

HCH



LTE_Band 4_Channel Bandwidth: 3 MHz_15RB#0

QPSK

16QAM

LCH



HCH



LTE_Band 4_Channel Bandwidth: 5 MHz_25RB#0

QPSK

16QAM

LCH



HCH

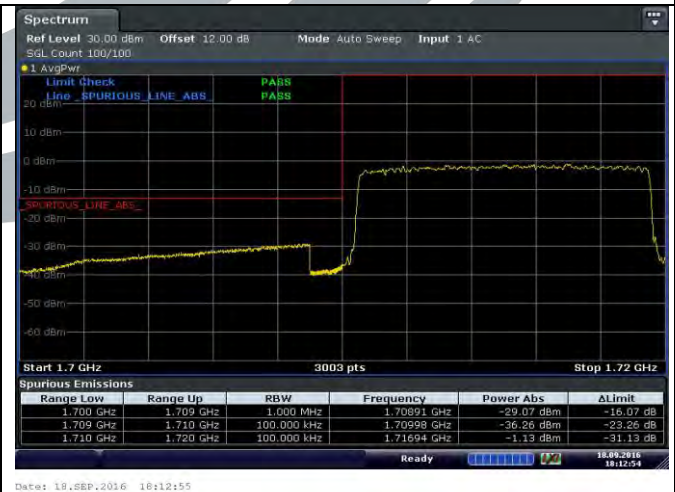
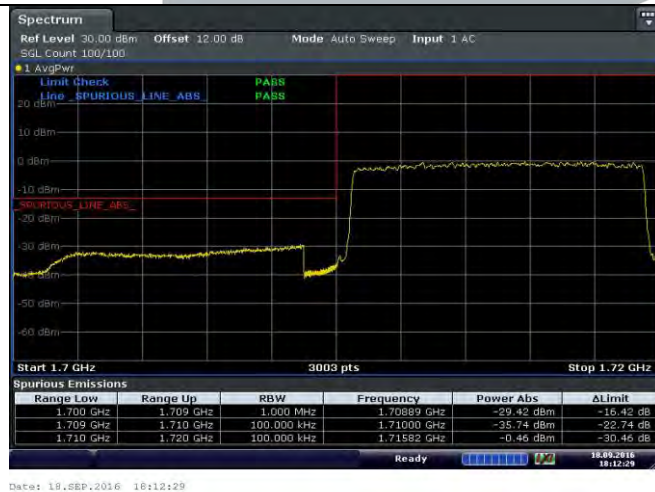


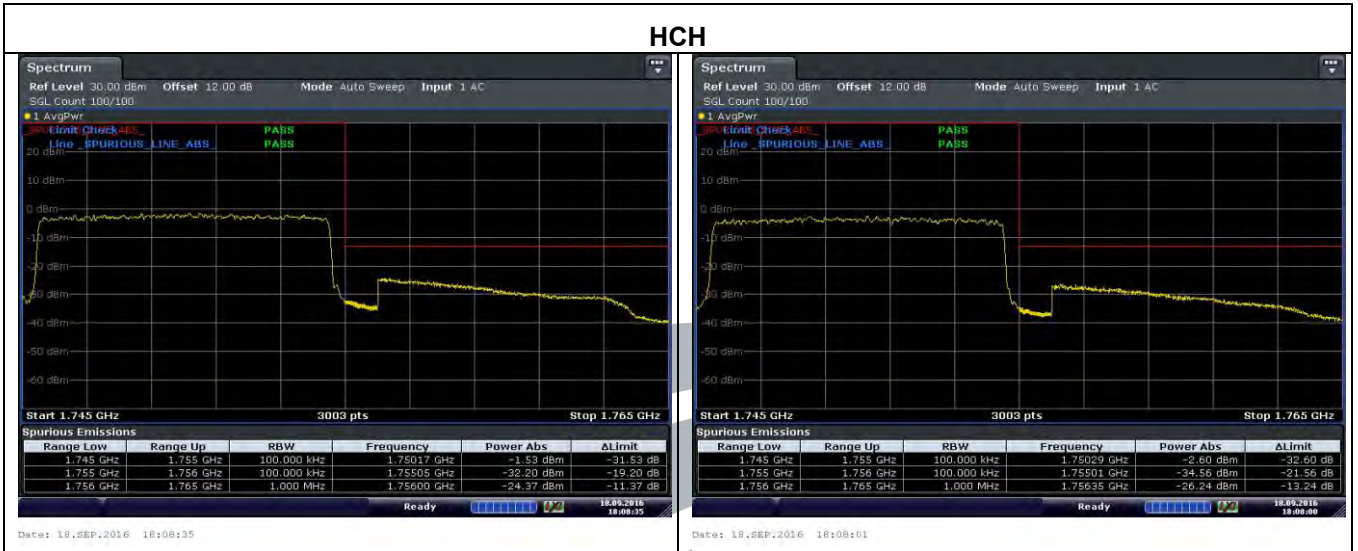
LTE_Band 4_Channel Bandwidth: 10 MHz_50RB#0

QPSK

16QAM

LCH





LTE_Band 4_Channel Bandwidth: 15 MHz_75RB#0

QPSK

16QAM



LTE_Band 4_Channel Bandwidth: 20 MHz_100RB#0

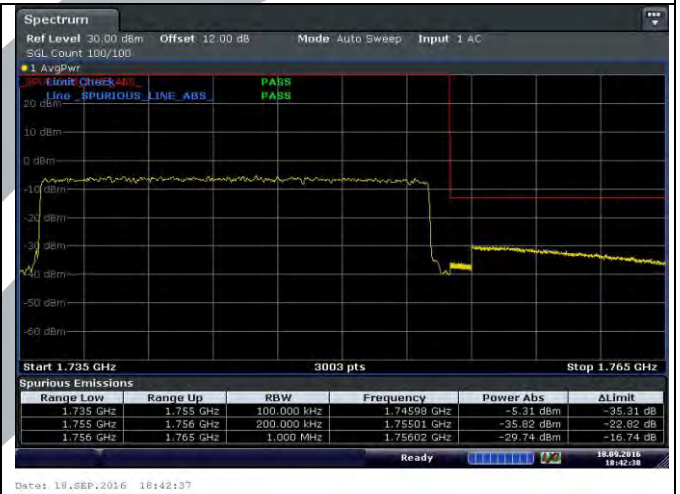
QPSK

16QAM

LCH



HCH

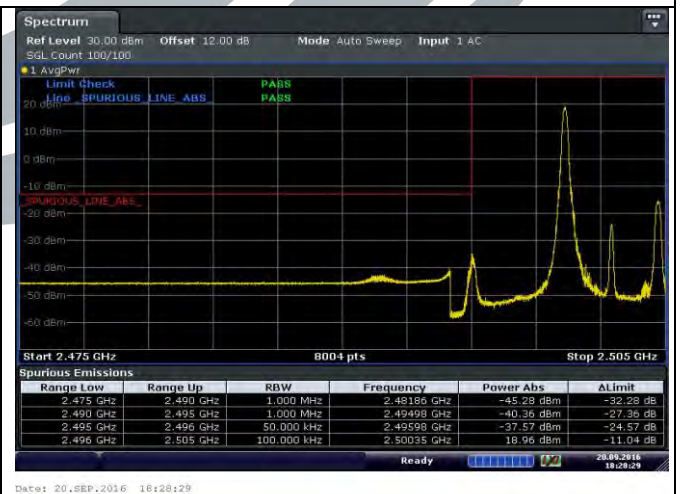
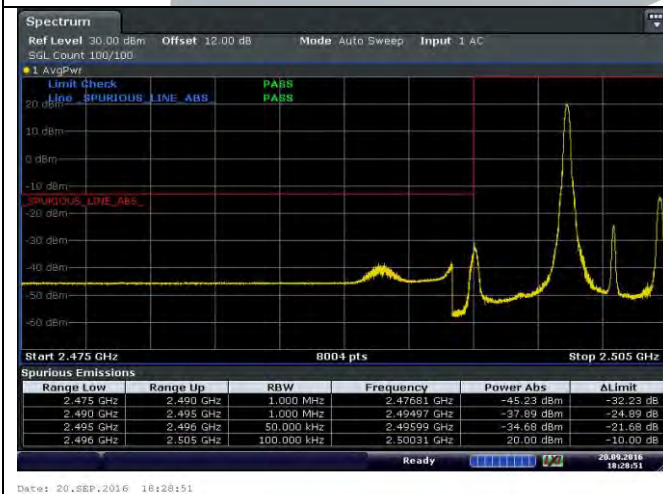


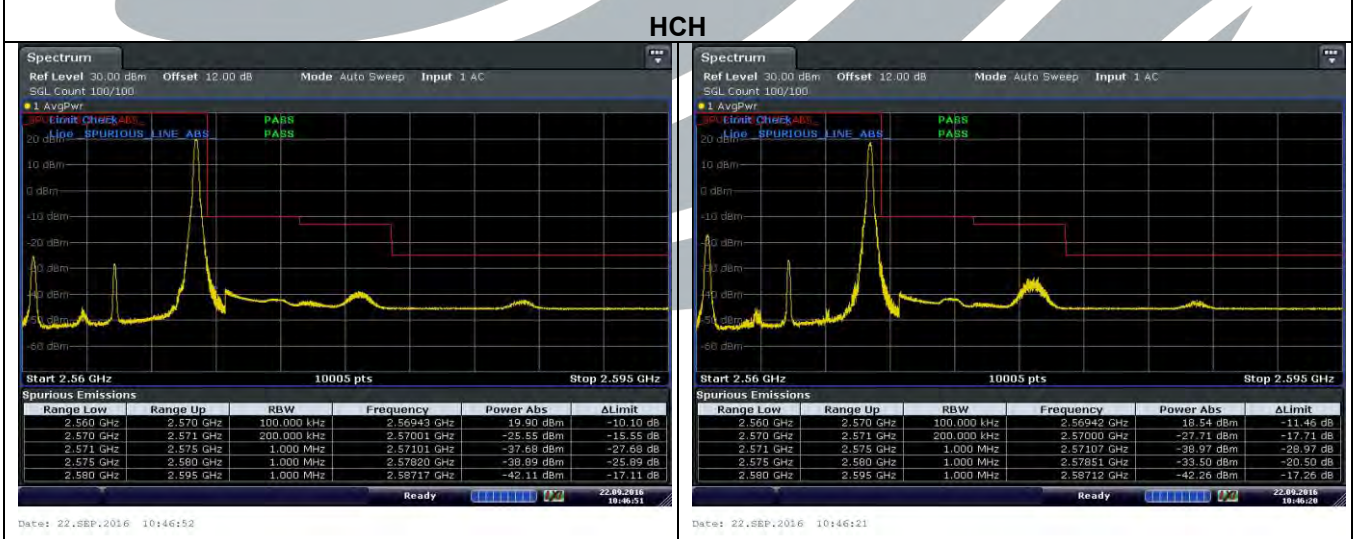
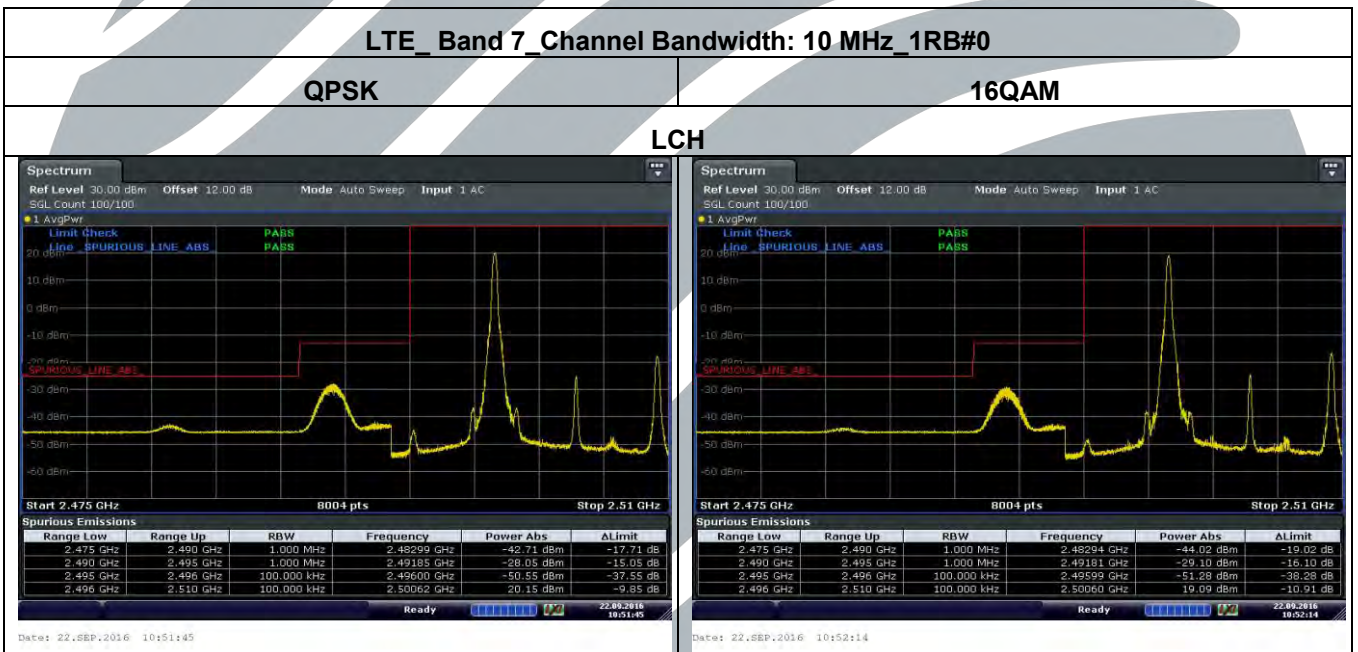
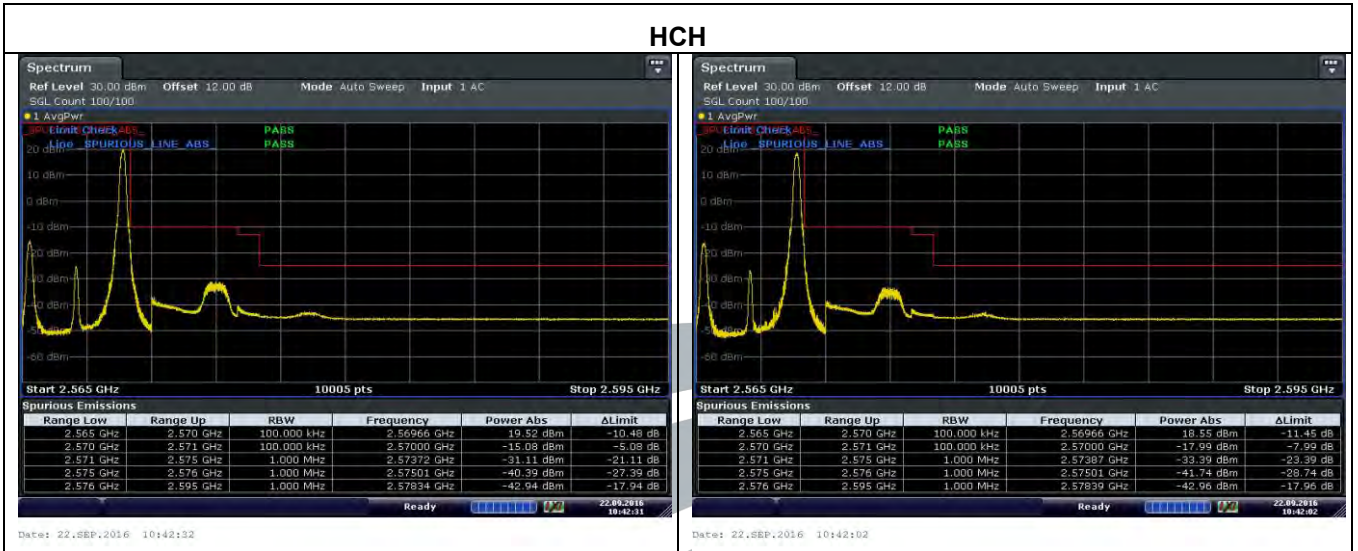
LTE_Band 7_Channel Bandwidth: 5 MHz_1RB#0

QPSK

16QAM

LCH



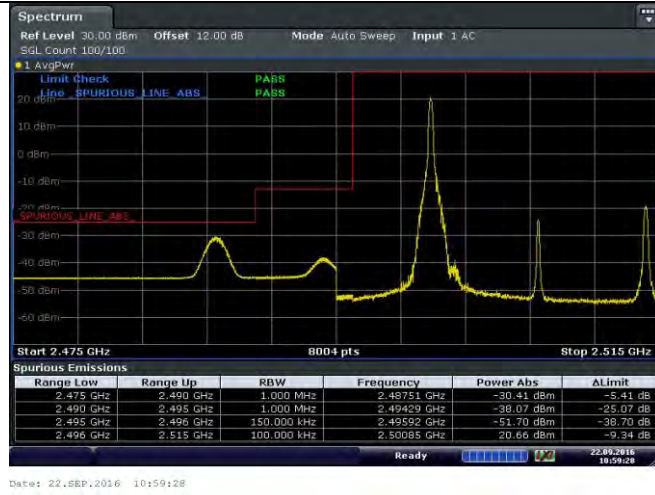


LTE_Band 7_Channel Bandwidth: 15 MHz_1RB#0

QPSK

16QAM

LCH



HCH

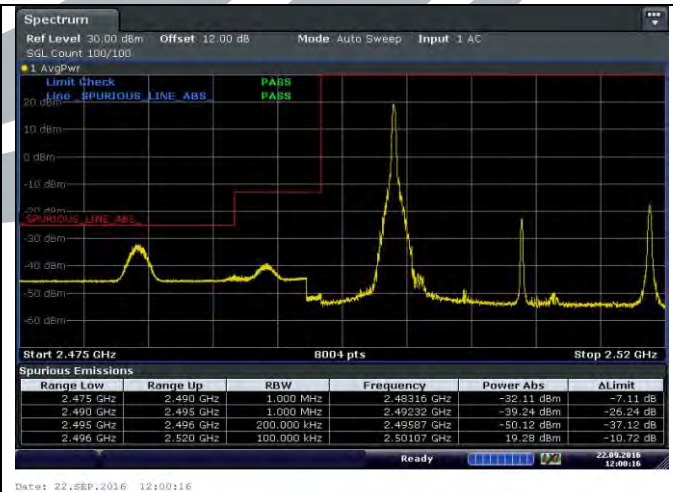
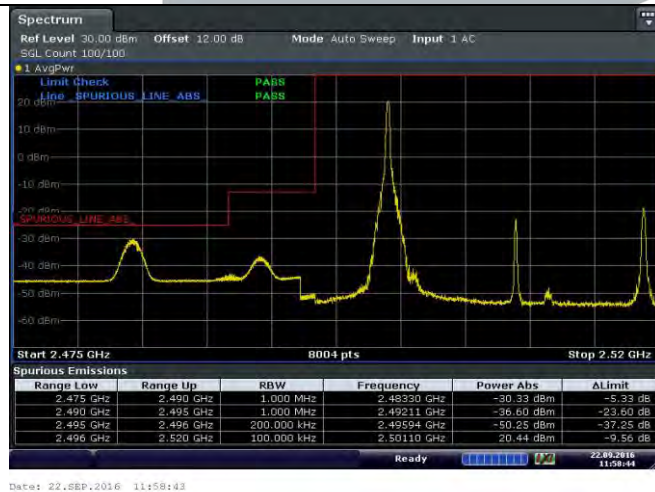


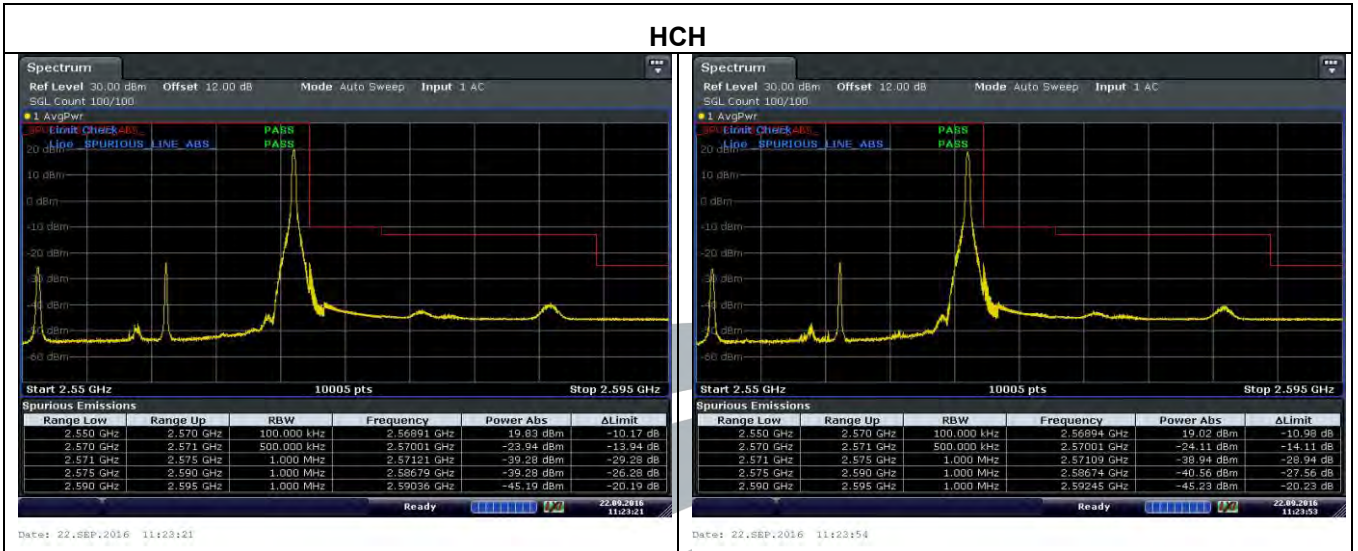
LTE_Band 7_Channel Bandwidth: 20 MHz_1RB#0

