

HUM-900-PRO-CAS
ANT-916-SP2
Protocol A

FCC 15.247

Linx Technologies
 Hummingbird MCA
 Model: HUM-900-PRO-CAS
 Configuration: Protocol A

Date: 02/07/2015
 Lab: D
 Tested By: Kyle Fujimoto

Peak Output Power

Freq. (MHz)	Level (dBuV)	Level (V/m)	Antenna Gain (dBi)	Numeric Gain	Power Output (Watts)	Power Output (mW)	Power Output (dBm)	Comments
902.971	102.03	0.1263281	1.4	1.38038	0.0034683	3.46834	5.40	Vert. X-Axis
915	98.55	0.0846253	1.4	1.38038	0.0015564	1.5564	1.92	Vert. X-Axis
926.653	101.99	0.1257477	1.4	1.38038	0.0034365	3.43654	5.36	Vert. X-Axis
902.971	98.86	0.0877001	1.4	1.38038	0.0016716	1.67156	2.23	Vert. Y-Axis
915	99.77	0.0973868	1.4	1.38038	0.0020612	2.06121	3.14	Vert. Y-Axis
926.653	100.01	0.1001152	1.4	1.38038	0.0021783	2.17832	3.38	Vert. Y-Axis
902.971	103.28	0.1458814	1.4	1.38038	0.0046251	4.6251	6.65	Vert. Z-Axis
915	102.11	0.127497	1.4	1.38038	0.0035328	3.53282	5.48	Vert. Z-Axis
926.653	102.48	0.1330454	1.4	1.38038	0.003847	3.84699	5.85	Vert. Z-Axis
902.971	107.35	0.2330773	1.4	1.38038	0.0118065	11.8065	10.72	Horiz. X-Axis
915	104.45	0.1669168	1.4	1.38038	0.0060551	6.0551	7.82	Horiz. X-Axis
926.653	105.24	0.18281	1.4	1.38038	0.0072631	7.26309	8.61	Horiz. X-Axis
902.971	100.16	0.1018591	1.4	1.38038	0.0022549	2.25487	3.53	Horiz. Y-Axis
915	100.95	0.1115578	1.4	1.38038	0.0027047	2.70471	4.32	Horiz. Y-Axis
926.653	101.05	0.1128496	1.4	1.38038	0.0027677	2.76771	4.42	Horiz. Y-Axis
902.971	106.51	0.2115924	1.4	1.38038	0.0097302	9.73019	9.88	Horiz. Z-Axis
915	106.55	0.212569	1.4	1.38038	0.0098202	9.82022	9.92	Horiz. Z-Axis
926.653	104.3	0.164059	1.4	1.38038	0.0058495	5.84953	7.67	Horiz. Z-Axis

The Power in Watts is obtained by the following Formula Below:

$$P = [(E \cdot D)^2] / (30 \cdot G)$$

P = Power in Watts

E = The Measured Maximum Field Strength in V/m

G = The Numeric Gain of the Transmitting Antenna over an Isotropic Radiator

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Low Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	48.25	V	82.03	-33.78	Peak	3	200	
2708.91	40.61	V	74	-33.39	Peak	1.5	110	
2708.91	30.36	V	54	-23.64	Avg	1.5	110	
3611.88	47.73	V	74	-26.27	Peak	1.1	15	
3611.88	42.54	V	54	-11.46	Avg	1.1	15	
4514.86	45.12	V	74	-28.88	Peak	2.8	45	
4514.86	35.87	V	54	-18.13	Avg	2.8	45	
5417.83	50.15	V	74	-23.85	Peak	3.2	135	
5417.83	43.88	V	54	-10.12	Avg	3.2	135	
6320.8	50.98	V	82.03	-31.05	Peak	1.5	180	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

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Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**Low Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	47.65	V	78.86	-31.21	Peak	3	45	
2708.91	41.12	V	74	-32.88	Peak	1	45	
2708.91	31.49	V	54	-22.51	Avg	1	45	
3611.88	50	V	74	-24	Peak	1.1	180	
3611.88	46.68	V	54	-7.32	Avg	1.1	180	
4514.86	42.46	V	74	-31.54	Peak	1.25	135	
4514.86	30.95	V	54	-23.05	Avg	1.25	135	
5417.83	49.07	V	74	-24.93	Peak	2.85	45	
5417.83	40.34	V	54	-13.66	Avg	2.85	45	
6320.8	50.51	V	78.86	-28.35	Peak	1.5	135	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

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Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
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ANT-916-SP2 Antenna

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**Low Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	46.35	V	83.28	-36.93	Peak	1.15	345	
2708.91	40.48	V	74	-33.52	Peak	2.75	190	
2708.91	30.37	V	54	-23.63	Avg	2.75	190	
3611.88	50.18	V	74	-23.82	Peak	1	150	
3611.88	46.01	V	54	-7.99	Avg	1	150	
4514.86	45.07	V	74	-28.93	Peak	1.65	90	
4514.86	38.14	V	54	-15.86	Avg	1.65	90	
5417.83	53.48	V	74	-20.52	Peak	1.5	45	
5417.83	49	V	54	-5	Avg	1.5	45	
6320.8	51.11	V	83.28	-32.17	Peak	1.1	60	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

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Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
 Configuration: Protocol A - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**Low Channel
Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	40.65	H	87.35	-46.7	Peak	1.75	175	
2708.91	41.64	H	74	-32.36	Peak	2.15	180	
2708.91	25.86	H	54	-28.14	Avg	2.15	180	
3611.88	47.24	H	74	-26.76	Peak	2.25	195	
3611.88	39.48	H	54	-14.52	Avg	2.25	195	
4514.86	46.42	H	74	-27.58	Peak	1.5	325	
4514.86	31.58	H	54	-22.42	Avg	1.5	325	
5417.83	49.31	H	74	-24.69	Peak	1.25	160	
5417.83	37.5	H	54	-16.5	Avg	1.25	160	
6320.8	52.06	H	87.35	-35.29	Peak	1.25	180	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

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Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
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ANT-916-SP2 Antenna

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**Low Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	43.75	H	80.16	-36.41	Peak	2.85	185	
2708.91	39.61	H	74	-34.39	Peak	1.75	190	
2708.91	28.83	H	54	-25.17	Avg	1.75	190	
3611.88	46.93	H	74	-27.07	Peak	1.5	35	
3611.88	41.6	H	54	-12.4	Avg	1.5	35	
4514.86	44.88	H	74	-29.12	Peak	2.85	200	
4514.86	38.22	H	54	-15.78	Avg	2.85	200	
5417.83	49.59	H	74	-24.41	Peak	2	0	
5417.83	42.39	H	54	-11.61	Avg	2	0	
6320.8	50.46	H	80.16	-29.7	Peak	1.1	180	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

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Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**Low Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	49.74	H	86.51	-36.77	Peak	1	160	
2708.91	39.07	H	74	-34.93	Peak	1.15	250	
2708.91	27.91	H	54	-26.09	Avg	1.15	250	
3611.88	49.27	H	74	-24.73	Peak	1.75	135	
3611.88	45.84	H	54	-8.16	Avg	1.75	135	
4514.86	44.42	H	74	-29.58	Peak	1.2	340	
4514.86	33.54	H	54	-20.46	Avg	1.2	340	
5417.83	50.57	H	74	-23.43	Peak	1.15	120	
5417.83	43.52	H	54	-10.48	Avg	1.15	120	
6320.8	51.24	H	86.51	-35.27	Peak	1.35	45	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

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Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	41.2	V	78.55	-37.35	Peak	1.5	180	
2745	42.12	V	74	-31.88	Peak	1.5	200	
2745	27.64	V	54	-26.36	Avg	1.5	200	
3660	45.98	V	74	-28.02	Peak	1	160	
3660	37.37	V	54	-16.63	Avg	1	160	
4575	48.64	V	74	-25.36	Peak	2	170	
4575	35.49	V	54	-18.51	Avg	2	170	
5490	49.31	V	74	-24.69	Peak	2	180	
5490	34.06	V	54	-19.94	Avg	2	180	
6405	52.17	V	78.55	-26.38	Peak	1.25	210	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

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Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	46.22	V	79.77	-33.55	Peak	2	35	
2745	42.87	V	74	-31.13	Peak	1.5	130	
2745	30.08	V	54	-23.92	Avg	1.5	130	
3660	46.48	V	74	-27.52	Peak	2	110	
3660	37.68	V	54	-16.32	Avg	2	110	
4575	46.25	V	74	-27.75	Peak	2.25	45	
4575	37.33	V	54	-16.67	Avg	2.25	45	
5490	49.06	V	74	-24.94	Peak	1.75	90	
5490	34.11	V	54	-19.89	Avg	1.75	90	
6405	52.08	V	79.77	-27.69	Peak	1.5	90	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

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Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	42.54	V	82.11	-39.57	Peak	1.25	180	
2745	42.87	V	74	-31.13	Peak	1	210	
2745	30.79	V	54	-23.21	Avg	1	210	
3660	47.15	V	74	-26.85	Peak	1.75	180	
3660	39.86	V	54	-14.14	Avg	1.75	180	
4575	47.54	V	74	-26.46	Peak	1	160	
4575	39.34	V	54	-14.66	Avg	1	160	
5490	50.25	V	74	-23.75	Peak	1.5	230	
5490	36.46	V	54	-17.54	Avg	1.5	230	
6405	52.13	V	82.11	-29.98	Peak	1.75	225	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	42.79	H	84.45	-41.66	Peak	1.25	180	
2745	41.34	H	74	-32.66	Peak	1.5	160	
2745	28.62	H	54	-25.38	Avg	1.5	160	
3660	46.02	H	74	-27.98	Peak	1.75	140	
3660	39.66	H	54	-14.34	Avg	1.75	140	
4575	48.12	H	74	-25.88	Peak	1.35	175	
4575	38.73	H	54	-15.27	Avg	1.35	175	
5490	48.56	H	74	-25.44	Peak	1.5	180	
5490	35.16	H	54	-18.84	Avg	1.5	180	
6405	52.05	H	84.45	-32.4	Peak	1.25	210	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	41.08	H	80.95	-39.87	Peak	1.75	65	
2745	42.55	H	74	-31.45	Peak	1.5	30	
2745	28.46	H	54	-25.54	Avg	1.5	30	
3660	47.64	H	74	-26.36	Peak	1.5	90	
3660	40.48	H	54	-13.52	Avg	1.5	90	
4575	45.32	H	74	-28.68	Peak	2	90	
4575	36.11	H	54	-17.89	Avg	2	90	
5490	49.74	H	74	-24.26	Peak	1.25	45	
5490	36.36	H	54	-17.64	Avg	1.25	45	
6405	51.48	H	80.95	-29.47	Peak	1.25	0	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

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Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	43.88	H	86.55	-42.67	Peak	1.75	225	
2745	42.22	H	74	-31.78	Peak	1	250	
2745	31.15	H	54	-22.85	Avg	1	250	
3660	48.02	H	74	-25.98	Peak	1	300	
3660	39.64	H	54	-14.36	Avg	1	300	
4575	46.31	H	74	-27.69	Peak	1.5	210	
4575	39.44	H	54	-14.56	Avg	1.5	210	
5490	50.31	H	74	-23.69	Peak	1.25	225	
5490	39.55	H	54	-14.45	Avg	1.25	225	
6405	53.08	H	86.55	-33.47	Peak	1	230	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

High Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1853.3	43.12	V	81.99	-38.87	Peak	1.25	170	
2779.9	42.16	V	74	-31.84	Peak	1.5	155	
2779.9	26.78	V	54	-27.22	Avg	1.5	155	
3706.6	46.85	V	74	-27.15	Peak	1.75	180	
3706.6	36.36	V	54	-17.64	Avg	1.75	180	
4633.25	47.88	V	74	-26.12	Peak	1.5	320	
4633.25	42.57	V	54	-11.43	Avg	1.5	320	
5559.9	49.32	V	74	-24.68	Peak	1.5	160	
5559.9	38.17	V	54	-15.83	Avg	1.5	160	
6486.55	51.98	V	81.99	-30.01	Peak	1.25	180	
7413.2								No Emissions
7413.2								Detected
8339.85								No Emissions
8339.85								Detected
9266.5								No Emissions
9266.5								Detected

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Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1853.3	44.67	V	80.01	-35.34	Peak	1.75	30	
2779.9	41.46	V	74	-32.54	Peak	1.25	135	
2779.9	27.98	V	54	-26.02	Avg	1.25	135	
3706.6	44.57	V	74	-29.43	Peak	1.75	0	
3706.6	30.6	V	54	-23.4	Avg	1.75	0	
4633.25	45.19	V	74	-28.81	Peak	1.5	45	
4633.25	31.31	V	54	-22.69	Avg	1.5	45	
5559.9	49.5	V	74	-24.5	Peak	1.35	90	
5559.9	37.49	V	54	-16.51	Avg	1.35	90	
6486.55	52.52	V	80.01	-27.49	Peak	1.25	200	
7413.2								No Emissions
7413.2								Detected
8339.85								No Emissions
8339.85								Detected
9266.5								No Emissions
9266.5								Detected

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Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
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 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1853.3	41.79	V	82.48	-40.69	Peak	1.75	225	
2779.9	43.08	V	74	-30.92	Peak	2.25	180	
2779.9	32.98	V	54	-21.02	Avg	2.25	180	
3706.6	48.55	V	74	-25.45	Peak	1.35	210	
3706.6	43.31	V	54	-10.69	Avg	1.35	210	
4633.25	51.43	V	74	-22.57	Peak	1	175	
4633.25	44.16	V	54	-9.84	Avg	1	175	
5559.9	51.23	V	74	-22.77	Peak	1.25	190	
5559.9	38.61	V	54	-15.39	Avg	1.25	190	
6486.55	53.77	V	82.48	-28.71	Peak	1.75	230	
7413.2								No Emissions
7413.2								Detected
8339.85								No Emissions
8339.85								Detected
9266.5								No Emissions
9266.5								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
 Configuration: Protocol A - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1853.3	45.89	H	85.24	-39.35	Peak	1.1	190	
2779.9	42	H	74	-32	Peak	1.25	160	
2779.9	26.46	H	54	-27.54	Avg	1.25	160	
3706.6	45.99	H	74	-28.01	Peak	1.25	135	
3706.6	38.74	H	54	-15.26	Avg	1.25	135	
4633.25	46.19	H	74	-27.81	Peak	1	210	
4633.25	37.88	H	54	-16.12	Avg	1	210	
5559.9	50.46	H	74	-23.54	Peak	2	45	
5559.9	38.66	H	54	-15.34	Avg	2	45	
6486.55	52.76	H	85.24	-32.48	Peak	1.5	190	
7413.2								No Emissions
7413.2								Detected
8339.85								No Emissions
8339.85								Detected
9266.5								No Emissions
9266.5								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**High Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1853.3	41.87	H	81.05	-39.18	Peak	1.65	45	
2779.9	41.44	H	74	-32.56	Peak	1.25	60	
2779.9	31.58	H	54	-22.42	Avg	1.25	60	
3706.6	46.35	H	74	-27.65	Peak	1.75	135	
3706.6	36.54	H	54	-17.46	Avg	1.75	135	
4633.25	46.22	H	74	-27.78	Peak	2.25	340	
4633.25	35.89	H	54	-18.11	Avg	2.25	340	
5559.9	51.08	H	74	-22.92	Peak	2	90	
5559.9	40.13	H	54	-13.87	Avg	2	90	
6486.55	53.46	H	81.05	-27.59	Peak	1.25	340	
7413.2								No Emissions
7413.2								Detected
8339.85								No Emissions
8339.85								Detected
9266.5								No Emissions
9266.5								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol A - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**High Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1853.3	49.21	H	84.3	-35.09	Peak	1.25	160	
2779.9	39.81	H	74	-34.19	Peak	1.5	180	
2779.9	30.12	H	54	-23.88	Avg	1.5	180	
3706.6	51.22	H	74	-22.78	Peak	2	90	
3706.6	48.1	H	54	-5.9	Avg	2	90	
4633.25	46.34	H	74	-27.66	Peak	1.35	85	
4633.25	39.51	H	54	-14.49	Avg	1.35	85	
5559.9	49.9	H	74	-24.1	Peak	1.5	135	
5559.9	39.34	H	54	-14.66	Avg	1.5	135	
6486.55	51.54	H	84.3	-32.76	Peak	1.15	45	
7413.2								No Emissions
7413.2								Detected
8339.85								No Emissions
8339.85								Detected
9266.5								No Emissions
9266.5								Detected

FCC 15.247 and FCC Class B

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
 Configuration: Protocol A - Module 2
 ANT-916-SP2 Antenna

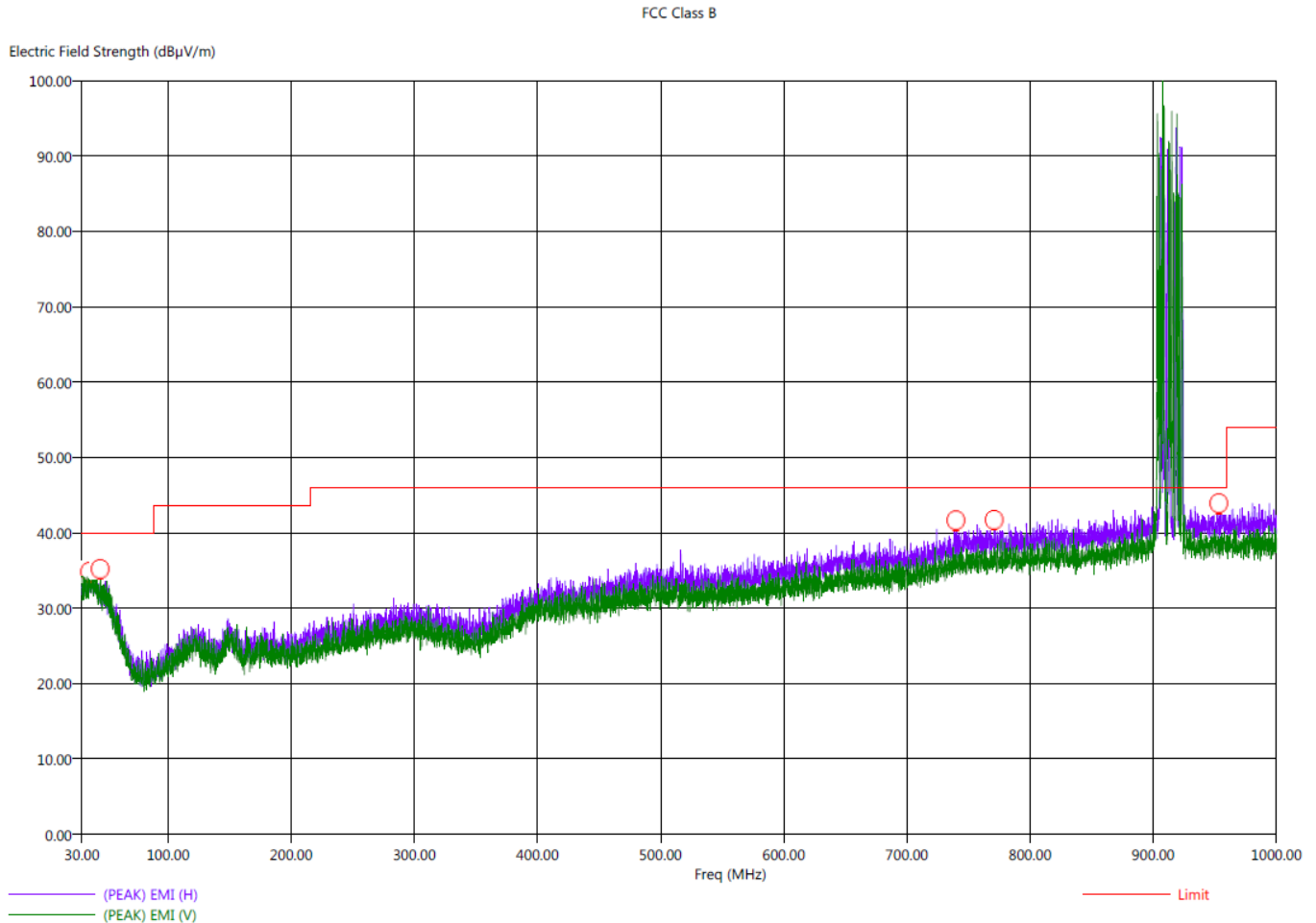
Dates: 02/04/2015 and 02/05/2015
 Labs: B and D
 Tested By: Kenneth Lee

Non Harmonic Emissions from the Tx and Digital Portion - 10 kHz to 30 MHz
Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Emissions Found for the
								Digital Portion
								from 10 kHz to 30 MHz
								for both Vertical and Horizontal
								Polarizations
								No Non Harmonic Emissions Found
								for the Tx Mode
								from 10 kHz to 30 MHz
								for both Vertical and Horizontal
								Polarizations
								Investigated in the X-Axis, Y-Axis,
								and Z-Axis
								No Emissions Found for the
								Digital Portion
								from 1 GHz to 9.3 GHz
								for both Vertical and Horizontal
								Polarizations
								No Non Harmonic Emissions Found
								for the Tx Mode
								from 1 GHz to 9.3 GHz
								for both Vertical and Horizontal
								Polarizations
								Investigated in the X-Axis, Y-Axis,
								and Z-Axis

Title: Pre-Scan - FCC Class B
File: Agilent - Radiated Pre-Scan 30-1000Mhz - FCC Class B_Module_2_Protocol_A_Z-Axis_02-06-2015.set
Operator: Kenneth Lee
EUT Type: Hummingbird MCA
EUT Condition: Continuously Transmitting - Frequency Hopping - Protocol A - Module 2 - Z-Axis - Worst Case
Comments: Customer: Linx Technologies
M/N: HUM-900-PRO-CAS
Note: Antenna - ANT-916-SP2

2/6/2015 4:11:37 PM
Sequence: Preliminary Scan

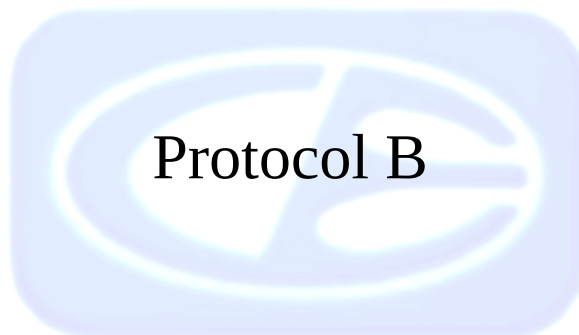


Title: Radiated Final - 30-1000 MHz - FCC Class B
File: Agilent - Radiated Final Scan 30-1000Mhz - FCC Class B_Module_2_Protocol_A_Z-Axis_02-06-2015.set
Operator: Kenneth Lee
EUT Type: Hummingbird MCA
EUT Condition: Continuously Transmitting - Frequency Hopping - Protocol A - Module 2 - Z-Axis - Worst Case
Comments: Customer: Linx Technologies
M/N: HUM-900-PRO-CAS
Note: Antenna - ANT-916-SP2

2/6/2015 4:23:06 PM
Sequence: Final Measurements

Final Scan - FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(OP) EMI (dBµV/m)	(PEAK) Margin (dB)	(OP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Twr Ht (cm)	Ttbl Aql (deg)
36.30	H	35.71	31.53	-4.29	-8.47	40.00	23.79	0.40	223.67	188.50
40.80	H	36.62	31.81	-3.38	-8.19	40.00	24.11	0.43	191.79	23.50
44.90	V	34.13	30.50	-5.87	-9.50	40.00	22.72	0.46	304.50	123.50
739.90	H	41.59	36.46	-4.41	-9.54	46.00	25.46	2.34	303.85	140.25
770.90	H	41.40	37.12	-4.60	-8.88	46.00	25.90	2.36	287.73	287.25
953.30	H	44.02	39.83	-1.98	-6.17	46.00	27.68	2.73	239.79	232.50



FCC 15.247

Linx Technologies
 Hummingbird MCA
 Model: HUM-900-PRO-CAS
 Configuration: Protocol B

Date: 01/29/2015
 Lab: D
 Tested By: Kyle Fujimoto

Peak Output Power

Freq. (MHz)	Level (dBuV)	Level (V/m)	Antenna Gain (dBi)	Numeric Gain	Power Output (Watts)	Power Output (mW)	Power Output (dBm)	Comments
902.971	99.78	0.097499	1.4	1.38038	0.002066	2.06596	3.15	Vert. X-Axis
915	99.8	0.0977237	1.4	1.38038	0.0020755	2.07549	3.17	Vert. X-Axis
926.277	103.04	0.1419058	1.4	1.38038	0.0043764	4.37644	6.41	Vert. X-Axis
902.971	102.15	0.1280855	1.4	1.38038	0.0035655	3.56551	5.52	Vert. Y-Axis
915	98.89	0.0880035	1.4	1.38038	0.0016831	1.68314	2.26	Vert. Y-Axis
926.277	94.43	0.0526623	1.4	1.38038	0.0006027	0.60273	-2.20	Vert. Y-Axis
902.971	102.53	0.1338135	1.4	1.38038	0.0038915	3.89154	5.90	Vert. Z-Axis
915	102.94	0.1402814	1.4	1.38038	0.0042768	4.27682	6.31	Vert. Z-Axis
926.277	103.54	0.1503142	1.4	1.38038	0.0049104	4.91045	6.91	Vert. Z-Axis
902.971	108.01	0.251478	1.4	1.38038	0.0137443	13.7443	11.38	Horiz. X-Axis
915	106.3	0.206538	1.4	1.38038	0.0092709	9.27089	9.67	Horiz. X-Axis
926.277	106.9	0.2213095	1.4	1.38038	0.0106444	10.6444	10.27	Horiz. X-Axis
902.971	95.59	0.0601866	1.4	1.38038	0.0007873	0.78727	-1.04	Horiz. Y-Axis
915	102.93	0.14012	1.4	1.38038	0.004267	4.26699	6.30	Horiz. Y-Axis
926.277	97.76	0.0772681	1.4	1.38038	0.0012975	1.29754	1.13	Horiz. Y-Axis
902.971	101.93	0.124882	1.4	1.38038	0.0033894	3.38939	5.30	Horiz. Z-Axis
915	104.79	0.1735801	1.4	1.38038	0.0065482	6.54819	8.16	Horiz. Z-Axis
926.277	104.22	0.1625549	1.4	1.38038	0.0057428	5.74277	7.59	Horiz. Z-Axis

The Power in Watts is obtained by the following Formula Below:

$$P = [(E \cdot D)^2] / (30 \cdot G)$$

P = Power in Watts

E = The Measured Maximum Field Strength in V/m

G = The Numeric Gain of the Transmitting Antenna over an Isotropic Radiator

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Low Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	40.98	V	79.78	-38.8	Peak	1.1	210	
2708.91	42.78	V	74	-31.22	Peak	1.35	190	
2708.91	31.55	V	54	-22.45	Avg	1.35	190	
3611.88	46.71	V	74	-27.29	Peak	1	160	
3611.88	38.34	V	54	-15.66	Avg	1	160	
4514.86	54.18	V	74	-19.82	Peak	2	230	
4514.86	36.73	V	54	-17.27	Avg	2	230	
5417.83	48.08	V	74	-25.92	Peak	1	45	
5417.83	37.88	V	54	-16.12	Avg	1	45	
6320.8	46.82	V	79.78	-32.96	Peak	1.25	180	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Low Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	42.79	V	82.15	-39.36	Peak	1.5	45	
2708.91	41.66	V	74	-32.34	Peak	1	90	
2708.91	32.18	V	54	-21.82	Avg	1	90	
3611.88	47.38	V	74	-26.62	Peak	2.25	350	
3611.88	40.09	V	54	-13.91	Avg	2.25	350	
4514.86	45.37	V	74	-28.63	Peak	1.5	345	
4514.86	34.86	V	54	-19.14	Avg	1.5	345	
5417.83	47.96	V	74	-26.04	Peak	1.5	60	
5417.83	36.22	V	54	-17.78	Avg	1.5	60	
6320.8	48.31	V	82.15	-33.84	Peak	1	90	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Low Channel
Transmit Mode - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	42.22	V	82.53	-40.31	Peak	1.1	90	
2708.91	41.57	V	74	-32.43	Peak	1.5	210	
2708.91	34.02	V	54	-19.98	Avg	1.5	210	
3611.88	47.27	V	74	-26.73	Peak	1.5	180	
3611.88	39.41	V	54	-14.59	Avg	1.5	180	
4514.86	45.67	V	74	-28.33	Peak	1.75	45	
4514.86	38.7	V	54	-15.3	Avg	1.75	45	
5417.83	47.44	V	74	-26.56	Peak	1	345	
5417.83	37.49	V	54	-16.51	Avg	1	345	
6320.8	52.19	V	82.53	-30.34	Peak	1.35	15	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**Low Channel
Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	39.87	H	88.01	-48.14	Peak	2	180	
2708.91	43.15	H	74	-30.85	Peak	1.25	210	
2708.91	35.87	H	54	-18.13	Avg	1.25	210	
3611.88	46.06	H	74	-27.94	Peak	2	160	
3611.88	39.55	H	54	-14.45	Avg	2	160	
4514.86	44.98	H	74	-29.02	Peak	1.75	180	
4514.86	36.12	H	54	-17.88	Avg	1.75	180	
5417.83	49.67	H	74	-24.33	Peak	2.25	110	
5417.83	38	H	54	-16	Avg	2.25	110	
6320.8	48.2	H	88.01	-39.81	Peak	1.75	230	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**Low Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	41.28	H	75.59	-34.31	Peak	1.35	0	
2708.91	41.65	H	74	-32.35	Peak	1	45	
2708.91	30.87	H	54	-23.13	Avg	1	45	
3611.88	49.31	H	74	-24.69	Peak	1.35	15	
3611.88	43.75	H	54	-10.25	Avg	1.35	15	
4514.86	46.07	H	74	-27.93	Peak	1	60	
4514.86	35.68	H	54	-18.32	Avg	1	60	
5417.83	50.06	H	74	-23.94	Peak	2	345	
5417.83	39.46	H	54	-14.54	Avg	2	345	
6320.8	50.76	H	75.59	-24.83	Peak	2	90	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**Low Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94	42.64	H	81.93	-39.29	Peak	1.75	145	
2708.91	40.16	H	74	-33.84	Peak	1.5	230	
2708.91	29.87	H	54	-24.13	Avg	1.5	230	
3611.88	45.18	H	74	-28.82	Peak	1.5	210	
3611.88	36.09	H	54	-17.91	Avg	1.5	210	
4514.86	44.98	H	74	-29.02	Peak	2.25	180	
4514.86	32.97	H	54	-21.03	Avg	2.25	180	
5417.83	47.89	H	74	-26.11	Peak	2	165	
5417.83	37.47	H	54	-16.53	Avg	2	165	
6320.8	51.07	H	81.93	-30.86	Peak	1.75	190	
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
 Configuration: Protocol B - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	42.87	V	79.8	-36.93	Peak	1	180	
2745	41.22	V	74	-32.78	Peak	1.1	90	
2745	32.48	V	54	-21.52	Avg	1.1	90	
3660	42.98	V	74	-31.02	Peak	1	145	
3660	33.81	V	54	-20.19	Avg	1	145	
4575	46.75	V	74	-27.25	Peak	1	340	
4575	37.66	V	54	-16.34	Avg	1	340	
5490	49.31	V	74	-24.69	Peak	1.75	210	
5490	36.88	V	54	-17.12	Avg	1.75	210	
6405	50.14	V	79.8	-29.66	Peak	1.35	190	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
 Configuration: Protocol B - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	46.21	V	78.89	-32.68	Peak	1.75	230	
2745	42.67	V	74	-31.33	Peak	1	45	
2745	32.49	V	54	-21.51	Avg	1	45	
3660	44.86	V	74	-29.14	Peak	1	60	
3660	37.28	V	54	-16.72	Avg	1	60	
4575	45.68	V	74	-28.32	Peak	1.25	90	
4575	34.09	V	54	-19.91	Avg	1.25	90	
5490	47.85	V	74	-26.15	Peak	1.35	110	
5490	36.75	V	54	-17.25	Avg	1.35	110	
6405	51.29	V	78.89	-27.6	Peak	1.25	355	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	43.13	V	82.94	-39.81	Peak	1.35	180	
2745	43.94	V	74	-30.06	Peak	1.5	160	
2745	34.57	V	54	-19.43	Avg	1.5	160	
3660	46.97	V	74	-27.03	Peak	1.5	90	
3660	40.24	V	54	-13.76	Avg	1.5	90	
4575	46.95	V	74	-27.05	Peak	2	340	
4575	39.4	V	54	-14.6	Avg	2	340	
5490	51.34	V	74	-22.66	Peak	1.75	230	
5490	43.07	V	54	-10.93	Avg	1.75	230	
6405	50.16	V	82.94	-32.78	Peak	1.75	210	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	42.79	H	86.3	-43.51	Peak	2	145	
2745	43.76	H	74	-30.24	Peak	1.5	160	
2745	36.84	H	54	-17.16	Avg	1.5	160	
3660	46.19	H	74	-27.81	Peak	1.5	180	
3660	38.67	H	54	-15.33	Avg	1.5	180	
4575	48.18	H	74	-25.82	Peak	1.25	230	
4575	41.59	H	54	-12.41	Avg	1.25	230	
5490	50.07	H	74	-23.93	Peak	2	120	
5490	40.65	H	54	-13.35	Avg	2	120	
6405	51.35	H	86.3	-34.95	Peak	1.75	180	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	41.36	H	82.93	-41.57	Peak	1.25	210	
2745	40.49	H	74	-33.51	Peak	1.75	25	
2745	28.74	H	54	-25.26	Avg	1.75	25	
3660	47.91	H	74	-26.09	Peak	2.25	0	
3660	42.82	H	54	-11.18	Avg	2.25	0	
4575	47.11	H	74	-26.89	Peak	1	200	
4575	41.05	H	54	-12.95	Avg	1	200	
5490	51.84	H	74	-22.16	Peak	1.5	180	
5490	46.08	H	54	-7.92	Avg	1.5	180	
6405	50.5	H	82.93	-32.43	Peak	1.5	45	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**Middle Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830	48.69	H	84.79	-36.1	Peak	1	170	
2745	40.39	H	74	-33.61	Peak	1.15	175	
2745	29.67	H	54	-24.33	Avg	1.15	175	
3660	51.92	H	74	-22.08	Peak	1.25	90	
3660	49.39	H	54	-4.61	Avg	1.25	90	
4575	45.91	H	74	-28.09	Peak	1.25	135	
4575	38.31	H	54	-15.69	Avg	1.25	135	
5490	50.23	H	74	-23.77	Peak	1.5	70	
5490	43.62	H	54	-10.38	Avg	1.5	70	
6405	50.96	H	84.79	-33.83	Peak	1.15	90	
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

High Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55	43.43	V	83.04	-39.61	Peak	1.25	180	
2778.83	42.08	V	74	-31.92	Peak	2	145	
2778.83	30.64	V	54	-23.36	Avg	2	145	
3705.11	46.18	V	74	-27.82	Peak	2	260	
3705.11	37.68	V	54	-16.32	Avg	2	260	
4631.39	46.19	V	74	-27.81	Peak	1.75	300	
4631.39	35.91	V	54	-18.09	Avg	1.75	300	
5557.66	49.82	V	74	-24.18	Peak	1.35	210	
5557.66	38.44	V	54	-15.56	Avg	1.35	210	
6483.94	52.4	V	83.04	-30.64	Peak	1.75	180	
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
 Configuration: Protocol B - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55	47.6	V	74.43	-26.83	Peak	2	170	
2778.83	39.43	V	74	-34.57	Peak	1.25	270	
2778.83	29.05	V	54	-24.95	Avg	1.25	270	
3705.11	47.37	V	74	-26.63	Peak	1.25	35	
3705.11	41.4	V	54	-12.6	Avg	1.25	35	
4631.39	46.6	V	74	-27.4	Peak	1.25	170	
4631.39	36.92	V	54	-17.08	Avg	1.25	170	
5557.66	49.37	V	74	-24.63	Peak	2.5	45	
5557.66	36.93	V	54	-17.07	Avg	2.5	45	
6483.94	52.52	V	74.43	-21.91	Peak	2.75	180	
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-PRO-CAS
Configuration: Protocol B - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**High Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55	46.76	V	83.54	-36.78	Peak	1.75	190	
2778.83	41.11	V	74	-32.89	Peak	1.5	200	
2778.83	30.33	V	54	-23.67	Avg	1.5	200	
3705.11	50.29	V	74	-23.71	Peak	1.5	200	
3705.11	46.19	V	54	-7.81	Avg	1.5	200	
4631.39	46.91	V	74	-27.09	Peak	1.25	45	
4631.39	39.16	V	54	-14.84	Avg	1.25	45	
5557.66	51.94	V	74	-22.06	Peak	1.25	140	
5557.66	42.8	V	54	-11.2	Avg	1.25	140	
6483.94	52.18	V	83.54	-31.36	Peak	1.5	90	
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
 Configuration: Protocol B - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55	45.75	H	86.9	-41.15	Peak	1.25	145	
2778.83	42.59	H	74	-31.41	Peak	1.25	180	
2778.83	32.66	H	54	-21.34	Avg	1.25	180	
3705.11	48.17	H	74	-25.83	Peak	1.5	240	
3705.11	41.3	H	54	-12.7	Avg	1.5	240	
4631.39	46.97	H	74	-27.03	Peak	1.75	320	
4631.39	38.12	H	54	-15.88	Avg	1.75	320	
5557.66	50.43	H	74	-23.57	Peak	1	180	
5557.66	39.67	H	54	-14.33	Avg	1	180	
6483.94	52.27	H	86.9	-34.63	Peak	1	160	
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
 Configuration: Protocol B - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55	45.31	H	77.76	-32.45	Peak	1	190	
2778.83	41.31	H	74	-32.69	Peak	1	15	
2778.83	28.71	H	54	-25.29	Avg	1	15	
3705.11	48.03	H	74	-25.97	Peak	2	170	
3705.11	42.15	H	54	-11.85	Avg	2	170	
4631.39	47.06	H	74	-26.94	Peak	3	180	
4631.39	39.79	H	54	-14.21	Avg	3	180	
5557.66	53.1	H	74	-20.9	Peak	1.5	170	
5557.66	46.06	H	54	-7.94	Avg	1.5	170	
6483.94	50.84	H	77.76	-26.92	Peak	1	175	
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-PRO-CAS
 Configuration: Protocol B - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55	52.44	H	84.22	-31.78	Peak	1.35	170	
2778.83	40.28	H	74	-33.72	Peak	1.15	180	
2778.83	30.55	H	54	-23.45	Avg	1.15	180	
3705.11	50.49	H	74	-23.51	Peak	1.25	180	
3705.11	46.49	H	54	-7.51	Avg	1.25	180	
4631.39	47.34	H	74	-26.66	Peak	1.5	95	
4631.39	38.29	H	54	-15.71	Avg	1.5	95	
5557.66	49.44	H	74	-24.56	Peak	1.5	160	
5557.66	37.66	H	54	-16.34	Avg	1.5	160	
6483.94	52.23	H	84.22	-31.99	Peak	1	45	
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

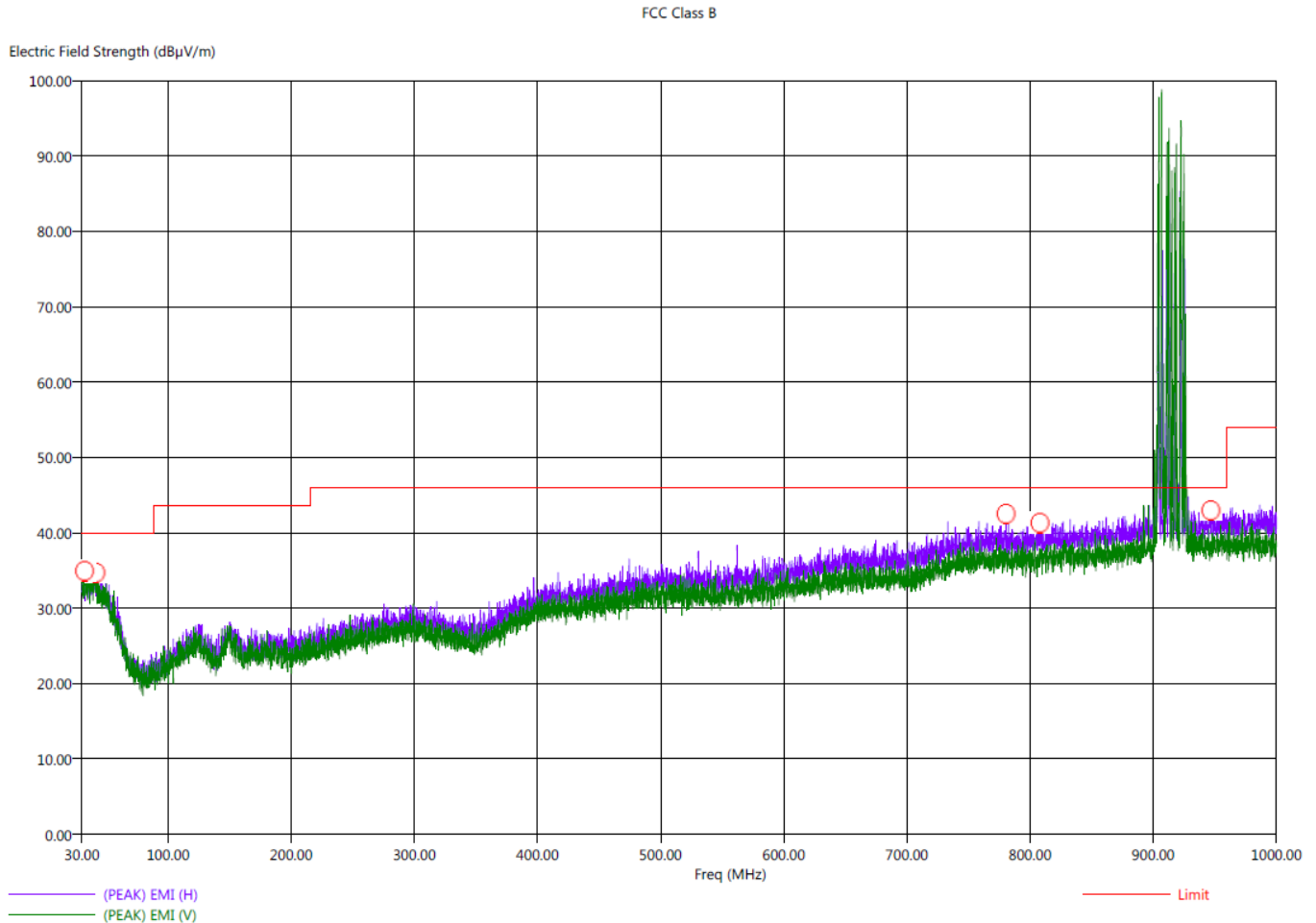


Tested By: Kenneth Lee

[illegible]

Title: Pre-Scan - FCC Class B
File: Agilent - Radiated Pre-Scan 30-1000Mhz - FCC Class B_Module_2_Protocol_B_Z-Axis_02-06-2015.set
Operator: Kenneth Lee
EUT Type: Hummingbird MCA
EUT Condition: Continuously Transmitting - Frequency Hopping - Protocol B - Module 2 - Z-Axis - Worst Case
Comments: Customer: Linx Technologies
M/N: HUM-900-PRO-CAS
Note: Antenna - ANT-916-SP2

2/6/2015 4:50:40 PM
Sequence: Preliminary Scan

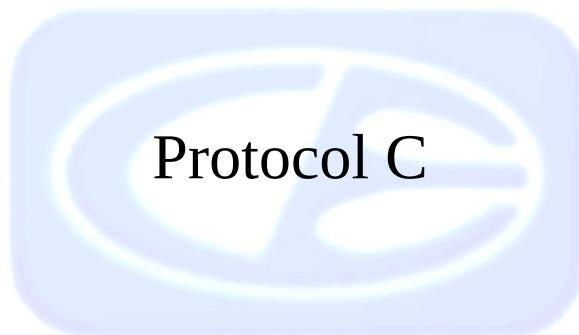


Title: Radiated Final - 30-1000 MHz - FCC Class B
File: Agilent - Radiated Final Scan 30-1000Mhz - FCC Class B_Module 2_Protocol_B_Z-Axis_02-06-2015.set
Operator: Kenneth Lee
EUT Type: Hummingbird MCA
EUT Condition: Continuously Transmitting - Frequency Hopping - Protocol B - Module 2 - Z-Axis - Worst Case
Comments: Customer: Linx Technologies
M/N: HUM-900-PRO-CAS
Note: Antenna - ANT-916-SP2

2/6/2015 5:00:38 PM
Sequence: Final Measurements

Final Scan - FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBμV/m)	(OP) EMI (dBμV/m)	(PEAK) Margin (dB)	(OP) Margin (dB)	Limit (dBμV/m)	Transducer (dB)	Cable (dB)	Twr Ht (cm)	Ttbl Aql (deg)
32.30	V	35.59	31.26	-4.41	-8.74	40.00	23.53	0.37	111.43	53.75
41.40	V	35.60	31.27	-4.40	-8.73	40.00	23.58	0.44	207.73	223.50
41.80	H	35.57	31.21	-4.43	-8.79	40.00	23.47	0.45	111.31	351.75
780.50	H	40.97	37.09	-5.03	-8.91	46.00	25.90	2.37	352.14	67.00
808.10	H	41.10	37.37	-4.90	-8.63	46.00	25.99	2.40	271.97	119.50
946.90	H	43.39	39.58	-2.61	-6.42	46.00	27.65	2.71	400.08	72.00



FCC 15.247Linx Technologies
Hummingbird MCA
Model: HUM-900-PRO-CAS
Configuration: Protocol CDate: 01/29/2015
Lab: D
Tested By: Kyle Fujimoto**Peak Output Power**

Freq. (MHz)	Level (dBuV)	Level (V/m)	Antenna Gain (dBi)	Numeric Gain	Power Output (Watts)	Power Output (mW)	Power Output (dBm)	Comments
902.75	104.84	0.1745822	1.4	1.38038	0.006624	6.62401	8.21	Vert. X-Axis
908.749	102.41	0.1319775	1.4	1.38038	0.0037855	3.78548	5.78	Vert. X-Axis
914.747	100.9	0.1109175	1.4	1.38038	0.0026738	2.67375	4.27	Vert. X-Axis
902.75	97.76	0.0772681	1.4	1.38038	0.0012975	1.29754	1.13	Vert. Y-Axis
908.749	98.85	0.0875992	1.4	1.38038	0.0016677	1.66771	2.22	Vert. Y-Axis
914.747	97.05	0.0712033	1.4	1.38038	0.0011018	1.10185	0.42	Vert. Y-Axis
902.75	98.32	0.0824138	1.4	1.38038	0.0014761	1.47612	1.69	Vert. Z-Axis
908.749	103.52	0.1499685	1.4	1.38038	0.0048879	4.88789	6.89	Vert. Z-Axis
914.747	99.69	0.0964939	1.4	1.38038	0.0020236	2.02358	3.06	Vert. Z-Axis
902.75	106.34	0.2074914	1.4	1.38038	0.0093567	9.35667	9.71	Horiz. X-Axis
908.749	106.51	0.2115924	1.4	1.38038	0.0097302	9.73019	9.88	Horiz. X-Axis
914.747	105	0.1778279	1.4	1.38038	0.0068726	6.8726	8.37	Horiz. X-Axis
902.75	100.2	0.1023293	1.4	1.38038	0.0022757	2.27573	3.57	Horiz. Y-Axis
908.749	94.74	0.0545758	1.4	1.38038	0.0006473	0.64732	-1.89	Horiz. Y-Axis
914.747	96.69	0.0683125	1.4	1.38038	0.0010142	1.01419	0.06	Horiz. Y-Axis
902.75	105.43	0.186853	1.4	1.38038	0.0075879	7.58789	8.80	Horiz. Z-Axis
908.749	103.36	0.1472313	1.4	1.38038	0.0047111	4.71109	6.73	Horiz. Z-Axis
914.747	100.85	0.1102808	1.4	1.38038	0.0026431	2.64315	4.22	Horiz. Z-Axis

The Power in Watts is obtained by the following Formula Below:

$$P = [(E \cdot D)^2] / (30 \cdot G)$$

P = Power in Watts

E = The Measured Maximum Field Strength in V/m

G = The Numeric Gain of the Transmitting Antenna over an Isotropic Radiator

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**Low Channel
Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.5	45.6	V	84.84	-39.24	Peak	3	200	
2708.25	39.77	V	74	-34.23	Peak	1.75	130	
2708.25	26.59	V	54	-27.41	Avg	1.75	130	
3611	45.45	V	74	-28.55	Peak	1.85	100	
3611	30.89	V	54	-23.11	Avg	1.85	100	
4513.75	45.58	V	74	-28.42	Peak	2	320	
4513.75	30.83	V	54	-23.17	Avg	2	320	
5416.5	49.07	V	74	-24.93	Peak	2.5	90	
5416.5	34.68	V	54	-19.32	Avg	2.5	90	
6319.25	51.44	V	84.84	-33.4	Peak	1.5	190	
7222								No Emissions
7222								Detected
8124.75								No Emissions
8124.75								Detected
9027.5								No Emissions
9027.5								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**Low Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.5	45.53	V	77.76	-32.23	Peak	1.35	190	
2708.25	40.69	V	74	-33.31	Peak	1.5	140	
2708.25	26.56	V	54	-27.44	Avg	1.5	140	
3611	46.64	V	74	-27.36	Peak	1.5	210	
3611	31.61	V	54	-22.39	Avg	1.5	210	
4513.75	43.59	V	74	-30.41	Peak	1	185	
4513.75	29.66	V	54	-24.34	Avg	1	185	
5416.5	48.4	V	74	-25.6	Peak	2.85	155	
5416.5	33.94	V	54	-20.06	Avg	2.85	155	
6319.25	51.3	V	77.76	-26.46	Peak	1	165	
7222								No Emissions
7222								Detected
8124.75								No Emissions
8124.75								Detected
9027.5								No Emissions
9027.5								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**Low Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.5	45.42	V	78.32	-32.9	Peak	1	350	
2708.25	41.13	V	74	-32.87	Peak	2.75	125	
2708.25	26.5	V	54	-27.5	Avg	2.75	125	
3611	45.36	V	74	-28.64	Peak	2.5	230	
3611	30.55	V	54	-23.45	Avg	2.5	230	
4513.75	45.94	V	74	-28.06	Peak	1.25	45	
4513.75	30.89	V	54	-23.11	Avg	1.25	45	
5416.5	49.85	V	74	-24.15	Peak	1.25	90	
5416.5	34.39	V	54	-19.61	Avg	1.25	90	
6319.25	51.02	V	78.32	-27.3	Peak	1.15	90	
7222								No Emissions
7222								Detected
8124.75								No Emissions
8124.75								Detected
9027.5								No Emissions
9027.5								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**Low Channel
Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.5	44.5	H	86.34	-41.84	Peak	1.75	65	
2708.25	40.58	H	74	-33.42	Peak	1	135	
2708.25	26.85	H	54	-27.15	Avg	1	135	
3611	47.99	H	74	-26.01	Peak	1.75	180	
3611	32.26	H	54	-21.74	Avg	1.75	180	
4513.75	44.24	H	74	-29.76	Peak	2.25	195	
4513.75	29.82	H	54	-24.18	Avg	2.25	195	
5416.5	49.05	H	74	-24.95	Peak	2.25	170	
5416.5	34.61	H	54	-19.39	Avg	2.25	170	
6319.25	51.09	H	86.34	-35.25	Peak	1.25	180	
7222								No Emissions
7222								Detected
8124.75								No Emissions
8124.75								Detected
9027.5								No Emissions
9027.5								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**Low Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.5	41.04	H	80.2	-39.16	Peak	3.2	0	
2708.25	39.8	H	74	-34.2	Peak	1.35	125	
2708.25	35.92	H	54	-18.08	Avg	1.35	125	
3611	44.96	H	74	-29.04	Peak	1.5	90	
3611	30.75	H	54	-23.25	Avg	1.5	90	
4513.75	44.32	H	74	-29.68	Peak	1.75	45	
4513.75	29.87	H	54	-24.13	Avg	1.75	45	
5416.5	48.83	H	74	-25.17	Peak	1.65	215	
5416.5	34.68	H	54	-19.32	Avg	1.65	215	
6319.25	49.65	H	80.2	-30.55	Peak	2.25	180	
7222								No Emissions
7222								Detected
8124.75								No Emissions
8124.75								Detected
9027.5								No Emissions
9027.5								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**Low Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.5	44.77	H	85.43	-40.66	Peak	1	200	
2708.25	39.33	H	74	-34.67	Peak	1.2	220	
2708.25	25.85	H	54	-28.15	Avg	1.2	220	
3611	47.47	H	74	-26.53	Peak	1.25	90	
3611	31.87	H	54	-22.13	Avg	1.25	90	
4513.75	44.25	H	74	-29.75	Peak	1.5	110	
4513.75	30.02	H	54	-23.98	Avg	1.5	110	
5416.5	48.4	H	74	-25.6	Peak	1.15	250	
5416.5	33.66	H	54	-20.34	Avg	1.15	250	
6319.25	51.43	H	85.43	-34	Peak	1	130	
7222								No Emissions
7222								Detected
8124.75								No Emissions
8124.75								Detected
9027.5								No Emissions
9027.5								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1817.5	44.11	V	82.41	-38.3	Peak	3	210	
2726.25	39.81	V	74	-34.19	Peak	1.5	170	
2726.25	25.72	V	54	-28.28	Avg	1.5	170	
3635	45.55	V	74	-28.45	Peak	1.35	95	
3635	30.49	V	54	-23.51	Avg	1.35	95	
4543.75	44.22	V	74	-29.78	Peak	1.75	270	
4543.75	30.23	V	54	-23.77	Avg	1.75	270	
5452.49	47.83	V	74	-26.17	Peak	1.4	180	
5452.49	33.19	V	54	-20.81	Avg	1.4	180	
6361.24	51.77	V	82.41	-30.64	Peak	1.15	185	
7269.99								No Emissions
7269.99								Detected
8178.74								No Emissions
8178.74								Detected
9087.49								No Emissions
9087.49								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1817.5	40.15	V	78.85	-38.7	Peak	1	160	
2726.25	36.48	V	74	-37.52	Peak	1.25	160	
2726.25	21.68	V	54	-32.32	Avg	1.25	160	
3635	38.46	V	74	-35.54	Peak	1.1	200	
3635	24.98	V	54	-29.02	Avg	1.1	200	
4543.75	41.05	V	74	-32.95	Peak	1	170	
4543.75	25.44	V	54	-28.56	Avg	1	170	
5452.49	44.2	V	74	-29.8	Peak	1.25	210	
5452.49	31.02	V	54	-22.98	Avg	1.25	210	
6361.24	47.88	V	78.85	-30.97	Peak	1	210	
7269.99								No Emissions
7269.99								Detected
8178.74								No Emissions
8178.74								Detected
9087.49								No Emissions
9087.49								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-RC-CAS
Configuration: Protocol C - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1817.5	41.65	V	83.52	-41.87	Peak	1.75	180	
2726.25	39.78	V	74	-34.22	Peak	1.5	210	
2726.25	23.26	V	54	-30.74	Avg	1.5	210	
3635	43.22	V	74	-30.78	Peak	1.1	160	
3635	28.59	V	54	-25.41	Avg	1.1	160	
4543.75	45.85	V	74	-28.15	Peak	1.35	145	
4543.75	26.68	V	54	-27.32	Avg	1.35	145	
5452.49	45.12	V	74	-28.88	Peak	1.5	230	
5452.49	31.33	V	54	-22.67	Avg	1.5	230	
6361.24	50.86	V	83.52	-32.66	Peak	1.5	175	
7269.99								No Emissions
7269.99								Detected
8178.74								No Emissions
8178.74								Detected
9087.49								No Emissions
9087.49								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**Middle Channel
Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1817.5	46.77	H	86.51	-39.74	Peak	1	160	
2726.25	40.27	H	74	-33.73	Peak	1	90	
2726.25	26.54	H	54	-27.46	Avg	1	90	
3635	48.7	H	74	-25.3	Peak	1.1	200	
3635	32.72	H	54	-21.28	Avg	1.1	200	
4543.75	45.52	H	74	-28.48	Peak	1	190	
4543.75	30.77	H	54	-23.23	Avg	1	190	
5452.49	49.3	H	74	-24.7	Peak	1	185	
5452.49	34.08	H	54	-19.92	Avg	1	185	
6361.24	51	H	86.51	-35.51	Peak	1	170	
7269.99								No Emissions
7269.99								Detected
8178.74								No Emissions
8178.74								Detected
9087.49								No Emissions
9087.49								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1817.5	42.84	H	74.74	-31.9	Peak	1.25	135	
2726.25	35.98	H	74	-38.02	Peak	1.1	160	
2726.25	25.01	H	54	-28.99	Avg	1.1	160	
3635	44.21	H	74	-29.79	Peak	1.5	160	
3635	27.74	H	54	-26.26	Avg	1.5	160	
4543.75	42.06	H	74	-31.94	Peak	2	180	
4543.75	26.48	H	54	-27.52	Avg	2	180	
5452.49	42.66	H	74	-31.34	Peak	1.75	135	
5452.49	30.79	H	54	-23.21	Avg	1.75	135	
6361.24	49.08	H	74.74	-25.66	Peak	1.65	210	
7269.99								No Emissions
7269.99								Detected
8178.74								No Emissions
8178.74								Detected
9087.49								No Emissions
9087.49								Detected

FCC 15.247

Linx Technologies
Hummingbird MCA Module
Model: HUM-900-RC-CAS
Configuration: Protocol C - Module 2
ANT-916-SP2 Antenna

Date: 02/04/2015
Lab: B
Tested By: Kenneth Lee

**Middle Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1817.5	46.58	H	83.36	-36.78	Peak	1.5	180	
2726.25	37.86	H	74	-36.14	Peak	1.75	210	
2726.25	24.1	H	54	-29.9	Avg	1.75	210	
3635	39.89	H	74	-34.11	Peak	1.25	160	
3635	25.16	H	54	-28.84	Avg	1.25	160	
4543.75	41.23	H	74	-32.77	Peak	1.25	180	
4543.75	25.66	H	54	-28.34	Avg	1.25	180	
5452.49	46.87	H	74	-27.13	Peak	1.35	235	
5452.49	32.49	H	54	-21.51	Avg	1.35	235	
6361.24	48.71	H	83.36	-34.65	Peak	1.75	190	
7269.99								No Emissions
7269.99								Detected
8178.74								No Emissions
8178.74								Detected
9087.49								No Emissions
9087.49								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

High Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1829.49	45.62	V	80.9	-35.28	Peak	1.15	180	
2744.24	39.58	V	74	-34.42	Peak	1.5	210	
2744.24	24.05	V	54	-29.95	Avg	1.5	210	
3658.99	44.08	V	74	-29.92	Peak	1.75	235	
3658.99	27.45	V	54	-26.55	Avg	1.75	235	
4573.74	44.96	V	74	-29.04	Peak	1.75	180	
4573.74	28.64	V	54	-25.36	Avg	1.75	180	
5488.48	46.21	V	74	-27.79	Peak	1.5	165	
5488.48	33.16	V	54	-20.84	Avg	1.5	165	
6403.23	47.87	V	80.9	-33.03	Peak	1.25	190	
7317.98								No Emissions
7317.98								Detected
8232.72								No Emissions
8232.72								Detected
9147.47								No Emissions
9147.47								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1829.49	46.39	V	77.05	-30.66	Peak	1.1	10	
2744.24	40.33	V	74	-33.67	Peak	2.25	335	
2744.24	26.26	V	54	-27.74	Avg	2.25	335	
3658.99	43.68	V	74	-30.32	Peak	2.75	15	
3658.99	29.2	V	54	-24.8	Avg	2.75	15	
4573.74	45.38	V	74	-28.62	Peak	1.8	195	
4573.74	30.86	V	54	-23.14	Avg	1.8	195	
5488.48	47.89	V	74	-26.11	Peak	1.75	150	
5488.48	33	V	54	-21	Avg	1.75	150	
6403.23	50.4	V	77.05	-26.65	Peak	1	170	
7317.98								No Emissions
7317.98								Detected
8232.72								No Emissions
8232.72								Detected
9147.47								No Emissions
9147.47								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1829.49	43.32	V	79.69	-36.37	Peak	1.25	220	
2744.24	39.98	V	74	-34.02	Peak	1.5	175	
2744.24	26.54	V	54	-27.46	Avg	1.5	175	
3658.99	46.07	V	74	-27.93	Peak	1.75	210	
3658.99	31.06	V	54	-22.94	Avg	1.75	210	
4573.74	47.39	V	74	-26.61	Peak	1.5	110	
4573.74	32.15	V	54	-21.85	Avg	1.5	110	
5488.48	48.35	V	74	-25.65	Peak	1	115	
5488.48	34.35	V	54	-19.65	Avg	1	115	
6403.23	49.74	V	79.69	-29.95	Peak	1.75	135	
7317.98								No Emissions
7317.98								Detected
8232.72								No Emissions
8232.72								Detected
9147.47								No Emissions
9147.47								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1829.49	44.26	H	85	-40.74	Peak	1.35	135	
2744.24	38.12	H	74	-35.88	Peak	1.5	200	
2744.24	26.54	H	54	-27.46	Avg	1.5	200	
3658.99	43.51	H	74	-30.49	Peak	1.5	210	
3658.99	37.49	H	54	-16.51	Avg	1.5	210	
4573.74	43.95	H	74	-30.05	Peak	1.35	180	
4573.74	29.86	H	54	-24.14	Avg	1.35	180	
5488.48	45.98	H	74	-28.02	Peak	1.1	160	
5488.48	32.51	H	54	-21.49	Avg	1.1	160	
6403.23	49.25	H	85	-35.75	Peak	1.25	180	
7317.98								No Emissions
7317.98								Detected
8232.72								No Emissions
8232.72								Detected
9147.47								No Emissions
9147.47								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1829.49	41.26	H	76.69	-35.43	Peak	1	180	
2744.24	39.64	H	74	-34.36	Peak	1	135	
2744.24	25.91	H	54	-28.09	Avg	1	135	
3658.99	44.03	H	74	-29.97	Peak	1.1	340	
3658.99	29.9	H	54	-24.1	Avg	1.1	340	
4573.74	47.77	H	74	-26.23	Peak	1.15	175	
4573.74	32.04	H	54	-21.96	Avg	1.15	175	
5488.48	49.87	H	74	-24.13	Peak	2.25	185	
5488.48	35.39	H	54	-18.61	Avg	2.25	185	
6403.23	49.15	H	76.69	-27.54	Peak	1.75	125	
7317.98								No Emissions
7317.98								Detected
8232.72								No Emissions
8232.72								Detected
9147.47								No Emissions
9147.47								Detected

FCC 15.247

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Date: 02/04/2015
 Lab: B
 Tested By: Kenneth Lee

**High Channel
Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1829.49	44.04	H	80.85	-36.81	Peak	1.1	170	
2744.24	39.8	H	74	-34.2	Peak	1	210	
2744.24	35.84	H	54	-18.16	Avg	1	210	
3658.99	44.91	H	74	-29.09	Peak	1	180	
3658.99	30.56	H	54	-23.44	Avg	1	180	
4573.74	43.62	H	74	-30.38	Peak	1.25	235	
4573.74	29.63	H	54	-24.37	Avg	1.25	235	
5488.48	47.89	H	74	-26.11	Peak	1.25	90	
5488.48	34.07	H	54	-19.93	Avg	1.25	90	
6403.23	48.62	H	80.85	-32.23	Peak	1.75	60	
7317.98								No Emissions
7317.98								Detected
8232.72								No Emissions
8232.72								Detected
9147.47								No Emissions
9147.47								Detected

FCC 15.247 and FCC Class B

Linx Technologies
 Hummingbird MCA Module
 Model: HUM-900-RC-CAS
 Configuration: Protocol C - Module 2
 ANT-916-SP2 Antenna

Dates: 02/04/2015 and 02/05/2015

Labs: B and D

Tested By: Kenneth Lee

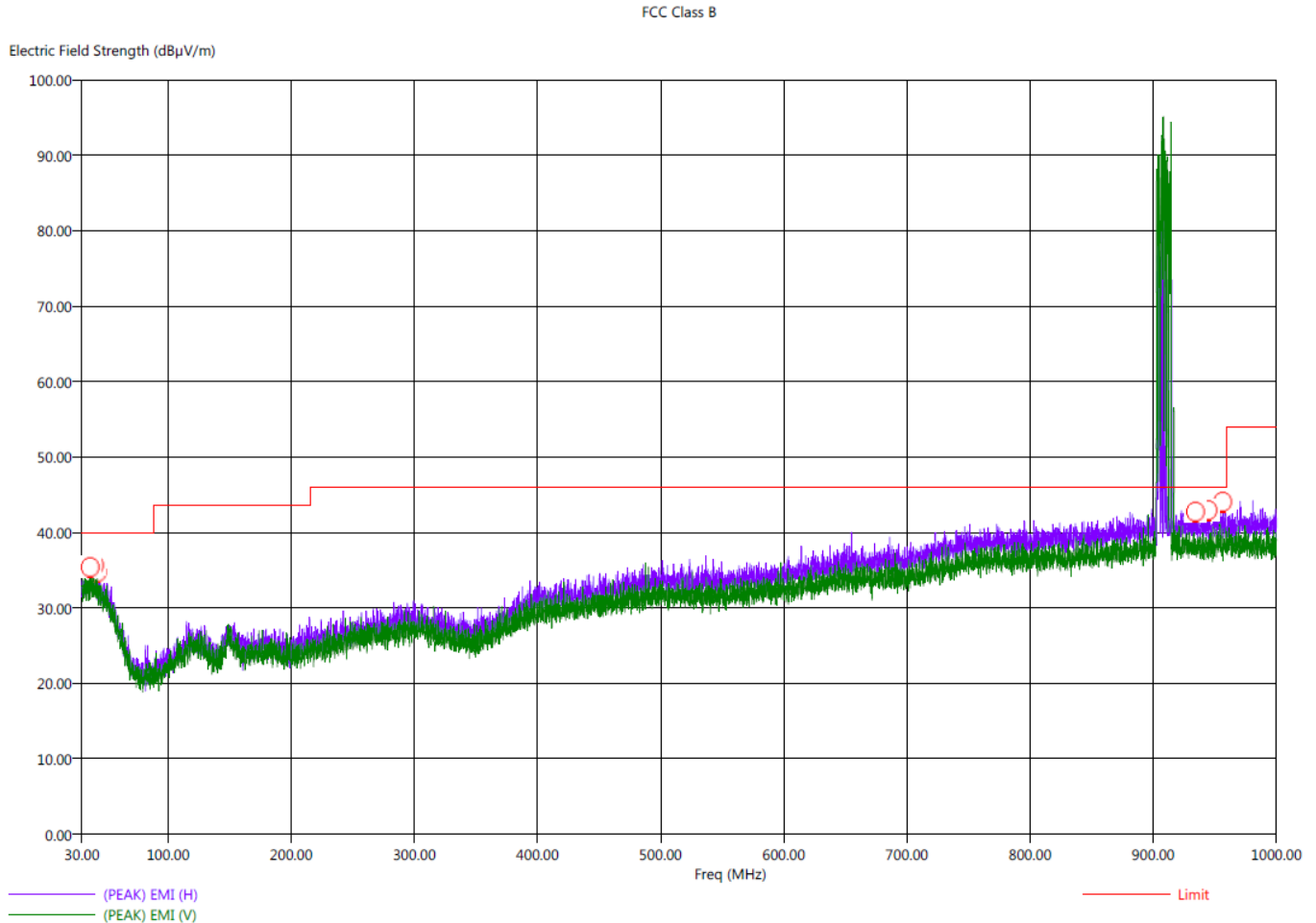
Non Harmonic Emissions from the Tx and Digital Portion - 10 kHz to 30 MHz

Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Emissions Found for the
								Digital Portion
								from 10 kHz to 30 MHz
								for both Vertical and Horizontal
								Polarizations
								No Non Harmonic Emissions Found
								for the Tx Mode
								from 10 kHz to 30 MHz
								for both Vertical and Horizontal
								Polarizations
								Investigated in the X-Axis, Y-Axis,
								and Z-Axis
								No Emissions Found for the
								Digital Portion
								from 1 GHz to 9.3 GHz
								for both Vertical and Horizontal
								Polarizations
								No Non Harmonic Emissions Found
								for the Tx Mode
								from 1 GHz to 9.3 GHz
								for both Vertical and Horizontal
								Polarizations
								Investigated in the X-Axis, Y-Axis,
								and Z-Axis

