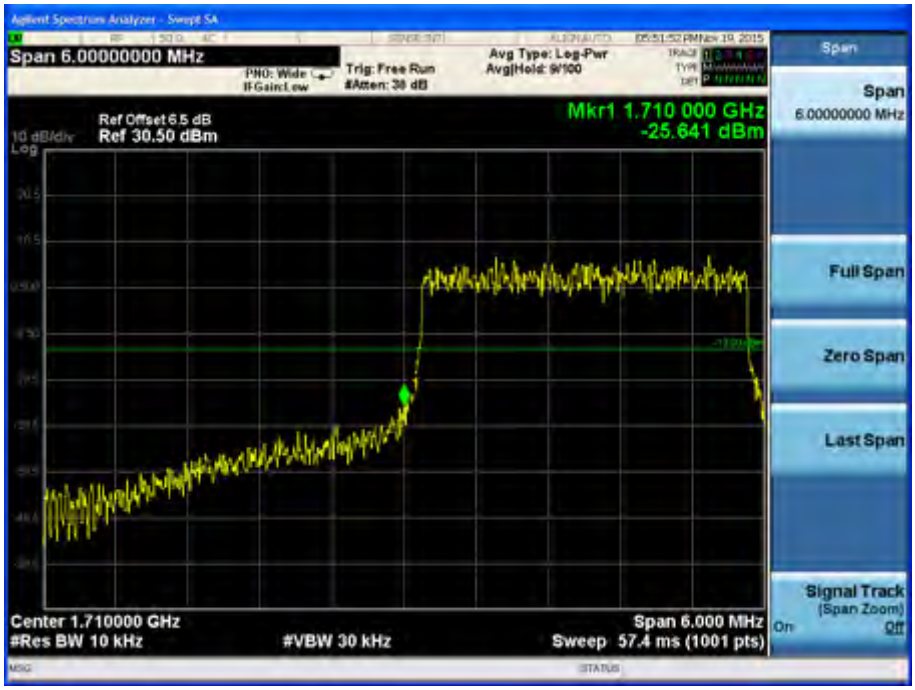


Fig.4

Fig.5

Fig.6

Fig.7

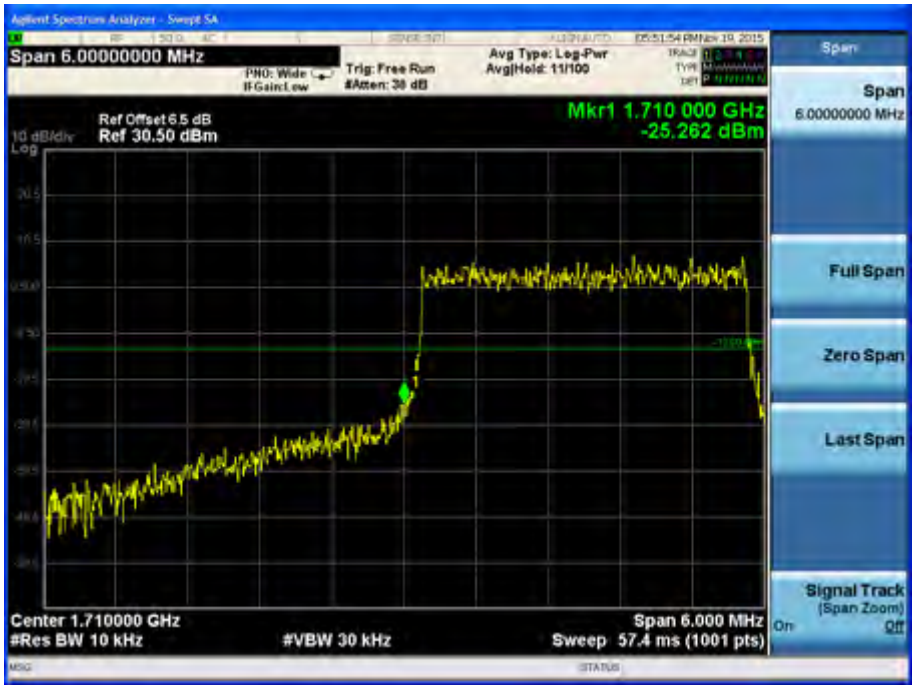


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
4	1753.5	20385	3	1	0	Fig.1	Fig.5
				1	14	Fig.2	Fig.6
				8	4	Fig.3	Fig.7
				15	0	Fig.4	Fig.8

Fig.1

Fig.2

Fig.3

Fig.4

Fig.5

Fig.6

Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
4	1712.5	19975	5	1	0	Fig.1	Fig.5
				1	24	Fig.2	Fig.6
				12	6	Fig.3	Fig.7
				25	0	Fig.4	Fig.8

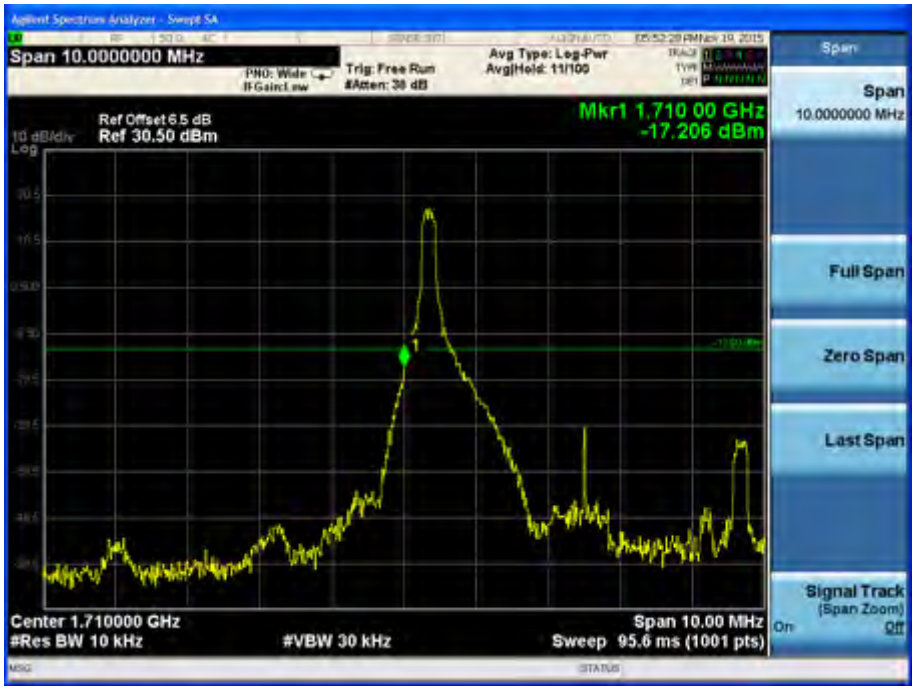


Fig.1

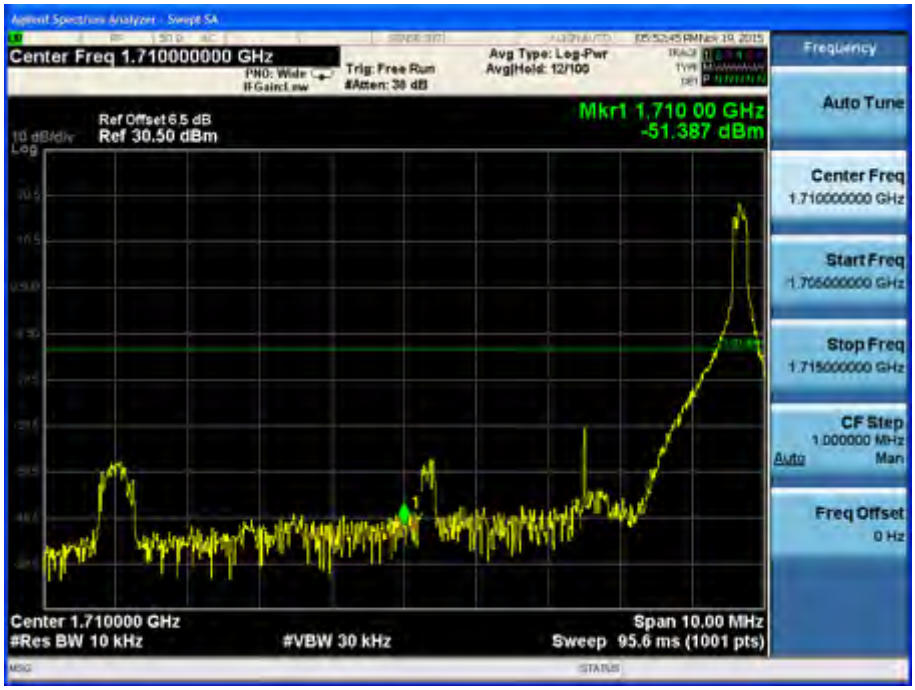


Fig.2

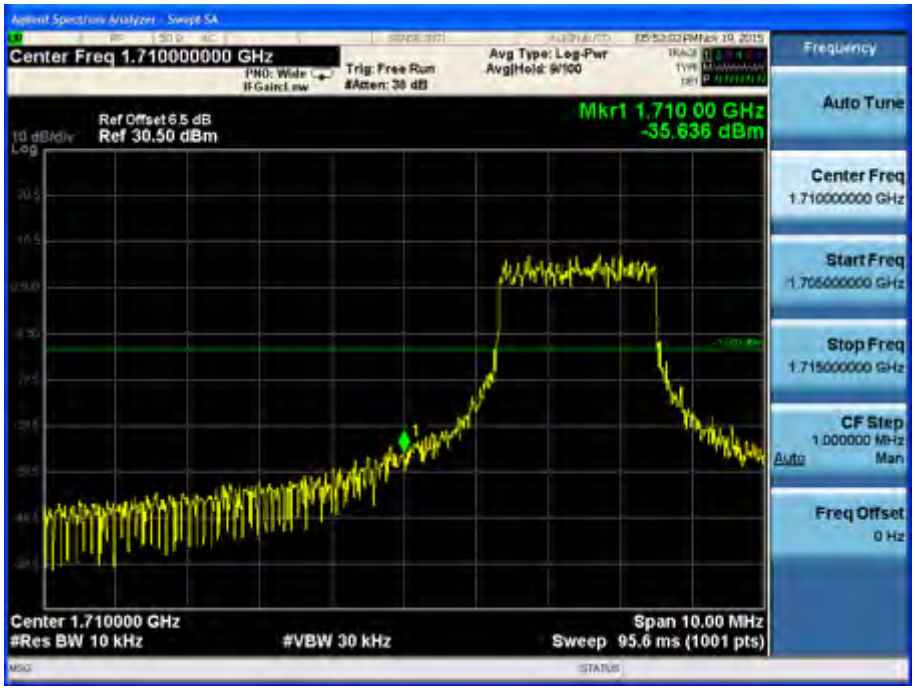


Fig.3

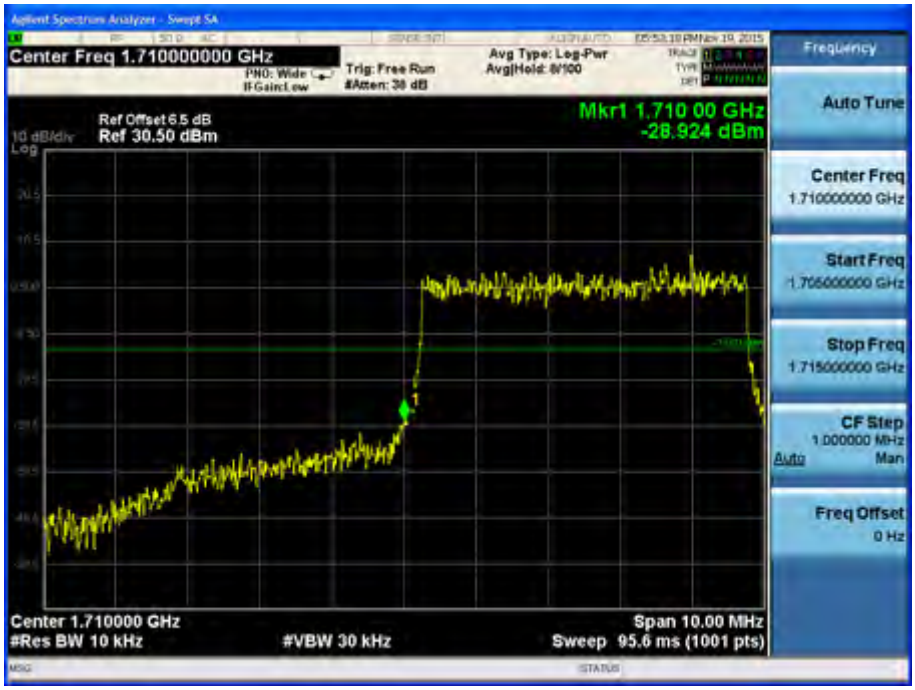


Fig.4

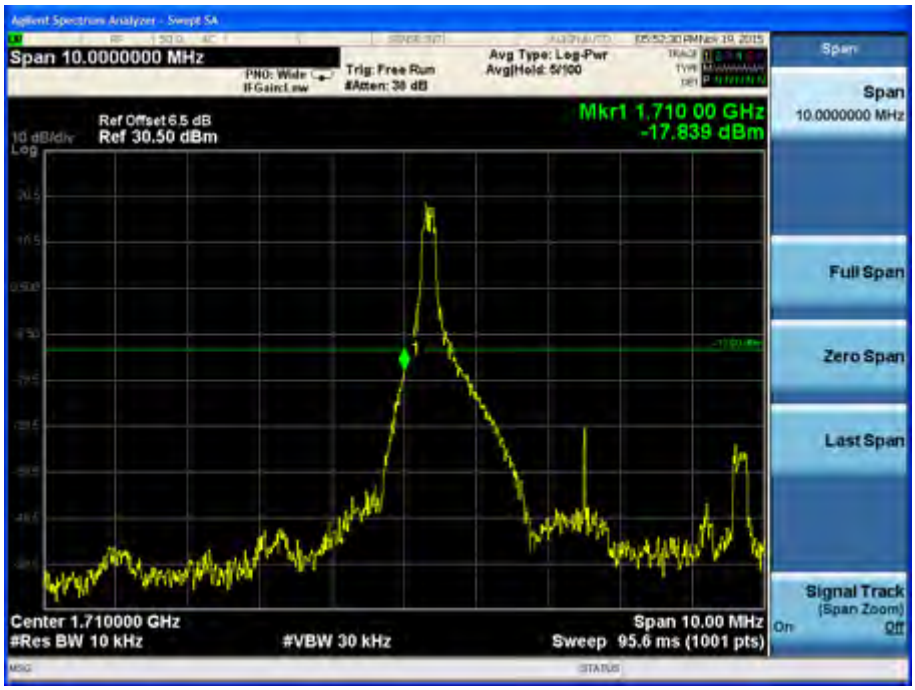


Fig.5

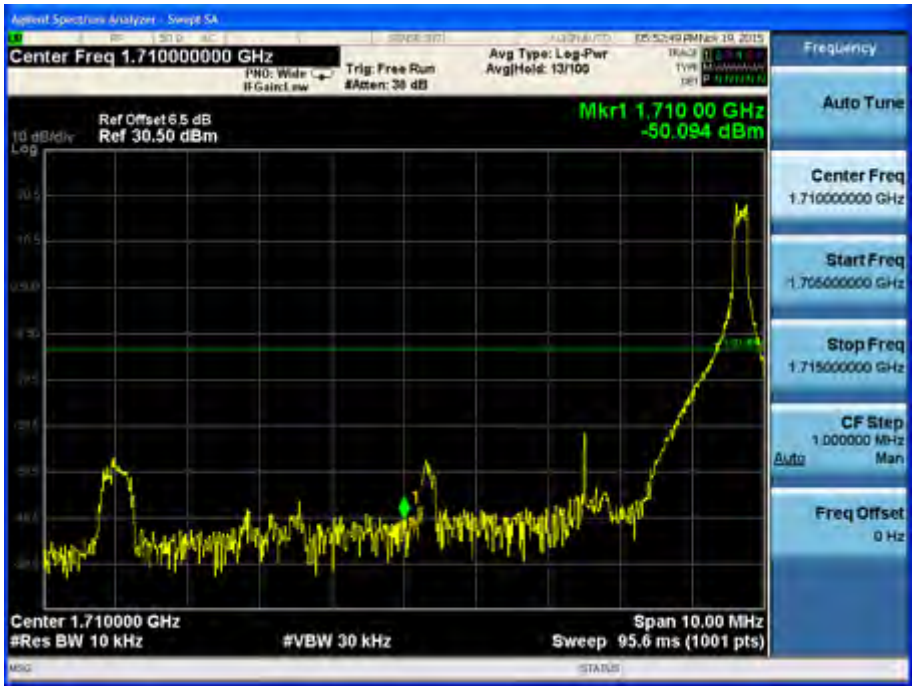


Fig.6

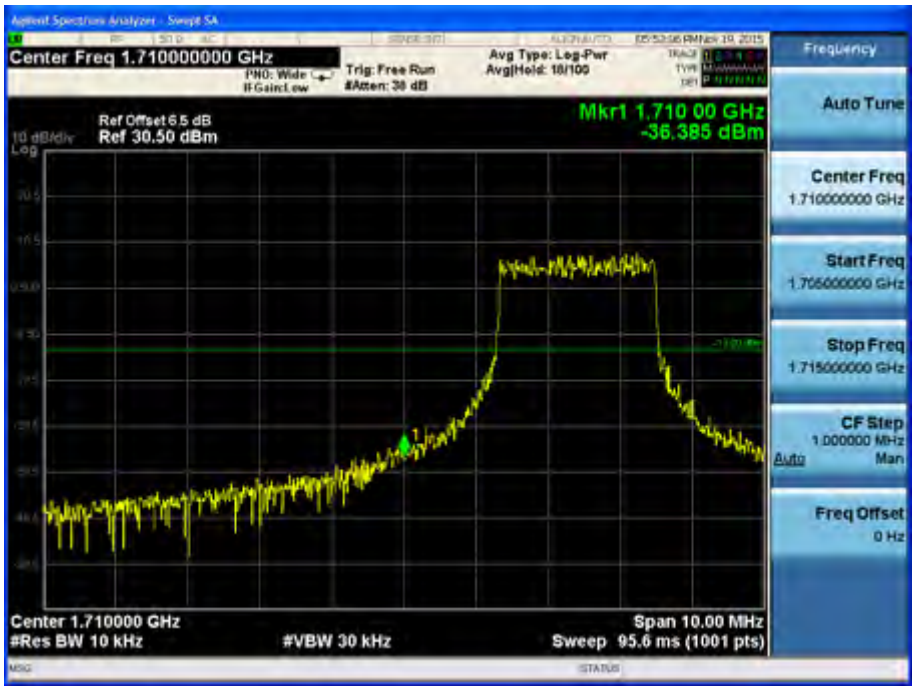


Fig.7

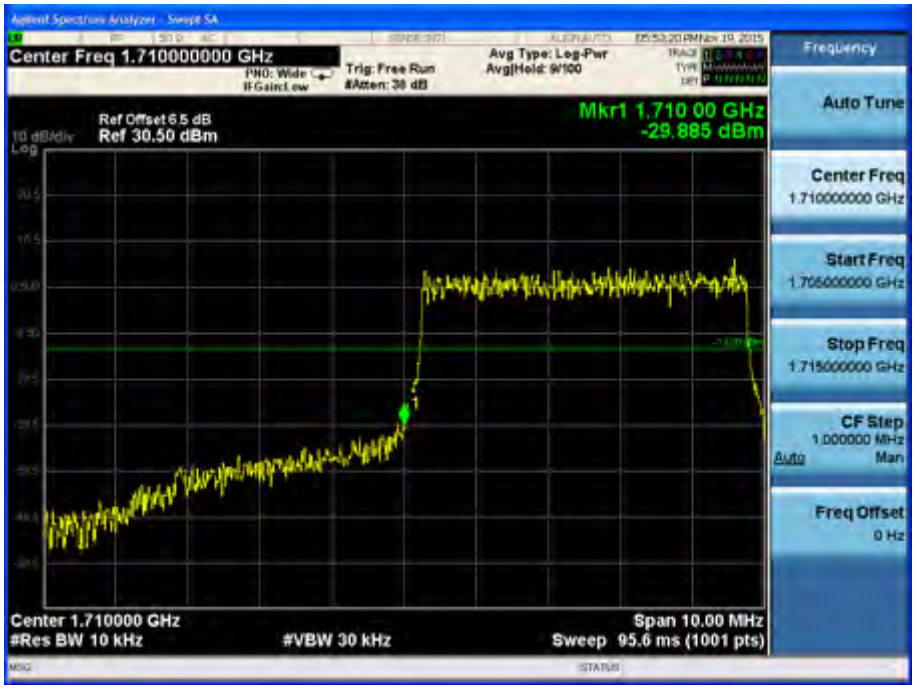


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
4	1752.5	20375	5	1	0	Fig.1	Fig.5
				1	24	Fig.2	Fig.6
				12	6	Fig.3	Fig.7
				25	0	Fig.4	Fig.8