QPSK

16QAM

LCH

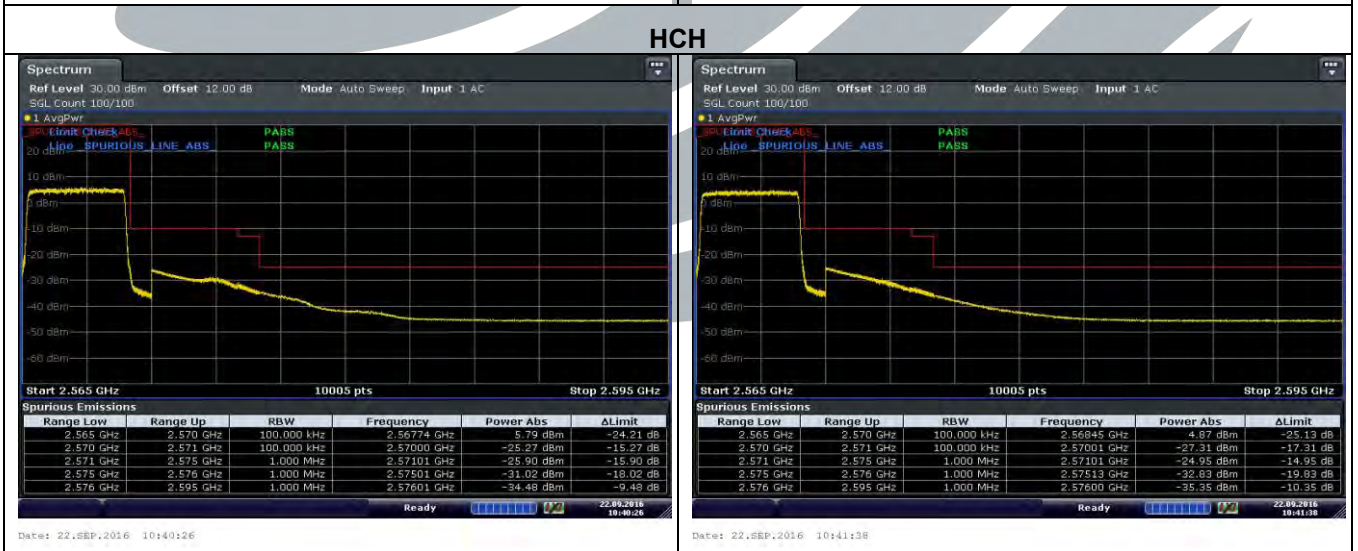




LTE_Band 7_Channel Bandwidth: 5 MHz_25RB#0

QPSK

16QAM



LTE_Band 7_Channel Bandwidth: 10 MHz_50RB#0

QPSK

16QAM

LCH



HCH



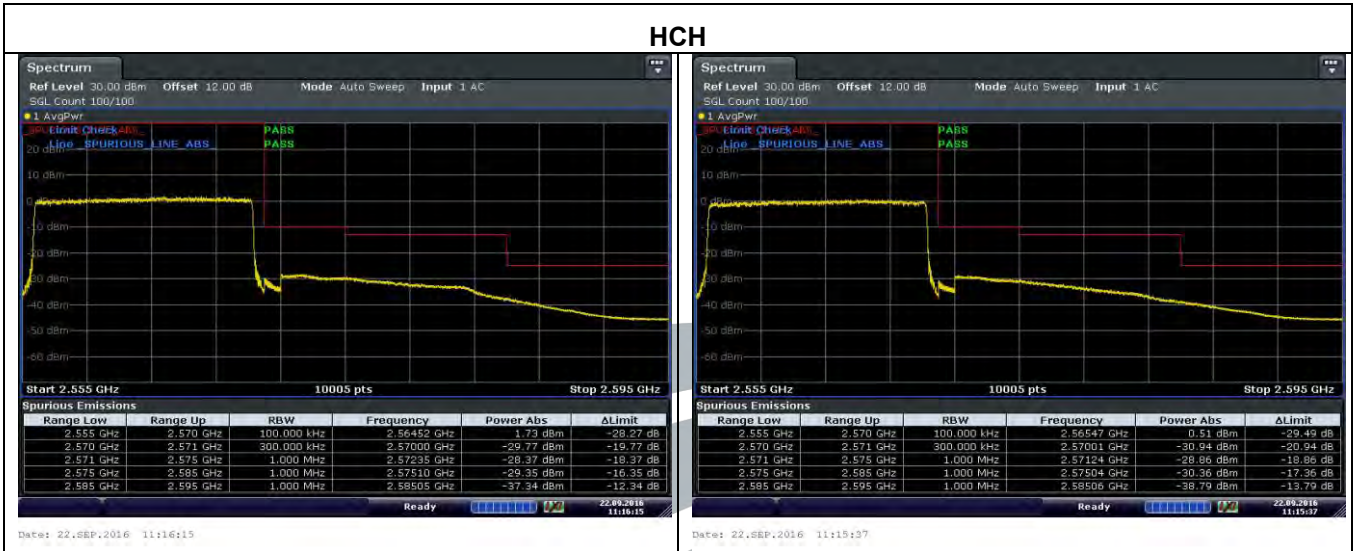
LTE_Band 7_Channel Bandwidth: 15 MHz_75RB#0

QPSK

16QAM

LCH

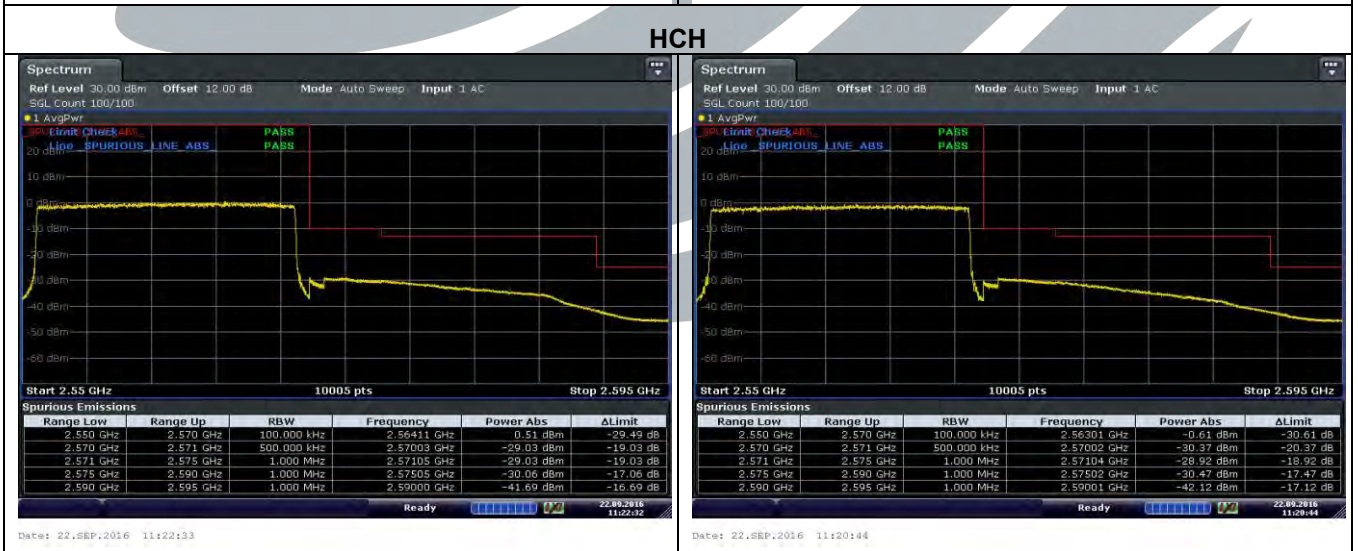




LTE_Band 7_Channel Bandwidth: 20 MHz_100RB#0

QPSK

16QAM



LTE_Band 41_Channel Bandwidth: 5 MHz_1RB#0

QPSK

16QAM

LCH



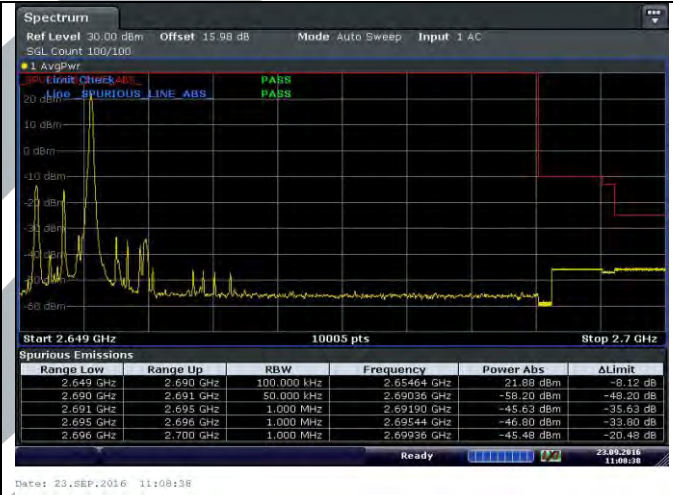
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Date: 23,SEP,2016 11:04:43

HCH



Date: 23,SEP,2016 11:09:23



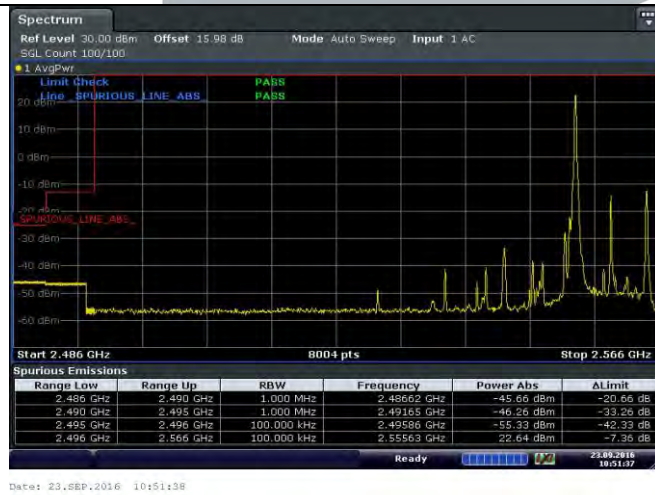
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LTE_Band 41_Channel Bandwidth: 10 MHz_1RB#0

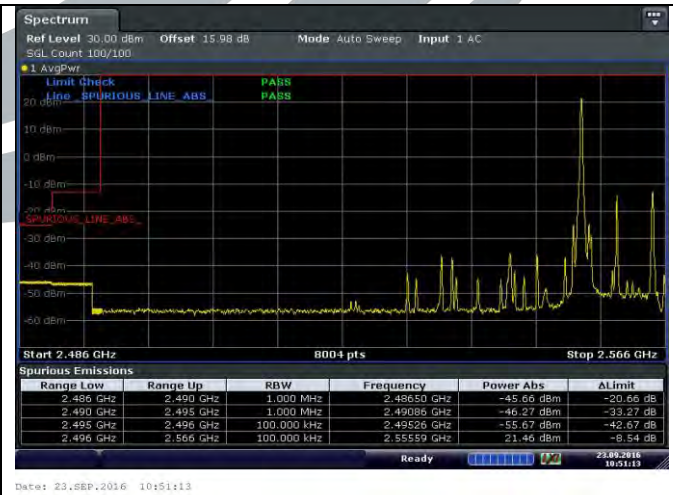
QPSK

16QAM

LCH

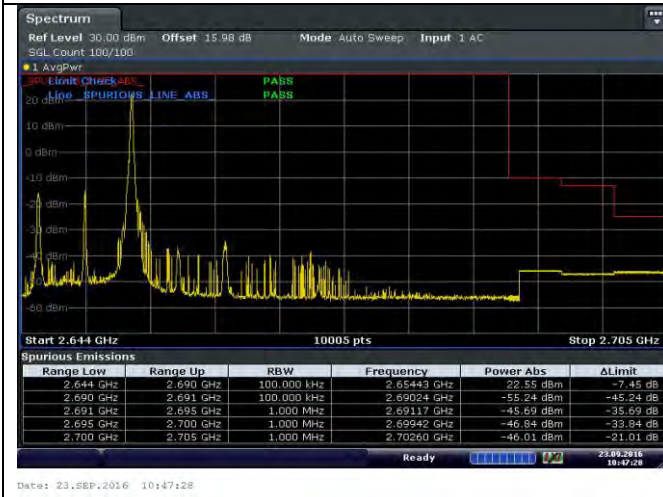


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Date: 23,SEP,2016 10:51:13

HCH

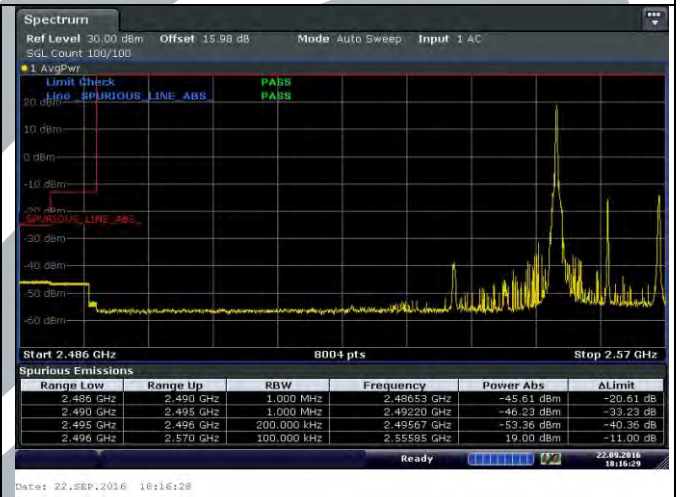
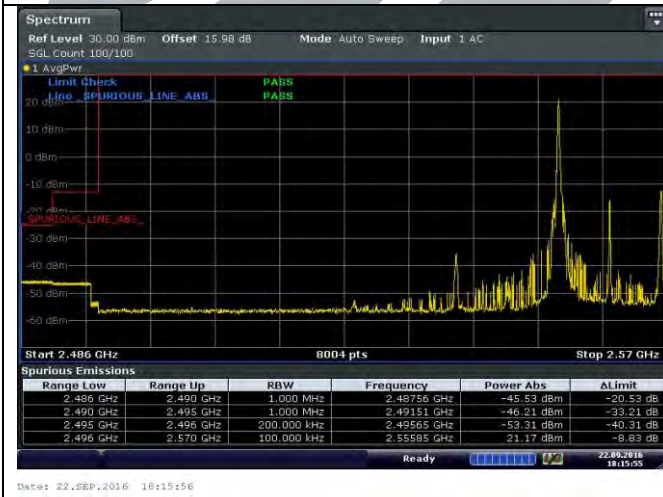


LTE_Band 41_Channel Bandwidth: 15 MHz_1RB#0

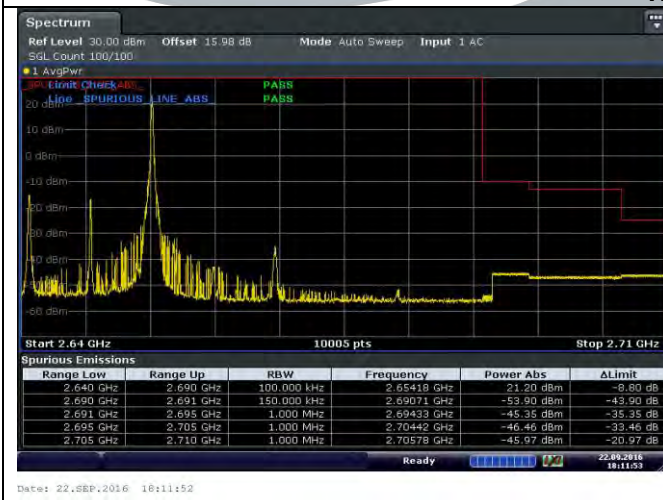
QPSK

16QAM

LCH



HCH

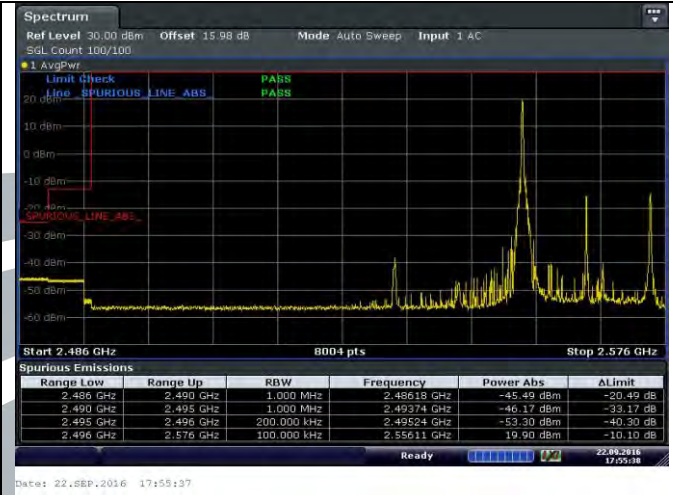
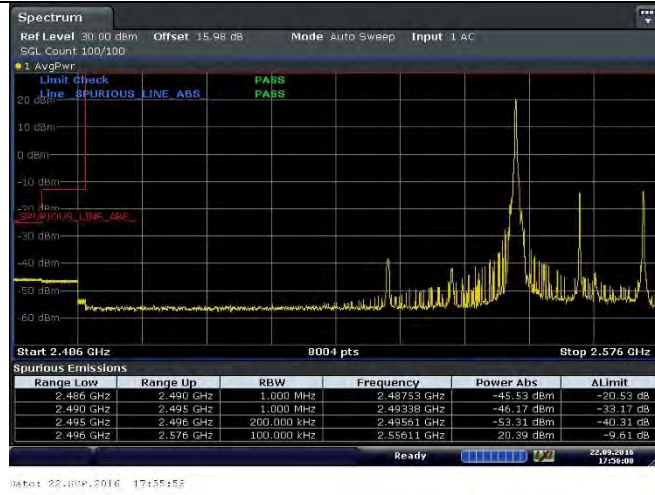


LTE_Band 41_Channel Bandwidth: 20 MHz_1RB#0

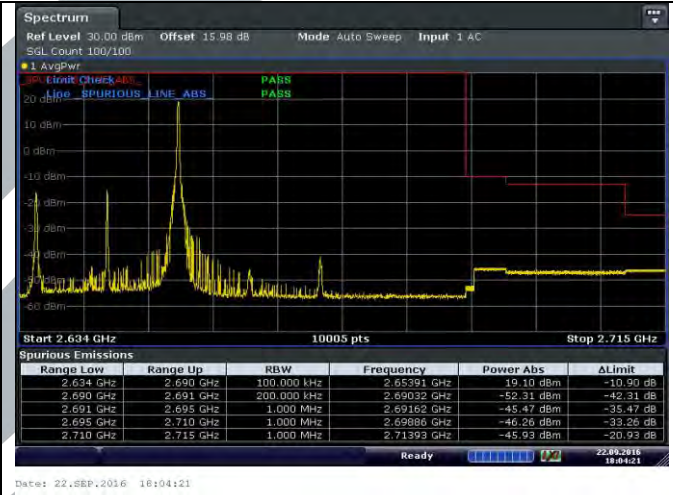
QPSK

16QAM

LCH



HCH

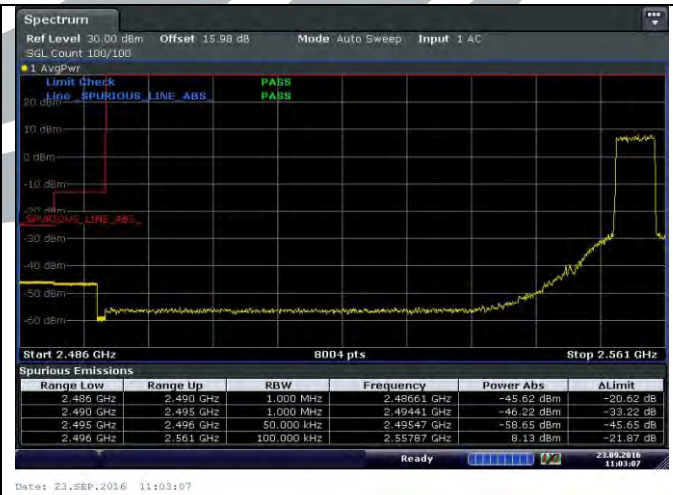


LTE_Band 41_Channel Bandwidth: 5 MHz_25RB#0

QPSK

16QAM

LCH



HCH



LTE_Band 41_Channel Bandwidth: 10 MHz_50RB#0

QPSK

16QAM

LCH



HCH



LTE_Band 41_Channel Bandwidth: 15 MHz_75RB#0

QPSK

16QAM

LCH



HCH



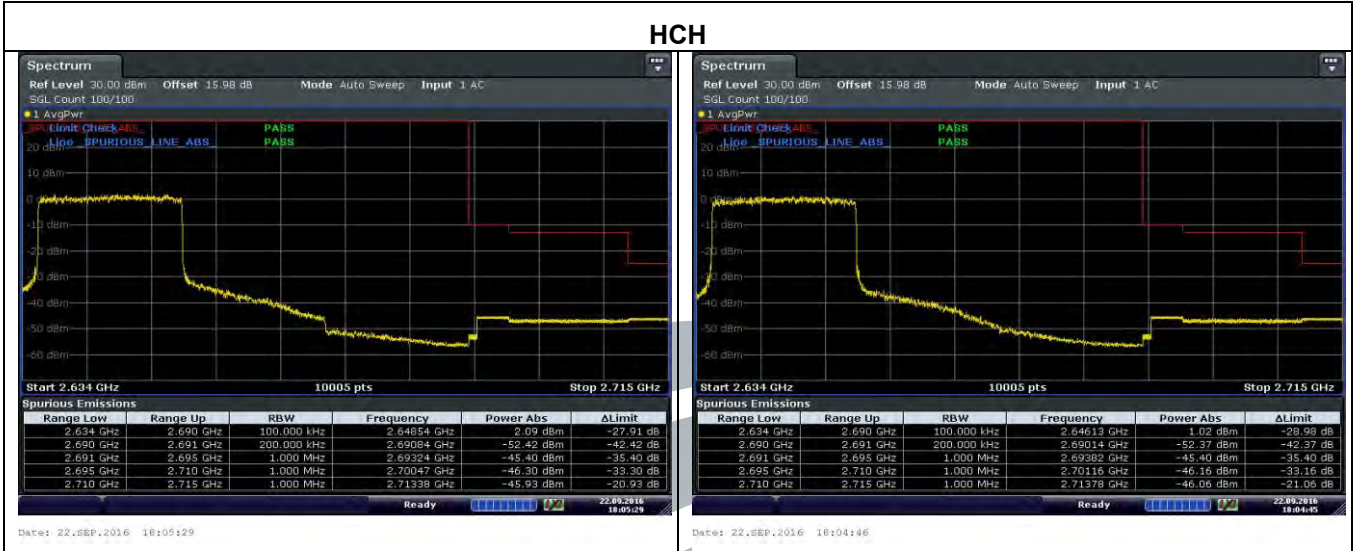
LTE_Band 41_Channel Bandwidth: 20 MHz_100RB#0