Title: Pre-Scan - FCC Class B
File: Agilent - Radiated Pre-Scan 30-1000Mhz - FCC Class B_Module_2_Protocol_C_X-Axis_02-06-2015.set
Operator: Kenneth Lee
EUT Type: Hummingbird MCA
EUT Condition: Continuously Transmitting - Frequency Hopping - Protocol C - Module 2 - X-Axis - Worst Case
Comments: Customer: Linx Technologies
M/N: HUM-900-RC-CAS
Note: Antenna - ANT-916-SP2

2/6/2015 5:42:24 PM
Sequence: Preliminary Scan

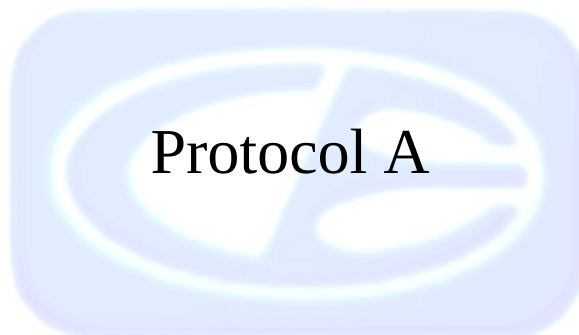


Title: Radiated Final - 30-1000 MHz - FCC Class B
File: Agilent - Radiated Final Scan 30-1000Mhz - FCC Class B_Module_2_Protocol_C_X-Axis_02-06-2015.set
Operator: Kenneth Lee
EUT Type: Hummingbird MCA
EUT Condition: Continuously Transmitting - Frequency Hopping - Protocol C - Module 2 - X-Axis - Worst Case
Comments: Customer: Linx Technologies
M/N: HUM-900-RC-CAS
Note: Antenna - ANT-916-SP2

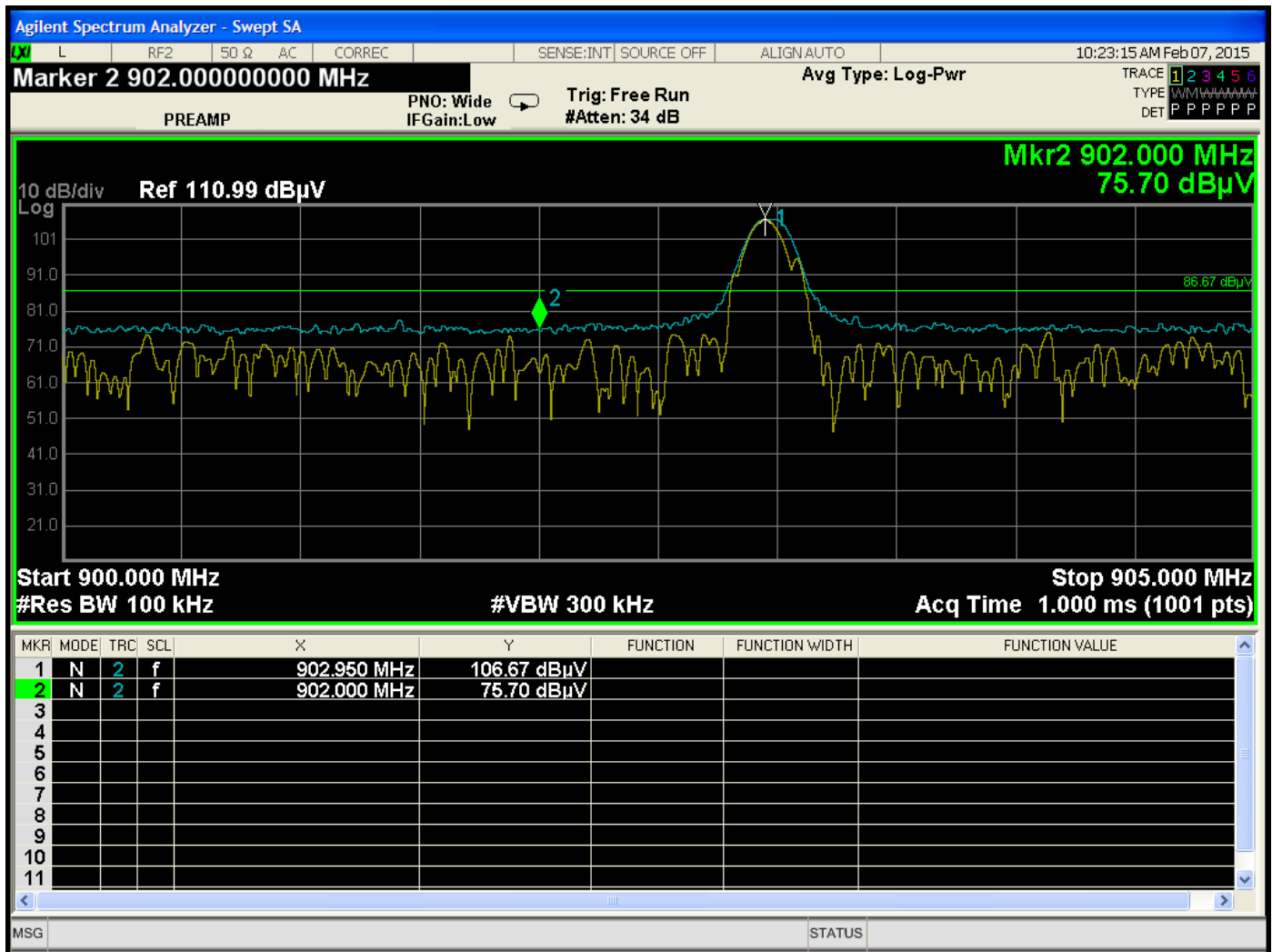
2/6/2015 5:54:21 PM
Sequence: Final Measurements

Final Scan - FCC Class B

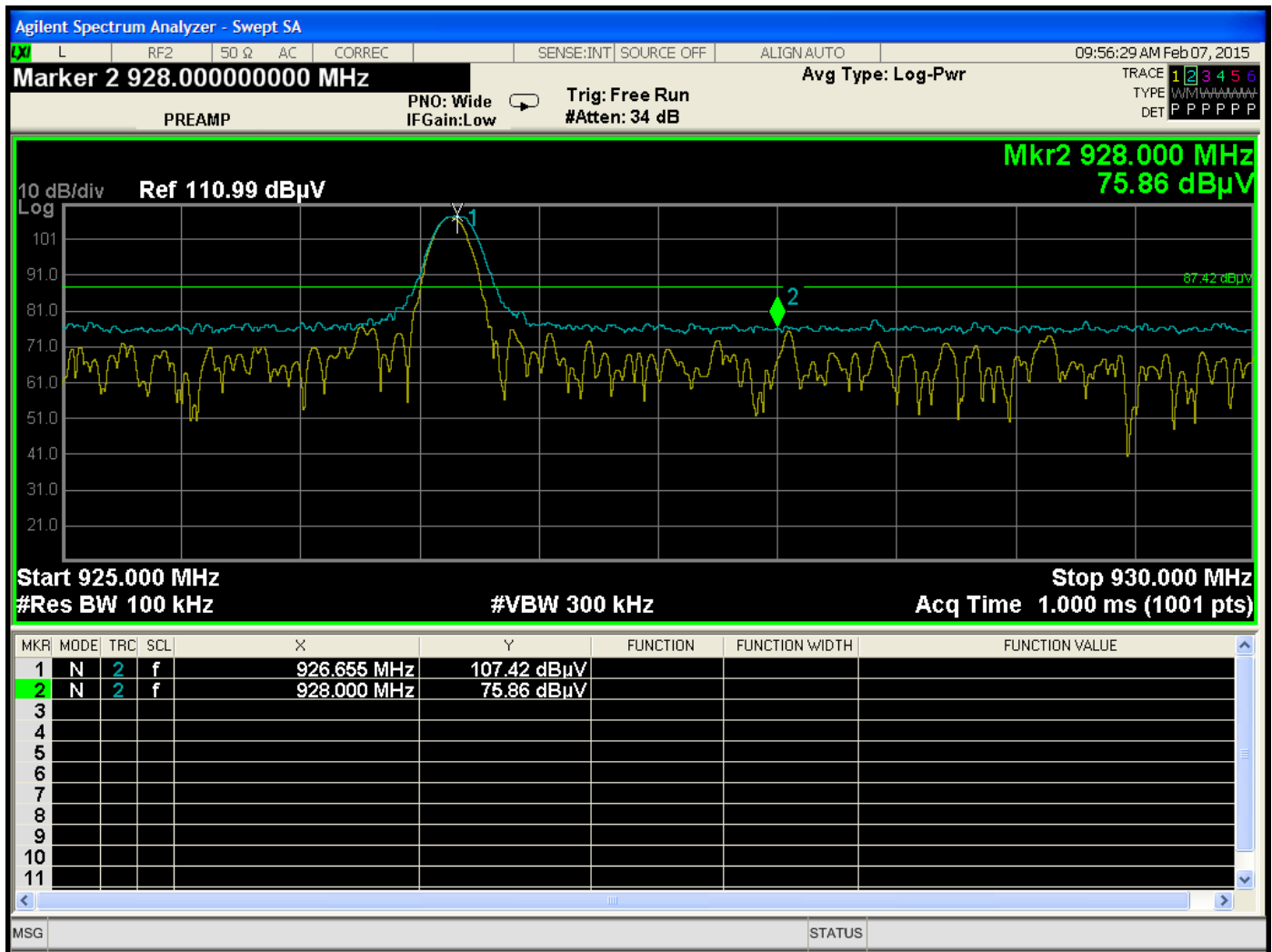
Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Twr Ht (cm)	Ttbl Aql (deq)
36.90	V	36.37	31.62	-3.63	-8.38	40.00	23.90	0.41	191.61	267.25
40.30	H	36.24	31.81	-3.76	-8.19	40.00	24.14	0.43	223.79	310.75
42.70	H	36.66	31.19	-3.34	-8.81	40.00	23.47	0.45	127.61	77.25
934.30	H	43.50	39.34	-2.50	-6.66	46.00	27.48	2.69	175.49	360.00
944.60	H	43.41	39.52	-2.59	-6.48	46.00	27.62	2.70	191.01	227.25
956.50	H	44.22	39.62	-1.78	-6.38	46.00	27.67	2.74	127.49	142.00



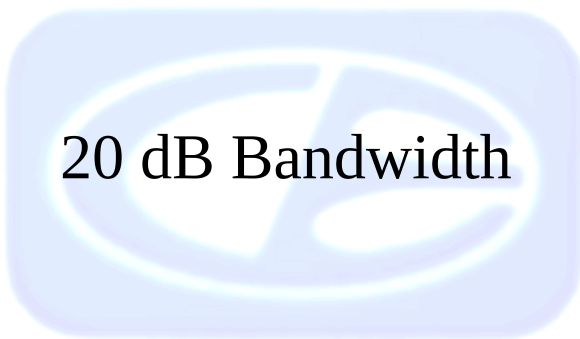




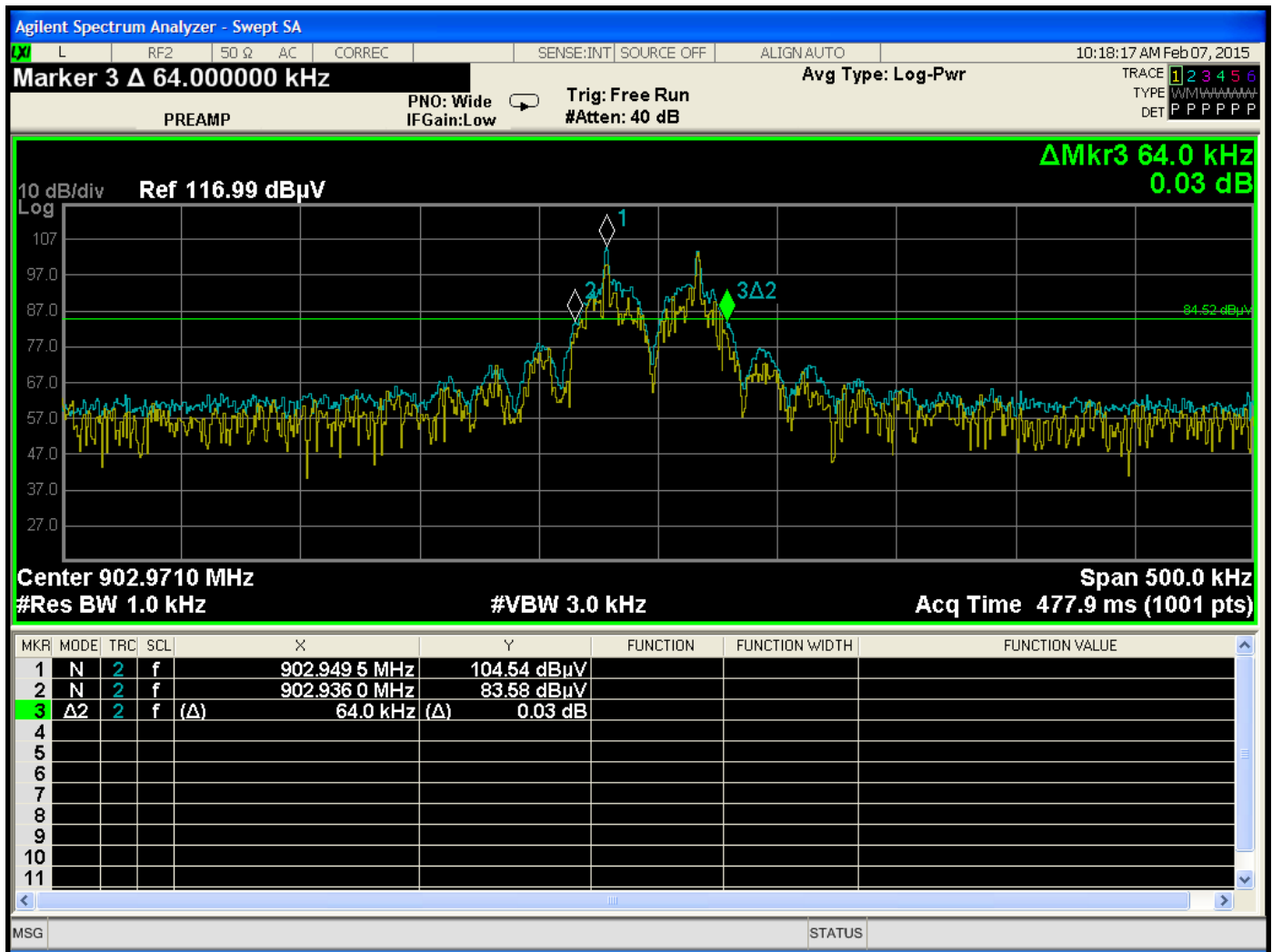
Band Edge – Low Channel – Protocol A



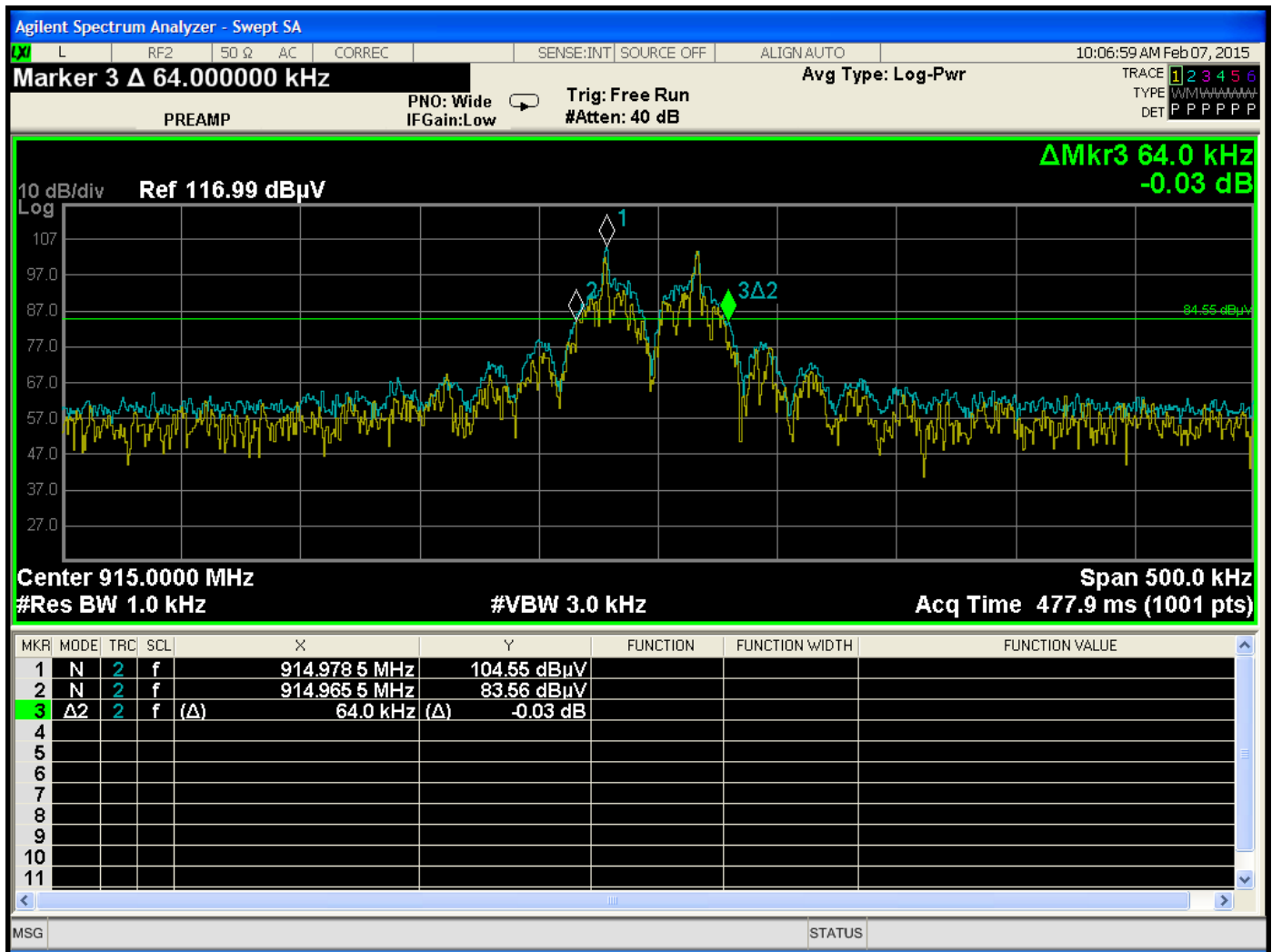
Band Edge – High Channel – Protocol A



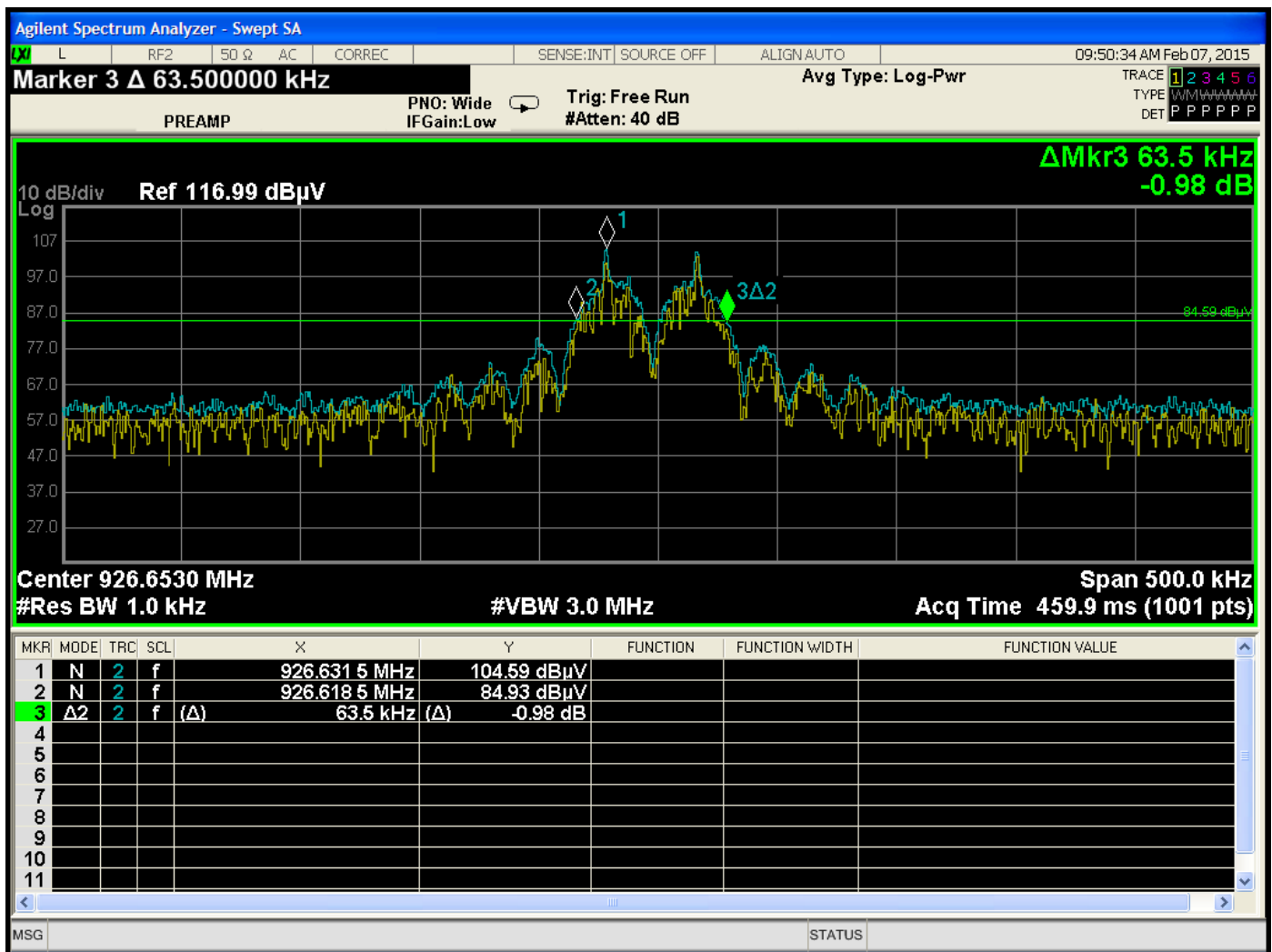
20 dB Bandwidth



20 dB Bandwidth – Low Channel – Protocol A

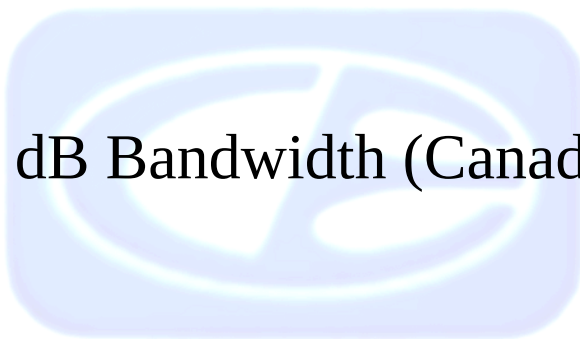


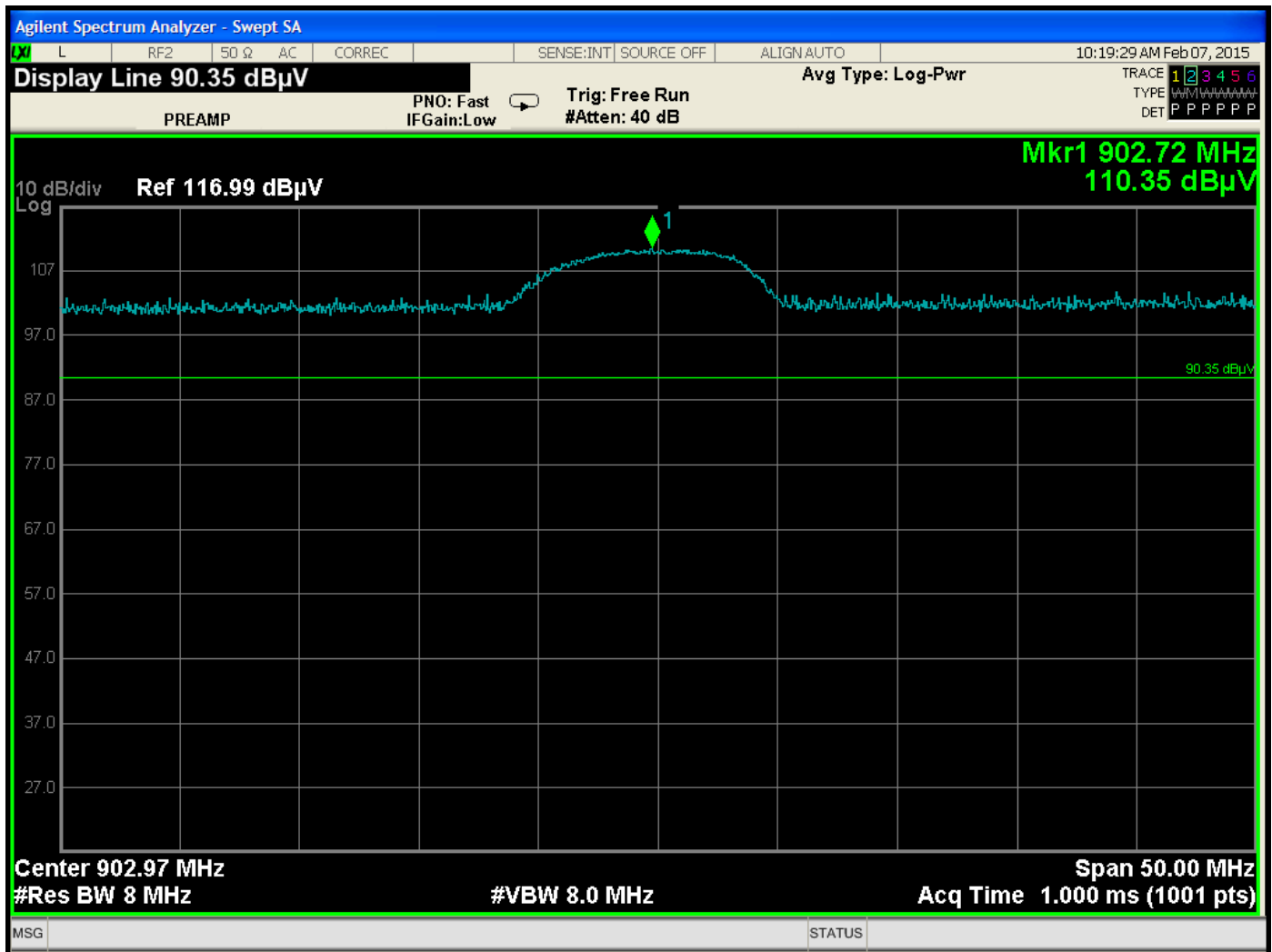
20 dB Bandwidth – Middle Channel – Protocol A



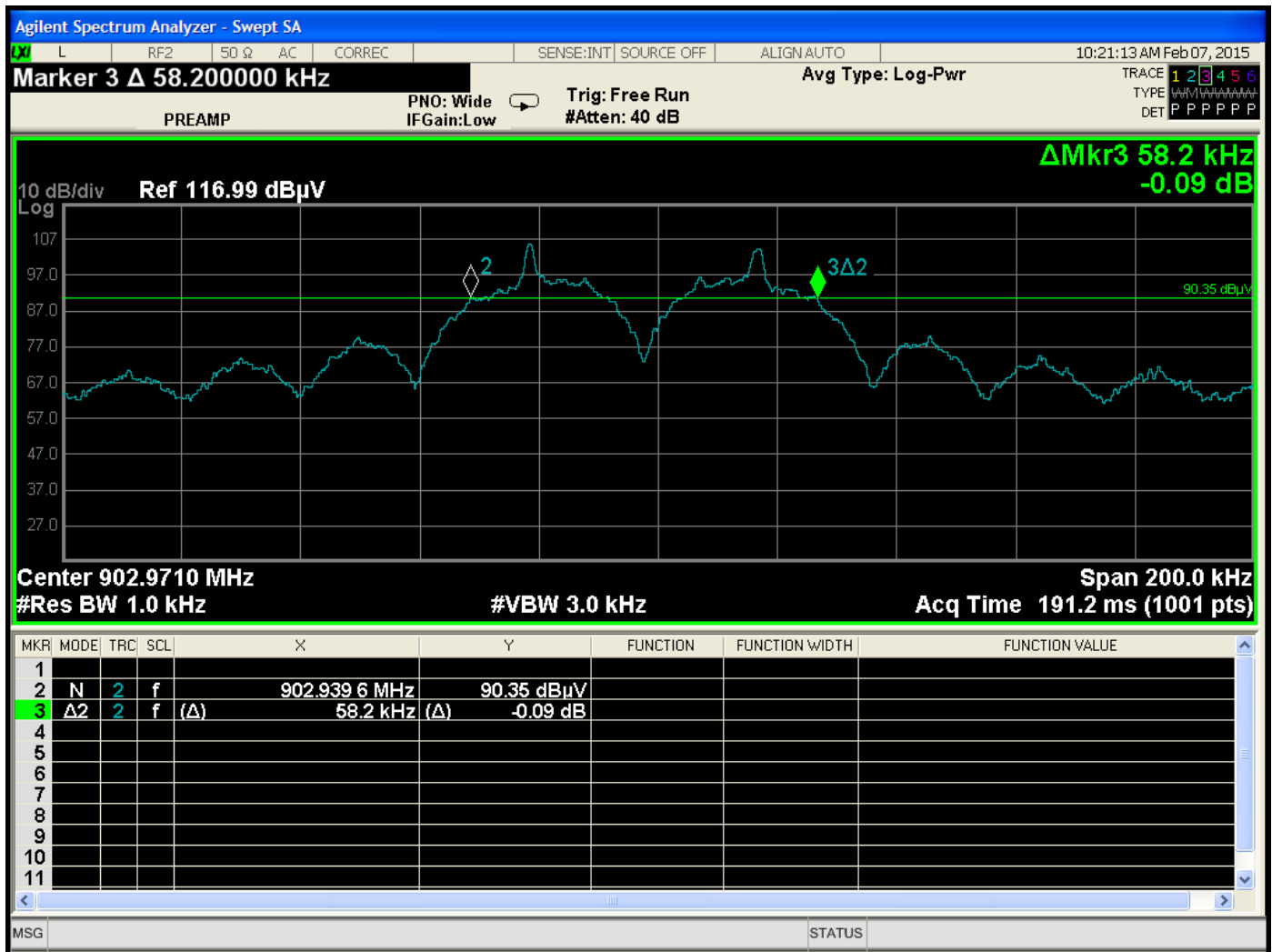
20 dB Bandwidth – High Channel – Protocol A

20 dB Bandwidth (Canada)

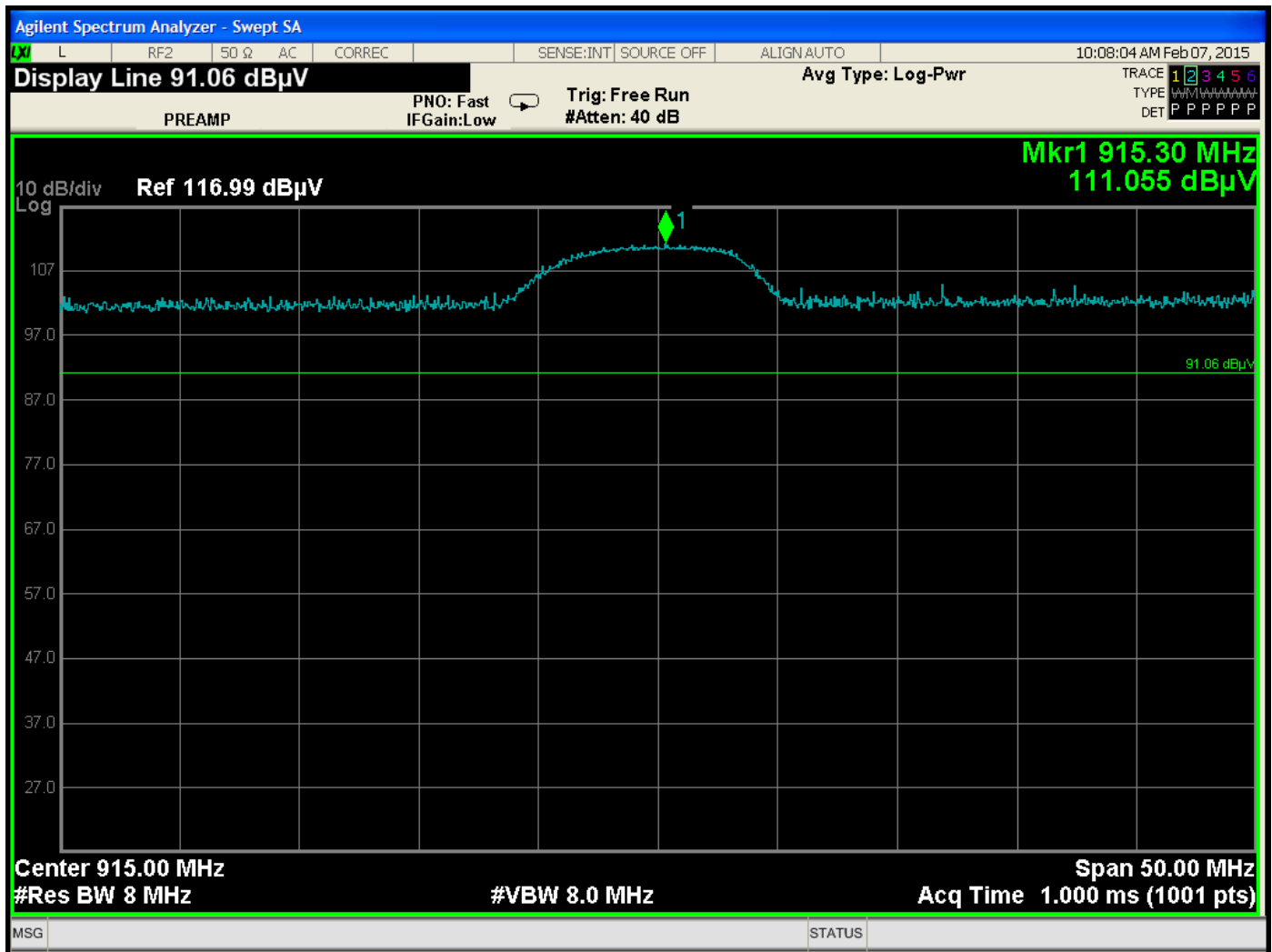




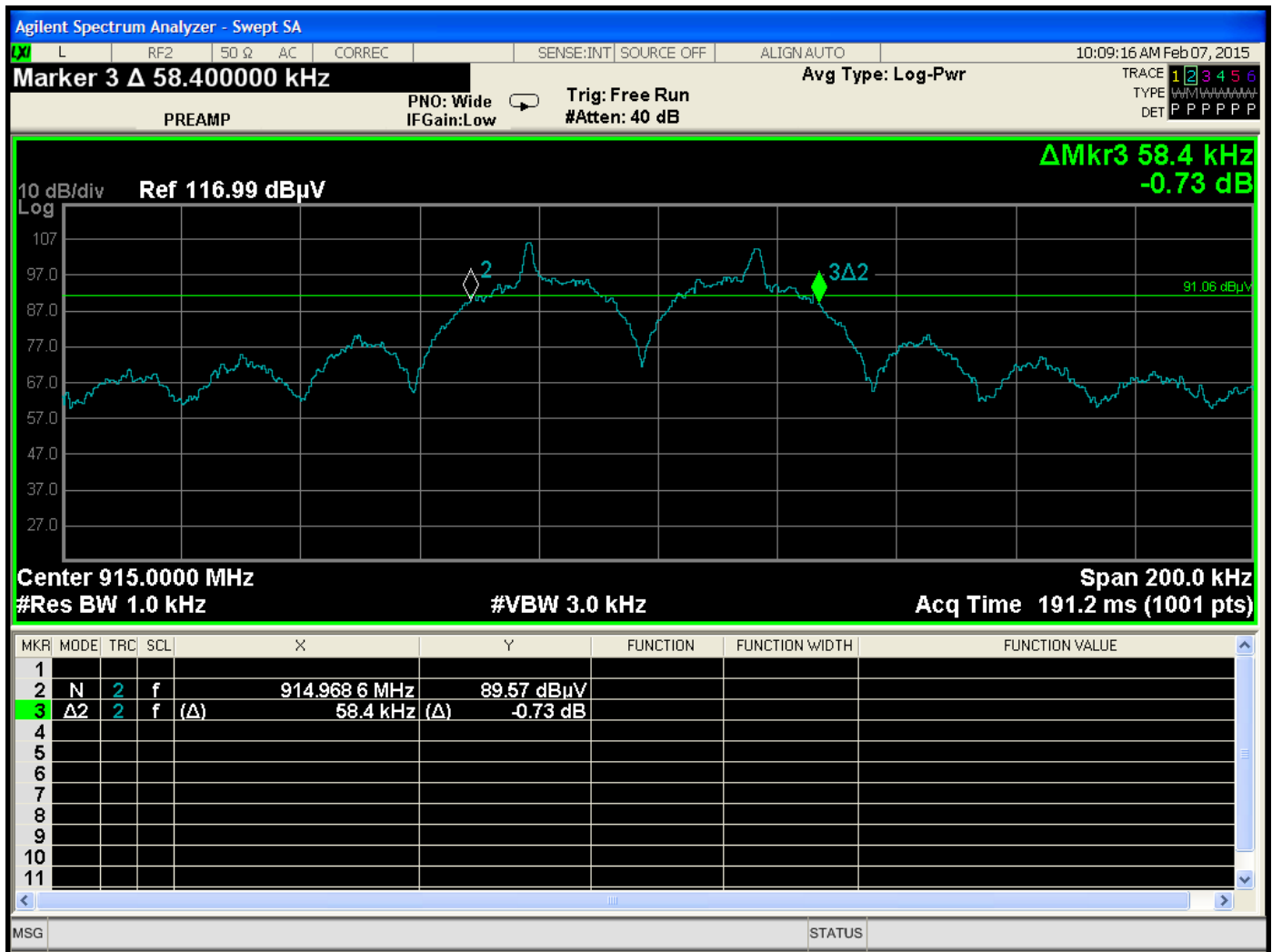
20 dB Bandwidth – Reference Level – Low Channel – Protocol A



