Laboratories GSD SRL CE **MARKING** *ELECTROMAGNETIC COMPATIBILITY* *ELECTRICAL SAFETY* *LASER SPECTROSCOPY* *ENVIRONMENTAL PHYSICS*		**G.S.D. S.r.l.** Certified in accordance with **UNI EN ISO 9001:2008** by **TÜV Rheinland Italia S.r.l.** **Certificate N. 39 00 1850509**
G.S.D. Srl **PISA - Italy**	***Test Report n. FCC-17238***	Rev. 01

Manufacturer	**CAEN RFID S.r.l.**
Address	Via Vetraia, 11 55049 Viareggio (LU) Italy
Test Family Name	**R1170IU**
Testing Laboratory Name	**G.S.D. S.r.l.**
Address	Via Marmiceto, 8 56121 Pisa (PI) Italy
Tel/Fax	+39 050 984254 / +39 050 984262
P.IVA/VAT	01343950505
http – e-mail	www.gsd.it - info@gsd.it
	FCC Listed: Registration Number: 424037
Location and Date of Issue	Pisa, 2017 May 17

G.S.D. s.r.l.
Via Marmiceto, 8
56121 OSPEDALETTO - PISA
Tel. 050.984254 - Fax 050.984262
P. IVA 01343950505

SENIOR EMC TEST MANAGER
Dr. Gian Luca Genovesi

QUALITY MANAGER
Dr. David Pelliccia

INDEX

1. MANUFACTURER AND EUT IDENTIFICATION [1]

Manufacturer	**CAEN RFID S.r.l..**
Address	Via Vetraia, 11 55049 Viareggio (LU) Italy
Test Family Name	**R1170IU**
Date of reception	**2017 April 11**
Sampling	**Laboratory sample for certification**
Test Item Description	**RFID Device**
Nominal Input Voltage	**5 Vdc (USB)**
FCC ID	**UVECAENRFID026**

[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 B 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
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
Maximum Permissible Exposure	OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radio-Frequency Electromagnetic Fields FCC Rules ad Regulations, Title 47 Part 15 – Sub part B DA 00-705 (30 March 2010) – Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