QPSK

16QAM

LCH

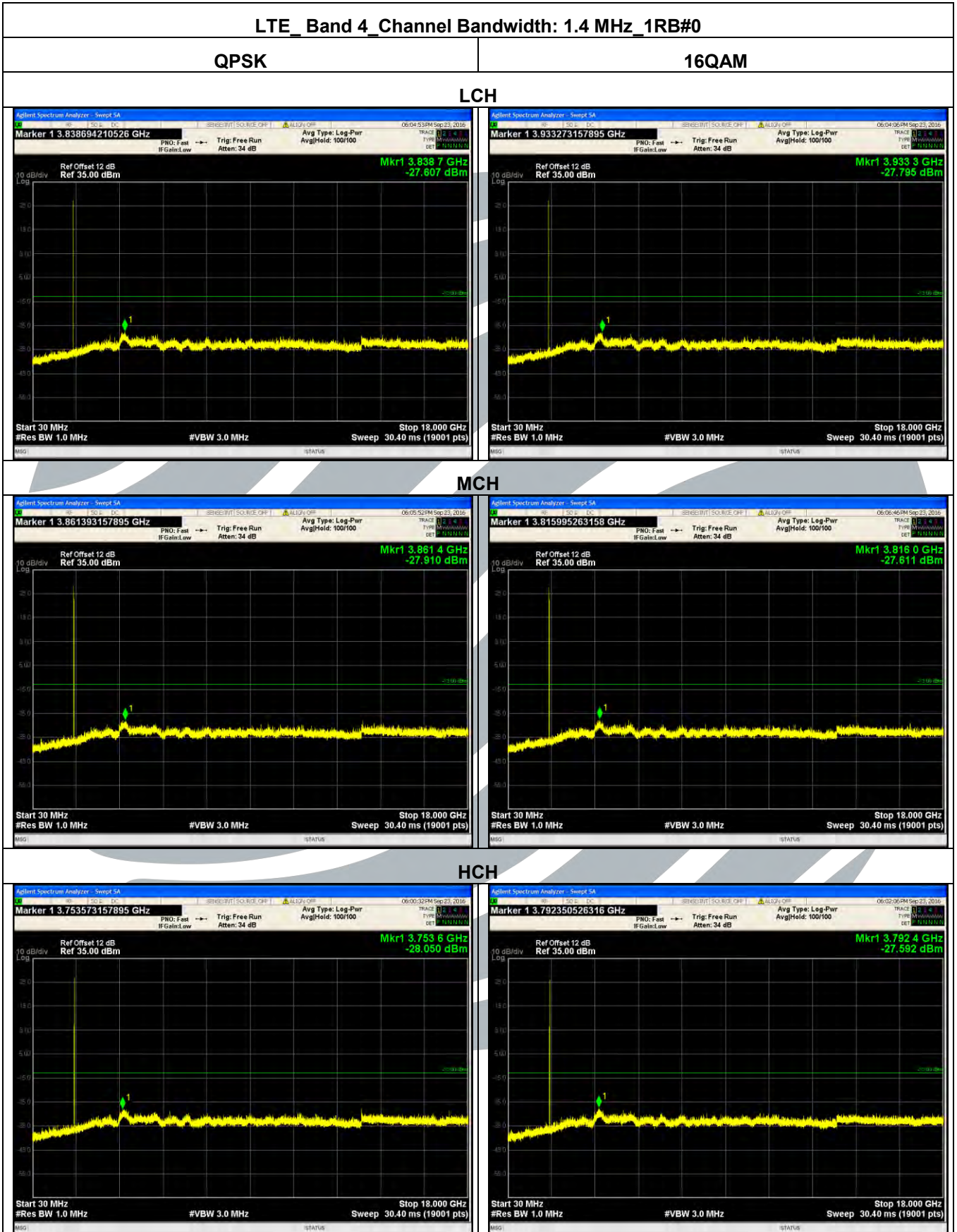




5.6 Spurious emissions at antenna terminals

Test Requirement:	Part 2.1051 & Part 27.53(h)(1)/(m)(4)
Test Method:	ANSI/TIA/EIA-603-D 2010 & KDB 971168 D01v02r02
Limit:	<p>Part 27.53(h)(1): Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB. The emission limit equal to -13 dBm.</p> <p>Part 27.53(m)(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 than $43 + 10 \log(P)$ 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.</p>
Test Procedure:	<p>The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range. b. Measuring frequency range is from 9 kHz to 20 GHz. Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.</p> <p>Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.</p>
Test Setup:	Refer to section 4.1.1(2) for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Link mode
Test Results:	Pass

The test plot as follows:

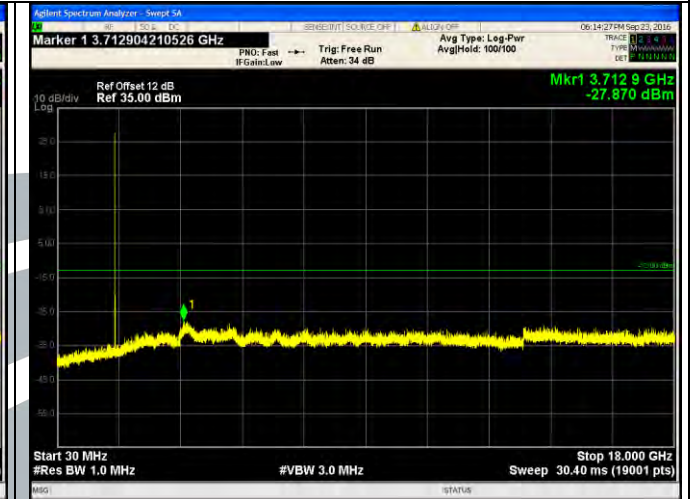
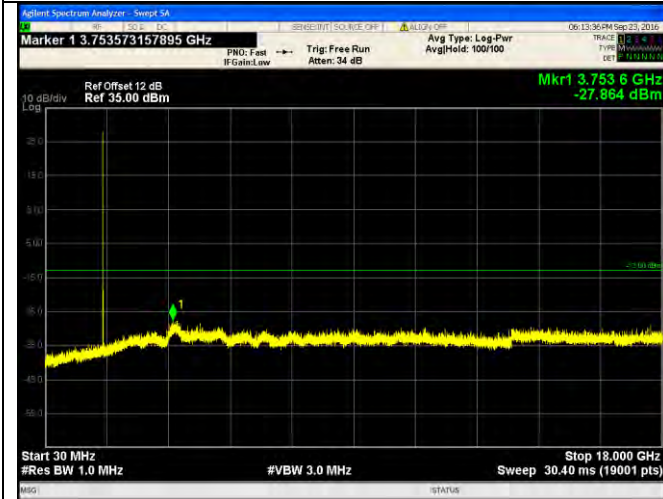


LTE_Band 4_Channel Bandwidth: 3 MHz_1RB#0

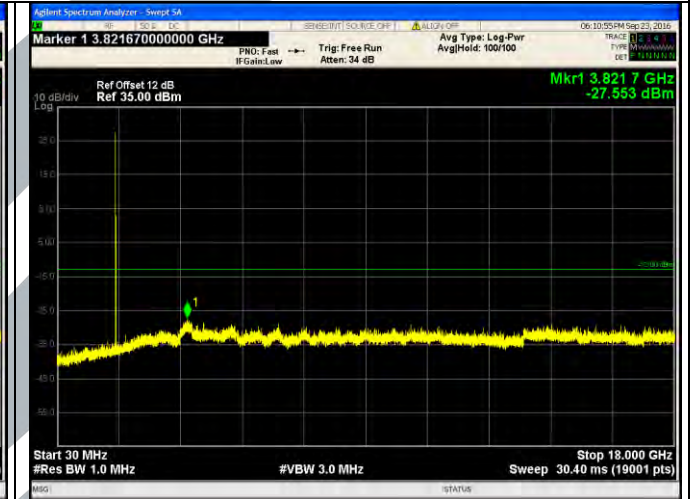
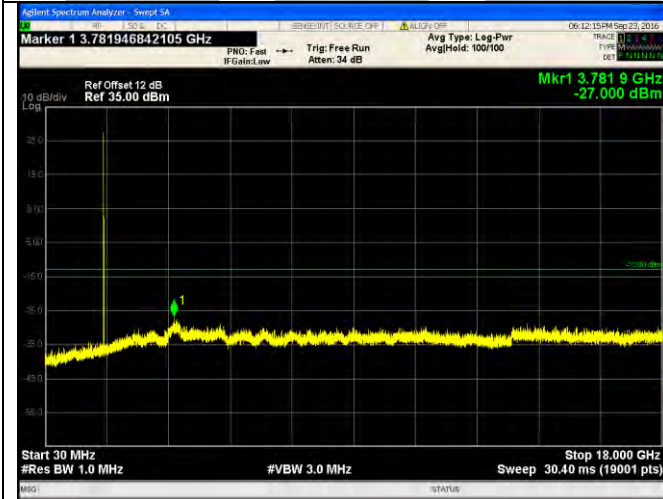
QPSK

16QAM

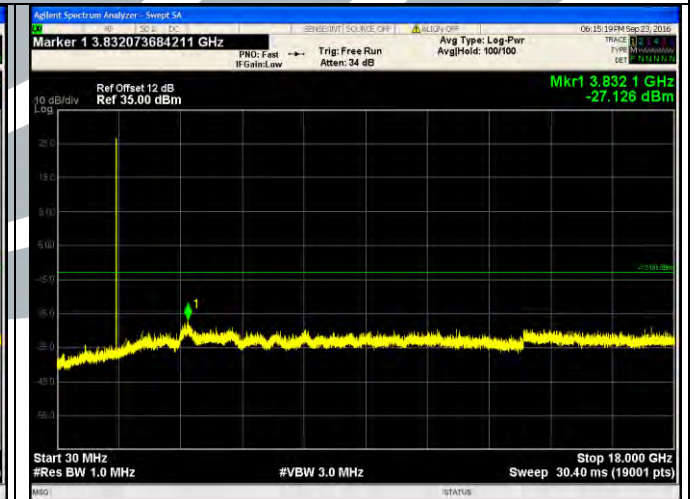
LCH



MCH



HCH

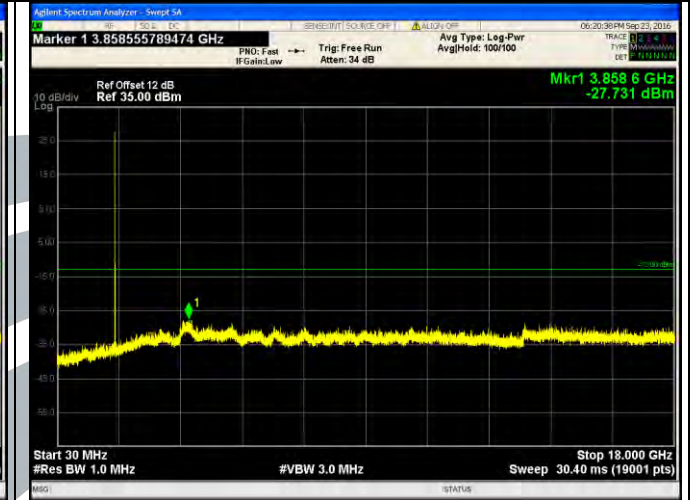
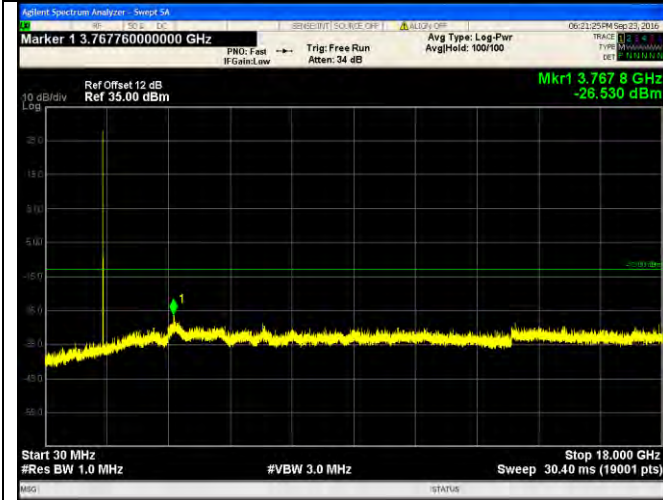


LTE_Band 4_Channel Bandwidth: 5 MHz_1RB#0

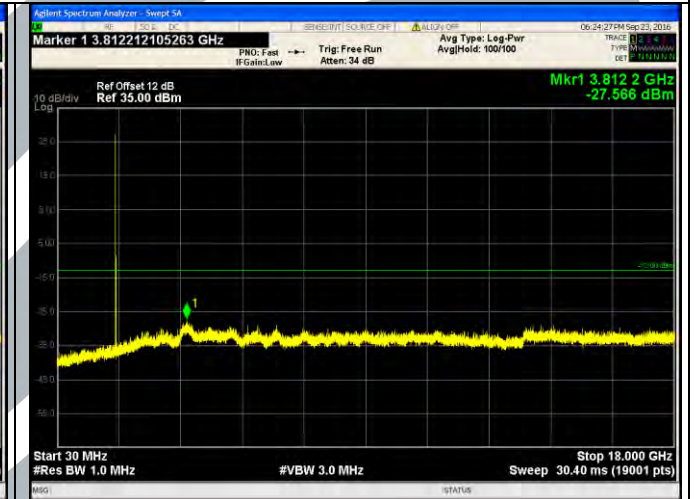
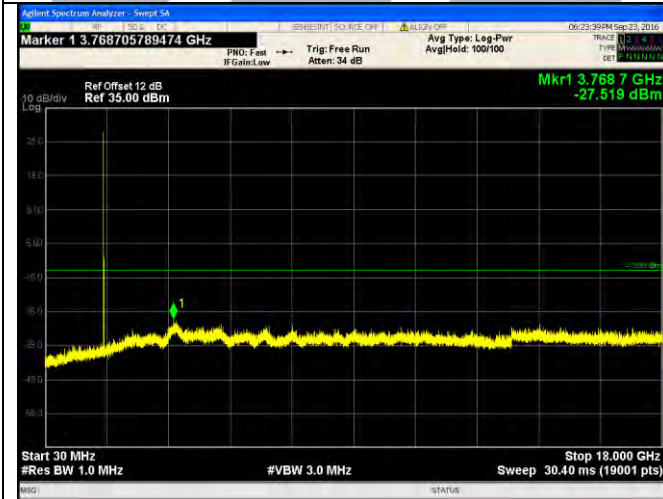
QPSK

16QAM

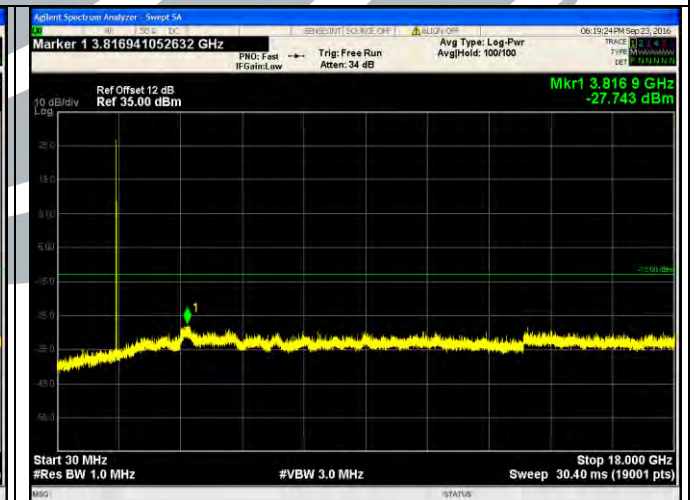
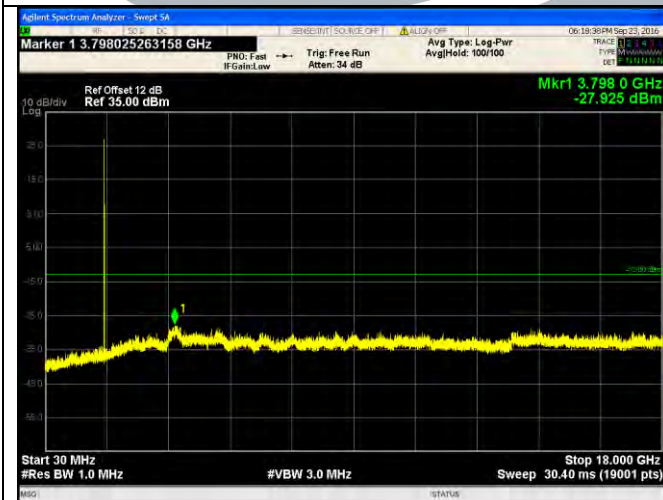
LCH



MCH



HCH

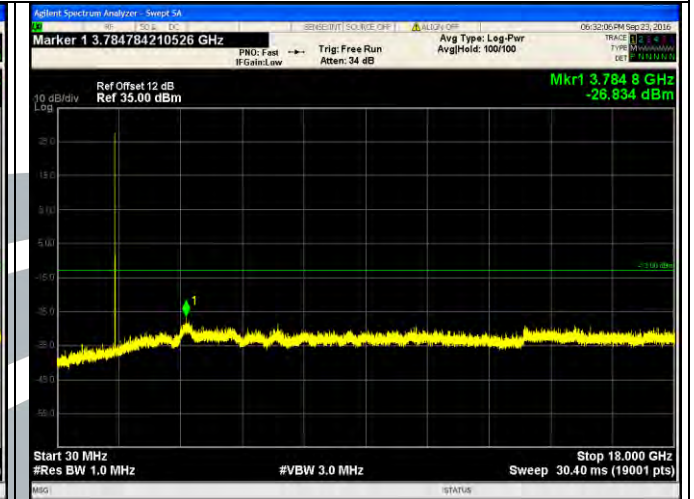


LTE_Band 4_Channel Bandwidth: 10 MHz_1RB#0

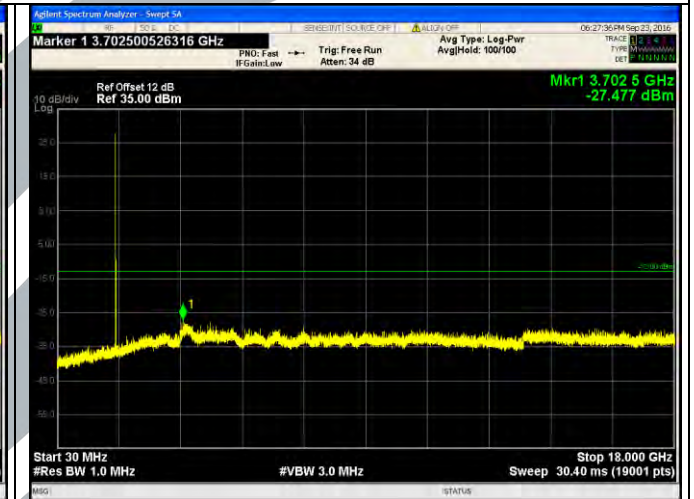
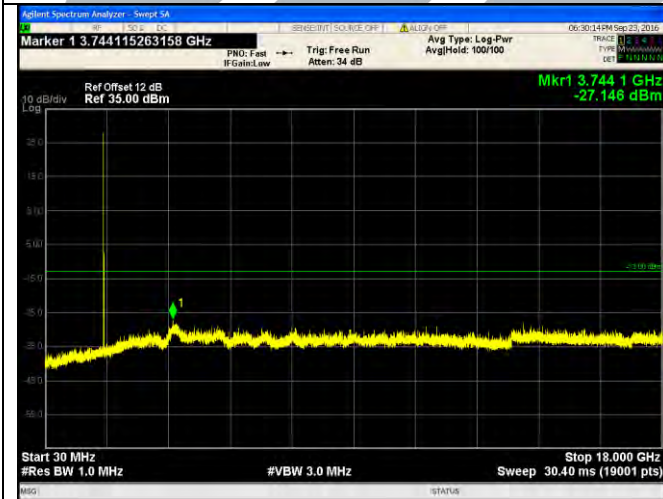
QPSK

16QAM

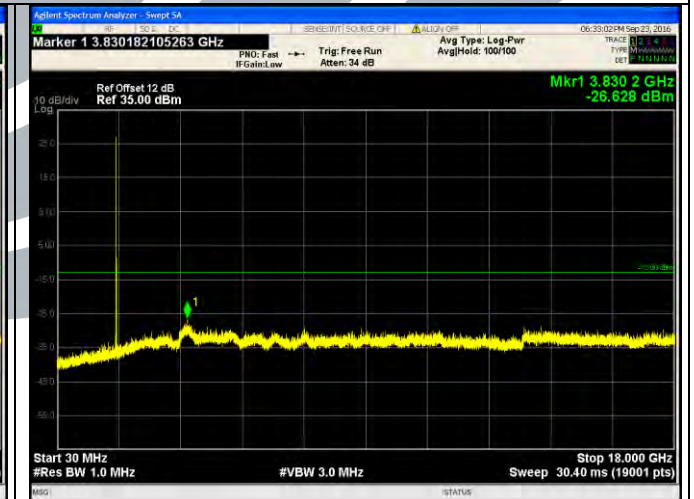
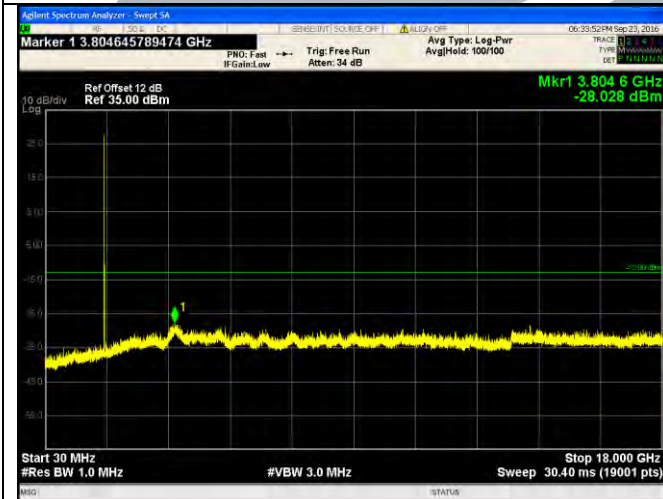
LCH

