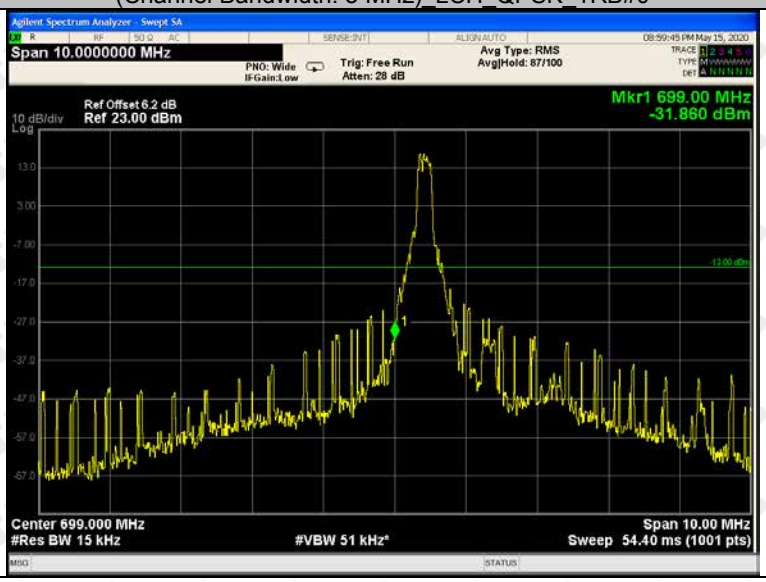


(Channel Bandwidth: 1.4 MHz)_HCH_16QAM_5RB#0

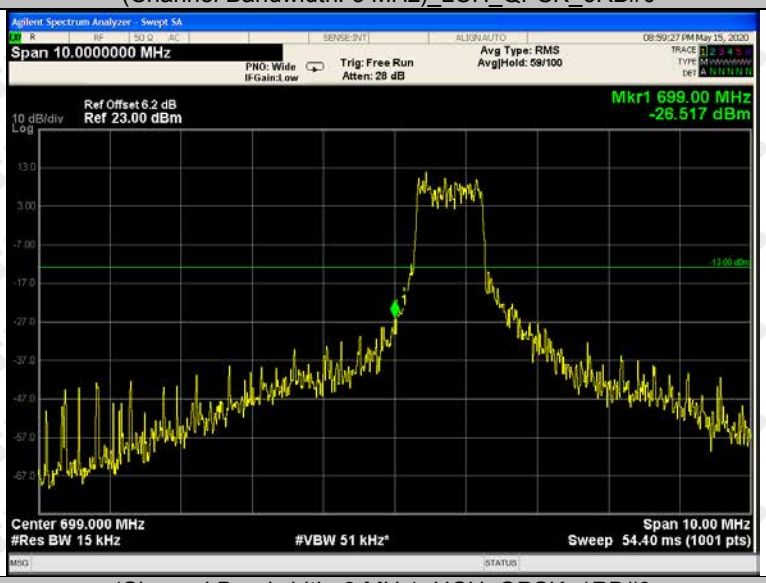


Channel Bandwidth: 3 MHz

(Channel Bandwidth: 3 MHz)_LCH_QPSK_1RB#0

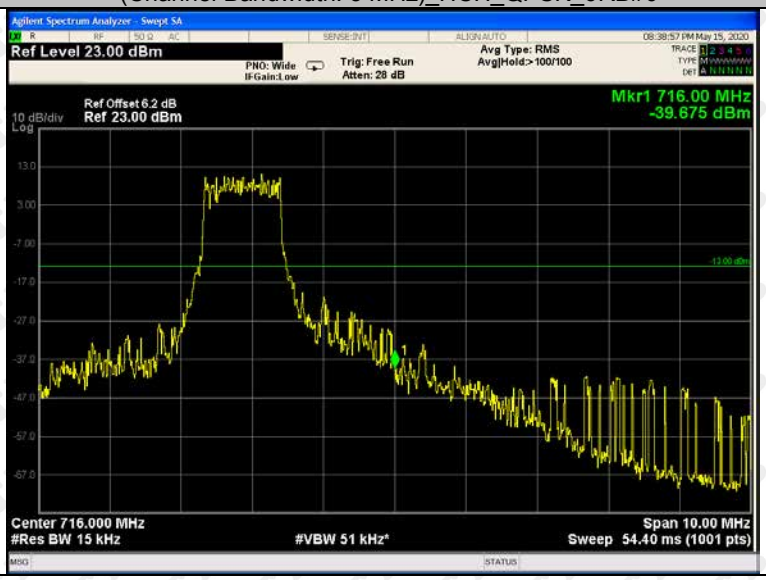