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*

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

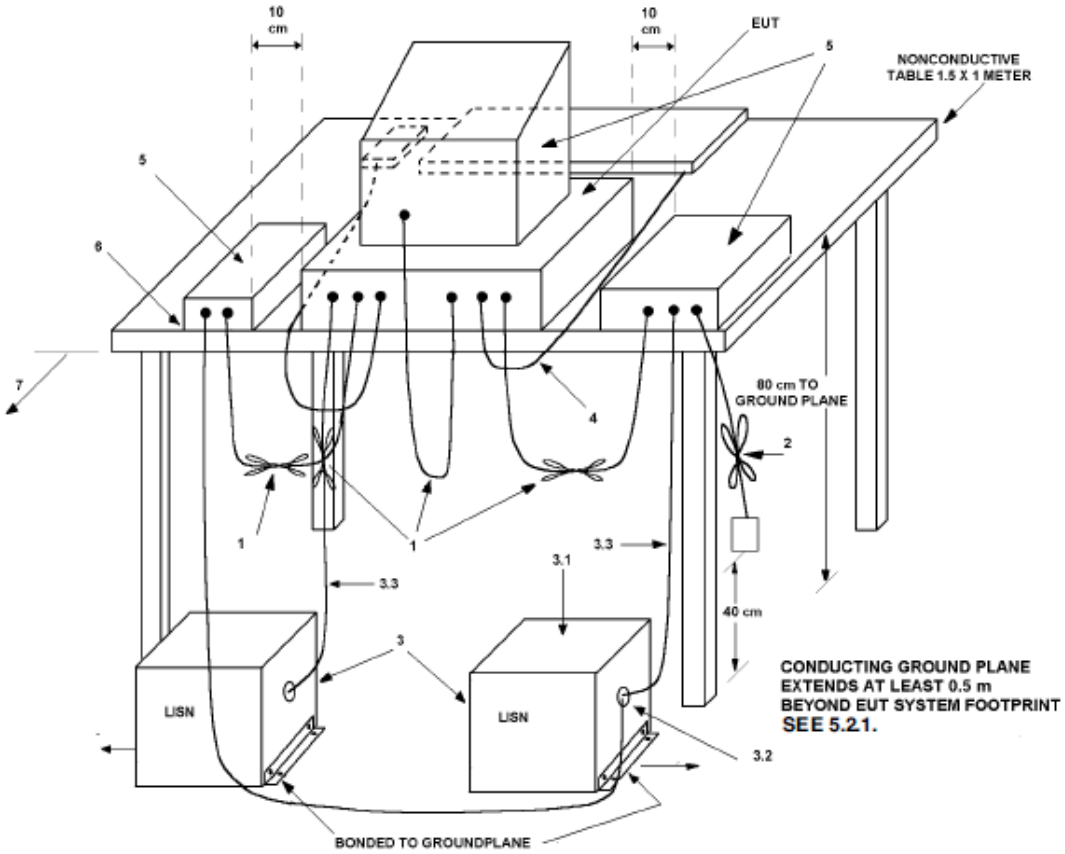
Climatic Conditions

PARAMETER	*VALUE*
Temperature	(293 ± 3) K
Relative humidity	(50 ± 5) %

Extensions

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

Modulations:
PR_ASK 40 kHz



Conducted and Radiated EUT Test Set-up example (ANSI C63.4 2014)

4. RADIATED EMISSIONS

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

FREQUENCY RANGE *(MHz)*	***Field Strength*** *QUASI-PEAK LIMITS* *[dB (µV/m)]*
30 – 88	40
88 – 216	43.5
216 – 960	46
Above 960	54

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
MXE EMI Receiver	Agilent	N9038A	01/2018
Anechoic Chamber	Comtest	CSA01	01/2018
Bilog Antenna	Schaffner	CBL6112B	01/2018
Horn Antenna	EMCO	3115	01/2018
Horn Antenna	Alpha Industries	61932500	01/2018
Loop Antenna	ETS Lindgren	6215	01/2018
Controller	Deisel	HD100	01/2018
Turn Table	Deisel	MA240	01/2018
LISN	GSD	NTW06	01/2018