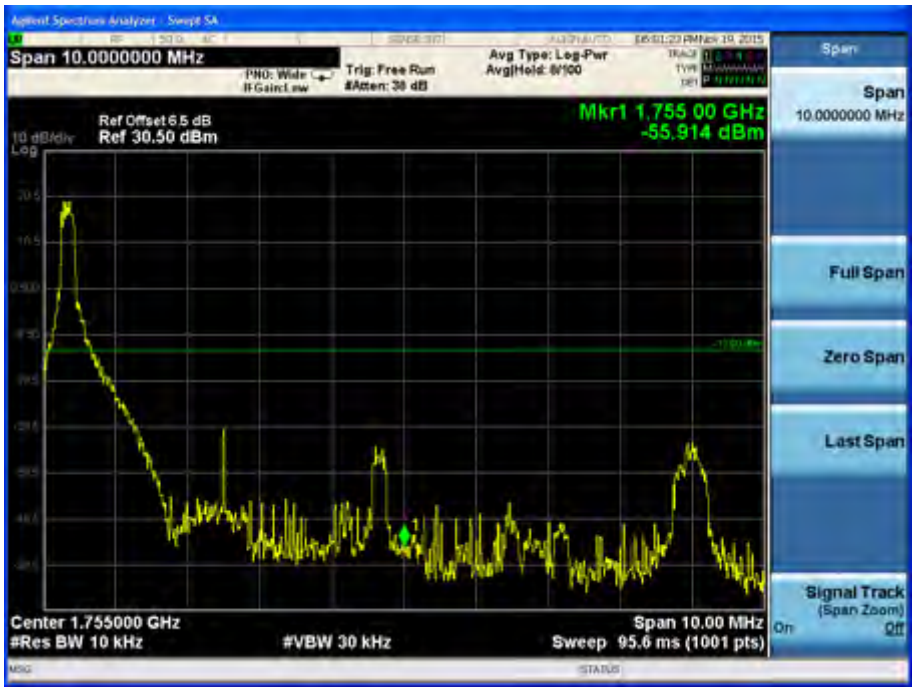


Fig.1

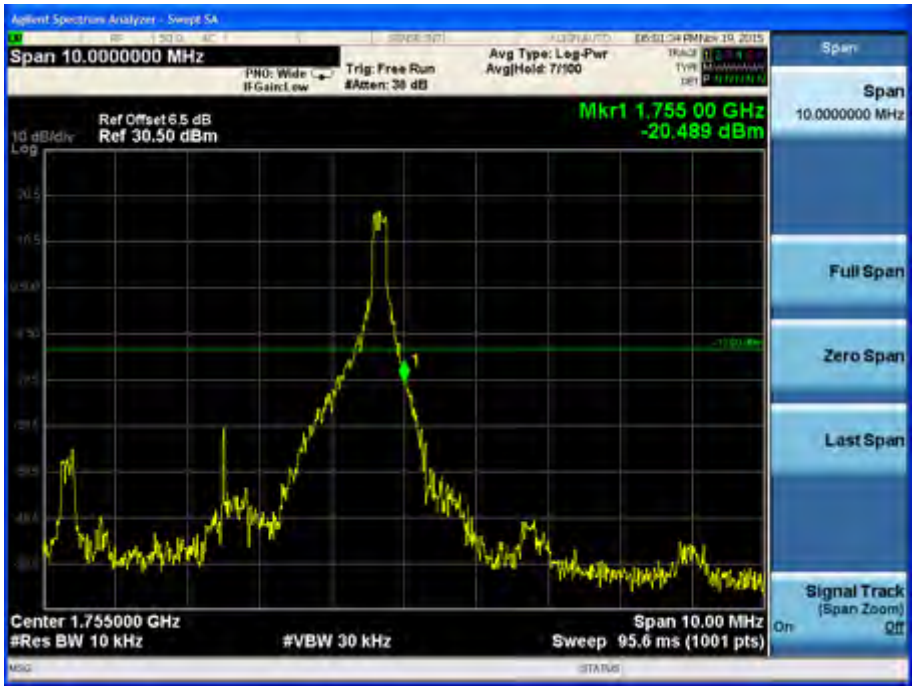


Fig.2

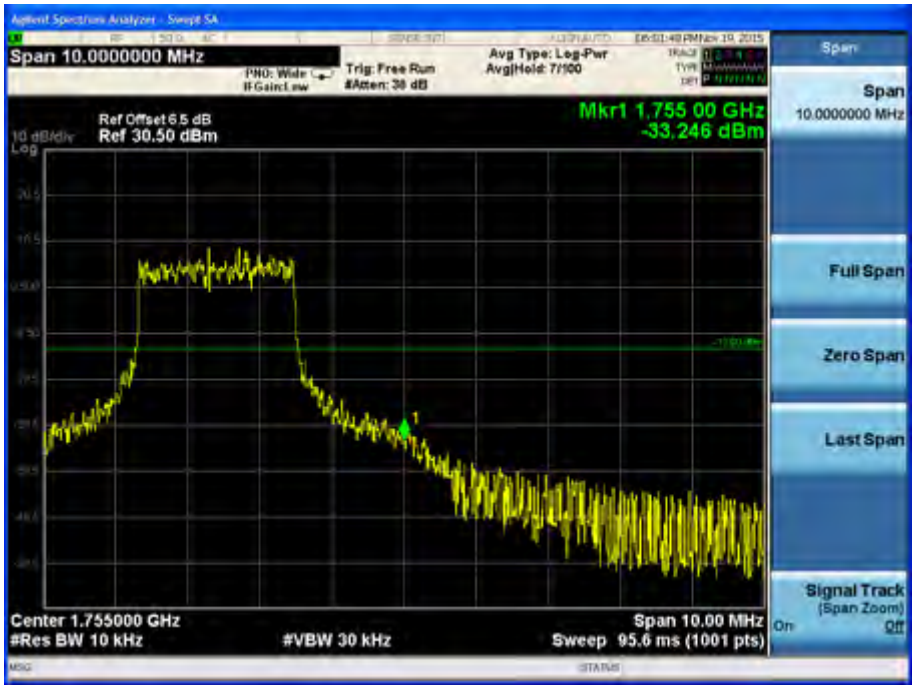


Fig.3

Fig.4

Fig.5

Fig.6

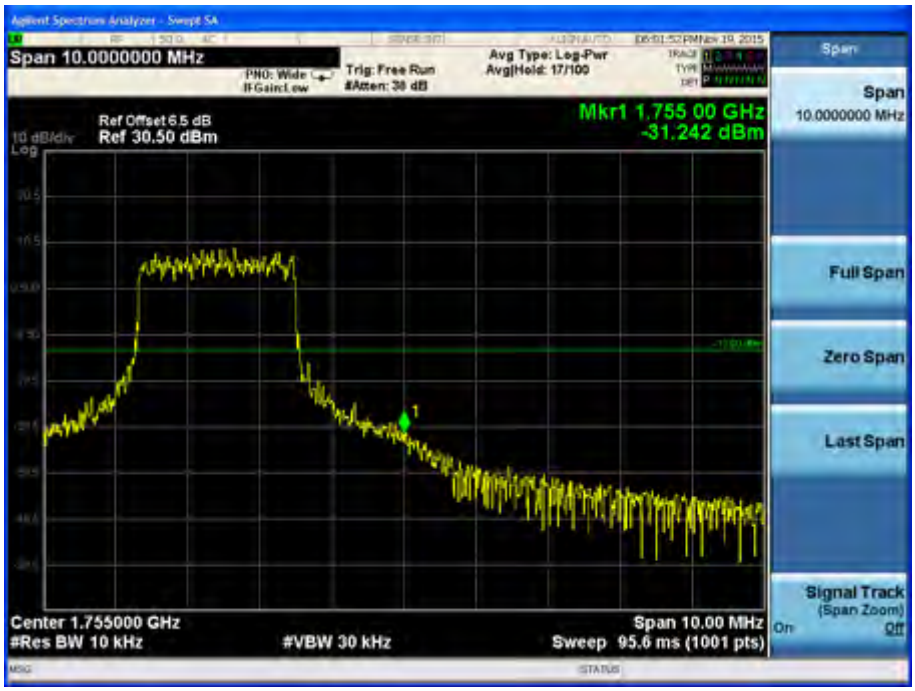


Fig.7

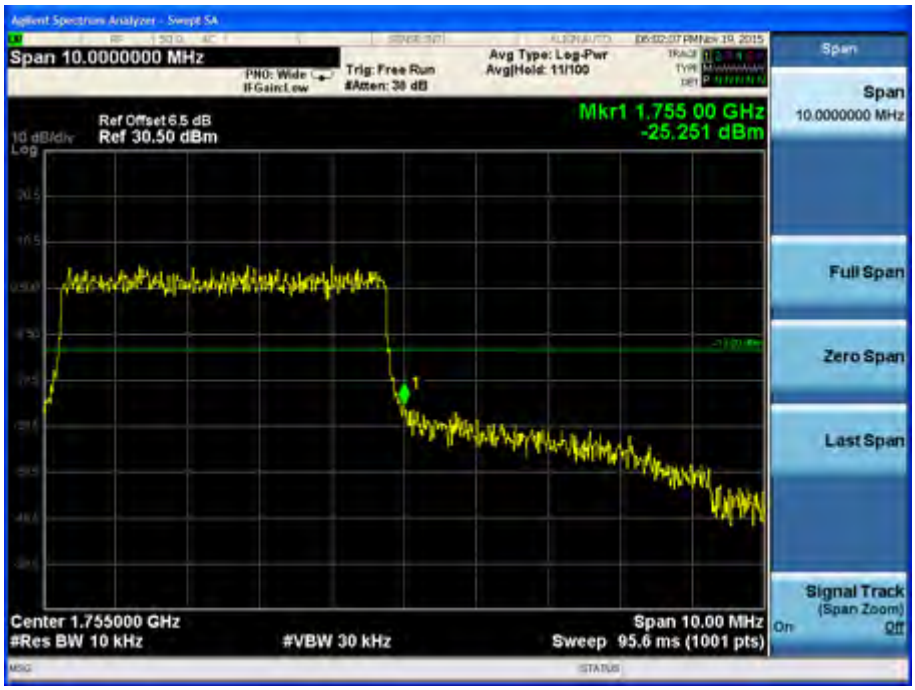


Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
4	1715	20000	10	1	0	Fig.1	Fig.5
				1	49	Fig.2	Fig.6
				24	12	Fig.3	Fig.7
				50	0	Fig.4	Fig.8

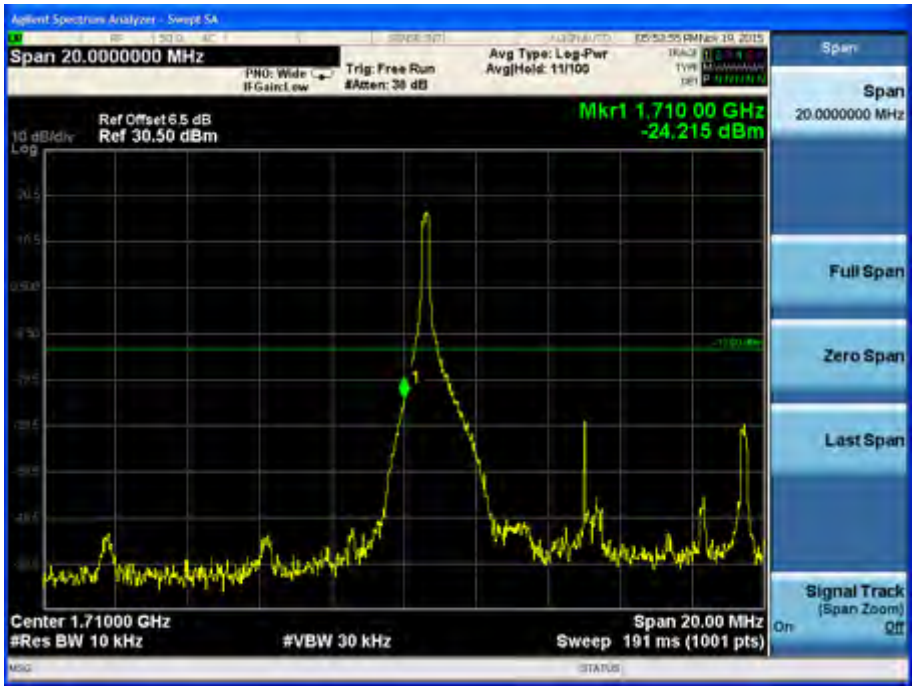


Fig.1

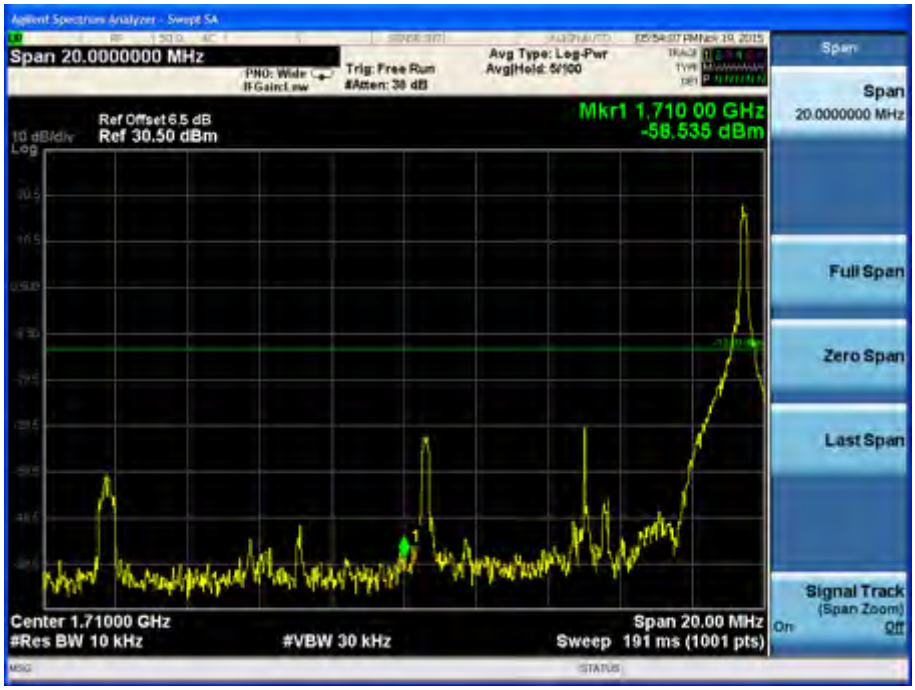


Fig.2

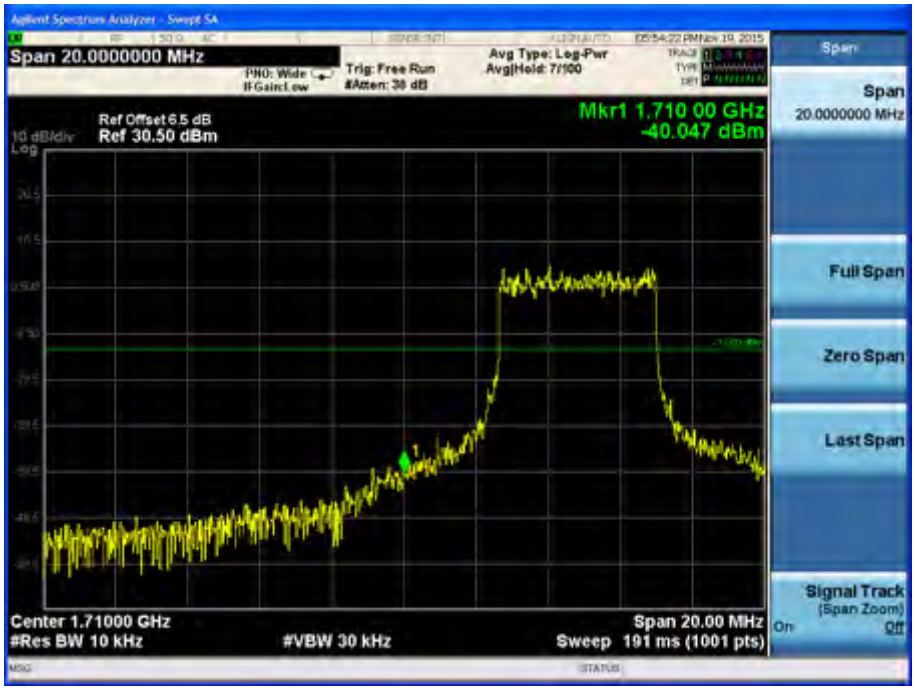


Fig.3

Fig.4

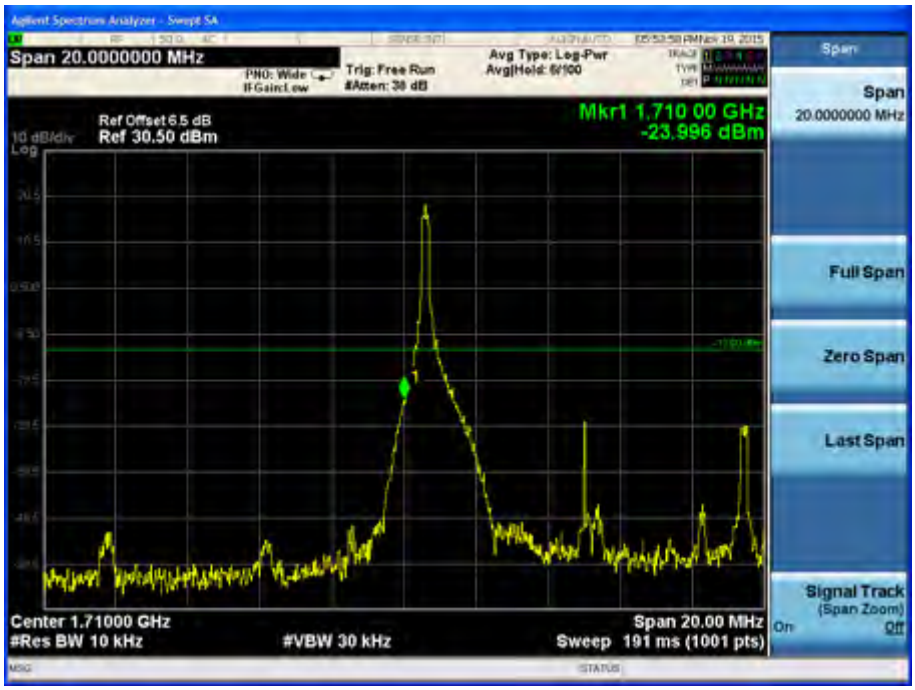


Fig.5

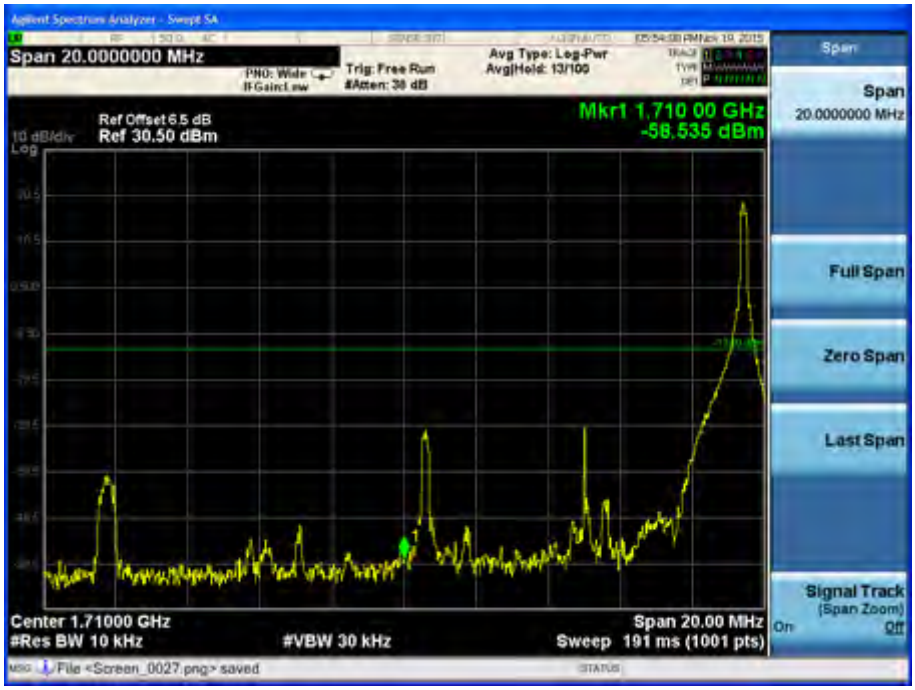


Fig.6

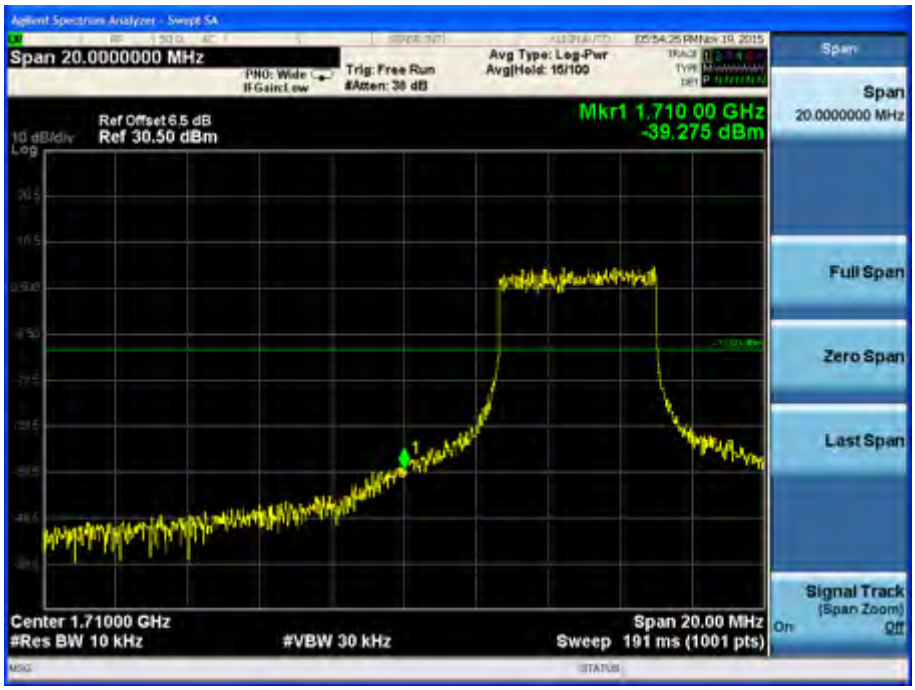


Fig.7

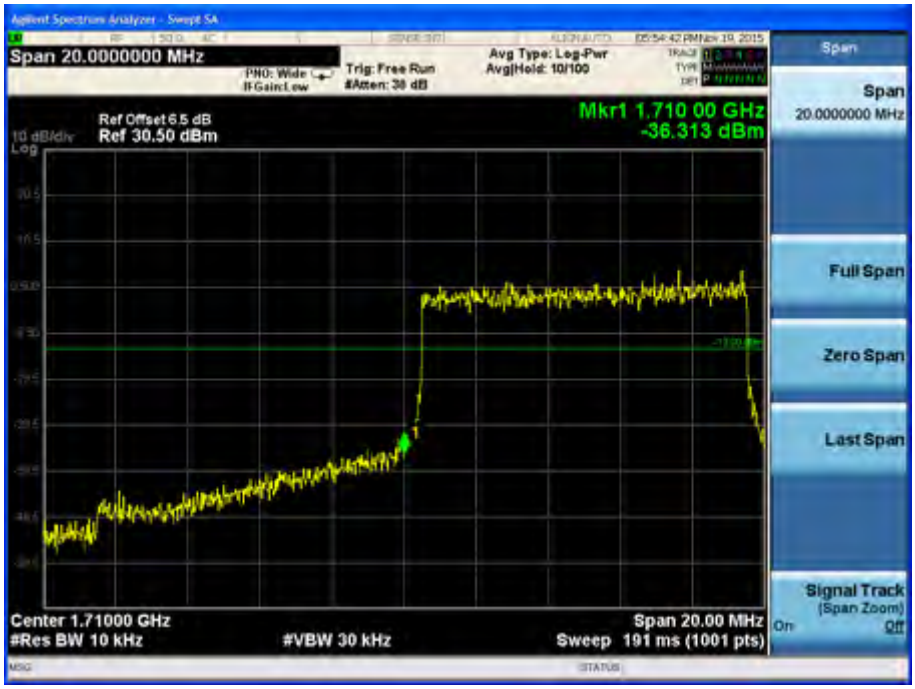


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
4	1750	20350	10	1	0	Fig.1	Fig.5
				1	49	Fig.2	Fig.6
				24	12	Fig.3	Fig.7
				50	0	Fig.4	Fig.8

Fig.1

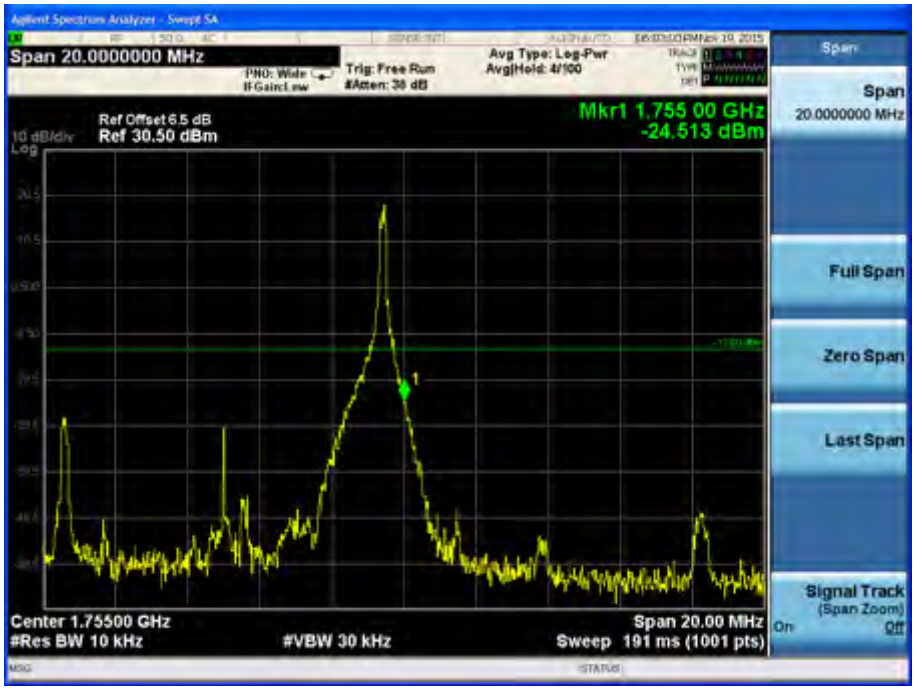


Fig.2

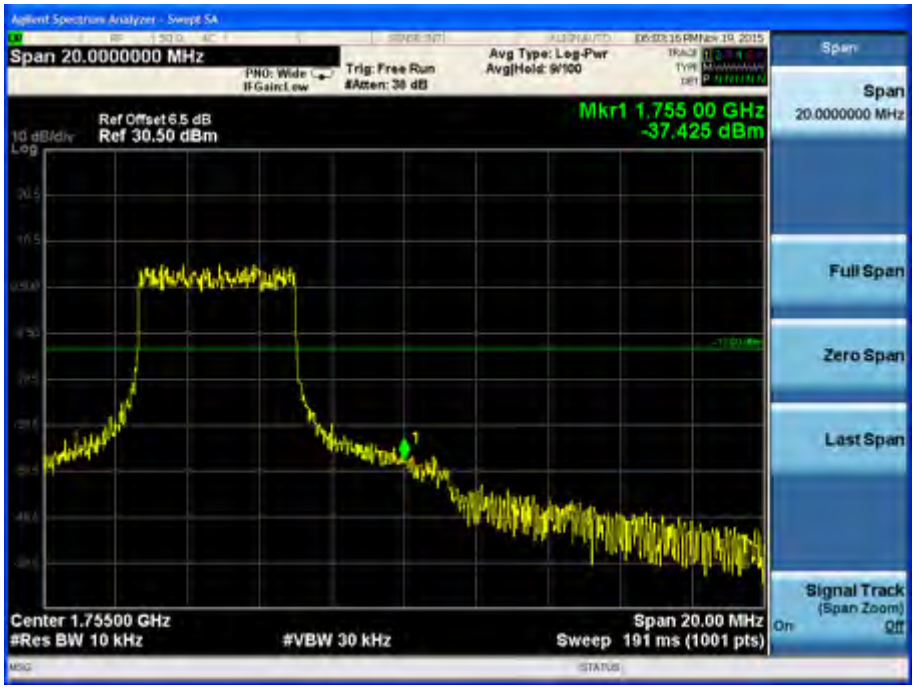


Fig.3

Fig.4

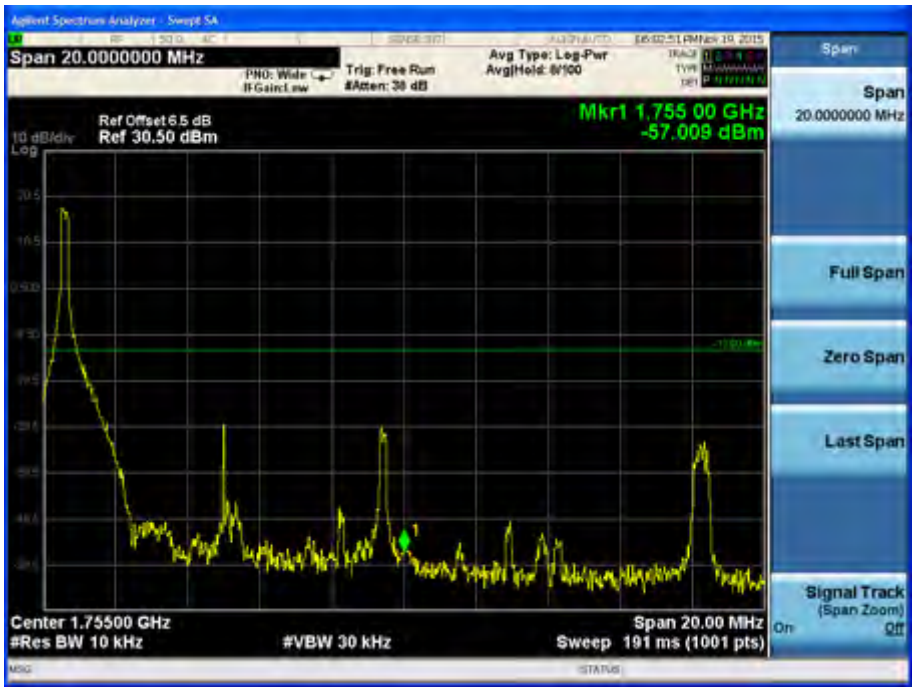


Fig.5

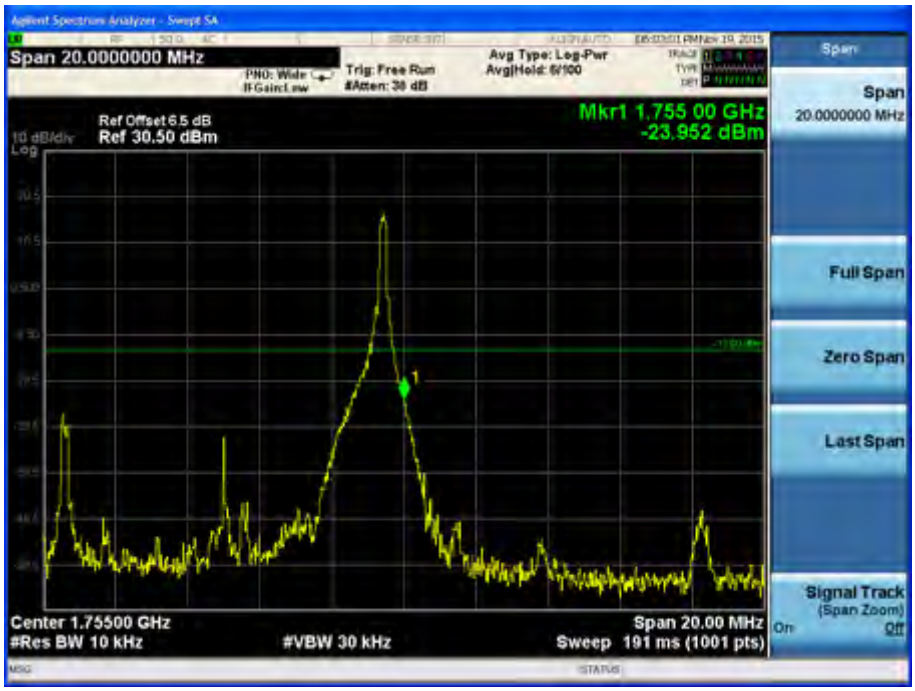


Fig.6

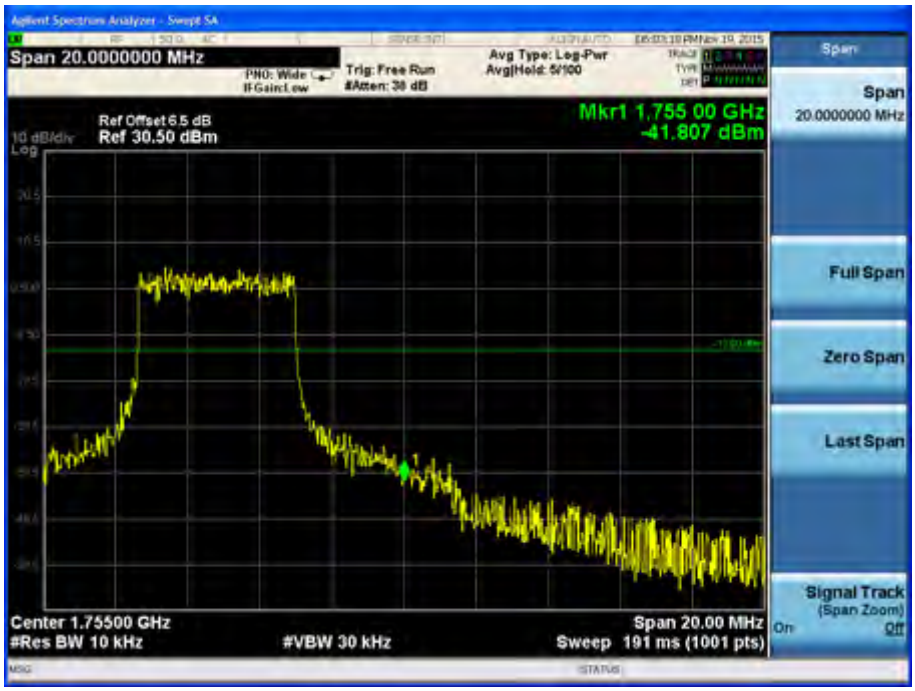


Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
4	1717.5	20025	15	1	0	Fig.1	Fig.5
				1	74	Fig.2	Fig.6
				38	18	Fig.3	Fig.7
				75	0	Fig.4	Fig.8