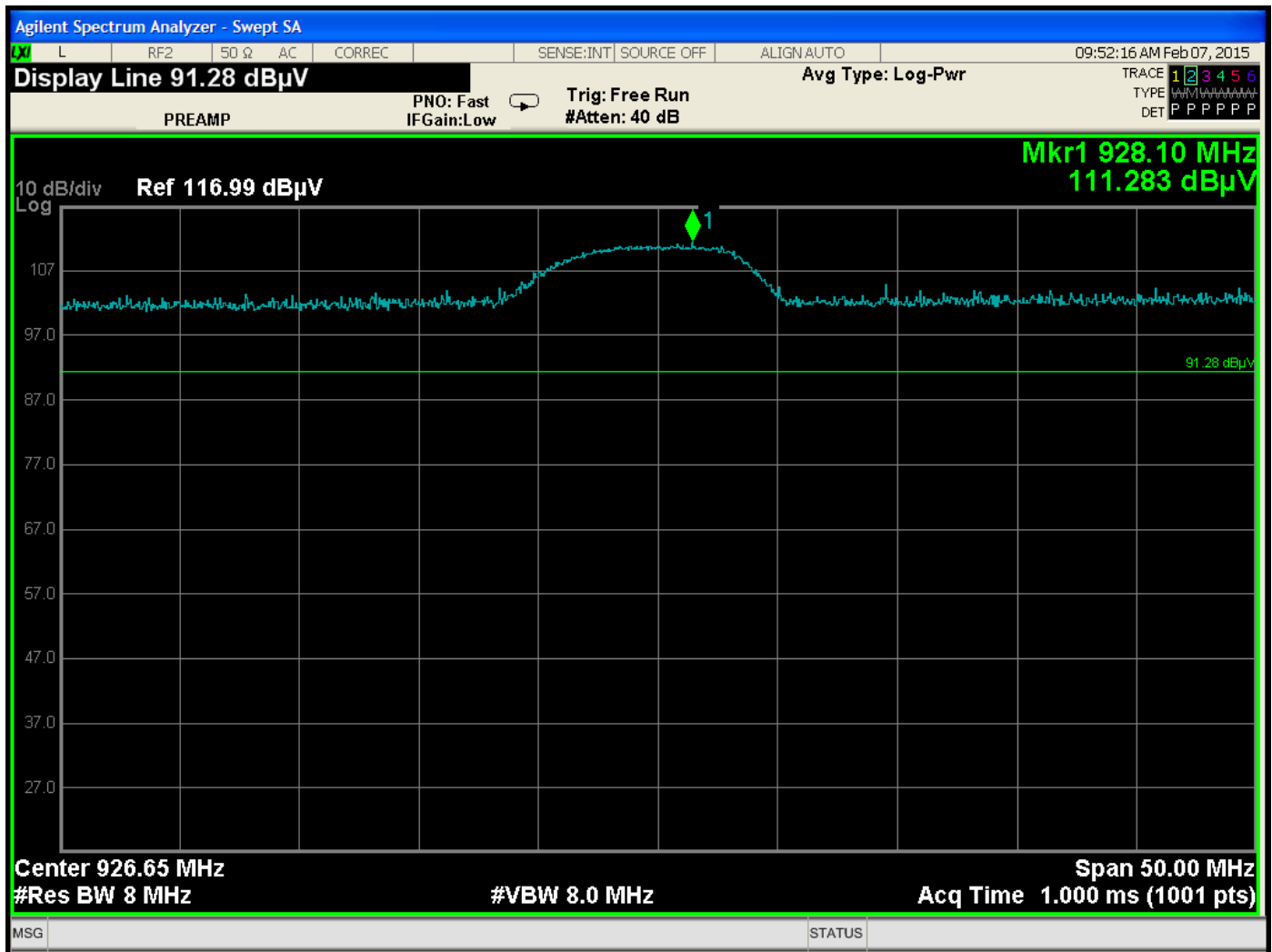
20 dB Bandwidth – 1 KHz RBW – Low Channel – Protocol A



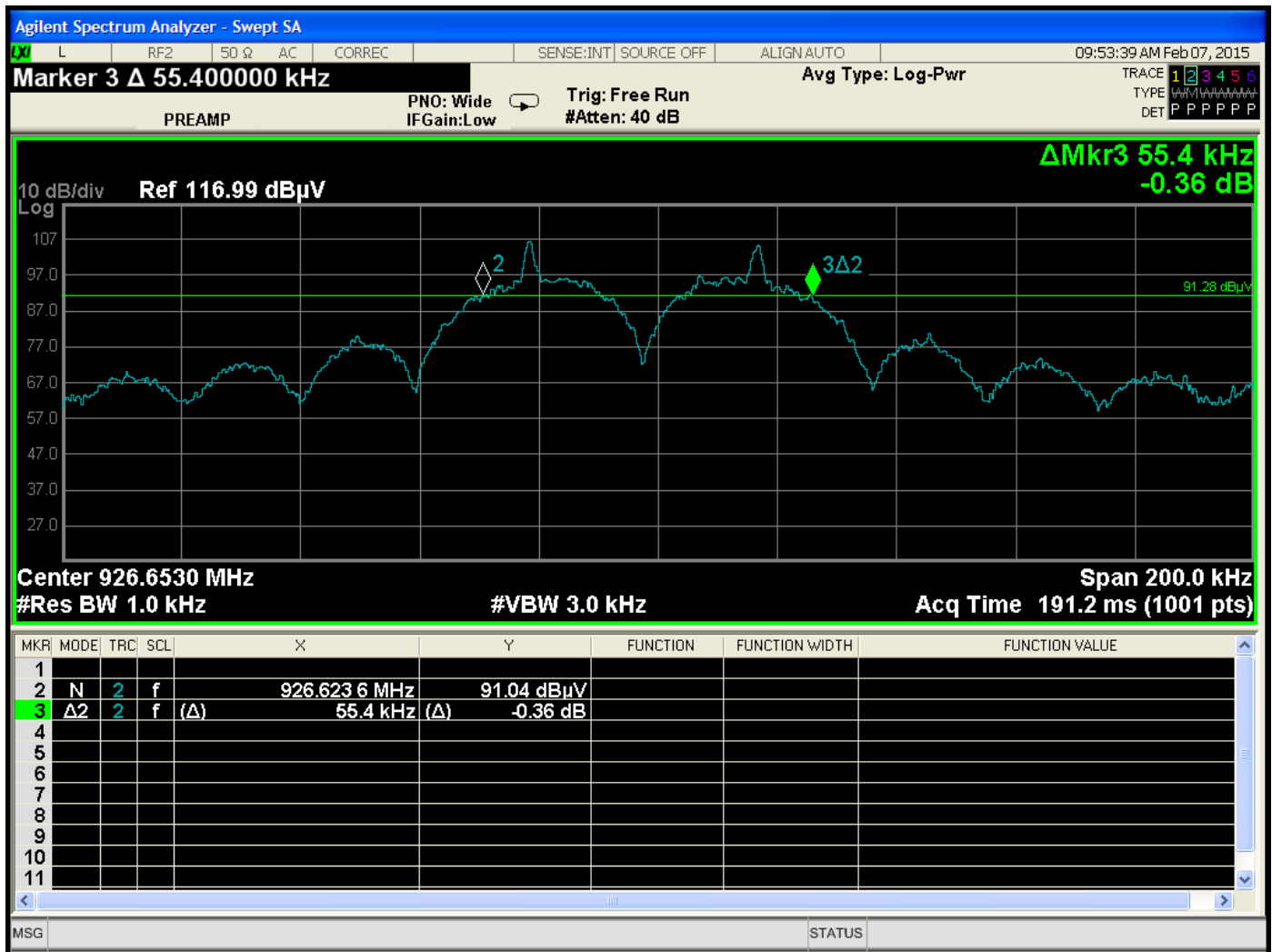
20 dB Bandwidth – Reference Level – Middle Channel – Protocol A



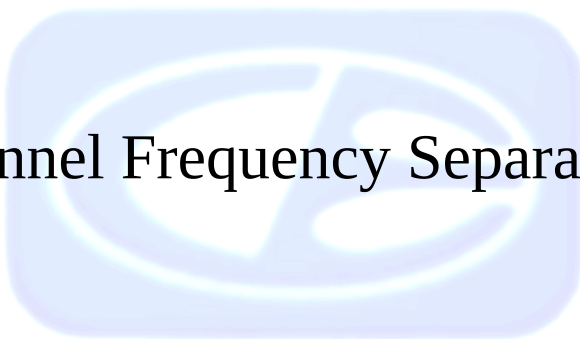
20 dB Bandwidth – 1 KHz RBW – Middle Channel – Protocol A



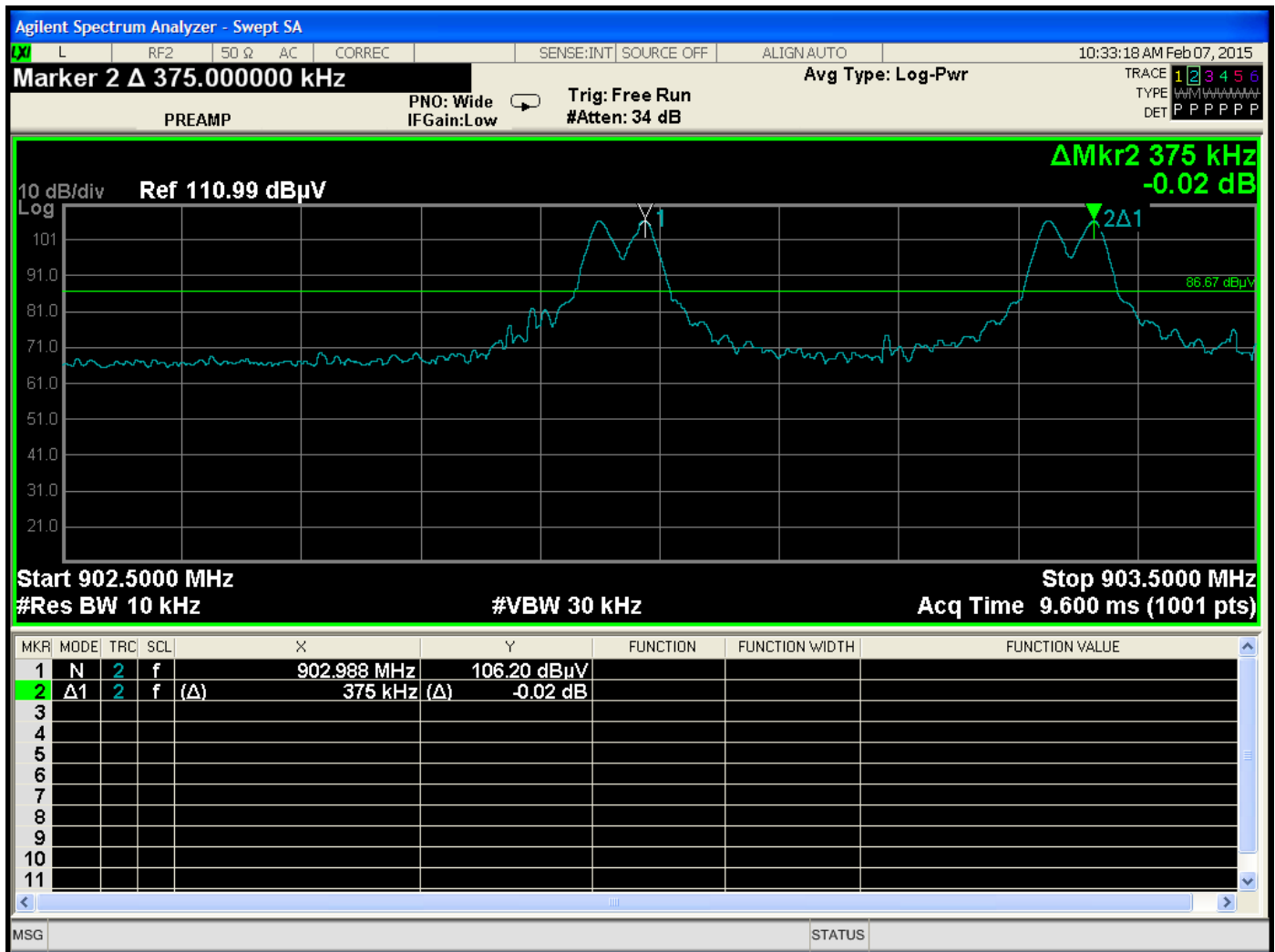
20 dB Bandwidth – Reference Level – High Channel – Protocol A



20 dB Bandwidth – 1 KHz RBW – High Channel – Protocol A



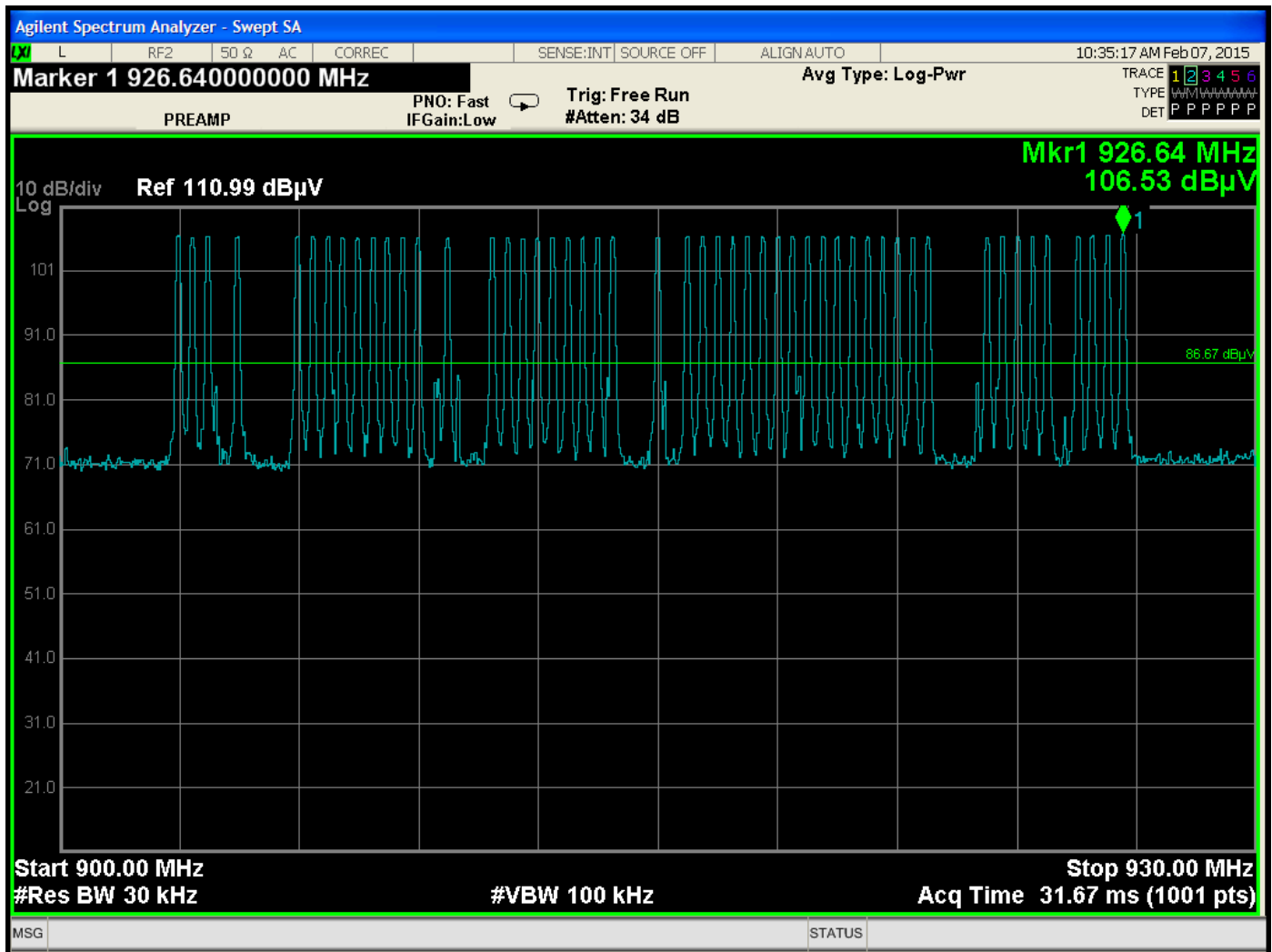
Channel Frequency Separation



Channel Frequency Separation – Protocol A



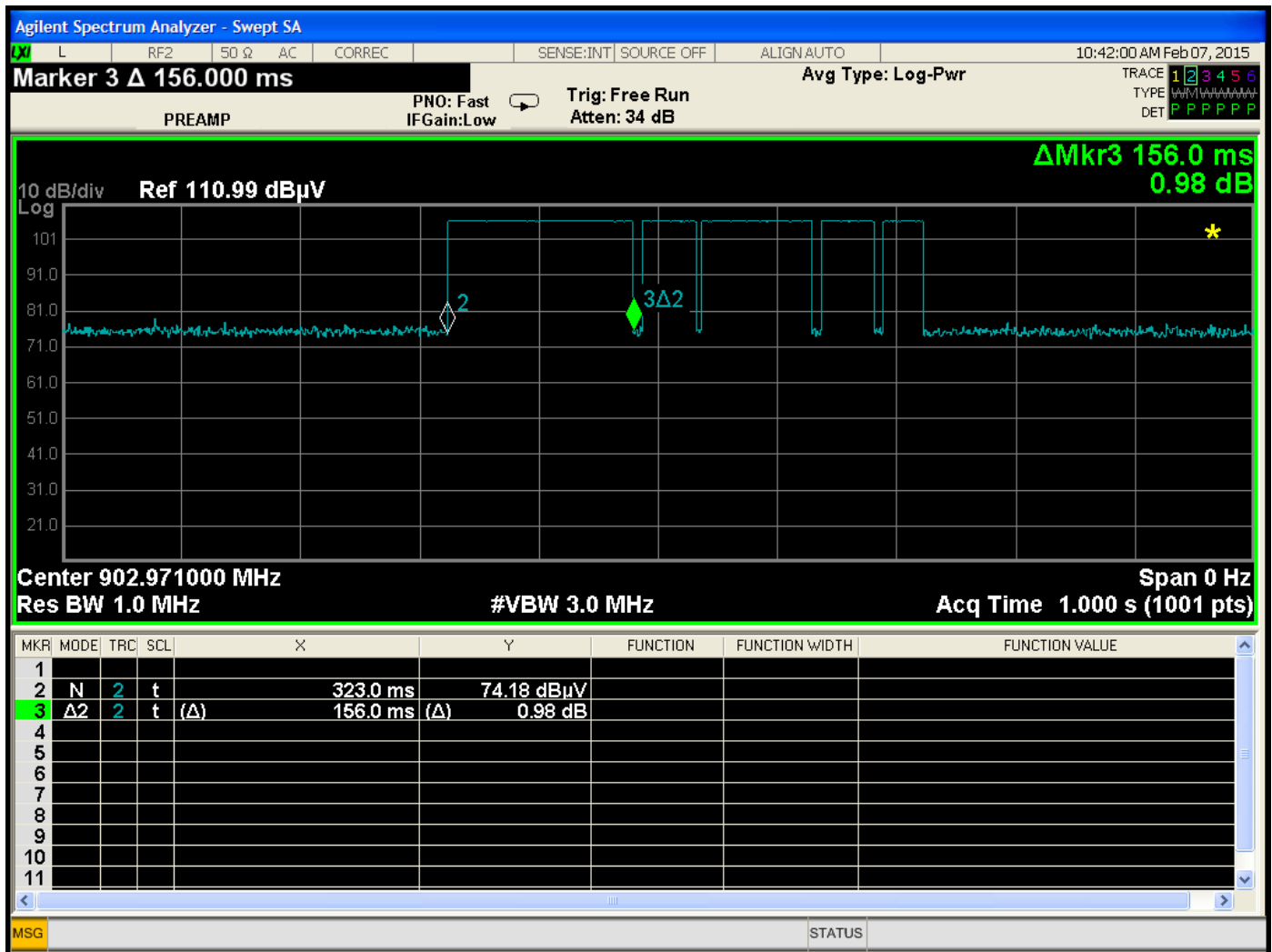
Number of Hopping Frequencies



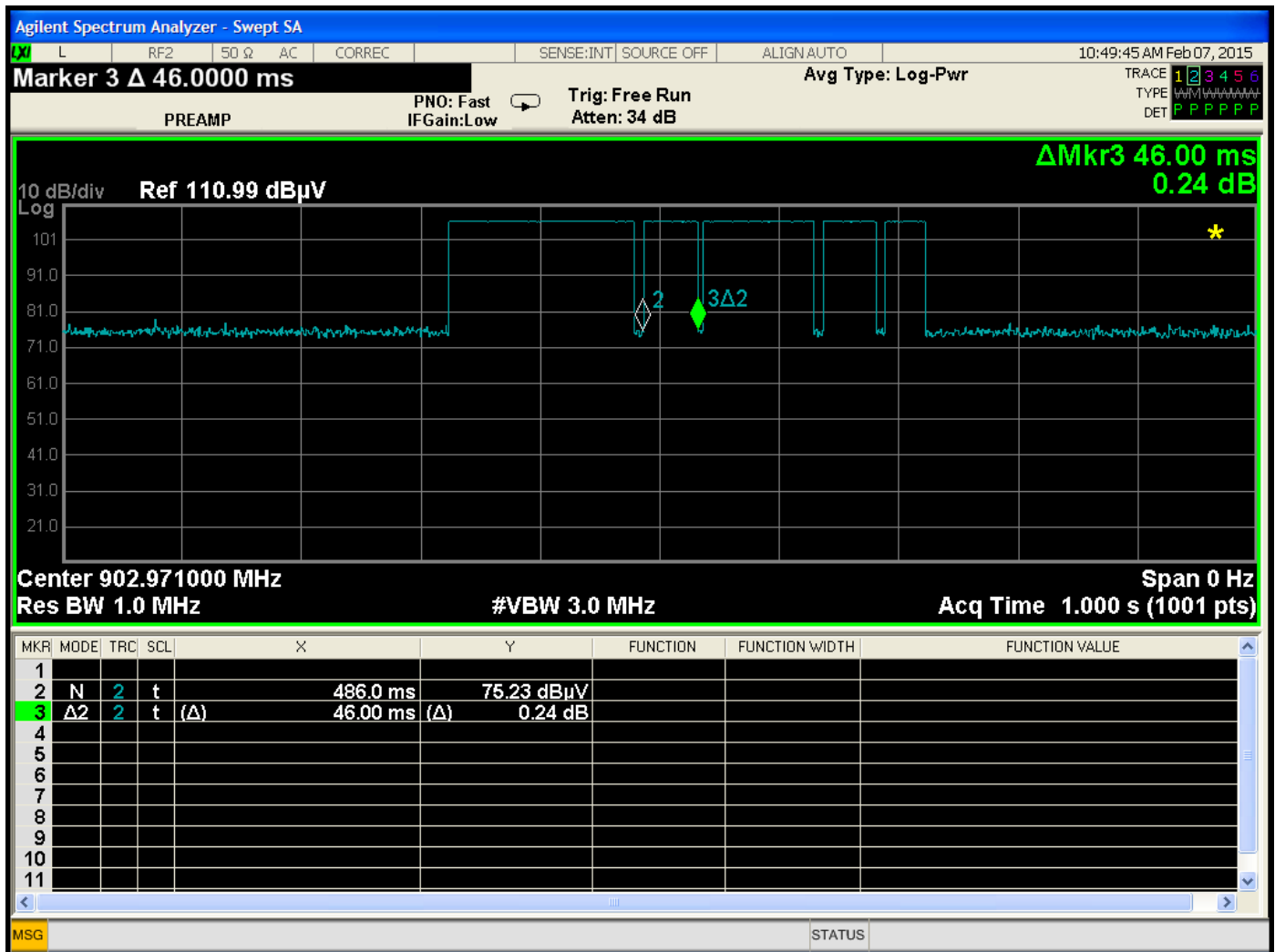
Number of Hopping Frequencies – Protocol A



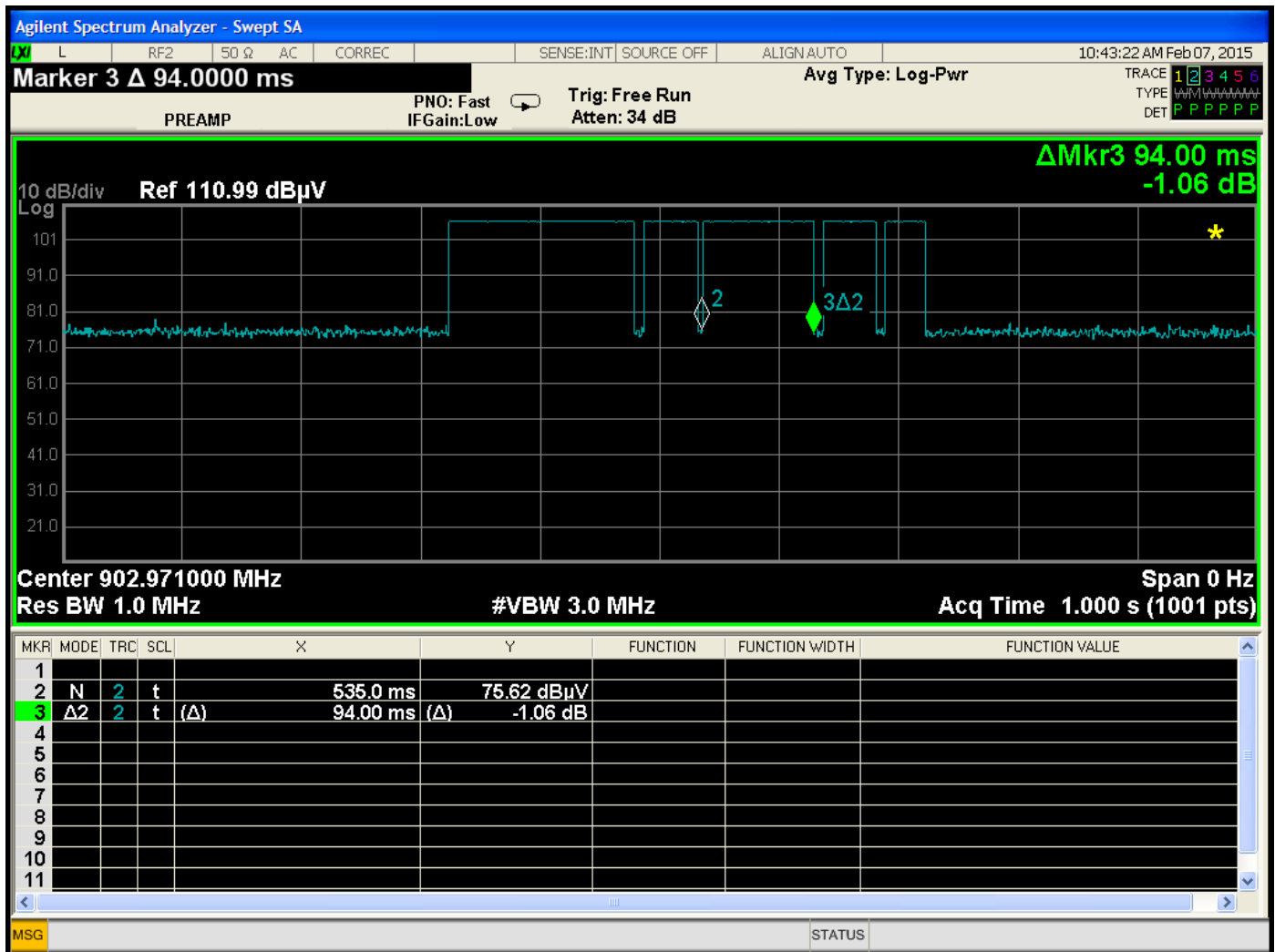
Time of Occupancy



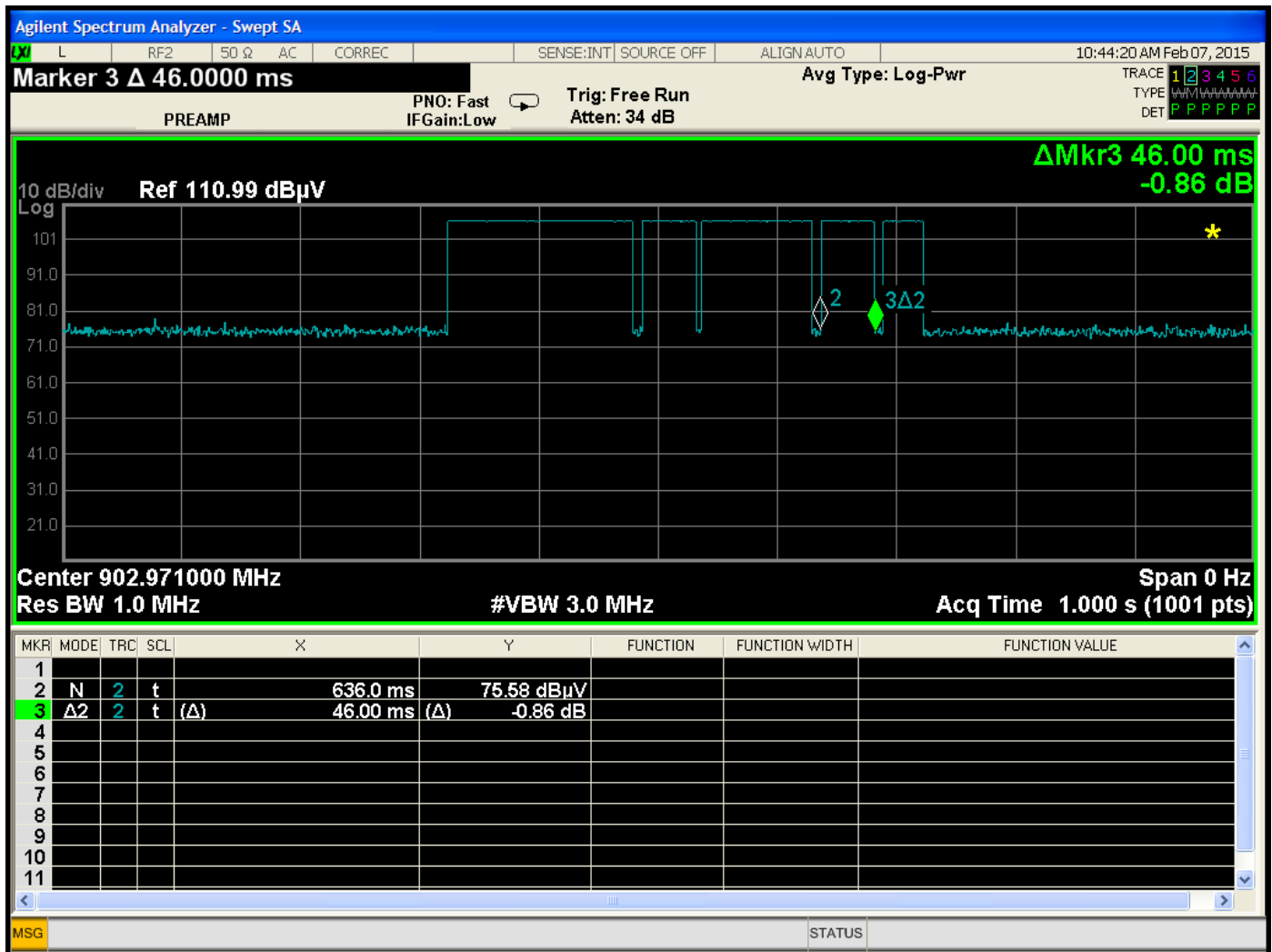
Time of Occupancy – Time of Pulse One = 156 ms