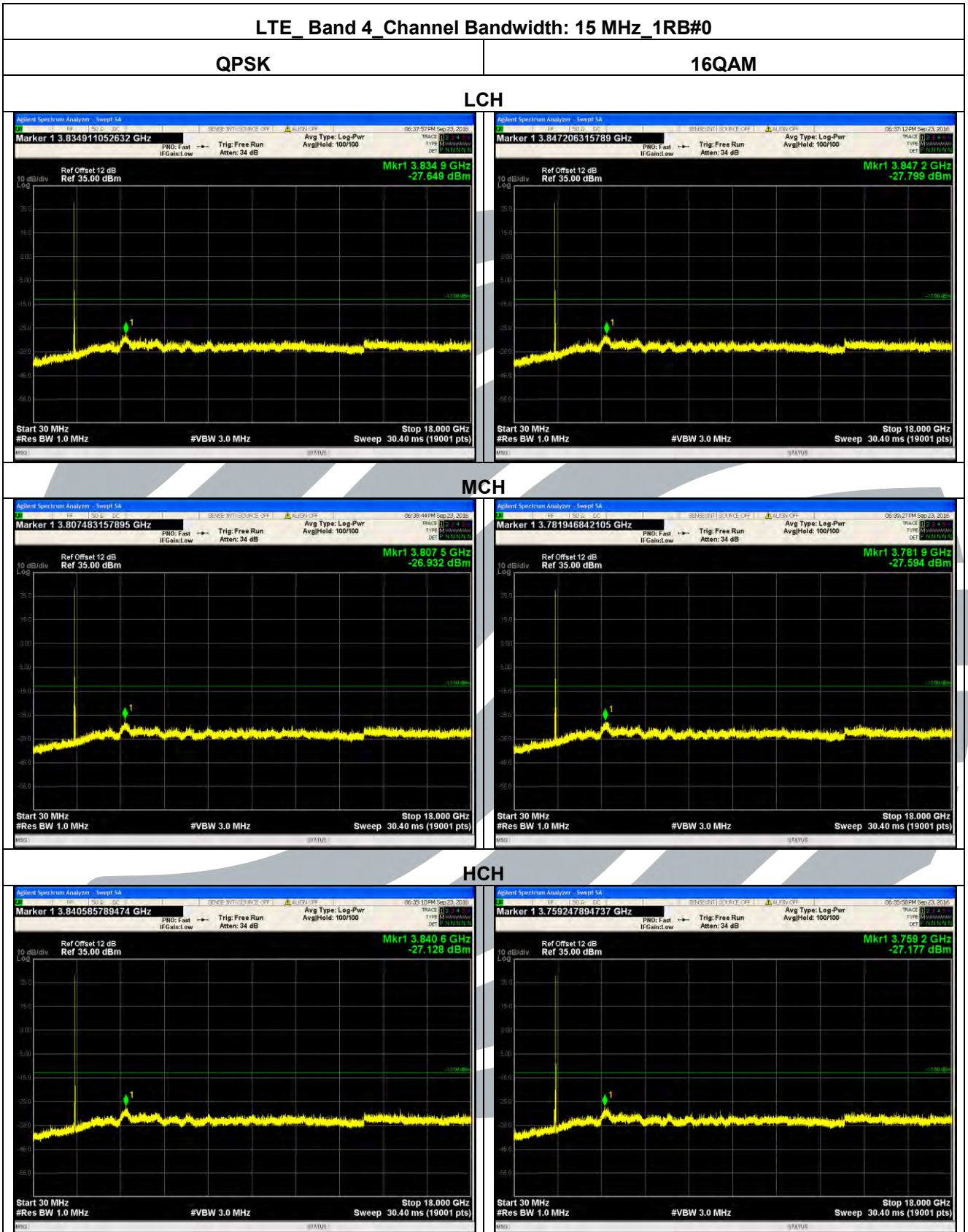


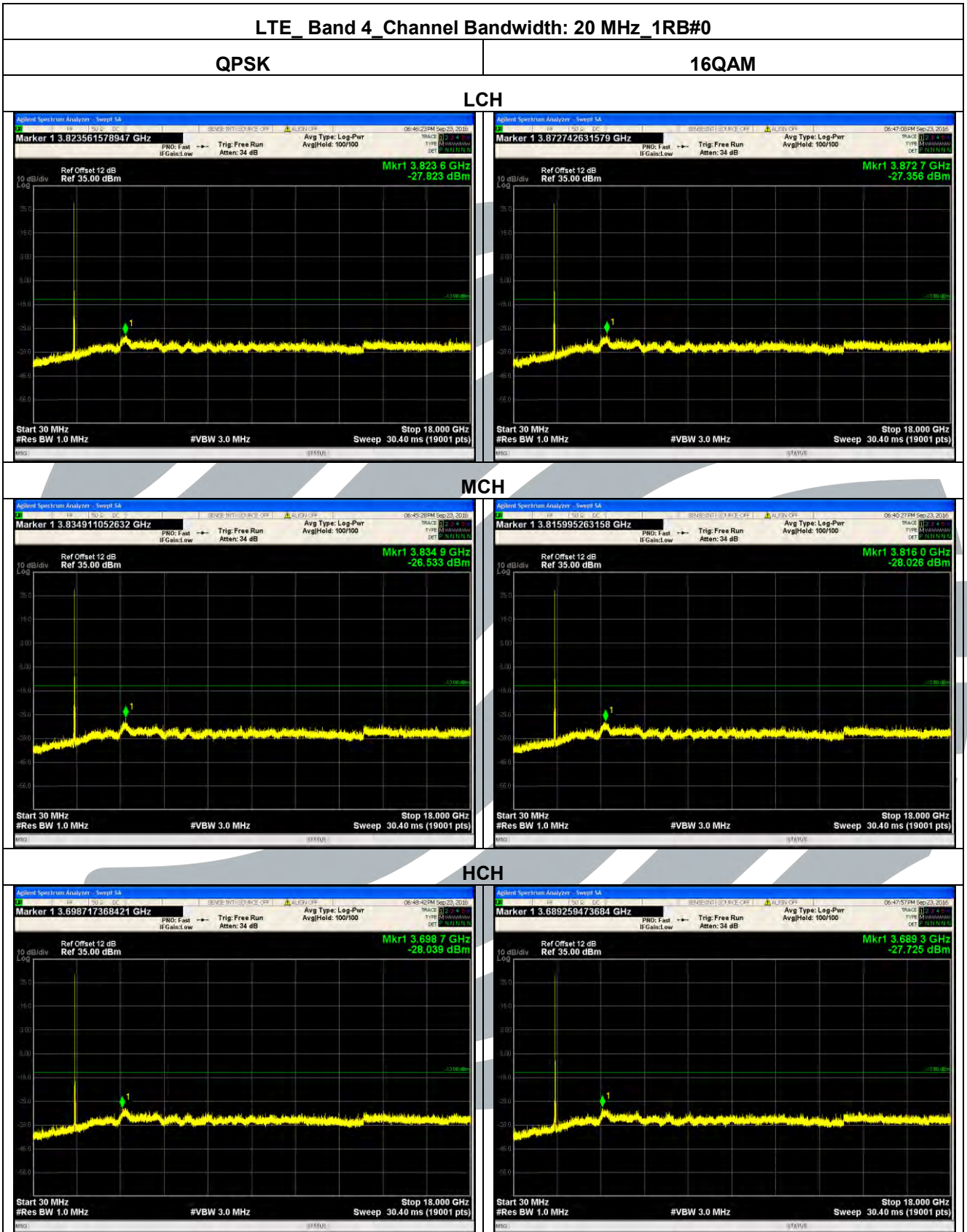
MCH

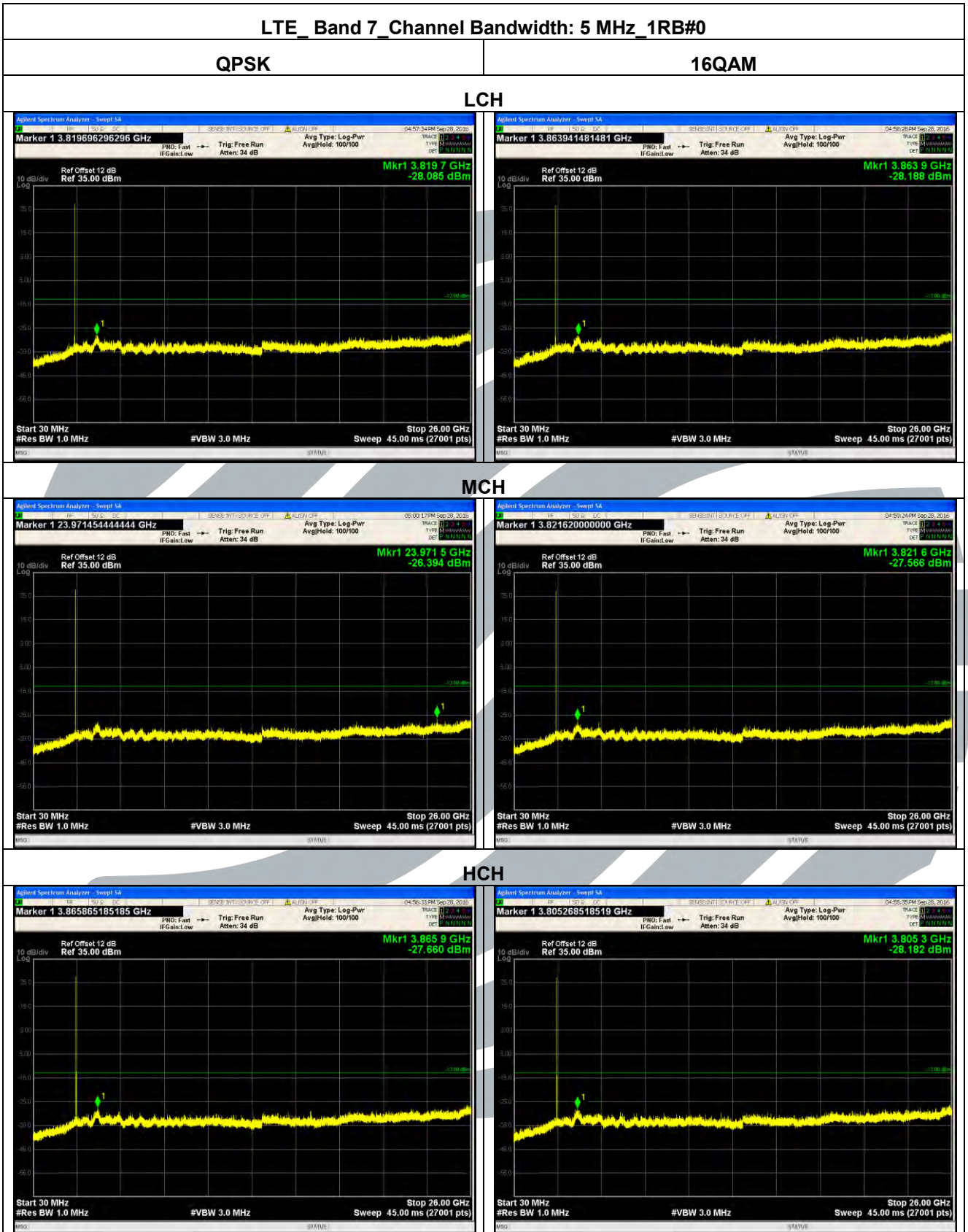


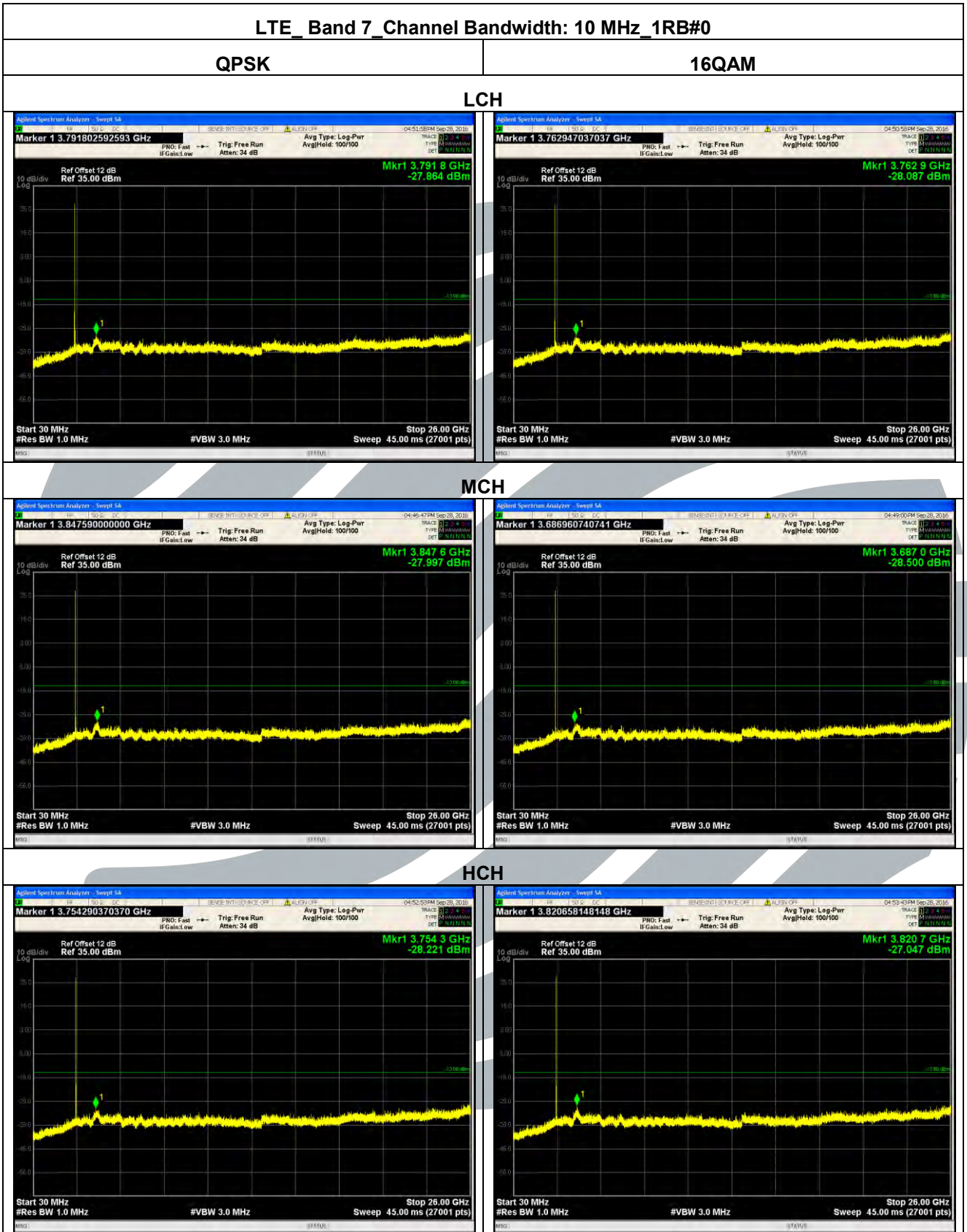
HCH

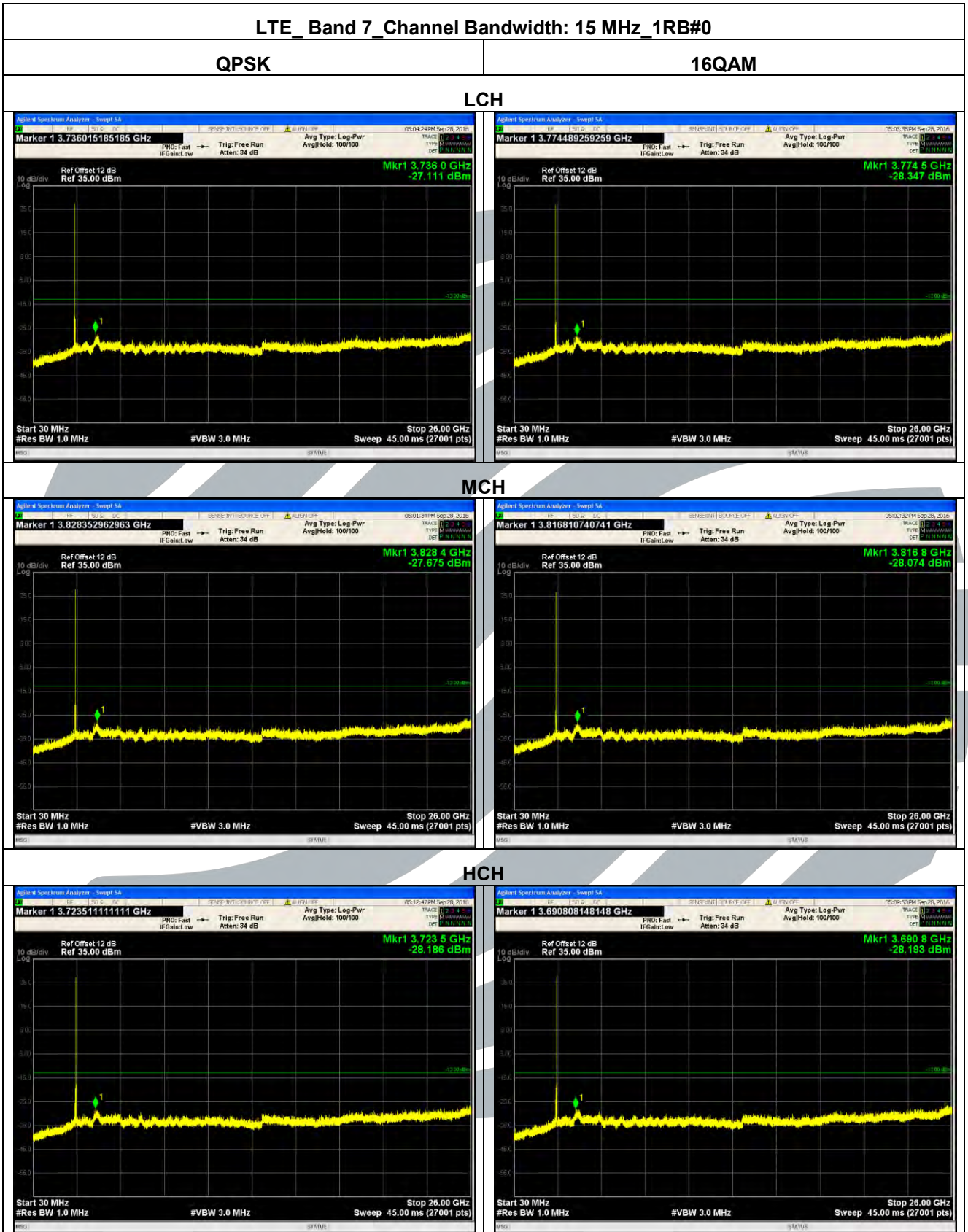










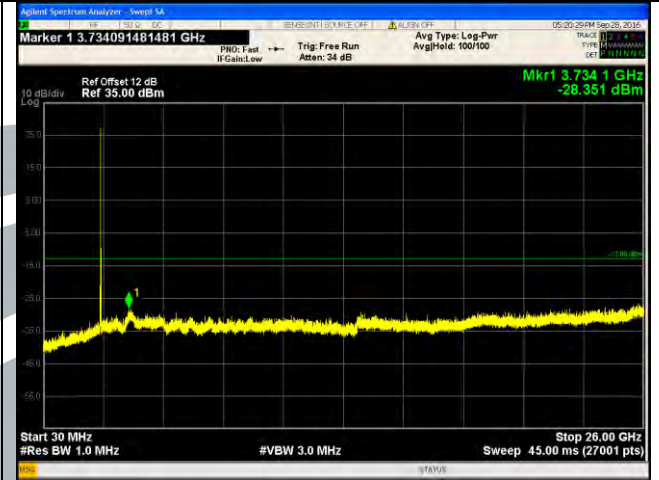
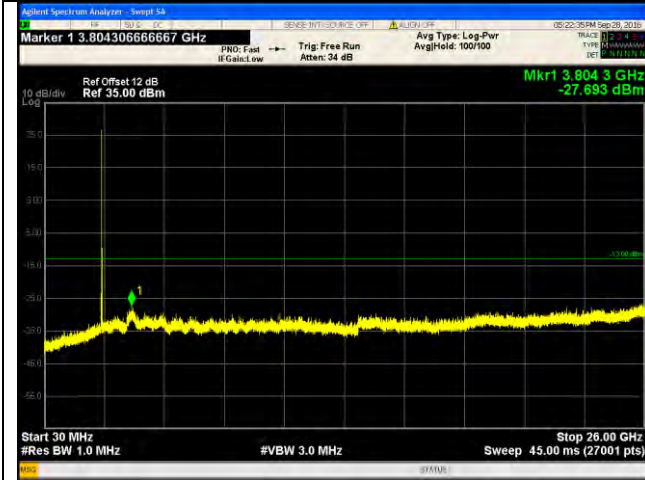


LTE_Band 7_Channel Bandwidth: 20 MHz_1RB#0

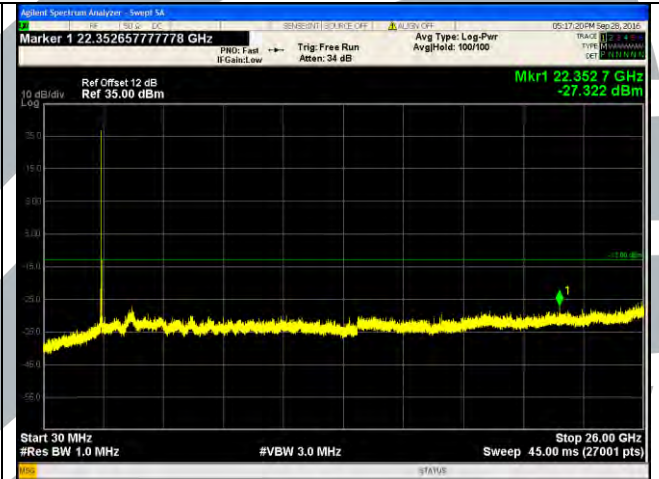
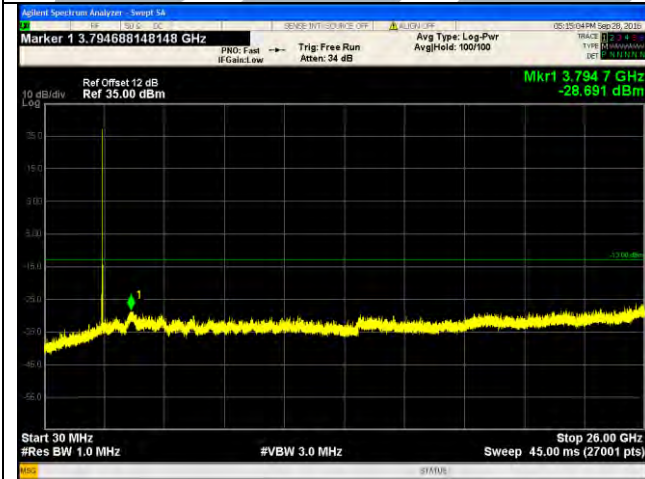
QPSK

16QAM

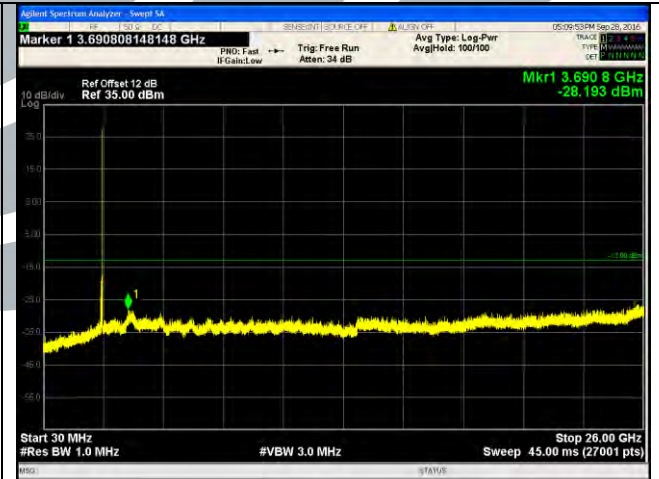
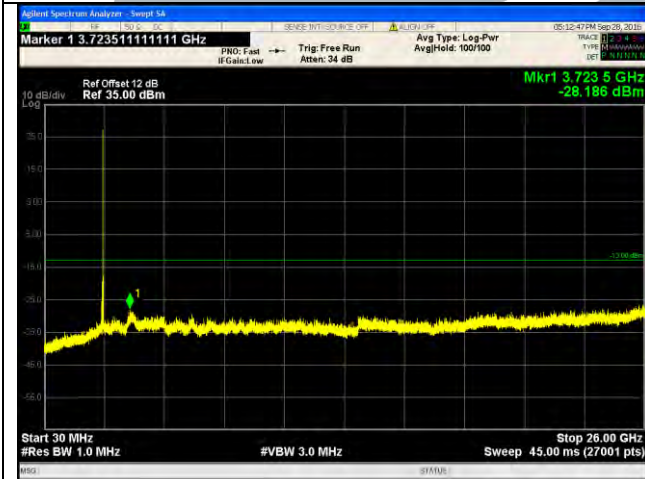
LCH

