G.S.D. Srl PISA - Italy	***Test Report n. FCC-16721***	Rev. 01
Manufacturer	**Extronics Ltd.**	
Address	Via Midpoint 18, 1 Dalton Way Middlewich CW10 0HU United Kingdom	
Test Family Name	**iRFID500**	
	FCC ID: 2AIZEEXTRFID00001	
Testing Laboratory Name	**G.S.D. S.r.l.**	
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	FCC Listed. Registration Number: 424037.	
Location and Date of Issue	Pisa, 2016 October, 12	

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Report Revision History

Revision details

Date	*Page No.(s)*	*Details*
2016 September, 30	62	Rev. 00 Initial issue
2016 October, 12	62	Rev. 01 Measurement uncertainty added Restricted band results added into Summary of Test Results

1. MANUFACTURER AND EUT IDENTIFICATION [1]

Manufacturer	**Extronics Ltd..**
Address	Via Midpoint 18, 1 Dalton Way Middlewich CW10 0HU United Kingdom
Test Family Name	**iRFID500**
	FCC ID: 2AIZEEXTRFID00001
Date of reception	**2016 August 22**
Sampling	**Laboratory sample for certification**
Test Item Description	**RFID Device**
Nominal Input Voltage	**5 Vdc (USB)**

[1] A detailed documentation is preserved in the internal fascicle.

Fig. 1.1
Equipment Photo

2. REFERENCE STANDARDS

Tests and measurements are performed accordingly to the reference standards given in the table below:

TEST	*STANDARD*
Emissions: Conducted and Radiated – Section 15.207 and 15.209	FCC Rules ad Regulations, Title 47 Part 15 – Sub part C ANSI C63.4 2014 – American National Standard for Methods of Measuring of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz ANSI C63.10 2013 – American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Operation within the band 902-928 MHz: Alternative Test Procedures 15.247 (b) and (c) , and (a) Bandwidth and average time of occupancy, Band Edge 15.247 (d)	FCC Rules ad Regulations, Title 47 Part 15 – Sub part C DA 00-705 (30 March 2000) – Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems ANSI C63.4 2014 – American National Standard for Methods of Measuring of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz ANSI C63.10 2013 – American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices 412172 D01 Determining ERP and EIRP v01r01 GUIDELINES FOR DETERMINING THE EFFECTIVE RADIATED POWER (ERP) AND EQUIVALENT ISOTROPICALLY RADIATED POWER (EIRP) OF AN RF TRANSMITTING SYSTEM

3. RESULT, CONDITION, MEASUREMENT UNCERTAINTY

Summary of Test Results

TEST	*RESULT*
Emissions: conducted *Section 15.207*	*Pass*
Emissions: radiated *Section 15.209*	*Pass*
Bandwidth and Average Time of Occupancy *Section 15.247 (a)*	*Pass*
Operation within the band 902-928 MHz: *Section 15.247 (b) and (c)*	*Pass*
Band Edge *Section 15.247 (d)*	*Pass*
Restricted Bands	*Pass*

Measurement uncertainty

TEST	*EXPANDED UNCERTAINTY*
Conducted Emission – 50Ω/50µH (150 kHz - 30 MHz)	± 3.5 dB
Radiated Emission – (Semianechoic Room) (30 MHz - 18 GHz)	± 4.7 dB
Bandwidth – Frequency Separation	< 1%
Time of occupancy	< 0.5%

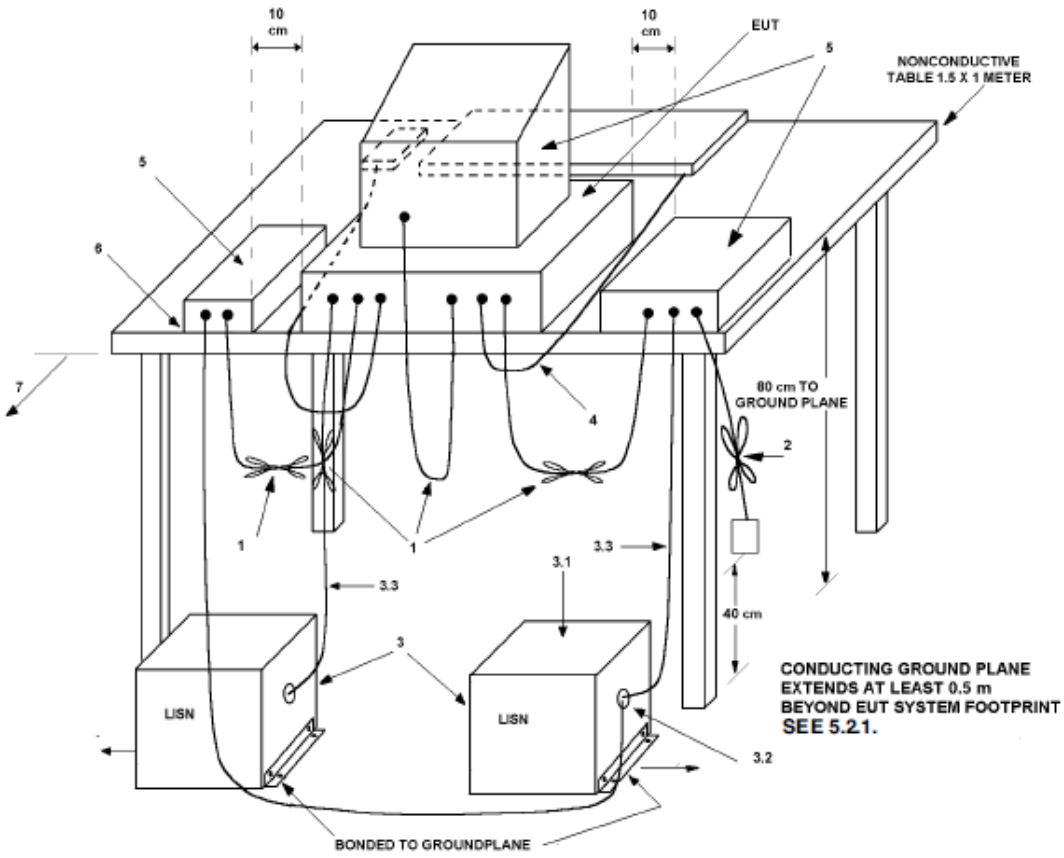
Climatic Conditions

PARAMETER	*VALUE*
Temperature	(294 ± 3) K
Relative humidity	(50 ± 5) %

Extensions

The results refer only to the sampled EUT and under the specified conditions.

Modulations:
Type: PR_ASK_40 kHz



Conducted and Radiated EUT Test Set-up example (ANSI C63.10 2013)

4. RADIATED EMISSIONS

In the following table you can find the limits established by the reference standard:

FREQUENCY RANGE *(MHz)*	***Field Strength** PEAK LIMITS* *[dB (µV/m)]*	***Field Strength** QUASI-PEAK LIMITS* *[dB (µV/m)]*	***Field Strength** AVERAGE LIMITS* *[dB (µV/m)]*
0.009 – 0.490	--	48.15 – 13.8 @ *300m*	--
0.490 – 1.705	--	33.8 – 23 @ *30m*	--
1.705 – 30	--	29.5 @ *30m*	--
30 ÷ 88	--	40 @ *3m*	--
88 ÷ 216	--	43,5 @ *3m*	--
216 ÷ 960	--	46 @ *3m*	--
960÷ 1000	--	54 @ *3m*	
>1000	74 @ *3m*	--	54 @ *3m*

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
MXE EMI Receiver	Agilent/Keysight	N9038A	01/2017
Anechoic Chamber	Comtest	CSA01	01/2017
Bilog Antenna	Schaffner	CBL6112B	01/2017
Horn Antenna	EMCO	3115	01/2017
Controller	Deisel	HD100	01/2017
Turn Table	Deisel	MA240	01/2017
LISN	GSD	NTW06	01/2017

Test procedure: RE22R02

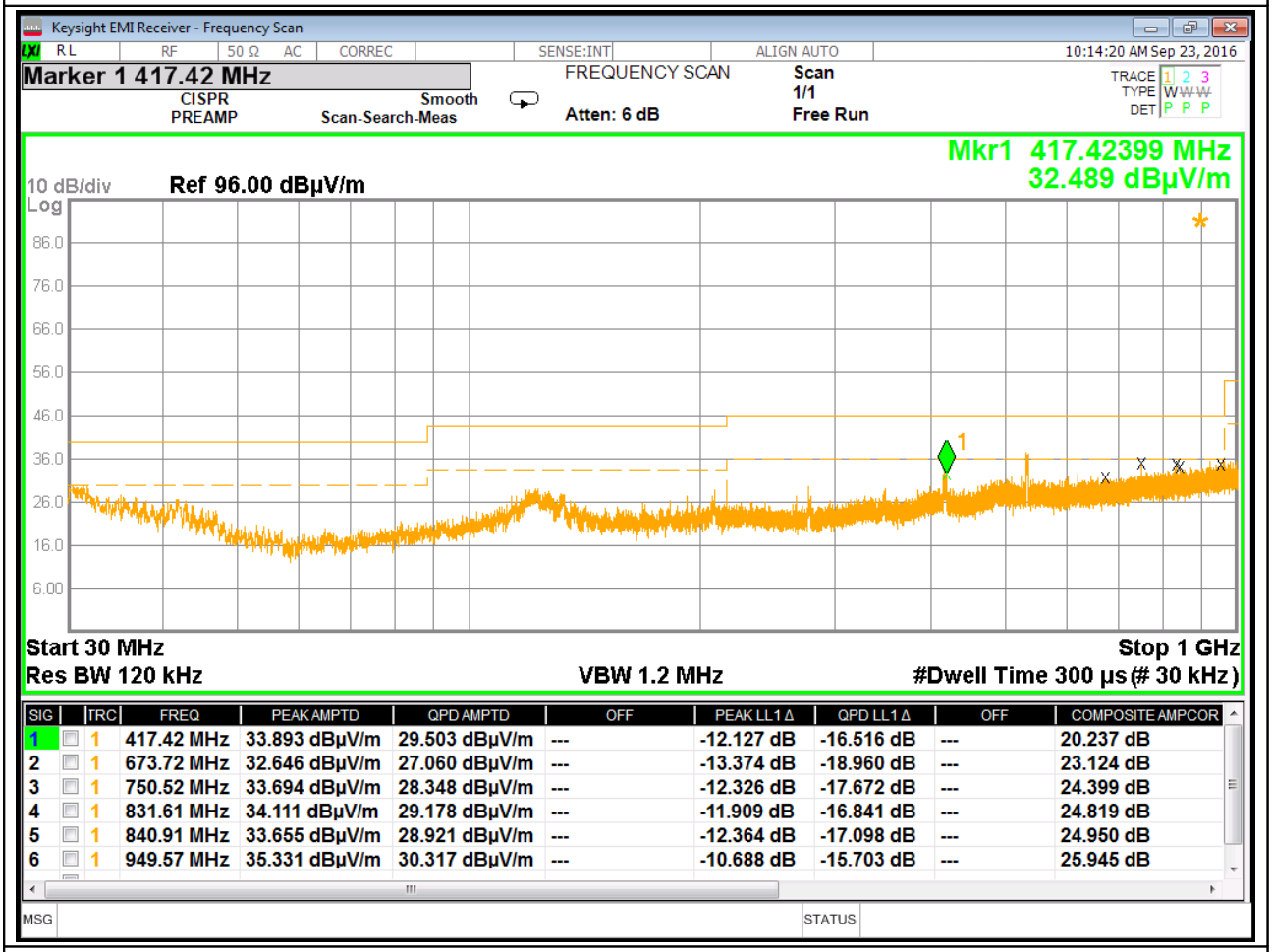
Notes

Azimuth position EUT-Antenna corresponding to 0° identifies the rotating table orientation (TT) in which the instrument to be tested shows the front part turned towards the antenna. Positive grades individuate clockwise rotations of TT when this one is observed from the top. For negative degrees, TT rotation is counter-clockwise.
Antenna height respect to the mass plane is conventionally individuated with: MA=XXX where XXX indicates the height (always positive and greater than 100) expressed in cm.
Antenna horizontal polarisation is indicated by POL=H.
Antenna vertical polarisation is indicated by POL=V.
EUT was tested in the three orthogonal planes.

Results and conclusions

In all the operative conditions, equipment complied with the standard limits. Graphics in following figures show the most significant registrations of the performed measurements.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500



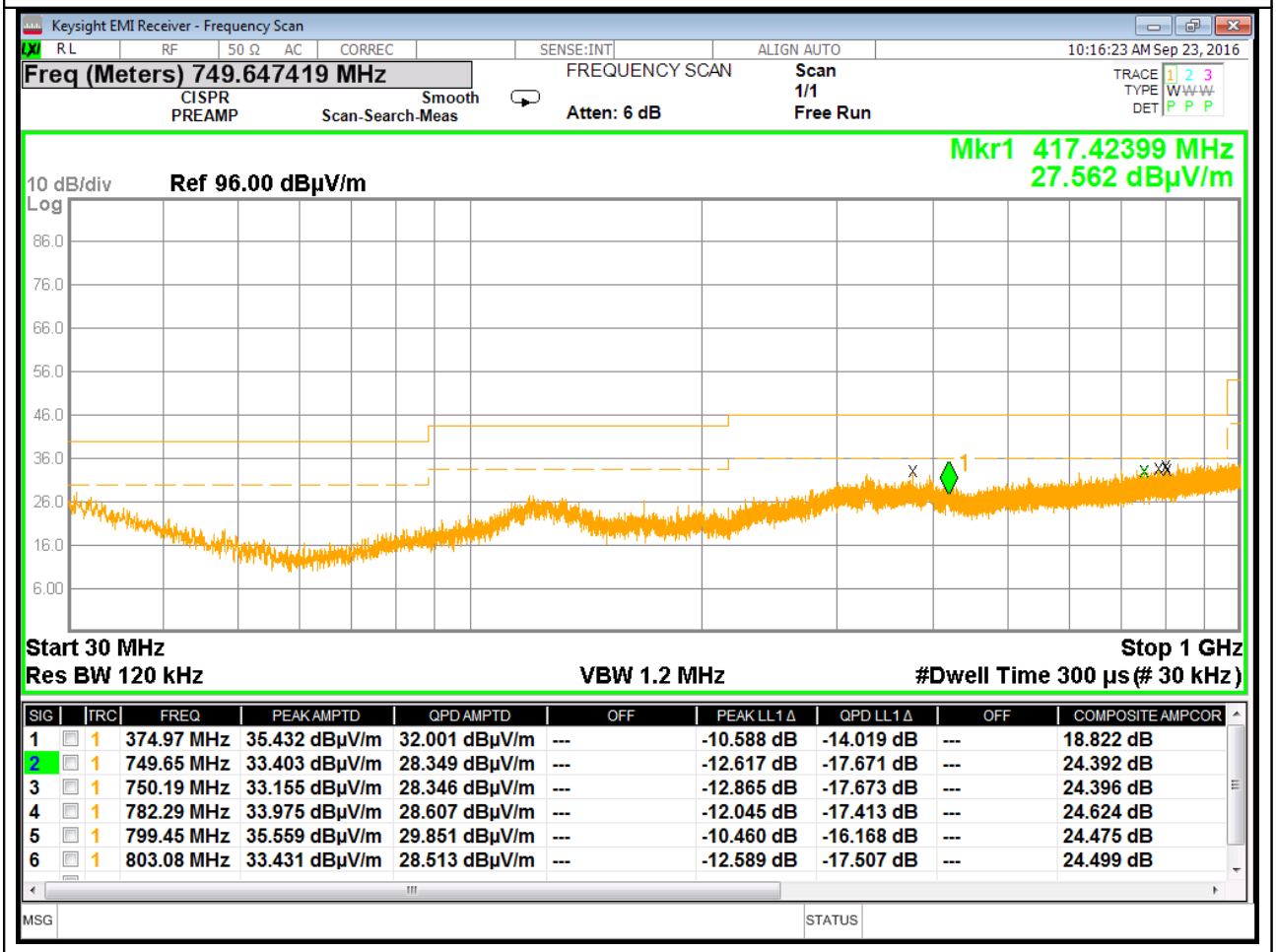
SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	417.42 MHz	33.893 dBµV/m	29.503 dBµV/m	---	-12.127 dB	-16.516 dB	---	20.237 dB
2	1	673.72 MHz	32.646 dBµV/m	27.060 dBµV/m	---	-13.374 dB	-18.960 dB	---	23.124 dB
3	1	750.52 MHz	33.694 dBµV/m	28.348 dBµV/m	---	-12.326 dB	-17.672 dB	---	24.399 dB
4	1	831.61 MHz	34.111 dBµV/m	29.178 dBµV/m	---	-11.909 dB	-16.841 dB	---	24.819 dB
5	1	840.91 MHz	33.655 dBµV/m	28.921 dBµV/m	---	-12.364 dB	-17.098 dB	---	24.950 dB
6	1	949.57 MHz	35.331 dBµV/m	30.317 dBµV/m	---	-10.688 dB	-15.703 dB	---	25.945 dB

Fig. 4.1

POL V
MA: 100 cm
TT: 0°
EUT mode: Standby

Record of the measurement of radiated emissions (PK)
Maximum disturbance determined in the frequency range 30 – 1000 MHz, Pol. V.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500



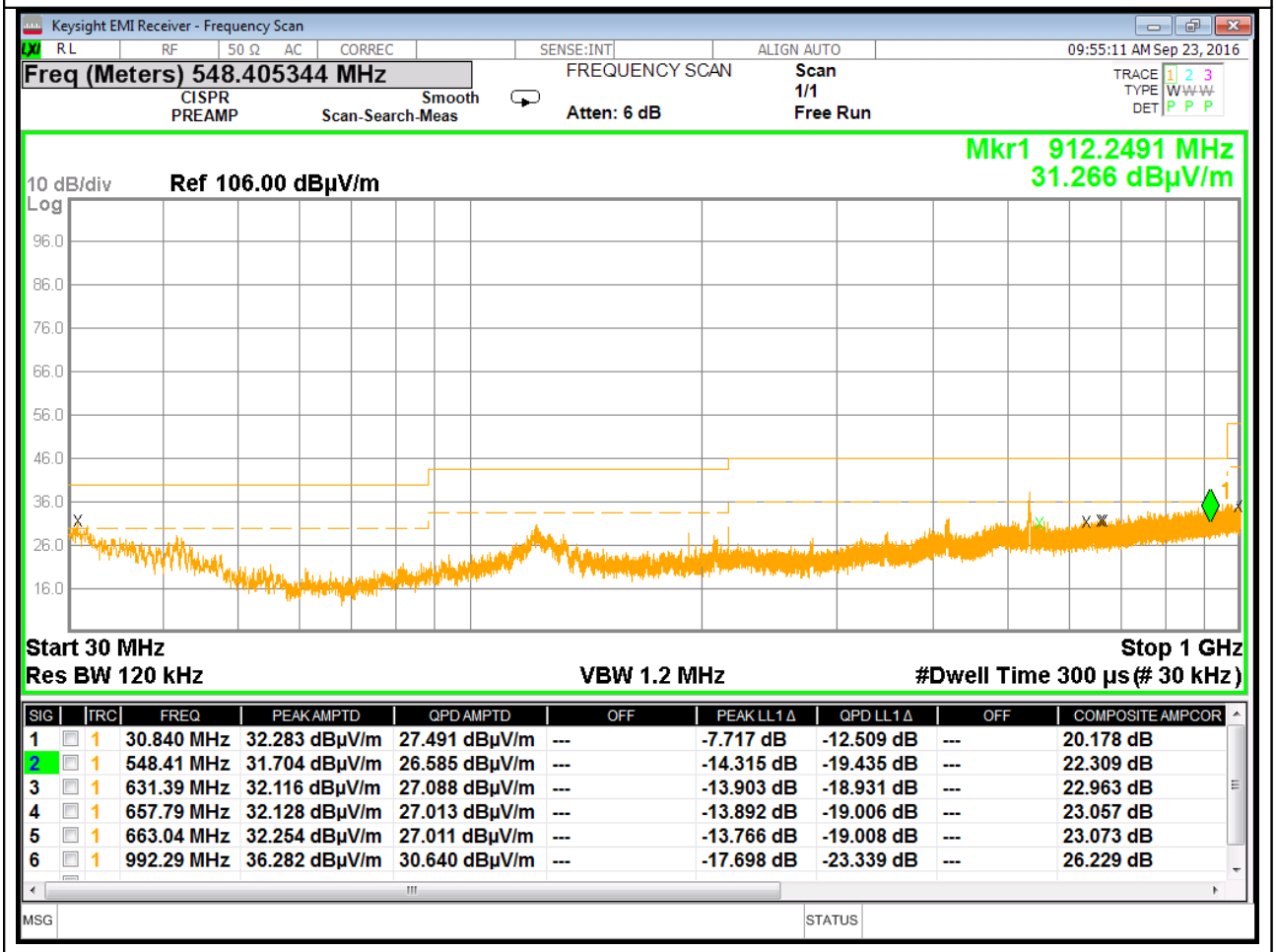
SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	374.97 MHz	35.432 dBµV/m	32.001 dBµV/m	---	-10.588 dB	-14.019 dB	---	18.822 dB
2	1	749.65 MHz	33.403 dBµV/m	28.349 dBµV/m	---	-12.617 dB	-17.671 dB	---	24.392 dB
3	1	750.19 MHz	33.155 dBµV/m	28.346 dBµV/m	---	-12.865 dB	-17.673 dB	---	24.396 dB
4	1	782.29 MHz	33.975 dBµV/m	28.607 dBµV/m	---	-12.045 dB	-17.413 dB	---	24.624 dB
5	1	799.45 MHz	35.559 dBµV/m	29.851 dBµV/m	---	-10.460 dB	-16.168 dB	---	24.475 dB
6	1	803.08 MHz	33.431 dBµV/m	28.513 dBµV/m	---	-12.589 dB	-17.507 dB	---	24.499 dB

Fig. 4.2

POL H
MA: 100 cm
TT: 0°
EUT mode: Standby

Record of the measurement of radiated emissions (PK)
Maximum disturbance determined in the frequency range 30 – 1000 MHz, Pol. H.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500