Test procedure: RE22R02

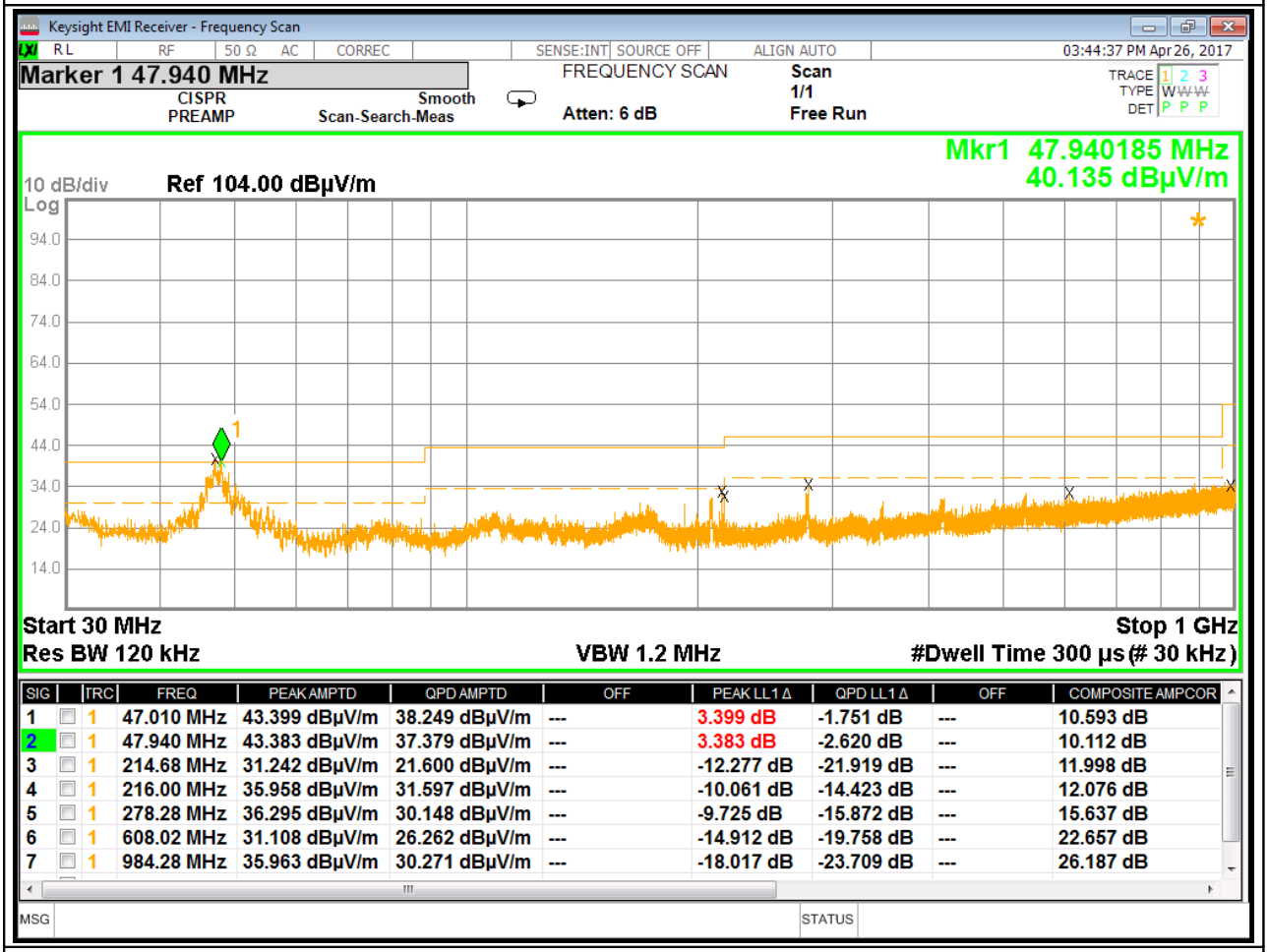
Notes

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 anticlockwise.
Antenna height respect to the mass plane is conventionally individuated with: MA=XXX where XXX indicates the height (always positive for d > 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 ortogonal 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-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