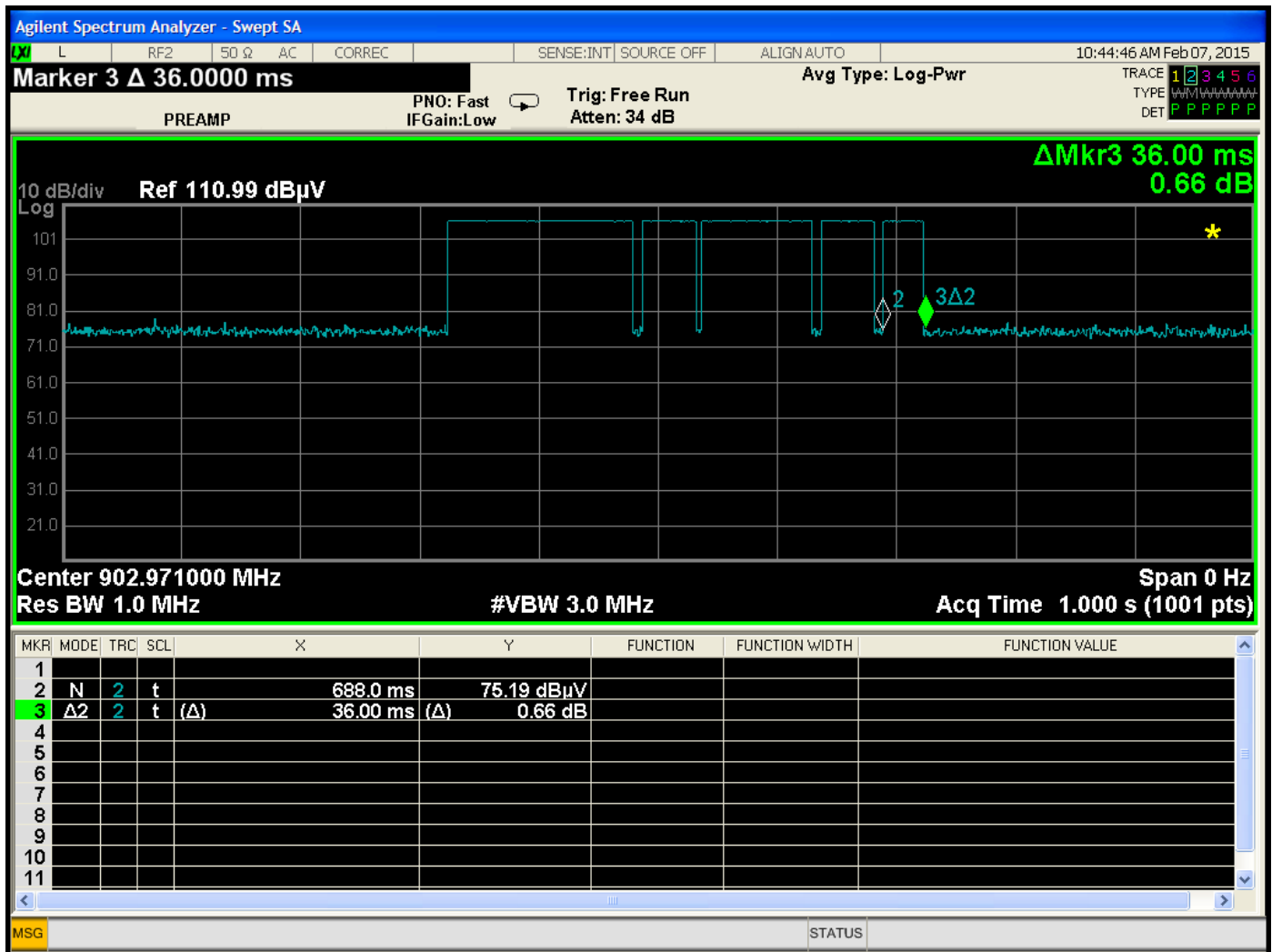
Time of Occupancy – Time of Pulse Two = 46 ms



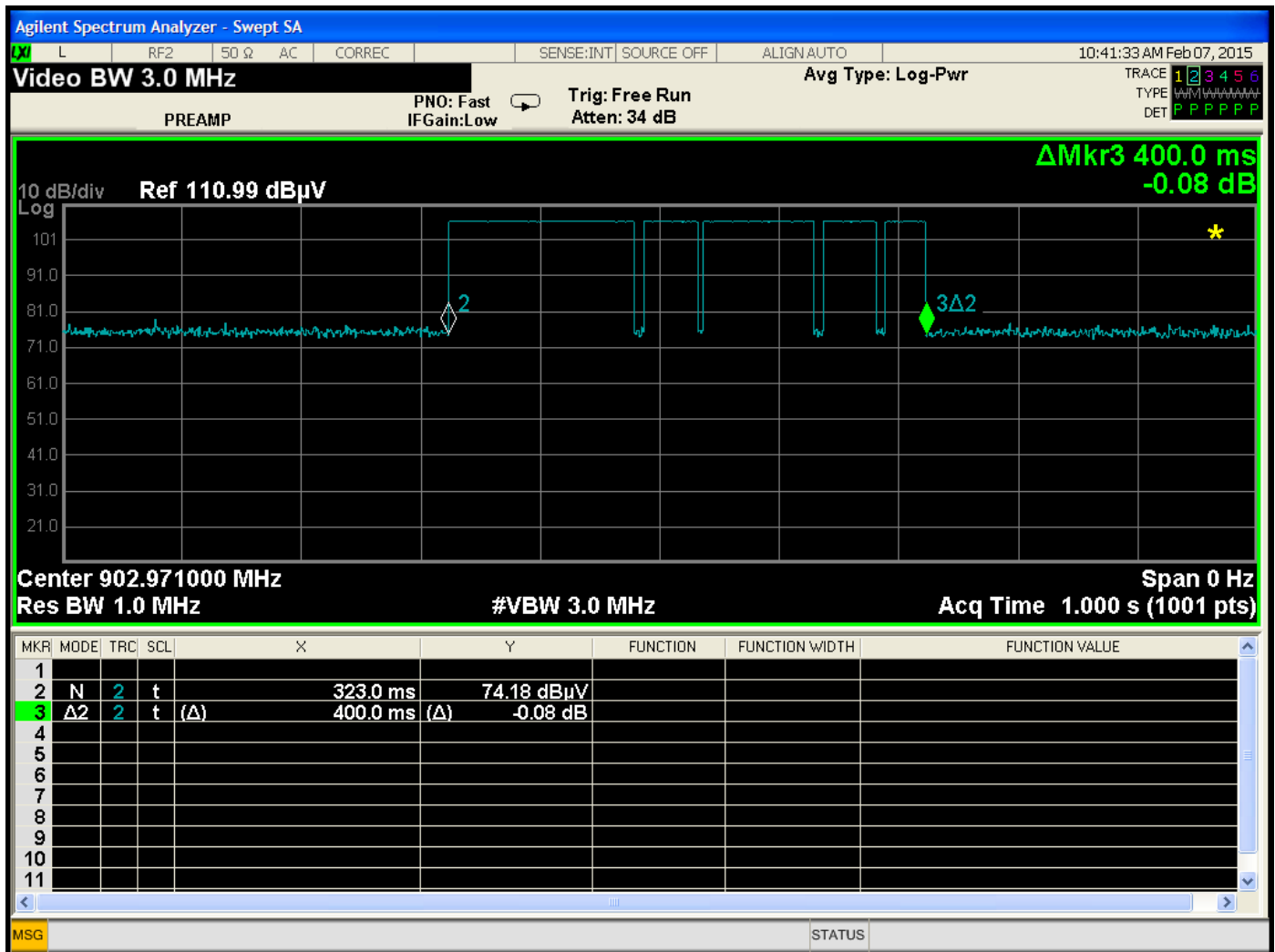
Time of Occupancy – Time of Pulse Three = 94 ms



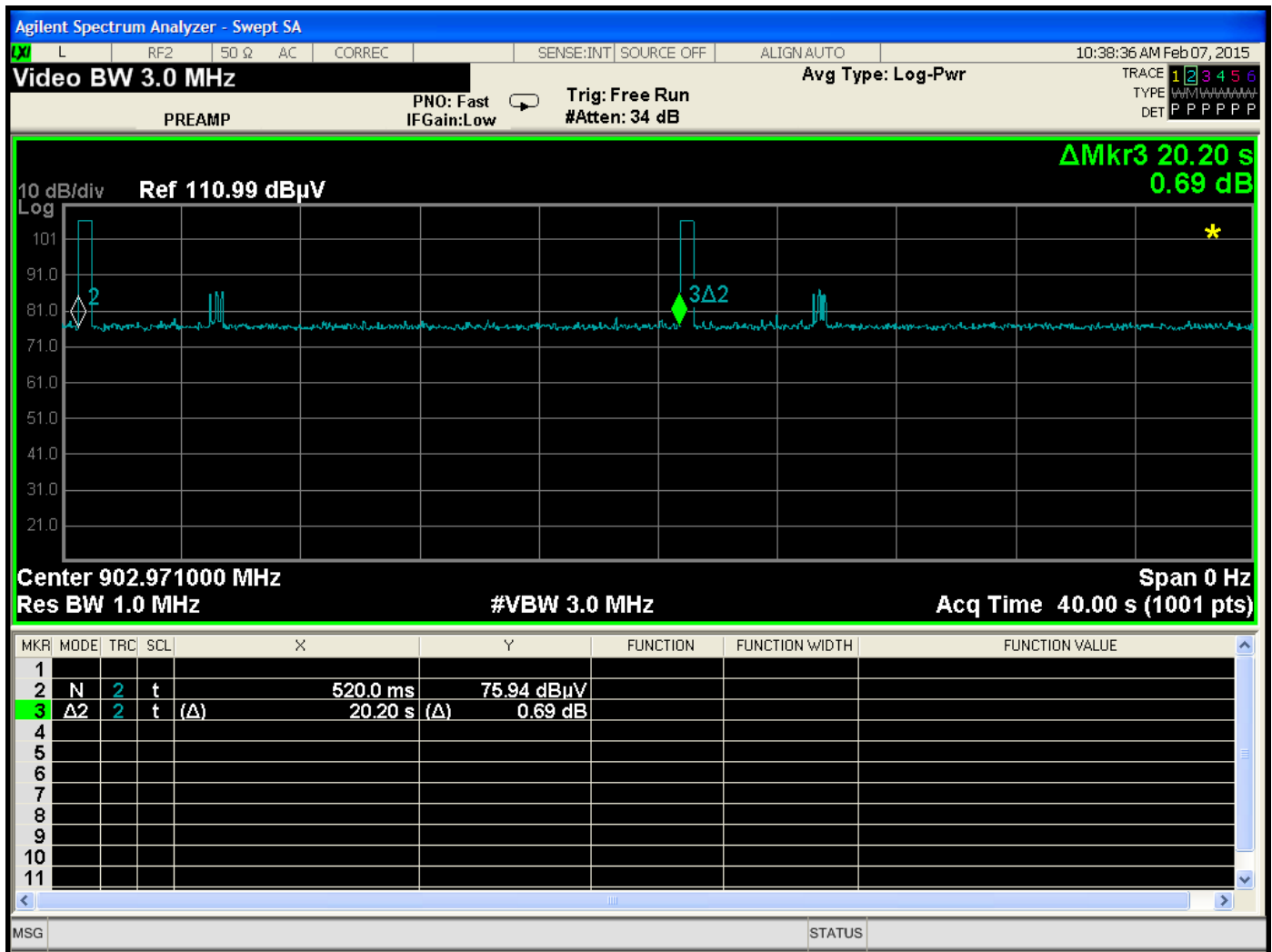
Time of Occupancy – Time of Pulse Four = 46 ms



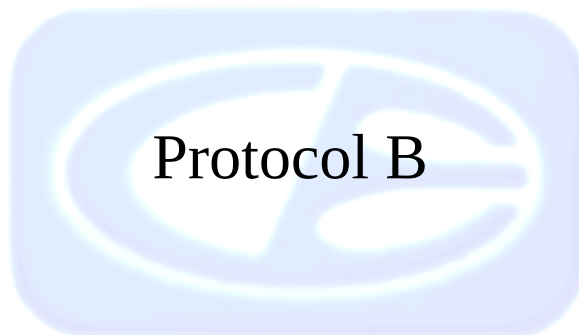
Time of Occupancy – Time of Pulse Five = 36 ms

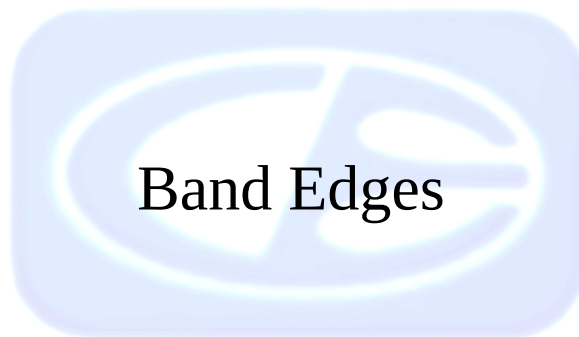


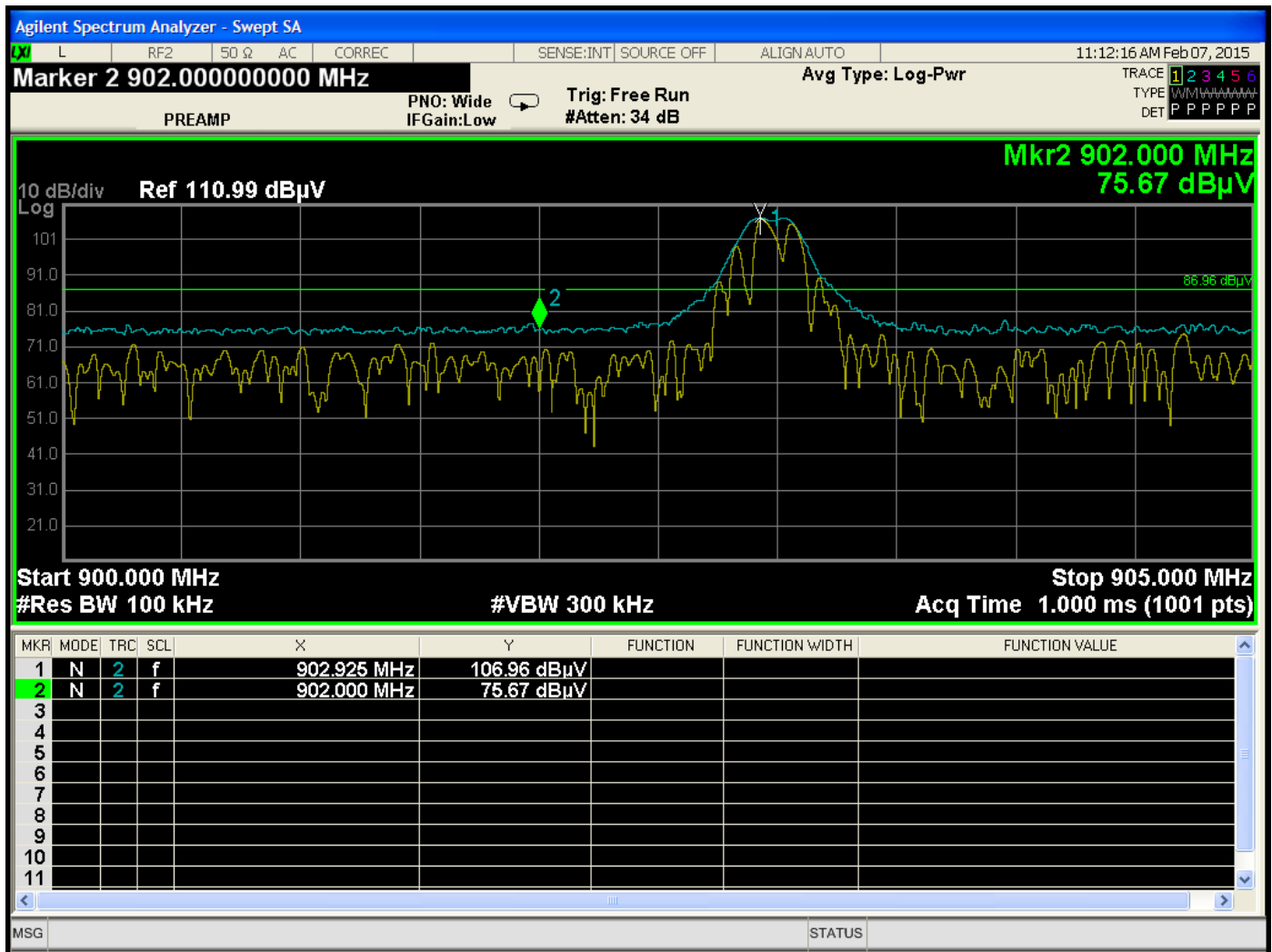
Time of Occupancy – Time of Pulse Train with Blanking = 378 ms



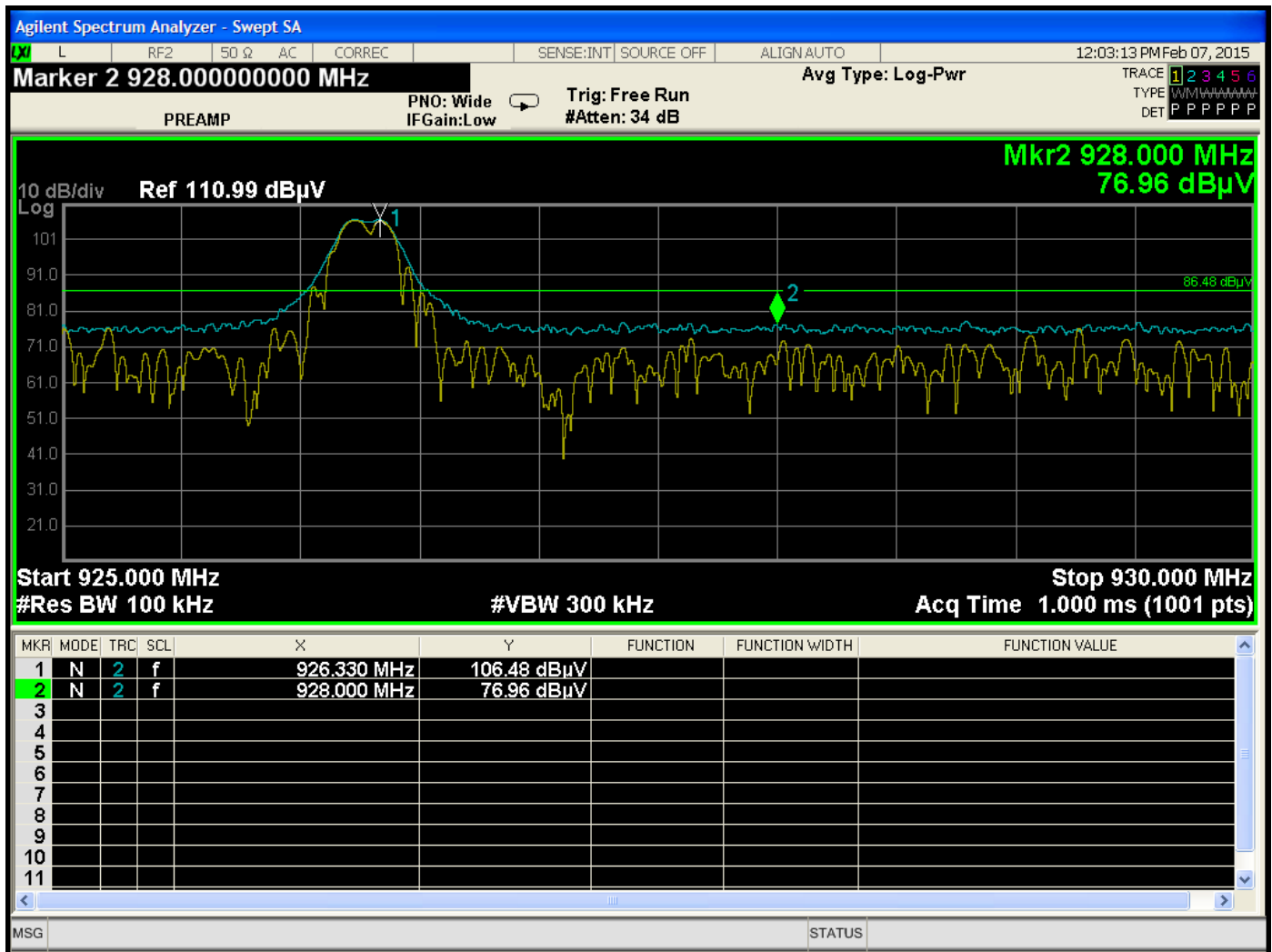
Time of Occupancy – Time Between Pulses = 20.20 s





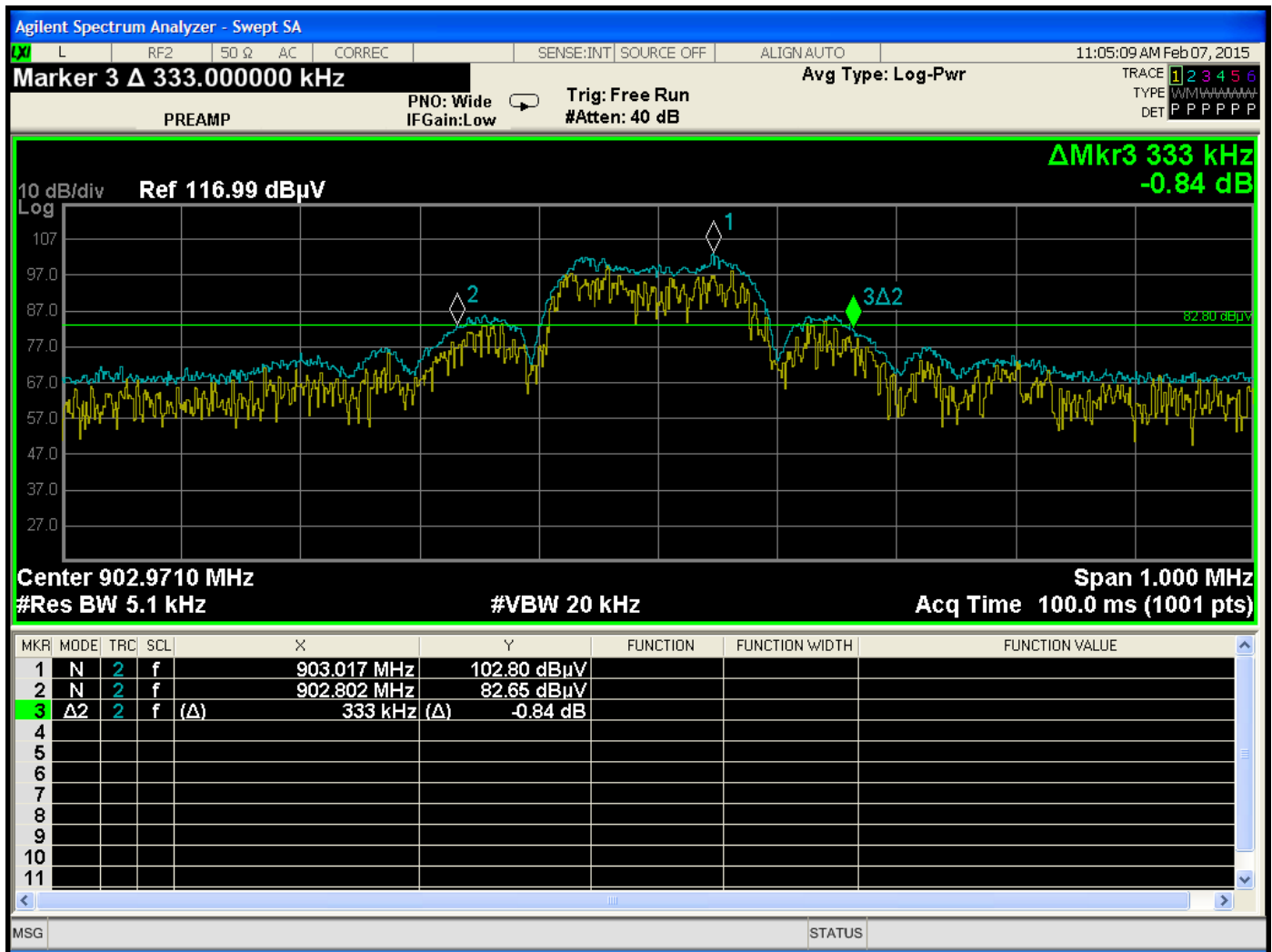


Band Edge – Low Chanel – Protocol B



Band Edge – High Channel – Protocol B

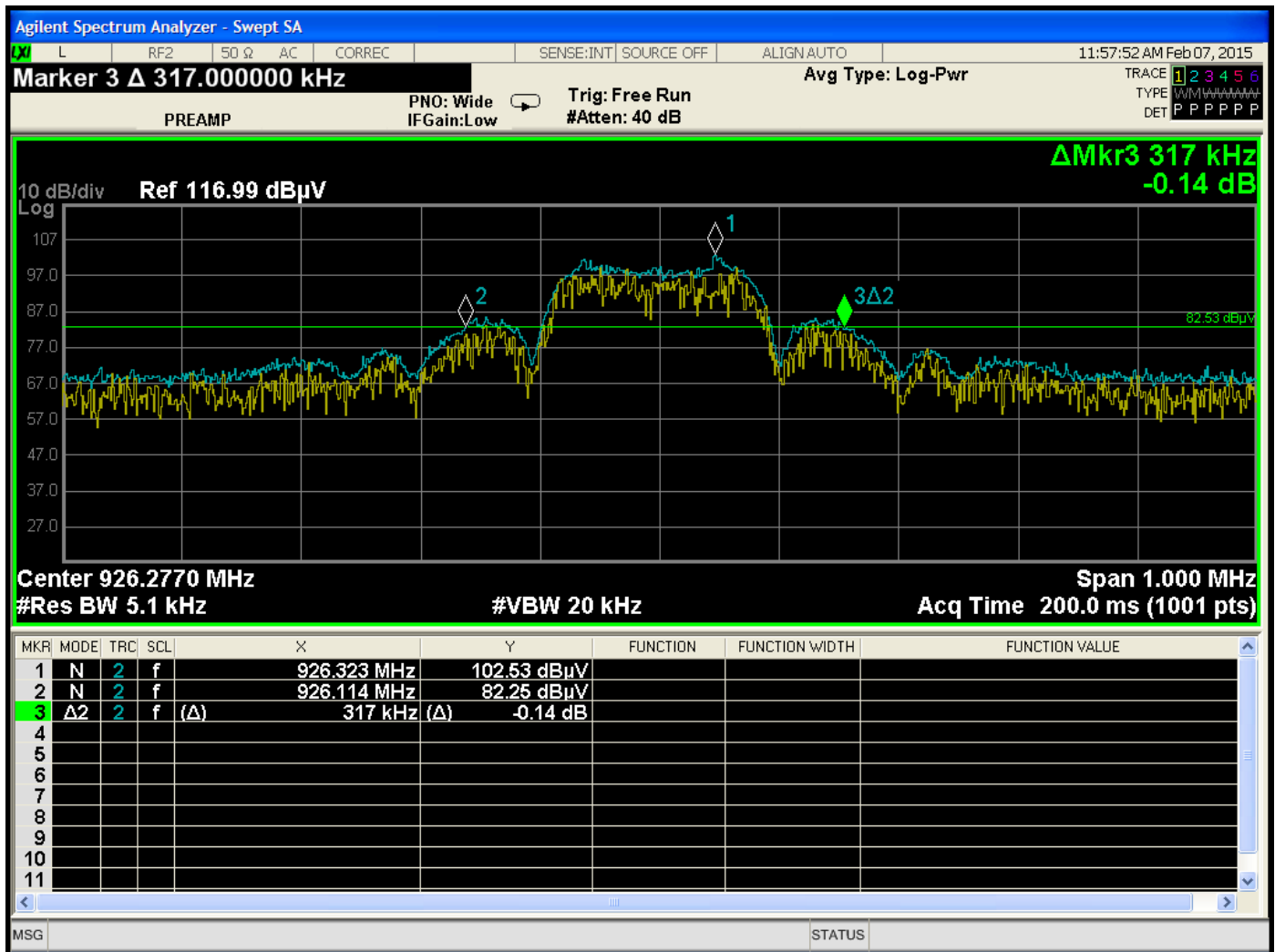




20 dB Bandwidth – Low Channel – Protocol B

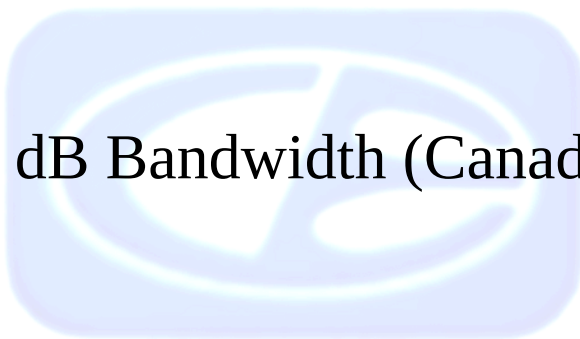


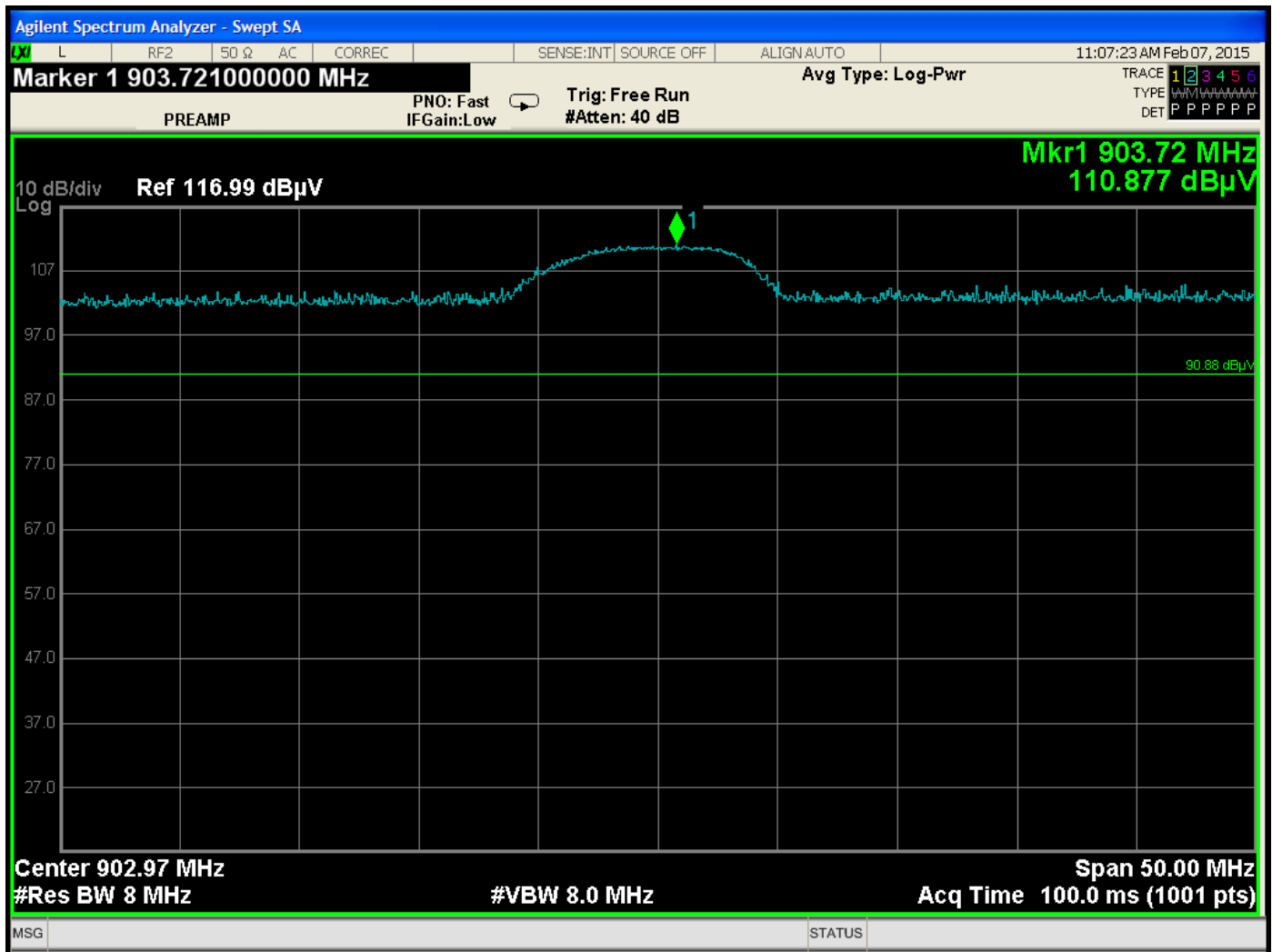
20 dB Bandwidth – Middle Channel – Protocol B