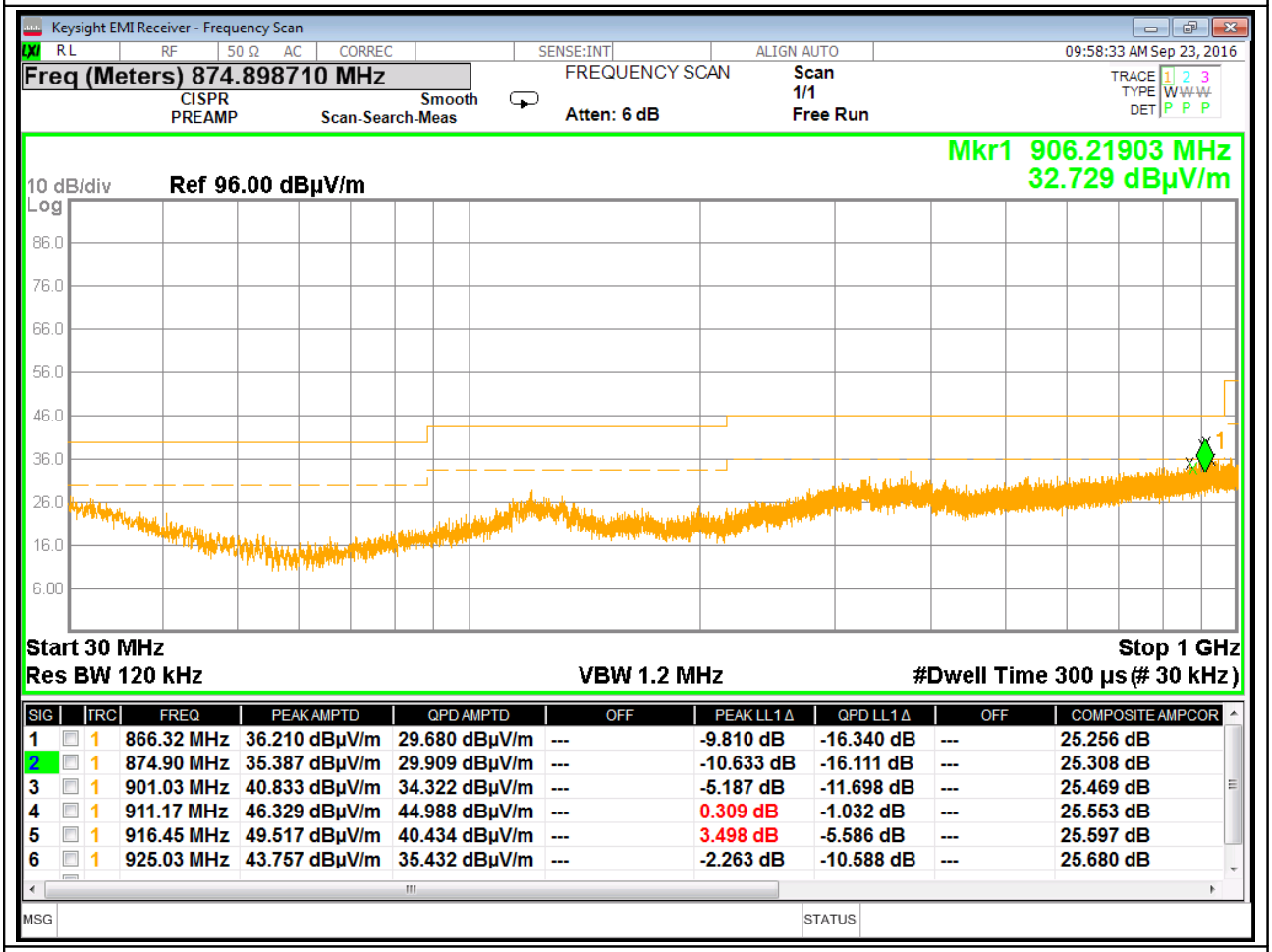
SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	30.840 MHz	32.283 dBµV/m	27.491 dBµV/m	---	-7.717 dB	-12.509 dB	---	20.178 dB
2	1	548.41 MHz	31.704 dBµV/m	26.585 dBµV/m	---	-14.315 dB	-19.435 dB	---	22.309 dB
3	1	631.39 MHz	32.116 dBµV/m	27.088 dBµV/m	---	-13.903 dB	-18.931 dB	---	22.963 dB
4	1	657.79 MHz	32.128 dBµV/m	27.013 dBµV/m	---	-13.892 dB	-19.006 dB	---	23.057 dB
5	1	663.04 MHz	32.254 dBµV/m	27.011 dBµV/m	---	-13.766 dB	-19.008 dB	---	23.073 dB
6	1	992.29 MHz	36.282 dBµV/m	30.640 dBµV/m	---	-17.698 dB	-23.339 dB	---	26.229 dB

Fig. 4.3

POL V
MA: 100 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (PK)
Maximum disturbance determined in the frequency range 30 – 1000 MHz, Pol. V.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500



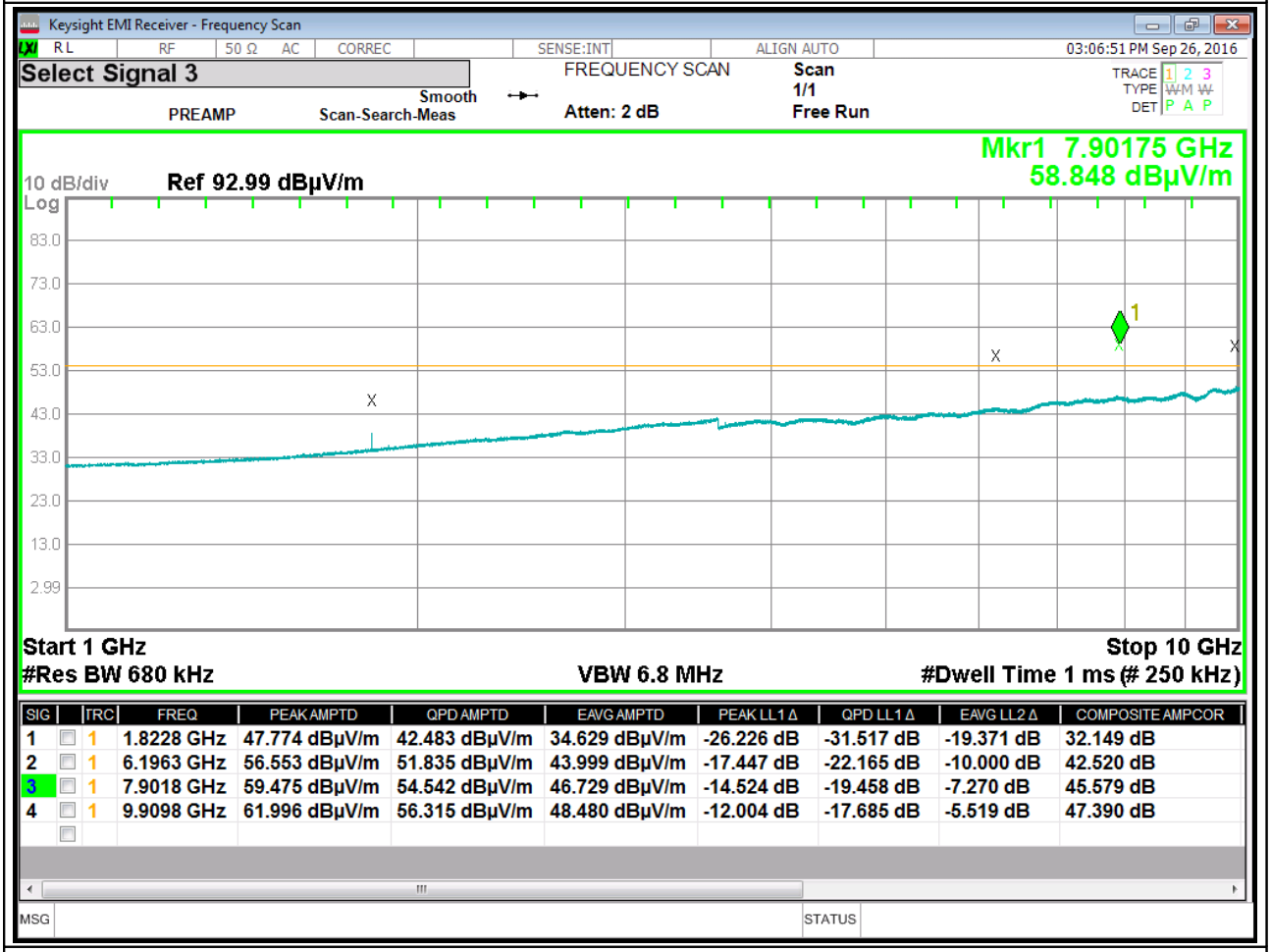
SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	866.32 MHz	36.210 dBµV/m	29.680 dBµV/m	---	-9.810 dB	-16.340 dB	---	25.256 dB
2	1	874.90 MHz	35.387 dBµV/m	29.909 dBµV/m	---	-10.633 dB	-16.111 dB	---	25.308 dB
3	1	901.03 MHz	40.833 dBµV/m	34.322 dBµV/m	---	-5.187 dB	-11.698 dB	---	25.469 dB
4	1	911.17 MHz	46.329 dBµV/m	44.988 dBµV/m	---	0.309 dB	-1.032 dB	---	25.553 dB
5	1	916.45 MHz	49.517 dBµV/m	40.434 dBµV/m	---	3.498 dB	-5.586 dB	---	25.597 dB
6	1	925.03 MHz	43.757 dBµV/m	35.432 dBµV/m	---	-2.263 dB	-10.588 dB	---	25.680 dB

Fig. 4.4

POL H
MA: 100 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (PK)
Maximum disturbance determined in the frequency range 30 – 1000 MHz, Pol. H.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500



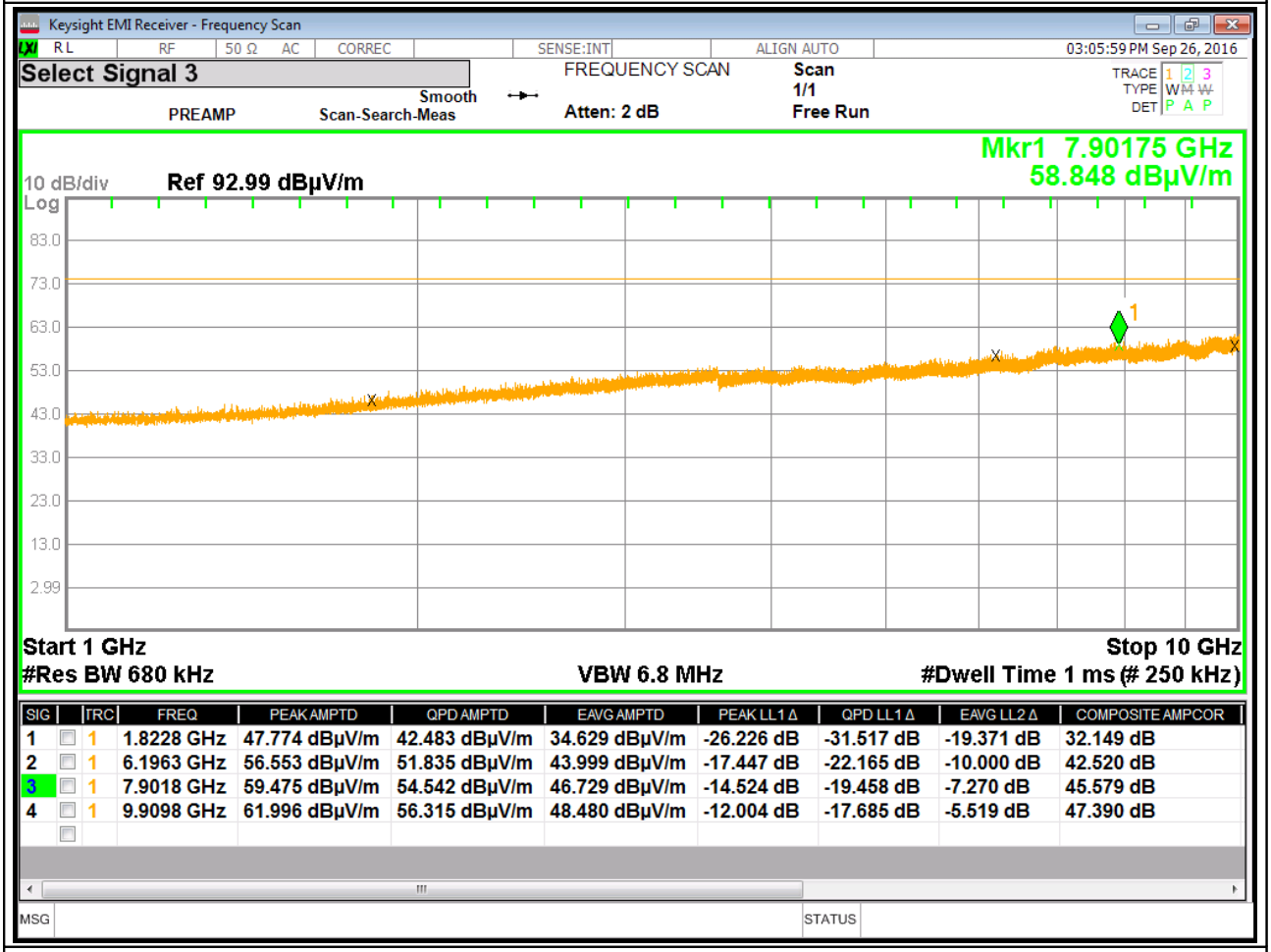
SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	EAVG LL2 Δ	COMPOSITE AMPCOR
1	1	1.8228 GHz	47.774 dBµV/m	42.483 dBµV/m	34.629 dBµV/m	-26.226 dB	-31.517 dB	-19.371 dB	32.149 dB
2	1	6.1963 GHz	56.553 dBµV/m	51.835 dBµV/m	43.999 dBµV/m	-17.447 dB	-22.165 dB	-10.000 dB	42.520 dB
3	1	7.9018 GHz	59.475 dBµV/m	54.542 dBµV/m	46.729 dBµV/m	-14.524 dB	-19.458 dB	-7.270 dB	45.579 dB
4	1	9.9098 GHz	61.996 dBµV/m	56.315 dBµV/m	48.480 dBµV/m	-12.004 dB	-17.685 dB	-5.519 dB	47.390 dB

Fig. 4.5

POL V
MA: 100 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (AVG detector)
Maximum disturbance determined in the frequency range 1 – 10 GHz, Pol. V.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	EAVG LL2 Δ	COMPOSITE AMPCOR
1	1	1.8228 GHz	47.774 dBµV/m	42.483 dBµV/m	34.629 dBµV/m	-26.226 dB	-31.517 dB	-19.371 dB	32.149 dB
2	1	6.1963 GHz	56.553 dBµV/m	51.835 dBµV/m	43.999 dBµV/m	-17.447 dB	-22.165 dB	-10.000 dB	42.520 dB
3	1	7.9018 GHz	59.475 dBµV/m	54.542 dBµV/m	46.729 dBµV/m	-14.524 dB	-19.458 dB	-7.270 dB	45.579 dB
4	1	9.9098 GHz	61.996 dBµV/m	56.315 dBµV/m	48.480 dBµV/m	-12.004 dB	-17.685 dB	-5.519 dB	47.390 dB

Fig. 4.6

POL V
MA: 100 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (Peak detector)
Maximum disturbance determined in the frequency range 1 – 10 GHz, Pol. V.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500

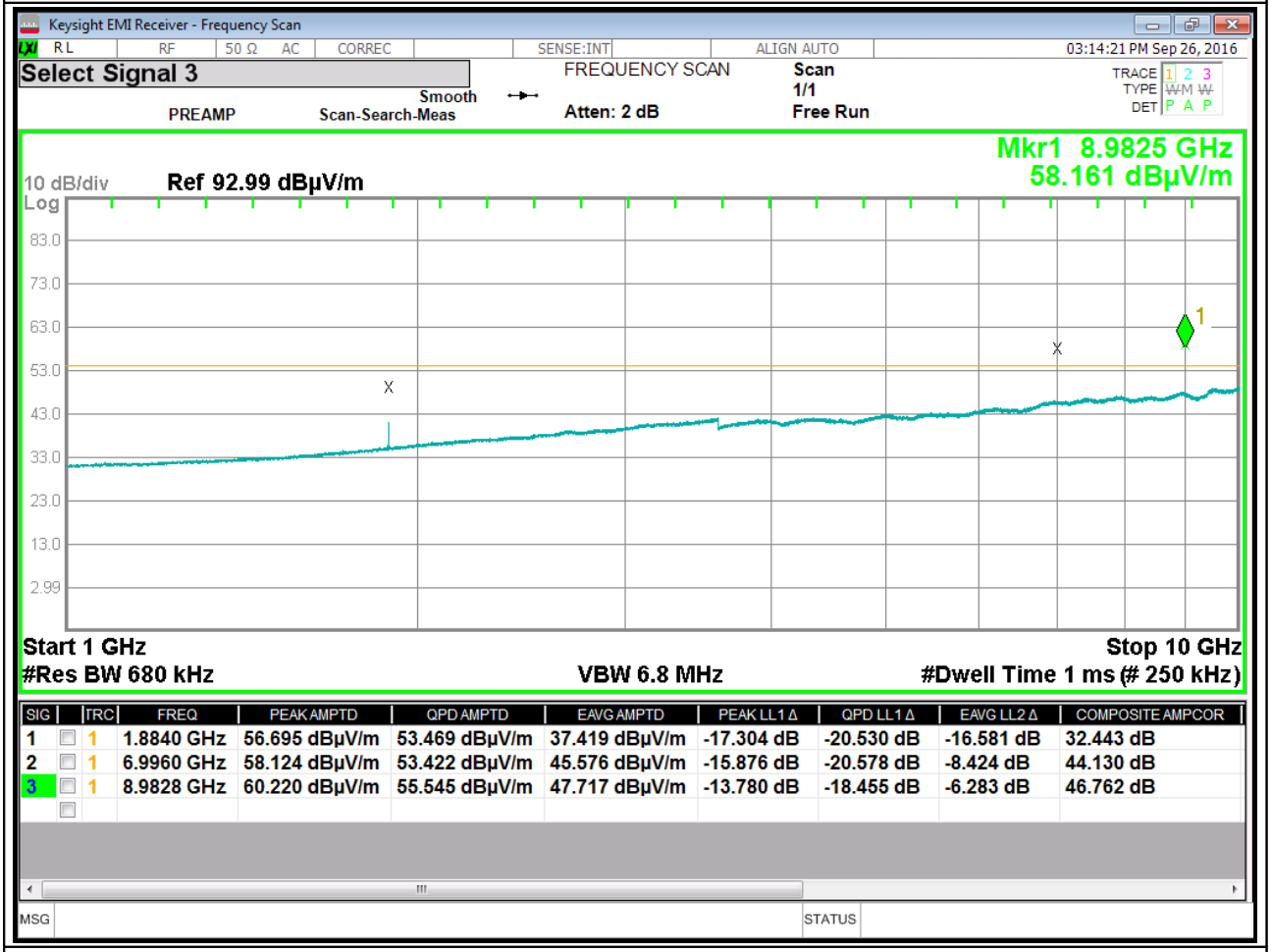


Fig. 4.7

POL H
MA: 181 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (AVG detector)
Maximum disturbance determined in the frequency range 1 – 10 GHz, Pol. H.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500

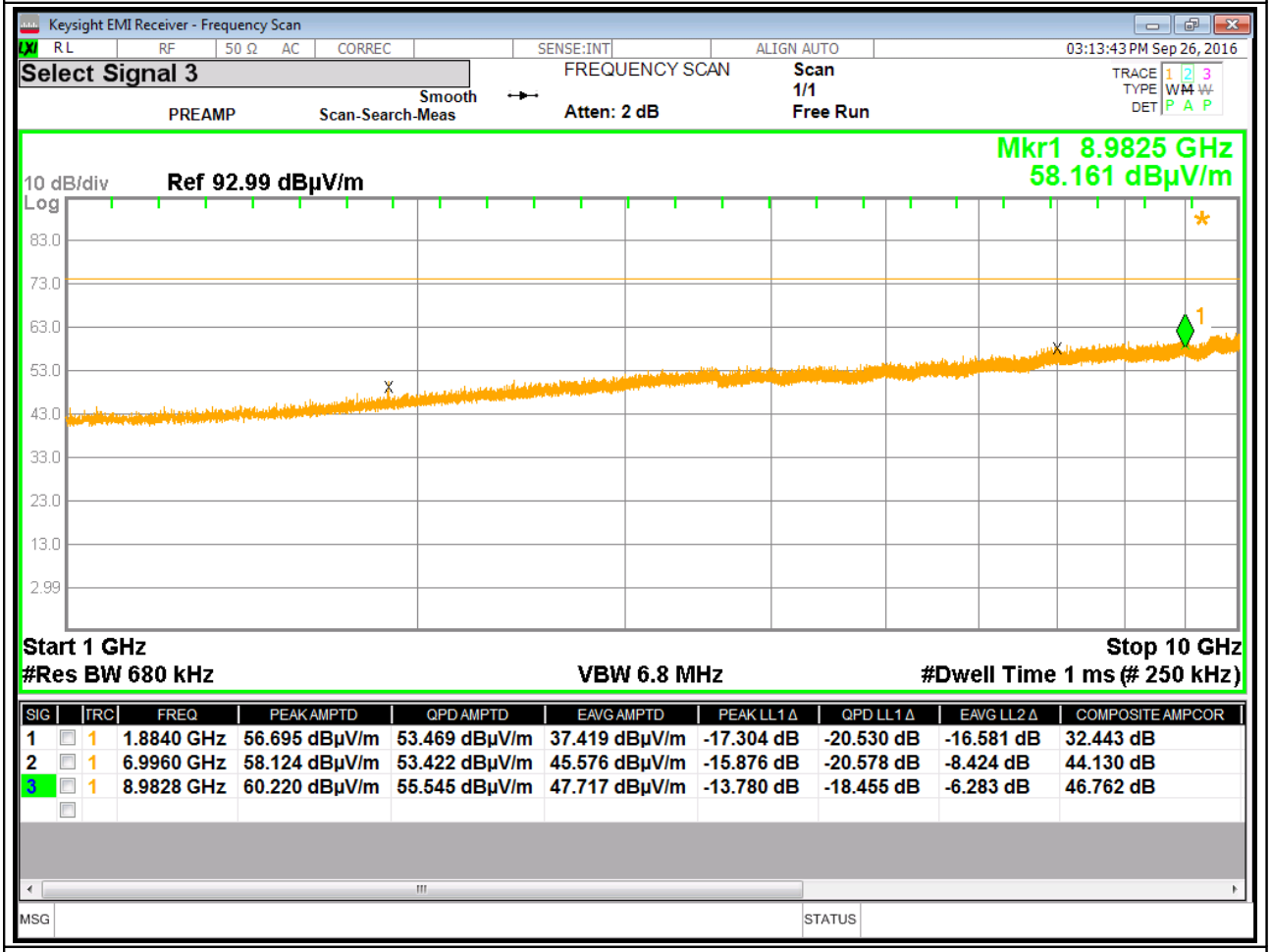


Fig. 4.8

POL H
MA: 181 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (Peak detector)
Maximum disturbance determined in the frequency range 1 – 10 GHz, Pol. H.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500