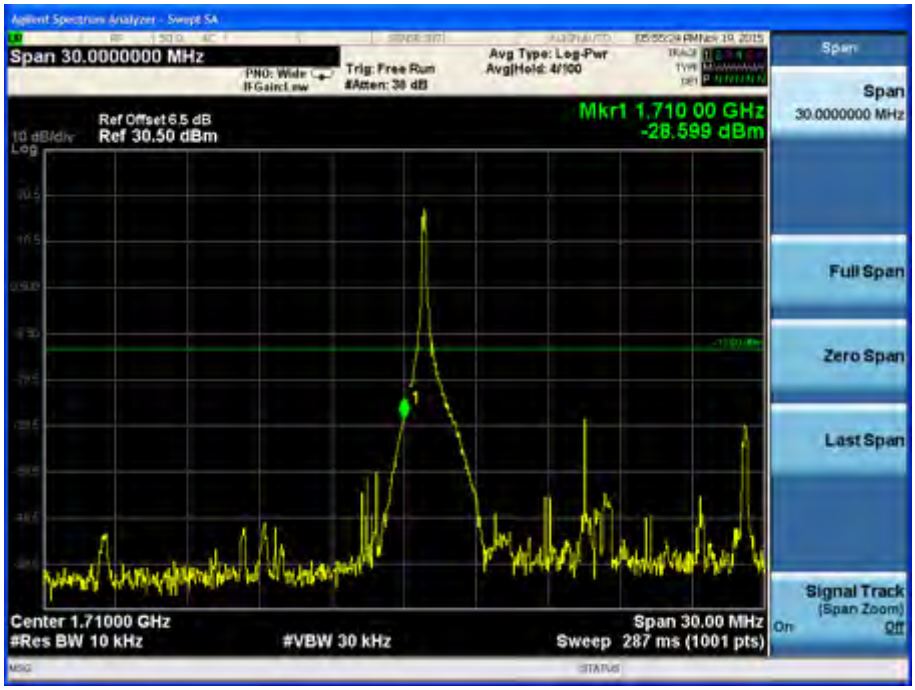


Fig.1

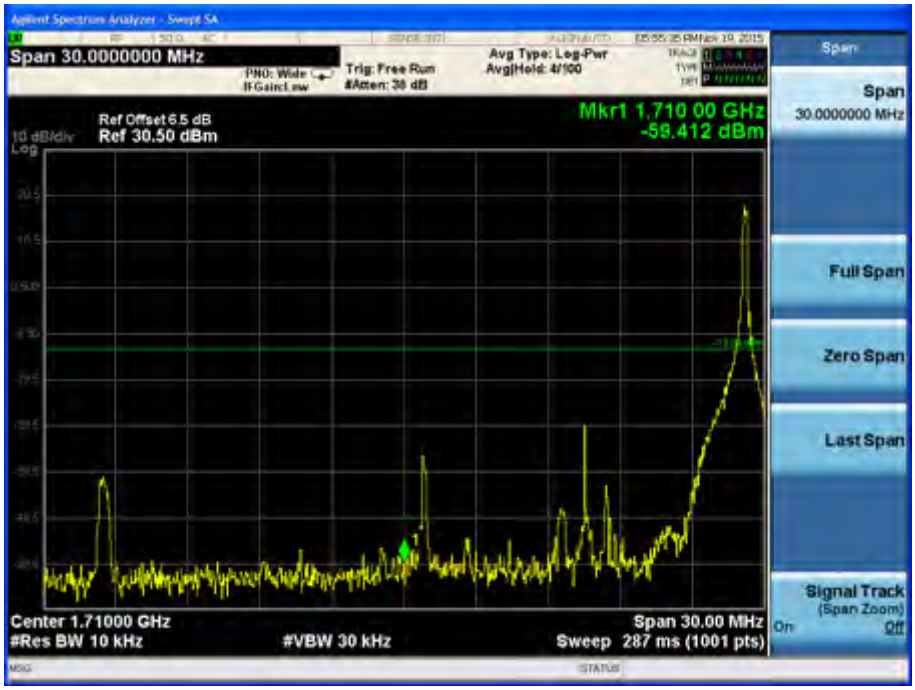


Fig.2

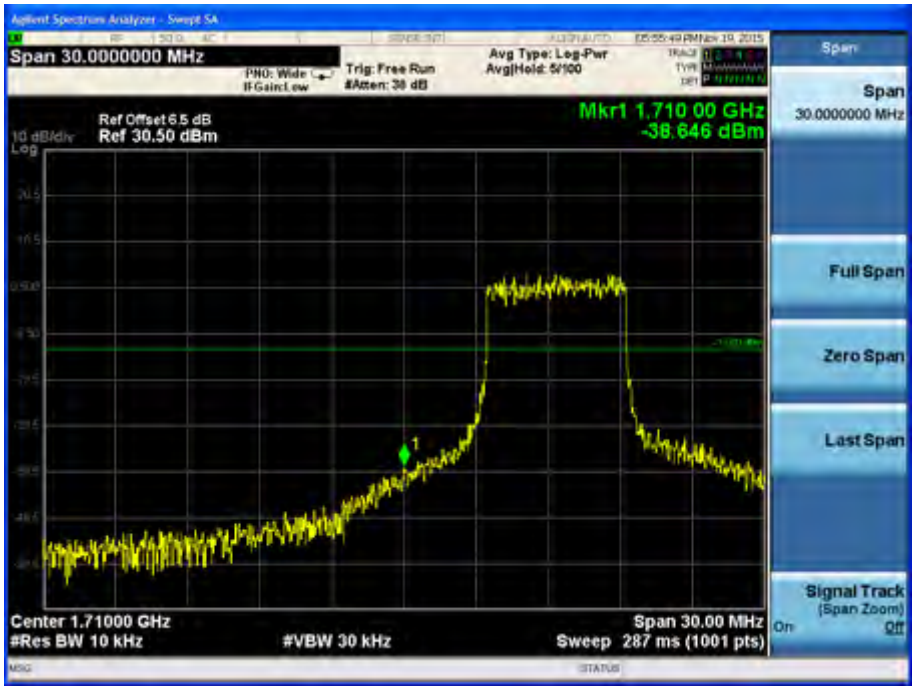


Fig.3

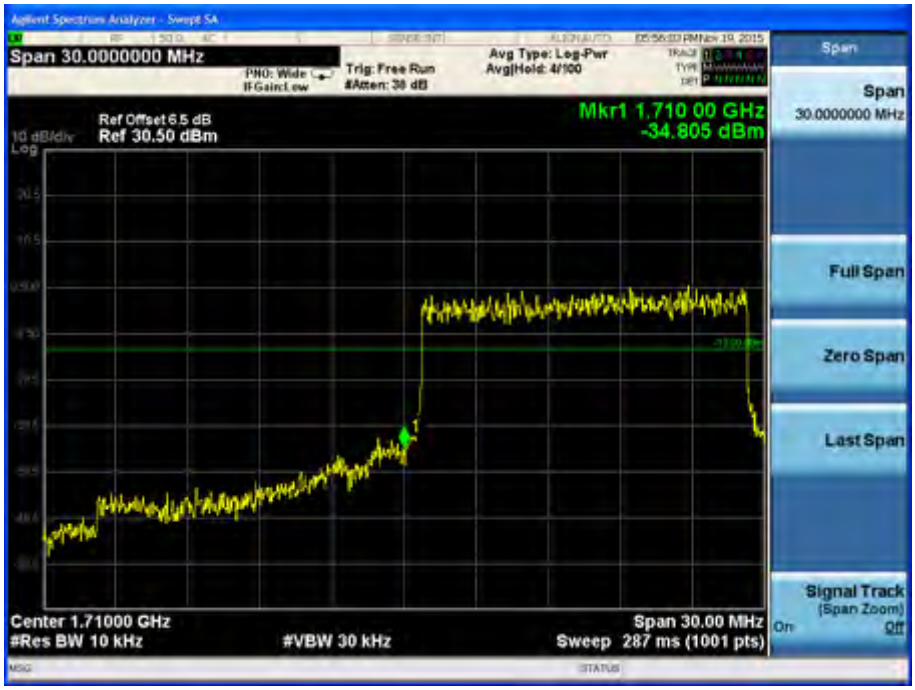


Fig.4

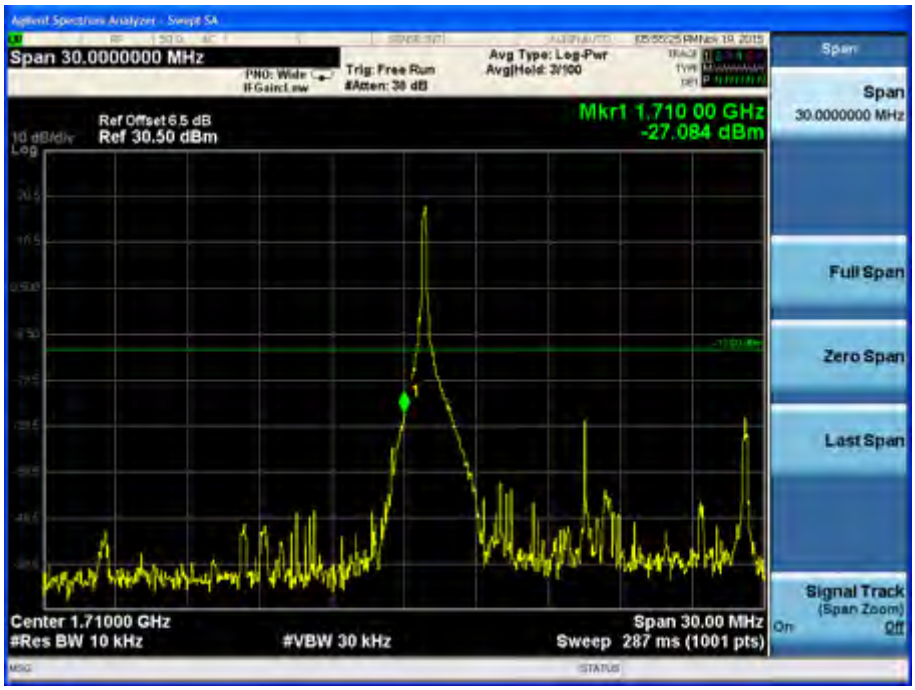


Fig.5

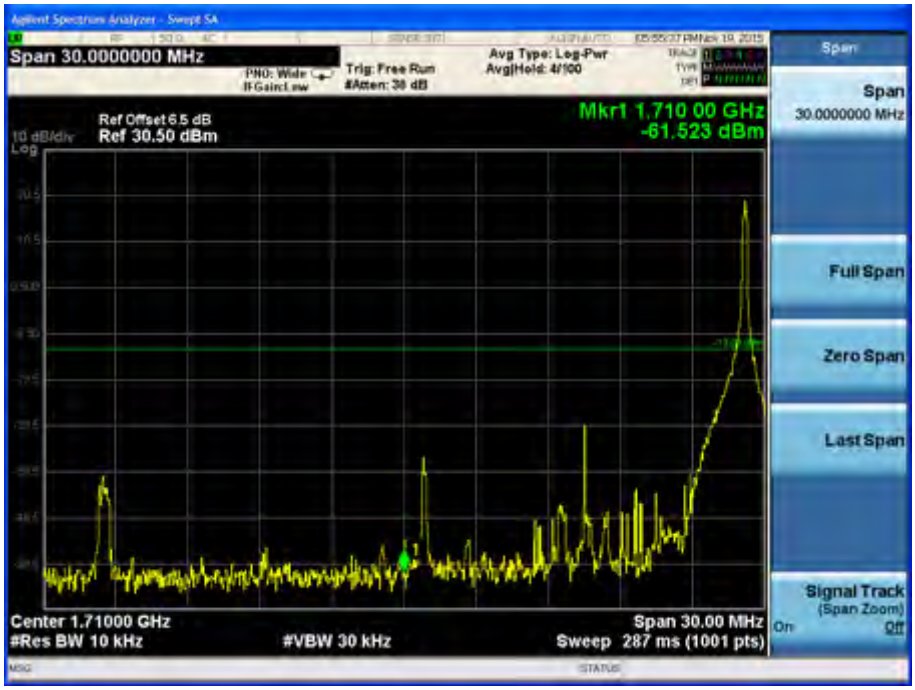


Fig.6

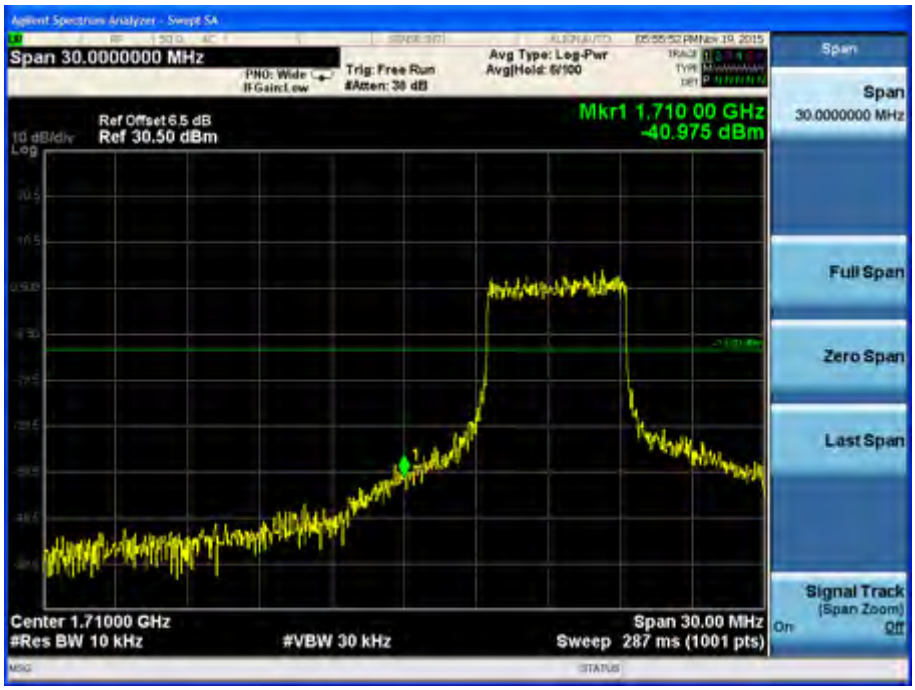


Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
4	1747.5	20325	15	1	0	Fig.1	Fig.5
				1	74	Fig.2	Fig.6
				38	18	Fig.3	Fig.7
				75	0	Fig.4	Fig.8

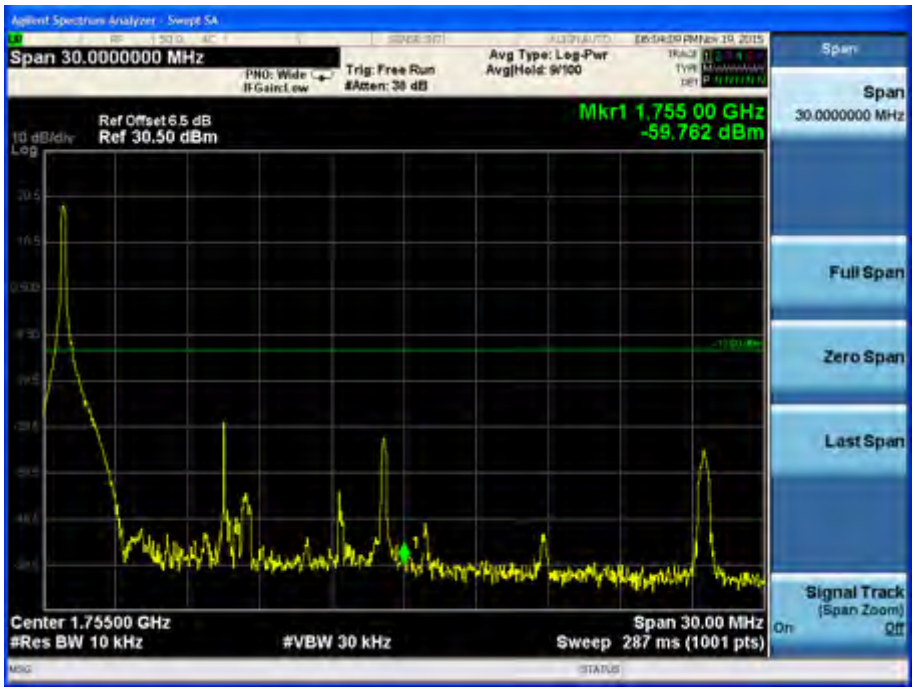


Fig.1

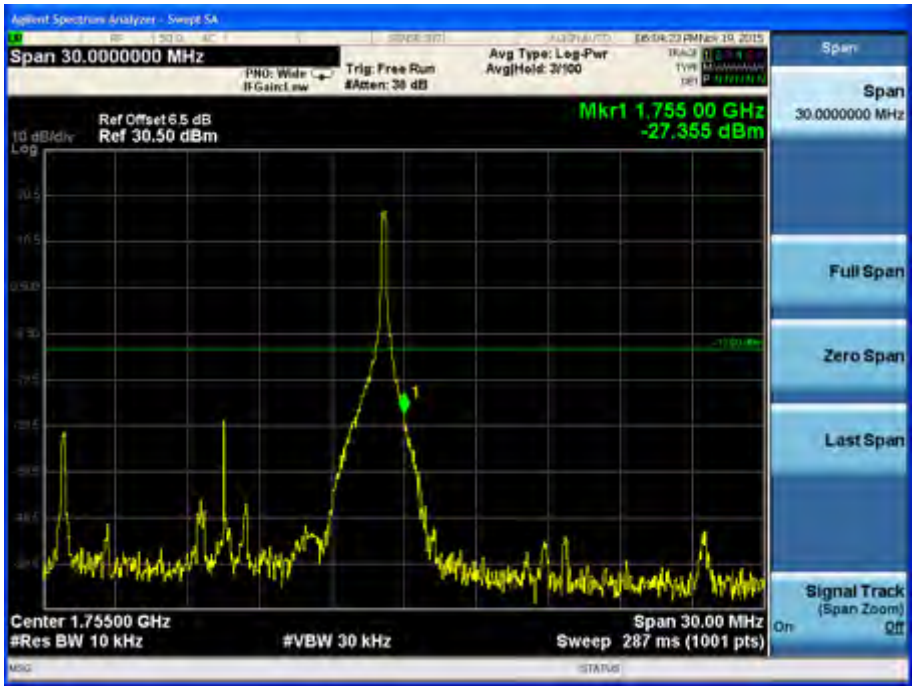


Fig.2

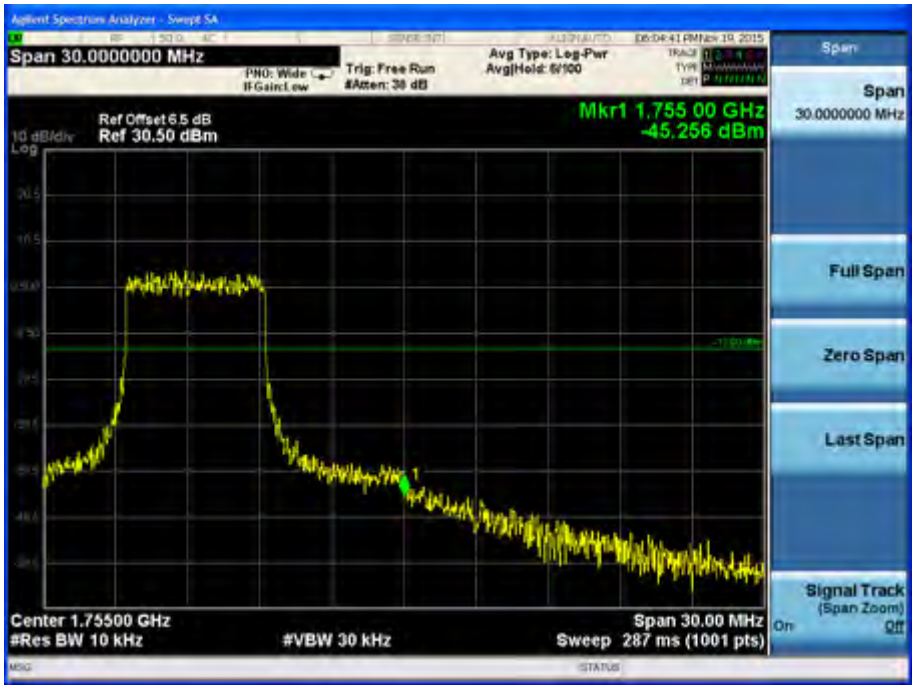


Fig.3

Fig.4

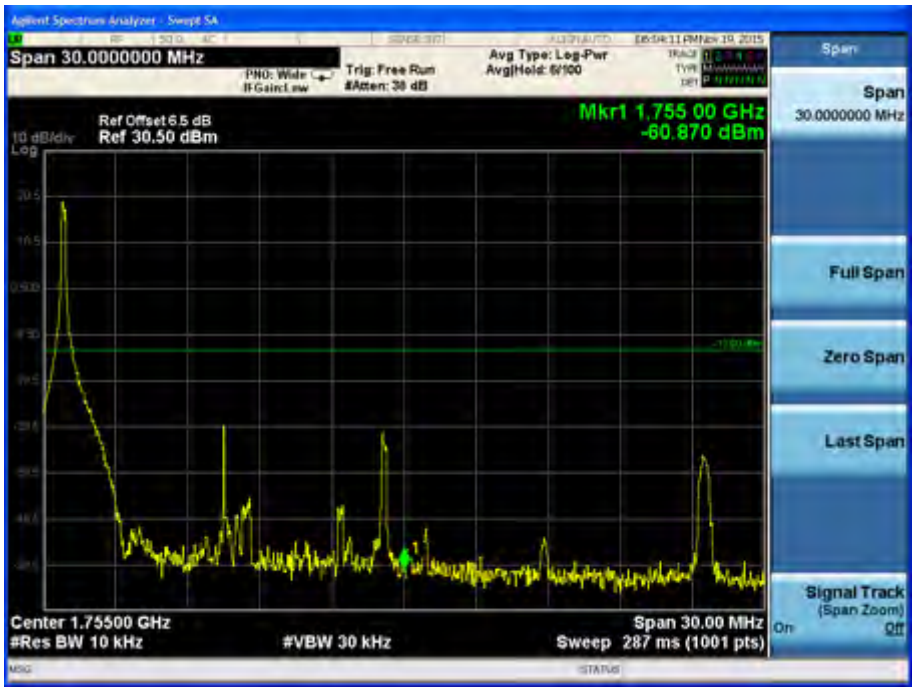


Fig.5

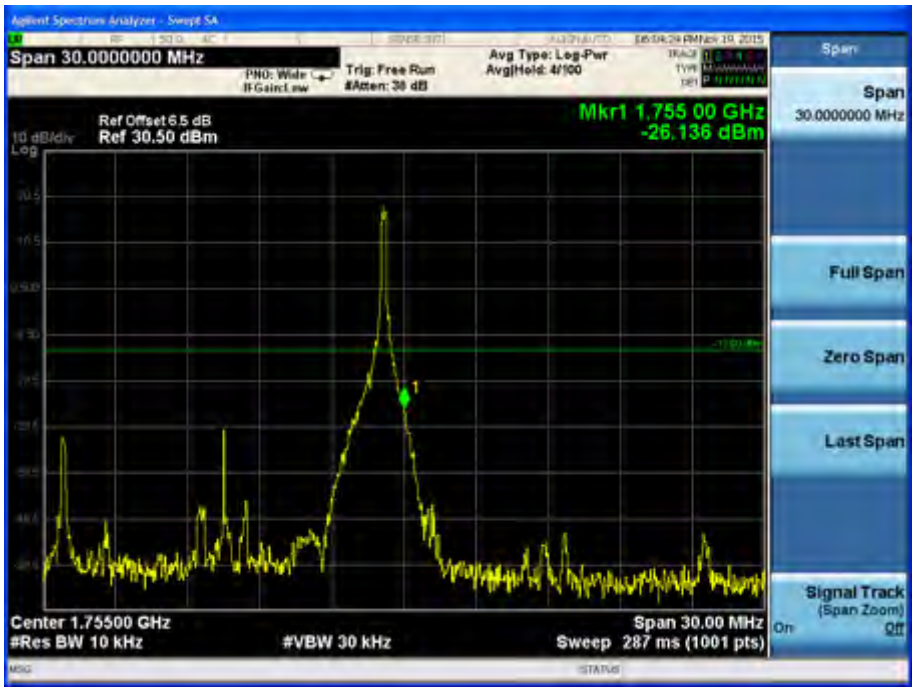


Fig.6

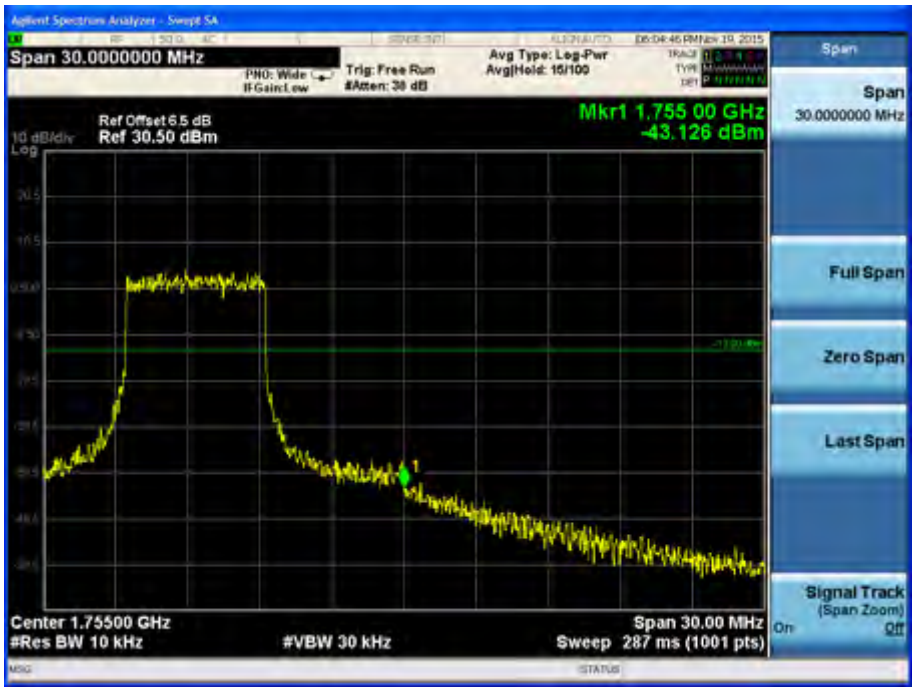


Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
4	1720	20050	20	1	0	Fig.1	Fig.5
				1	99	Fig.2	Fig.6
				50	25	Fig.3	Fig.7
				100	0	Fig.4	Fig.8