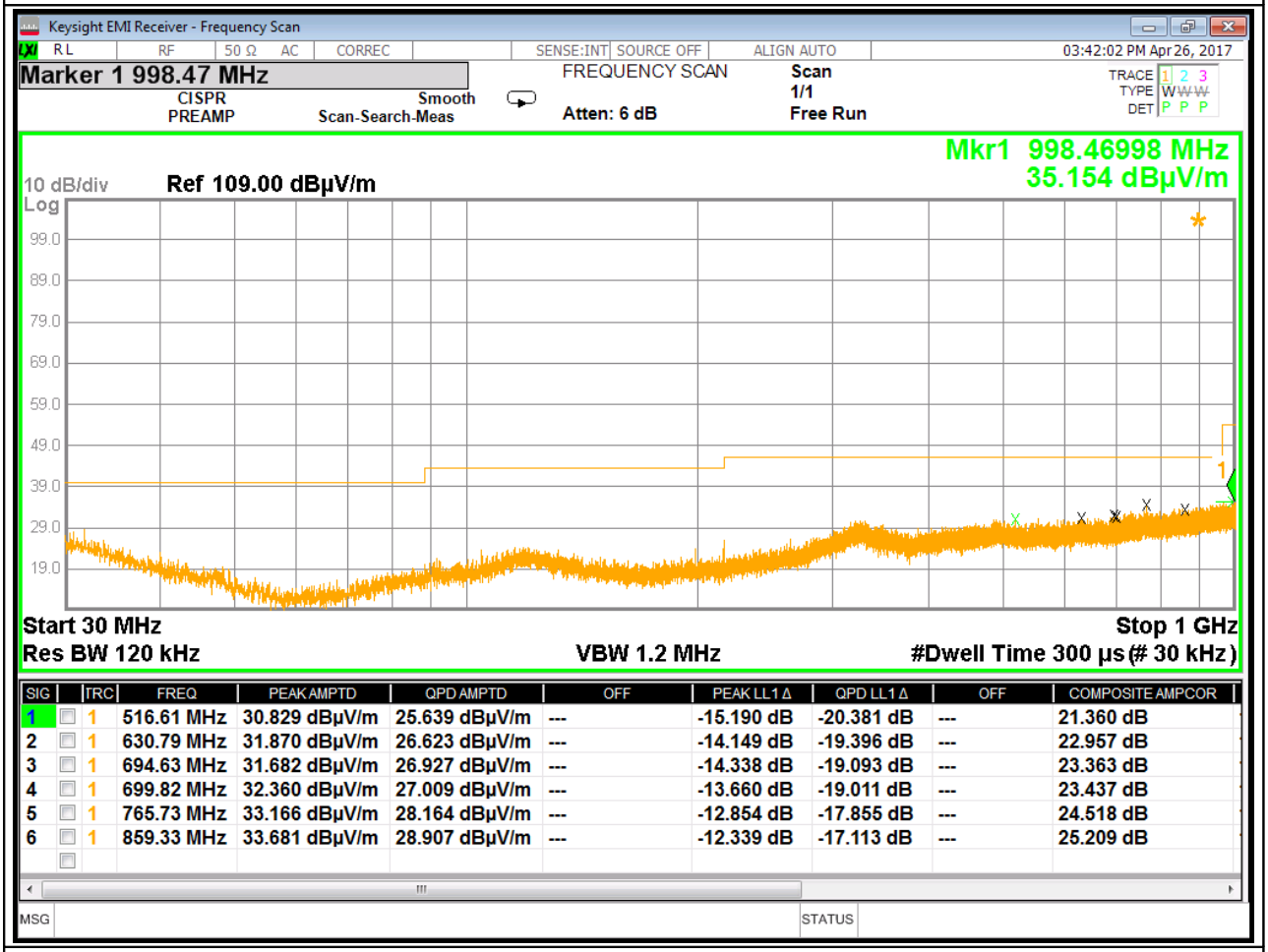


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	47.010 MHz	43.399 dBµV/m	38.249 dBµV/m	---	3.399 dB	-1.751 dB	---	10.593 dB
2	1	47.940 MHz	43.383 dBµV/m	37.379 dBµV/m	---	3.383 dB	-2.620 dB	---	10.112 dB
3	1	214.68 MHz	31.242 dBµV/m	21.600 dBµV/m	---	-12.277 dB	-21.919 dB	---	11.998 dB
4	1	216.00 MHz	35.958 dBµV/m	31.597 dBµV/m	---	-10.061 dB	-14.423 dB	---	12.076 dB
5	1	278.28 MHz	36.295 dBµV/m	30.148 dBµV/m	---	-9.725 dB	-15.872 dB	---	15.637 dB
6	1	608.02 MHz	31.108 dBµV/m	26.262 dBµV/m	---	-14.912 dB	-19.758 dB	---	22.657 dB
7	1	984.28 MHz	35.963 dBµV/m	30.271 dBµV/m	---	-18.017 dB	-23.709 dB	---	26.187 dB