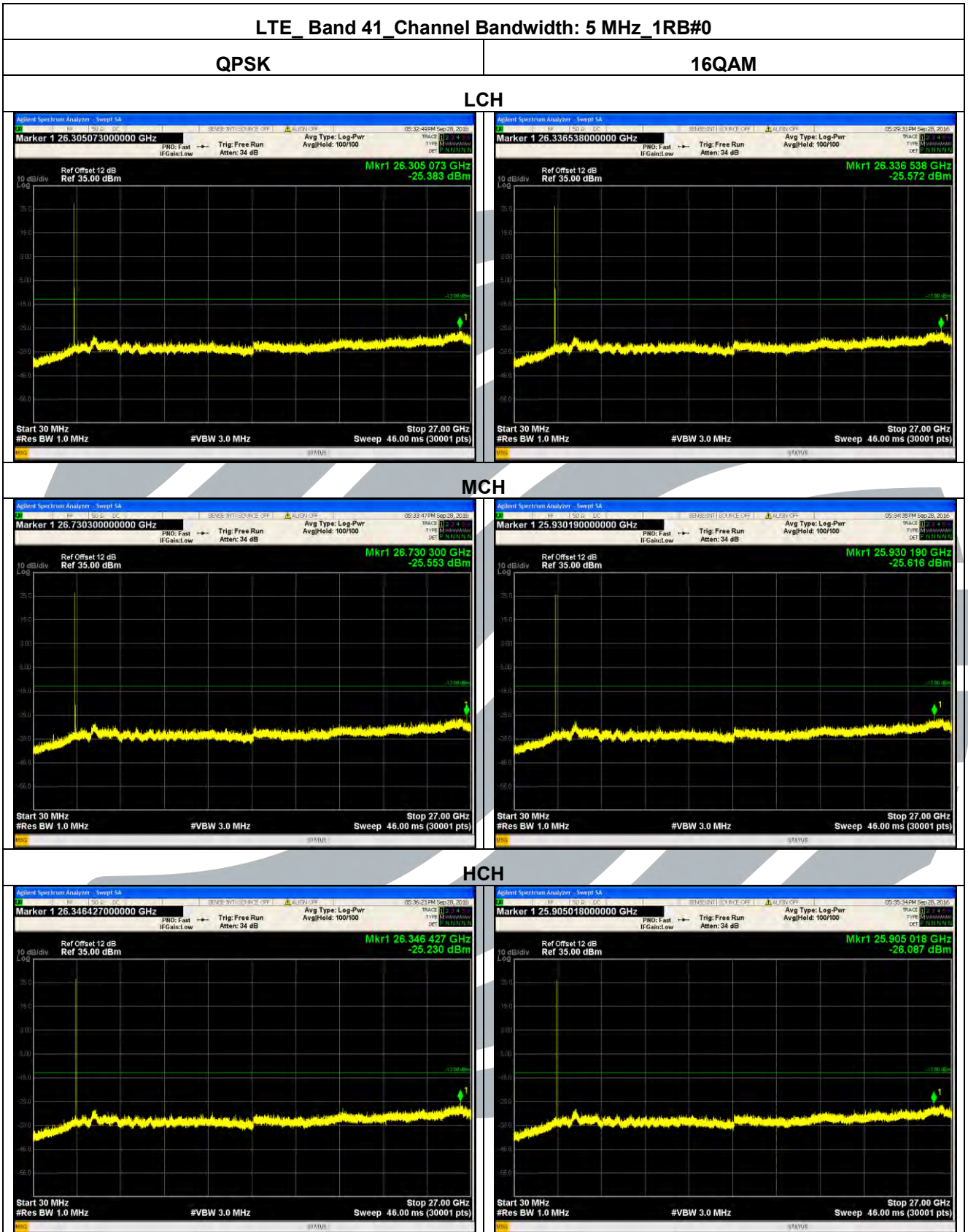


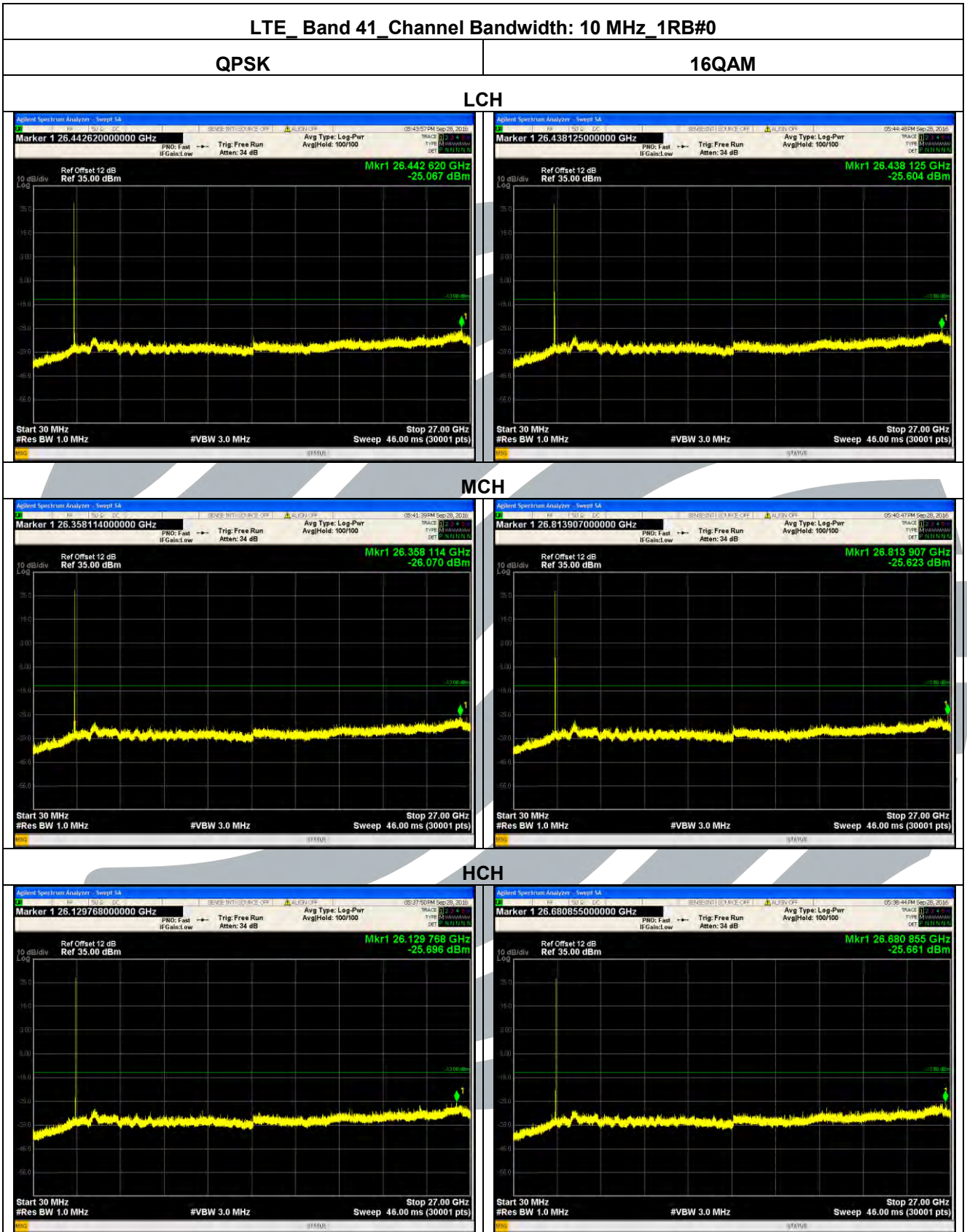
MCH

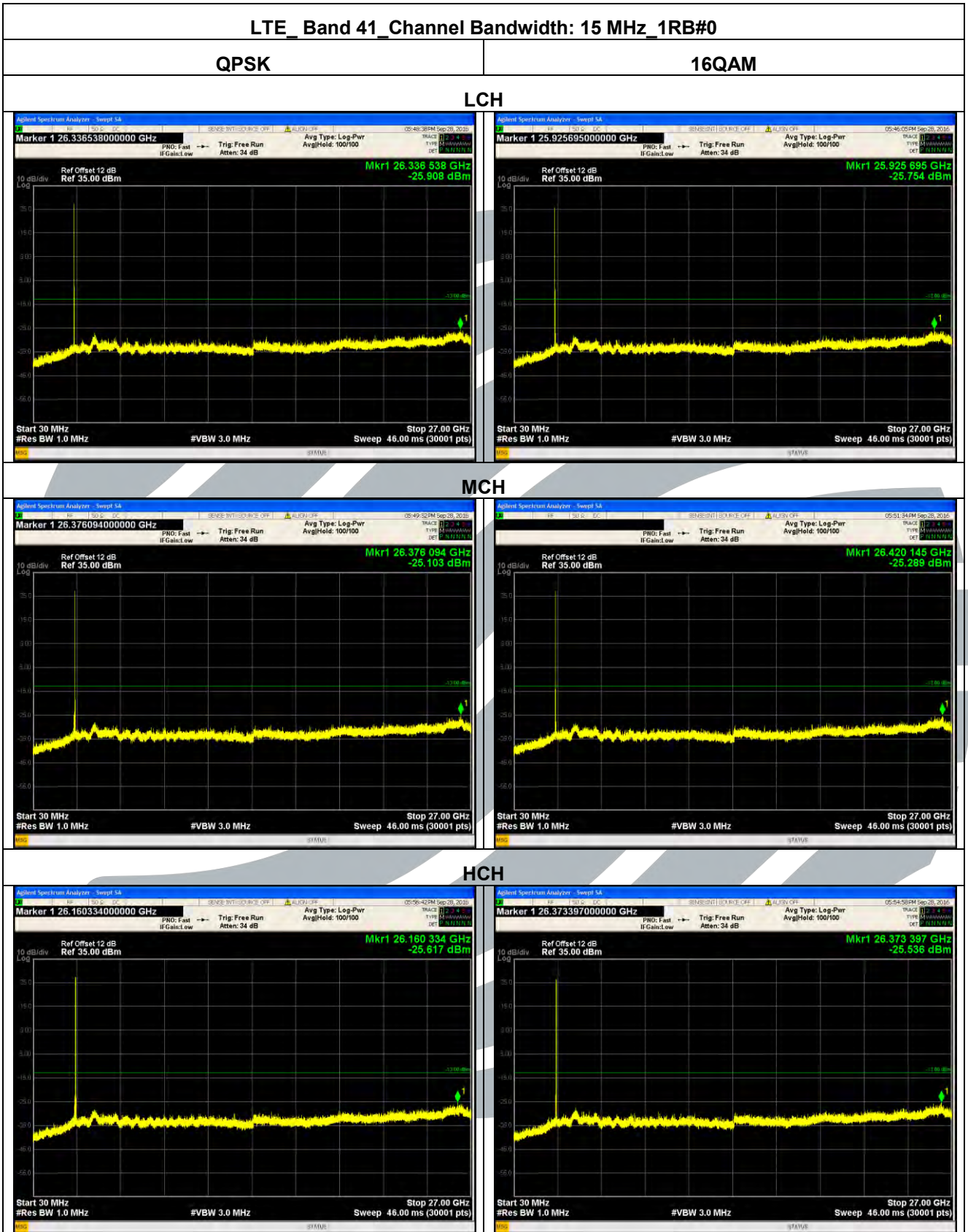


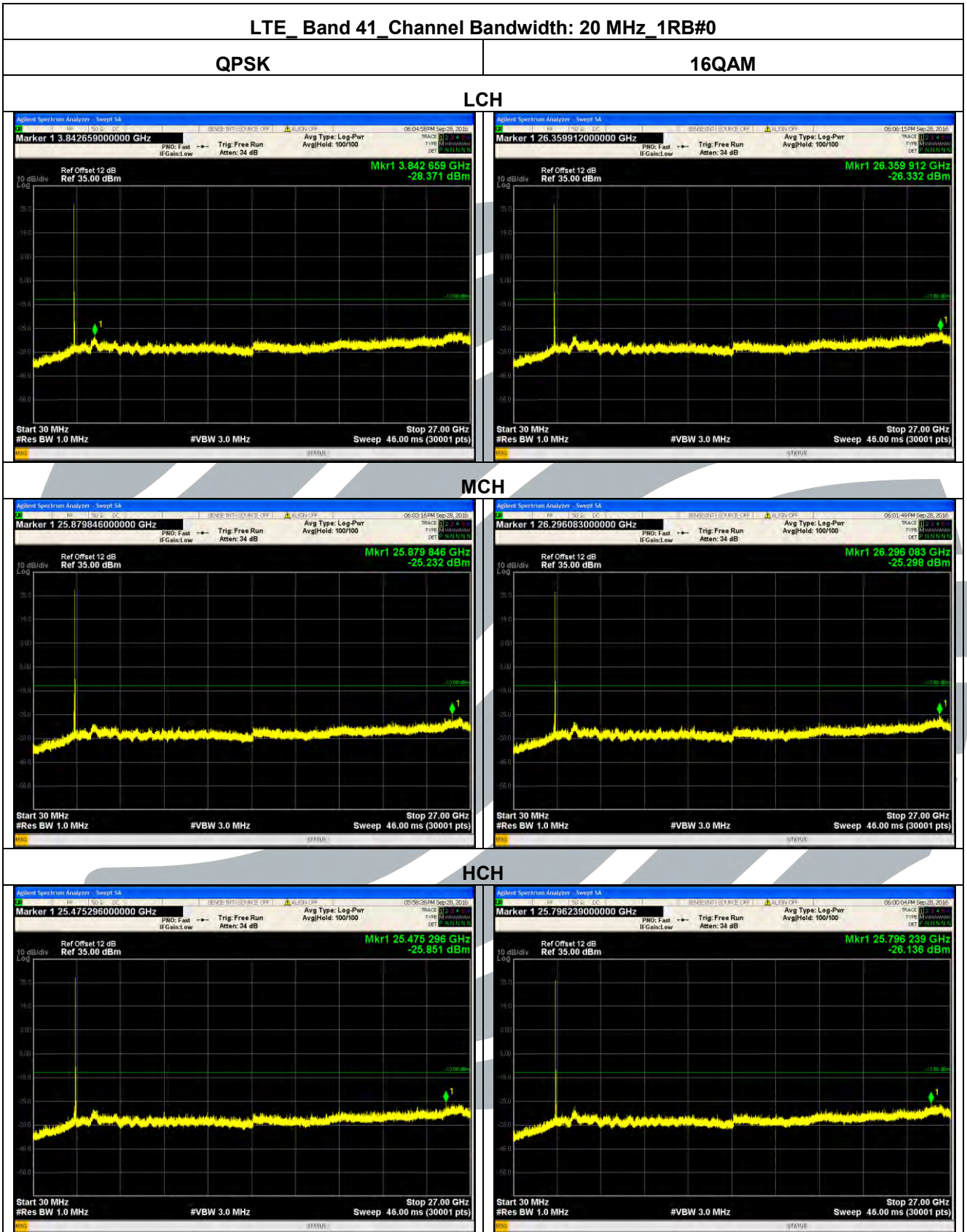
HCH











5.7 Field strength of spurious radiation

Test Requirement: Part 2.1053 & Part 27.53(h)/(m)
Test Method: ANSI/TIA/EIA-603-D 2010 & KDB 971168 D01v02r02
Limit: **Part 27.53(h)(1):** Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB. The emission limit equal to -13 dBm.

Part 27.53(m)(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 than $43 + 10 \log(P)$ 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.

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 high 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:

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

$$\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

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 错误!未找到引用源。 positioning which it is worse case.

12) Repeat above procedures until all frequencies measured was complete.

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-30MHz	Peak	10kHz	30kHz	Peak
30MHz-1GHz	Peak	100kHz	300kHz	Peak
Above 1GHz	Peak	1MHz	3MHz	Peak

Test Setup:

Refer to section 4.1.2 for details.

Instruments Used:

Refer to section 3 for details

Test Mode:

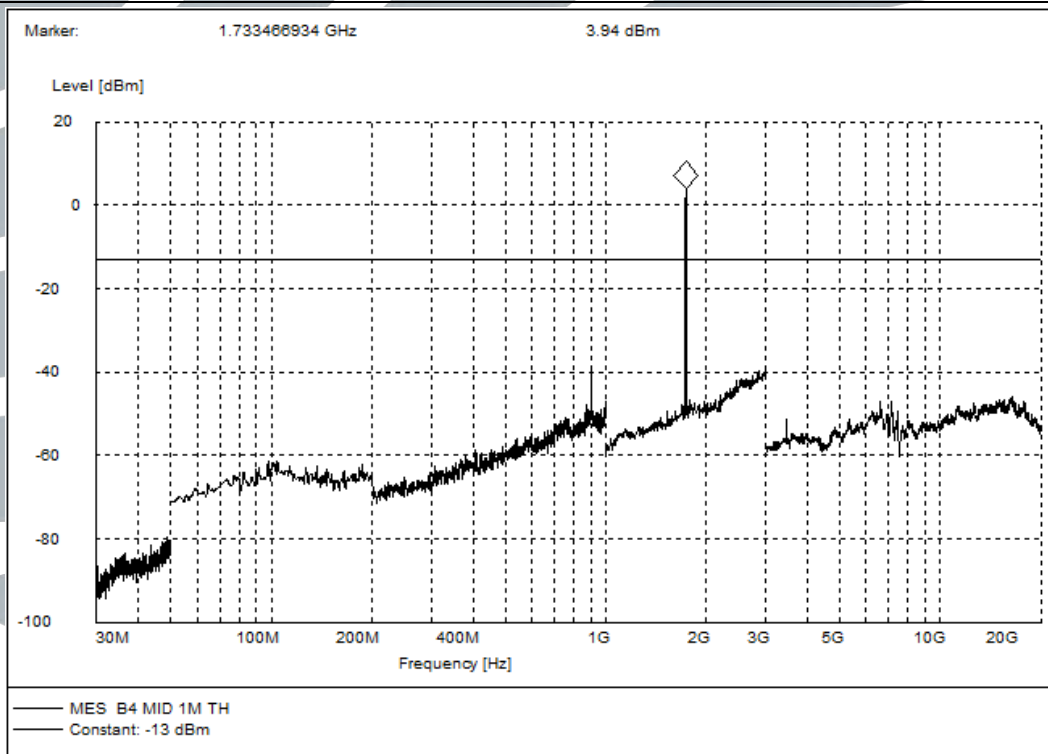
Link mode

Test Results:

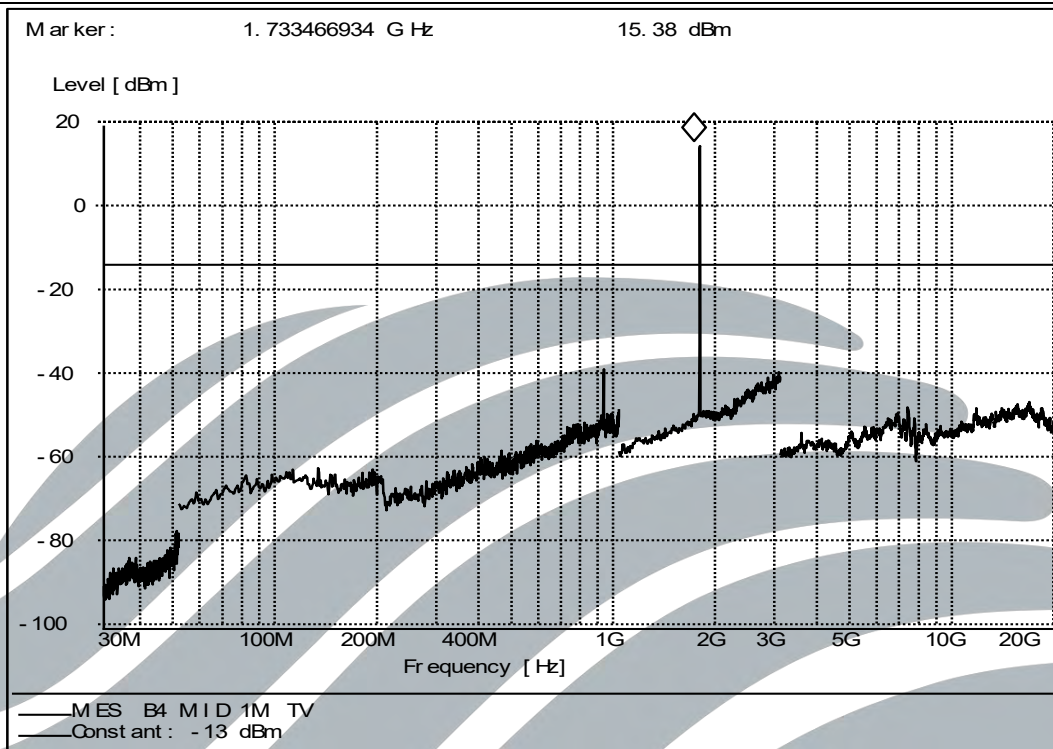
Pass

Test Data:

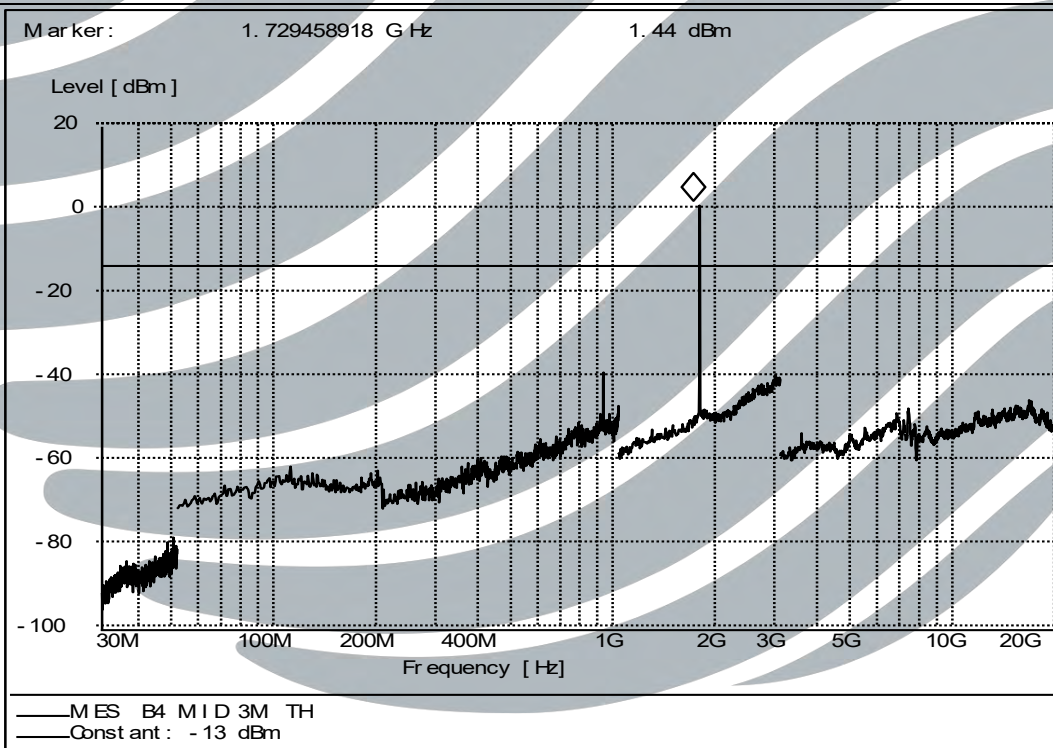
LTE Band 4; Bandwidth 1.4MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Horizontal