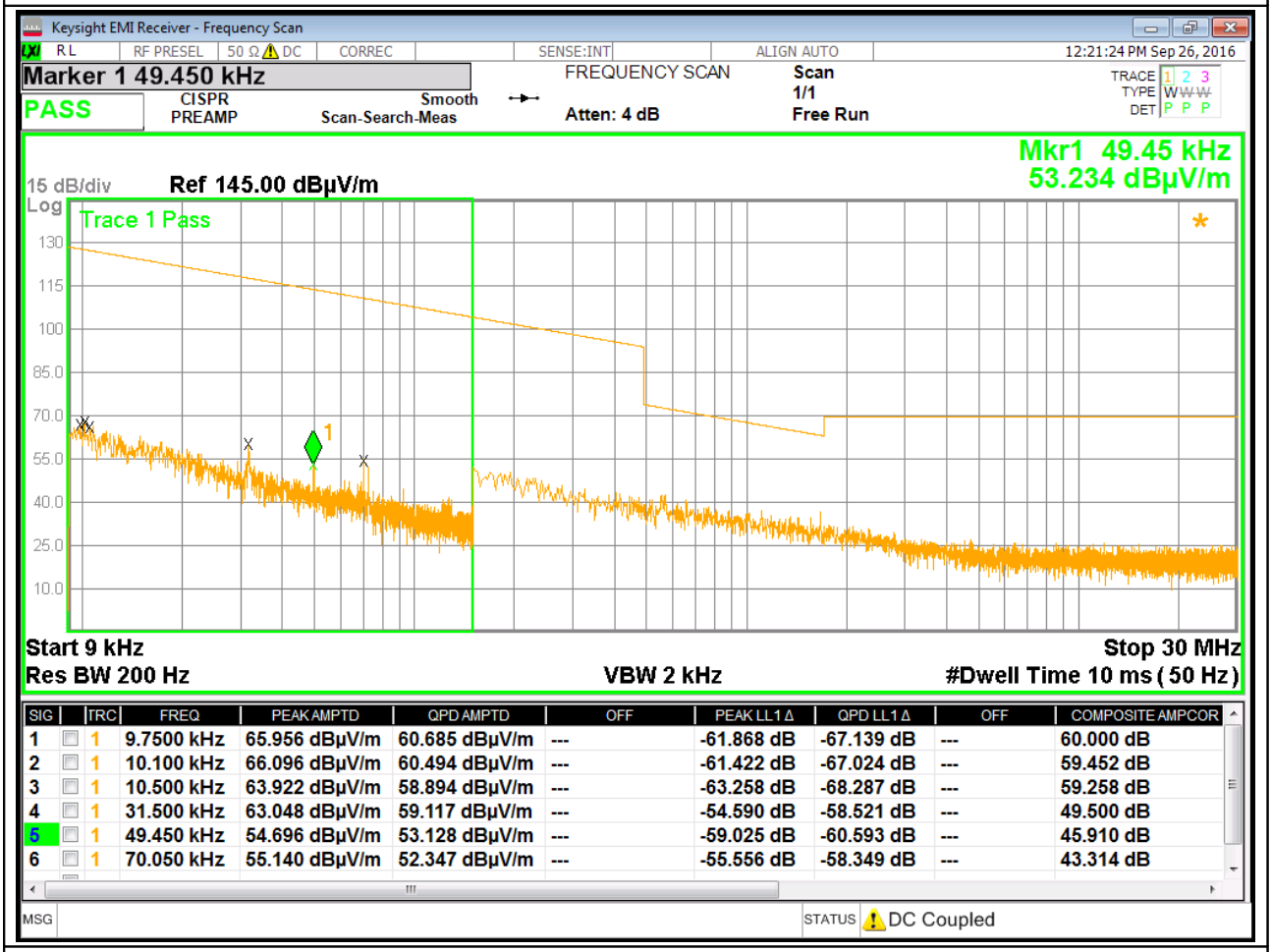


Fig. 4.9

POL Parallel
MA: 150 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (PK)
Maximum disturbance determined in the frequency range 0.009 – 30 MHz, Pol. Parallel.

Job Number	FCC-16721
Test Name	Radiated Emissions
EUT Name	Extronics Ltd. - iRFID500

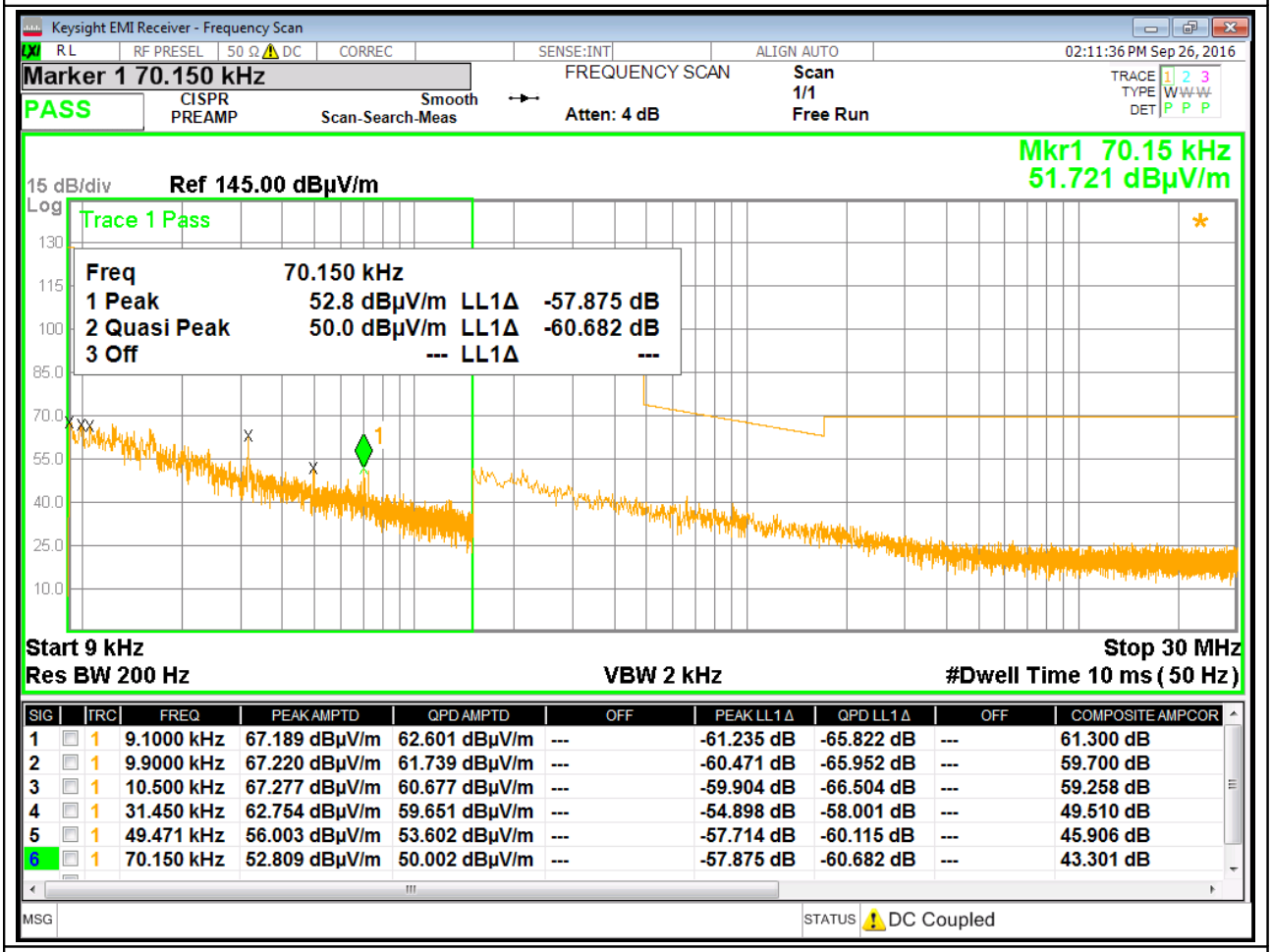


Fig. 4.10

POL Orthogonal
MA: 150 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (PK)
Maximum disturbance determined in the frequency range 0.009 – 30 MHz, Pol. Orthogonal.

5. POWER LINES CONDUCTED EMISSIONS

Equipment shall meet the limits below when using a CISPR16 quasi-peak and average detector receivers.

FCC 15.207

FREQUENCY RANGE (MHz)	*QUASI-PEAK LIMIT* [dB (µV)]	*AVERAGE LIMIT* [dB (µV)]
0.15 – 0.50	66 – 56(*)	56 – 46(*)
0.50 – 5	56	46
5 – 30	60	50

(*) *Limit decreasing linearly with logarithm of frequency*

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
MXE EMI Receiver	Agilent/Keysight	N9038A	01/2017
Screened Room	GSD	CSC01	01/2017
LISN	GSD	NTW06	01/2017

Test procedure: CE22R01

The EUT power cable was connected to a LISN and the monitored output of the LISN was connected to a spectrum analyzer by a transient limiter. The conducted emissions from 150 kHz to 30 MHz were monitored and compared to the specification limits

Test method

Test method was in accordance with the reference standard.

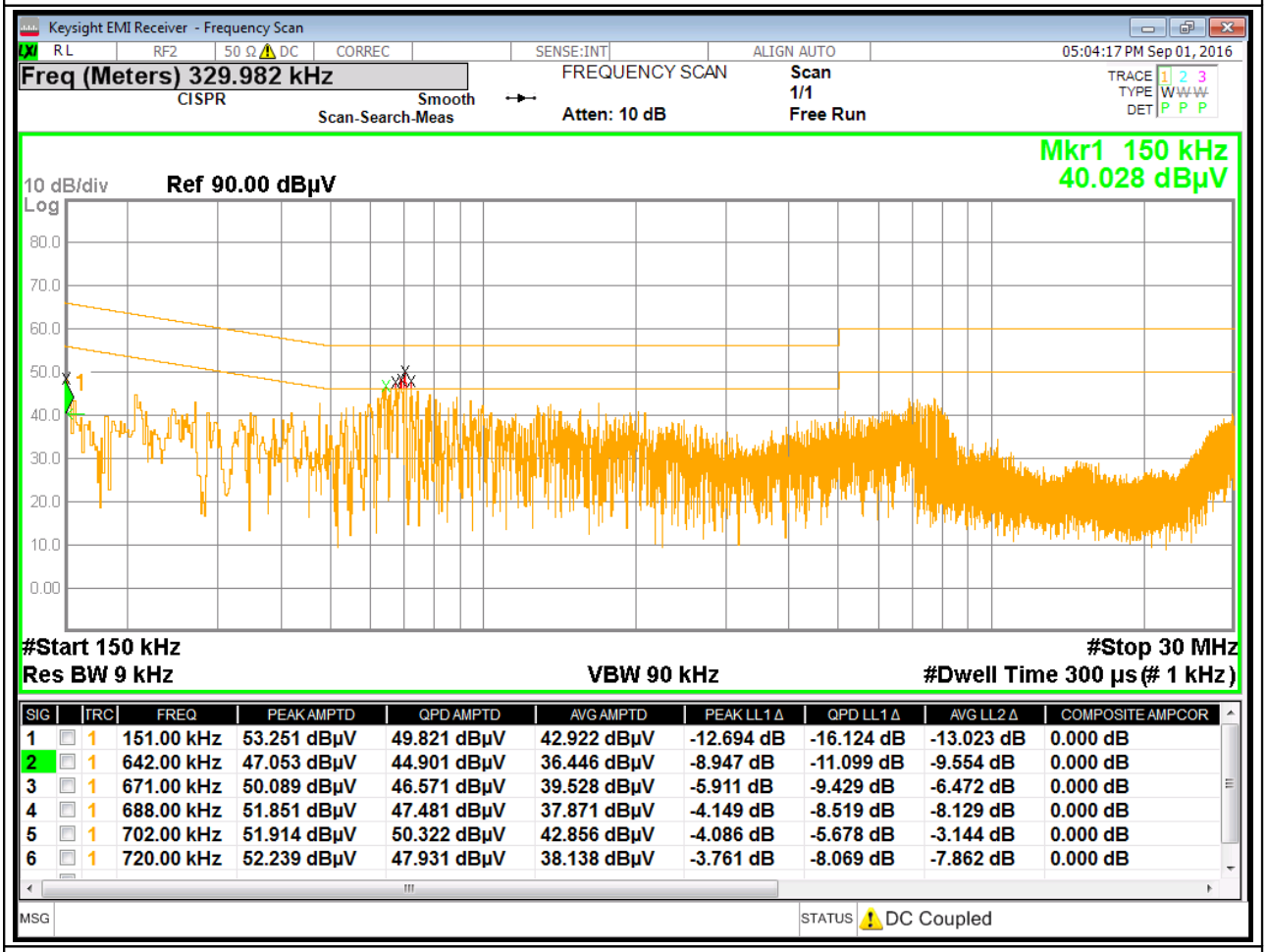
EUT modes of operations were tested in order to achieve the maximum level of emission.

Results

Equipment complied with the test specification limits.

Graphics in following figures show some registrations of the frequency spectrum of the conducted emissions.

Job Number	FCC-16721
Test Name	Power line Conducted Emissions FCC 15.207
EUT Name	iRFID500



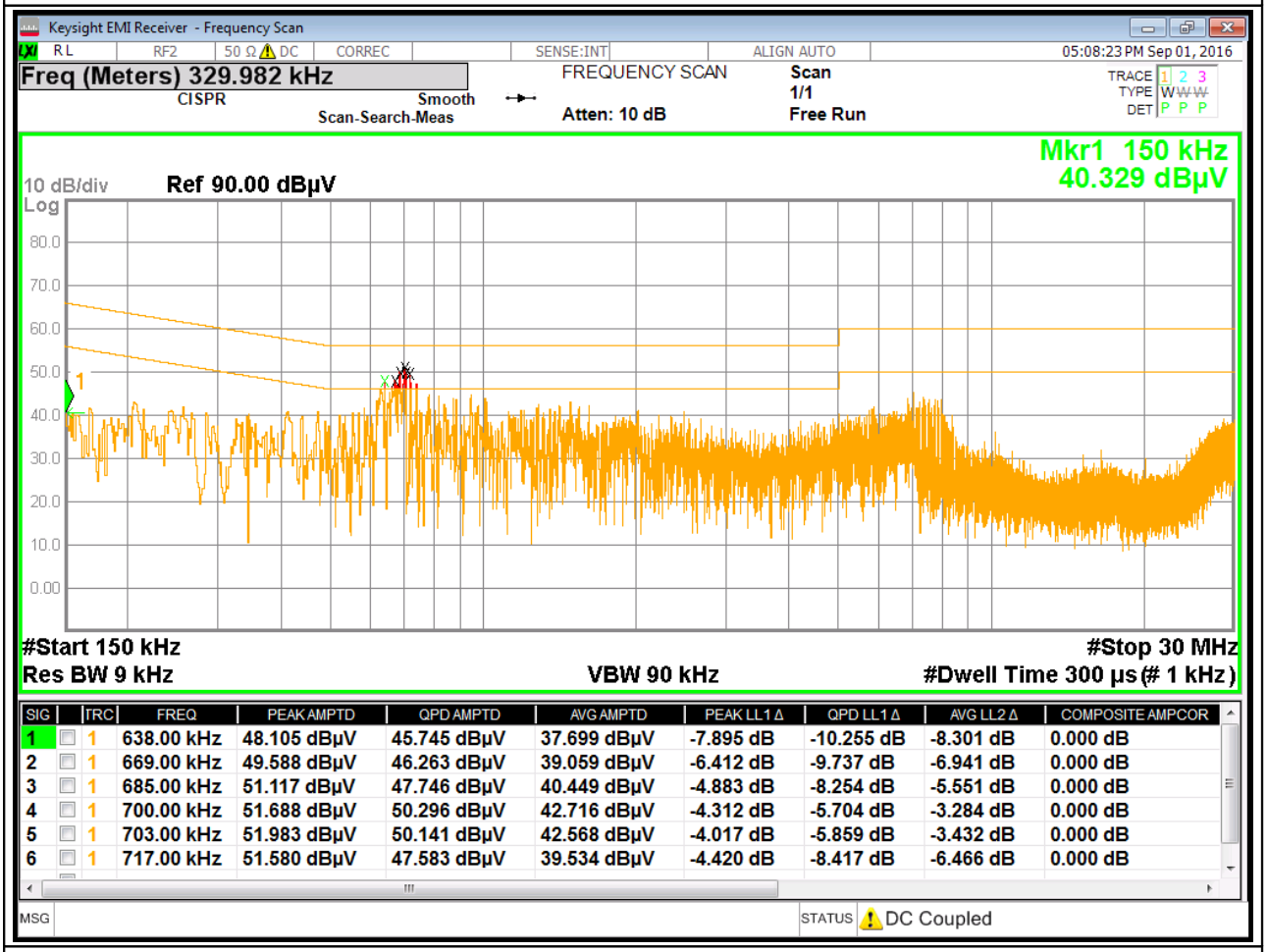
SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	151.00 kHz	53.251 dBµV	49.821 dBµV	42.922 dBµV	-12.694 dB	-16.124 dB	-13.023 dB	0.000 dB
2	1	642.00 kHz	47.053 dBµV	44.901 dBµV	36.446 dBµV	-8.947 dB	-11.099 dB	-9.554 dB	0.000 dB
3	1	671.00 kHz	50.089 dBµV	46.571 dBµV	39.528 dBµV	-5.911 dB	-9.429 dB	-6.472 dB	0.000 dB
4	1	688.00 kHz	51.851 dBµV	47.481 dBµV	37.871 dBµV	-4.149 dB	-8.519 dB	-8.129 dB	0.000 dB
5	1	702.00 kHz	51.914 dBµV	50.322 dBµV	42.856 dBµV	-4.086 dB	-5.678 dB	-3.144 dB	0.000 dB
6	1	720.00 kHz	52.239 dBµV	47.931 dBµV	38.138 dBµV	-3.761 dB	-8.069 dB	-7.862 dB	0.000 dB

Fig. 5.1

Phase 1 of auxiliary apparatus (worst case)
EUT mode: disconnected
Auxiliary apparatus: Laptop whit power supply linked

B Band (0.15 – 30 MHz)

Job Number	FCC-16721
Test Name	Power line Conducted Emissions FCC 15.207
EUT Name	iRFID500



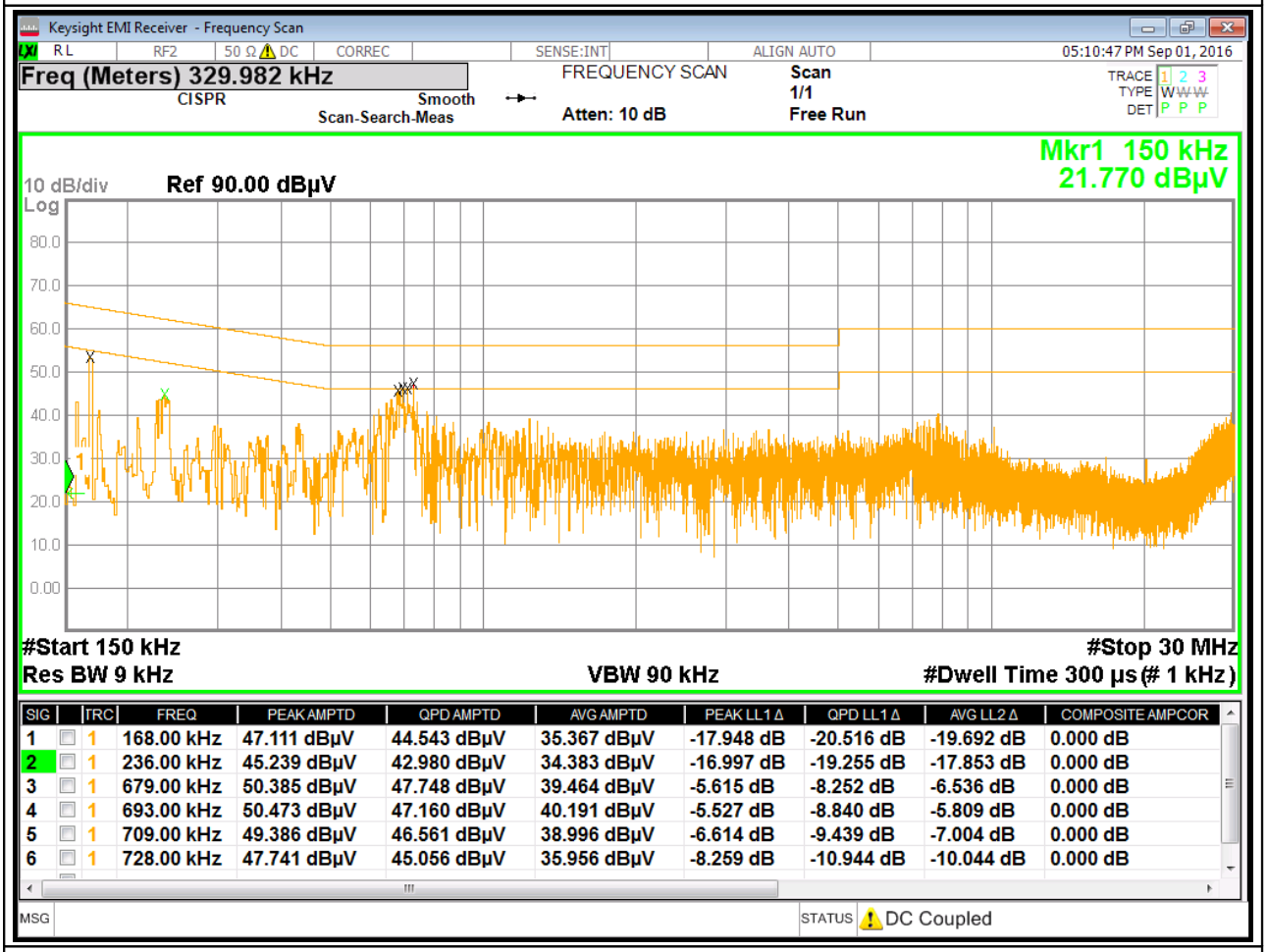
SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	638.00 kHz	48.105 dBµV	45.745 dBµV	37.699 dBµV	-7.895 dB	-10.255 dB	-8.301 dB	0.000 dB
2	1	669.00 kHz	49.588 dBµV	46.263 dBµV	39.059 dBµV	-6.412 dB	-9.737 dB	-6.941 dB	0.000 dB
3	1	685.00 kHz	51.117 dBµV	47.746 dBµV	40.449 dBµV	-4.883 dB	-8.254 dB	-5.551 dB	0.000 dB
4	1	700.00 kHz	51.688 dBµV	50.296 dBµV	42.716 dBµV	-4.312 dB	-5.704 dB	-3.284 dB	0.000 dB
5	1	703.00 kHz	51.983 dBµV	50.141 dBµV	42.568 dBµV	-4.017 dB	-5.859 dB	-3.432 dB	0.000 dB
6	1	717.00 kHz	51.580 dBµV	47.583 dBµV	39.534 dBµV	-4.420 dB	-8.417 dB	-6.466 dB	0.000 dB