(Channel Bandwidth: 3 MHz)_LCH_QPSK_6RB#0

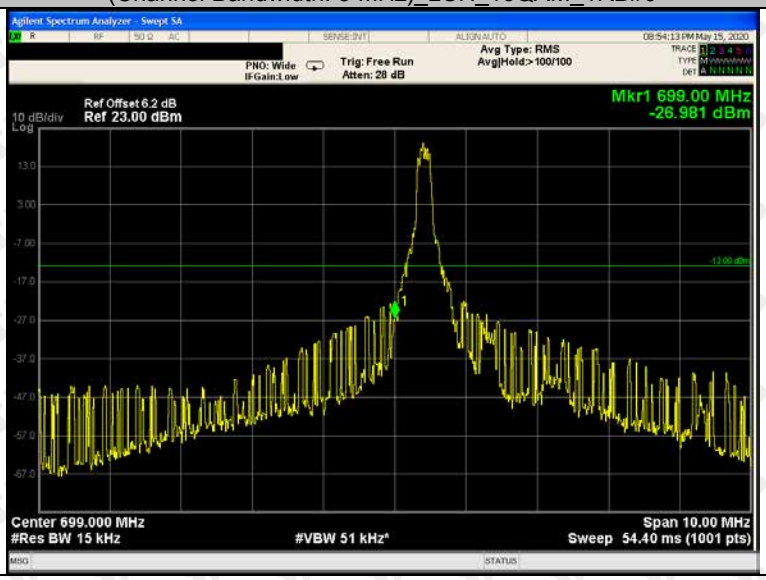


(Channel Bandwidth: 3 MHz)_HCH_QPSK_1RB#0

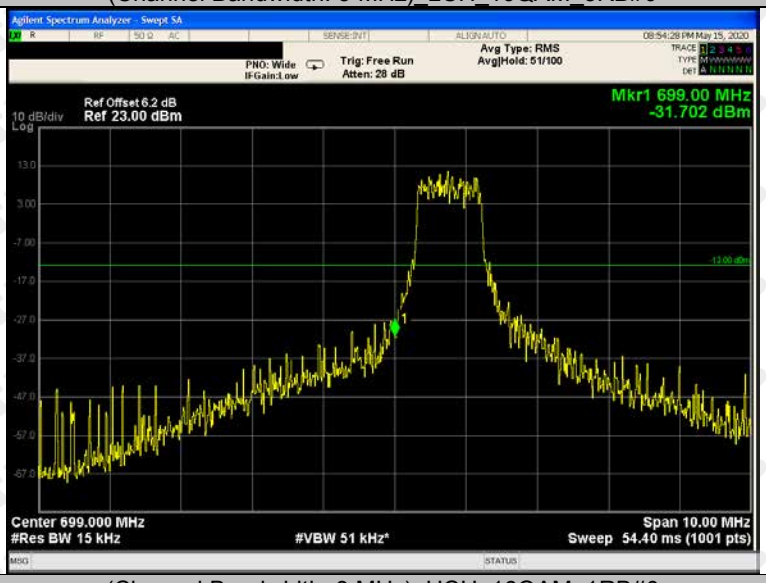
(Channel Bandwidth: 3 MHz)_HCH_QPSK_6RB#0