Fig. 4.1 - standby

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

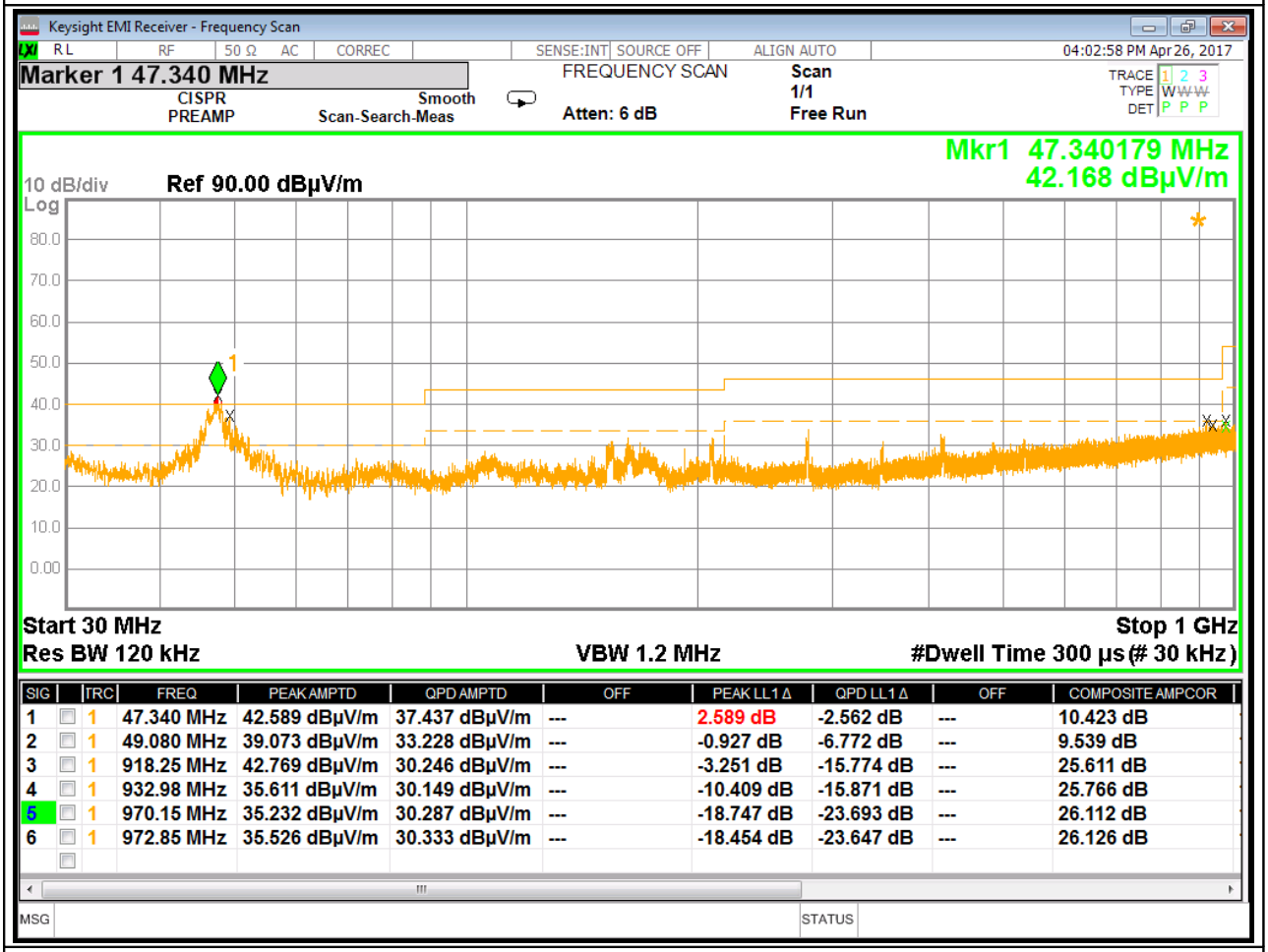


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	516.61 MHz	30.829 dBµV/m	25.639 dBµV/m	---	-15.190 dB	-20.381 dB	---	21.360 dB
2	1	630.79 MHz	31.870 dBµV/m	26.623 dBµV/m	---	-14.149 dB	-19.396 dB	---	22.957 dB
3	1	694.63 MHz	31.682 dBµV/m	26.927 dBµV/m	---	-14.338 dB	-19.093 dB	---	23.363 dB
4	1	699.82 MHz	32.360 dBµV/m	27.009 dBµV/m	---	-13.660 dB	-19.011 dB	---	23.437 dB
5	1	765.73 MHz	33.166 dBµV/m	28.164 dBµV/m	---	-12.854 dB	-17.855 dB	---	24.518 dB
6	1	859.33 MHz	33.681 dBµV/m	28.907 dBµV/m	---	-12.339 dB	-17.113 dB	---	25.209 dB

Fig. 4.2 - standby

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	47.340 MHz	42.589 dBµV/m	37.437 dBµV/m	---	2.589 dB	-2.562 dB	---	10.423 dB
2	1	49.080 MHz	39.073 dBµV/m	33.228 dBµV/m	---	-0.927 dB	-6.772 dB	---	9.539 dB
3	1	918.25 MHz	42.769 dBµV/m	30.246 dBµV/m	---	-3.251 dB	-15.774 dB	---	25.611 dB
4	1	932.98 MHz	35.611 dBµV/m	30.149 dBµV/m	---	-10.409 dB	-15.871 dB	---	25.766 dB
5	1	970.15 MHz	35.232 dBµV/m	30.287 dBµV/m	---	-18.747 dB	-23.693 dB	---	26.112 dB
6	1	972.85 MHz	35.526 dBµV/m	30.333 dBµV/m	---	-18.454 dB	-23.647 dB	---	26.126 dB