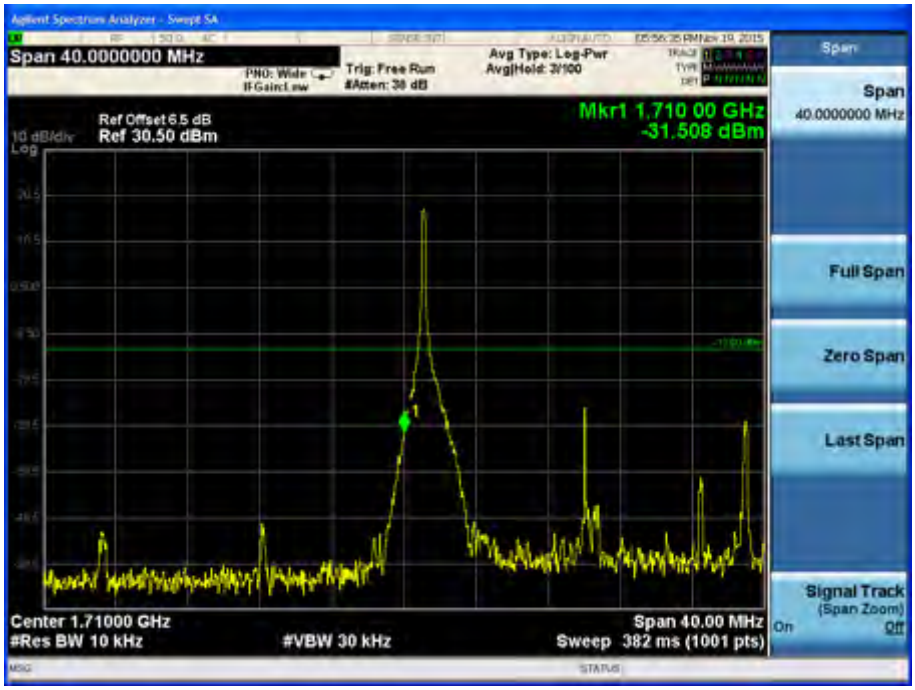


Fig.1

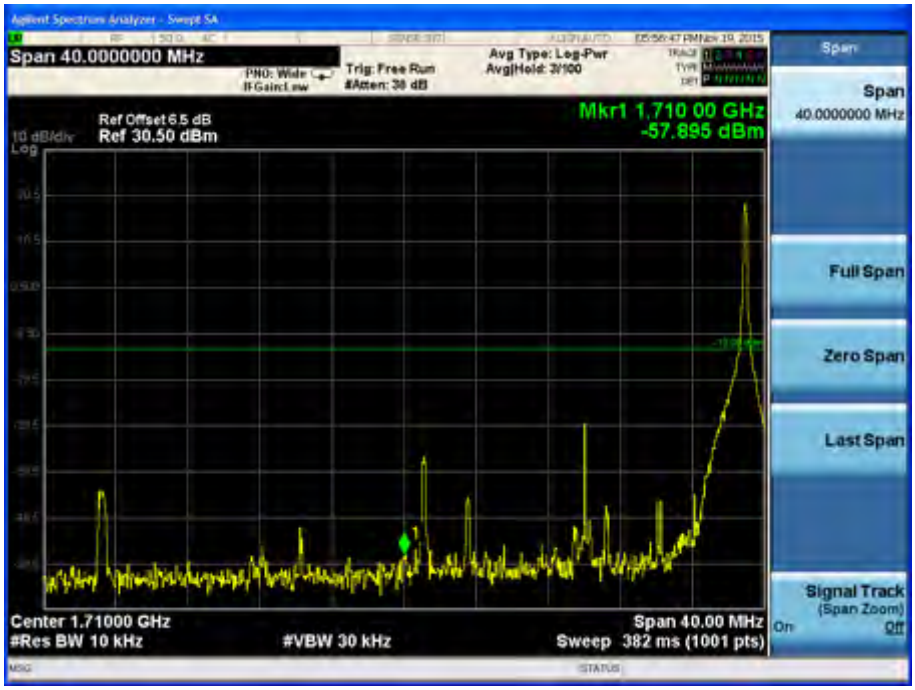


Fig.2

Fig.3

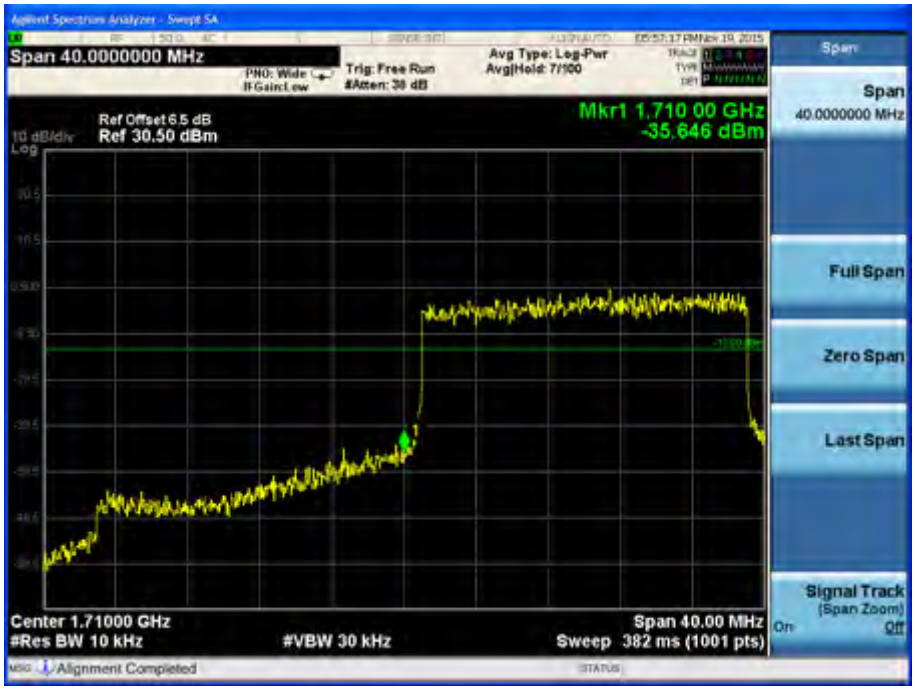


Fig.4

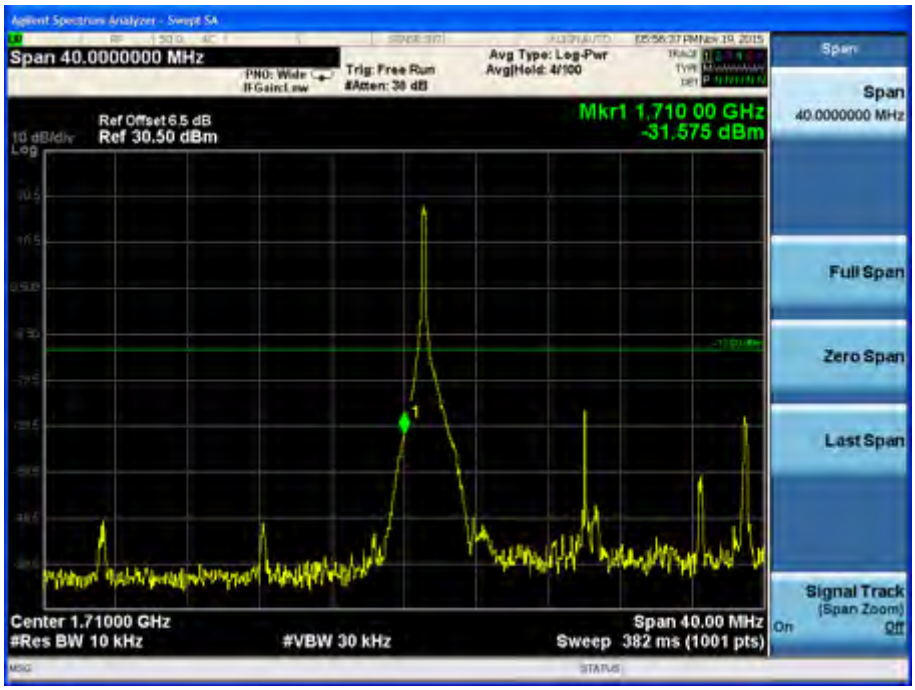


Fig.5

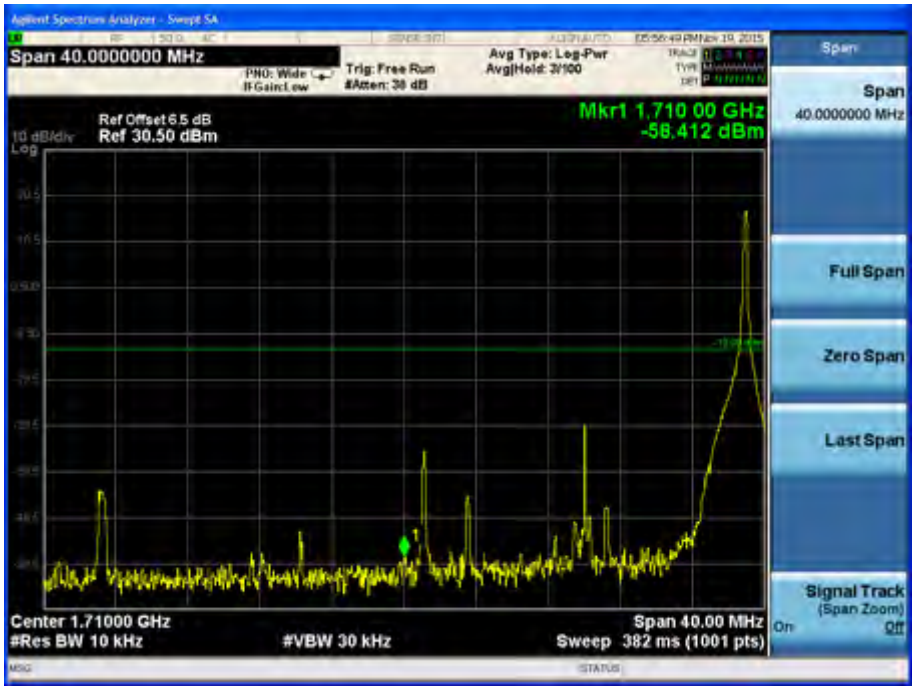


Fig.6

Fig.7

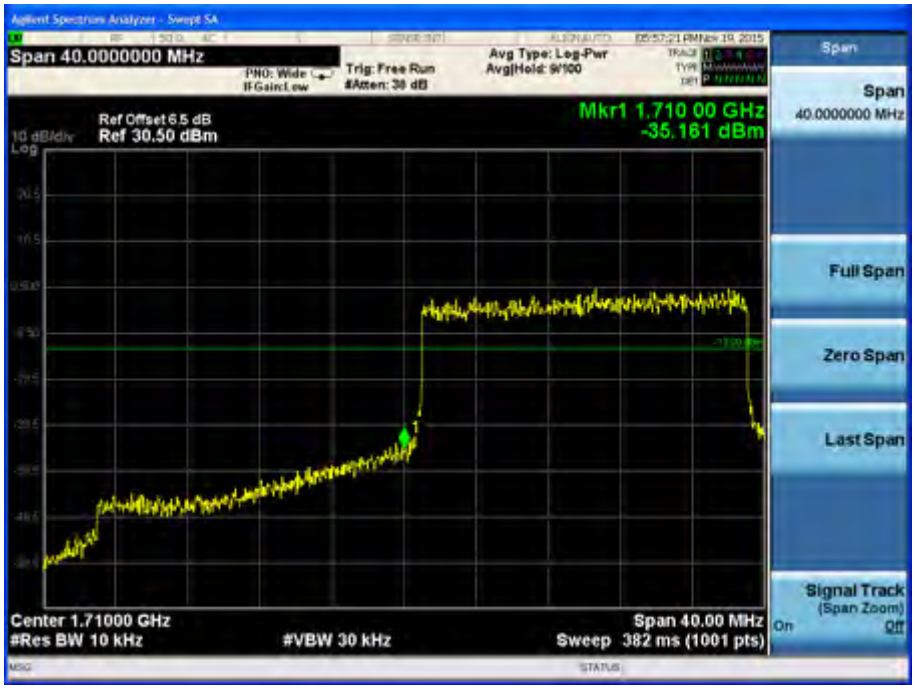


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
4	1745	20300	20	1	0	Fig.1	Fig.5
				1	99	Fig.2	Fig.6
				50	25	Fig.3	Fig.7
				100	0	Fig.4	Fig.8

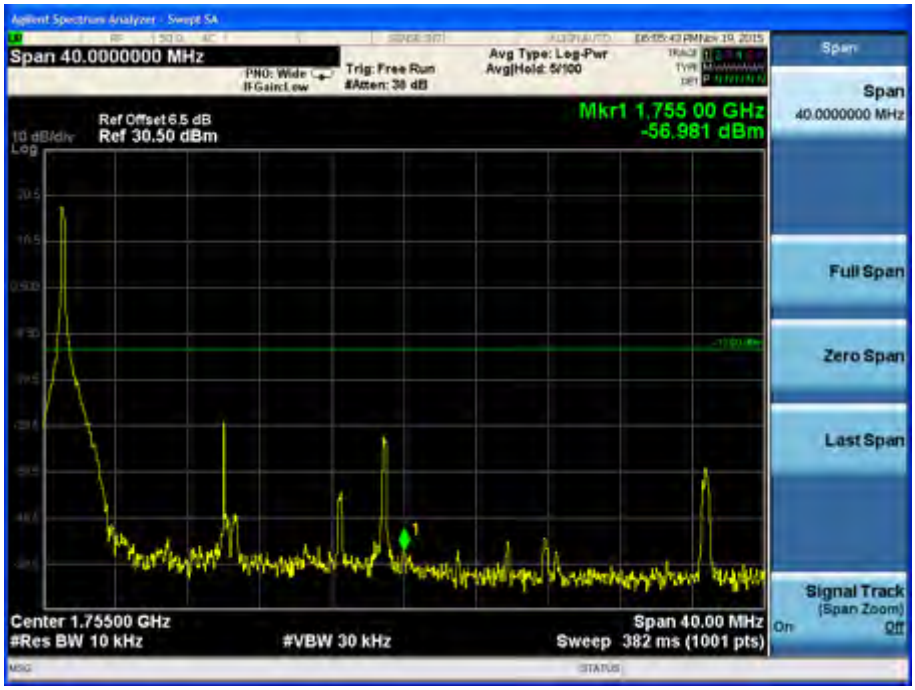


Fig.1

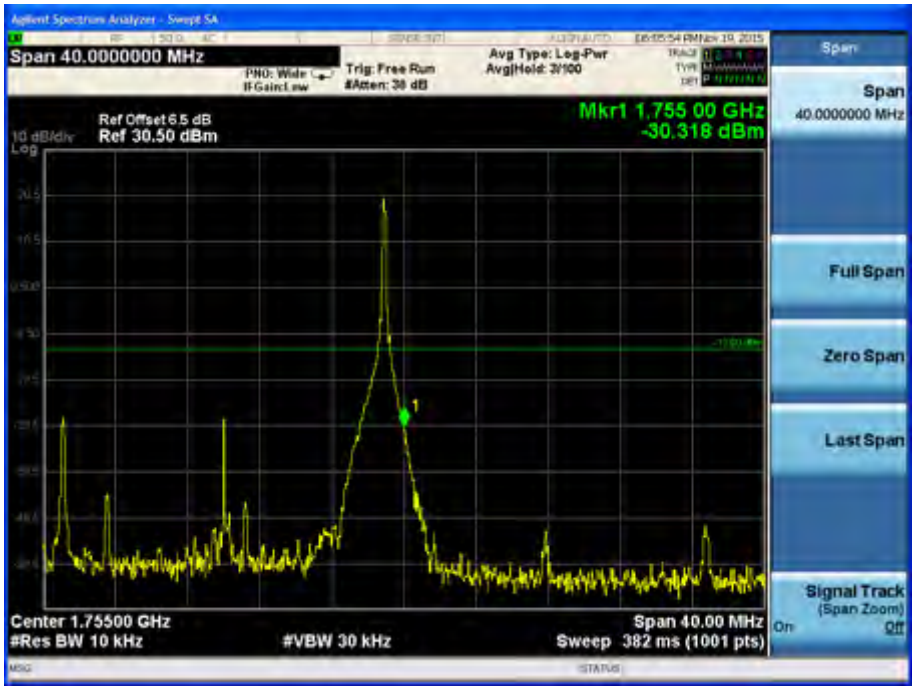


Fig.2

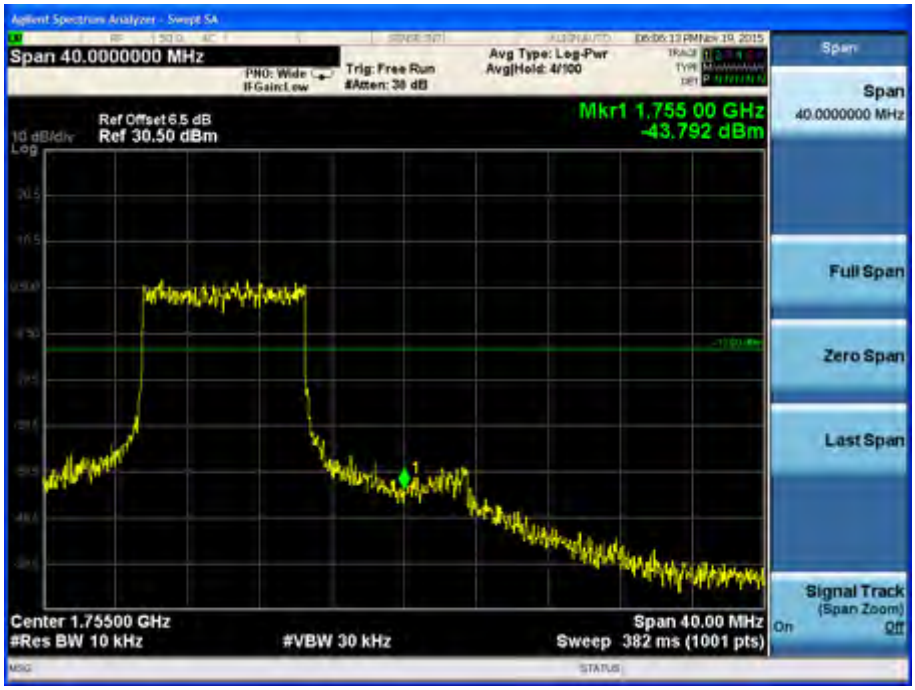


Fig.3

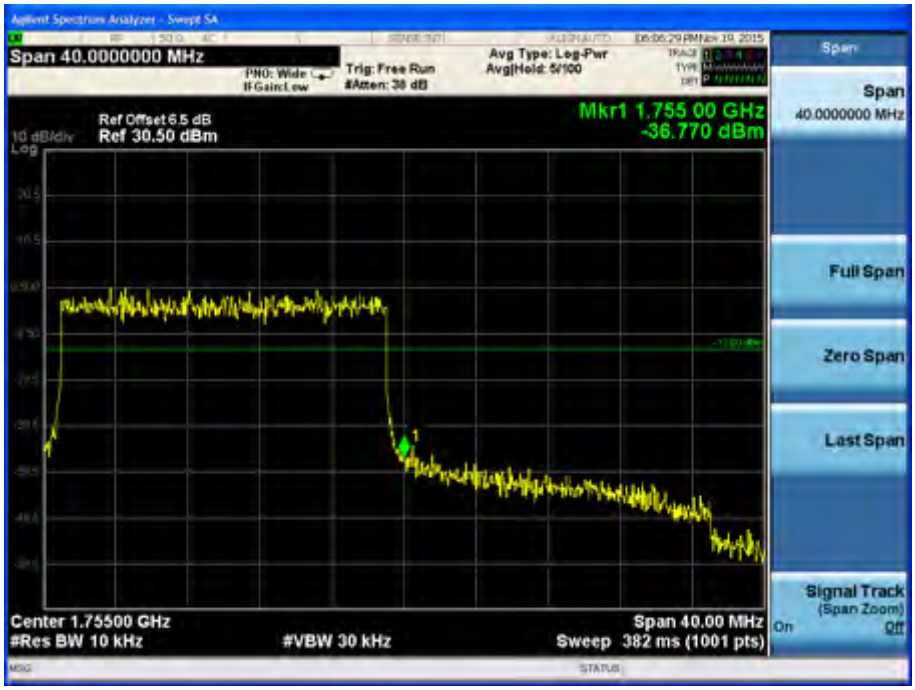


Fig.4

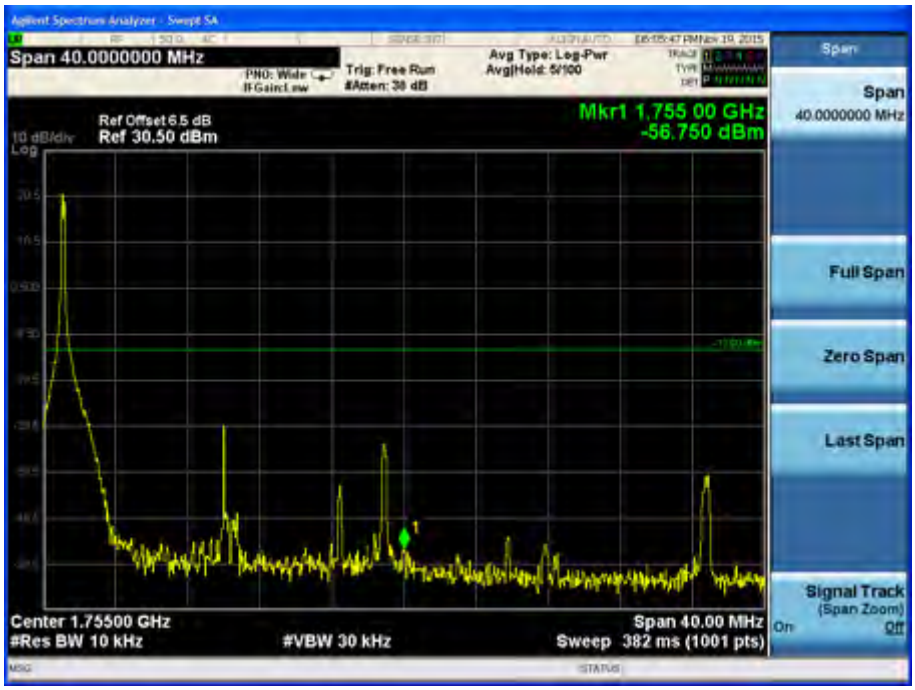


Fig.5

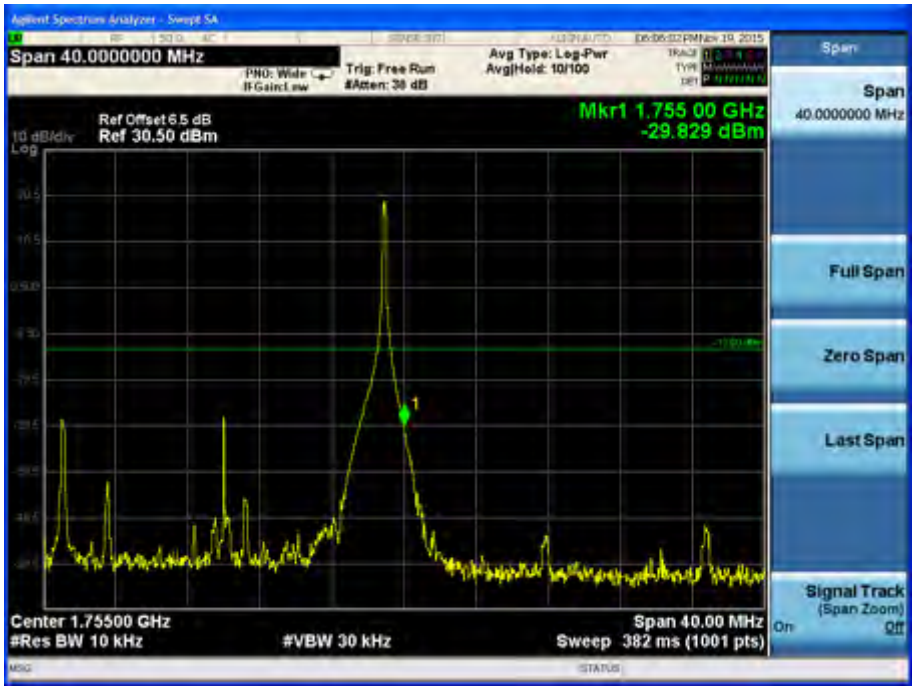


Fig.6

Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
7	2502.5	20775	5	1	0	Fig.1	Fig.5
				1	24	Fig.2	Fig.6
				12	6	Fig.3	Fig.7
				25	0	Fig.4	Fig.8