(Channel Bandwidth: 3 MHz)_LCH_16QAM_1RB#0

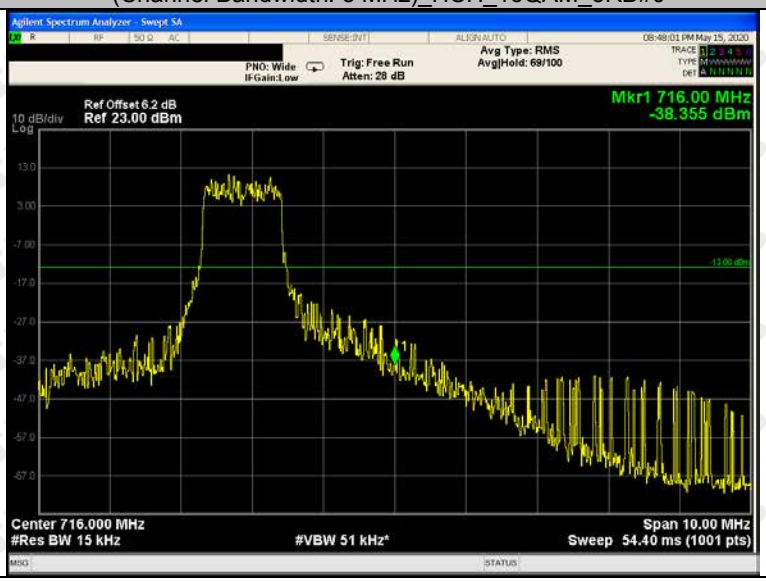


(Channel Bandwidth: 3 MHz)_LCH_16QAM_5RB#0



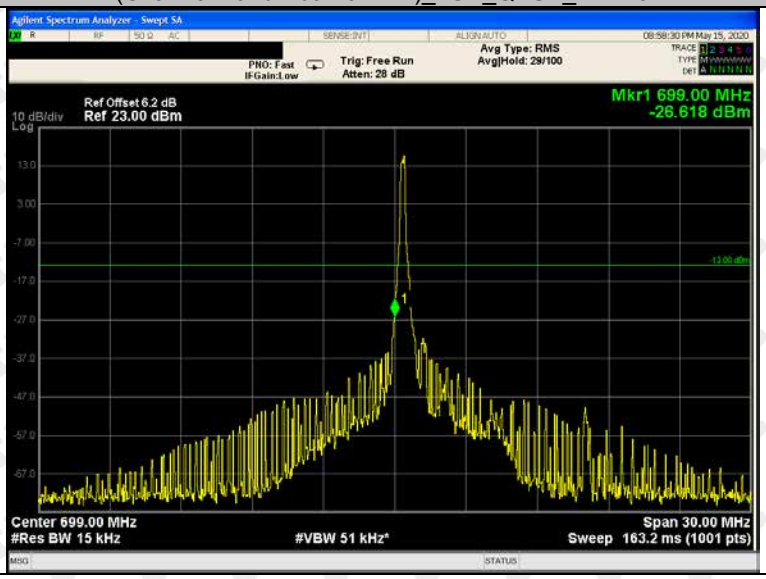
(Channel Bandwidth: 3 MHz)_HCH_16QAM_1RB#0