Fig. 5.2

Phase 2 of auxiliary apparatus (worst case)
EUT mode: disconnected
Auxiliary apparatus: Laptop whit power supply linked

B Band (0.15 – 30 MHz)

Job Number	FCC-16721
Test Name	Power line Conducted Emissions FCC 15.207
EUT Name	iRFID500



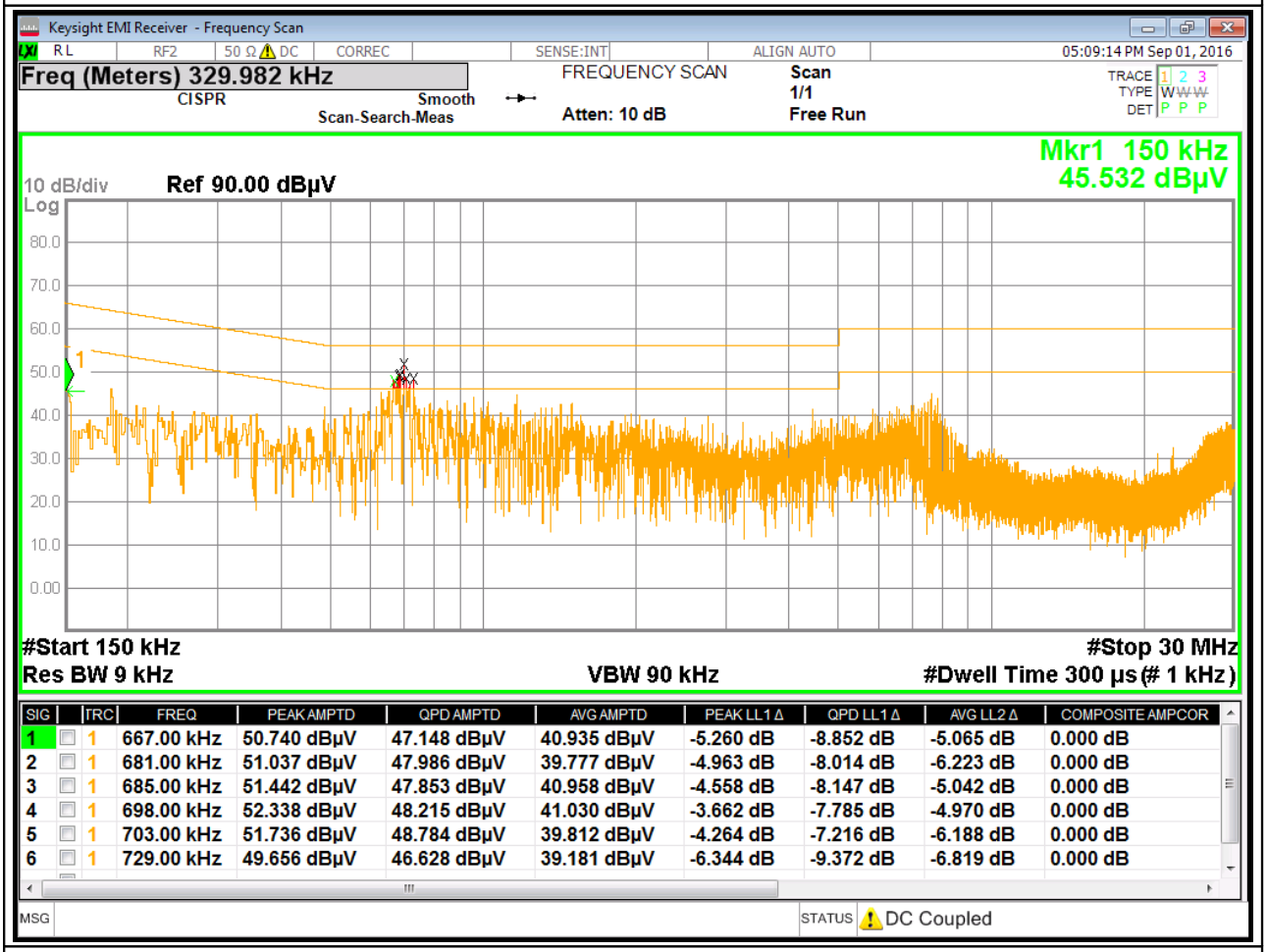
SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	168.00 kHz	47.111 dBµV	44.543 dBµV	35.367 dBµV	-17.948 dB	-20.516 dB	-19.692 dB	0.000 dB
2	1	236.00 kHz	45.239 dBµV	42.980 dBµV	34.383 dBµV	-16.997 dB	-19.255 dB	-17.853 dB	0.000 dB
3	1	679.00 kHz	50.385 dBµV	47.748 dBµV	39.464 dBµV	-5.615 dB	-8.252 dB	-6.536 dB	0.000 dB
4	1	693.00 kHz	50.473 dBµV	47.160 dBµV	40.191 dBµV	-5.527 dB	-8.840 dB	-5.809 dB	0.000 dB
5	1	709.00 kHz	49.386 dBµV	46.561 dBµV	38.996 dBµV	-6.614 dB	-9.439 dB	-7.004 dB	0.000 dB
6	1	728.00 kHz	47.741 dBµV	45.056 dBµV	35.956 dBµV	-8.259 dB	-10.944 dB	-10.044 dB	0.000 dB

Fig. 5.3

Phase 1 of auxiliary apparatus (worst case)
EUT mode: Modulation
Auxiliary apparatus: Laptop whit power supply linked

B Band (0.15 – 30 MHz)

Job Number	FCC-16721
Test Name	Power line Conducted Emissions FCC 15.207
EUT Name	iRFID500



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	667.00 kHz	50.740 dBµV	47.148 dBµV	40.935 dBµV	-5.260 dB	-8.852 dB	-5.065 dB	0.000 dB
2	1	681.00 kHz	51.037 dBµV	47.986 dBµV	39.777 dBµV	-4.963 dB	-8.014 dB	-6.223 dB	0.000 dB
3	1	685.00 kHz	51.442 dBµV	47.853 dBµV	40.958 dBµV	-4.558 dB	-8.147 dB	-5.042 dB	0.000 dB
4	1	698.00 kHz	52.338 dBµV	48.215 dBµV	41.030 dBµV	-3.662 dB	-7.785 dB	-4.970 dB	0.000 dB
5	1	703.00 kHz	51.736 dBµV	48.784 dBµV	39.812 dBµV	-4.264 dB	-7.216 dB	-6.188 dB	0.000 dB
6	1	729.00 kHz	49.656 dBµV	46.628 dBµV	39.181 dBµV	-6.344 dB	-9.372 dB	-6.819 dB	0.000 dB

Fig. 5.4

Phase 2 of auxiliary apparatus (worst case)
EUT mode: Modulation
Auxiliary apparatus: Laptop whit power supply linked

B Band (0.15 – 30 MHz)

6. Operation within the Band 902 - 928 MHz

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

6.1. Number of Hopping Channel

For frequency hopping systems operating in the 902 – 928 MHz band:

- if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies;
- if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Measurement

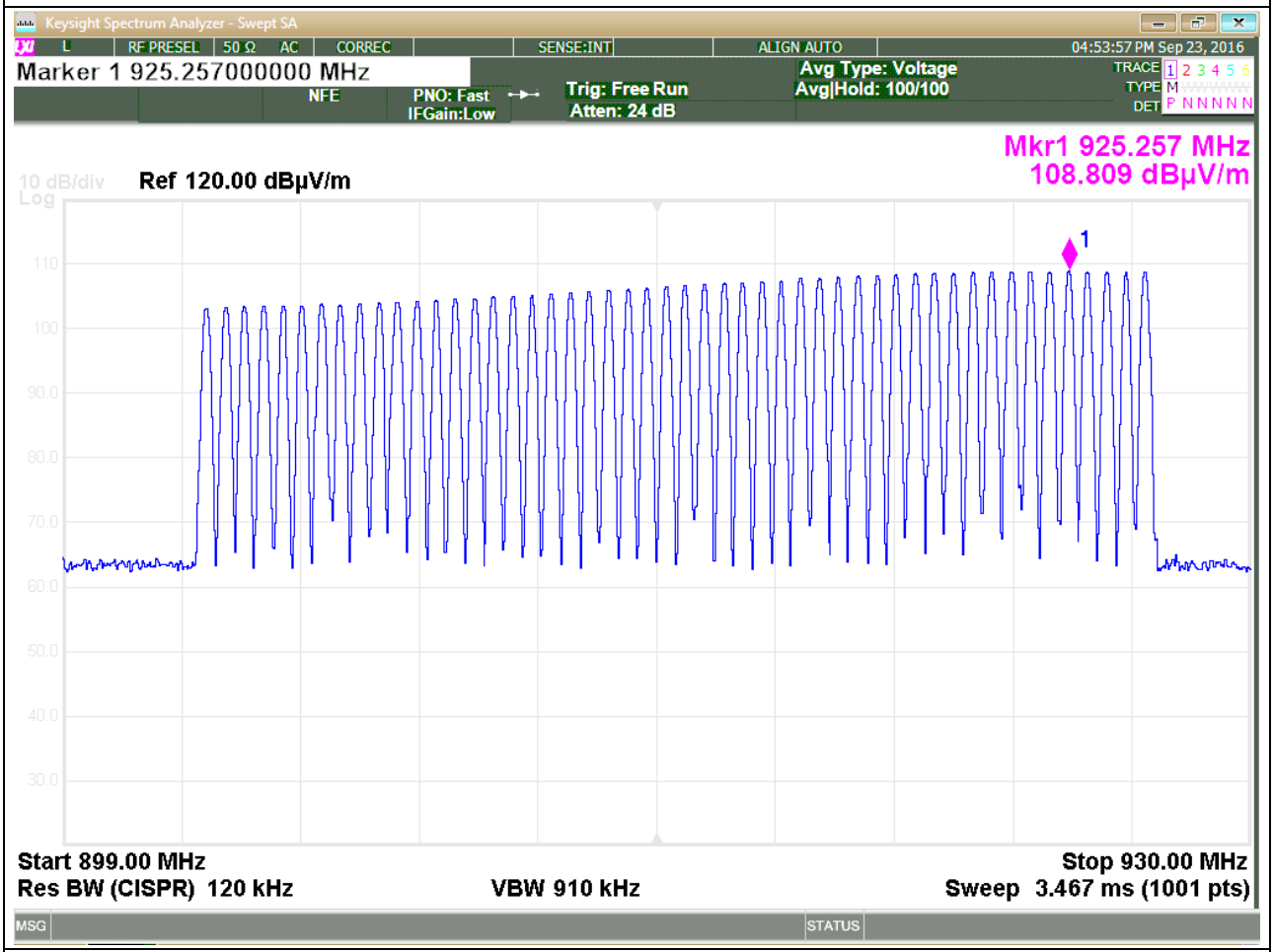


Fig. 6.1

6.2. CARRIER FREQUENCY SEPARATION

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Measurement

The following figures show the acquired graphics.

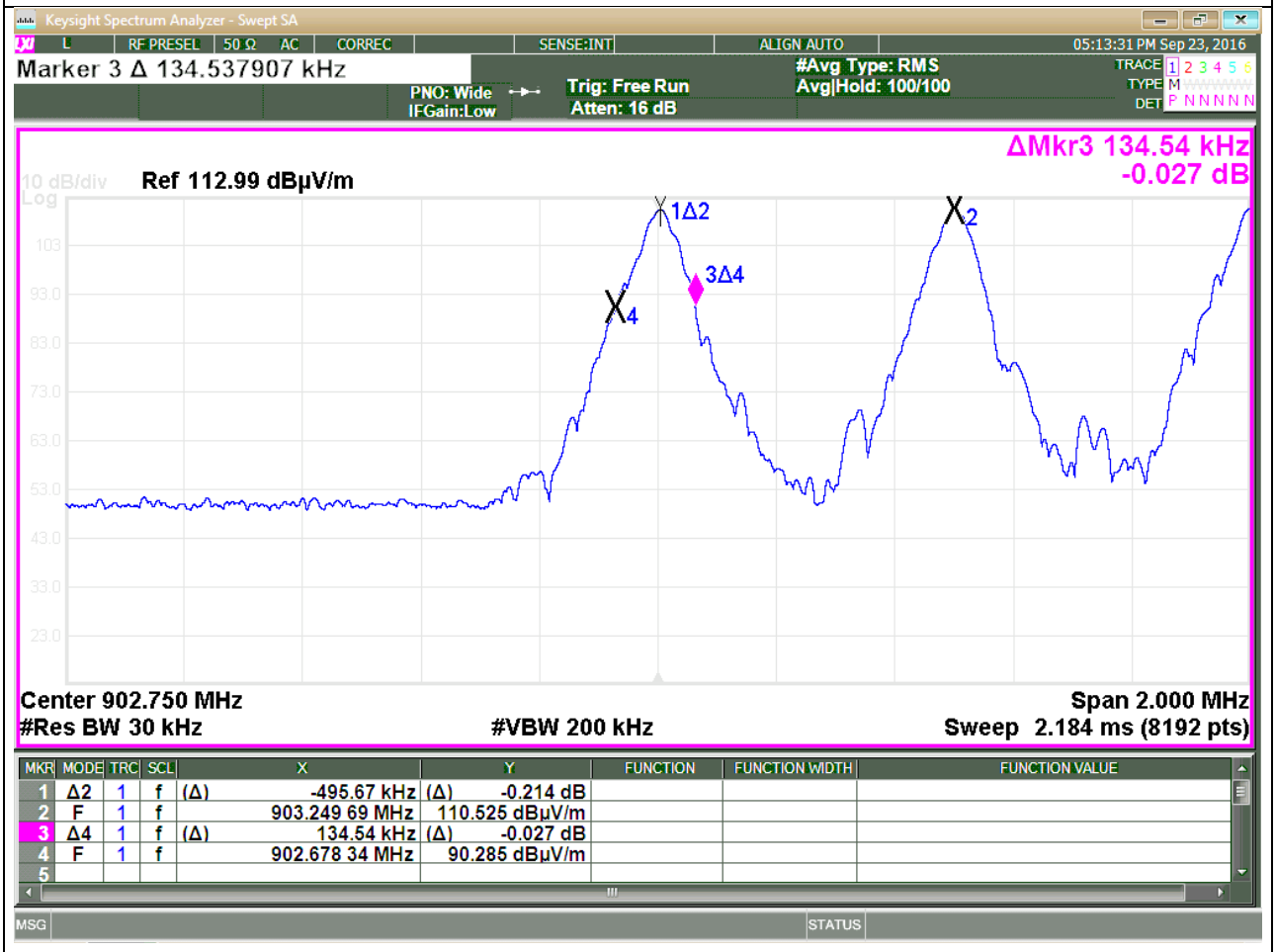


Fig. 6.2
Modulation ; Channels: 0 to 1; Maxhold

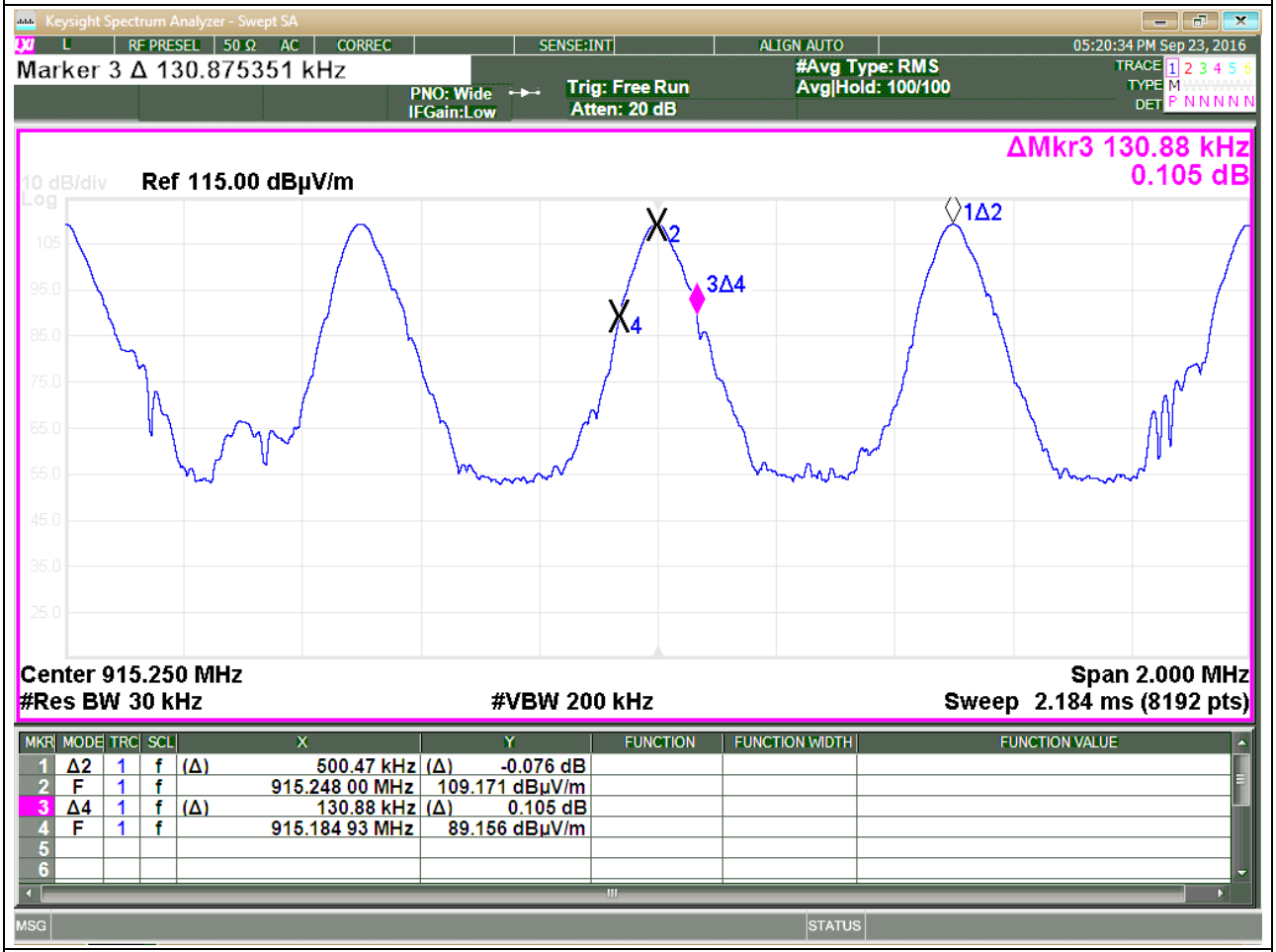


Fig. 6.3
Modulation; Channels: 25 to 26; Maxhold

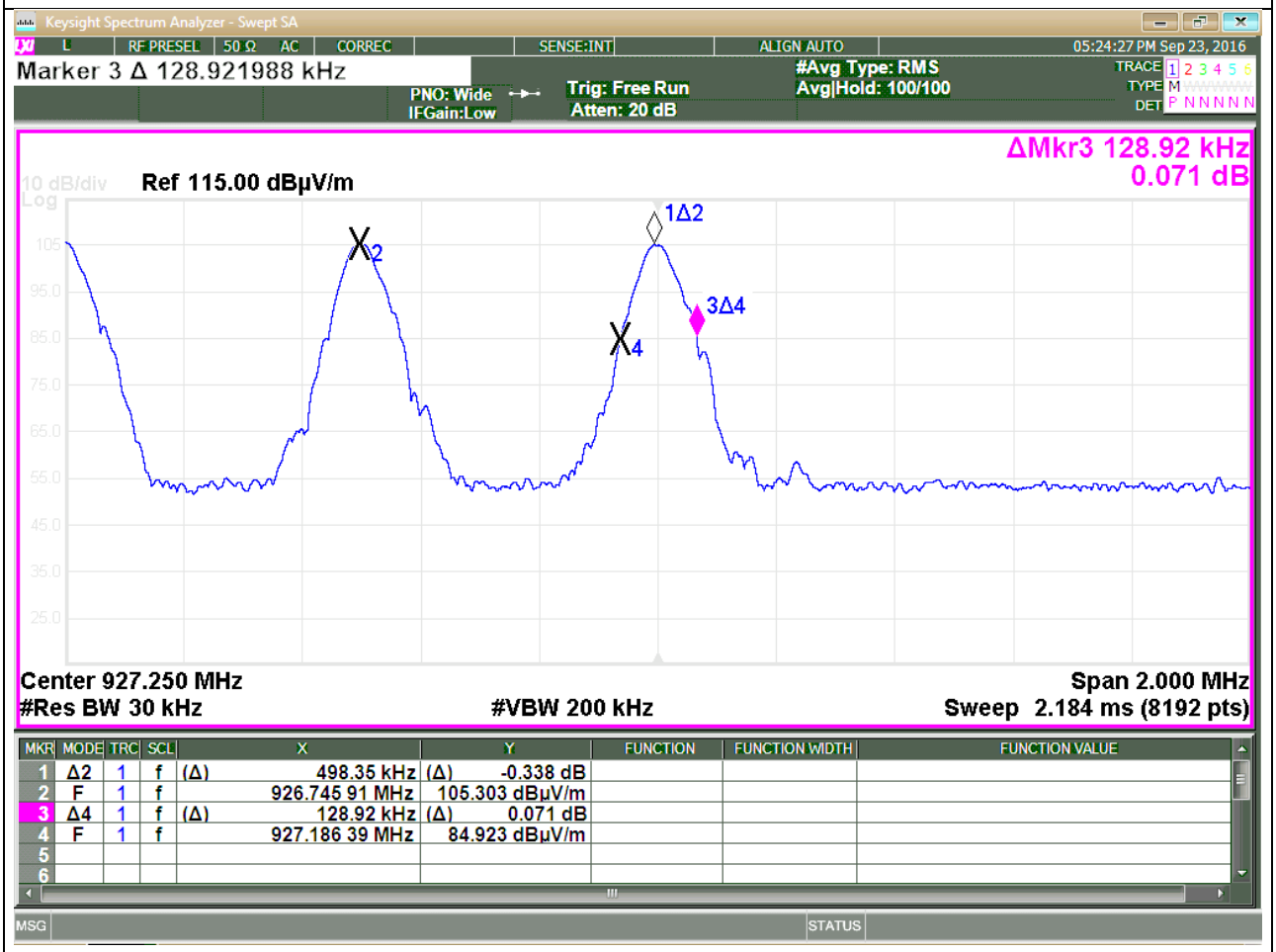


Fig. 6.4
Modulation; Channels: 49 to 48; Maxhold.