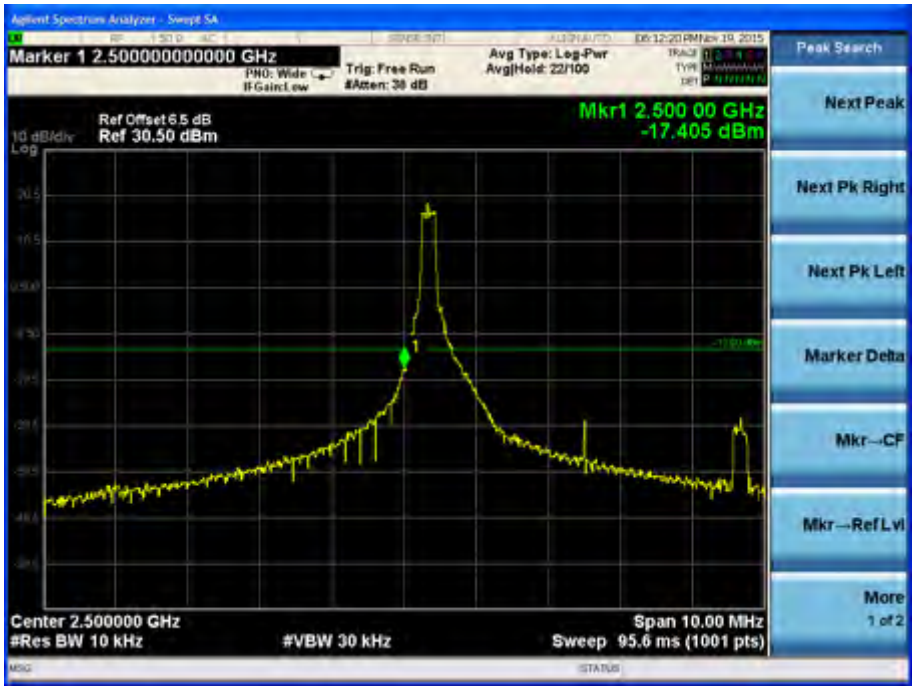


Fig.1

Fig.2

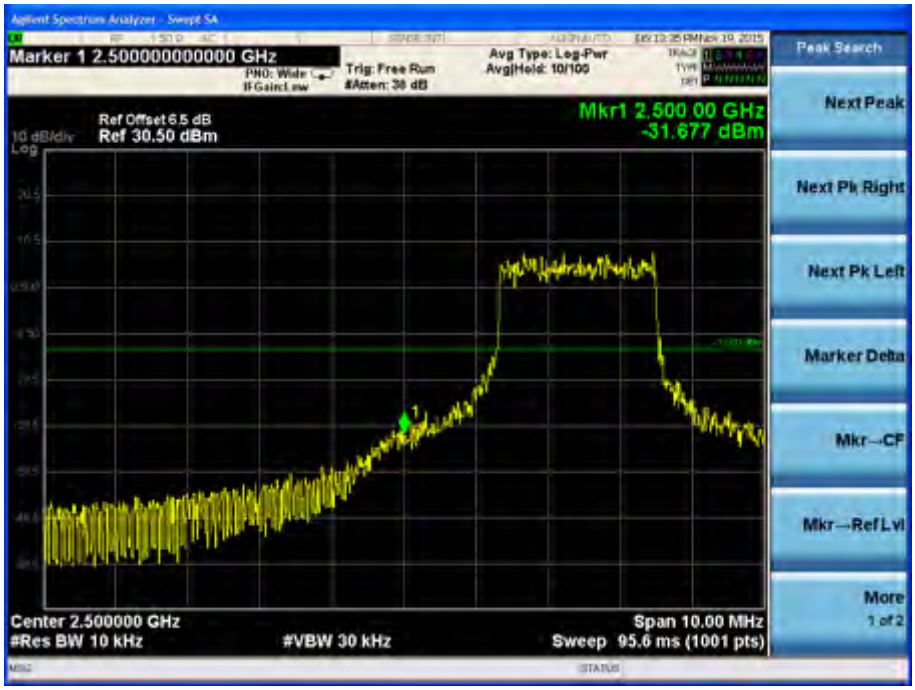


Fig.3

Fig.4

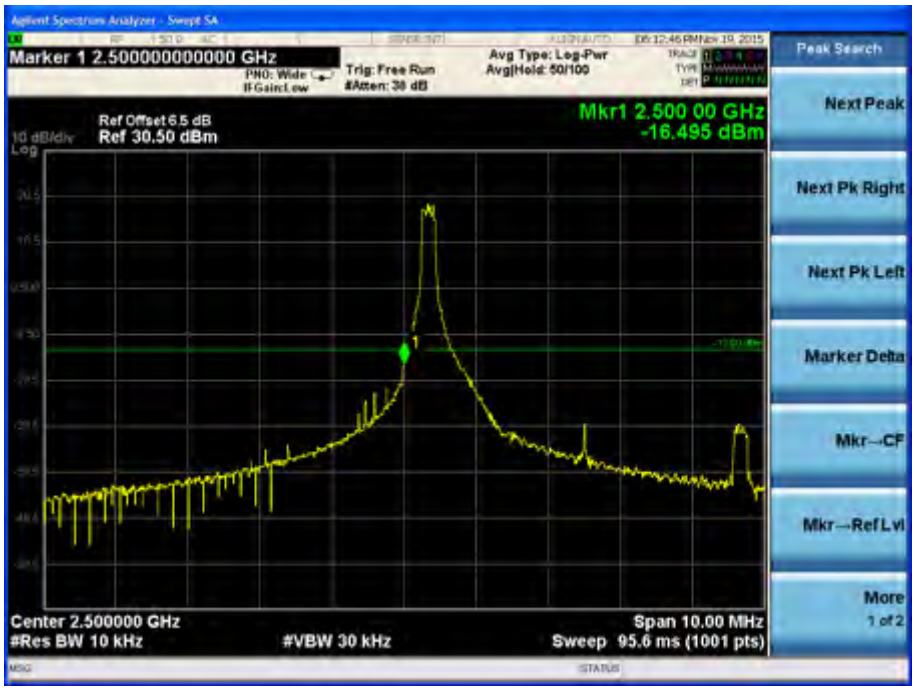


Fig.5

Fig.6

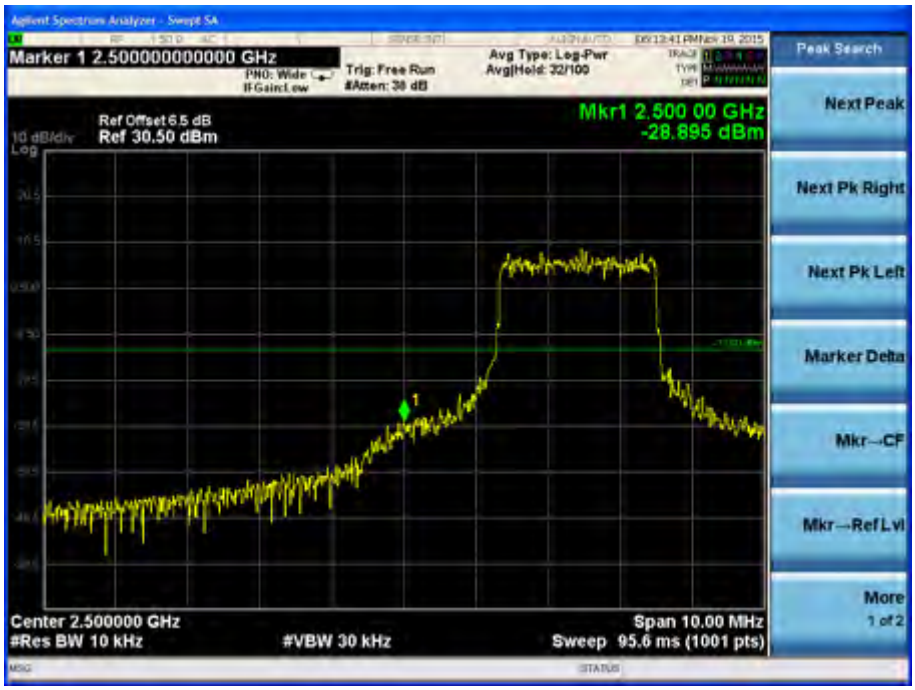


Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
7	2567.5	21425	5	1	0	Fig.1	Fig.5
				1	24	Fig.2	Fig.6
				12	6	Fig.3	Fig.7
				25	0	Fig.4	Fig.8

Fig.1

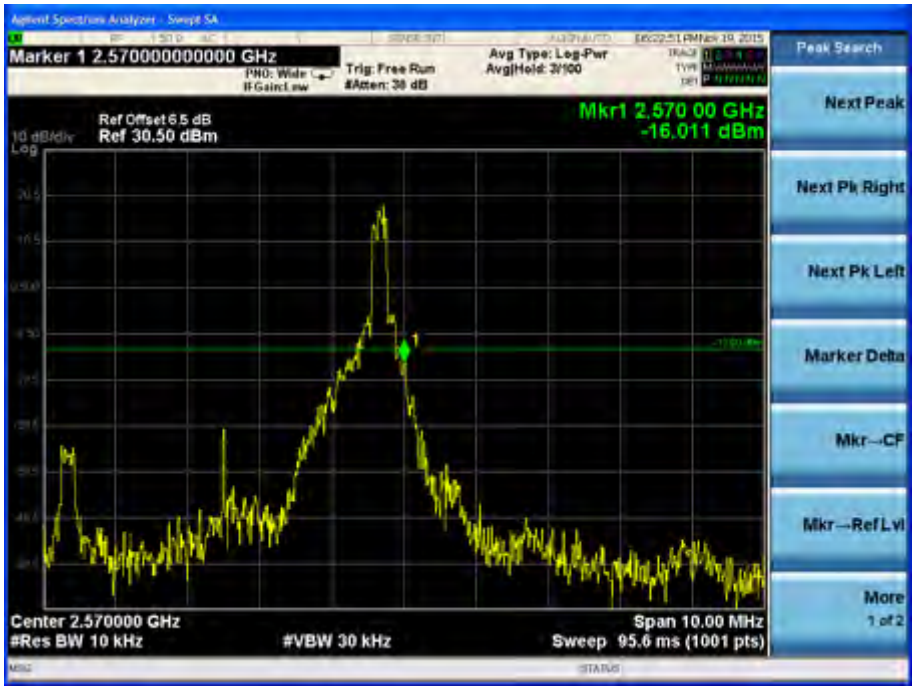


Fig.2

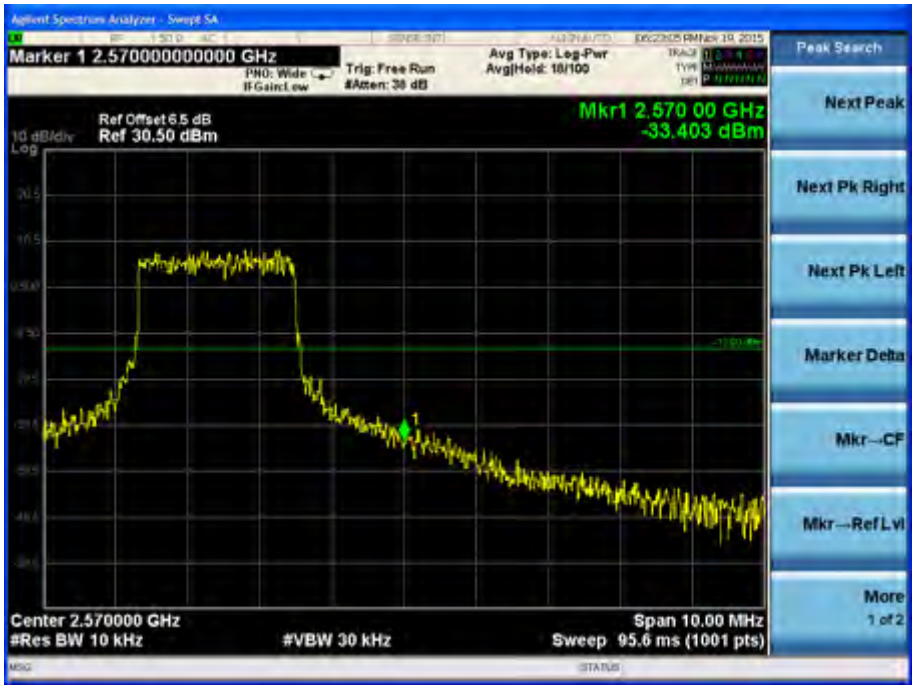


Fig.3

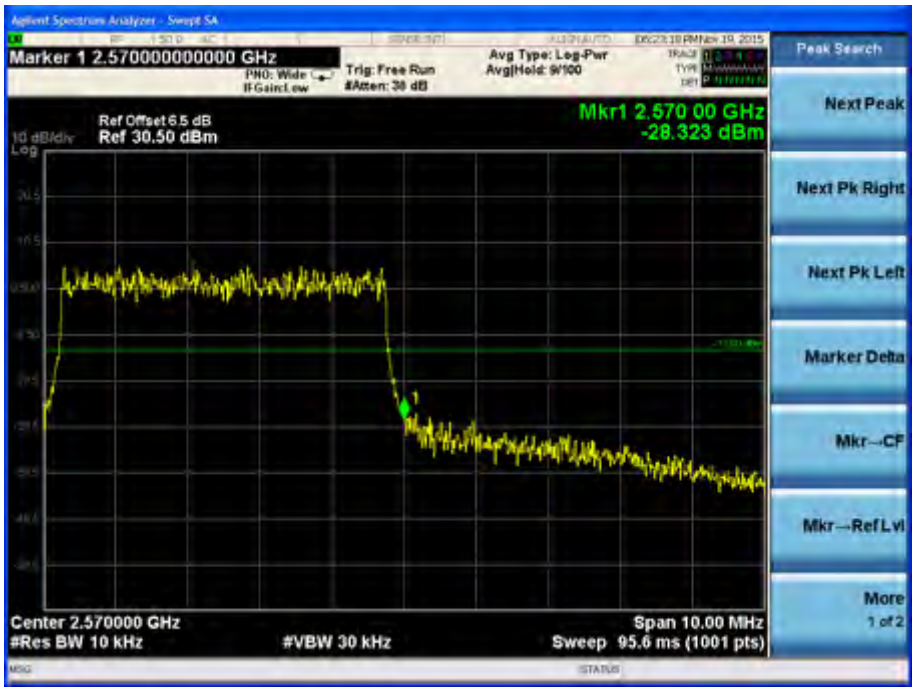


Fig.4

Fig.5

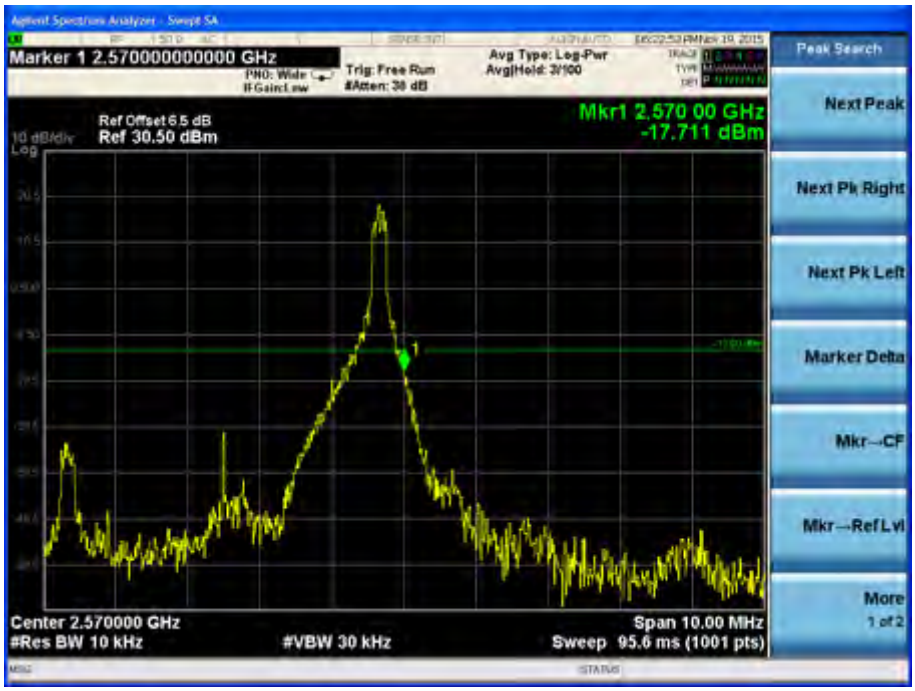


Fig.6

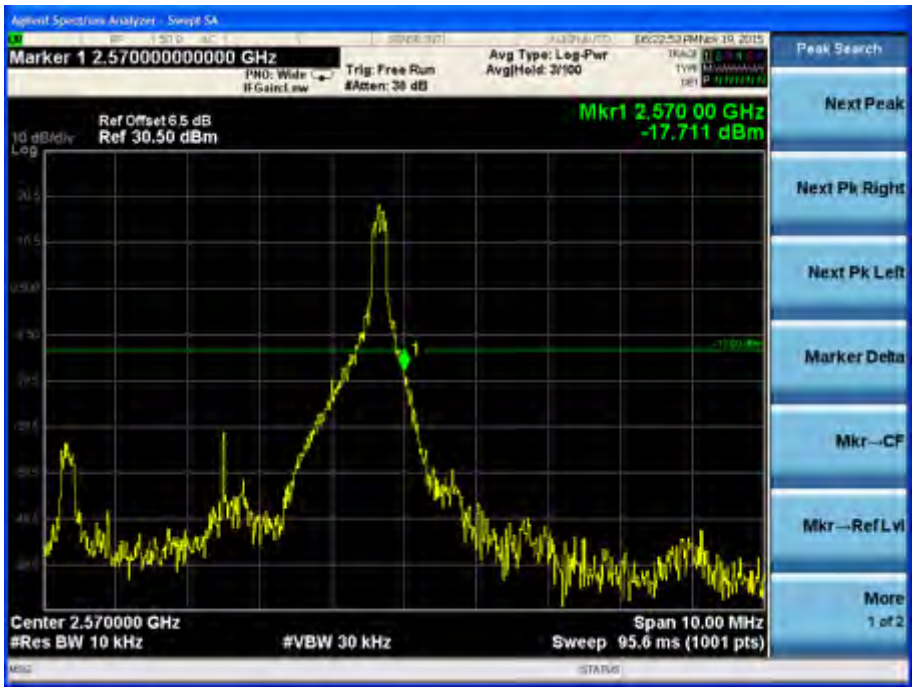


Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
7	2505	20800	10	1	0	Fig.1	Fig.5
				1	49	Fig.2	Fig.6
				24	12	Fig.3	Fig.7
				50	0	Fig.4	Fig.8