(Channel Bandwidth: 3 MHz)_HCH_16QAM_5RB#0

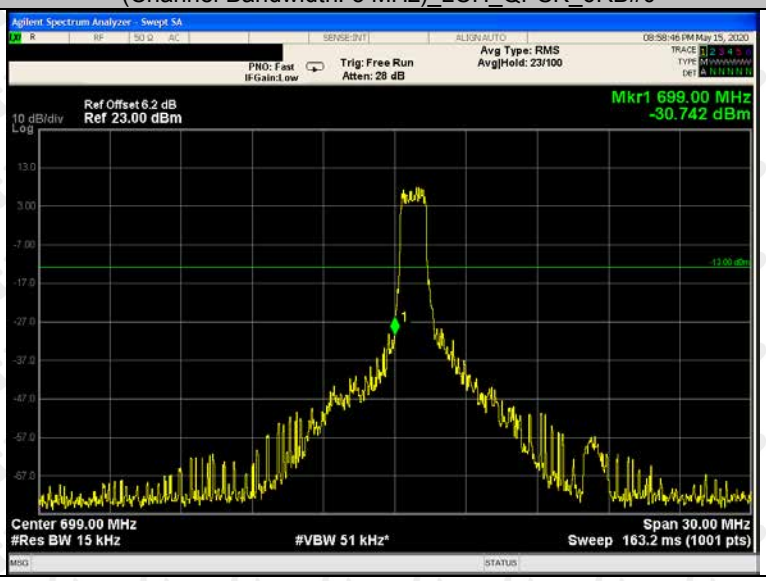


Channel Bandwidth: 5 MHz

(Channel Bandwidth: 5 MHz)_LCH_QPSK_1RB#0



(Channel Bandwidth: 5 MHz)_LCH_QPSK_6RB#0



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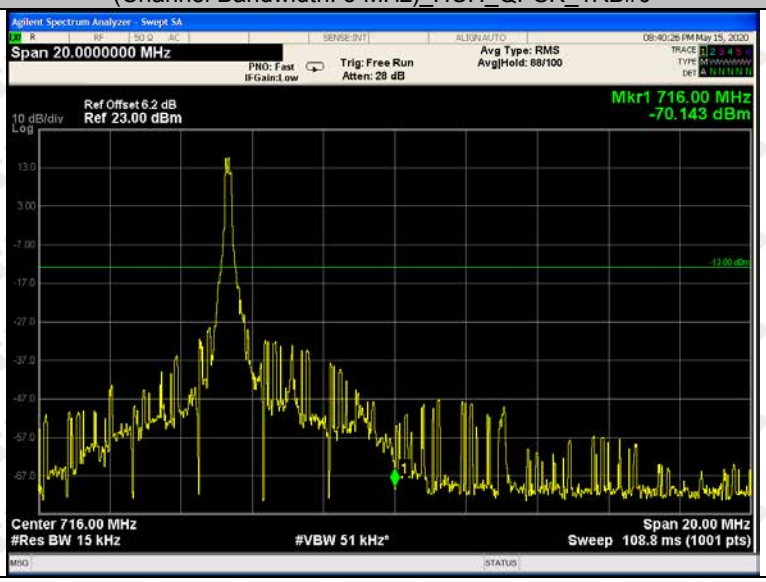
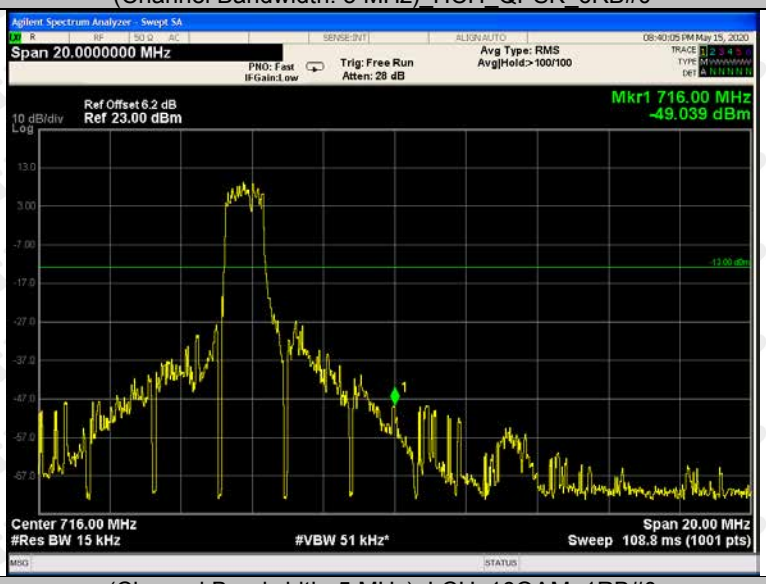
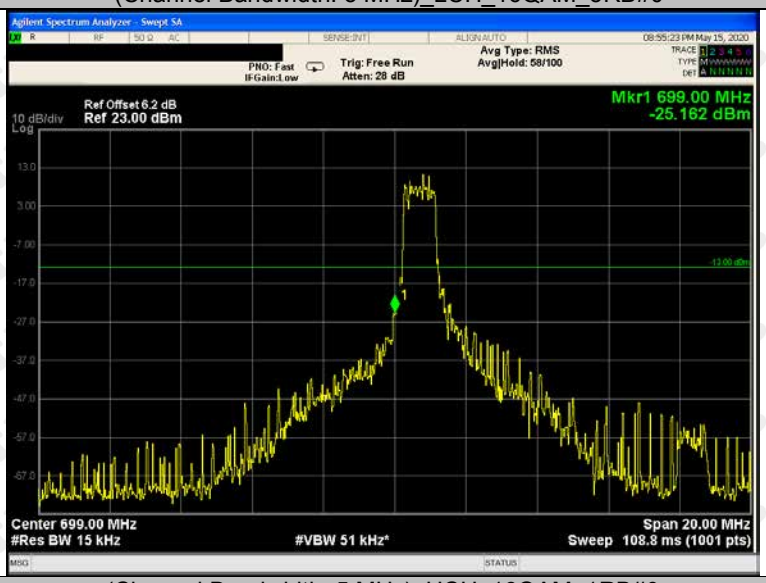