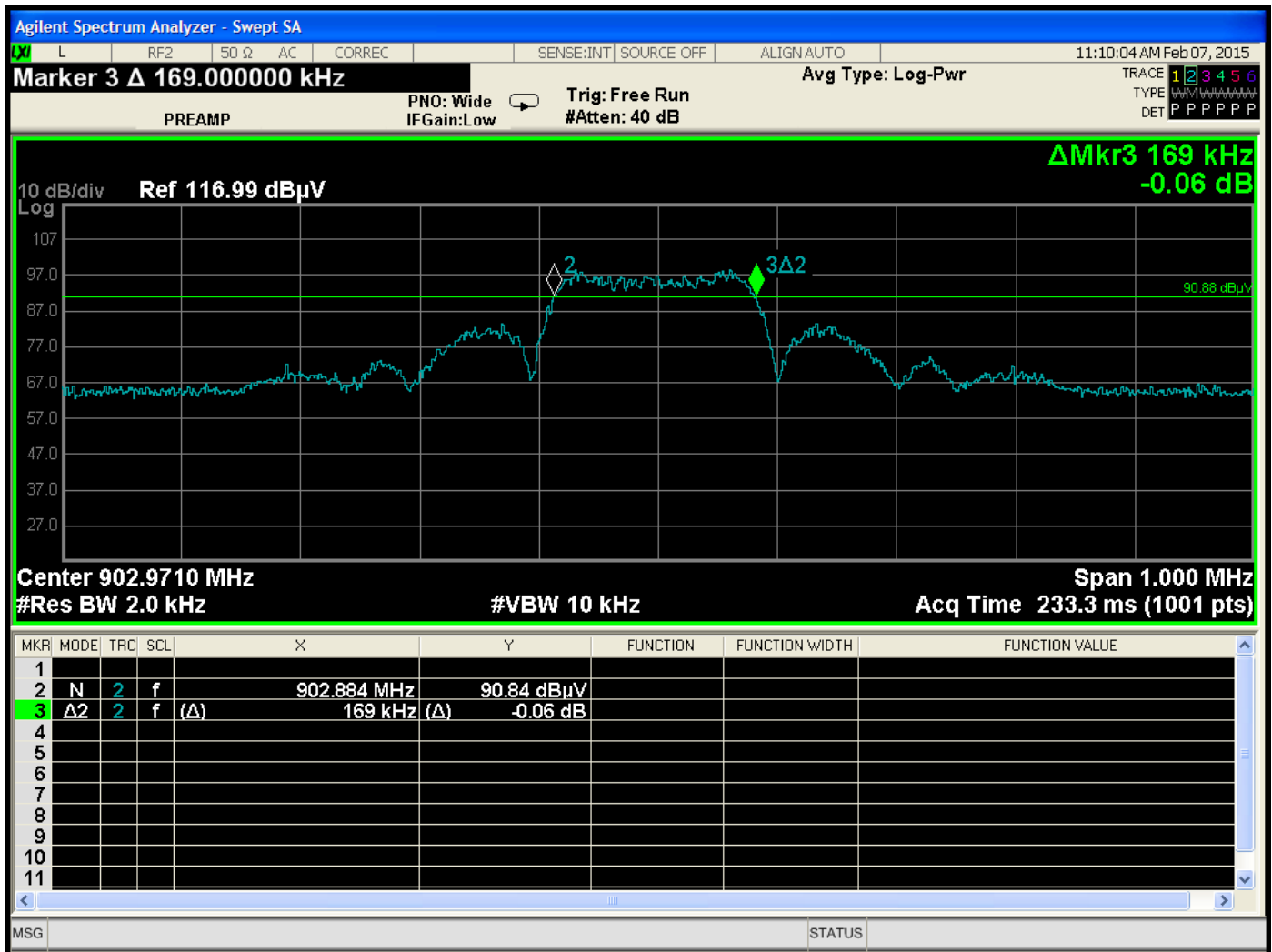
20 dB Bandwidth – High Channel – Protocol B

20 dB Bandwidth (Canada)

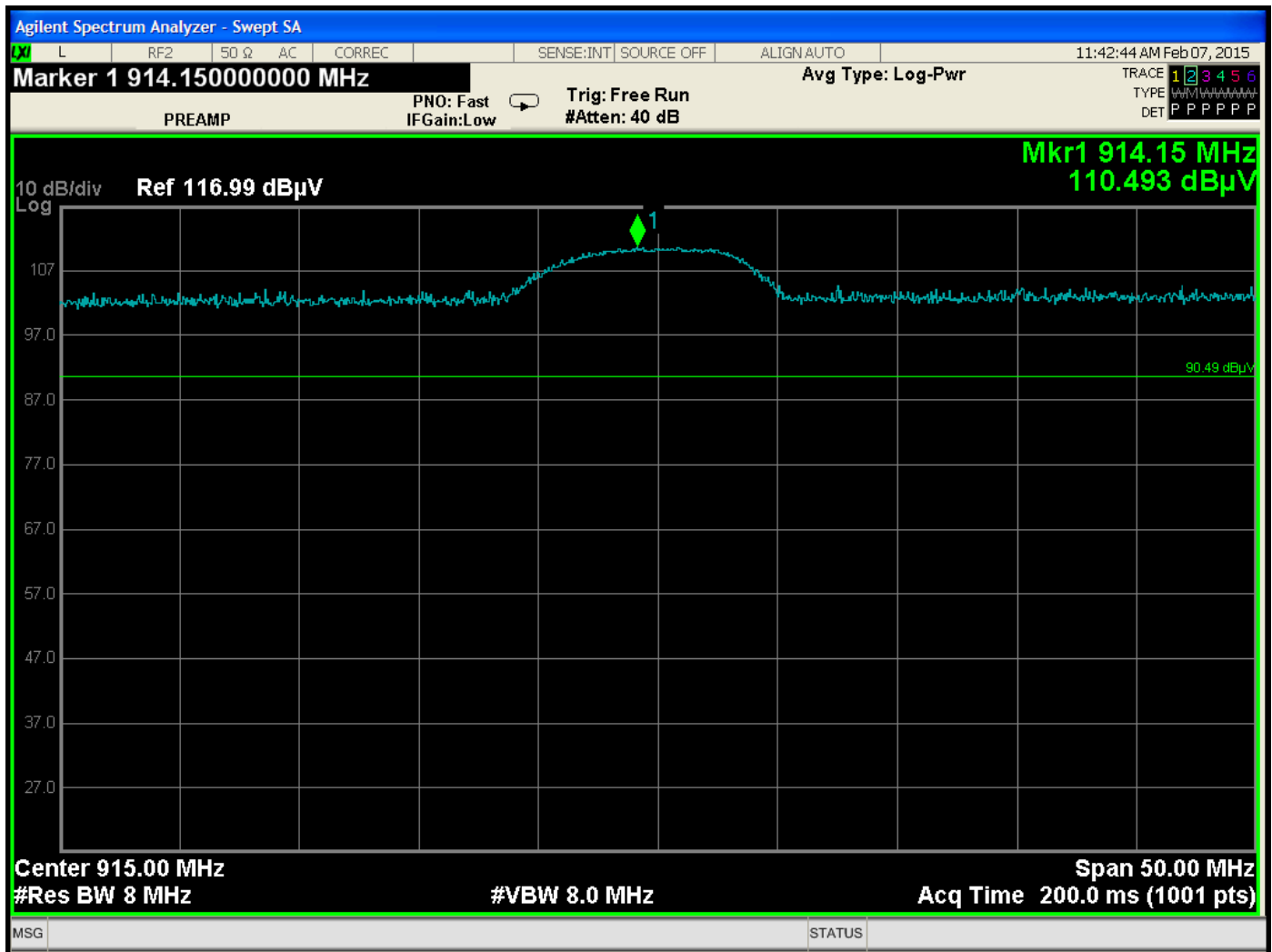




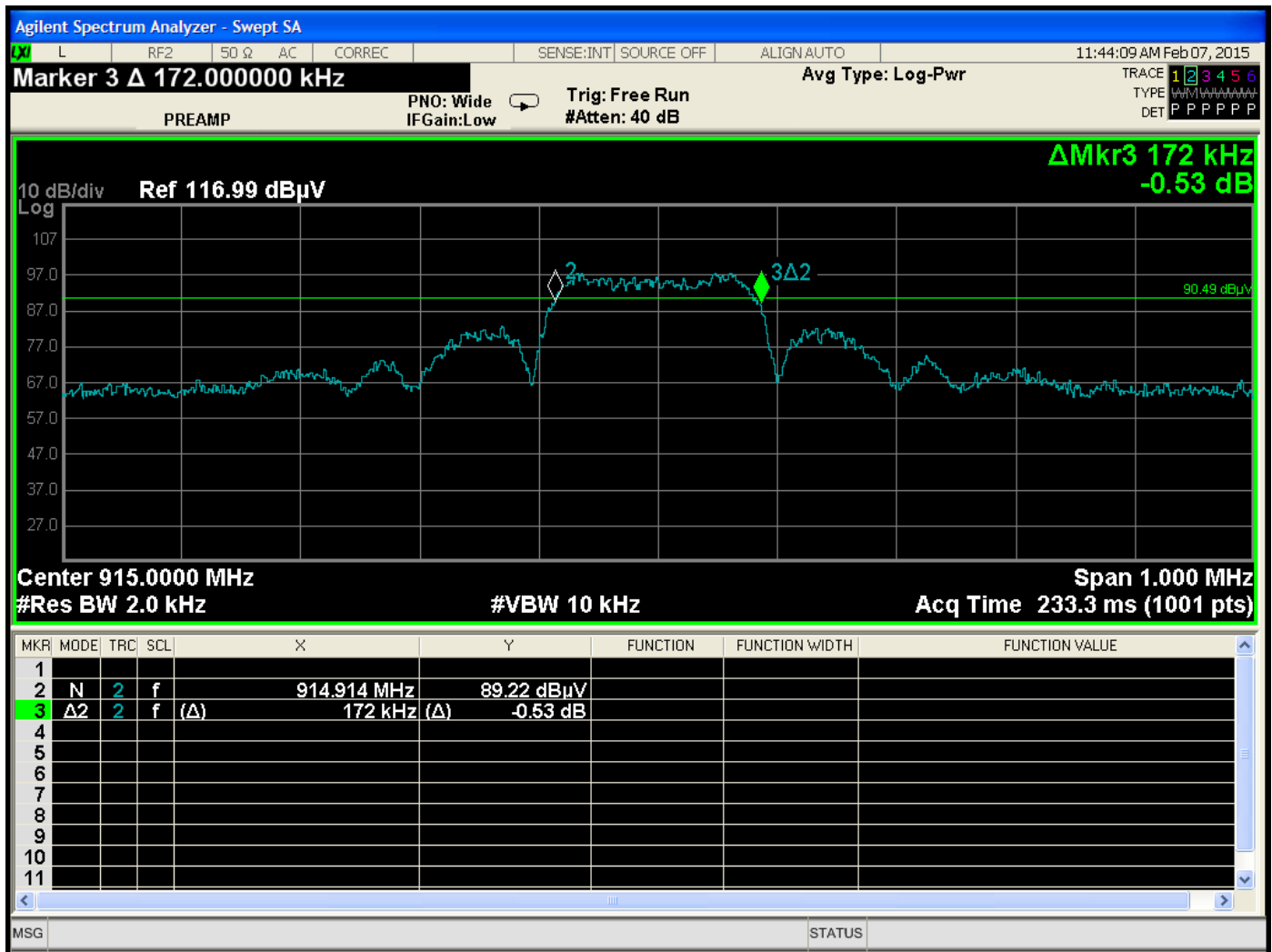
20 dB Bandwidth – Reference Level – Low Channel – Protocol B



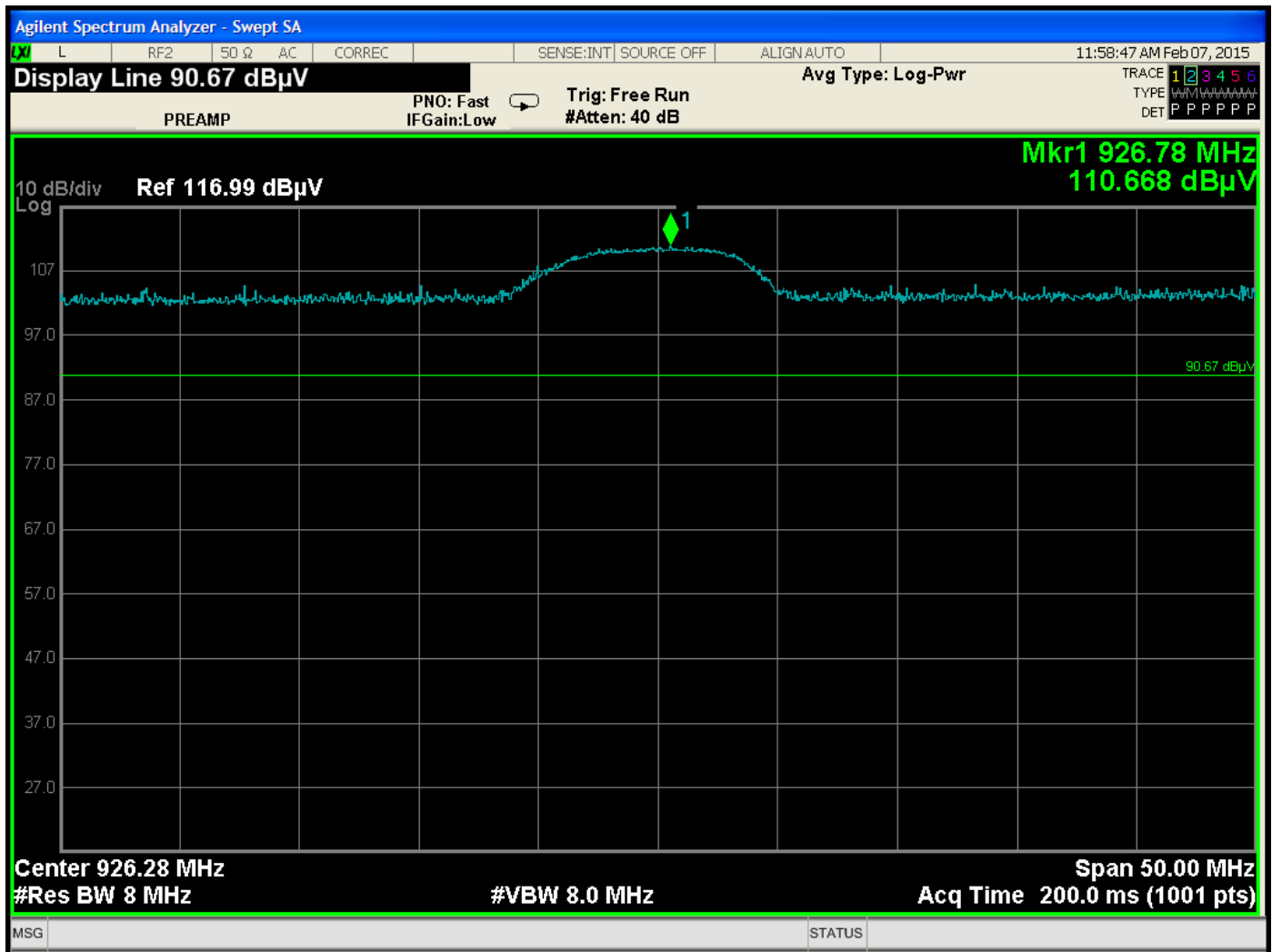
20 dB Bandwidth – 2 KHz RBW – Low Channel – Protocol B



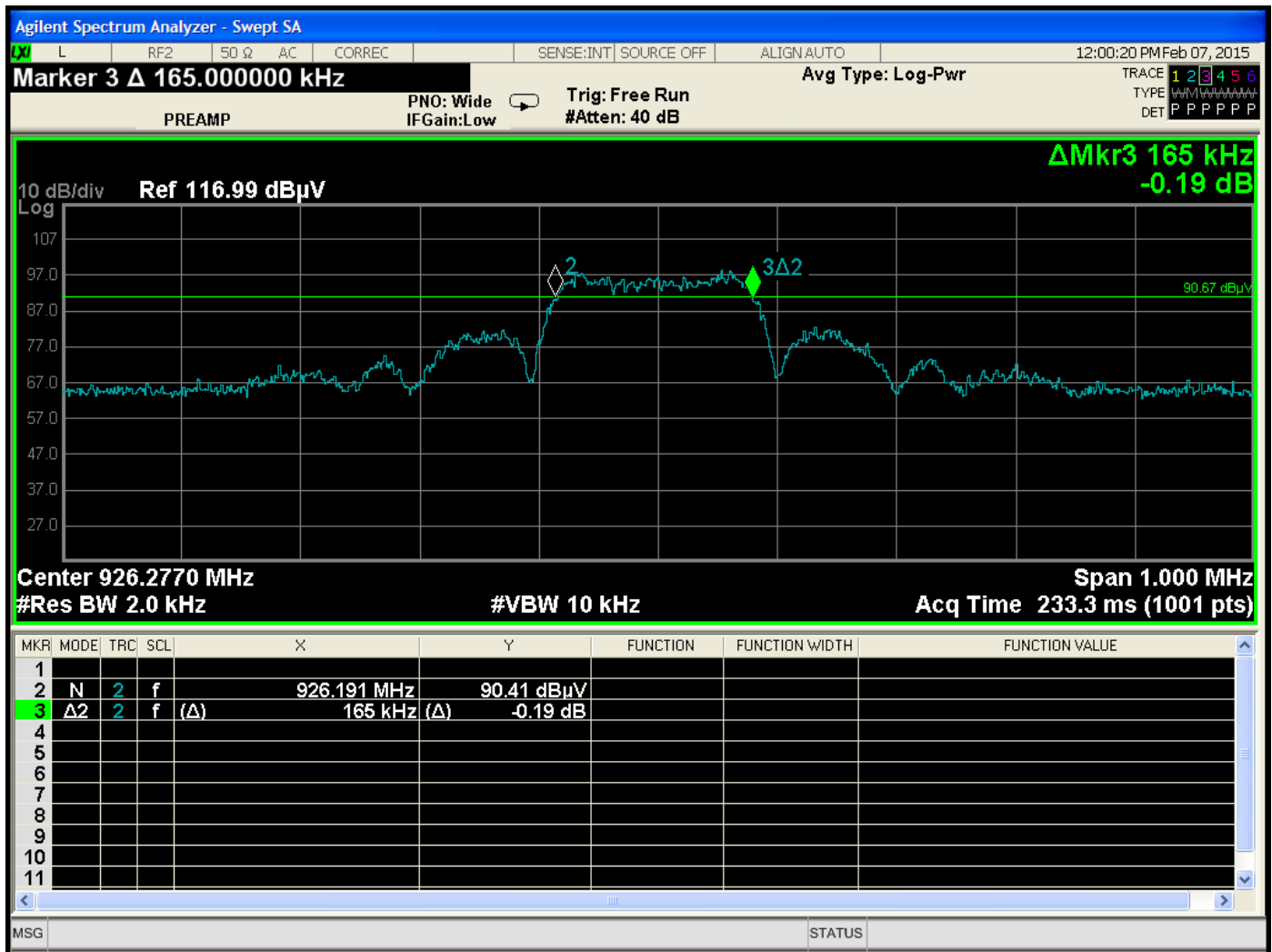
20 dB Bandwidth – Reference Level – Middle Channel – Protocol B



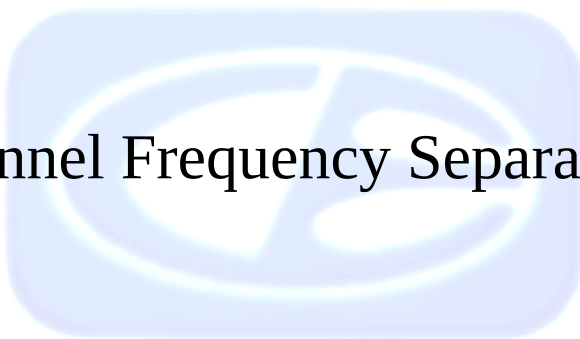
20 dB Bandwidth – 2 KHz RBW – Middle Channel – Protocol B



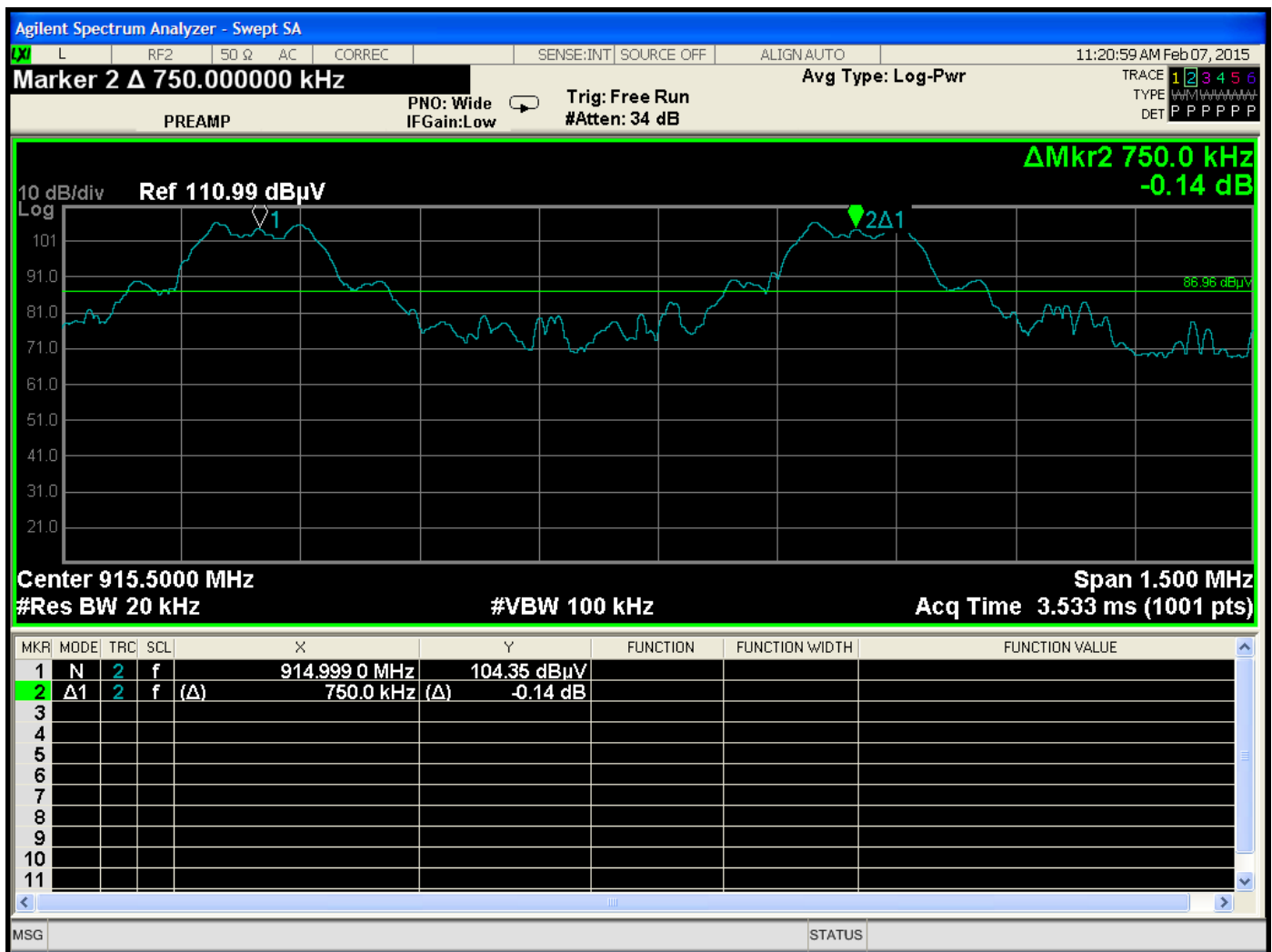
20 dB Bandwidth – Reference Level – High Channel – Protocol B



20 dB Bandwidth – 2 KHz RBW – High Channel – Protocol B



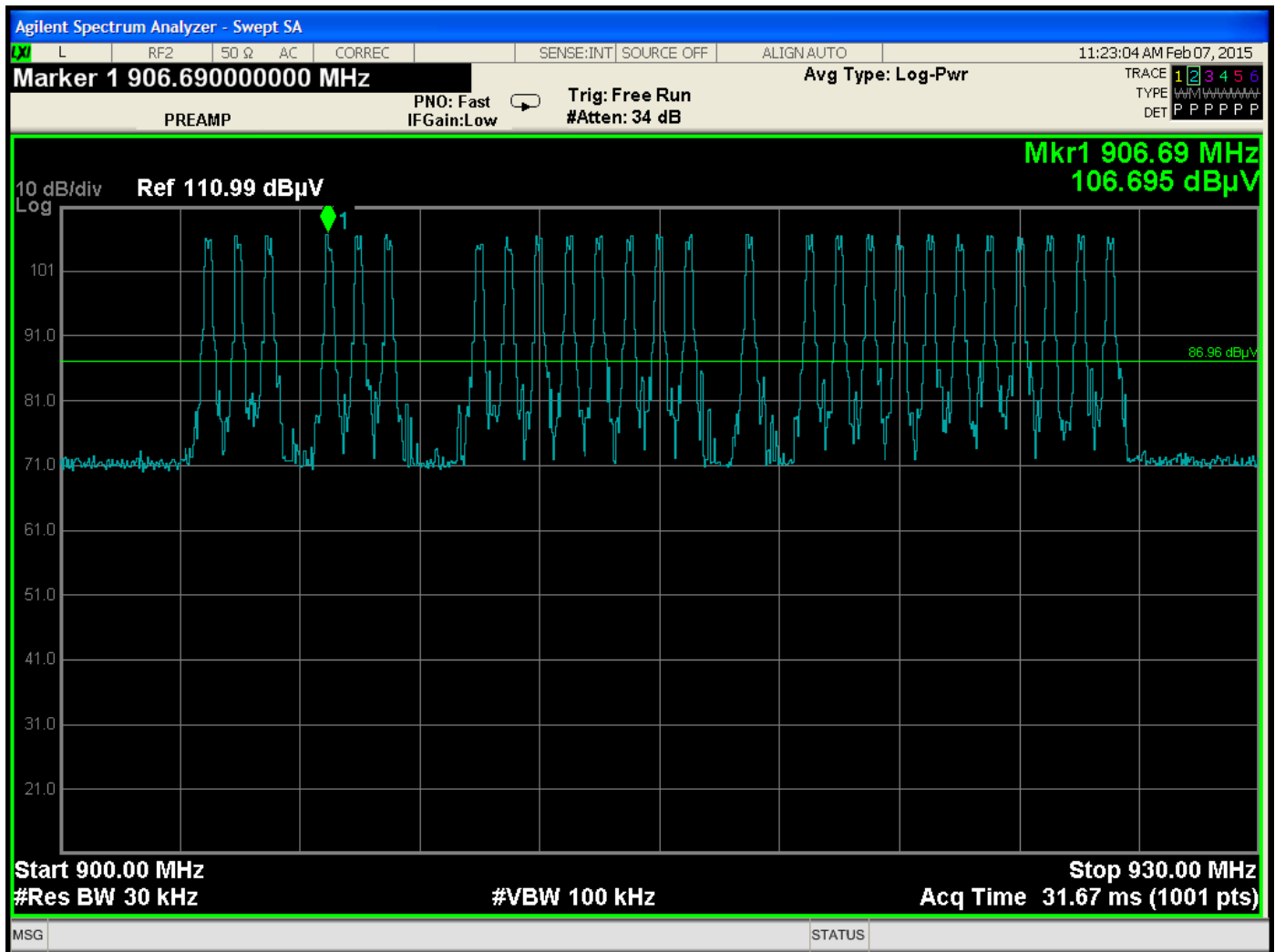
Channel Frequency Separation



Channel Frequency Separation – Protocol B



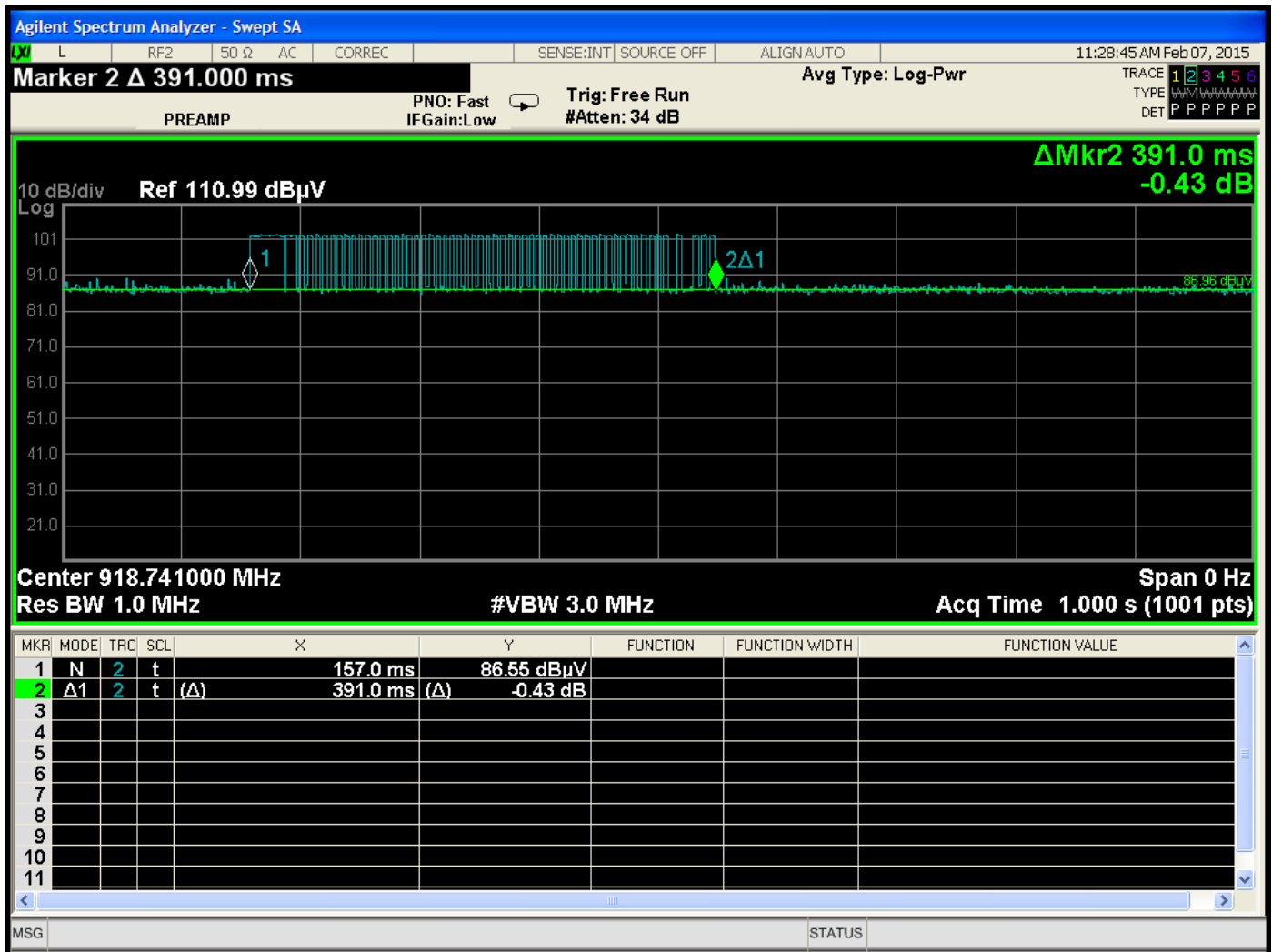
Number of Hopping Frequencies



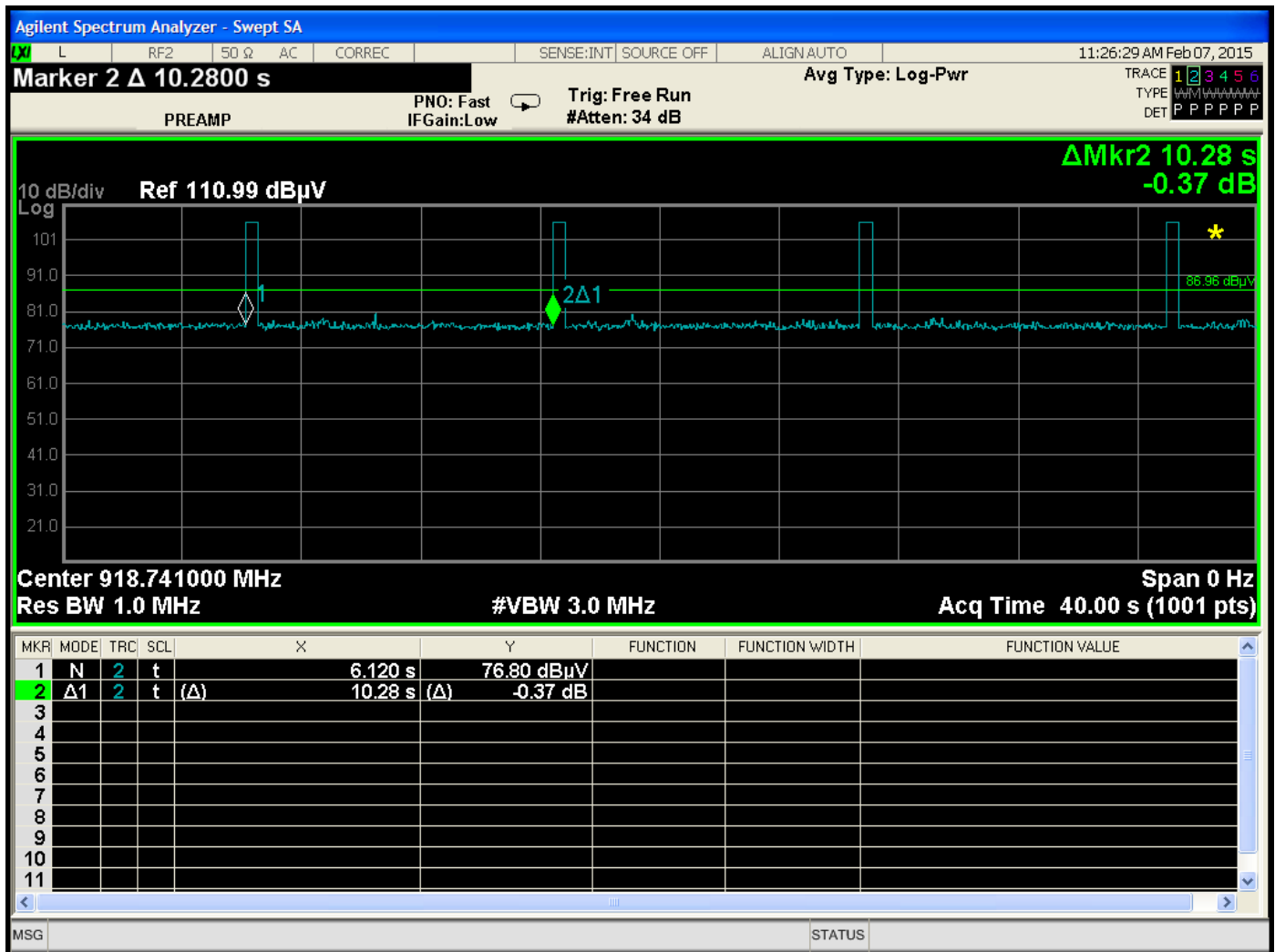
Number of Hopping Frequencies – Protocol B