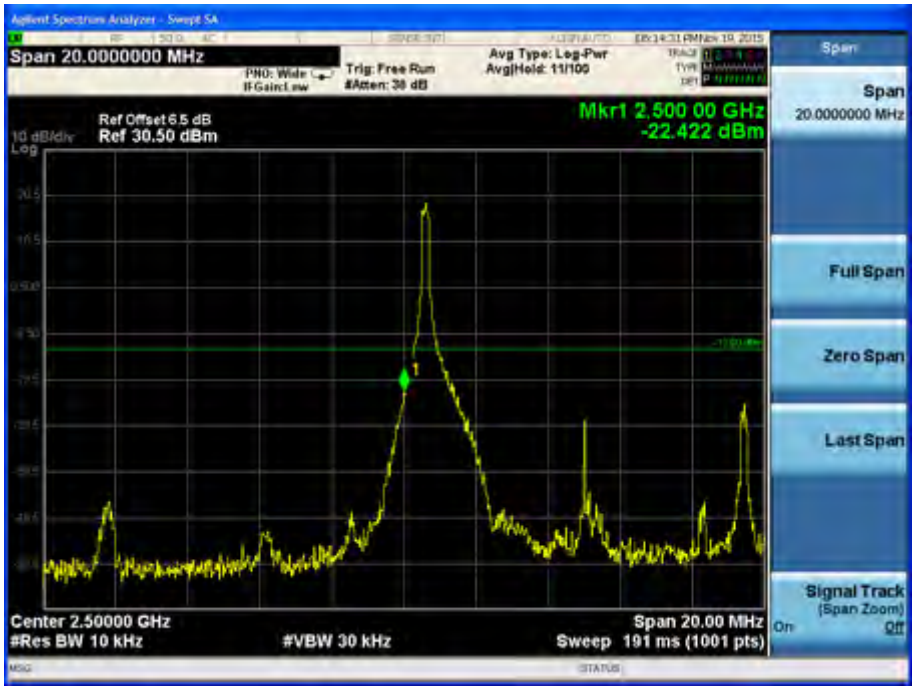


Fig.1

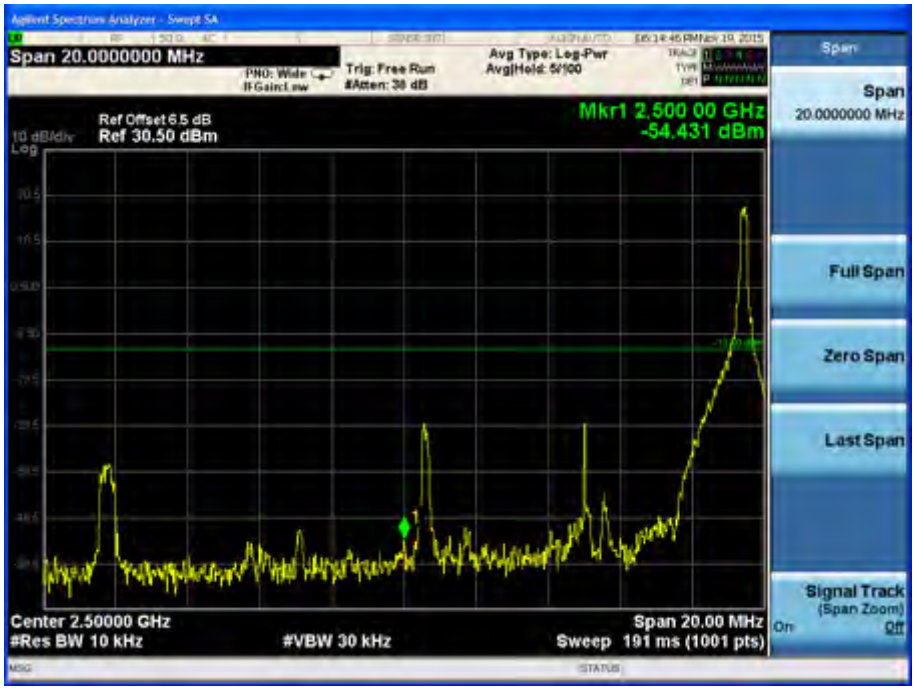


Fig.2

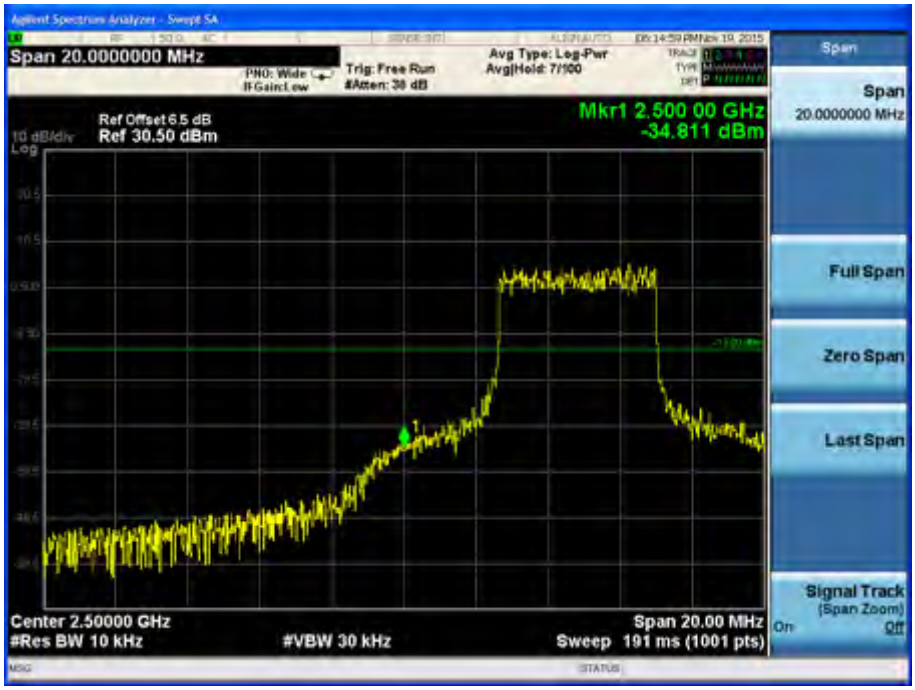


Fig.3

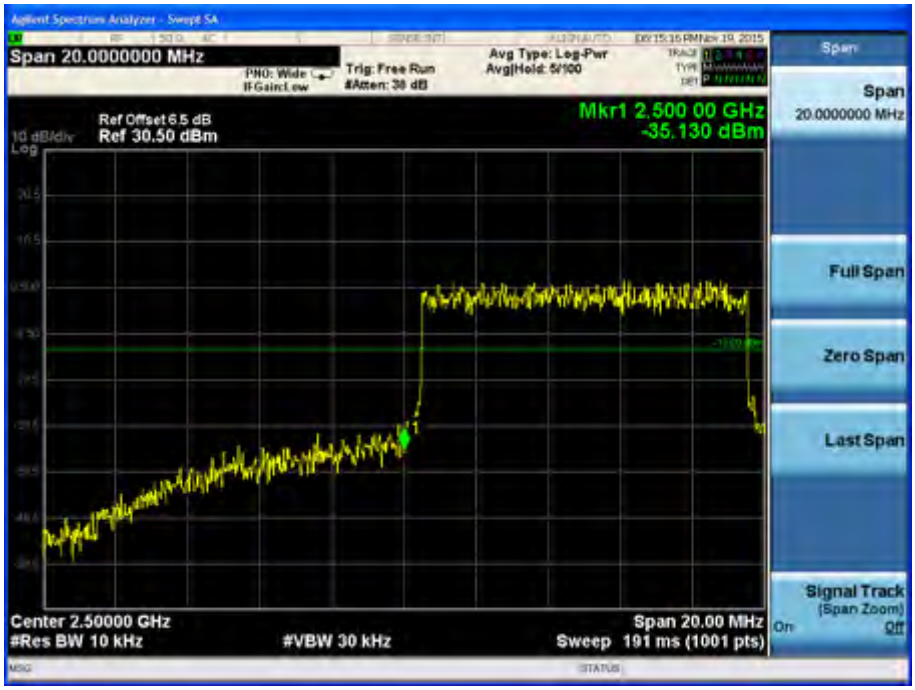


Fig.4

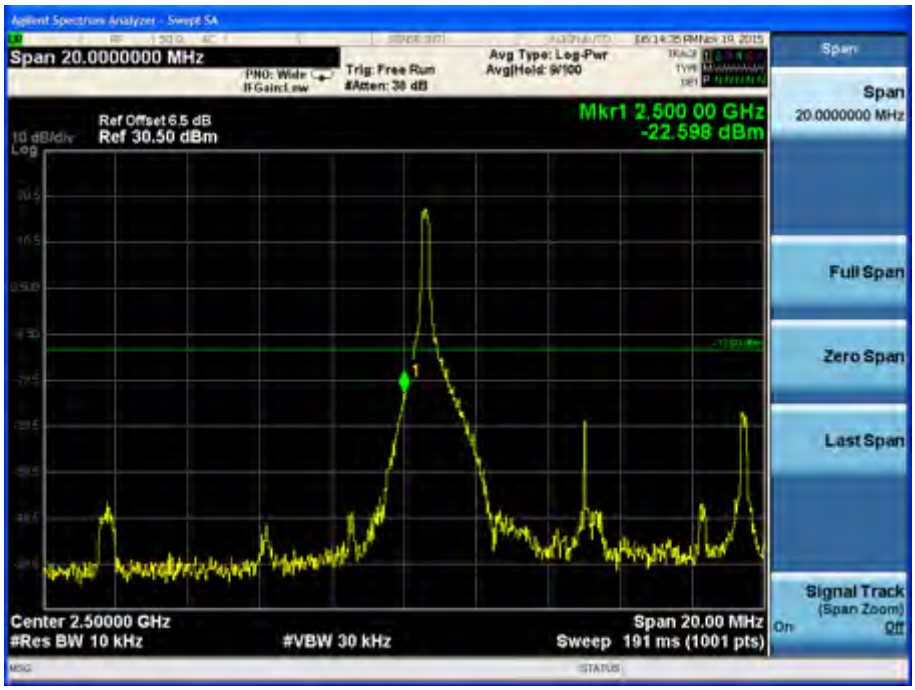


Fig.5

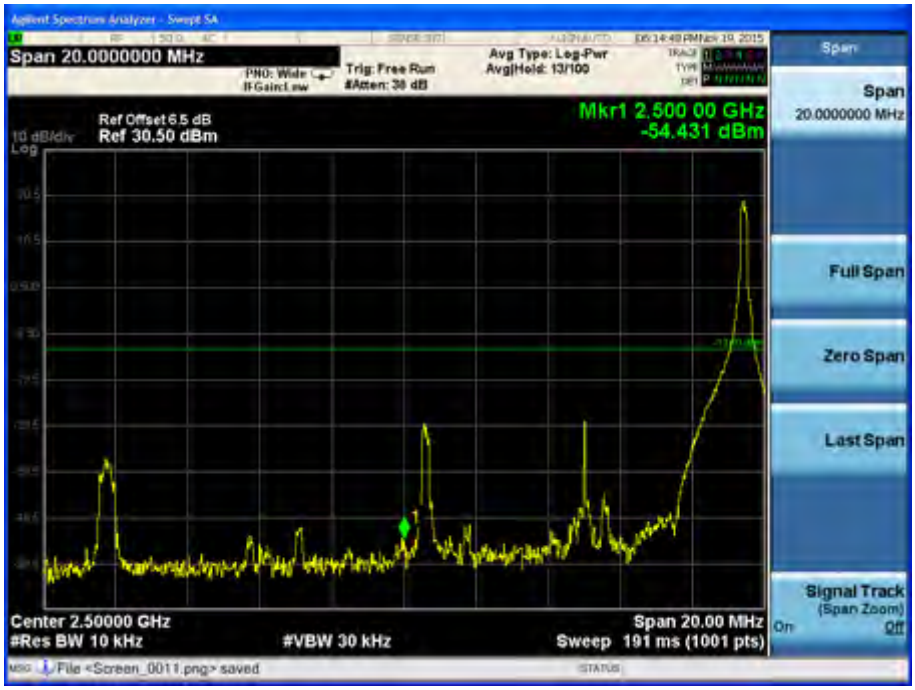


Fig.6

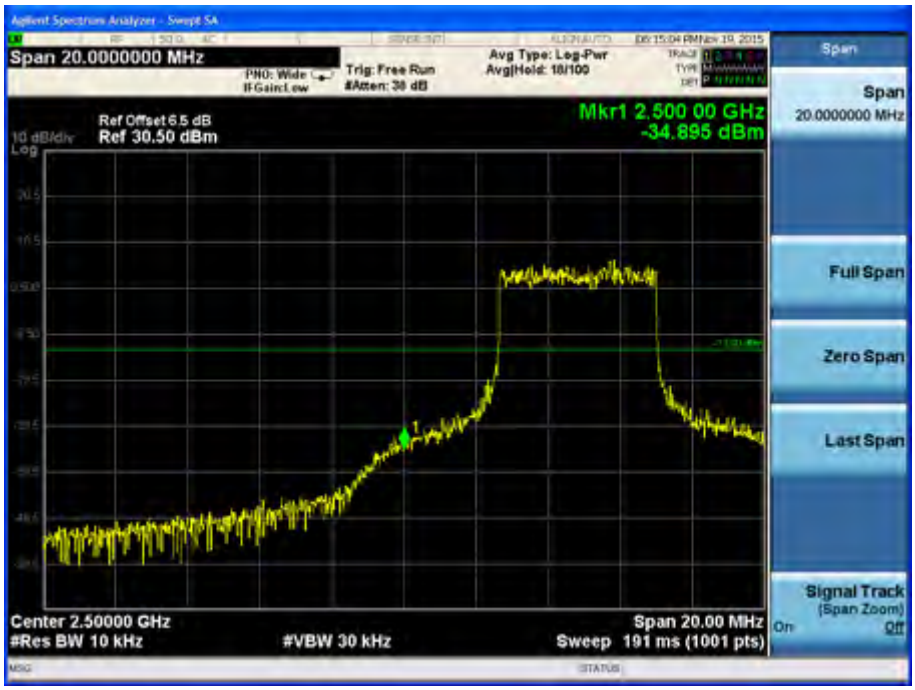


Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
7	2565	21400	10	1	0	Fig.1	Fig.5
				1	49	Fig.2	Fig.6
				24	12	Fig.3	Fig.7
				50	0	Fig.4	Fig.8

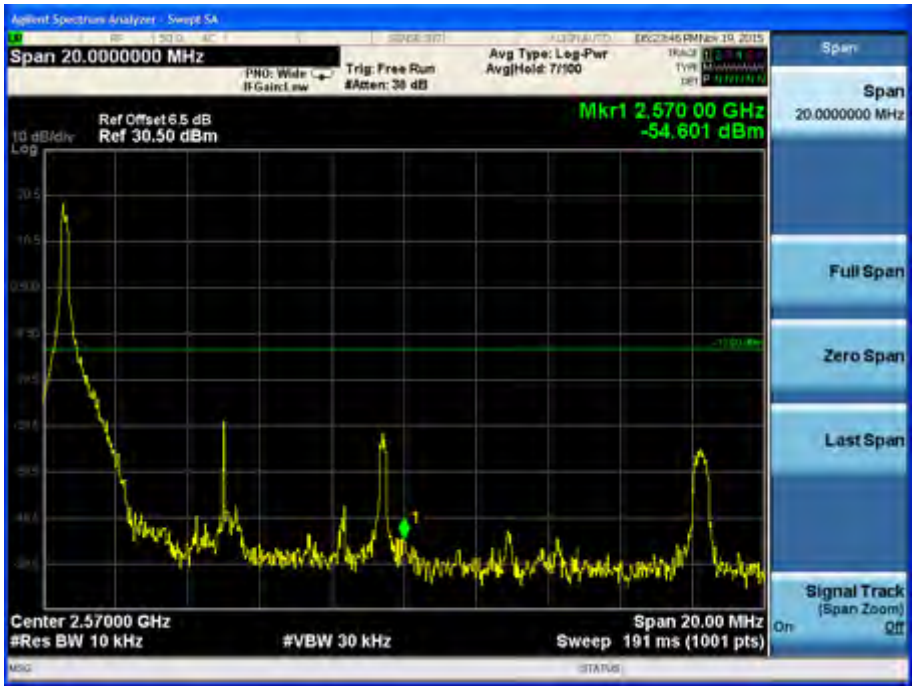


Fig.1

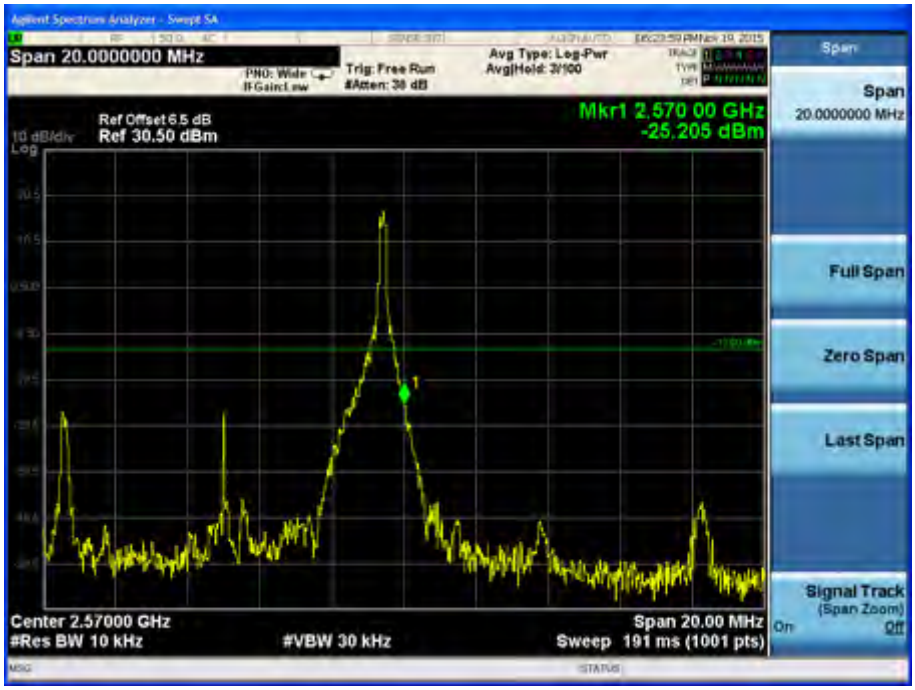


Fig.2

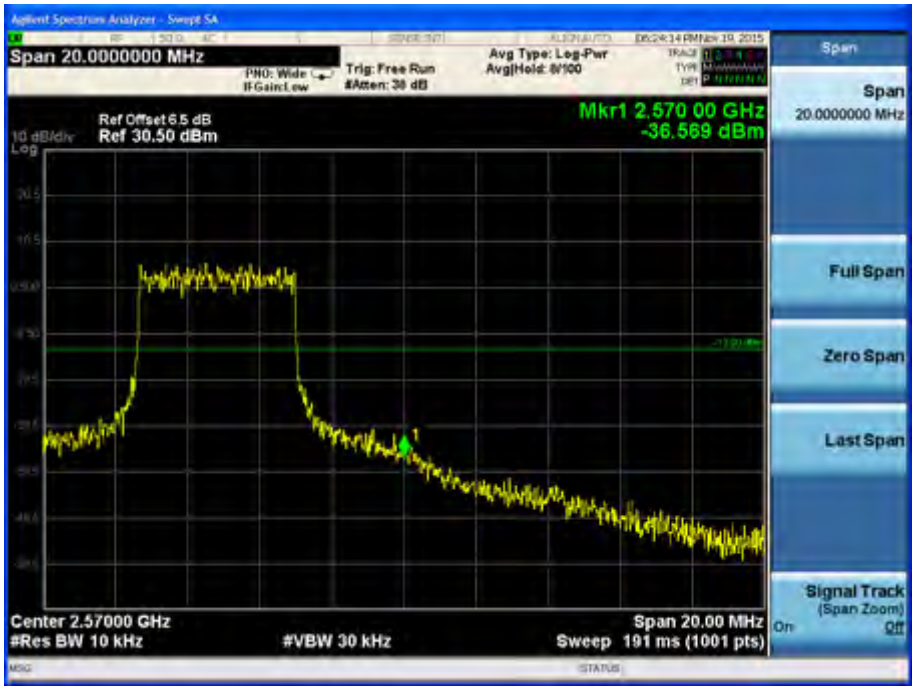


Fig.3

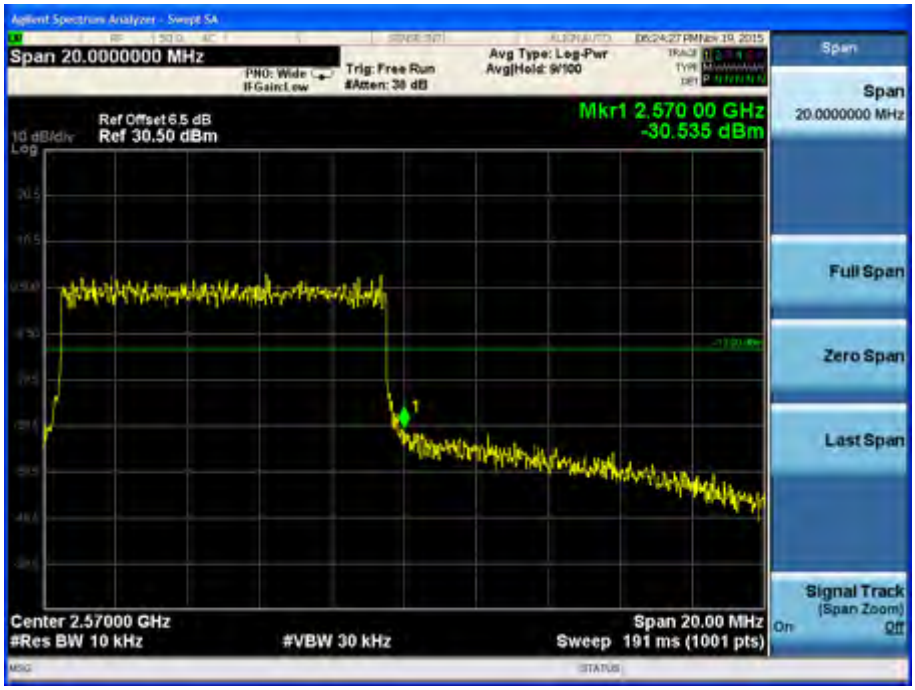


Fig.4

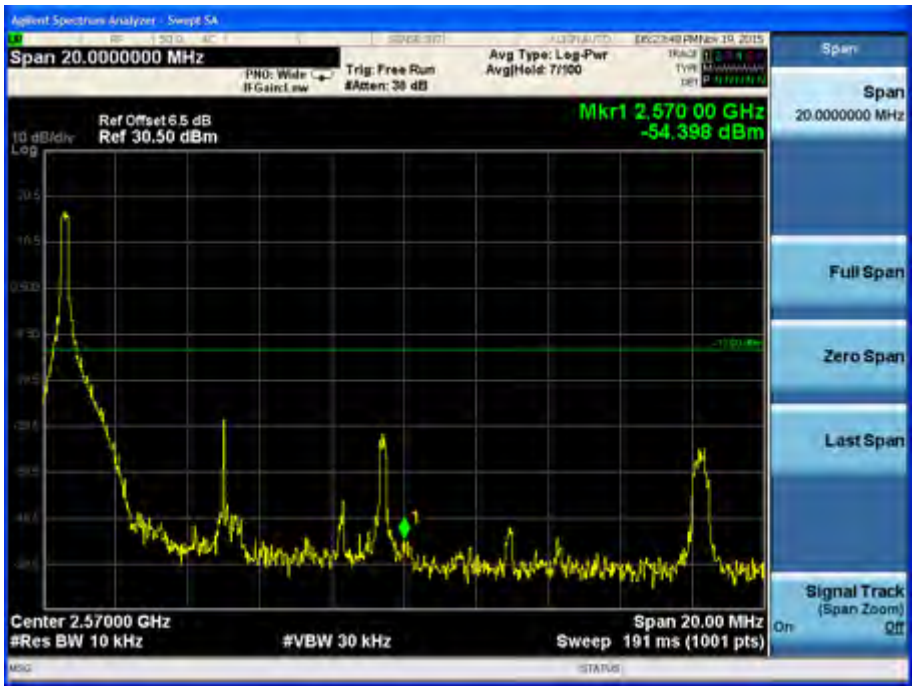


Fig.5

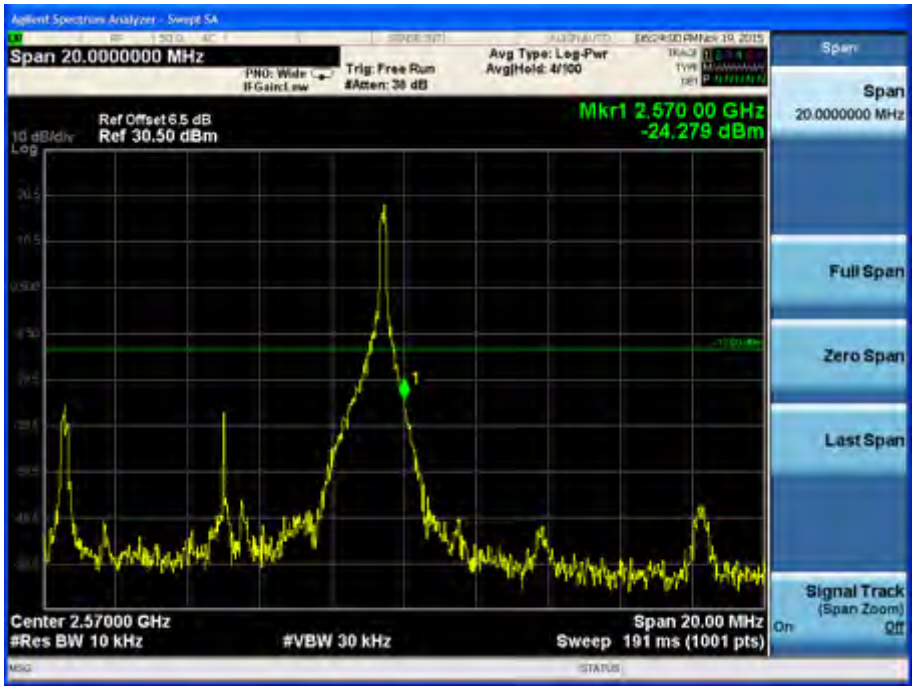


Fig.6

Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
7	2507.5	20825	15	1	0	Fig.1	Fig.5
				1	74	Fig.2	Fig.6
				38	18	Fig.3	Fig.7
				75	0	Fig.4	Fig.8