(Channel Bandwidth: 5 MHz)_HCH_QPSK_6RB#0



(Channel Bandwidth: 5 MHz)_LCH_16QAM_1RB#0

(Channel Bandwidth: 5 MHz)_LCH_16QAM_5RB#0



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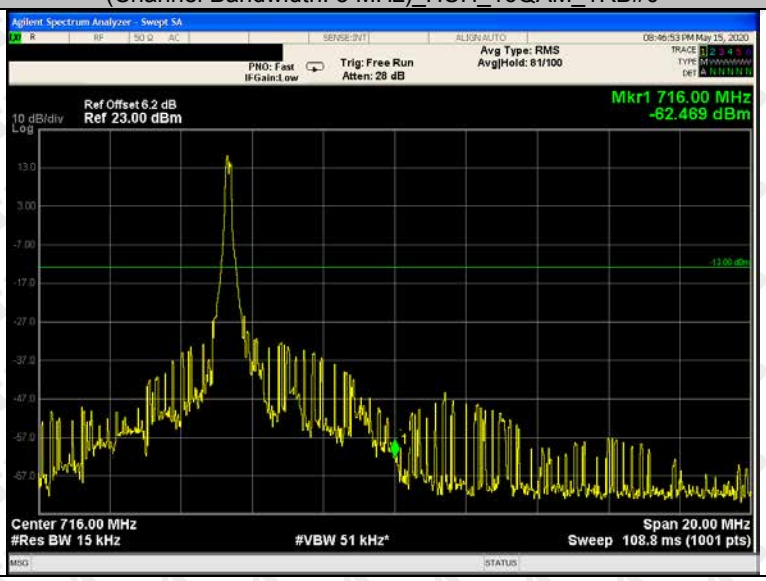
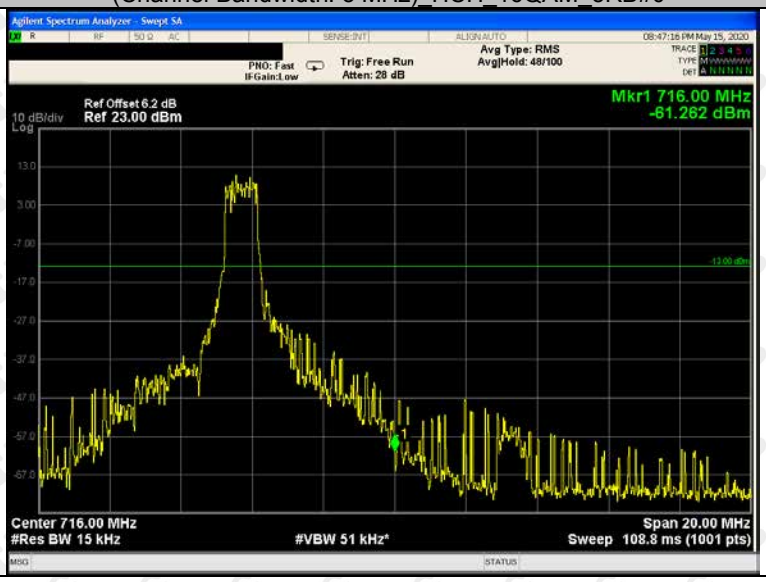
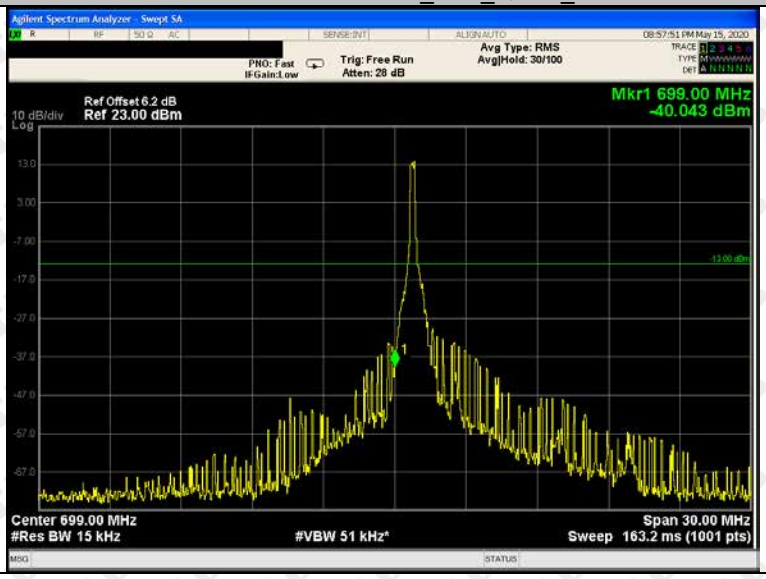