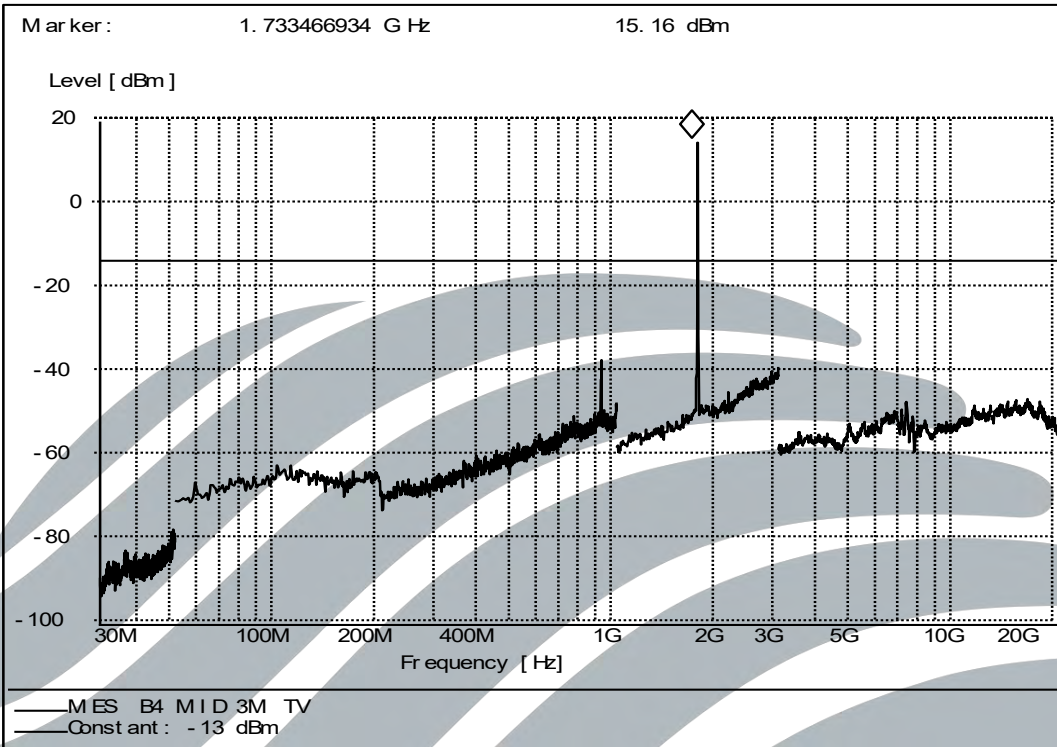
LTE Band 4; Bandwidth 1.4MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Verical



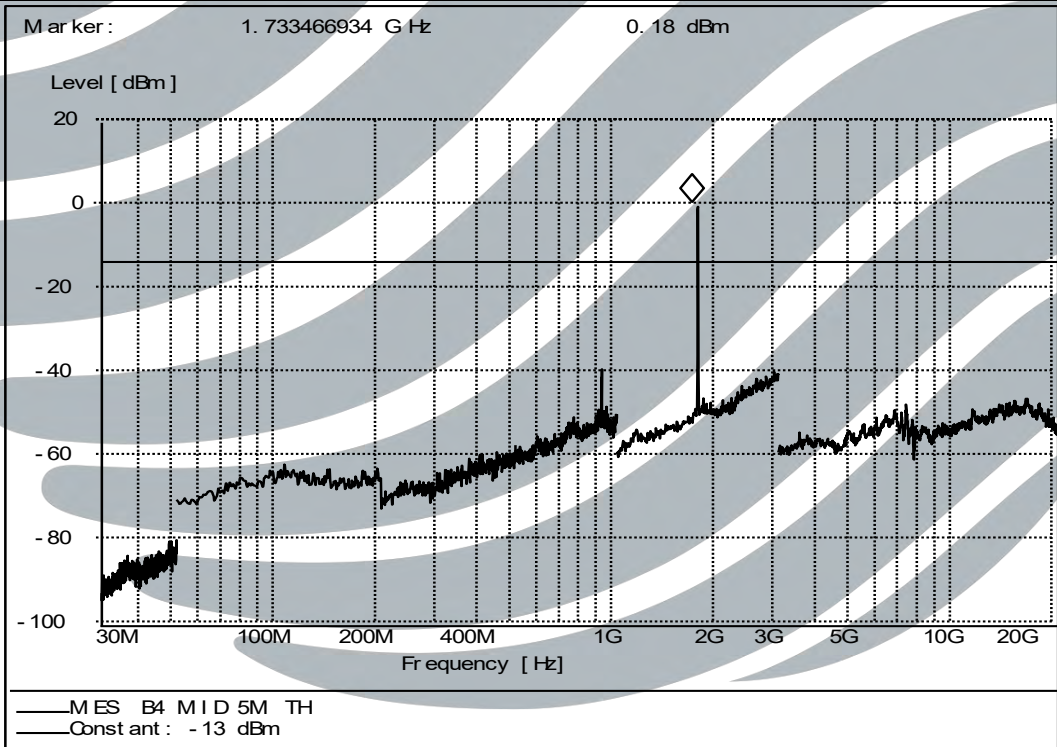
LTE Band 4; Bandwidth 3MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Horizontal



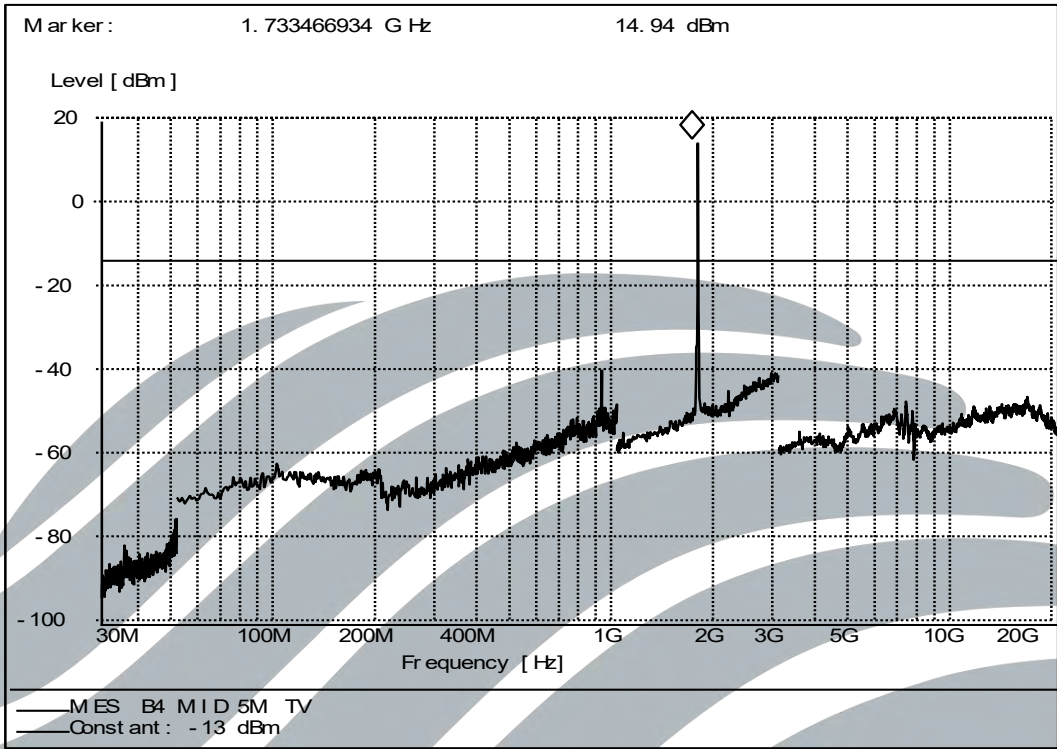
LTE Band 4; Bandwidth 3MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Verical



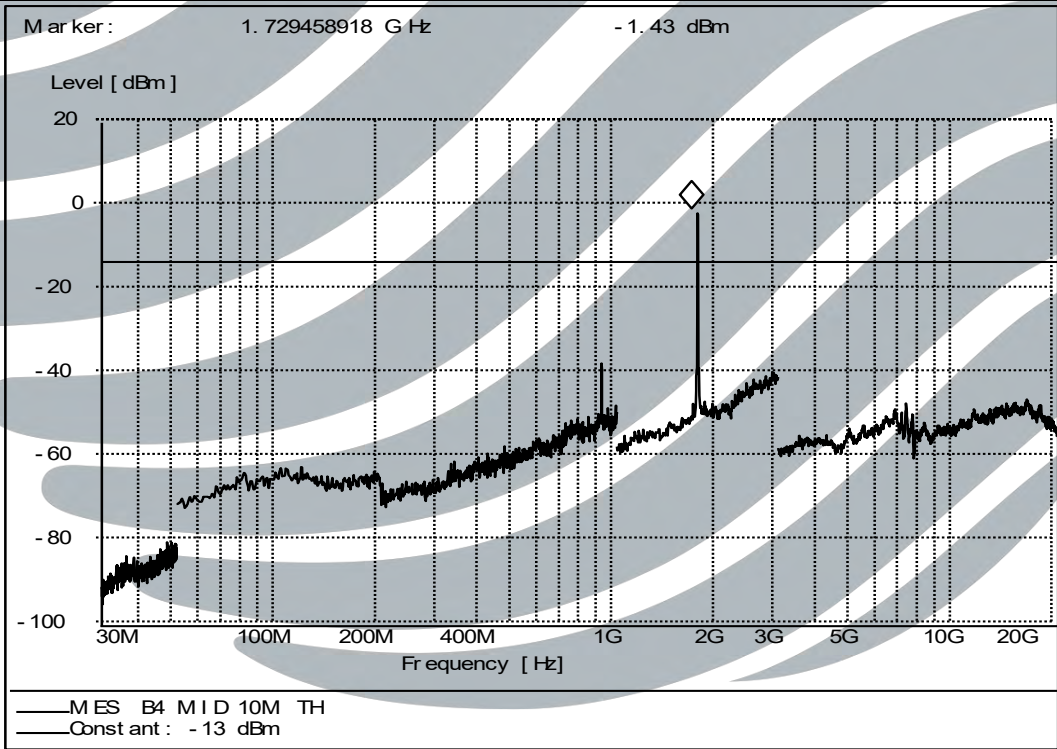
LTE Band 4; Bandwidth 5MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Horizontal



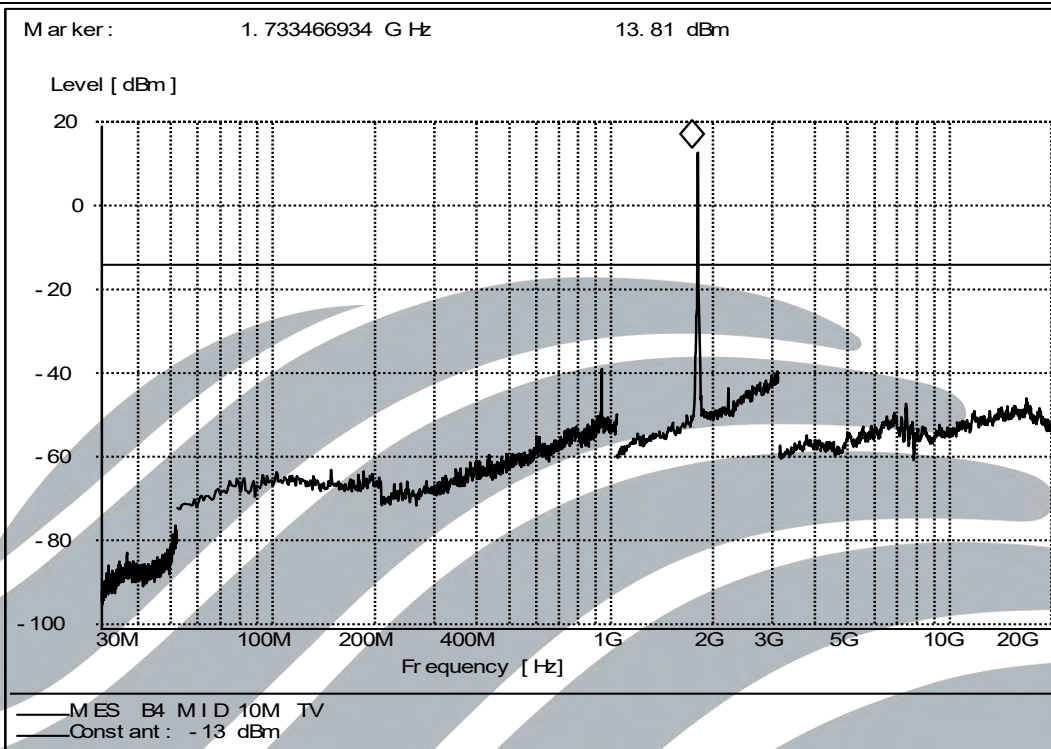
LTE Band 4; Bandwidth 5MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Vertical



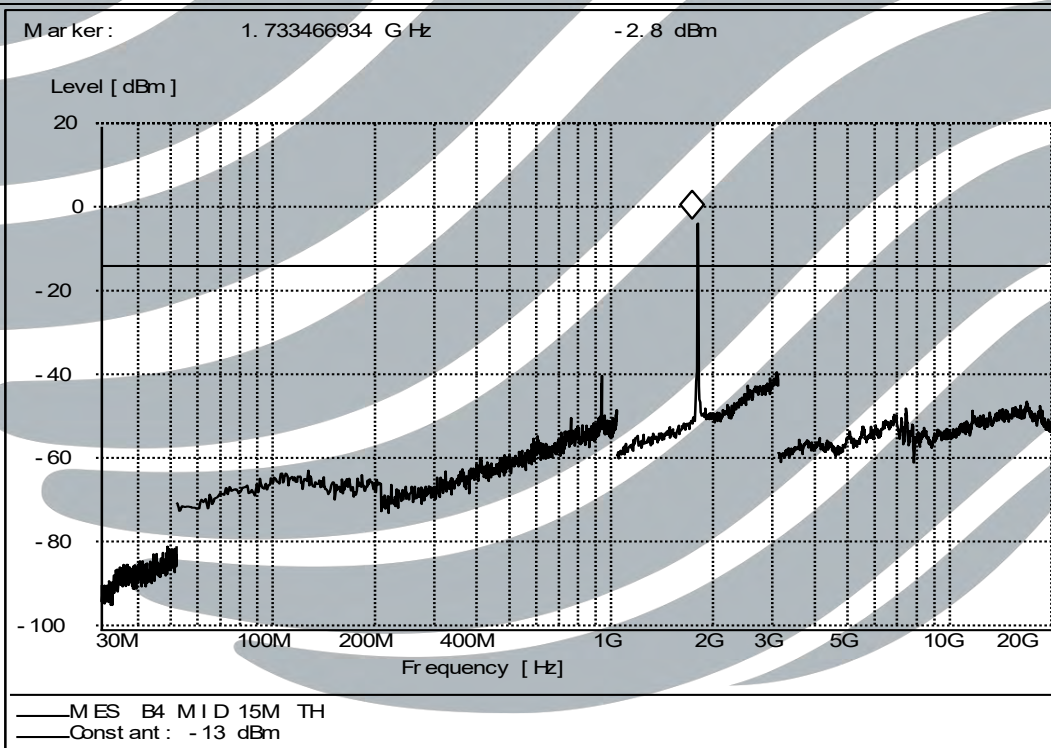
LTE Band 4; Bandwidth 10MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Horizontal



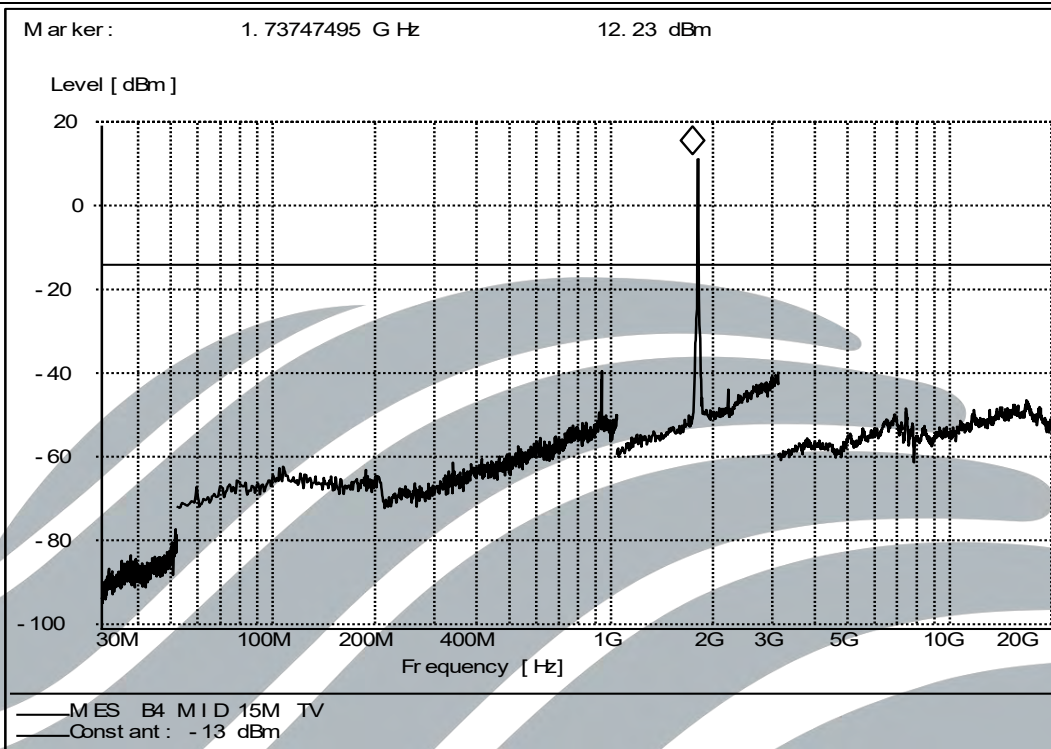
LTE Band 4; Bandwidth 10MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Vertical



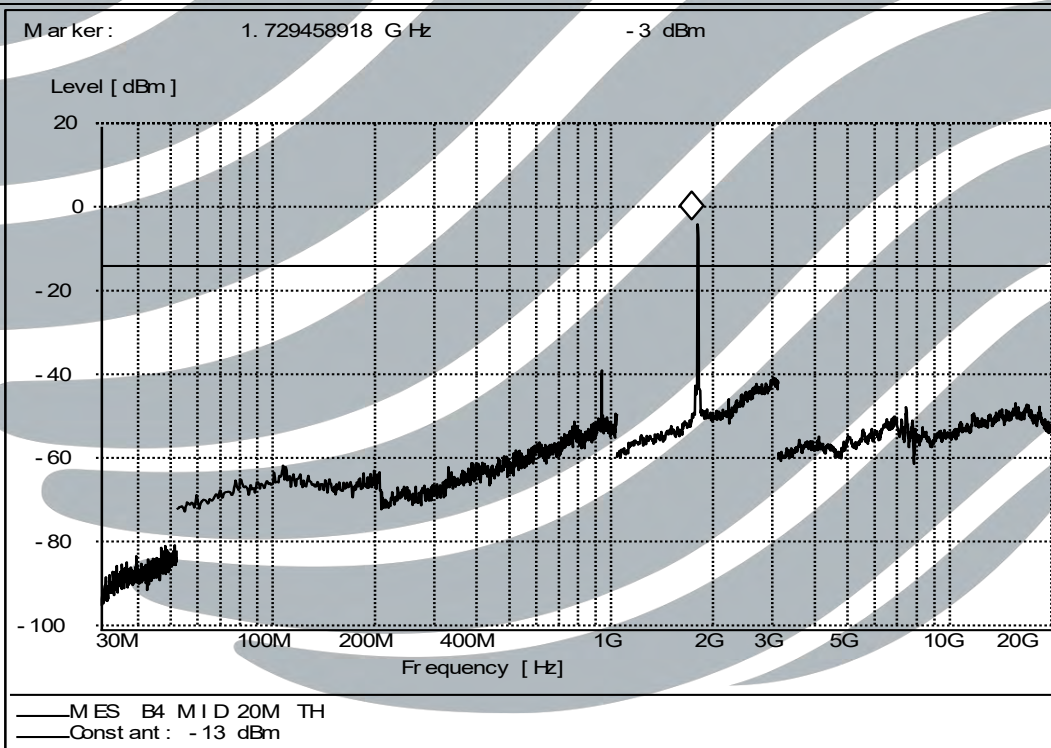
LTE Band 4; Bandwidth 15MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Horizontal



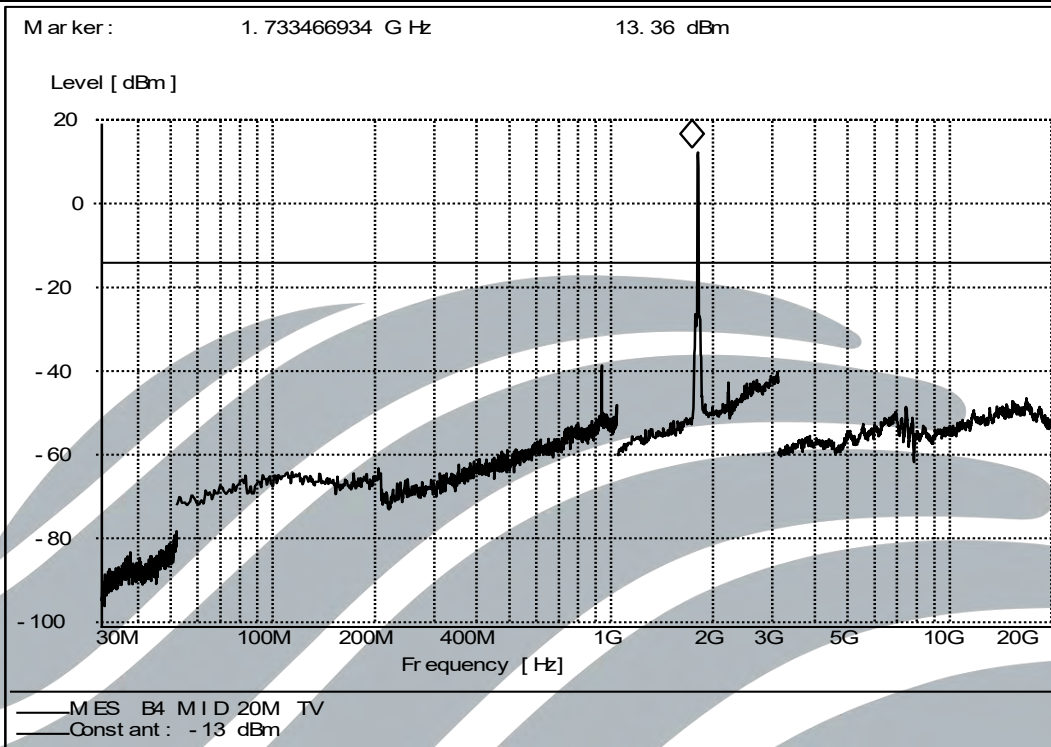
LTE Band 4; Bandwidth 15MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Vertical