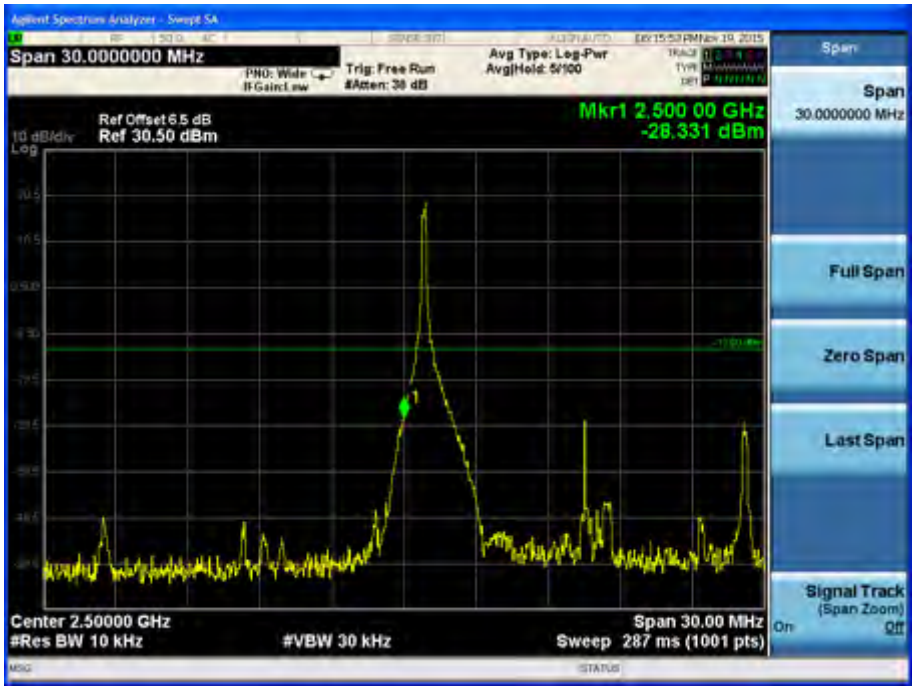


Fig.1

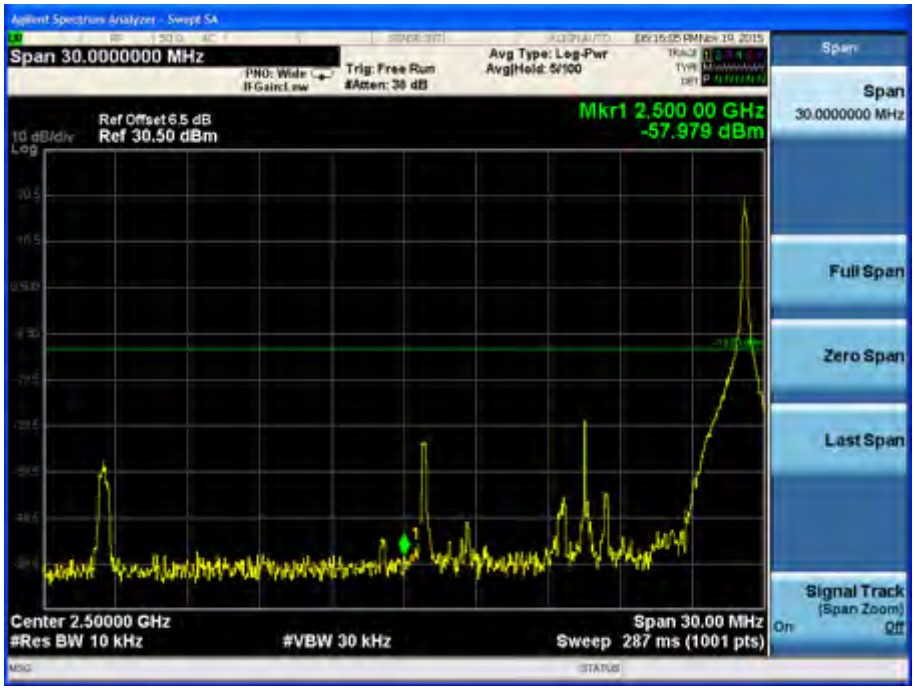


Fig.2

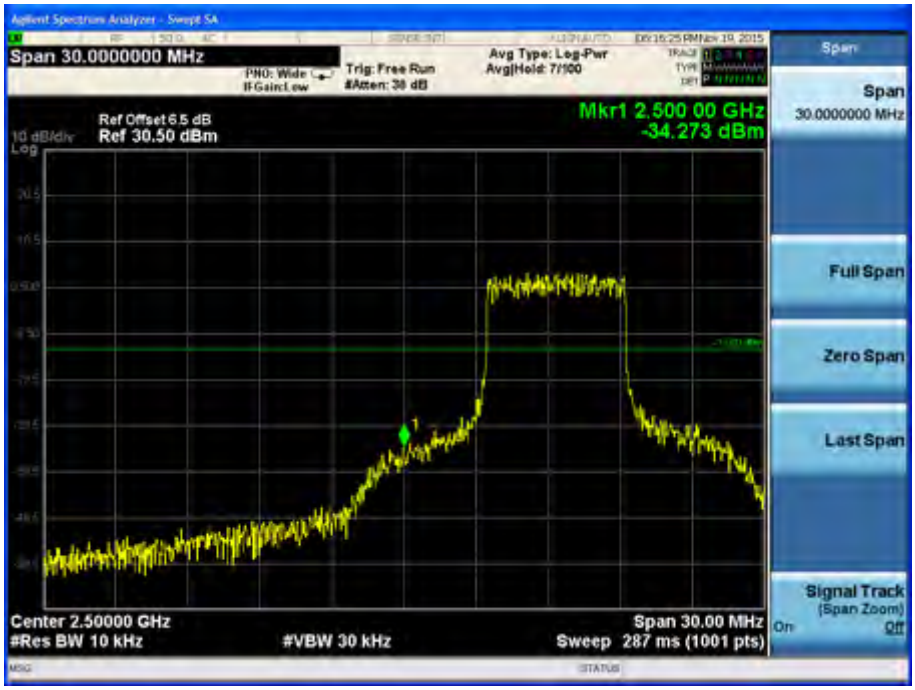


Fig.3

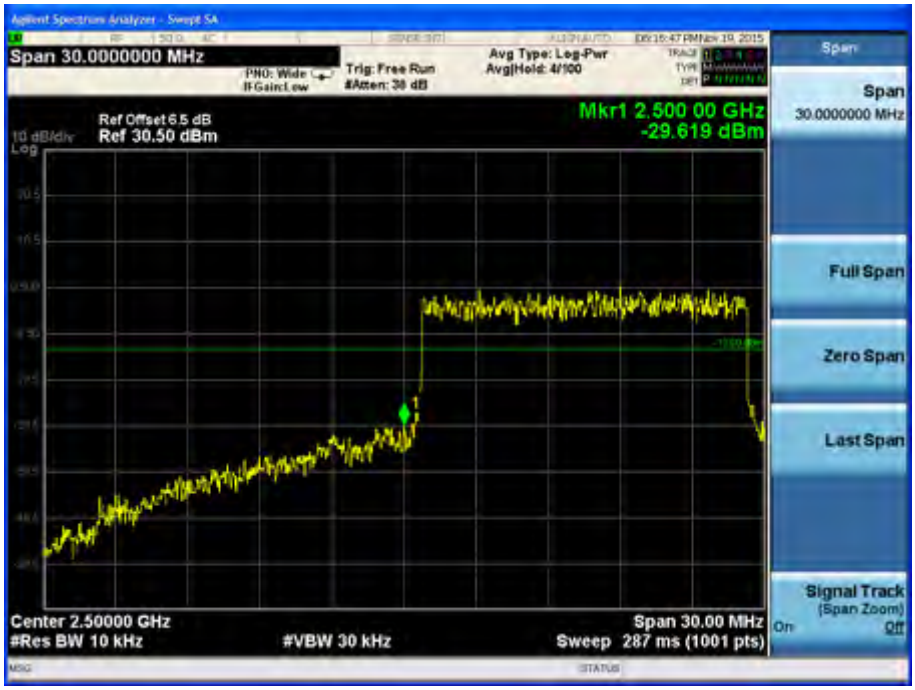


Fig.4

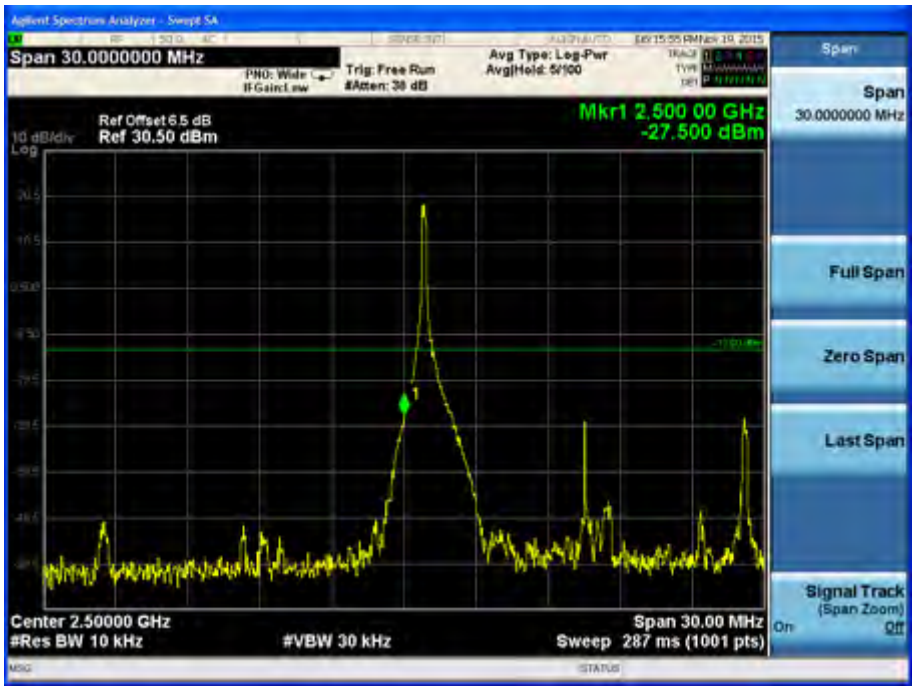


Fig.5

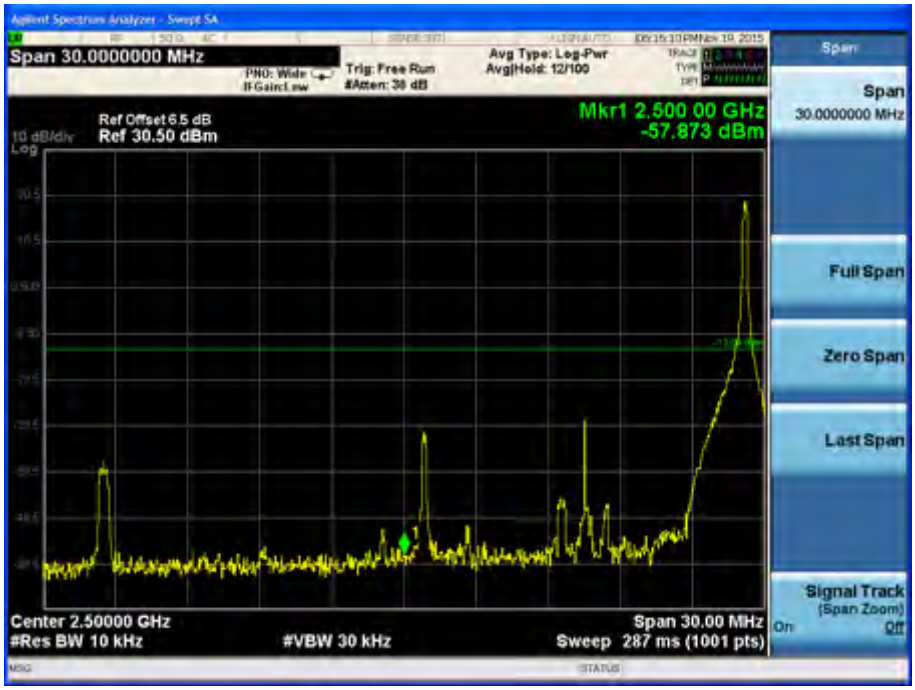


Fig.6

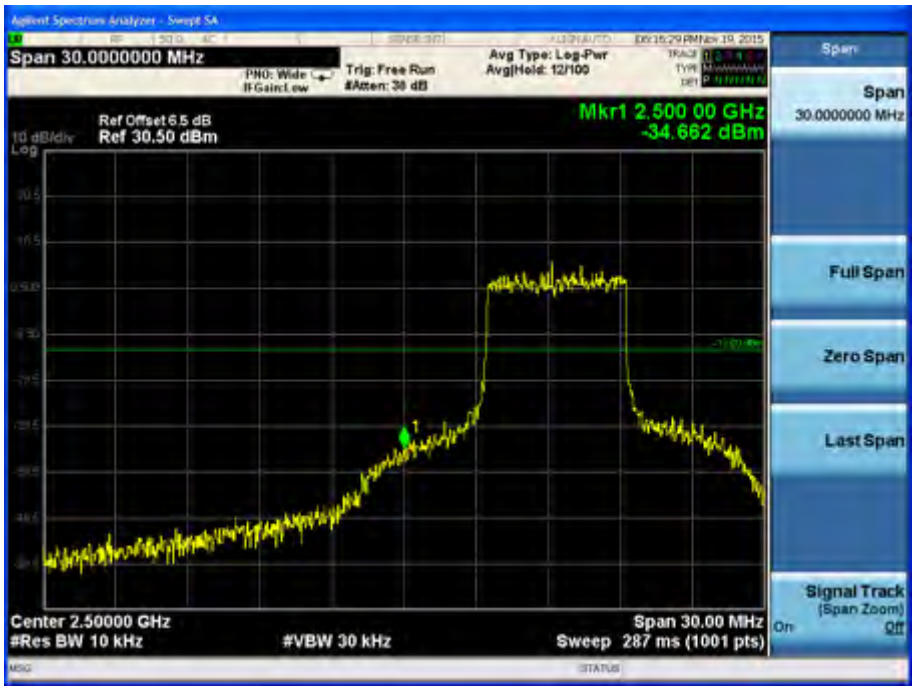


Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
7	2562.5	21375	15	1	0	Fig.1	Fig.5
				1	74	Fig.2	Fig.6
				38	18	Fig.3	Fig.7
				75	0	Fig.4	Fig.8

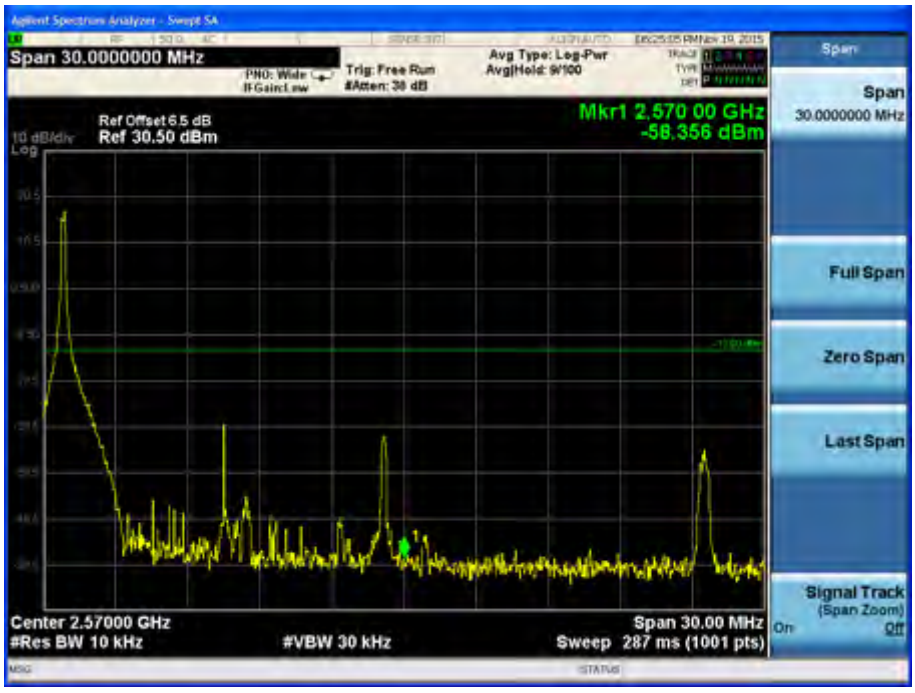


Fig.1

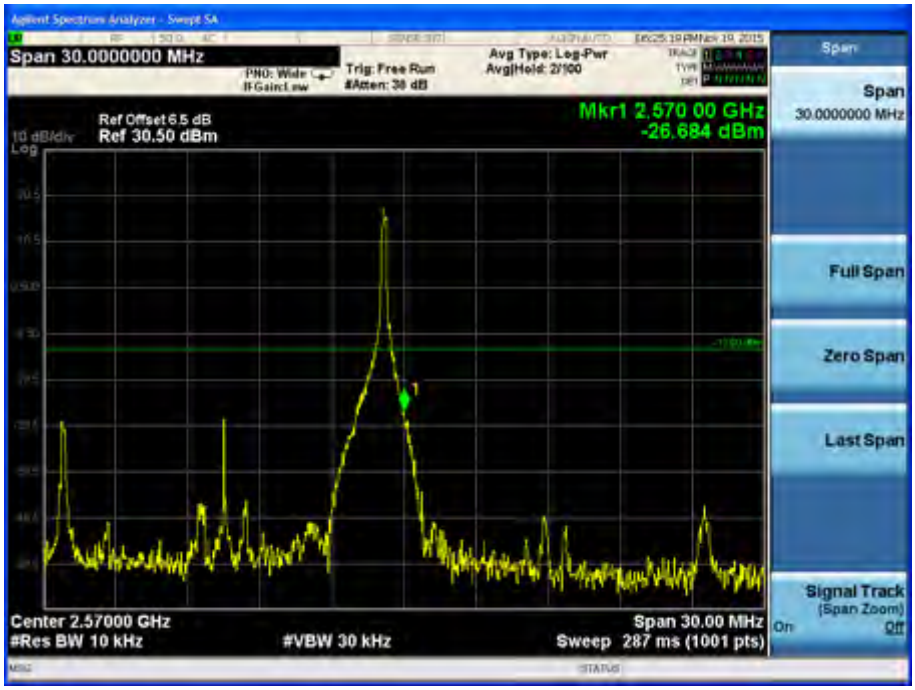


Fig.2

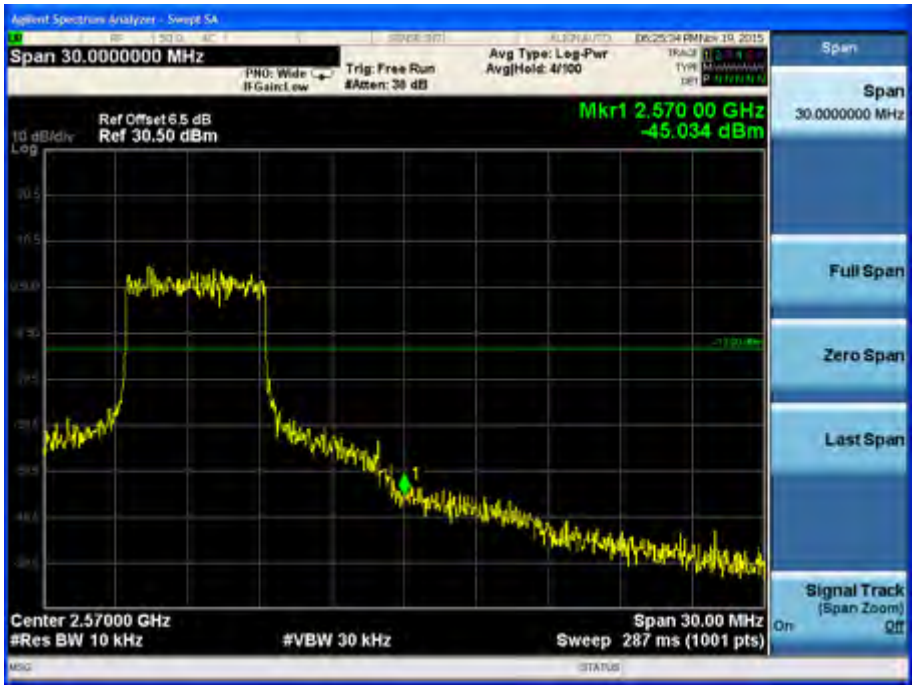


Fig.3

Fig.4

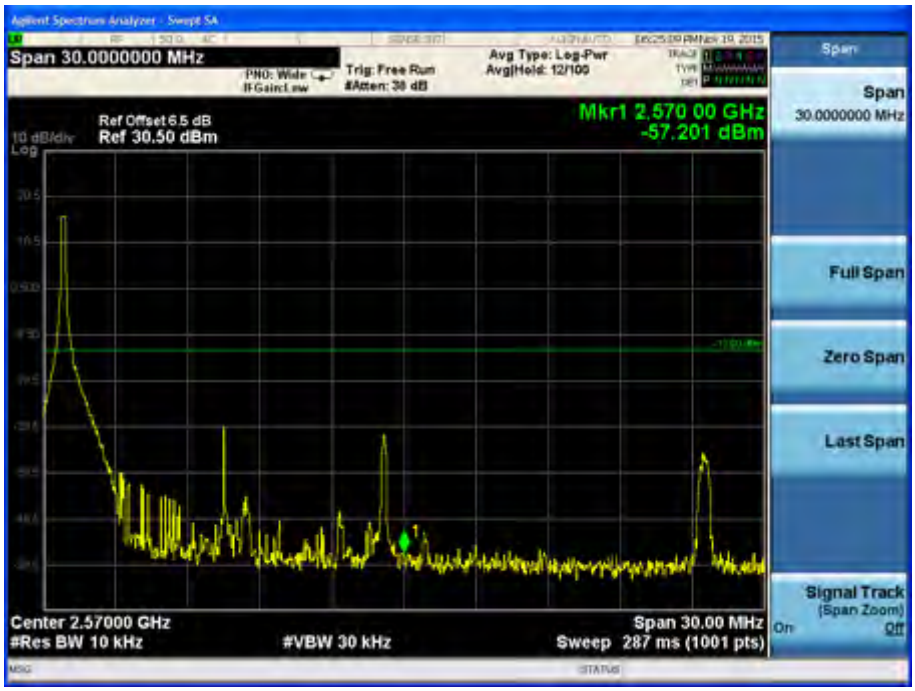


Fig.5

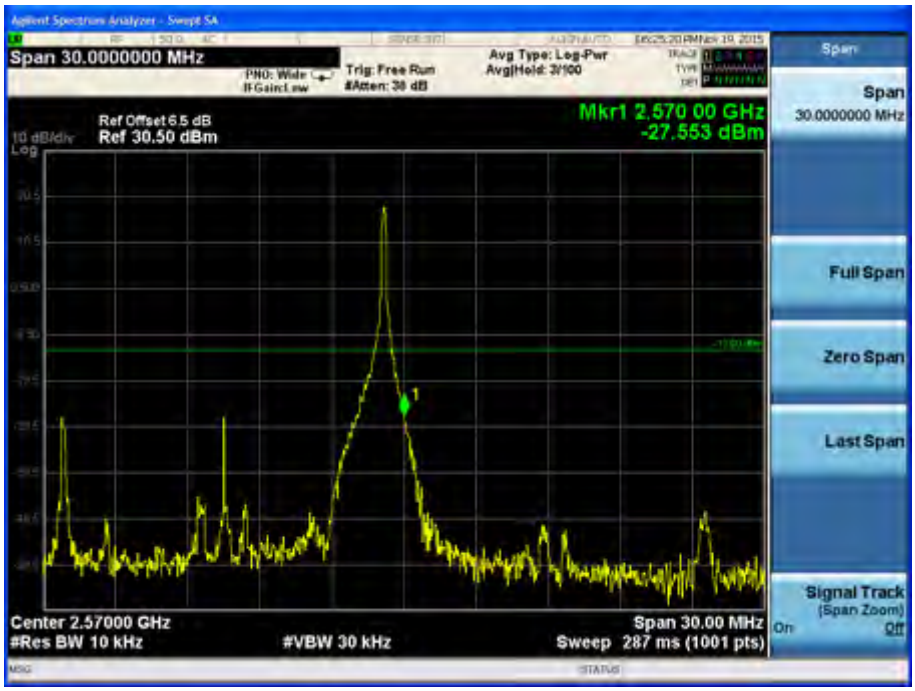


Fig.6

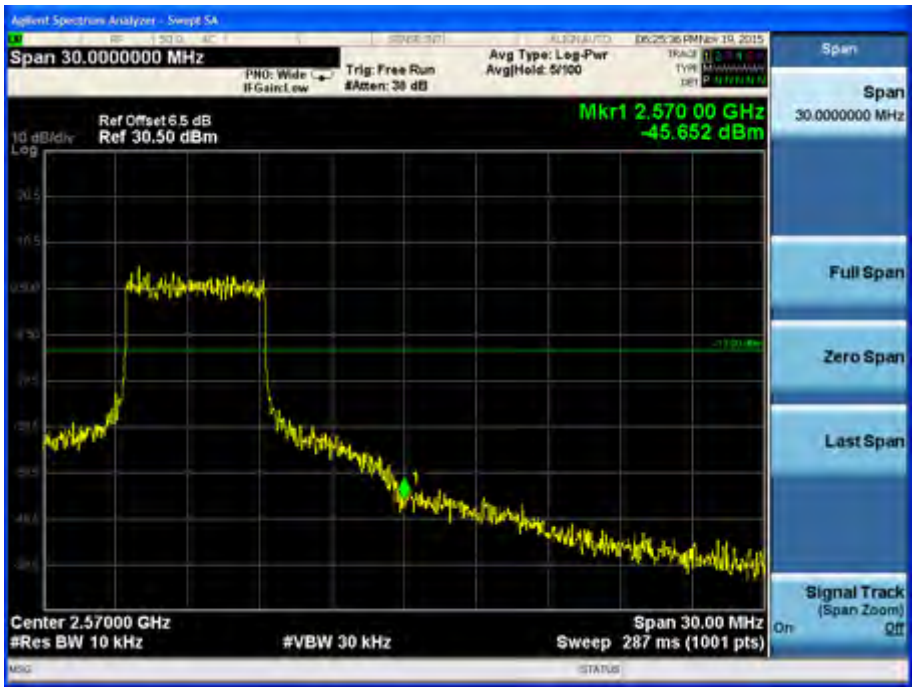


Fig.7

Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
7	2510	20850	20	1	0	Fig.1	Fig.5
				1	99	Fig.2	Fig.6
				50	25	Fig.3	Fig.7
				100	0	Fig.4	Fig.8