Fig. 4.3

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

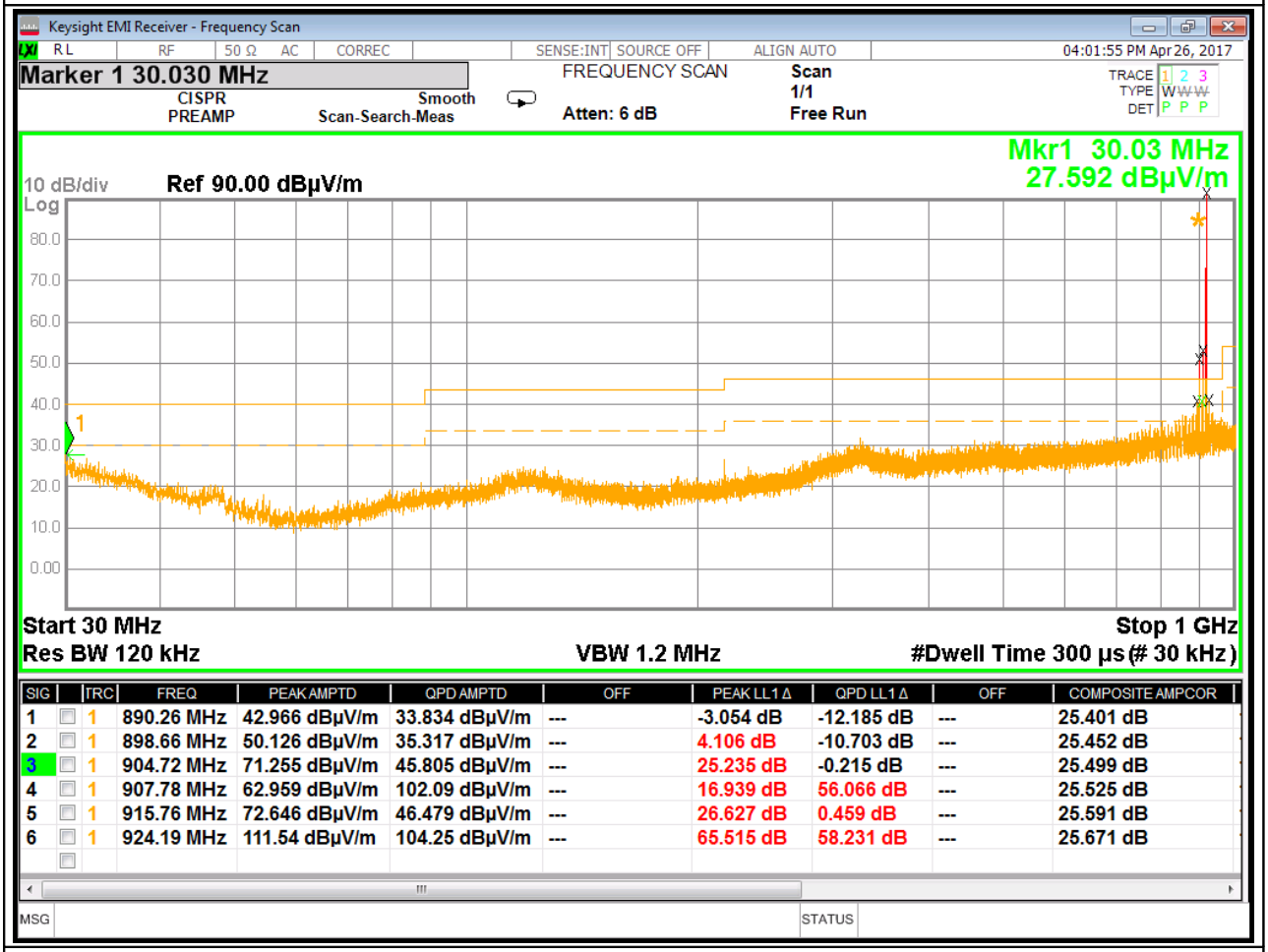
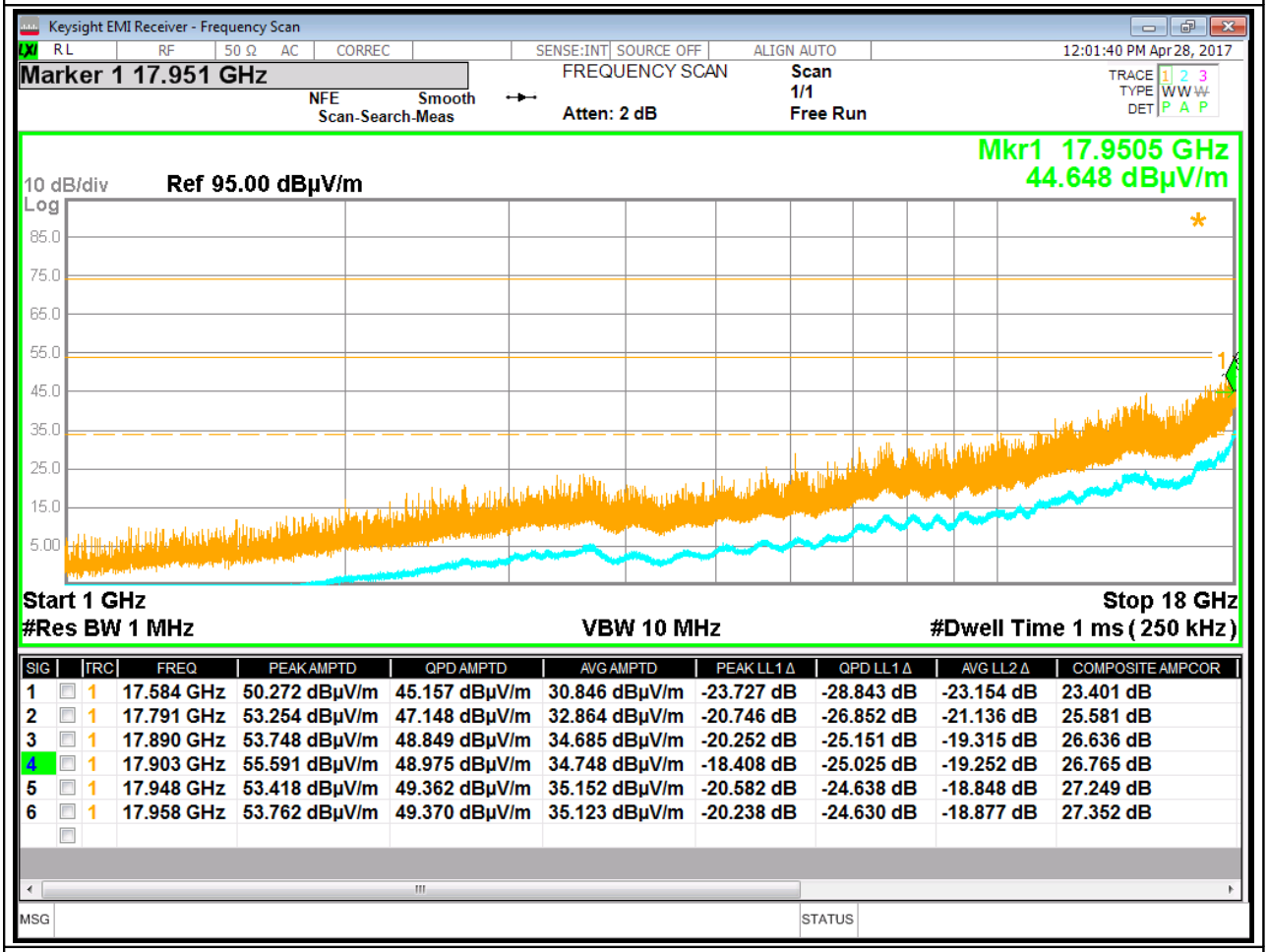