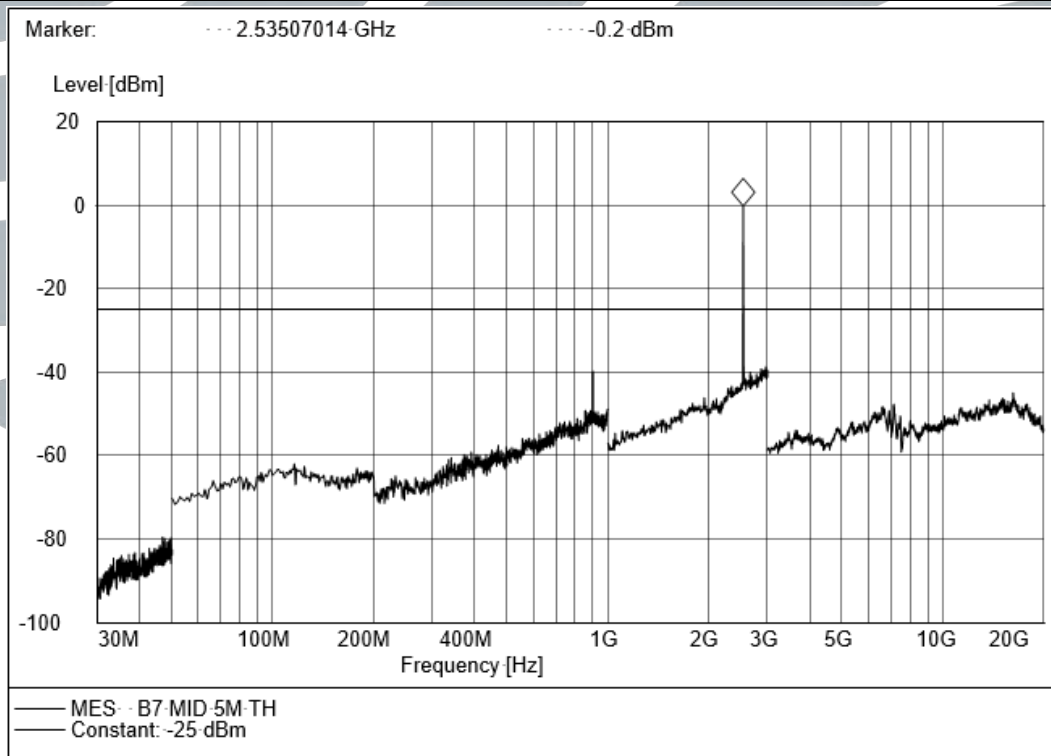
LTE Band 4; Bandwidth 20MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Horizontal



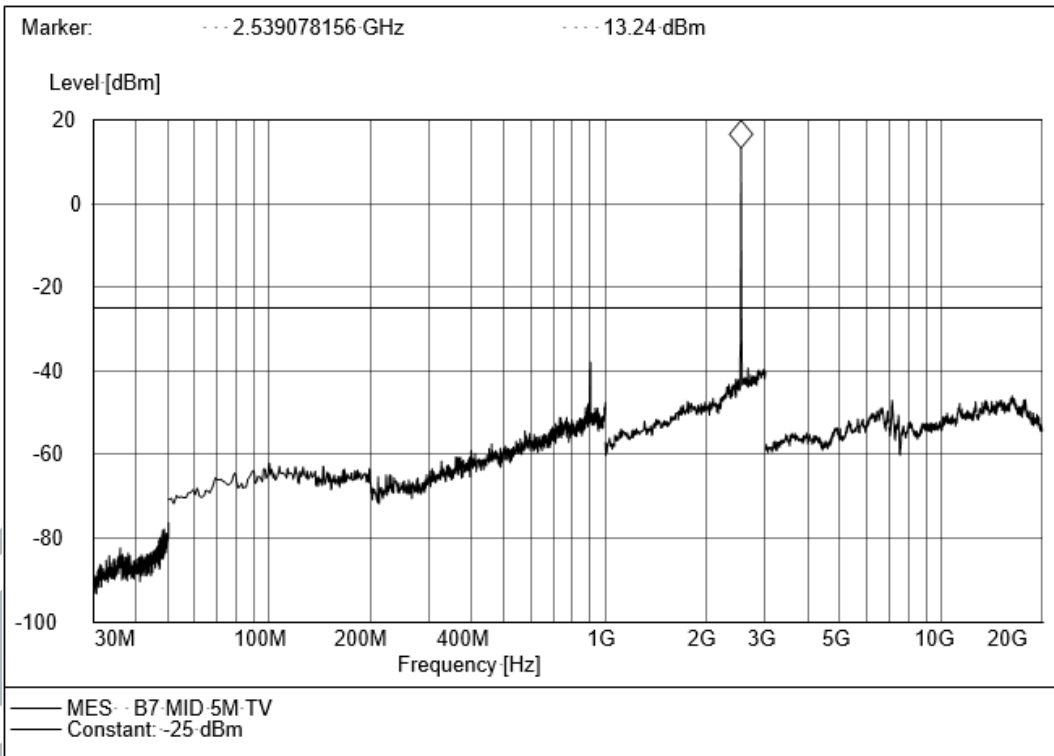
LTE Band 4; Bandwidth 20MHz; Modulation: QPSK; RB:1; Mid Channel: 20175/1732.5MHz_Vertical



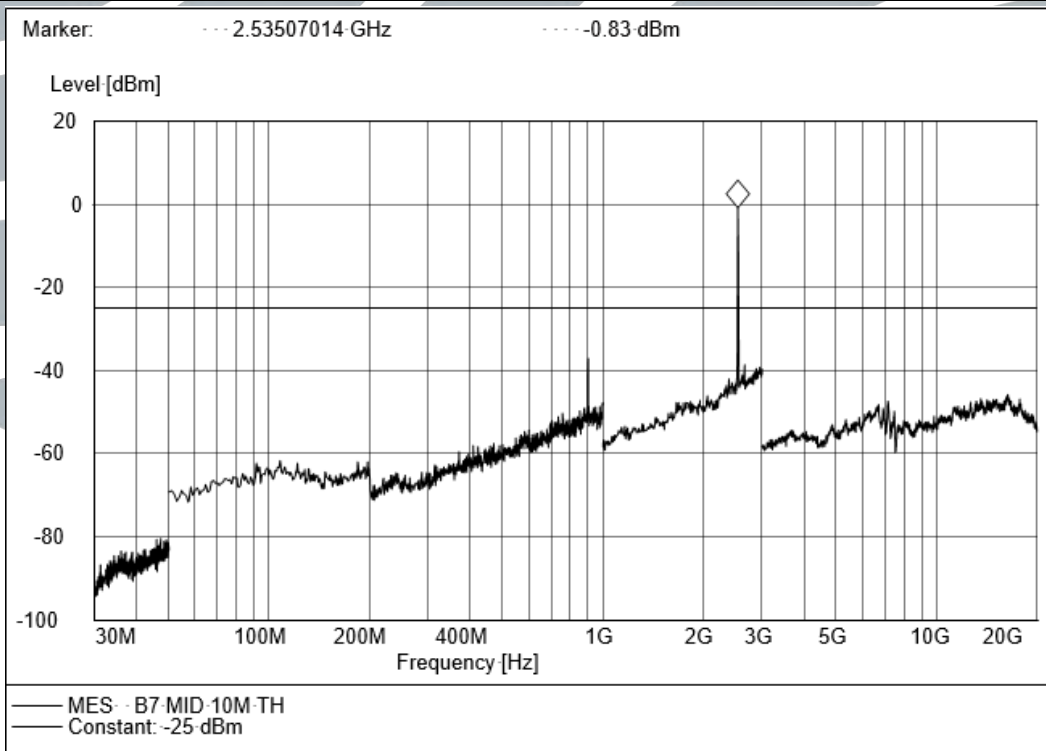
LTE Band 7; Bandwidth 5.0 MHz; Modulation: QPSK; RB:1; Mid Channel: 21100/2535MHz_Horizontal



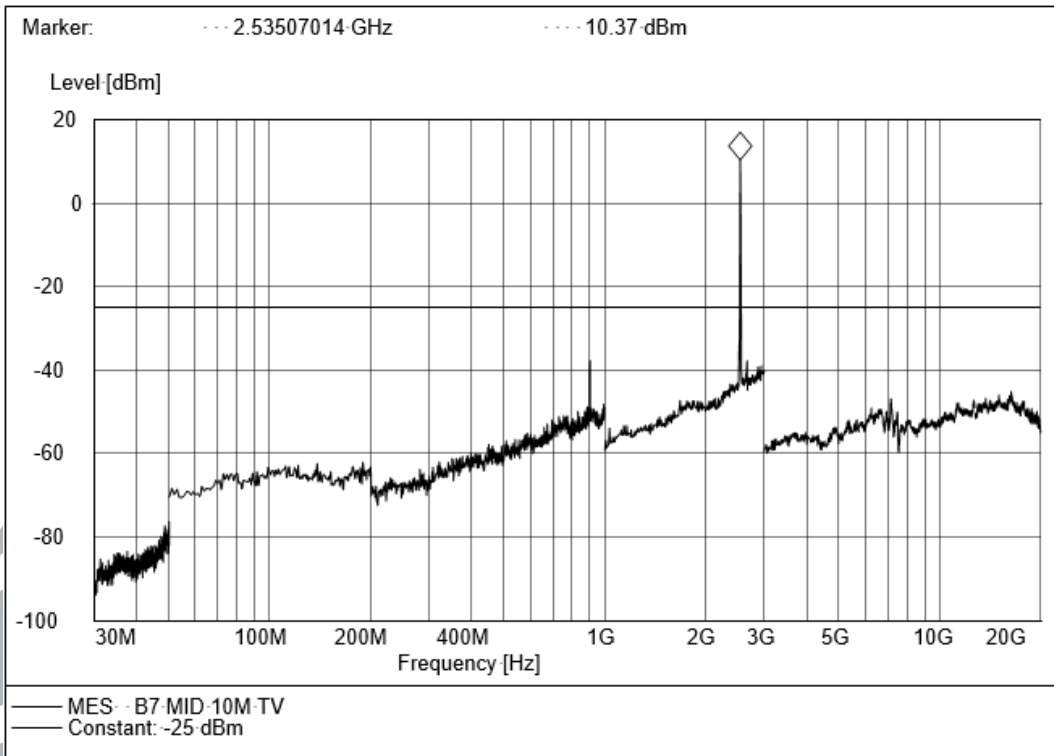
LTE Band 7; Bandwidth 5.0 MHz; Modulation: QPSK; RB:1; Mid Channel: 21100/2535MHz_Vertical



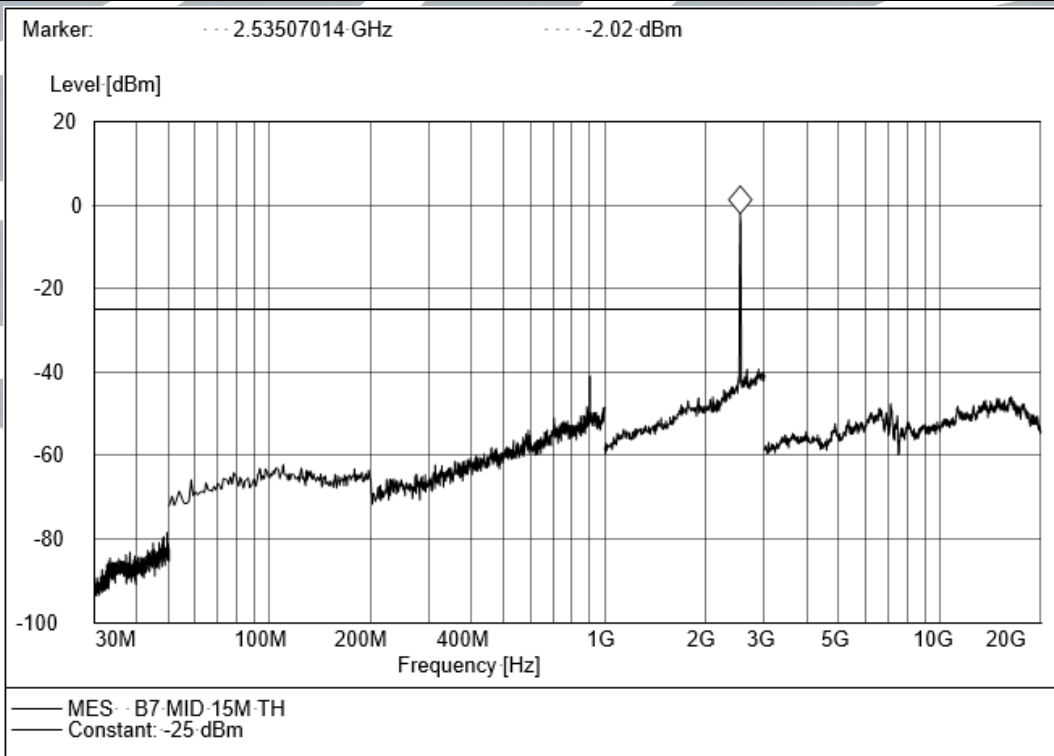
LTE Band 7; Bandwidth 10 MHz; Modulation: QPSK; RB:1;Mid Channel: 21100/2535MHz_Horizontal



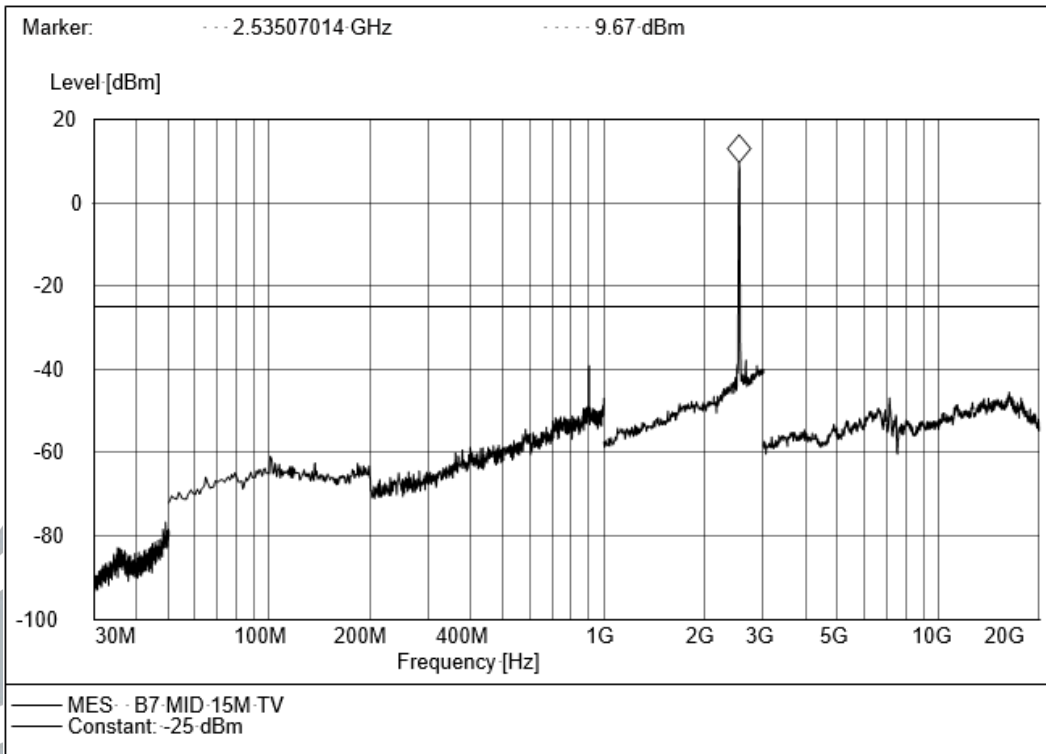
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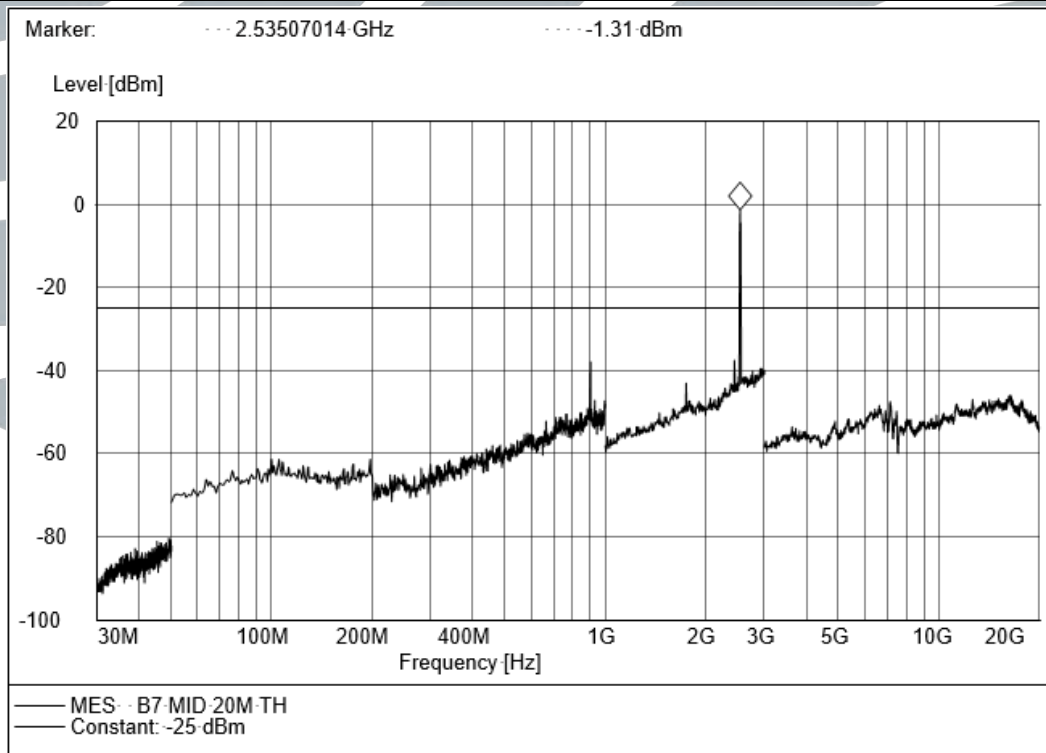
LTE Band 7; Bandwidth 15 MHz; Modulation: QPSK; RB:1;Mid Channel: 21100/2535MHz_Horizontal



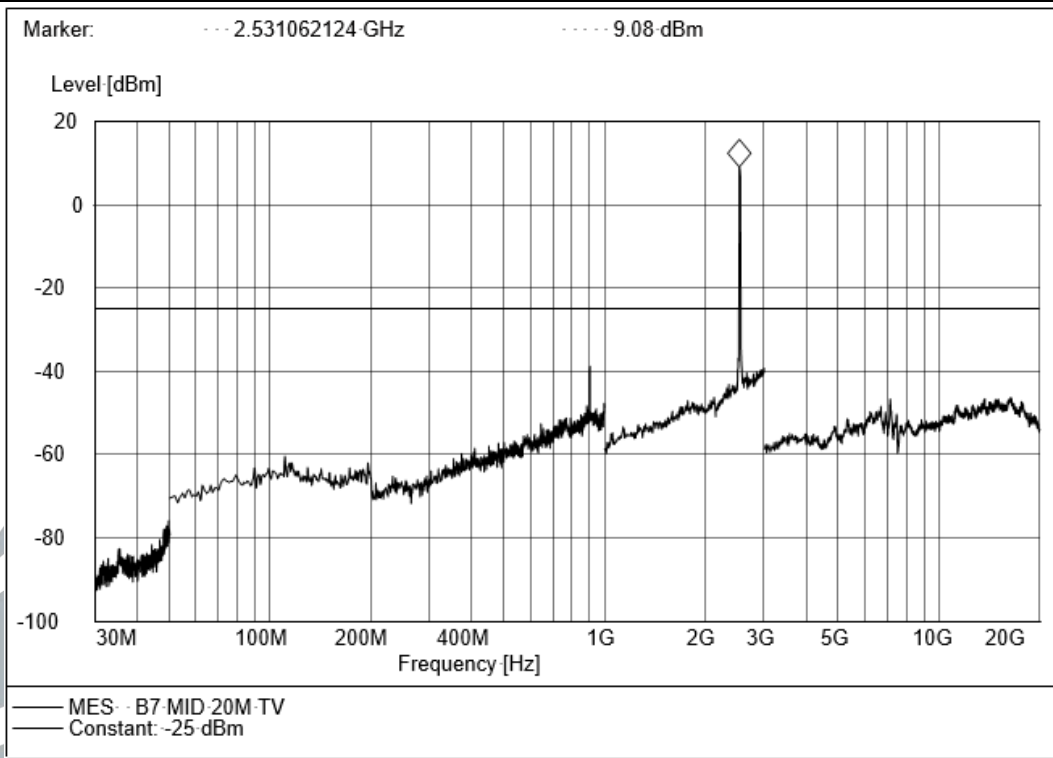
LTE Band 7; Bandwidth 15 MHz; Modulation: QPSK; RB:1; Mid Channel: 21100/2535MHz_Vertical



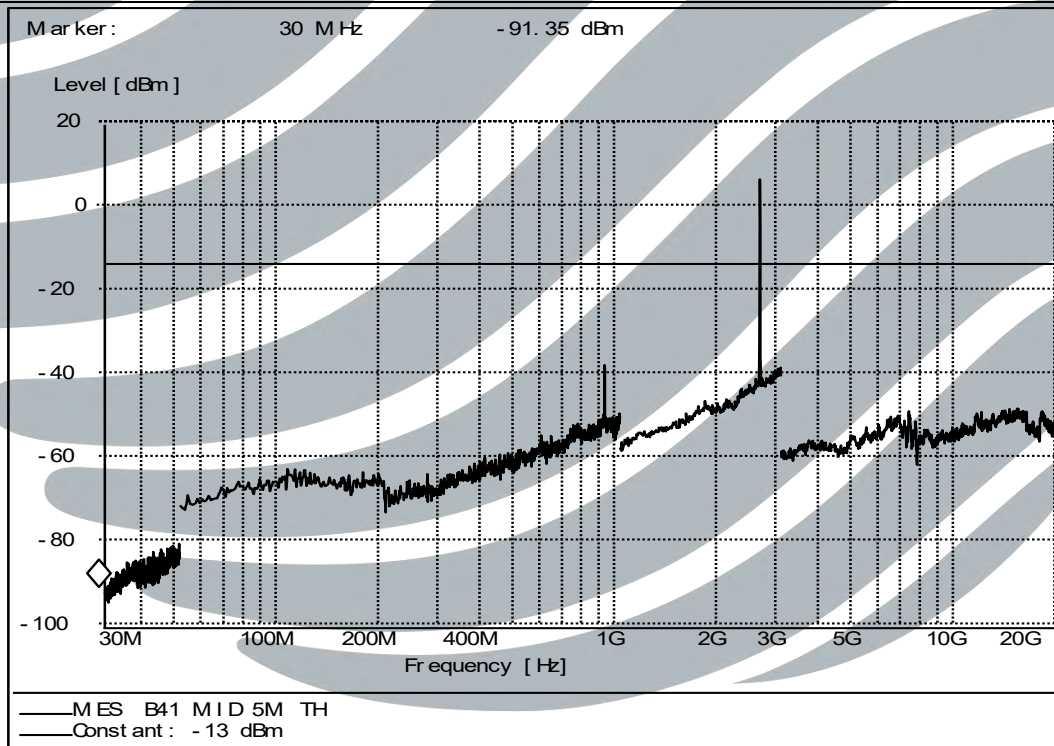
LTE Band 7; Bandwidth 20 MHz; Modulation: QPSK; RB:1;Mid Channel: 21100/2535MHz_Horizontal