(Channel Bandwidth: 5 MHz)_HCH_16QAM_5RB#0



Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz_LCH_QPSK_1RB#0



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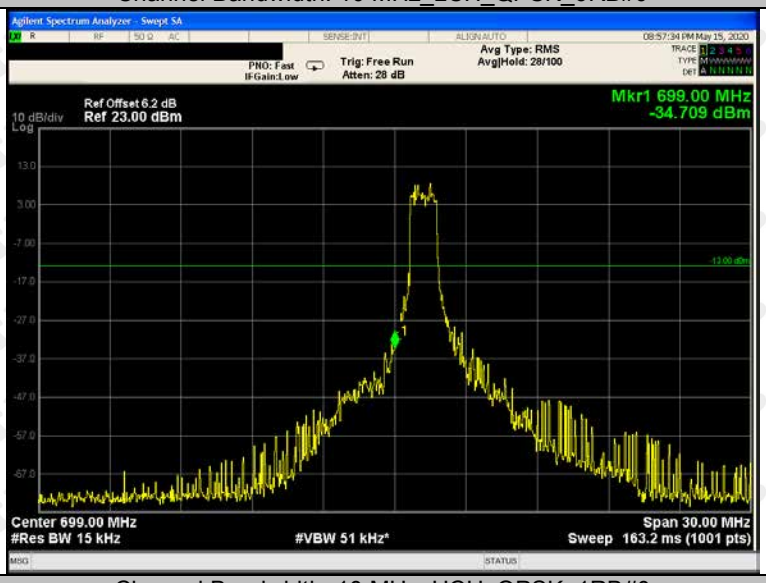
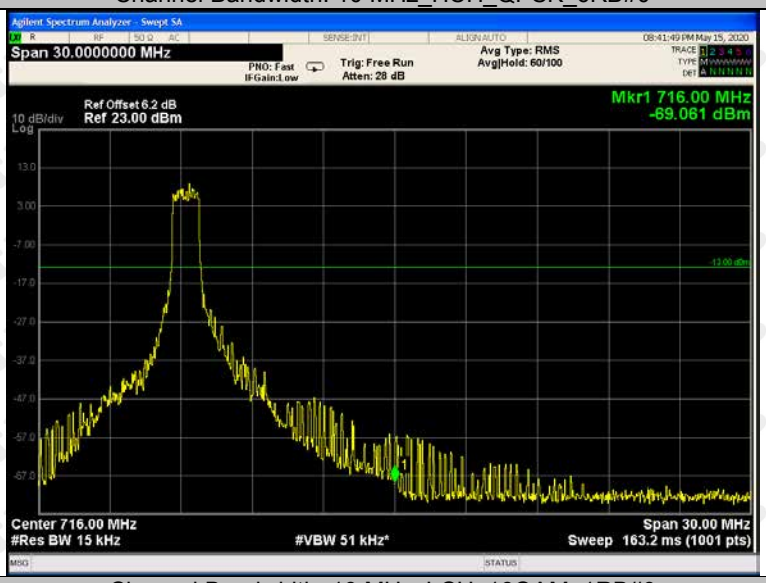