6.3. TIME OF OCCUPANCY

Limits

For frequency hopping systems operating in the 902928
MHz band: if the 20 dB bandwidth of the hopping channel
is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any
frequency shall not be greater than 0.4 seconds within a 20 second period

Measurements

Channel	Dwell Time (ms)	Nr. of Transmission for channel (in 20 s)	Pol.	Time of Occupancy in 20 s (ms)
0	31.8	**5**	--	**159**
25	32.6	**5**	--	**163**
49	31.9	**5**	--	**160**

The following figures show the acquired graphics.

Time of transmission

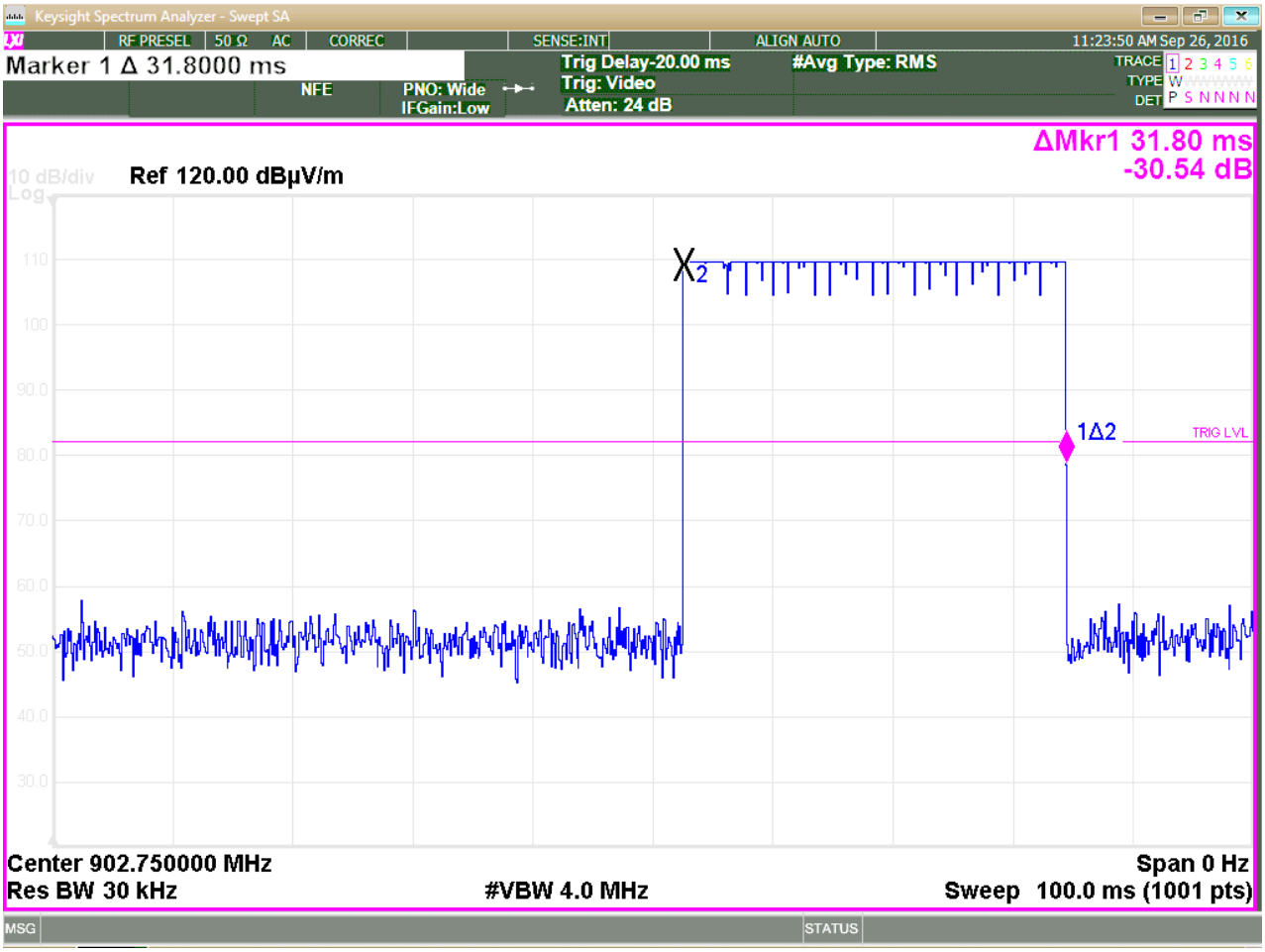


Fig. 6.5
Channel: 0 (Maxhold)

Nr. of Transmission for channel

Fig. 6.6
Channel: 0

Time of transmission

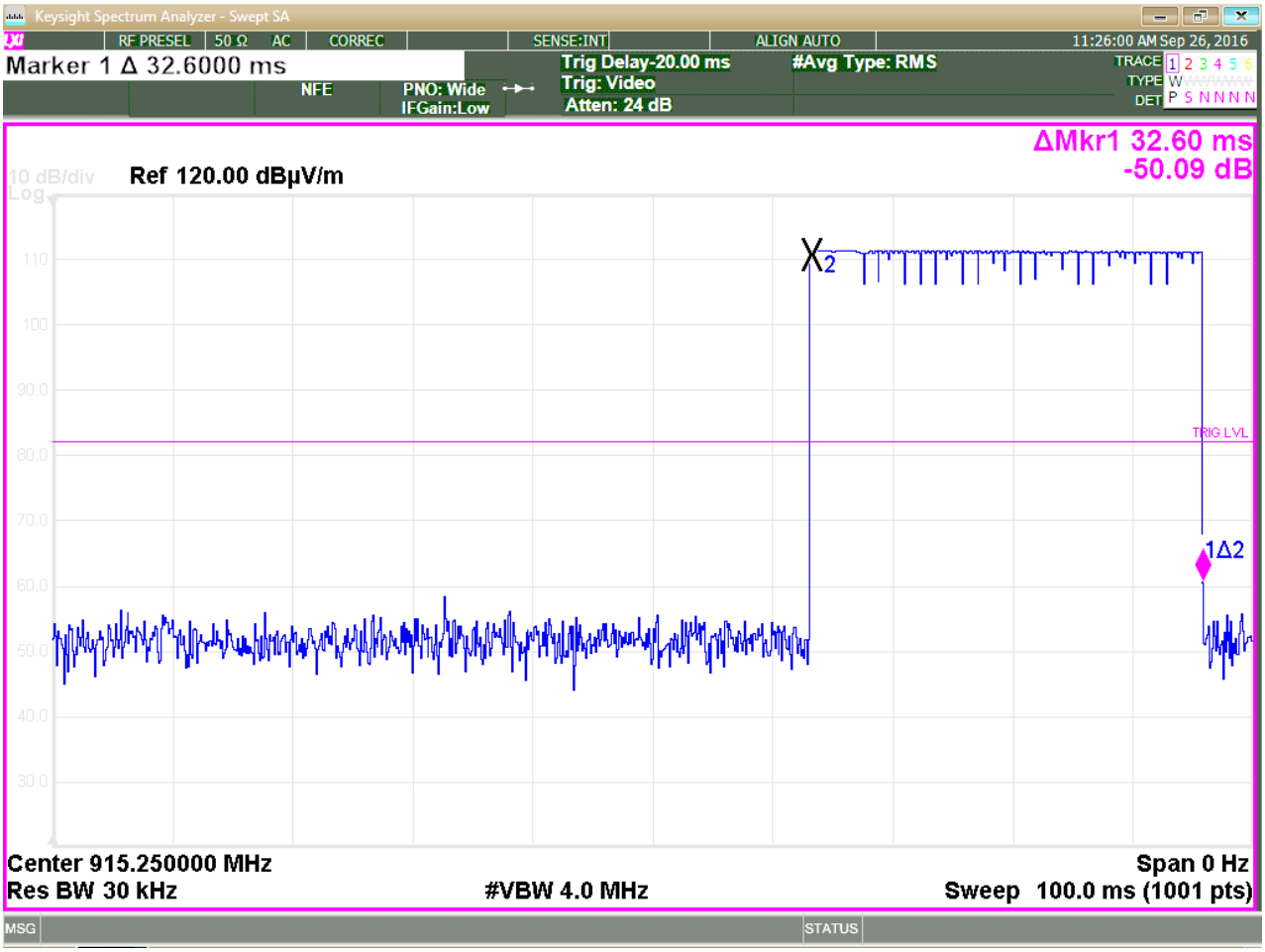


Fig. 6.7
Channel: 25 (Maxhold)

Nr. of Transmission for channel

Fig. 6.8
Channel: 25

Time of transmission

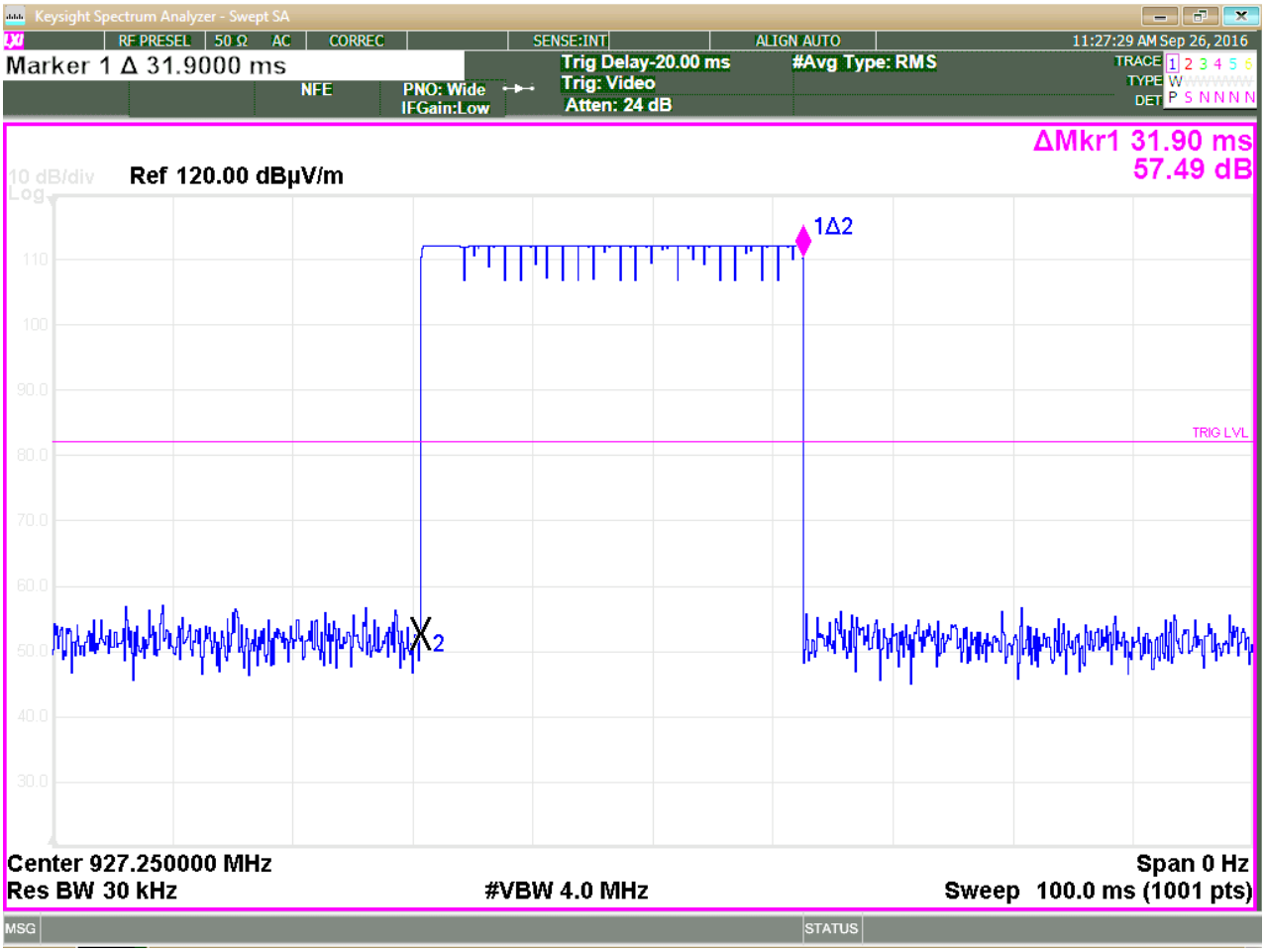


Fig. 6.9
Channel: 49 (Maxhold)

Nr. of Transmission for channel

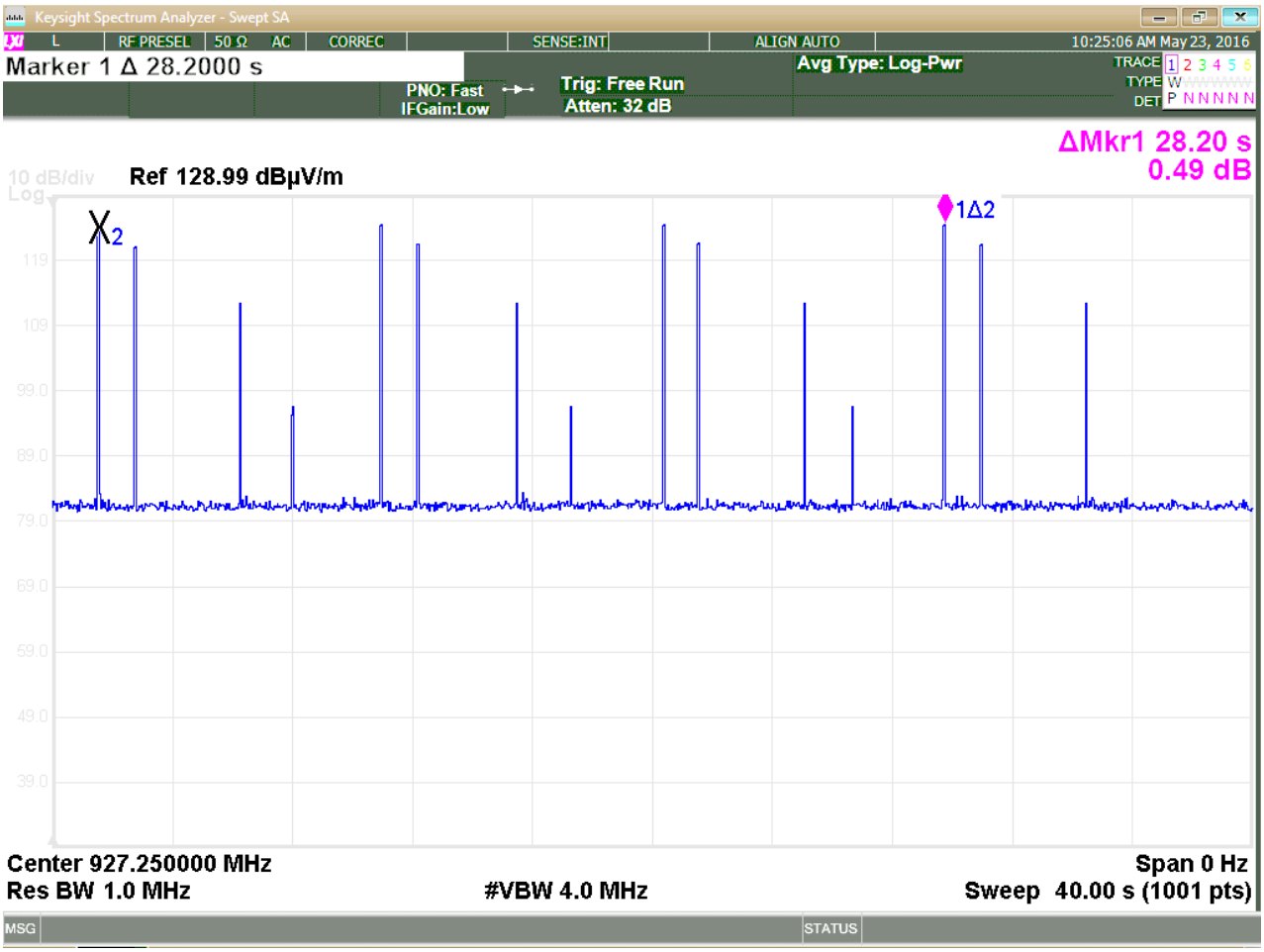


Fig. 6.10
Channel: 49

6.4. 20 dB Bandwidth

Measurements

Channel	Frequency (Pol. V / Pol. H) [MHz]	Bandwidth (Pol. V / Pol. H) [kHz]
0	902.7485 / 902.7495	60.5 / 60.5
25	915.2505 / 915.2500	75.5 / 72.5
49	927.2505 / 927.2495	59.5 / 59.5

The following figures show the acquired graphics.