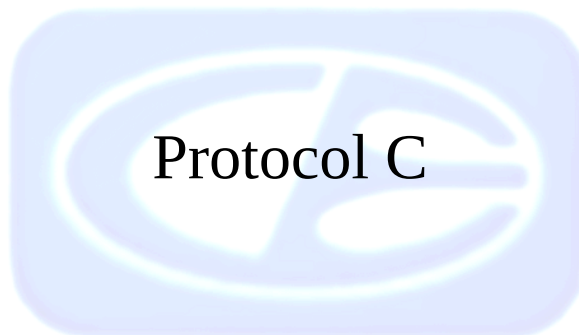
Time of Occupancy

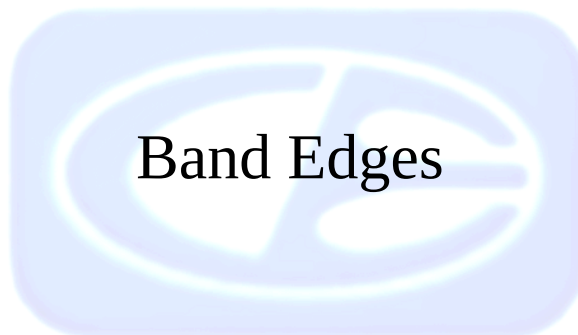


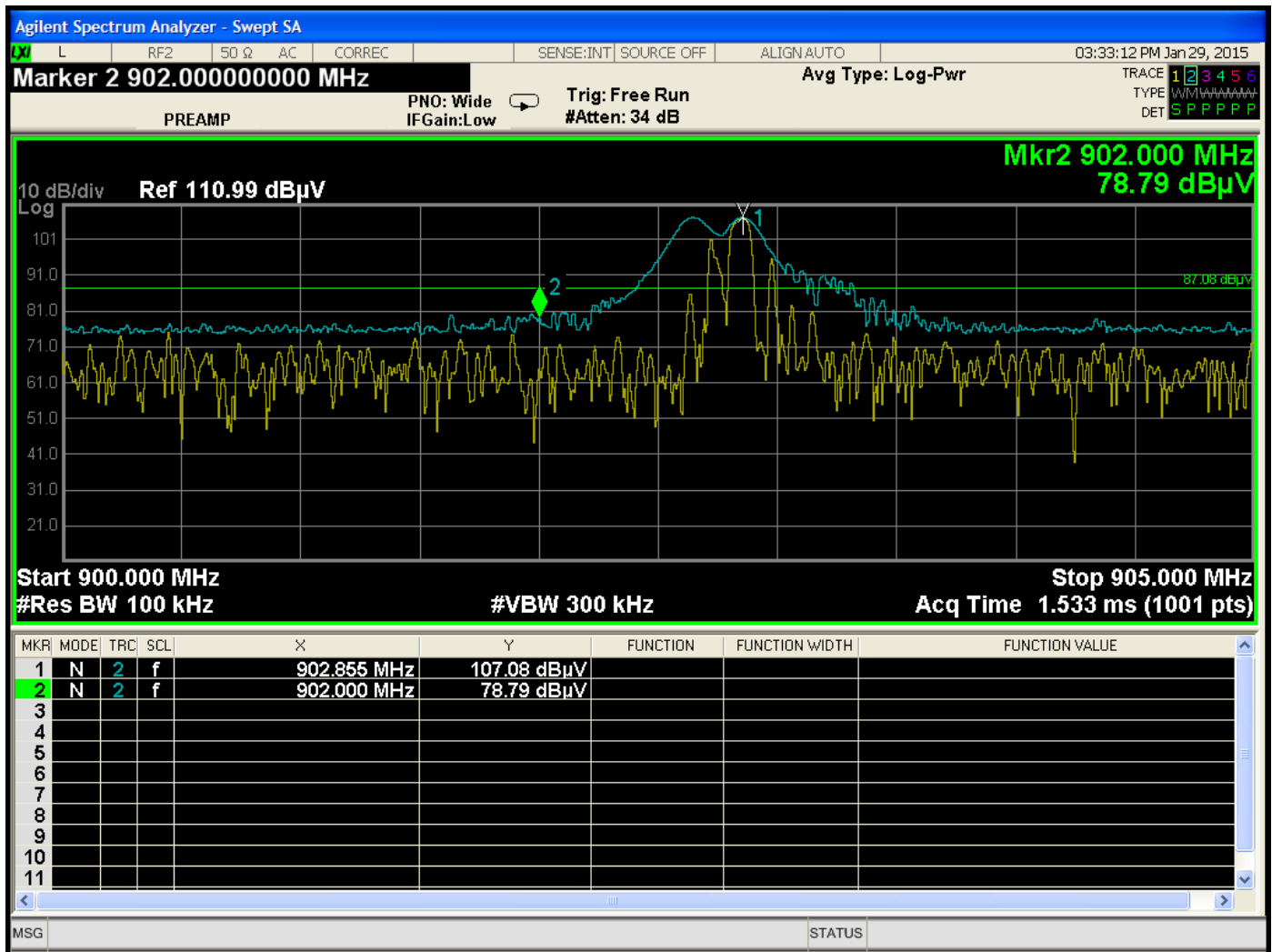
Time of Occupancy – Time of One Pulse = 391.00 ms



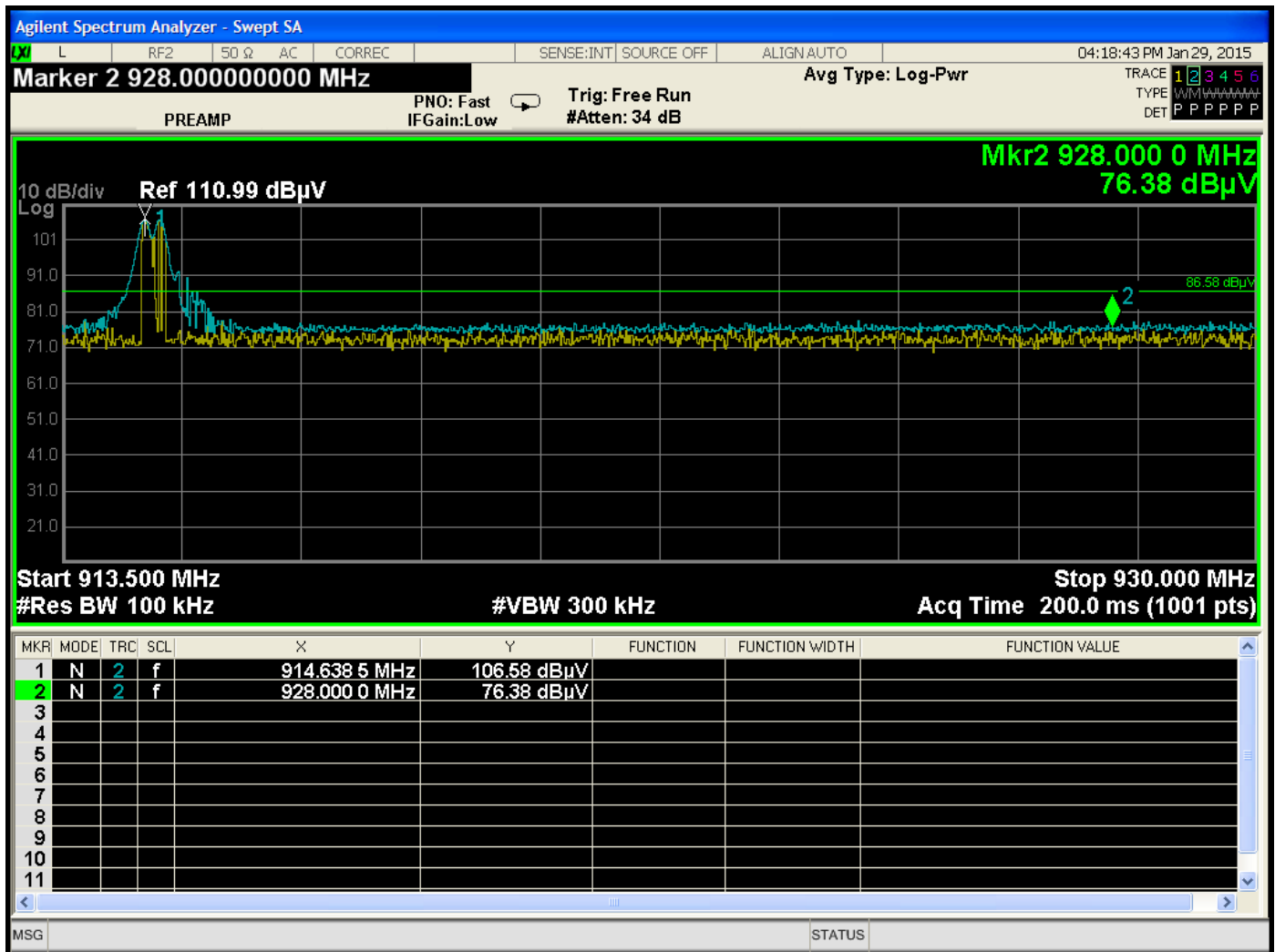
Time of Occupancy – Time Between Pulses = 10.28 s





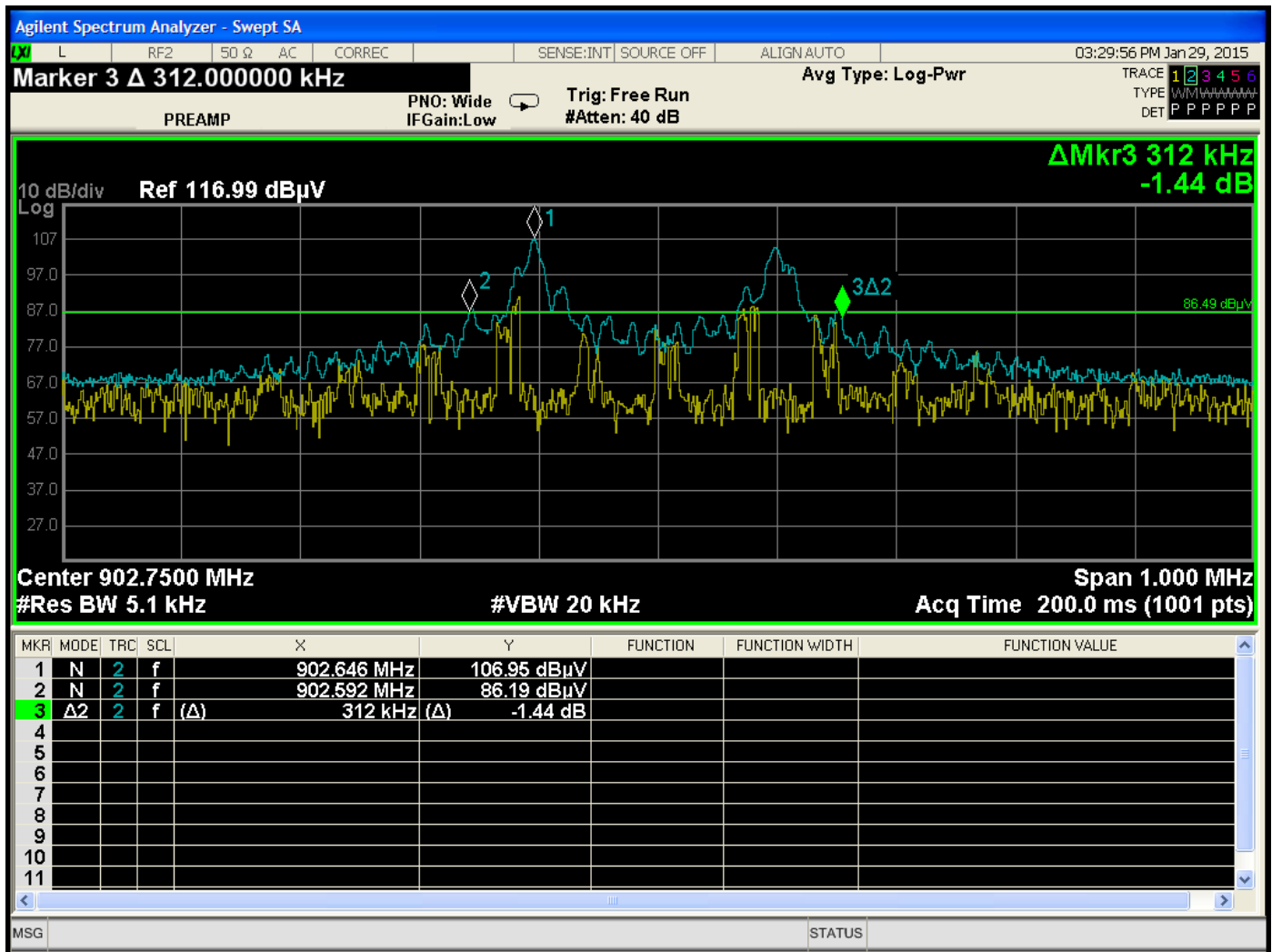


Band Edge – Low Channel – Protocol C

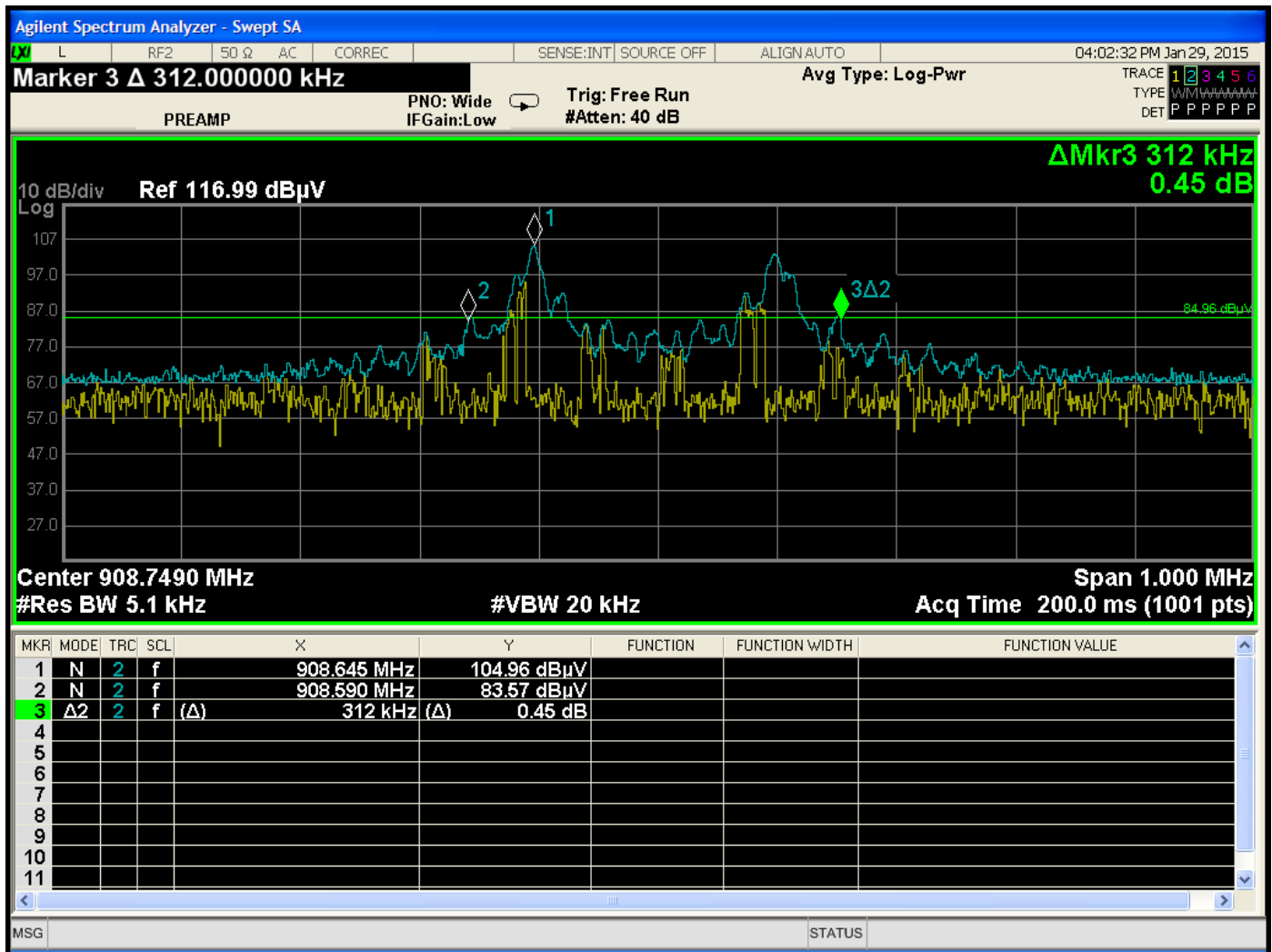


Band Edge – High Channel – Protocol C

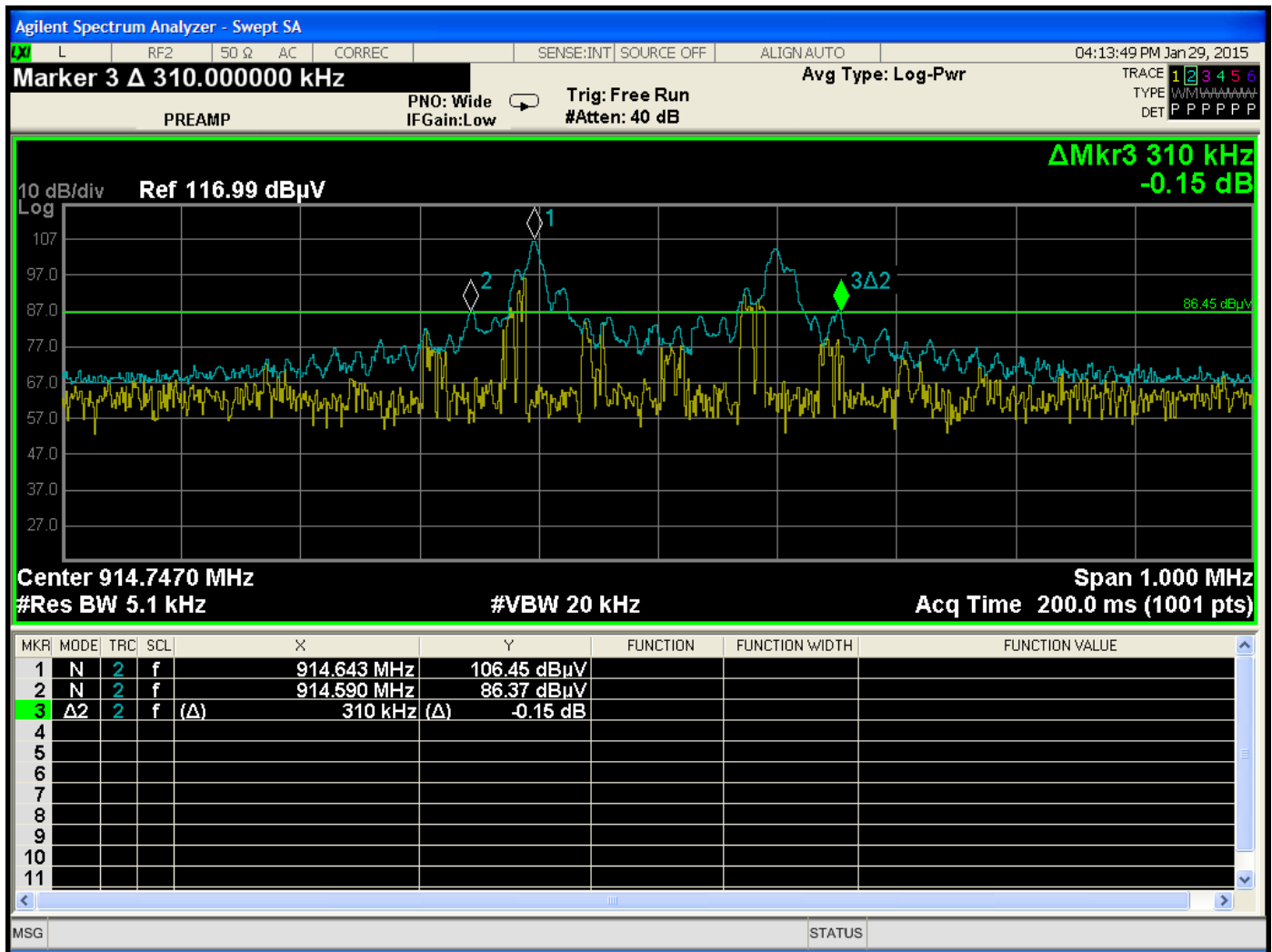




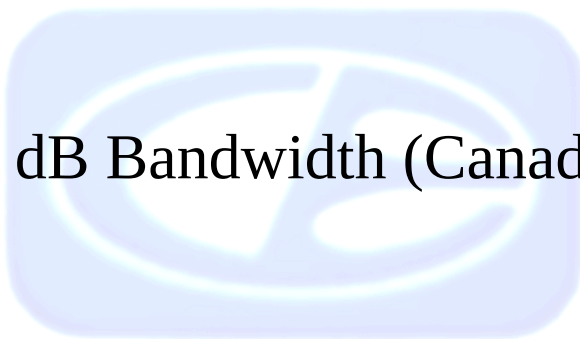
20 dB Bandwidth – Low Channel – Protocol C



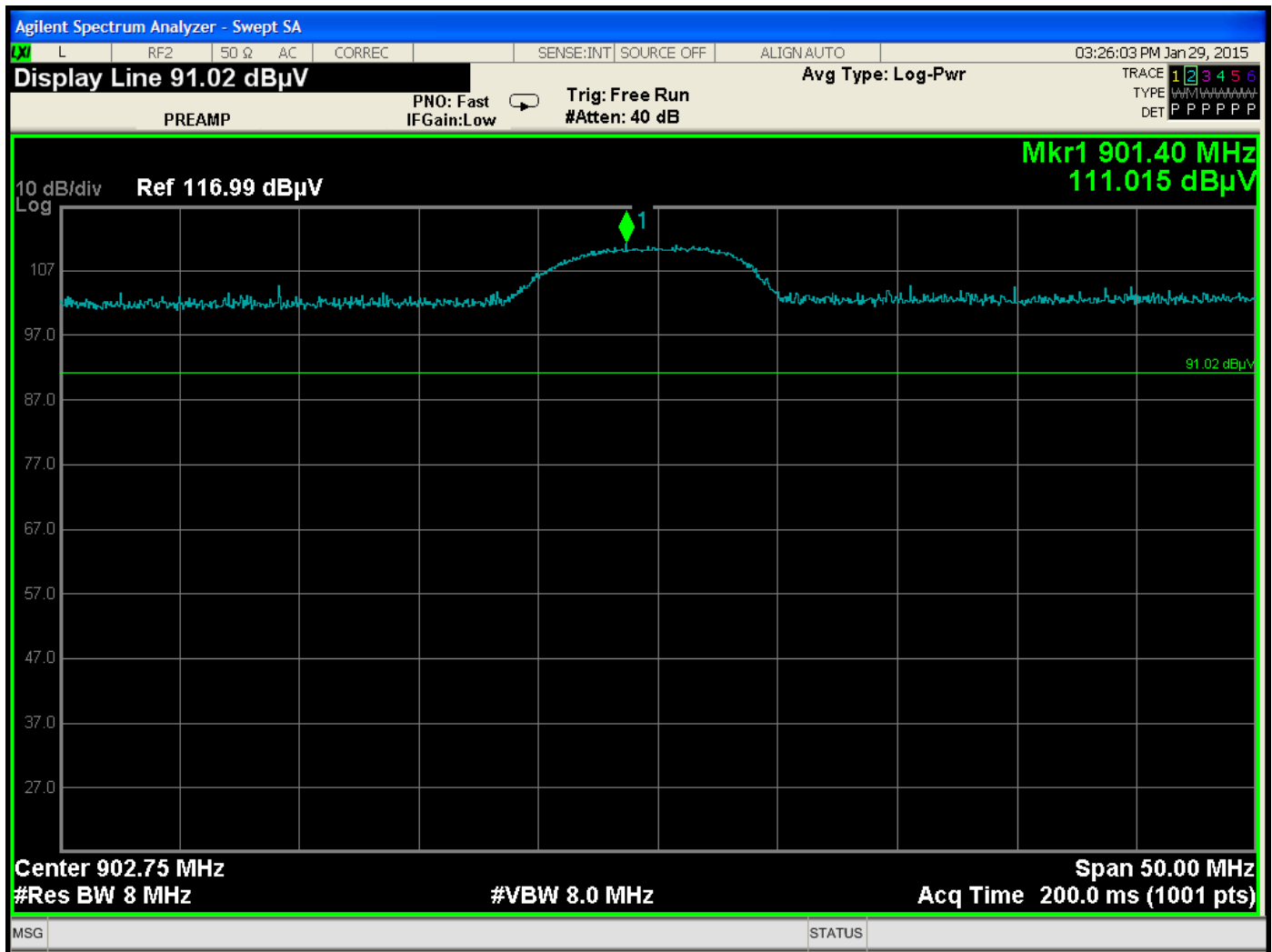
20 dB Bandwidth – Middle Channel – Protocol C



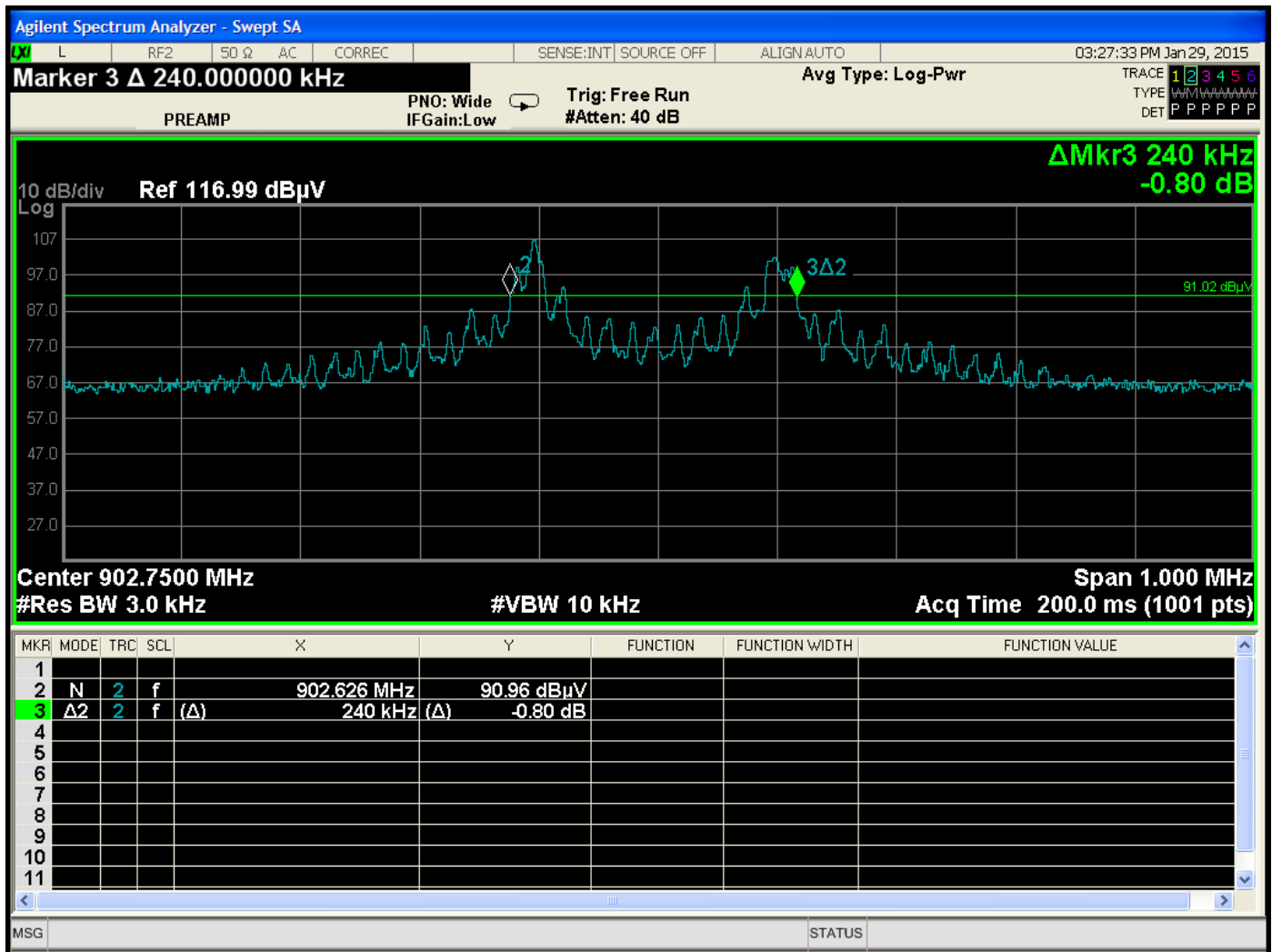
20 dB Bandwidth – High Channel – Protocol C



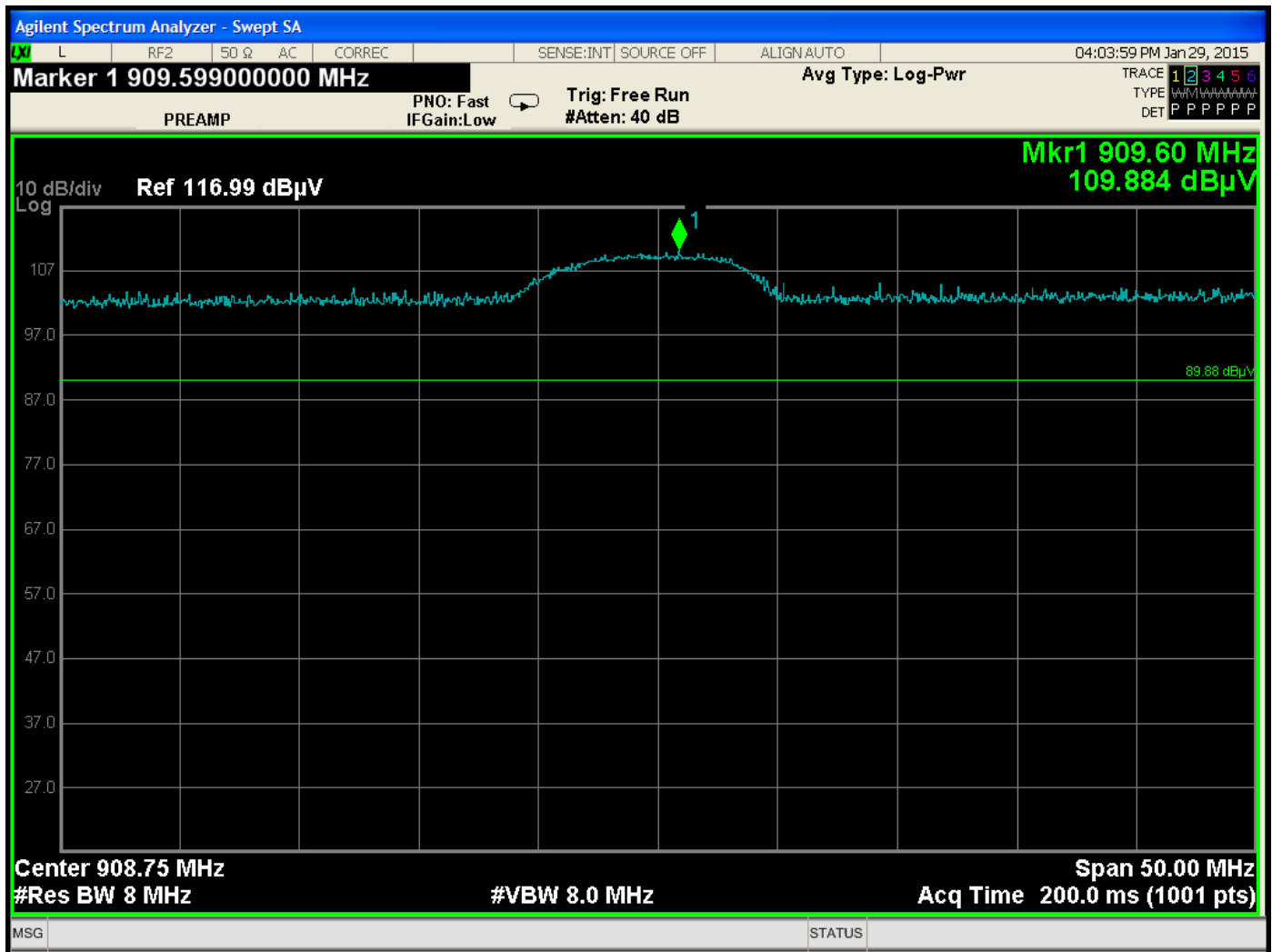
20 dB Bandwidth (Canada)