Channel Bandwidth: 10 MHz_HCH_QPSK_1RB#0

Channel Bandwidth: 10 MHz_HCH_QPSK_6RB#0



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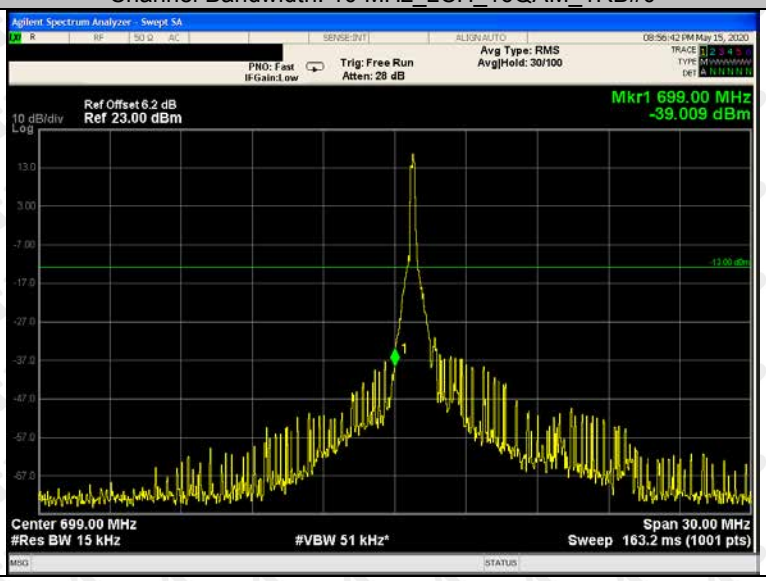
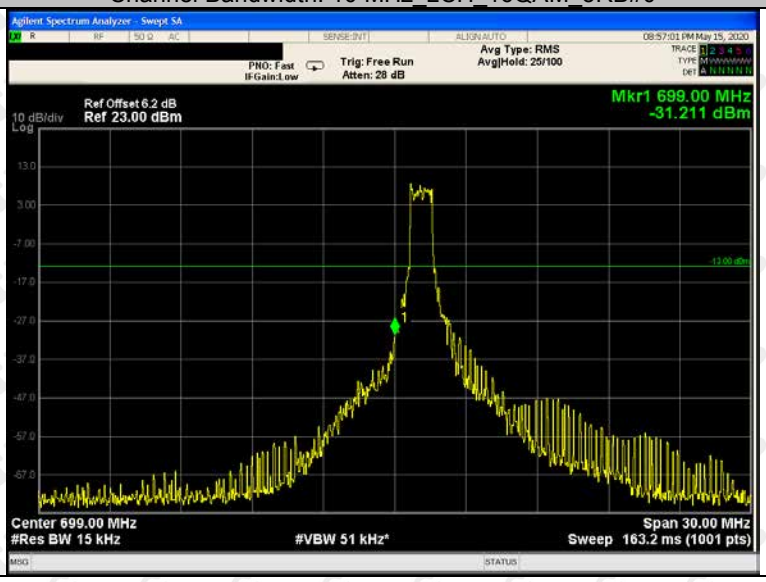
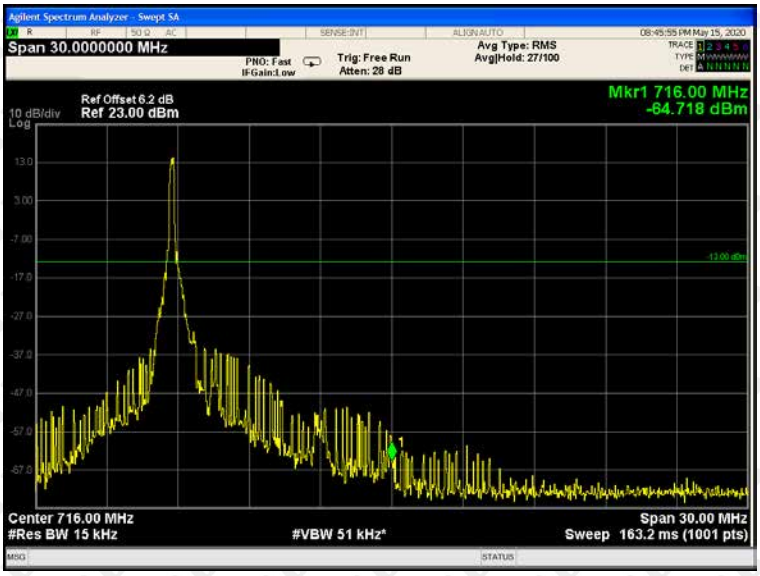