Ch 0: Bandwidth

Fig. 6.11
Pol. V

Ch 25: Bandwidth

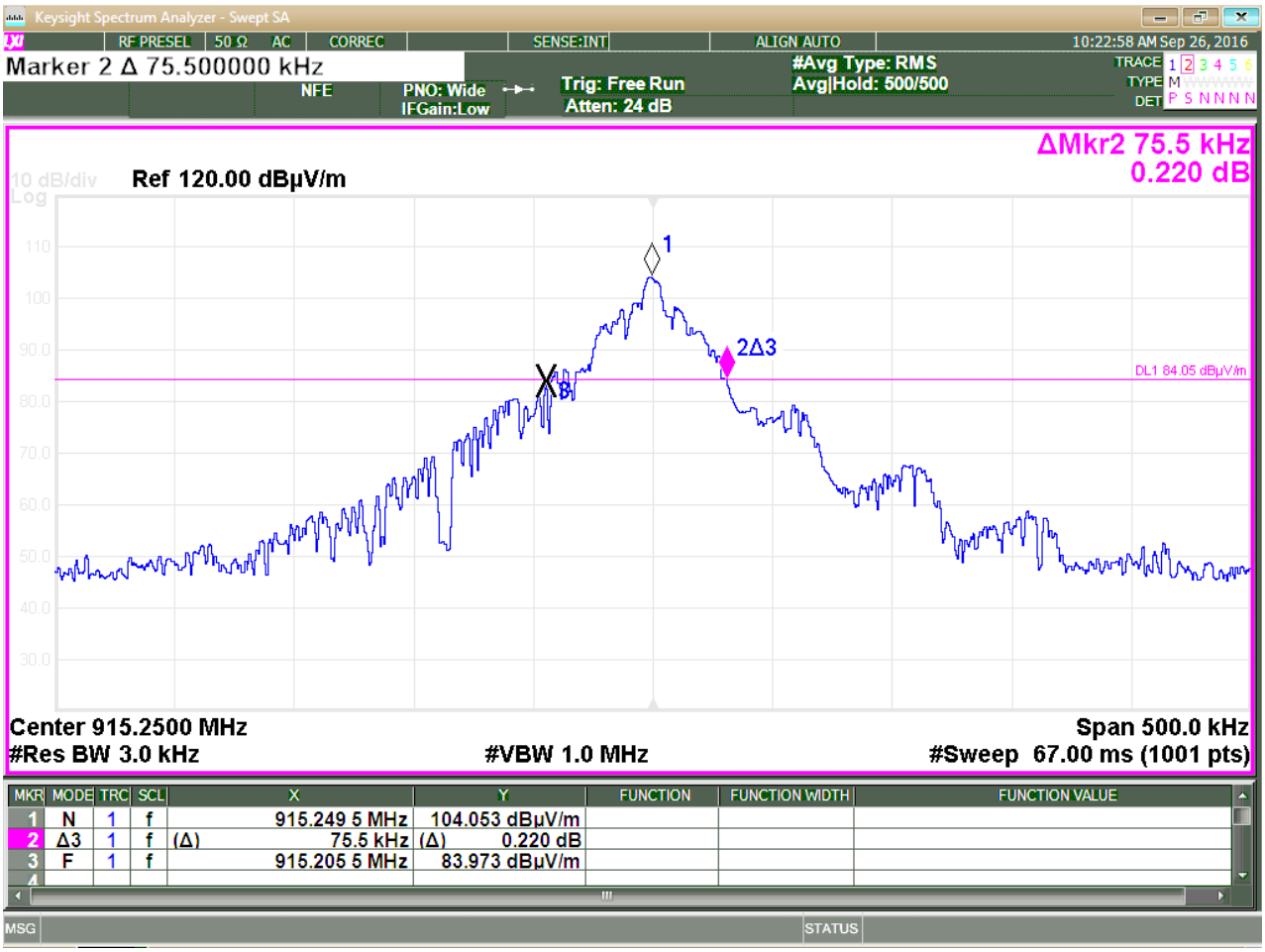


Fig. 6.12
Pol. V

Ch 49: Bandwidth

Fig. 6.13
Pol. V

Ch 0: Bandwidth

Fig. 6.14
Pol. H

Ch 25: Bandwidth

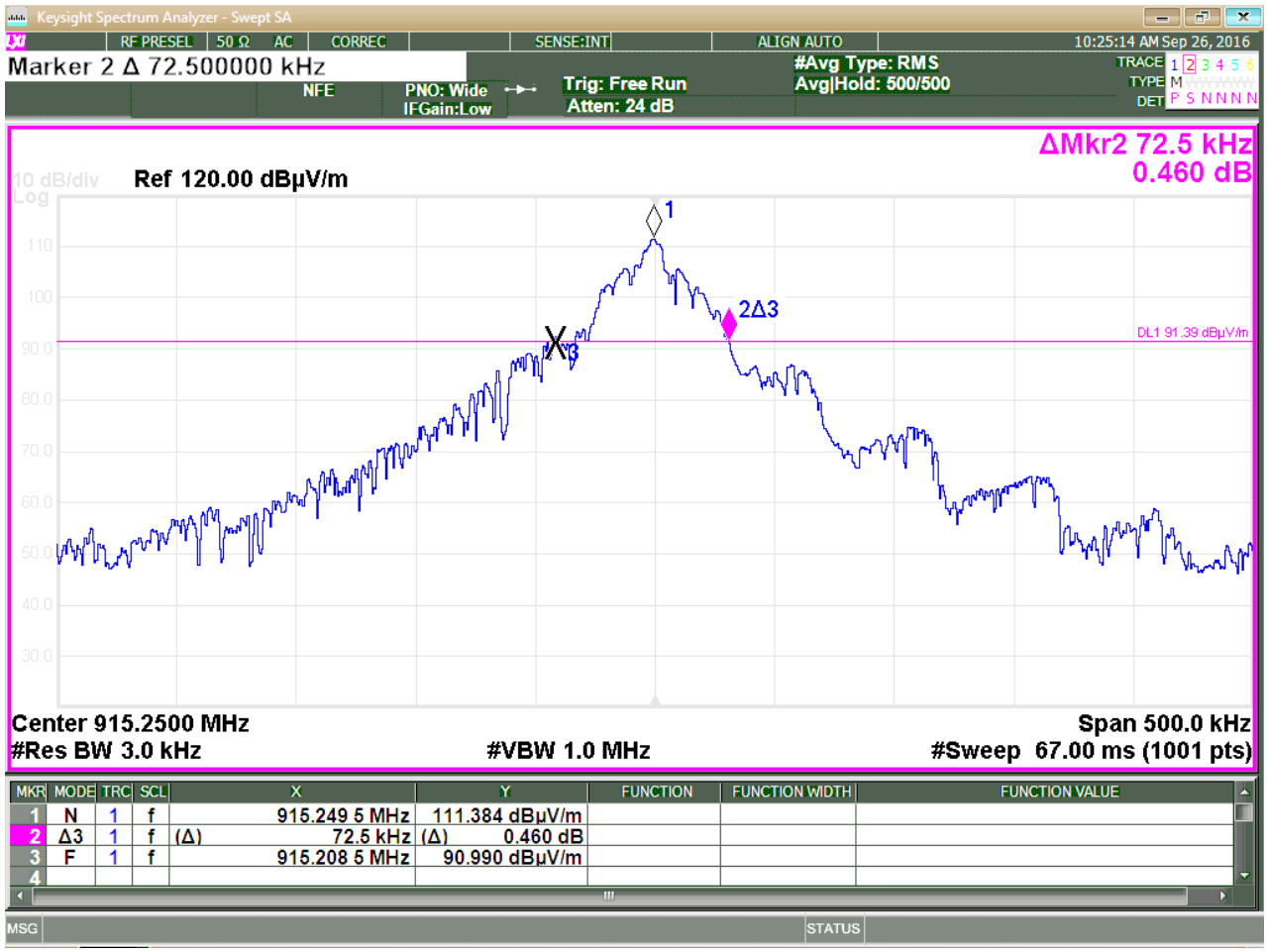


Fig. 6.15
Pol. H

Ch 49: Bandwidth

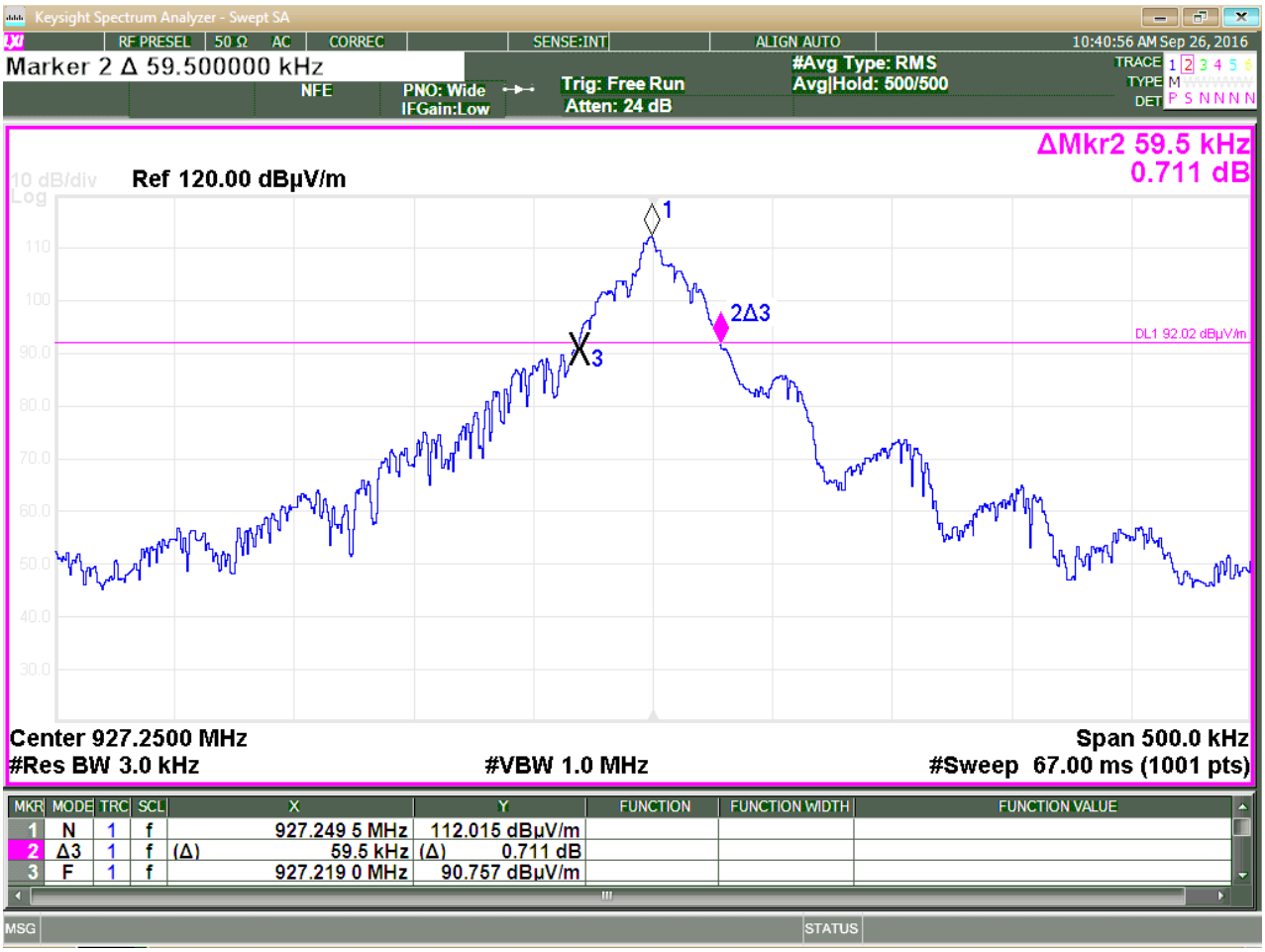


Fig. 6.16
Pol. H

6.5. *Peak Output Power*

Equipment shall meet the limits below.

Frequency range [MHz]	***Number of Channel*** [#]	***RF power output Limit*** [dBm]
902 – 928	50	30.0 (1 W)
902 – 928	< 50	24.0 (0.25 W)

Measurement

Eirp and Erp measurement were measured accordingly to ANSI C63.10: 2013 and 412172 D01 Determining ERP and EIRP v01r01.
Field Strength approach (linear terms):

$$erp = (E * d)^2 / (30 * 1.64) \quad (1)$$

E = Electric field strength in V/m
d = measure distance in m

Note: for f< 1GHz the radiated power is in ERP

The measured values are:

Channel	Electric Field [dBµV/m] / **Output Power [dBm]**	
	Pol. V	Pol. H
0	101.296 / **3.89**	122,402/ **24.99**
25	98.661 / **1.25**	122,851 / **25.44**
49	101.676 / **4.27**	122,189 / **24.78**

Maximum Electric Field 122,851 dBuV/m = 1,4V/m
d = 3m

Accordingly to (1) erp is calculated:

$$erp = 0.35\,W$$

The following figures show the acquired graphics.