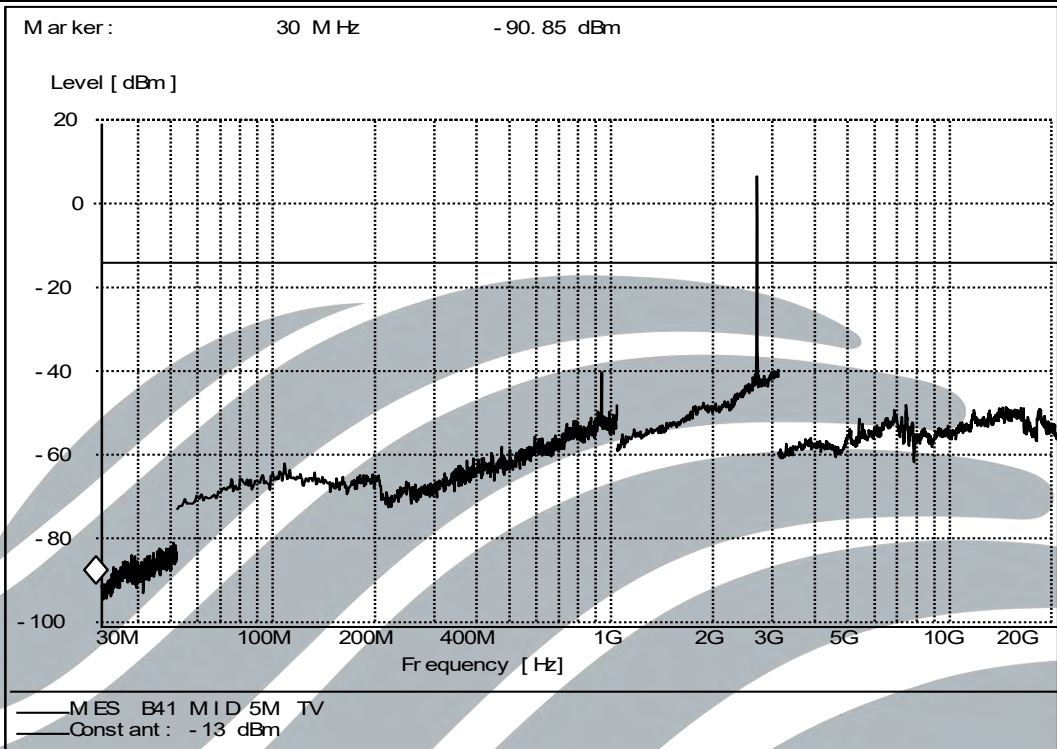
LTE Band 7; Bandwidth 20 MHz; Modulation: QPSK; RB:1; Mid Channel: 21100/2535MHz_Vertical



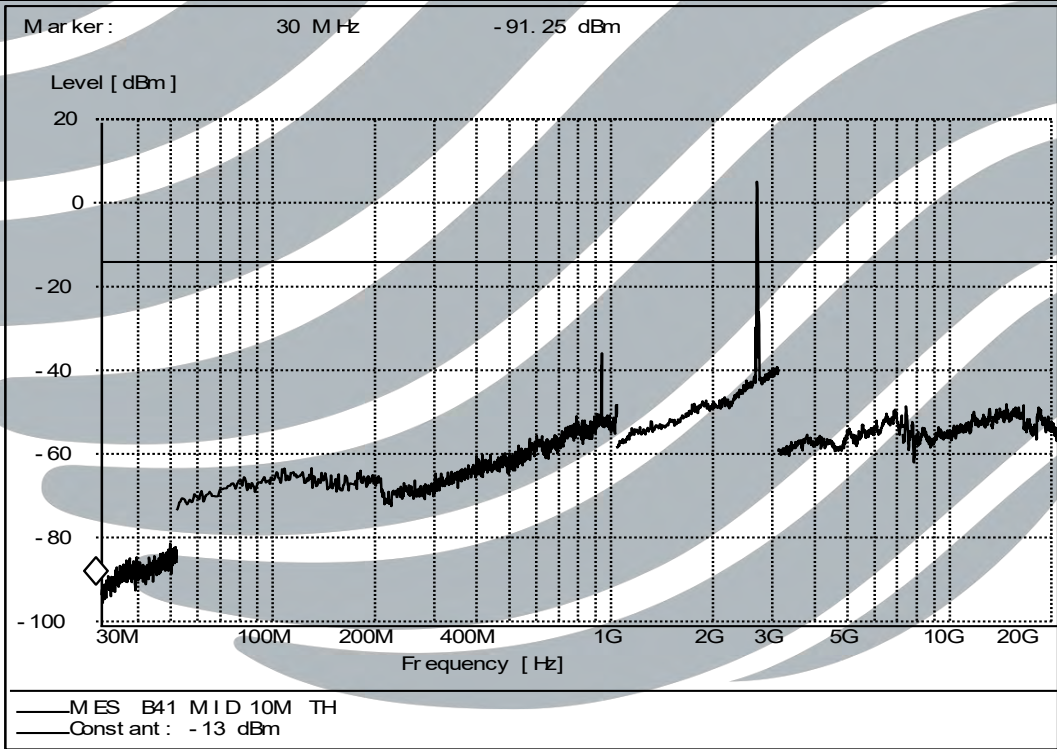
LTE Band 41; Bandwidth 5.0 MHz; Modulation: QPSK; RB:1; Mid Channel: 40740/2605MHz_Horizontal



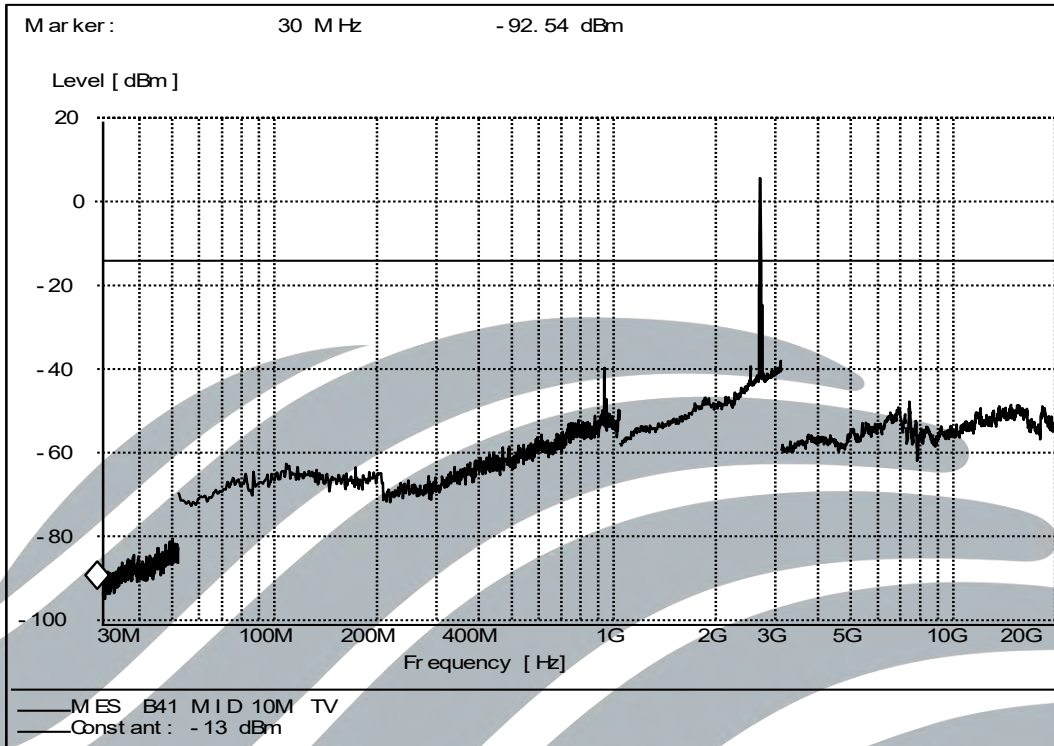
LTE Band 41; Bandwidth 5.0 MHz; Modulation: QPSK; RB:1; Mid Channel: 40740/2605MHz_Vertical



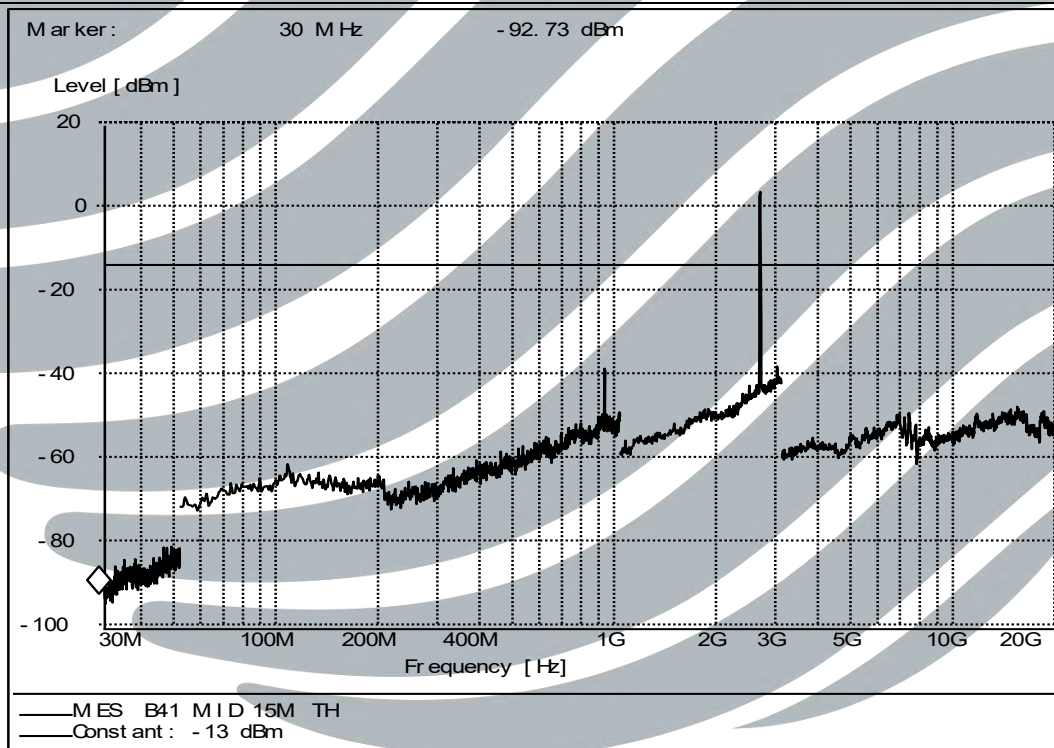
LTE Band 41; Bandwidth 10 MHz; Modulation: QPSK; RB:1;Mid Channel: 40740/2605MHz_Horizontal



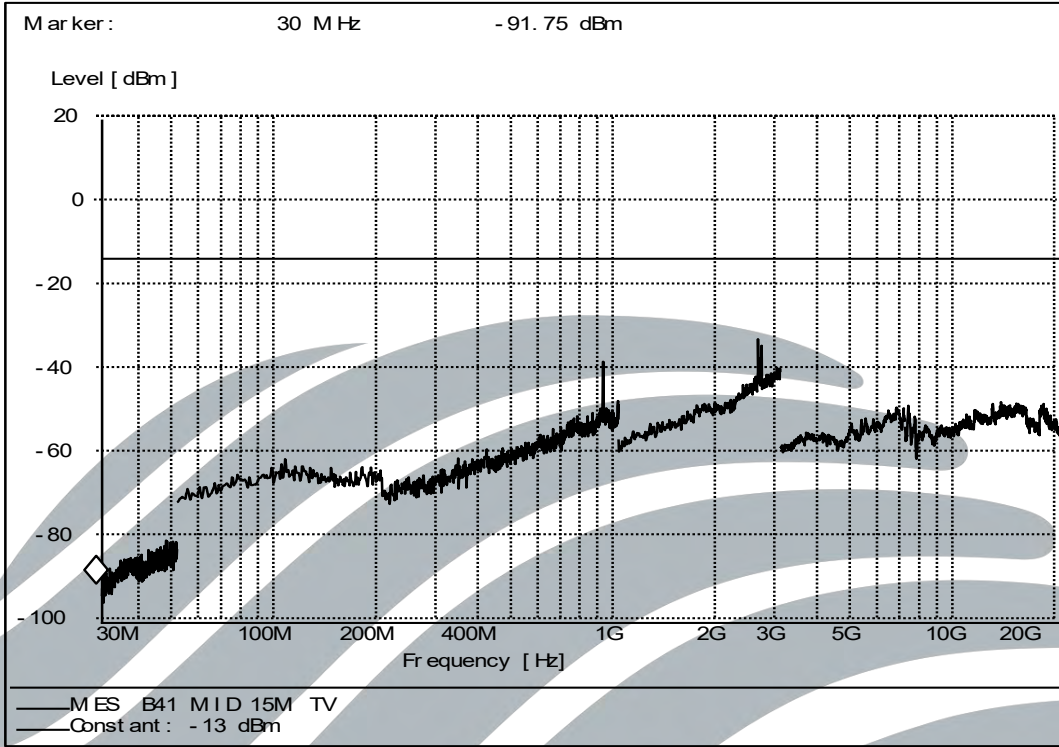
LTE Band 41; Bandwidth 10 MHz; Modulation: QPSK; RB:1; Mid Channel: 40740/2605MHz_Vertical



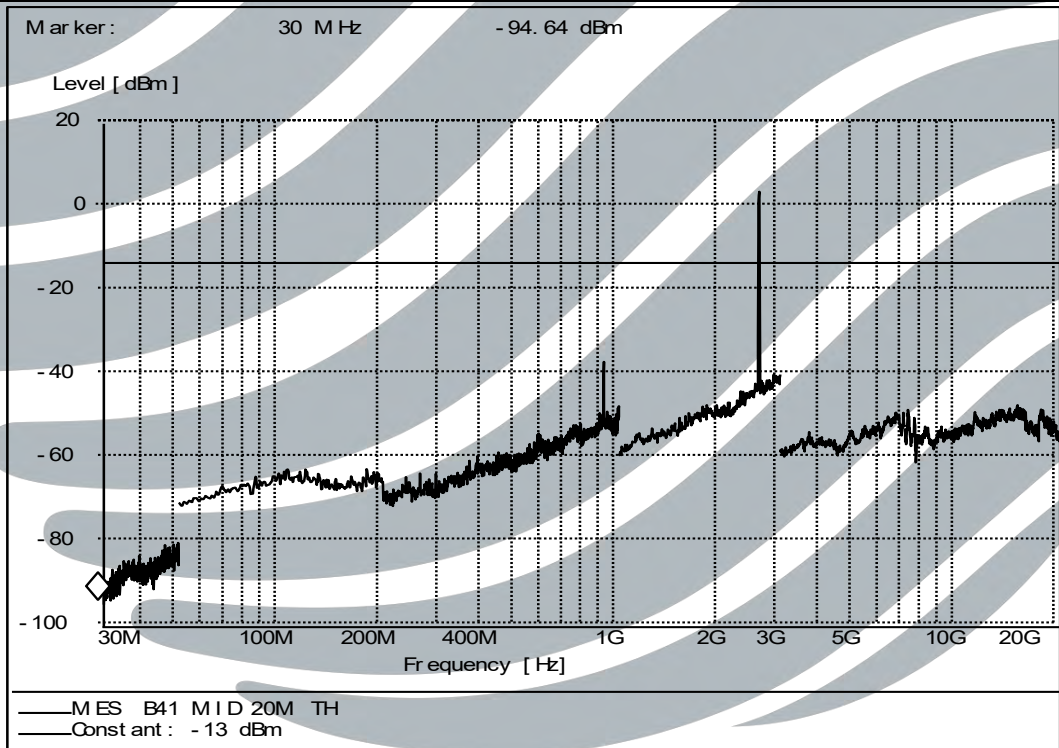
LTE Band 41; Bandwidth 15 MHz; Modulation: QPSK; RB:1;Mid Channel: 40740/2605MHz_Horizontal



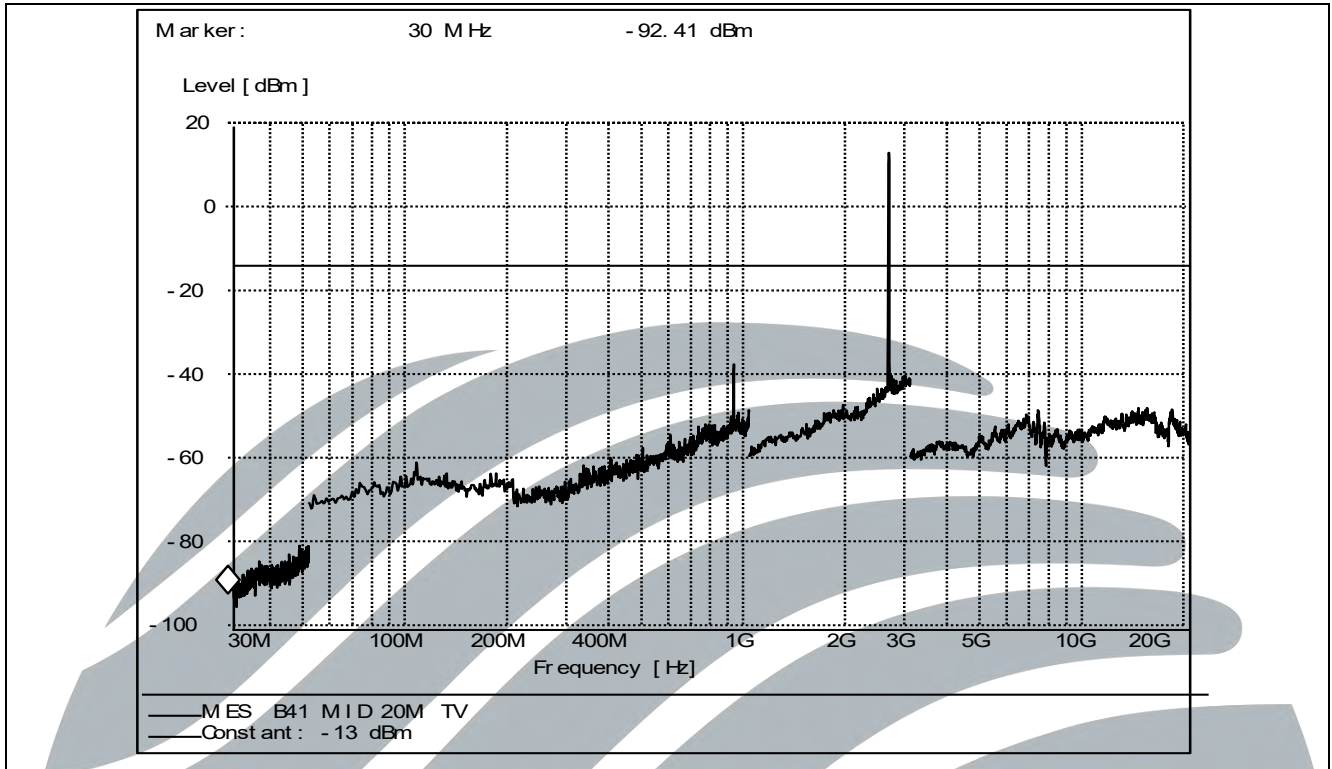
LTE Band 41; Bandwidth 15 MHz; Modulation: QPSK; RB:1; Mid Channel: 40740/2605MHz_Vertical



LTE Band 41; Bandwidth 20 MHz; Modulation: QPSK; RB:1;Mid Channel: 40740/2605MHz_Horizontal



LTE Band 41; Bandwidth 20 MHz; Modulation: QPSK; RB:1; Mid Channel: 40740/2605MHz_Vertical



Note:

1) Scan from 9 kHz to 20 GHz, the disturbance above 20 GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

5.8 Frequency stability

Test Requirement: Part 2.1055 & Part 24.235
Test Method: ANSI/TIA/EIA-603-D 2010 & KDB 971168 D01v02r02
Limit: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
Test Procedure: 1) Use CMW 500 or CMU 200 with Frequency Error measurement capability.
 a) Temp. = -30° to +50°C
 The applicant declared that the normal operating temperature of the EUT is from -30° to +50°C. The EUT would shut down automatically as below -10°C.
 b) Voltage = low voltage, 3.6Vdc, Normal, 3.84Vdc and High voltage, 4.35Vdc.
 The applicant defined the normal working voltage of the battery is from 3.6~4.35Vdc.
 2) Frequency Stability vs Temperature:
 The EUT is place inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50°C is reached.
 3) Frequency Stability vs Voltage:
 The peak frequency error is recorded (worst-case).
Test Setup: Refer to section 4.1.1(3) for details.
Instruments Used: Refer to section 3 for details
Test Mode: Link mode
Test Results: Pass
Test Data:

Modulation	Channel/Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/Fail	
LTE Band 4; Channel Bandwidth: 20 MHz								
QPSK	20175/1732.5	3.6	Normal	9	0.0052	± 2.5	PASS	
		3.84		5	0.0029	± 2.5	PASS	
		4.35		8	0.0046	± 2.5	PASS	
			50	10	0.0058	± 2.5	PASS	
			40	12	0.0069	± 2.5	PASS	
			30	7	0.0040	± 2.5	PASS	
			20	5	0.0029	± 2.5	PASS	
			20	9	0.0052	± 2.5	PASS	
			3.84	0	10	0.0058	± 2.5	PASS
				-10	9	0.0052	± 2.5	PASS
				-20	11	0.0063	± 2.5	PASS
				-30	12	0.0069	± 2.5	PASS
				50	10	0.0058	± 2.5	PASS
				40	12	0.0069	± 2.5	PASS

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
LTE Band 7; Channel Bandwidth: 20 MHz							
QPSK	21100/ 2535	3.6	Normal	-14	-0.0055	± 2.5	PASS
		3.84		-11	-0.0043	± 2.5	PASS
		4.35		-13	-0.0051	± 2.5	PASS
		3.84	50	-19	-0.0075	± 2.5	PASS
			40	-16	-0.0063	± 2.5	PASS
			30	-20	-0.0079	± 2.5	PASS
			20	-11	-0.0043	± 2.5	PASS
			20	5	0.0020	± 2.5	PASS
			0	6	0.0024	± 2.5	PASS
			-10	11	0.0043	± 2.5	PASS
			-20	9	0.0036	± 2.5	PASS
			-30	10	0.0039	± 2.5	PASS
			50	-19	-0.0075	± 2.5	PASS
			40	-16	-0.0063	± 2.5	PASS

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
LTE Band 41; Channel Bandwidth: 20 MHz							
QPSK	40740/ 2605	3.6	Normal	12	0.0046	± 2.5	PASS
		3.84		9	0.0035	± 2.5	PASS
		4.35		15	0.0058	± 2.5	PASS
		3.84	50	17	0.0066	± 2.5	PASS
			40	14	0.0054	± 2.5	PASS
			30	12	0.0046	± 2.5	PASS
			20	9	0.0035	± 2.5	PASS
			20	15	0.0058	± 2.5	PASS
			0	16	0.0062	± 2.5	PASS
			-10	17	0.0066	± 2.5	PASS
			-20	20	0.0077	± 2.5	PASS
			-30	19	0.0073	± 2.5	PASS
			50	17	0.0066	± 2.5	PASS
			40	14	0.0054	± 2.5	PASS

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

See test photographs attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photographs.

*** End of Report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.