Channel Bandwidth: 10 MHz_LCH_16QAM_5RB#0



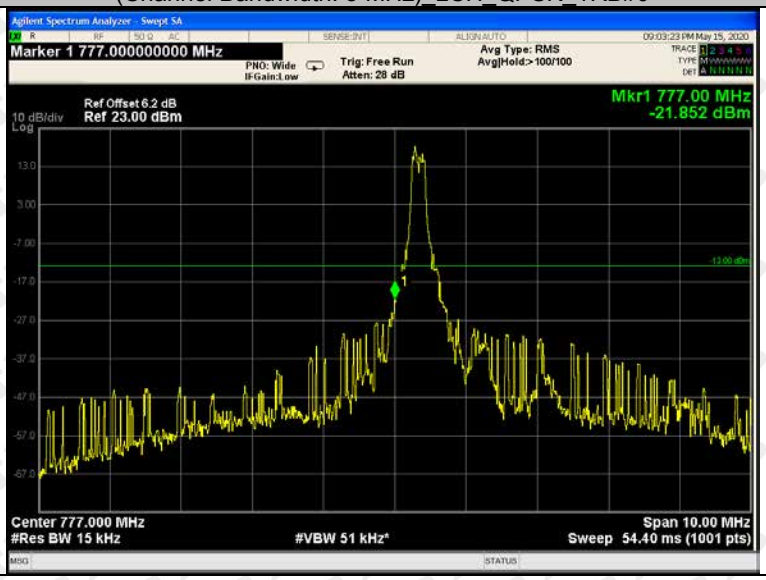
Channel Bandwidth: 10 MHz_HCH_16QAM_1RB#0

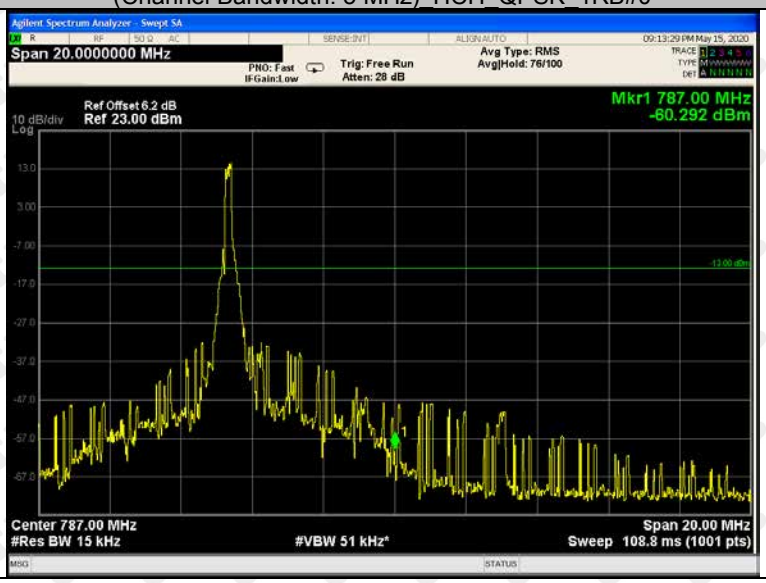


Channel Bandwidth: 10 MHz_HCH_16QAM_5RB#0

Test Graphs Band 13 Channel Bandwidth: 5 MHz
Channel Bandwidth: 5 MHz

(Channel Bandwidth: 5 MHz)_LCH_QPSK_1RB#0



(Channel Bandwidth: 5 MHz)_LCH_QPSK_6RB#0

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