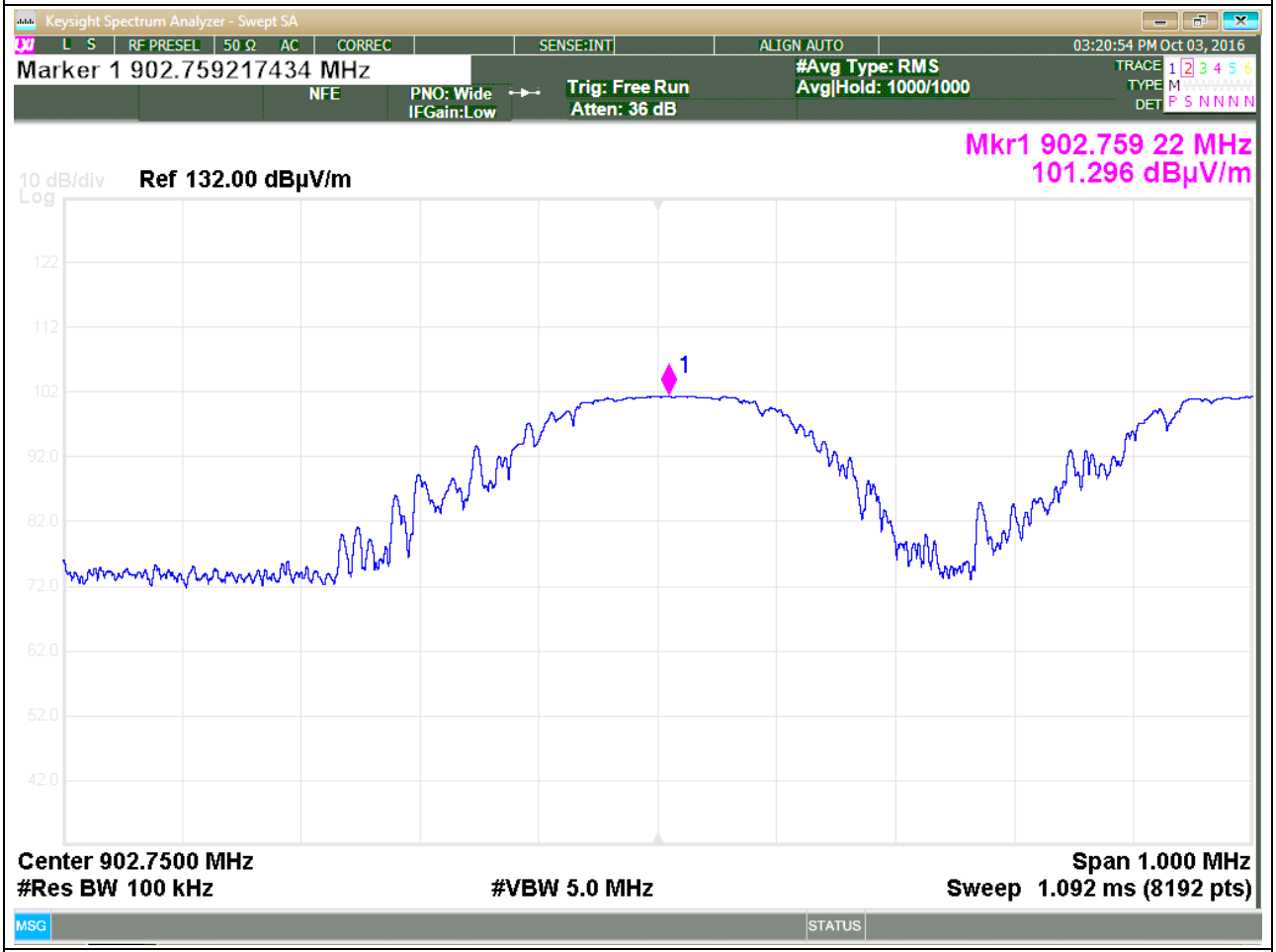


Fig. 6.17
Pol. V, Channel 0, Max Hold

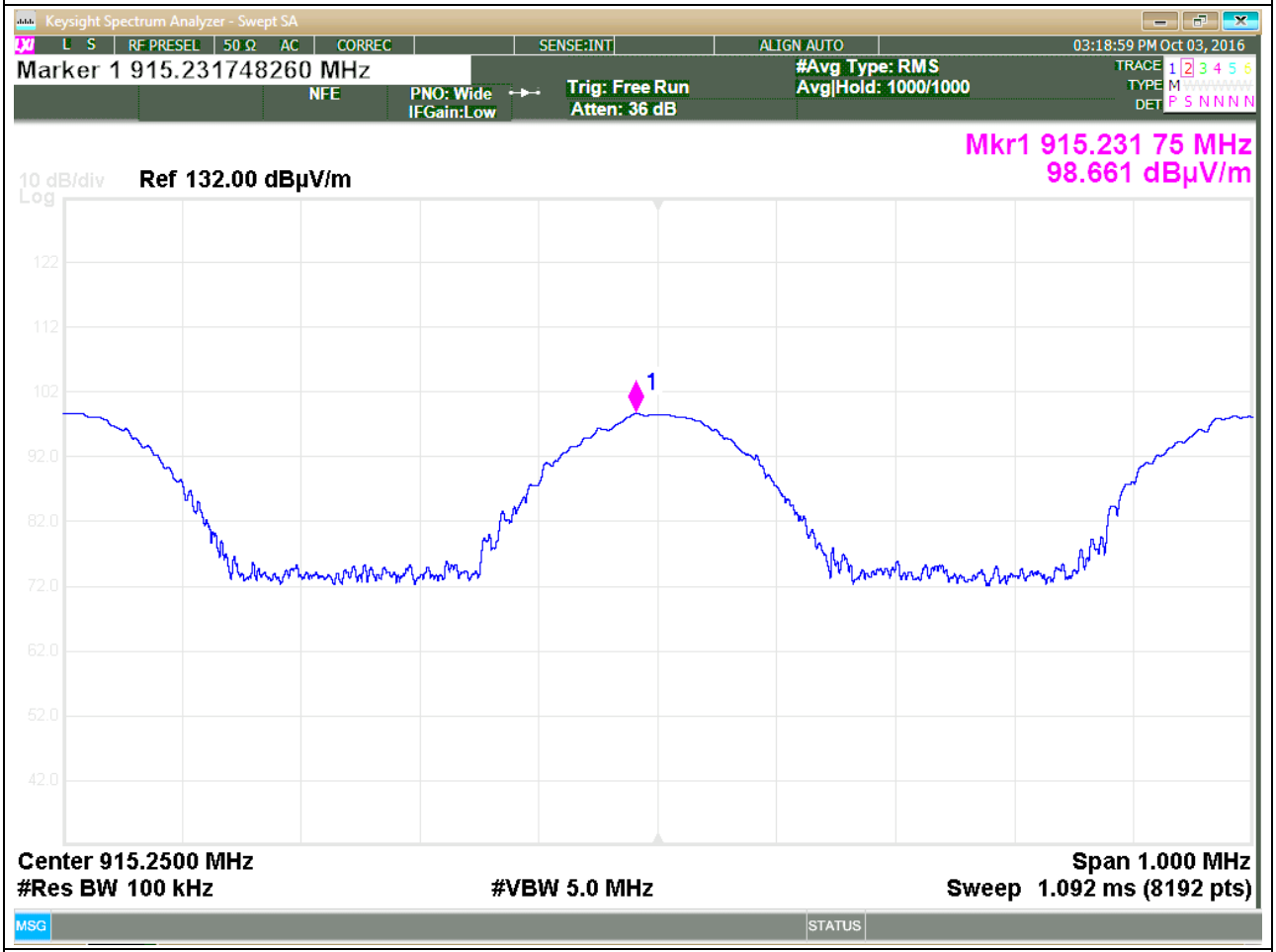


Fig. 6.18
Pol. V, Channel 25, Max Hold

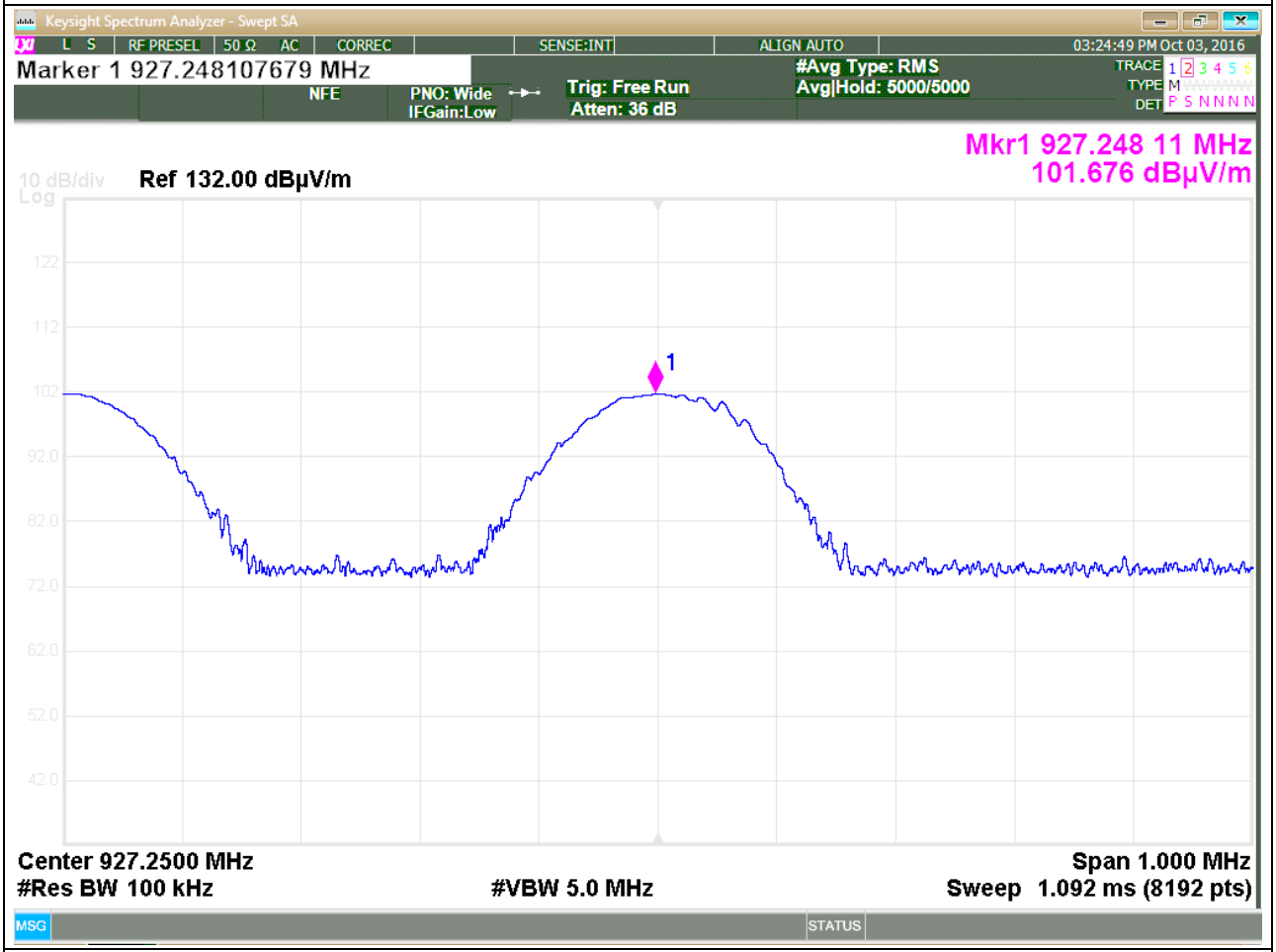


Fig. 6.19
Pol. V, Channel 49, Max Hold

Fig. 6.20
Pol. H, Channel 0, Max Hold

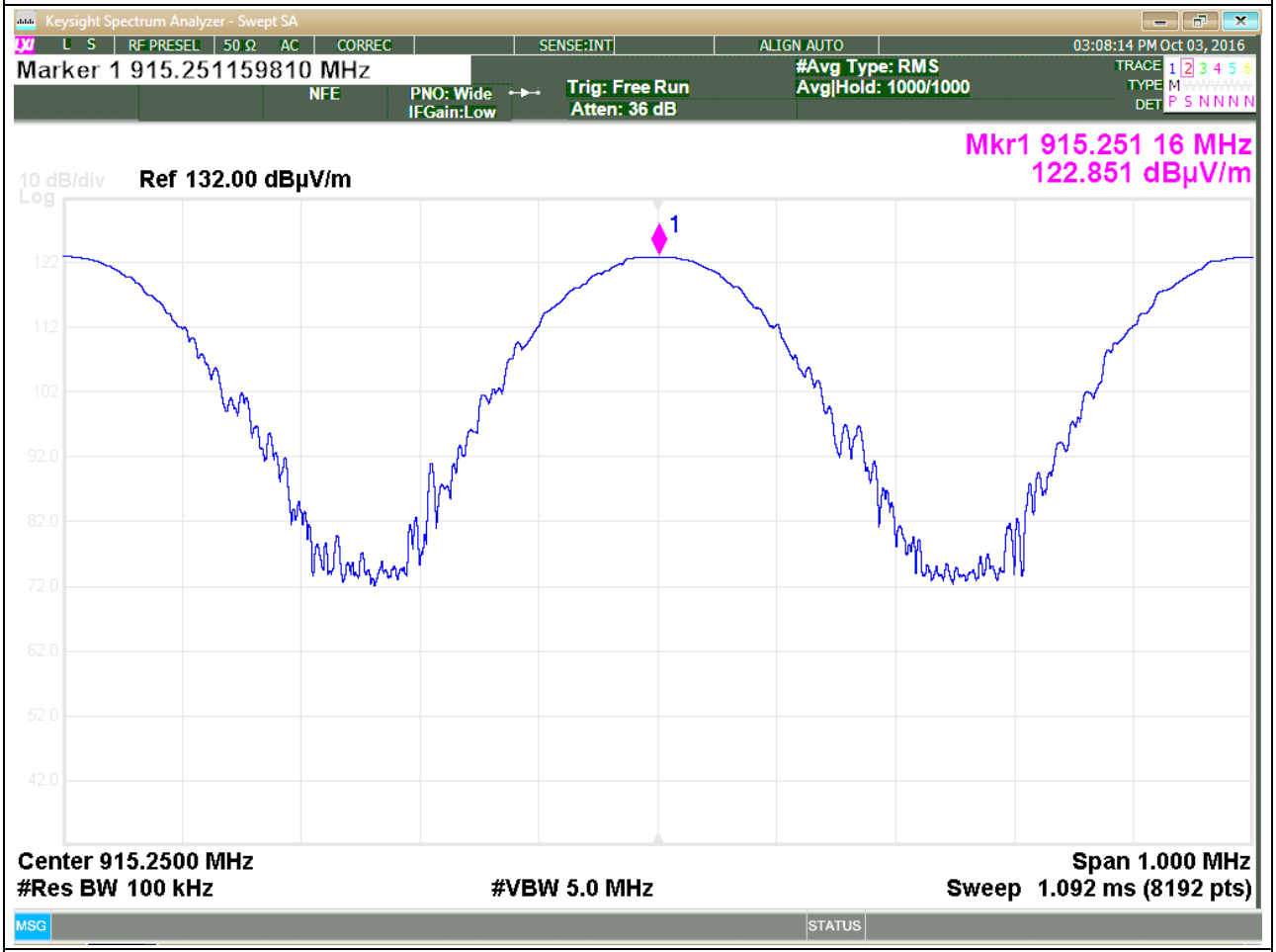


Fig. 6.21
Pol. H, Channel 25, Max Hold

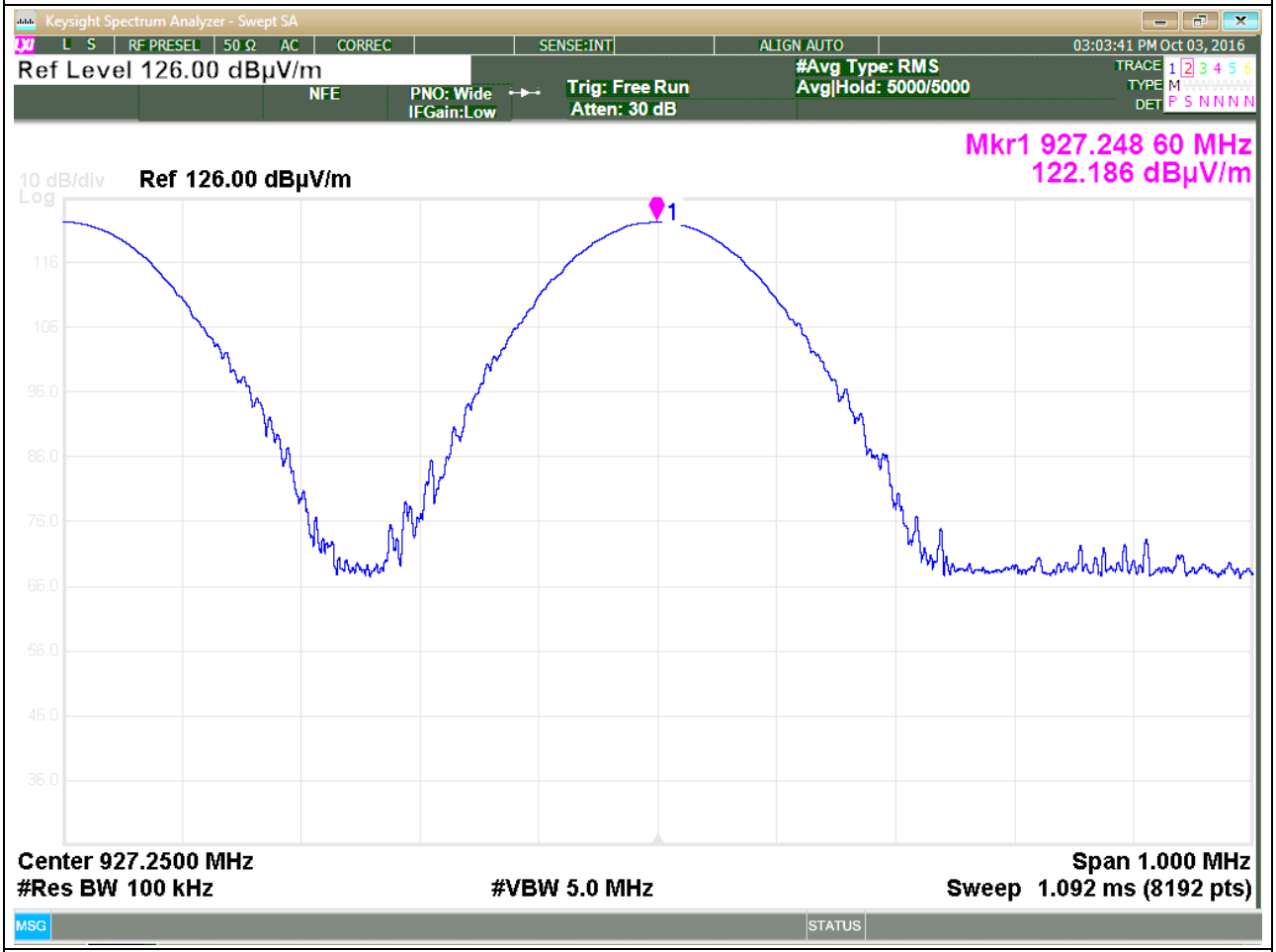


Fig. 6.22
Pol. H, Channel 49, Max Hold

6.6. BAND EDGE

Emissions must be within the band 902-928 MHz.

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Measurements

The following figures show the acquired graphics.