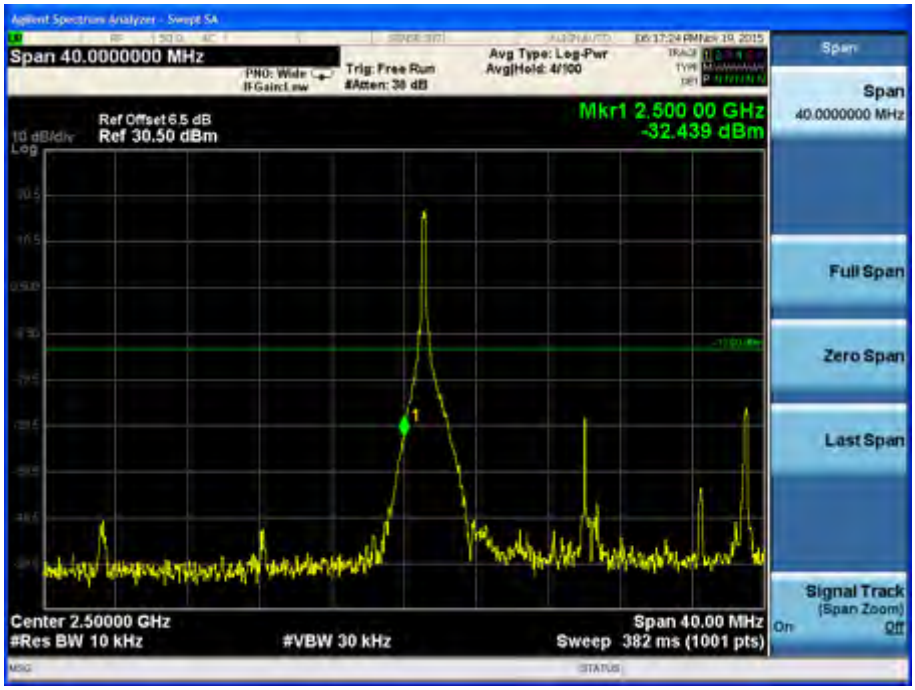


Fig.1

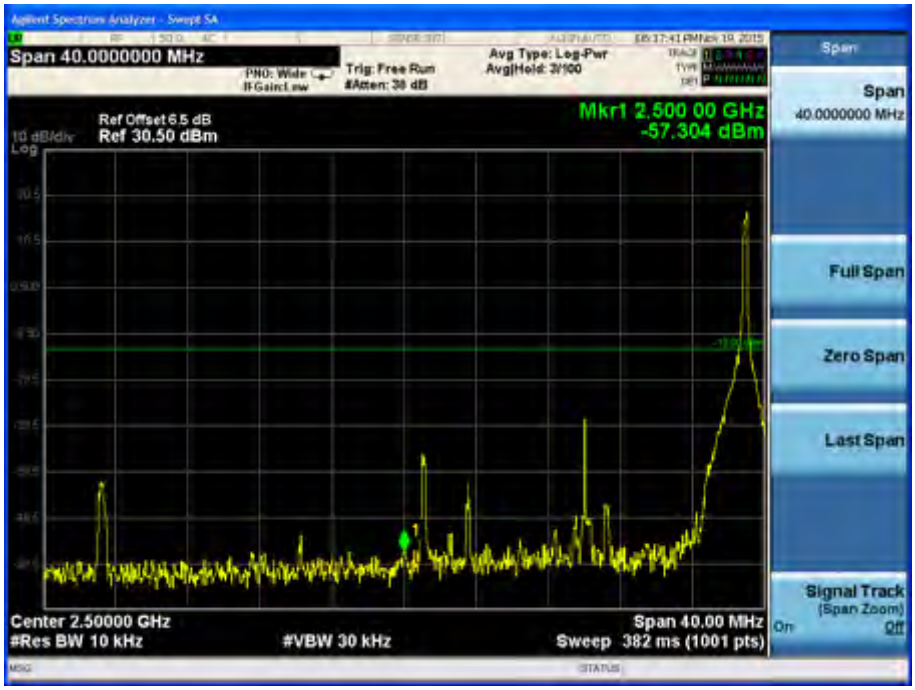


Fig.2

Fig.3

Fig.4

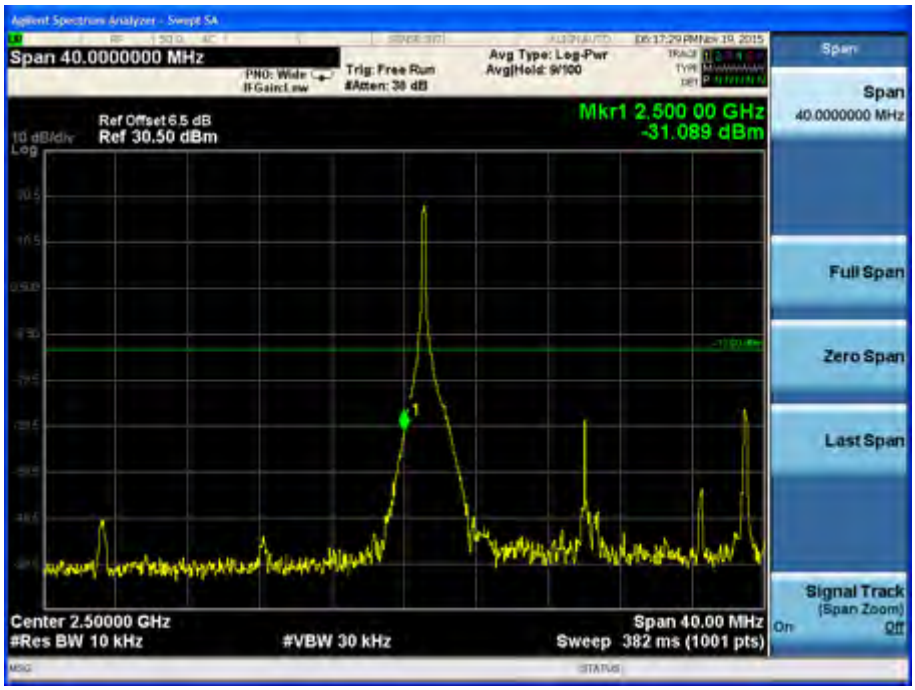


Fig.5

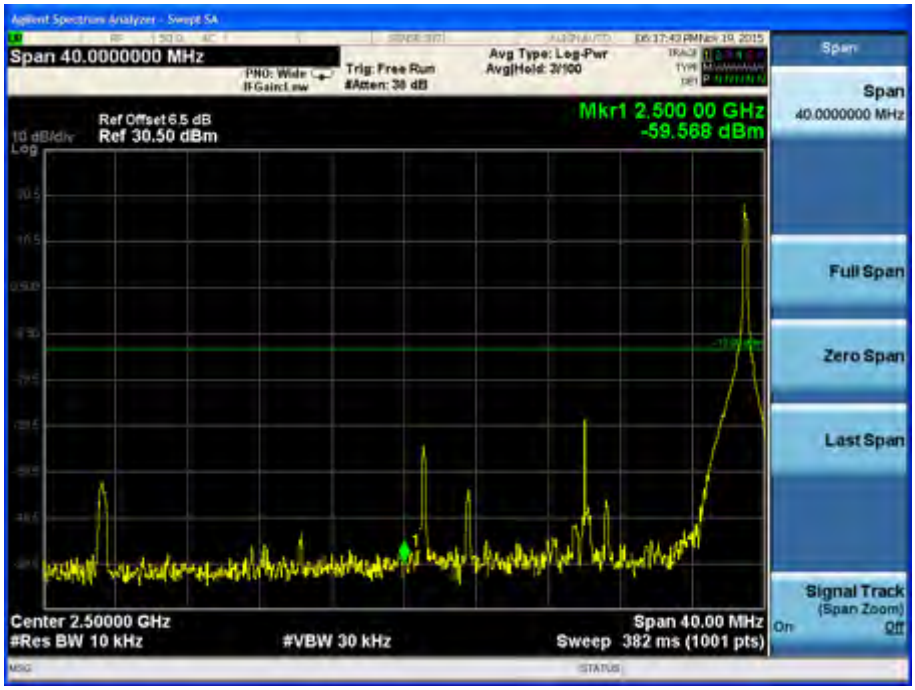


Fig.6

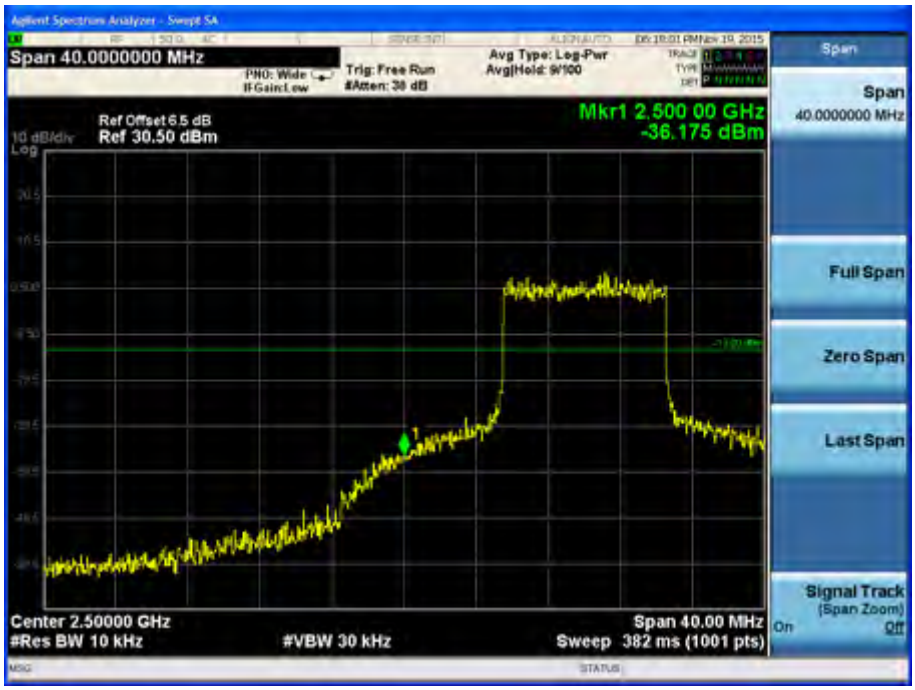


Fig.7

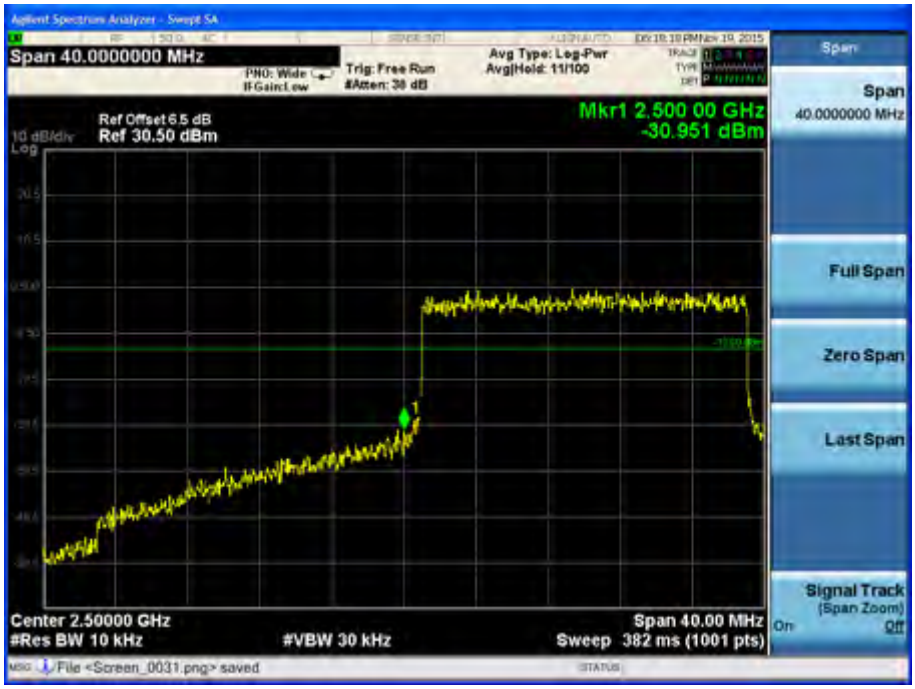


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Band Edges Plot	
						QPSK	16-QAM
7	2560	21350	20	1	0	Fig.1	Fig.5
				1	99	Fig.2	Fig.6
				50	25	Fig.3	Fig.7
				100	0	Fig.4	Fig.8

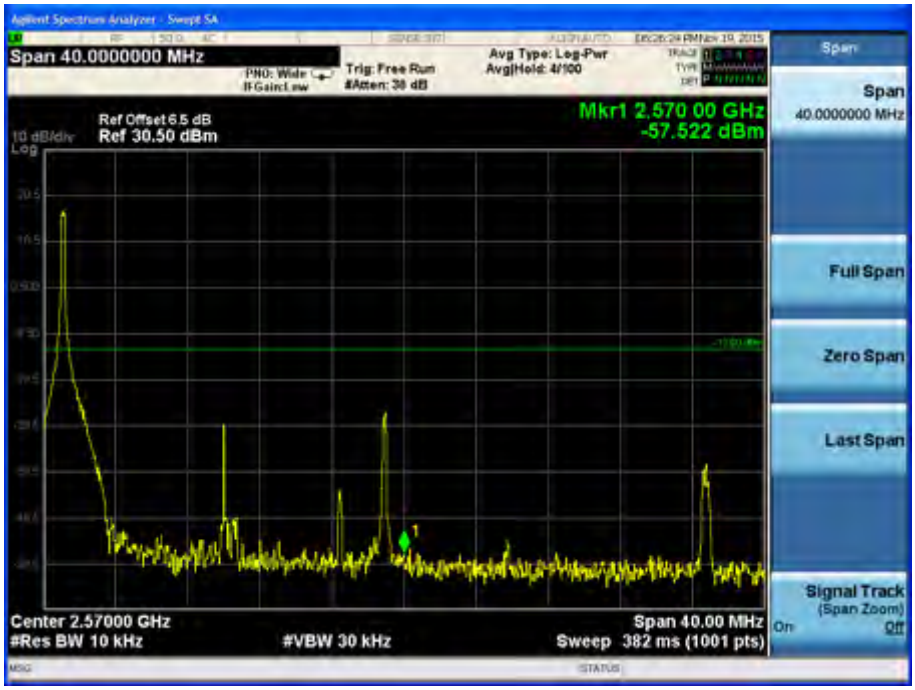


Fig.1

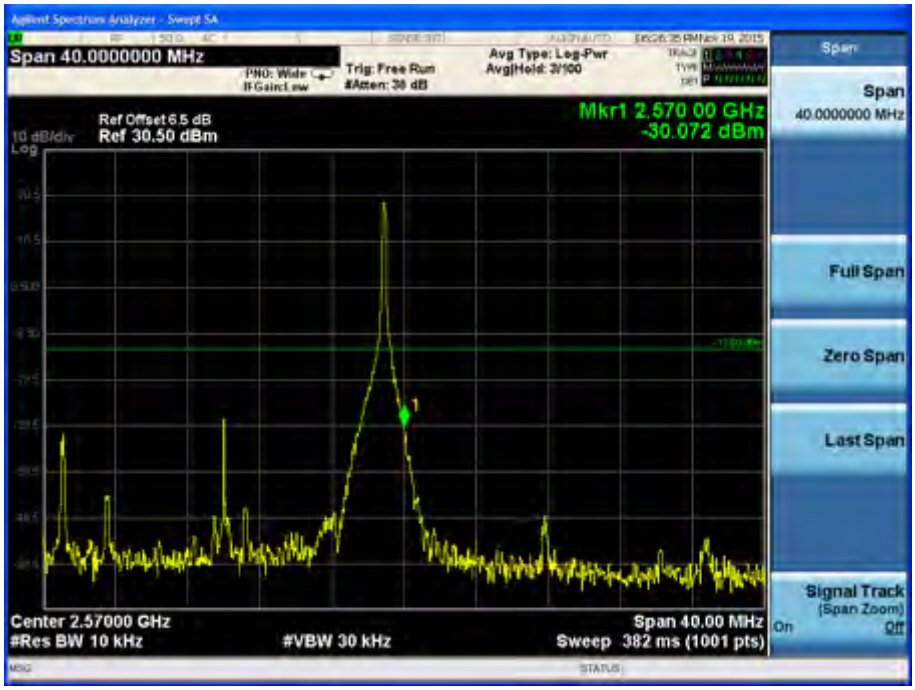


Fig.2

Fig.3

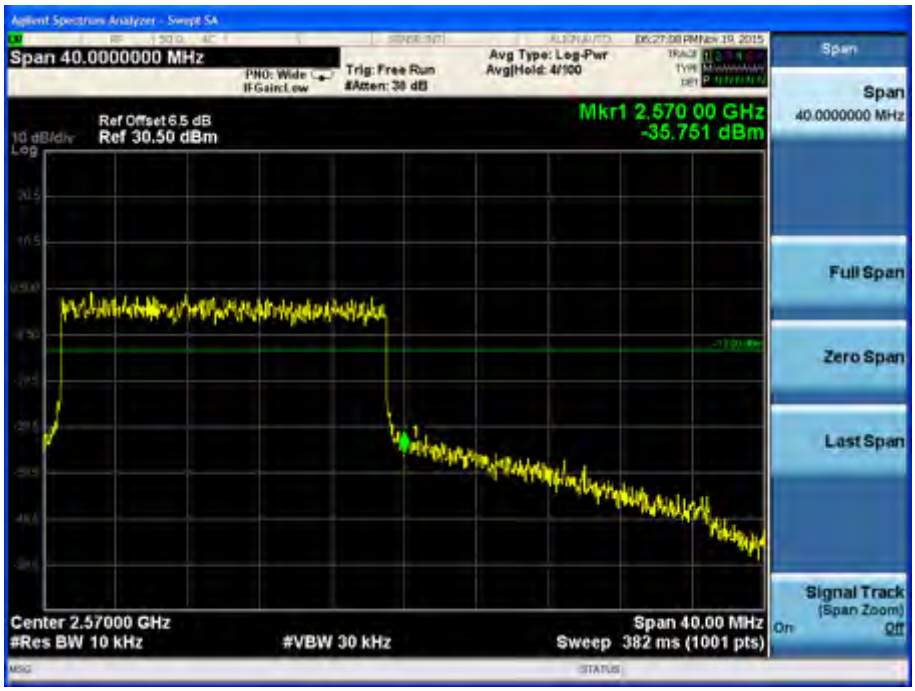


Fig.4

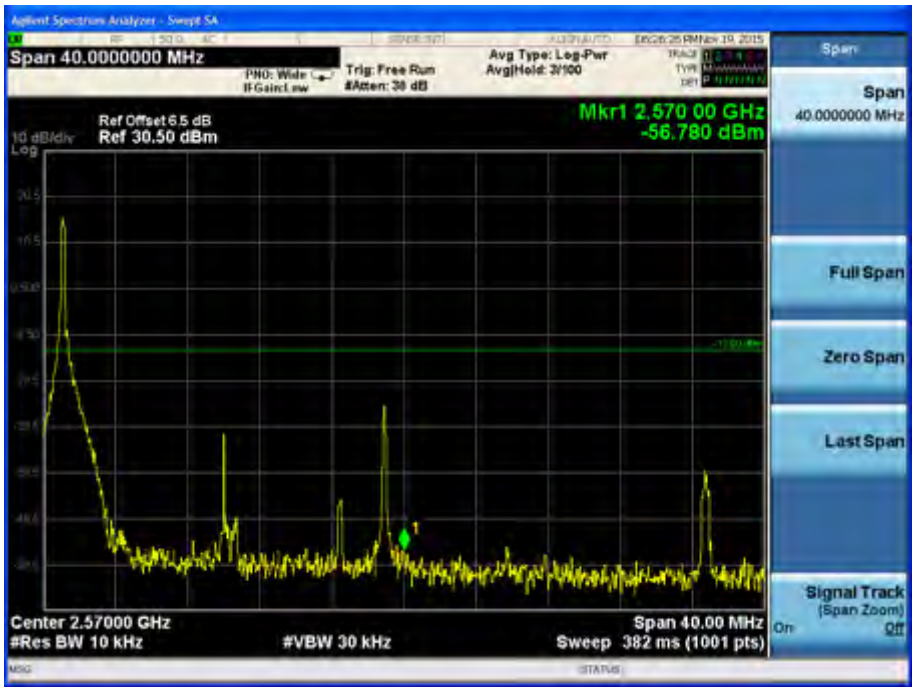


Fig.5

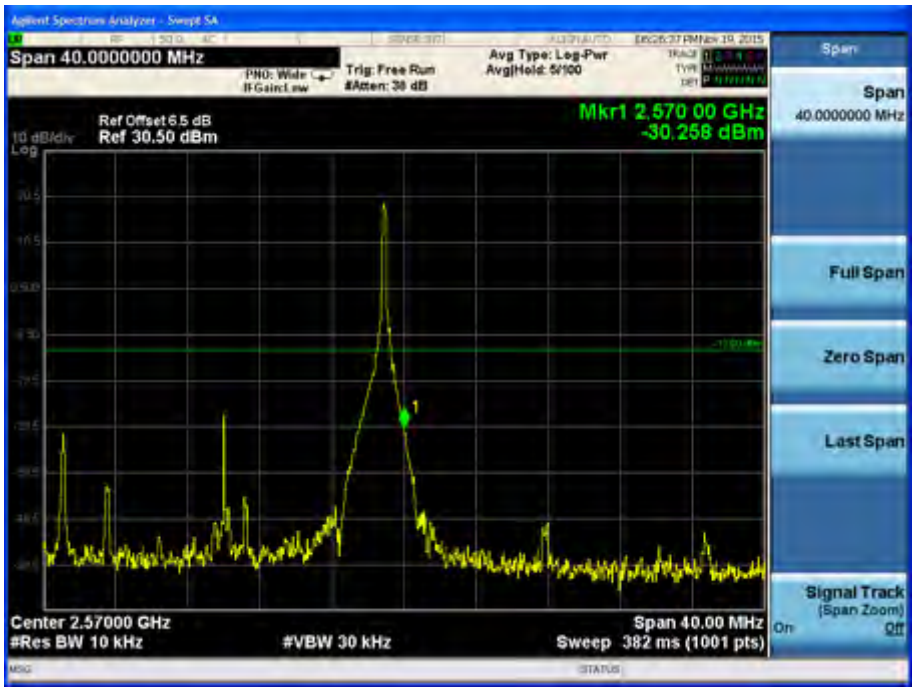


Fig.6

Fig.7

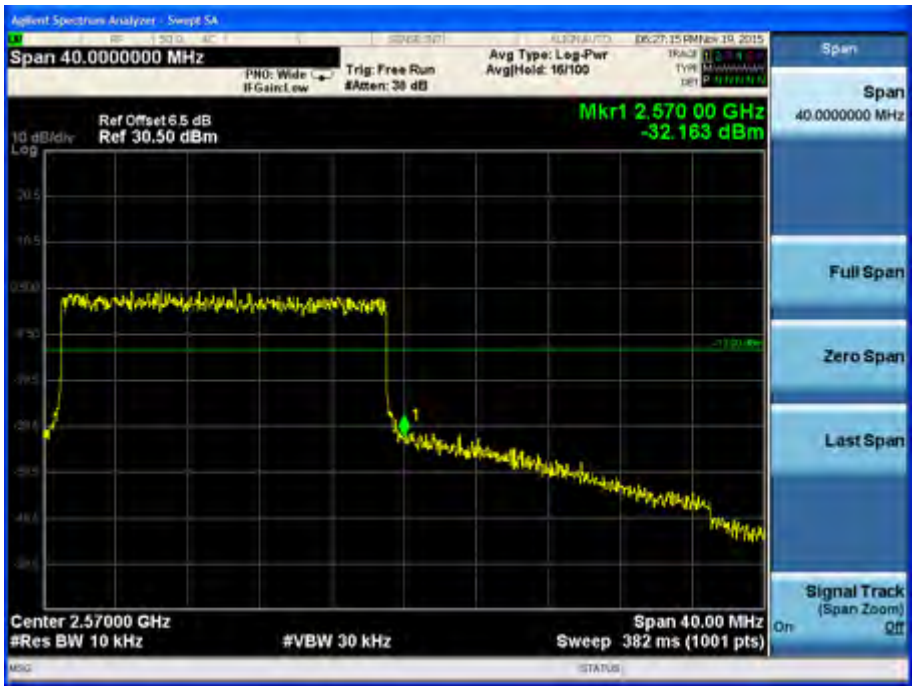


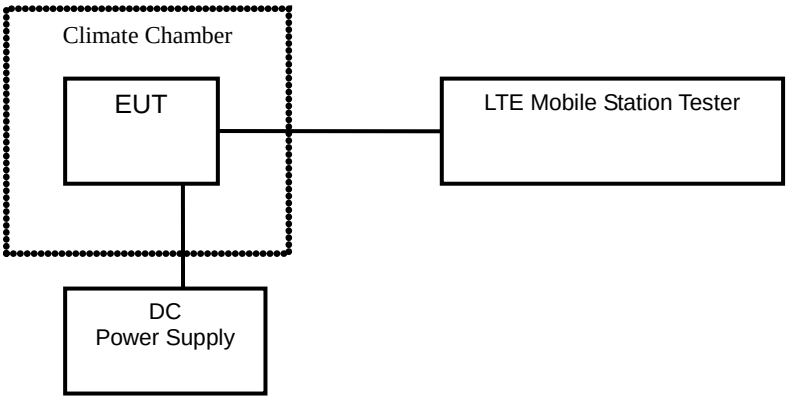
Fig.8

6.7 Frequency Stability-FCC Part 2.1055/27.54

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test setup:



Test Procedure:
A radio link shall be established between EUT and Tester. The tester will sample the transmitter RF output signal and measure its frequency. The temperature inside the climate chamber is varied from -30 to +50°C in 10°C step size, and also the DC power supply voltage to the EUT is varied from LV to HV. The measurement will be conducted at three channels No18100, No18300 and No18500 (Bottom, middle and top channels of LTE band I).

Limits: No specific frequency stability requirements in part 2.1055 and part 22.355.

Test result:

Temperature(°C)	Test Result (ppm)@NV		
	Band 2	Band 4	Band 7
	Frequency 1880 MHz	Frequency 1732.5 MHz	Frequency 2535 MHz
-30	0.002	0.002	0.004
-20	0.001	0.001	0.002
-10	0.004	0.001	0.001
0	0.005	0.002	0.001
+10	0.003	0.003	0.002
+20	0.007	0.003	0.004
+30	0.001	0.002	0.003
+40	0.002	0.005	0.004
+50	0.002	0.006	0.005

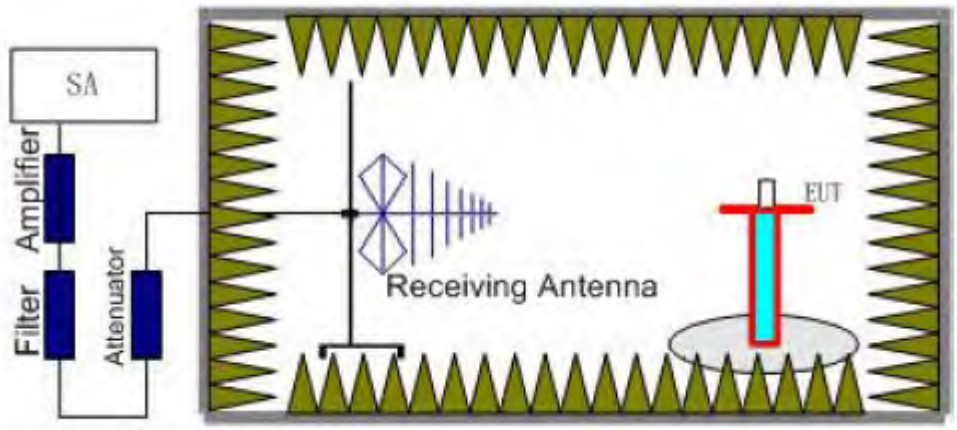
Voltage	Test Result (ppm)@NT		
	Band 2	Band 4	Band 7
	Frequency 1880 MHz	Frequency 1732.5 MHz	Frequency 2535 MHz
LV	0.002	0.002	0.006
HV	0.006	0.001	0.008

6.8 Radiated Spurious Emissions-FCC Part 2.1053/27.53(h), 27.53(g)

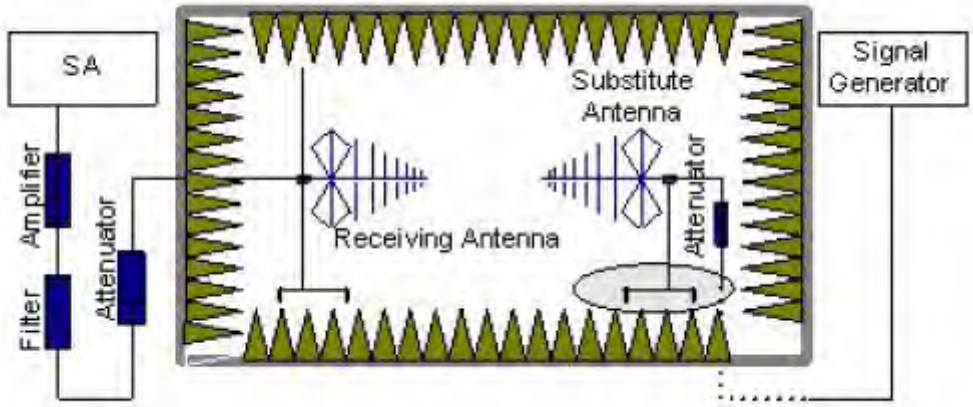
Ambient condition:

Temperature	Relative humidity	Pressure
20.8°C	36.5%	100.9kPa

Test Setup:



Step 1



Step 2

Test procedure:
The measurements procedures in TIA-603C-2004 are used.
The spectrum was scanned from 30MHz to the 10th harmonic of the highest frequency generated within the equipment.

Step 1:
The measurement is carried out in the fully anechoic chamber. EUT was placed on a 2.4 meter high non-conductive table at a 3 meter test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

Step 2:
A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
A power (Pmea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (Pmea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
A “reference path loss” should be calculated after test. The attenuation of “reference path loss” is the cable loss between the Signal Source with the Substitution Antenna (Pca) and the Substitution Antenna Gain (Ga).

Calculation procedure:
The data of cable loss and antenna gain has been calibrated in full testing frequency range before the testing.

The power of the Radiated Spurious Emissions is calculated by adding the cable loss and antenna gain. The basic equation with a sample calculation is as followed:
Power(EIRP) = Pmea+ Pca + Ga
This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP – 2.15 (dB).

Assumed the power of signal source record is -20dBm. A cable loss of -30dB, and an antenna gain of 11dB are added.
P=Pmea+Pca+Ga=(-20dBm)+(-30dB)+(11dB)= -39dBm

LTE band 2
Test result:
Channel 18615

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2458.22	-53.21	-13	Vertical
2777.15	-51.69	-13	Vertical
3729.14	-44.04	-13	Vertical
6677.65	-43.36	-13	Horizontal
9962.14	-39.02	-13	Vertical
17822.20	-36.32	-13	Vertical

Channel 18900

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2458.17	-52.34	-13	Vertical
2777.48	-51.83	-13	Vertical
3732.49	-43.94	-13	Horizontal
6680.57	-43.35	-13	Vertical
9965.04	-39.49	-13	Vertical
17822.30	-35.74	-13	Vertical

Channel 19175

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2456.67	-53.16	-13	Vertical
2777.35	-51.12	-13	Vertical
3732.58	-44.53	-13	Vertical
6681.24	-43.37	-13	Vertical
9964.70	-39.64	-13	Vertical
17819.57	-35.69	-13	Vertical

LTE band 4
Test result:
Channel 19957

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2455.58	-53.27	-13	Vertical
2778.25	-51.20	-13	Vertical
3728.41	-44.19	-13	Vertical
6681.59	-43.24	-13	Horizontal
9960.12	-39.59	-13	Vertical
17821.64	-35.63	-13	Vertical

Channel 20175

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2455.16	-53.02	-13	Vertical
2775.05	-51.44	-13	Vertical
3731.63	-44.38	-13	Horizontal
6679.29	-43.75	-13	Vertical
9964.46	-39.70	-13	Vertical
17823.14	-35.79	-13	Vertical

Channel 20393

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2454.53	-52.49	-13	Vertical
2777.51	-51.05	-13	Vertical
3728.87	-43.65	-13	Vertical
6678.38	-43.58	-13	Vertical
9964.39	-39.64	-13	Vertical
17824.09	-36.00	-13	Vertical

LTE band 7
Test result:
Channel 20775

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2456.77	-53.27	-13	Vertical
2779.16	-51.57	-13	Vertical
3731.77	-44.36	-13	Vertical
6680.25	-43.17	-13	Horizontal
9960.26	-39.12	-13	Vertical
17821.98	-35.54	-13	Vertical

Channel 21100

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2457.98	-52.80	-13	Vertical
2777.37	-51.82	-13	Vertical
3731.18	-44.27	-13	Horizontal
6679.73	-43.71	-13	Vertical
9960.75	-38.99	-13	Vertical
17824.03	-35.56	-13	Vertical

Channel 21350

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2454.00	-52.88	-13	Vertical
2776.64	-51.45	-13	Vertical
3729.31	-43.91	-13	Vertical
6677.34	-43.04	-13	Vertical
9960.53	-39.12	-13	Vertical
17820.02	-35.66	-13	Vertical

7 MEASUREMENT UNCERTAINTIES

Items	Uncertainty	
RF Power Output	U=0.6 dB	
Occupied Bandwidth	3kHz	
Spurious Emissions	9kHz~2GHz	U=1.2dB
	2G~3.6GHz	U=1.4dB
	3.6G~8GHz	U=2.2dB
	8G~12.75GHz	U=2.7dB
Band Edges Compliance	1.2dB	
Frequency Stability	U=48 Hz	

8 TEST EQUIPMENTS

No.	Name/Model	Manufacturer	Serial Number	Calibration Due Date
1	Mobile Station Tester	SP8010B	E0095	2016.09.24
2	N9020A Spectrum Analyzer	Agilent	MY48010771	2016.08.20
3	DC Power Supply E3645A	Agilent	MY43007648	2016.08.20
4	Power Splitter 11850C	Agilent	19632	2016.08.20
5	Temperature chamber SH241	ESPEC	92013758	2016.08.20
6	12.65m×8.03m×7.50m Fully-Anechoic Chamber	FRANKONIA	-----	-----
7	Turn table Diameter:1m	HD	-----	-----
8	Antenna master FAC(MA4.0)	MATURO	-----	-----
9	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	2016.08.20
10	HL562 Ultra log antenna	R&S	100016	2016.08.20
11	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2016.08.20
12	ESI 40 EMI test receiver	R&S	100015	2016.08.20
13	Radio tester	CMU 200	114667	2016.08.20
14	Spectrum Analyzer	FSV40	101065	2016.08.20

APPENDIX

Appendix Test Setup

---End of Test Report---