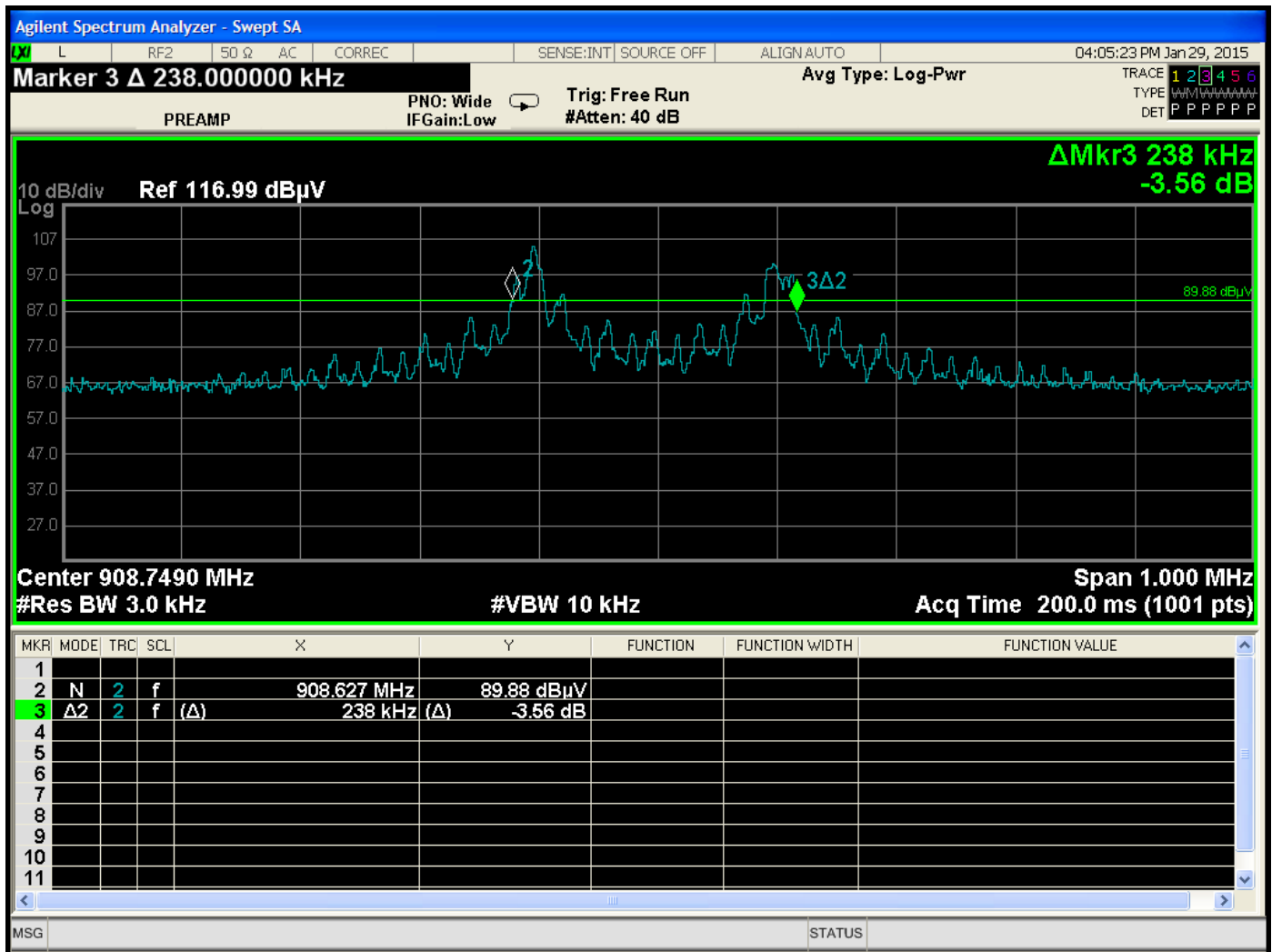
20 dB Bandwidth – Reference Level – Low Channel – Protocol C



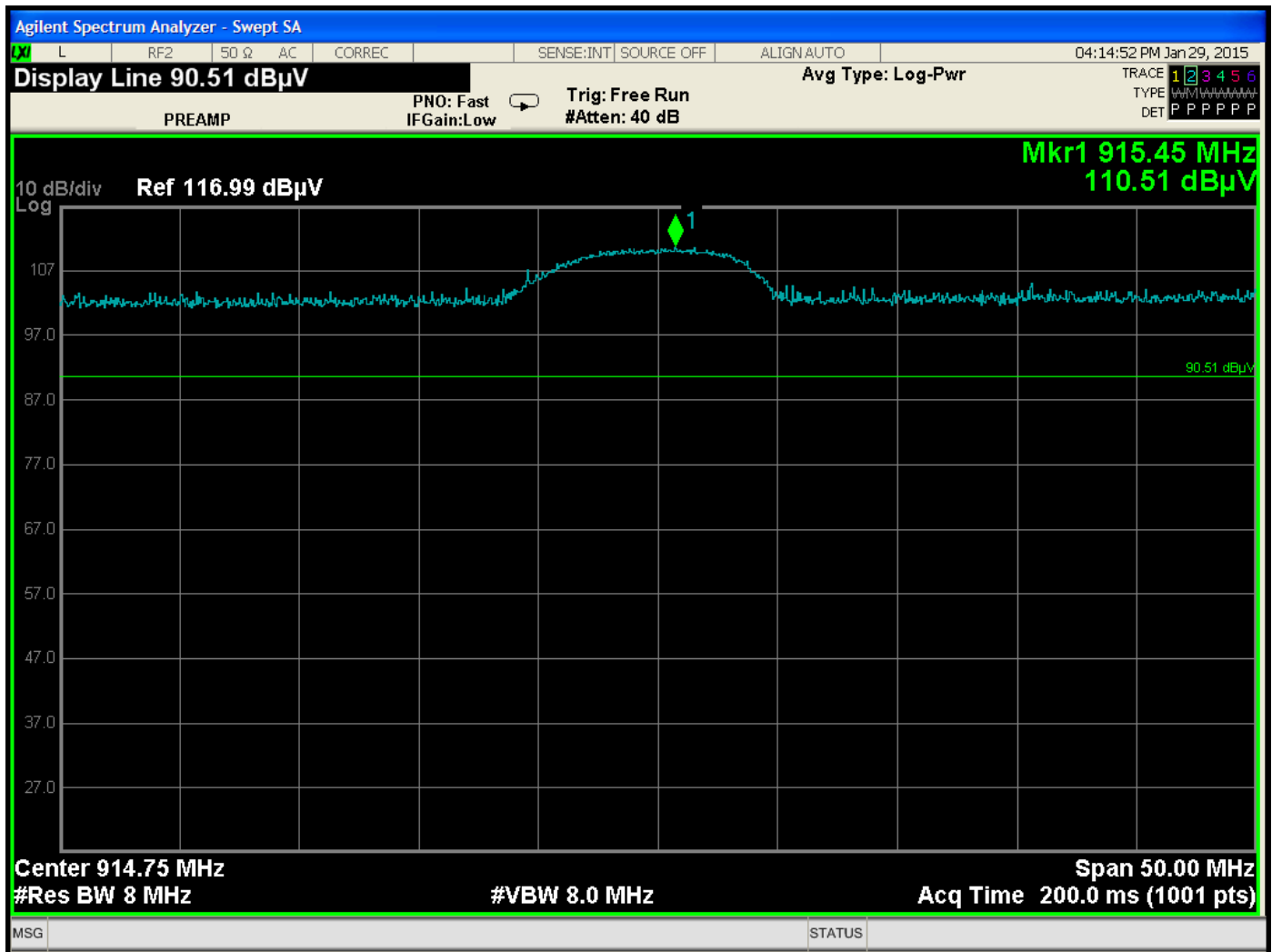
20 dB Bandwidth – 3 KHz RBW – Low Channel – Protocol C



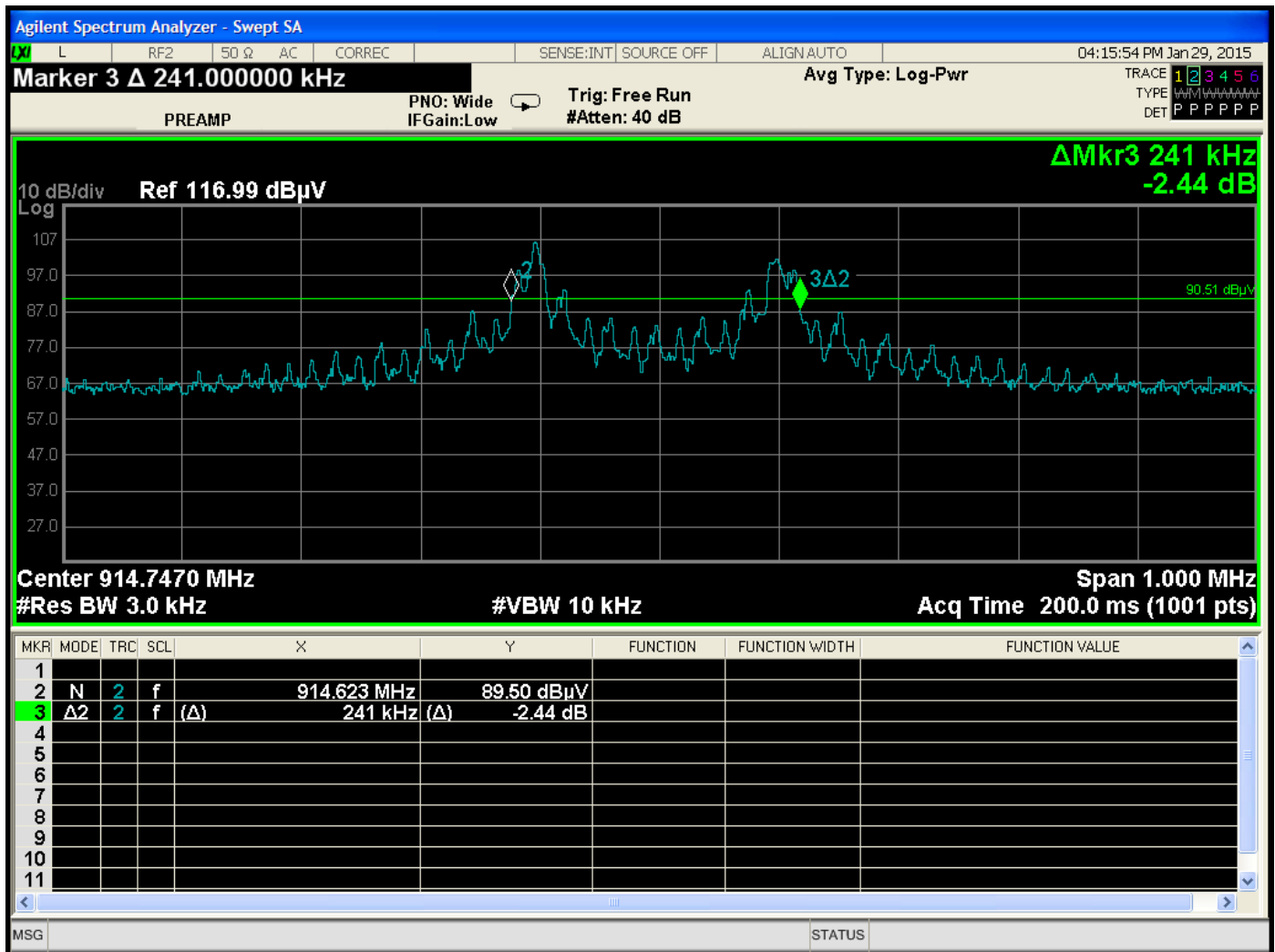
20 dB Bandwidth – Reference Level – Middle Channel – Protocol C



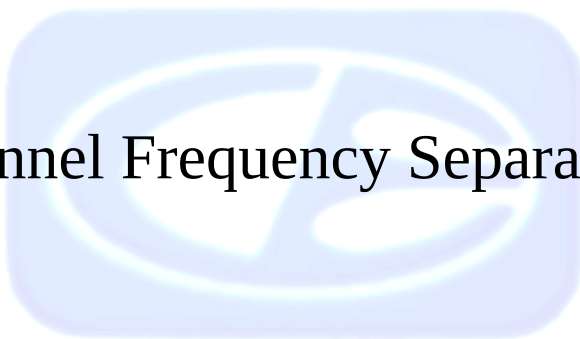
20 dB Bandwidth – 3 KH RBW – Middle Channel – Protocol C



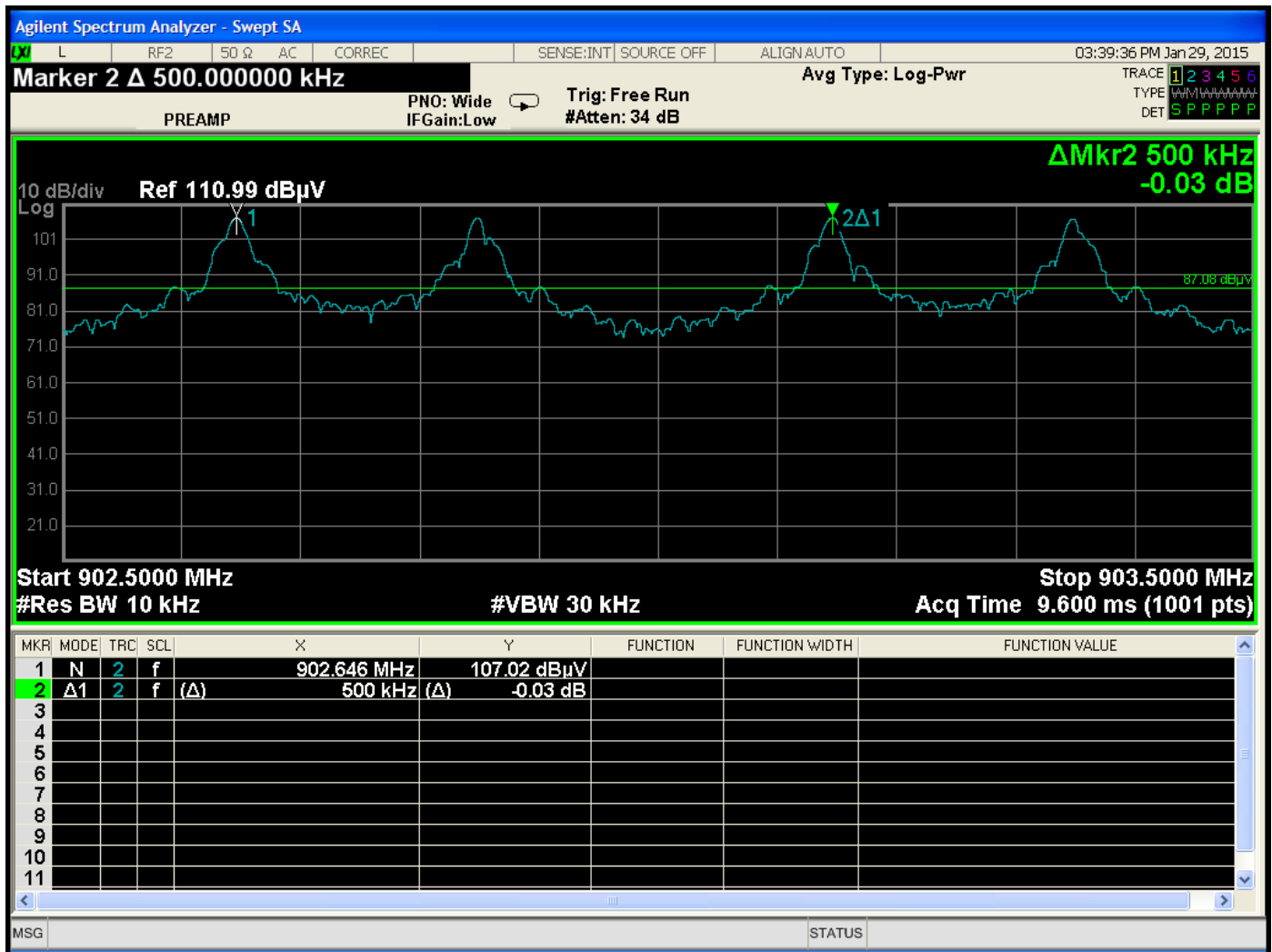
20 dB Bandwidth – Reference Level – High Channel – Protocol C



20 dB Bandwidth – 3 KHz RBW – High Chanel – Protocol C

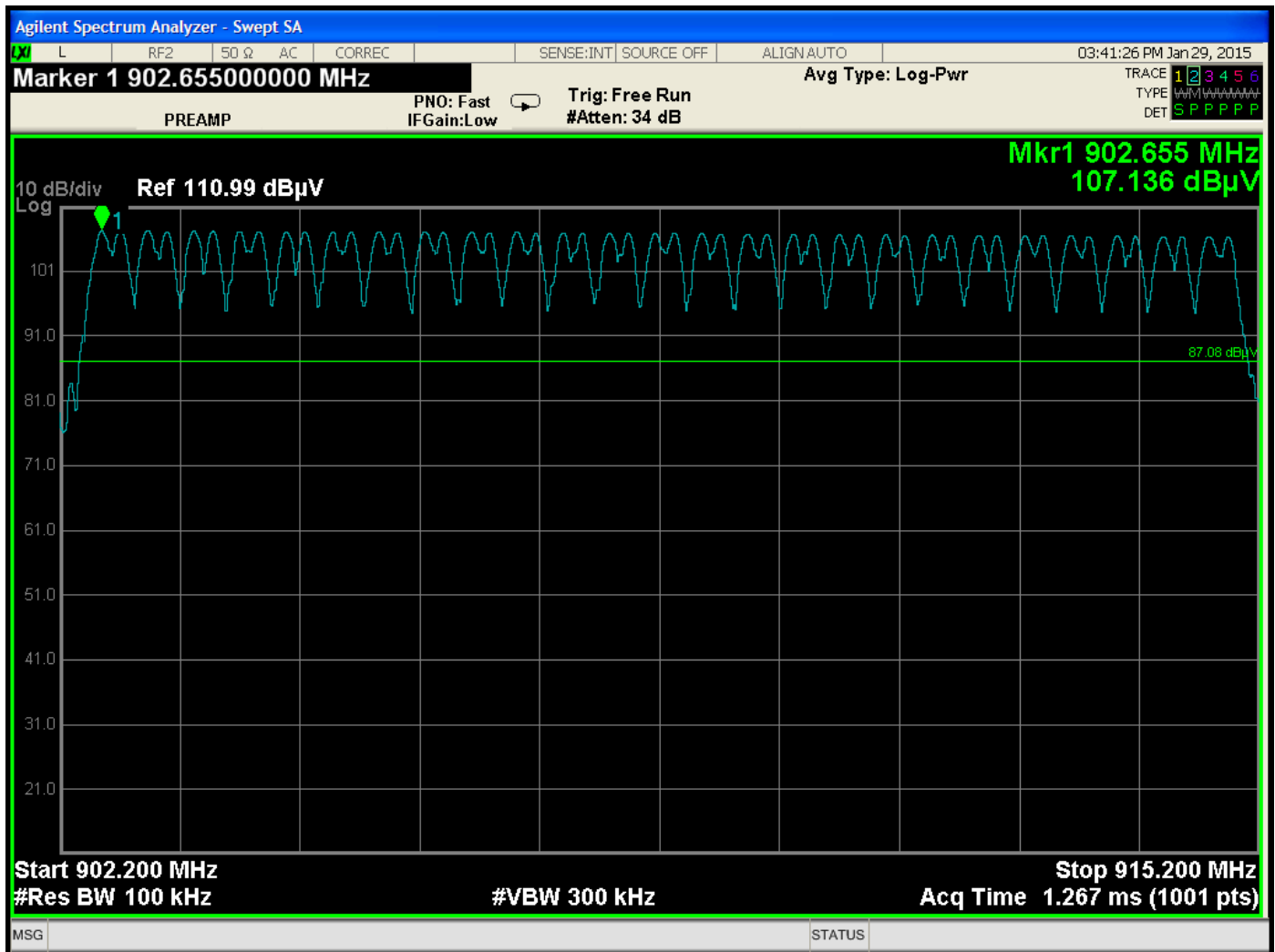


Channel Frequency Separation



Channel Frequency Separation – Protocol C

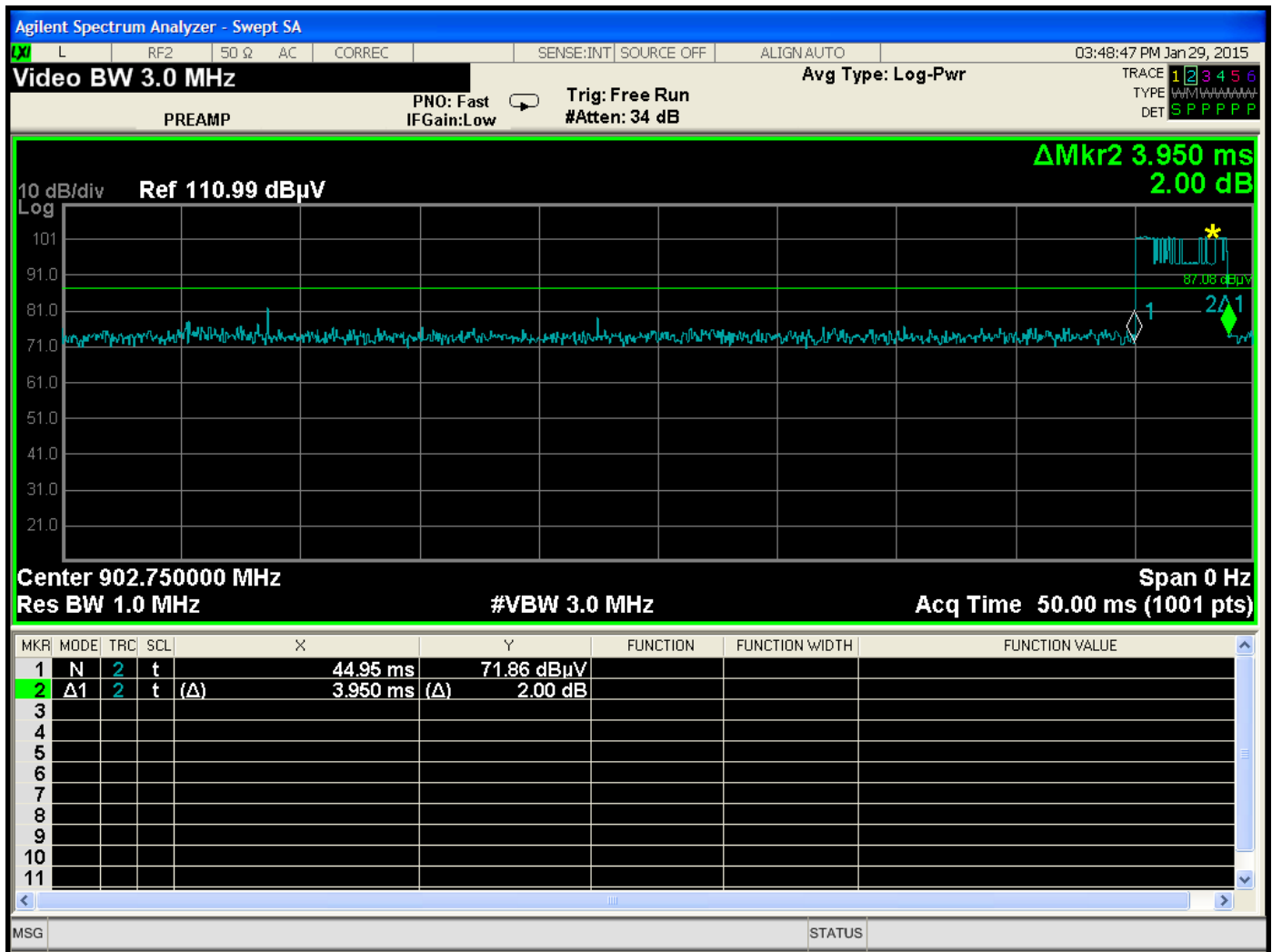
Number of Hopping Frequencies



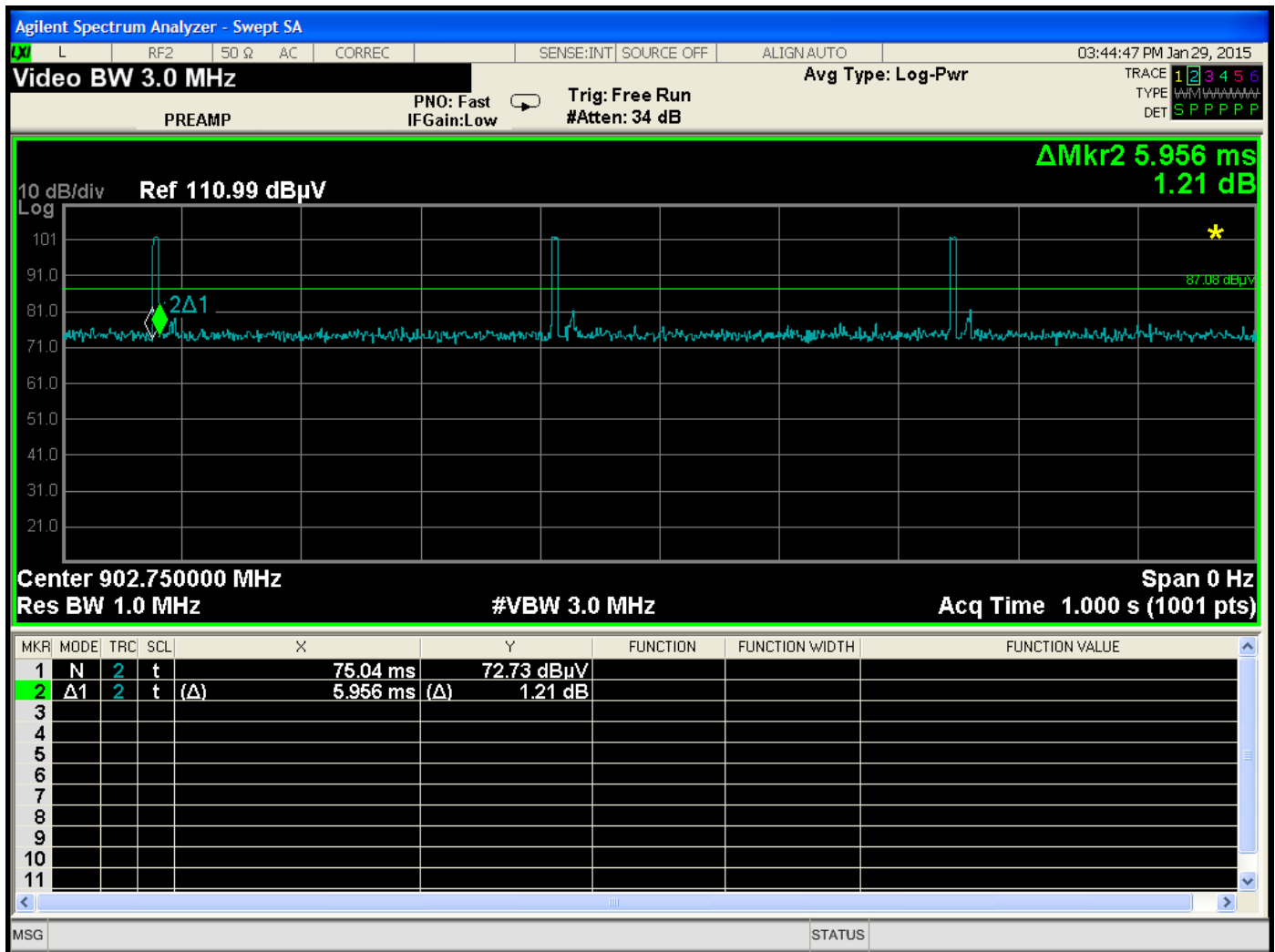
Number of Hopping Frequencies – Protocol C



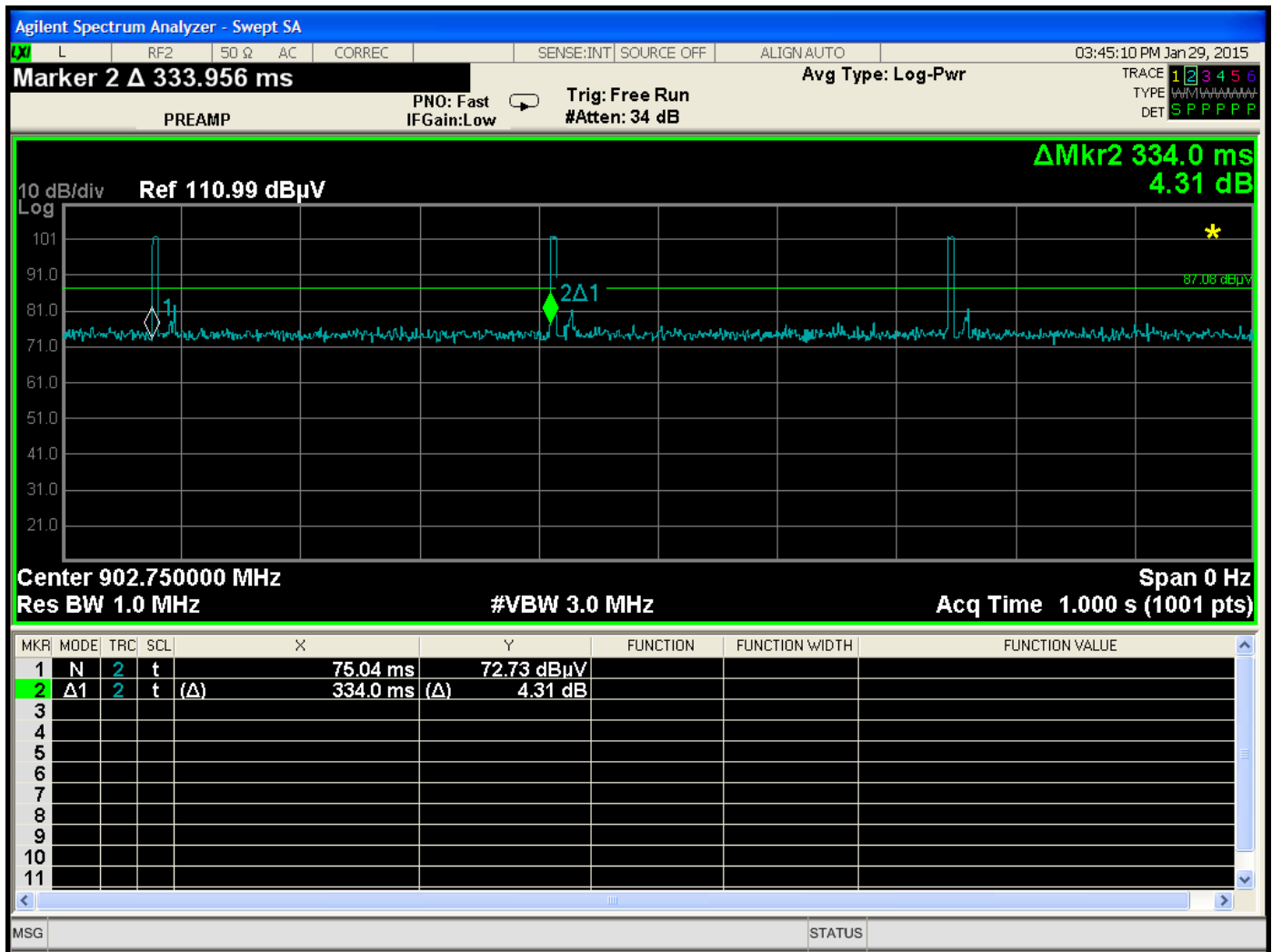
Time of Occupancy



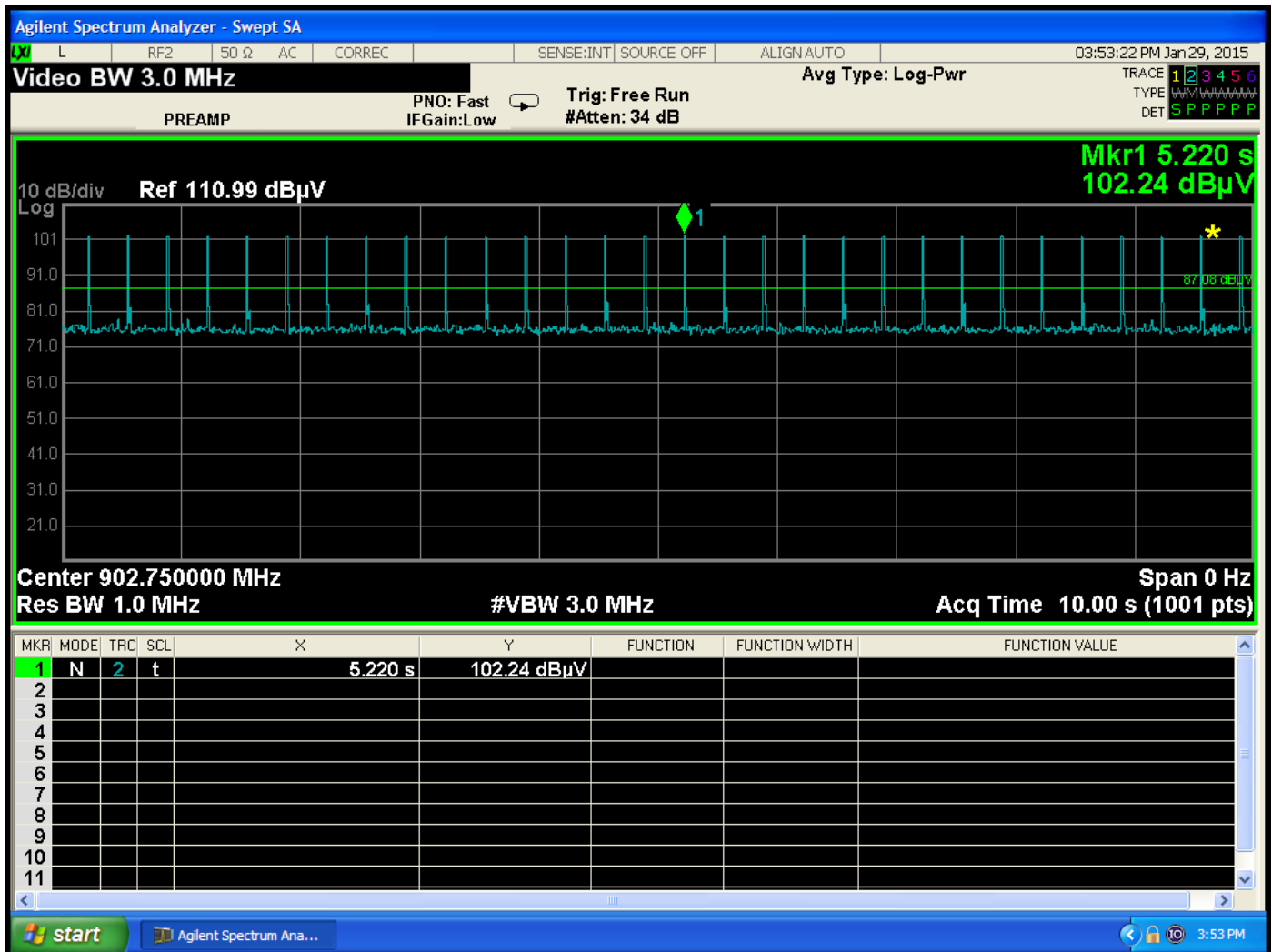
Time of Occupancy – 50 ms Scale – Time of One Pulse = 3.95 ms



Time of Occupancy – 1 s Scale – Time of One Pulse = 5.956 ms



Time of Occupancy – 1 s Scale – Time Between Pulses



Time of Occupancy – Number of Pulses in 10 s = 30

Time of Occupancy – 30 pulses * 3.95 ms = 118 ms