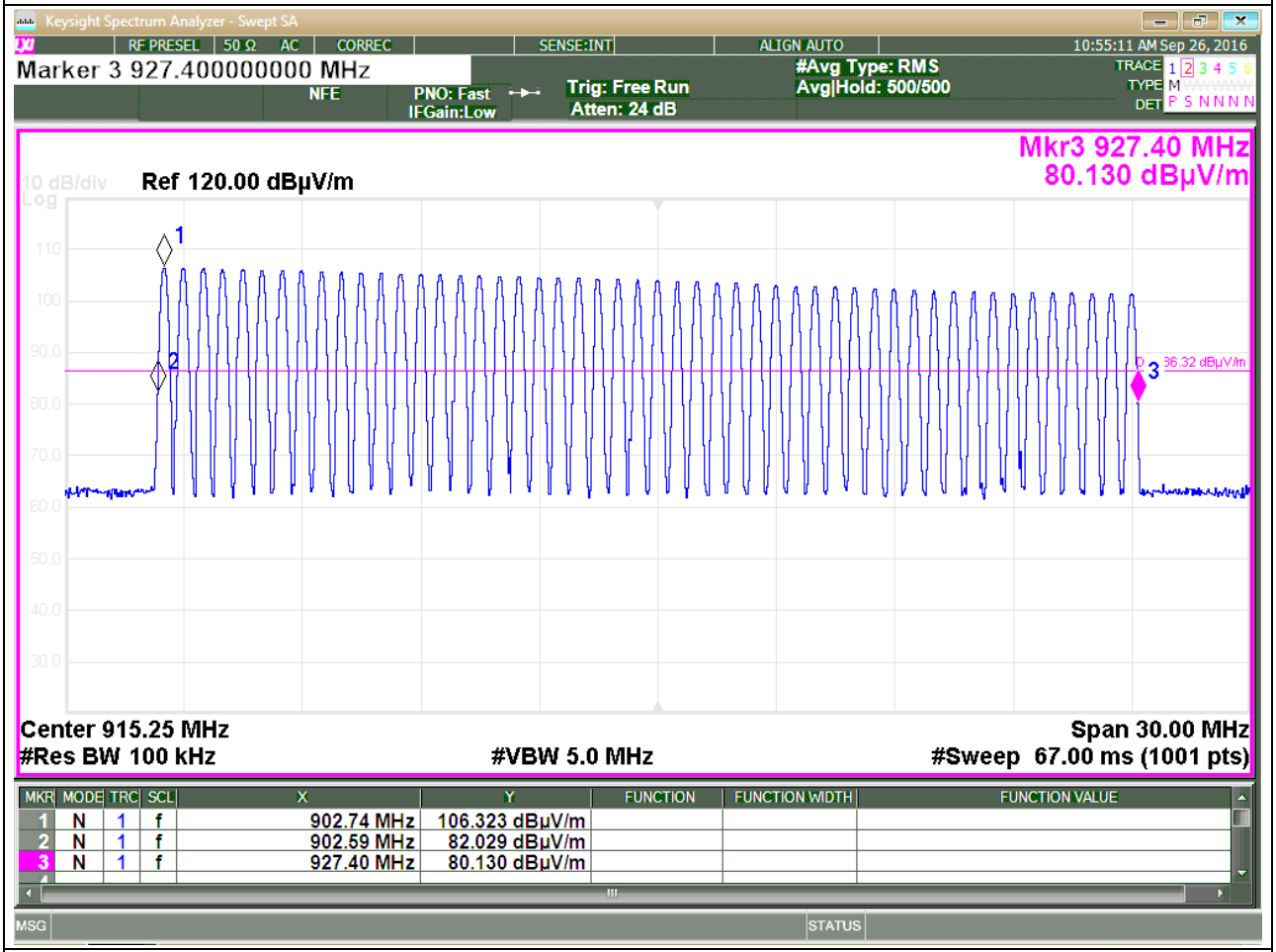


Fig. 6.23
Pol. V

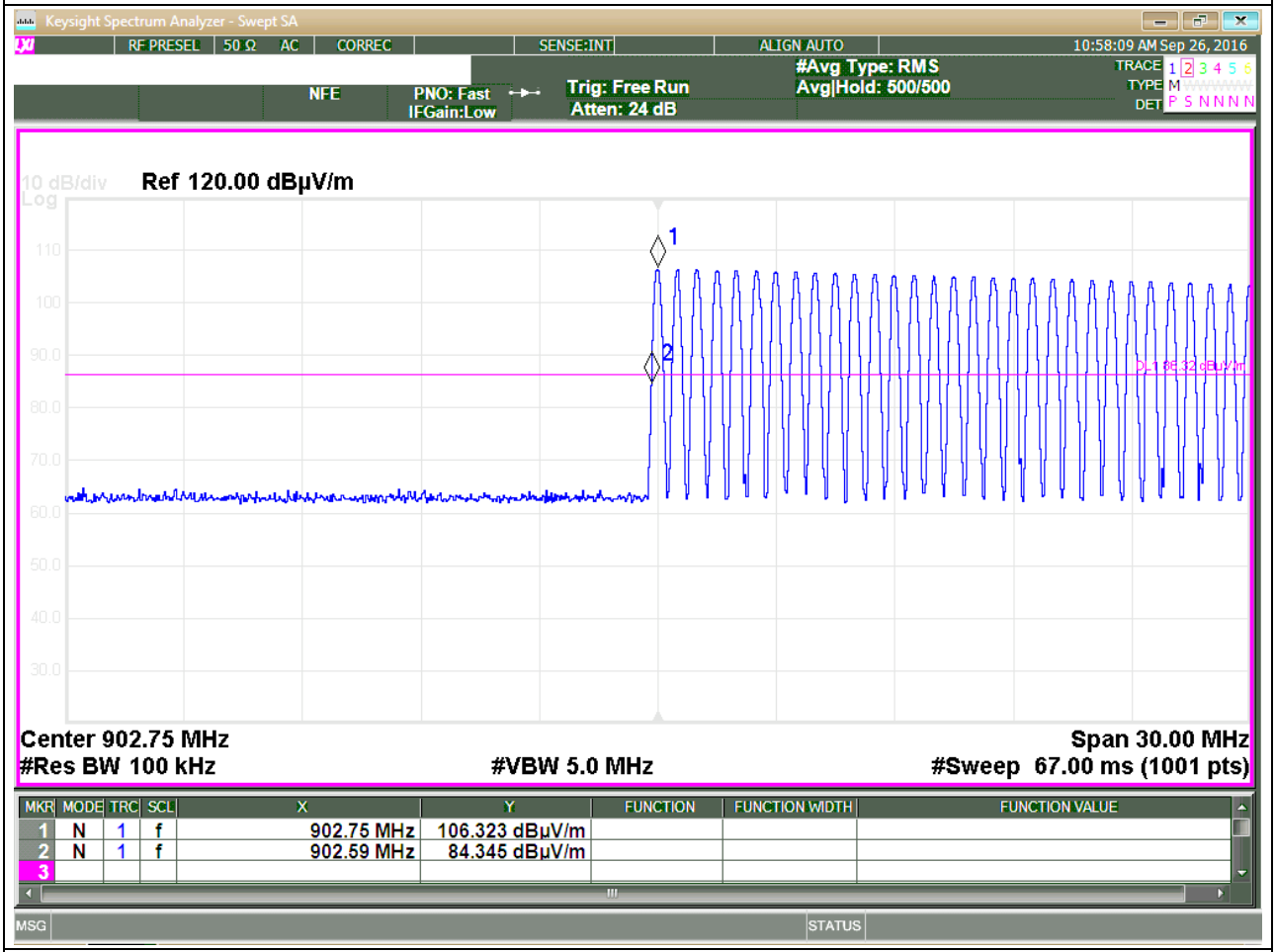


Fig. 6.24
Pol. V, Low Band Edge

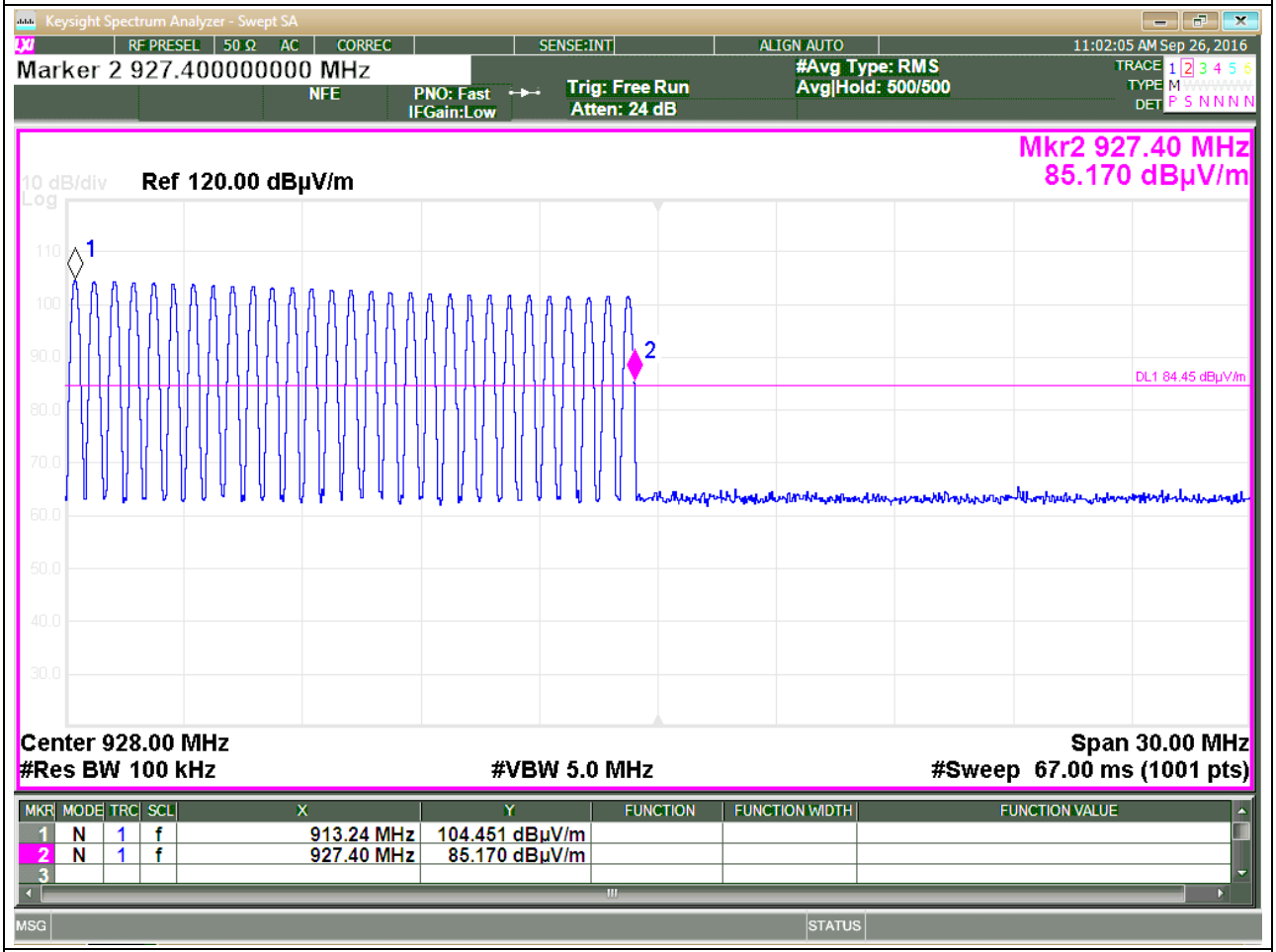


Fig. 6.25
Pol. V, High Band Edge

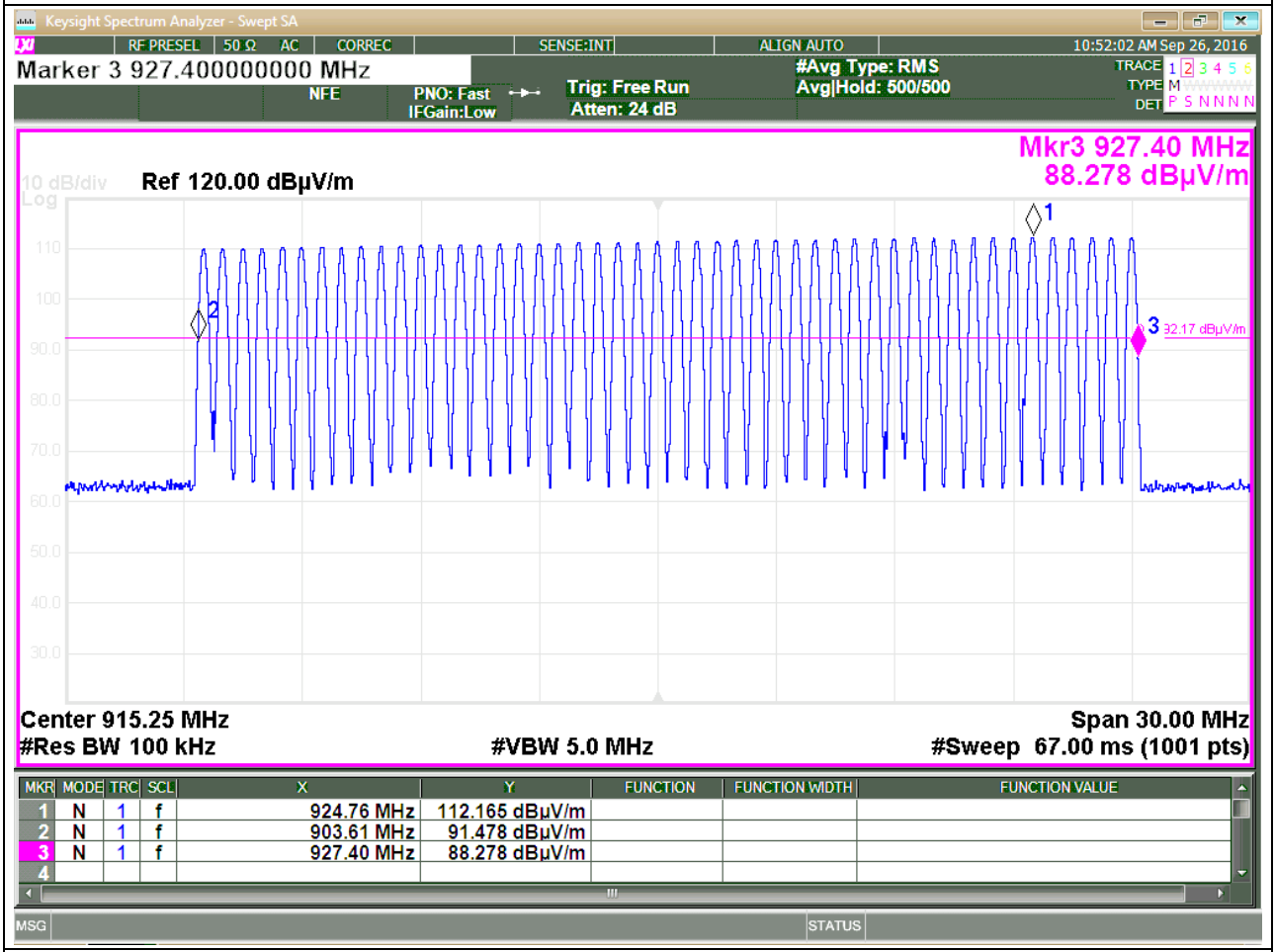


Fig. 6.26
Pol. H

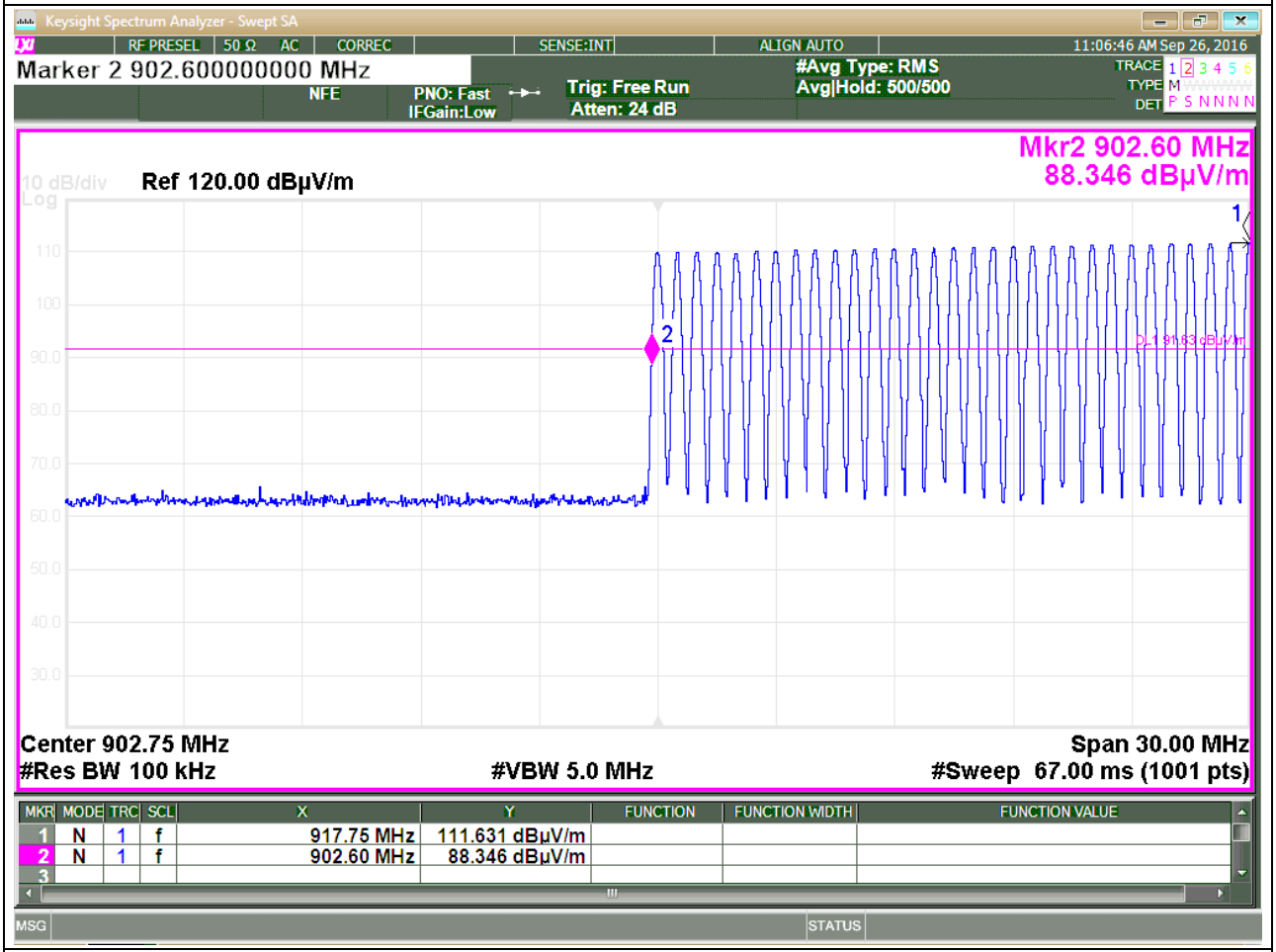


Fig. 6.27
Pol. H, Low Band Edge

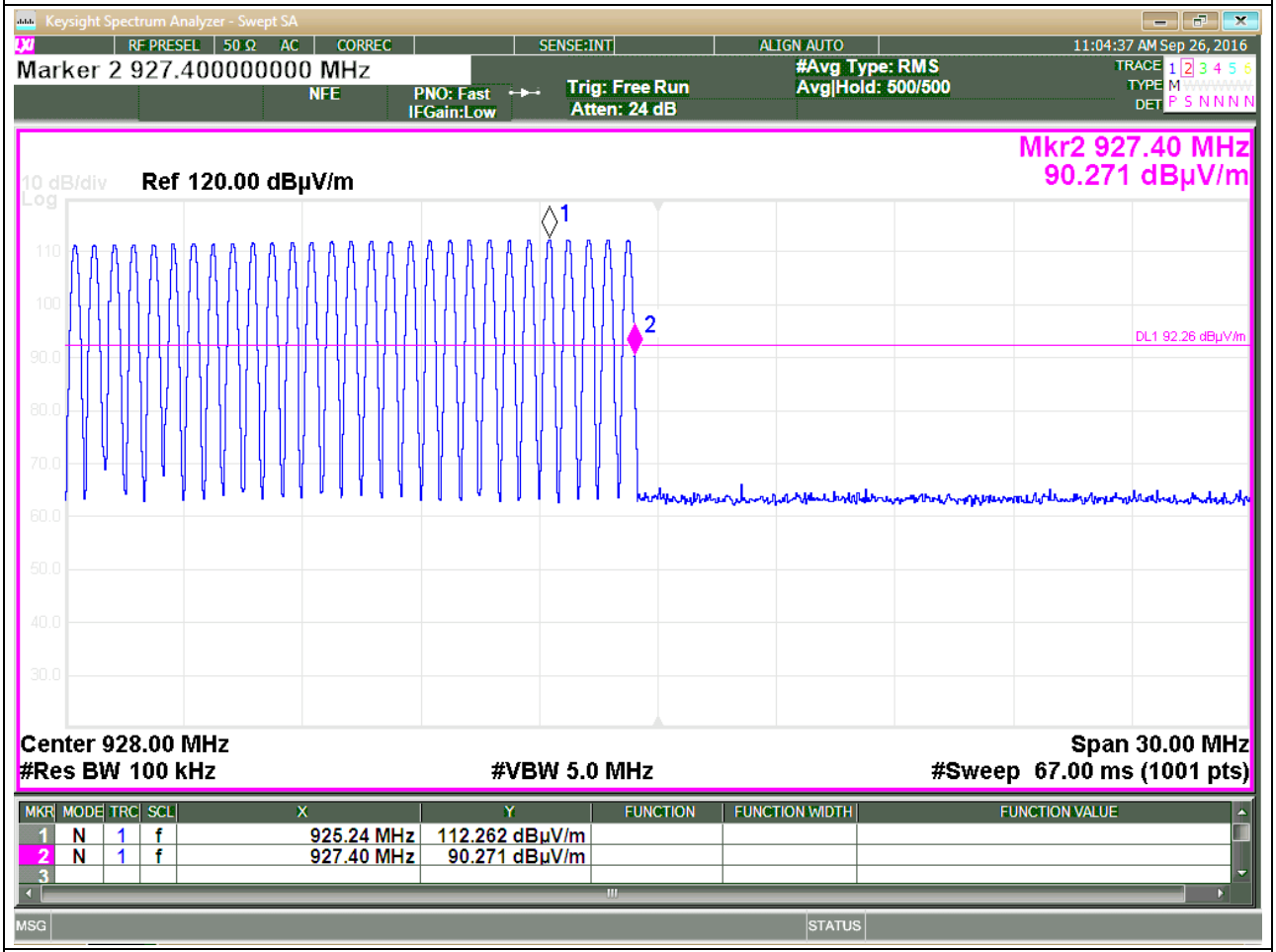


Fig. 6.28
Pol. H, High Band Edge

7. RADIATED OPERATION WITHIN THE BAND 902 - 928 MHZ

7.1. SPURIOUS RADIATED EMISSIONS

Nr Harmonics	AVG Level (dBµV/m)						AVG Limits (dBµV/m)	Remark
	Ch 0		Ch 25		Ch 49			
	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)		
2	--	--	--	--	--	--	54.0	
3	--	--	--	--	--	--	54.0	
4	--	--	--	--	--	--	54.0	
5	--	--	--	--	--	--	54.0	
6	--	--	--	--	--	--	54.0	
7	--	--	--	--	--	--	54.0	
8	--	--	--	--	--	--	54.0	
9	--	--	--	--	--	--	54.0	
10	--	--	--	--	--	--	54.0	

Note: Levels below 20 dB of limits are indicated with (--).

Nr Harmonics	Peak Level (dBµV/m)						PK Limits (dBµV/m)	Remark
	Ch 0		Ch 25		Ch 49			
	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)		
2	--	--	--	--	--	--	74.0	
3	--	--	--	--	--	--	74.0	
4	--	--	--	--	--	--	74.0	
5	--	--	--	--	--	--	74.0	
6	--	--	--	--	--	--	74.0	
7	--	--	--	--	--	--	74.0	
8	--	--	--	--	--	--	74.0	
9	--	--	--	--	--	--	74.0	
10	--	--	--	--	--	--	74.0	

Note: Levels below 20 dB of limits are indicated with (--).

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
MXE EMI Receiver	Agilent/Keysight	N9038A	01/2017
Anechoic Chamber	Comtest	CSA01	01/2017
Bilog Antenna	Schaffner	CBL6112B	01/2017
Horn Antenna	EMCO	3115	01/2017
Controller	Deisel	HD100	01/2017
Turn Table	Deisel	MA240	01/2017
LISN	GSD	NTW06	01/2017

Test procedure: CT15R01

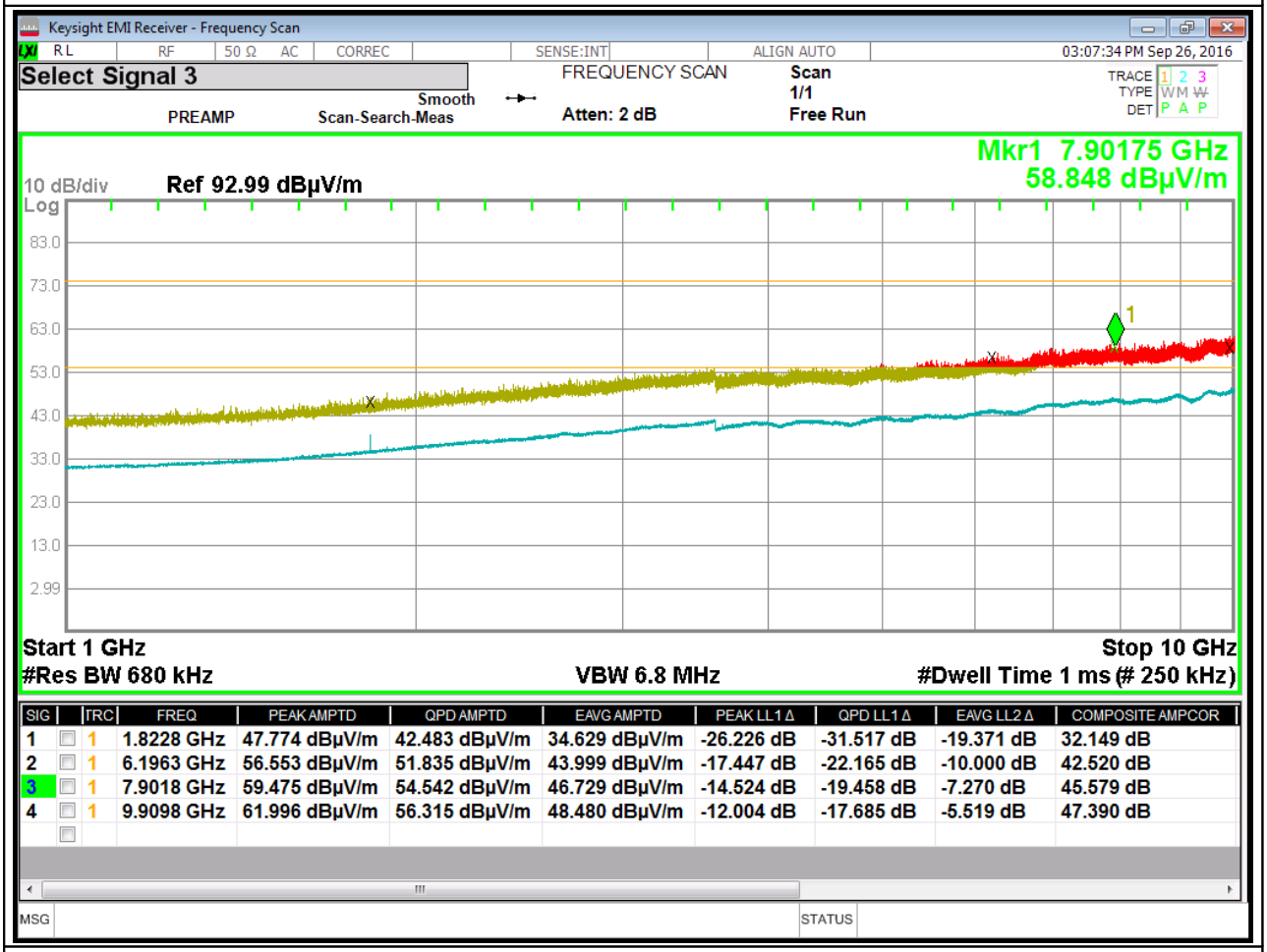


Fig. 7.1

POL V
MA: 100 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (PK and AVG detector)
Maximum disturbance determined in the frequency range 1 – 10 GHz, Pol. V.

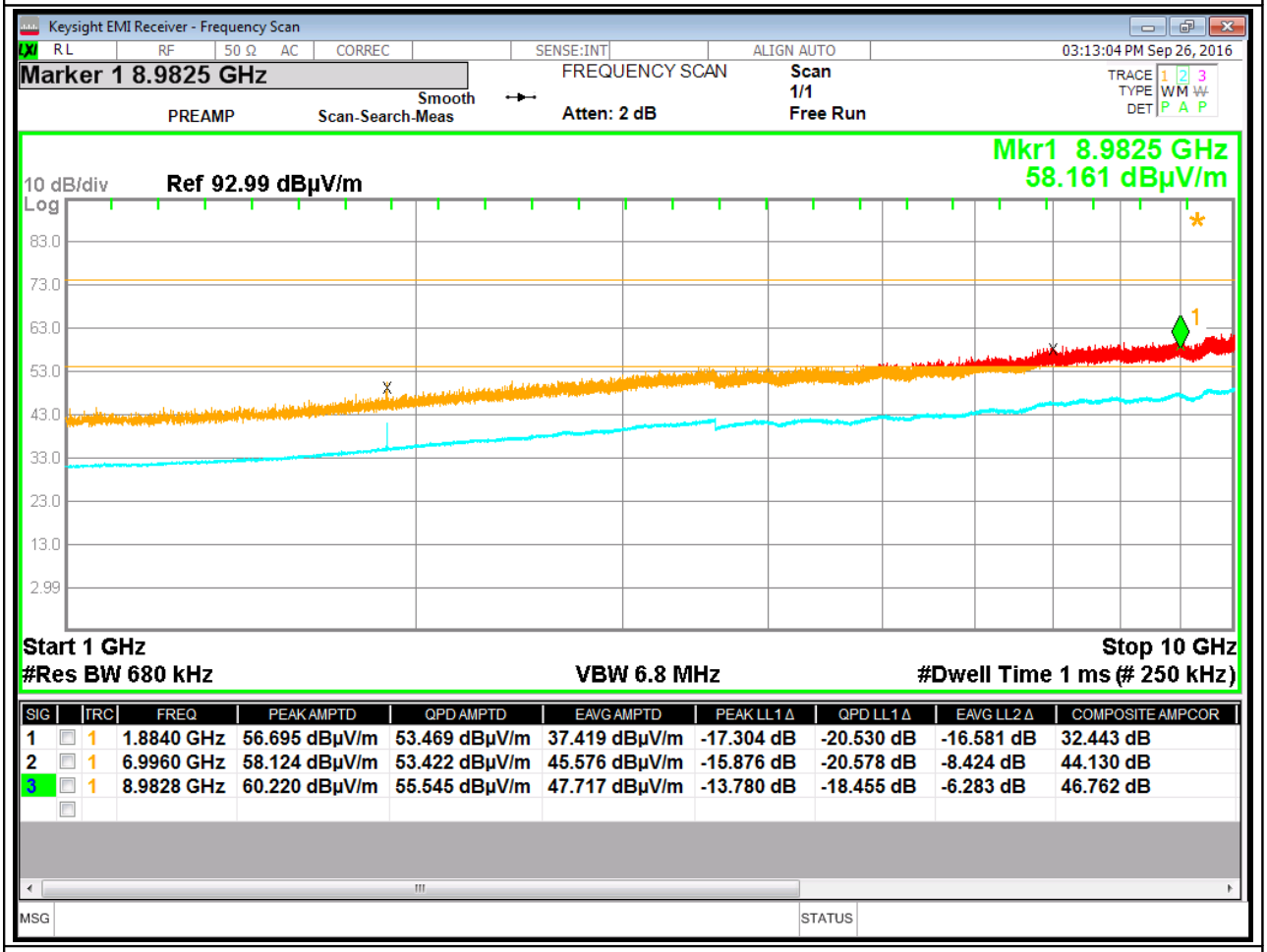


Fig. 7.2

POL H
MA: 181 cm
TT: 0°
EUT mode: Modulation

Record of the measurement of radiated emissions (PK and AVG detector)
Maximum disturbance determined in the frequency range 1 – 10 GHz, Pol. H.

8. PHOTO

Fig. 8.1
Conducted Emissions Test Set-up

Fig. 8.2

Radiated Emissions Test Set-up
Range: 30 – 1000 MHz

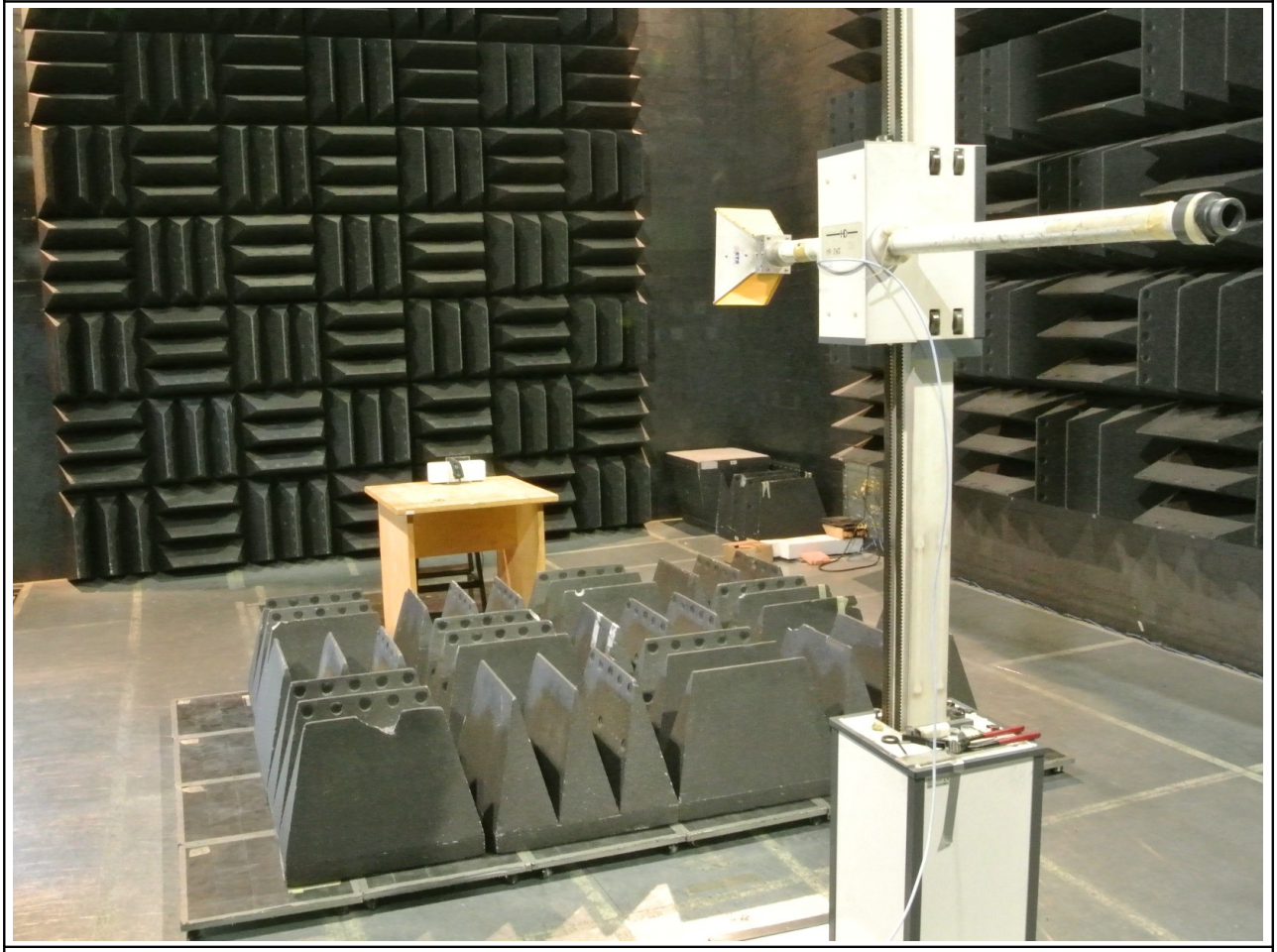


Fig. 8.3

Radiated Emissions Test Set-up
Range: 1 – 10 GHz

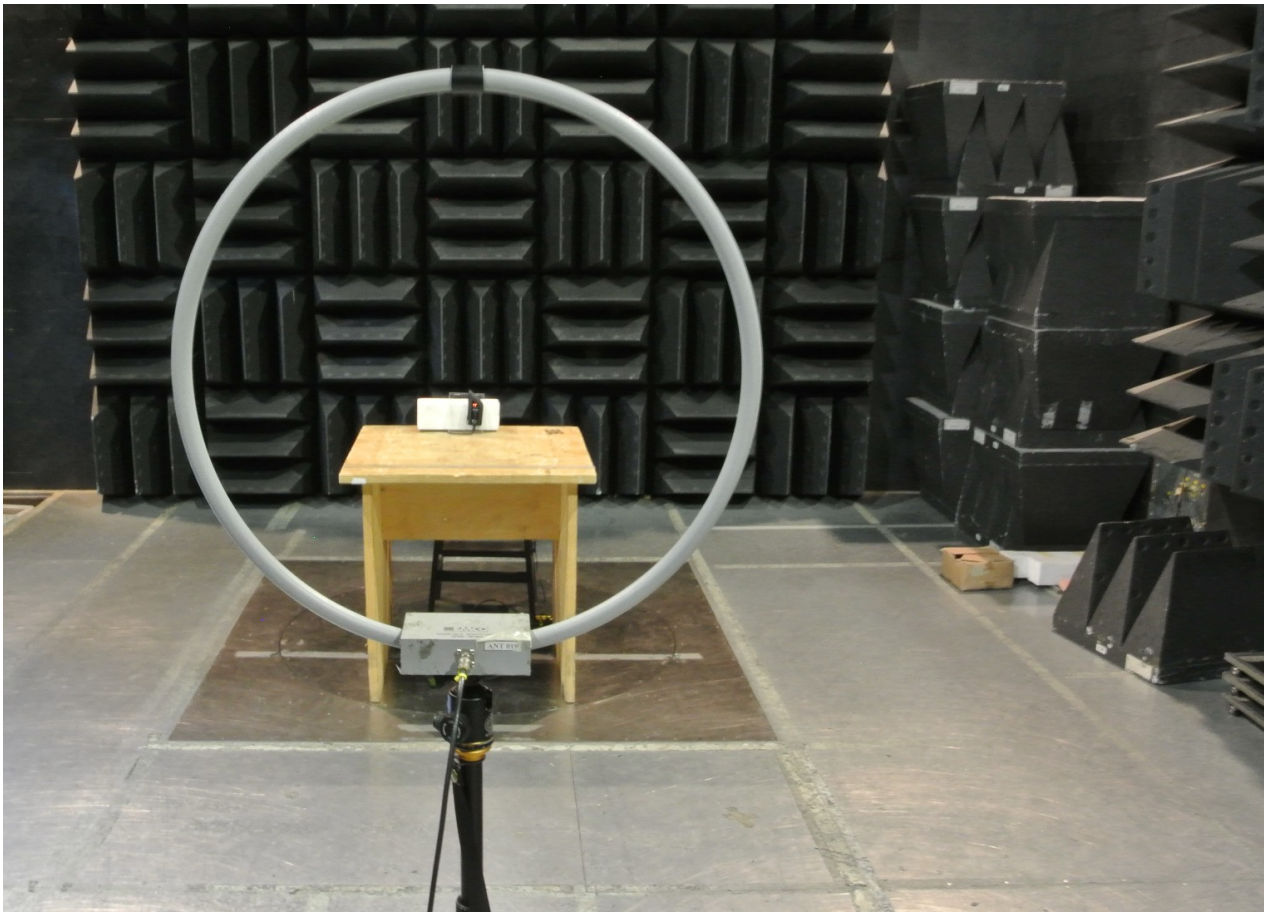


Fig. 8.4

Radiated Emissions Test Set-up
Range: 9 kHz – 30 MHz