Fig. 4.4

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

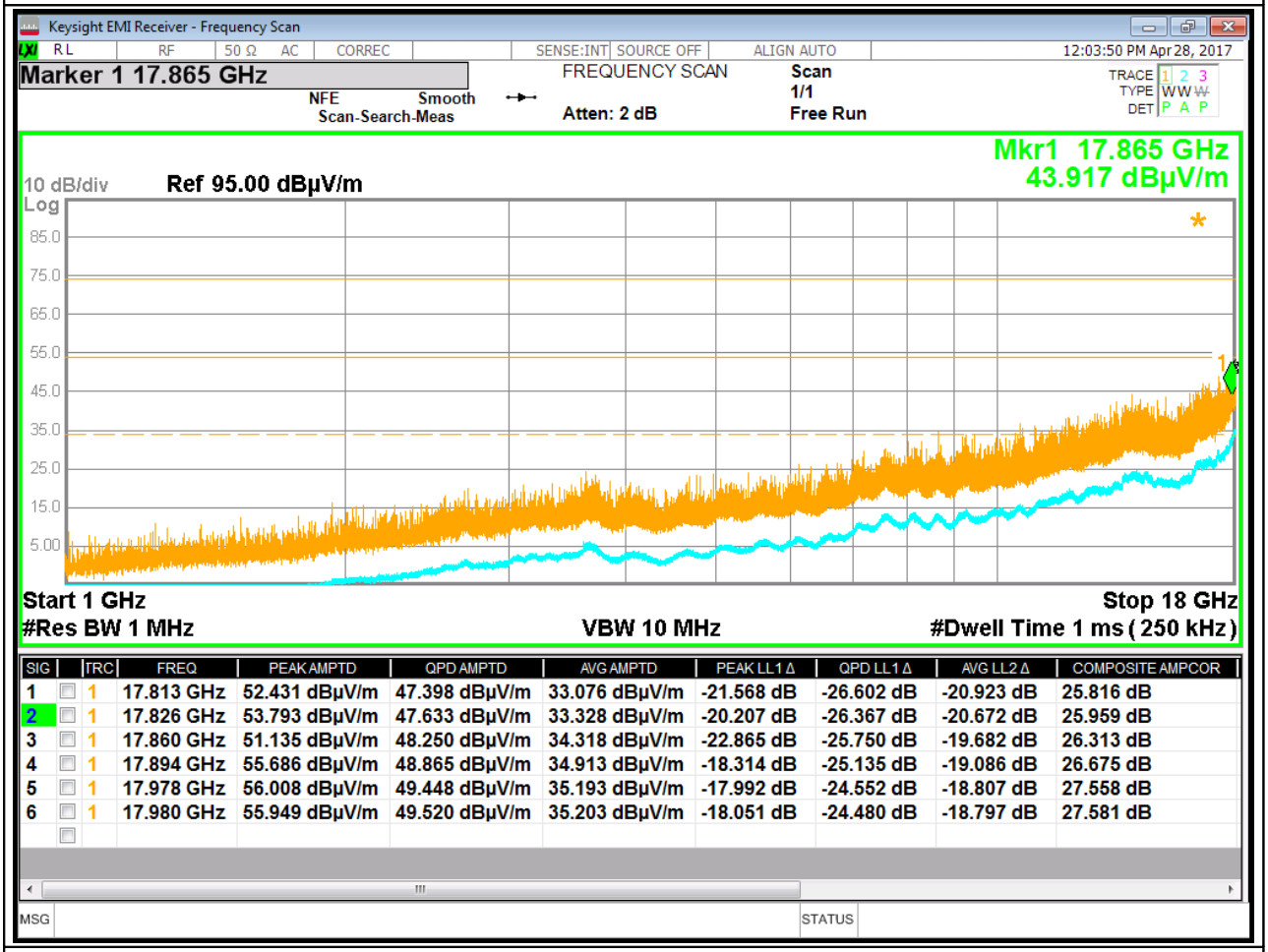


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	17.584 GHz	50.272 dBµV/m	45.157 dBµV/m	30.846 dBµV/m	-23.727 dB	-28.843 dB	-23.154 dB	23.401 dB
2	1	17.791 GHz	53.254 dBµV/m	47.148 dBµV/m	32.864 dBµV/m	-20.746 dB	-26.852 dB	-21.136 dB	25.581 dB
3	1	17.890 GHz	53.748 dBµV/m	48.849 dBµV/m	34.685 dBµV/m	-20.252 dB	-25.151 dB	-19.315 dB	26.636 dB
4	1	17.903 GHz	55.591 dBµV/m	48.975 dBµV/m	34.748 dBµV/m	-18.408 dB	-25.025 dB	-19.252 dB	26.765 dB
5	1	17.948 GHz	53.418 dBµV/m	49.362 dBµV/m	35.152 dBµV/m	-20.582 dB	-24.638 dB	-18.848 dB	27.249 dB
6	1	17.958 GHz	53.762 dBµV/m	49.370 dBµV/m	35.123 dBµV/m	-20.238 dB	-24.630 dB	-18.877 dB	27.352 dB

Fig. 4.5 - standby

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

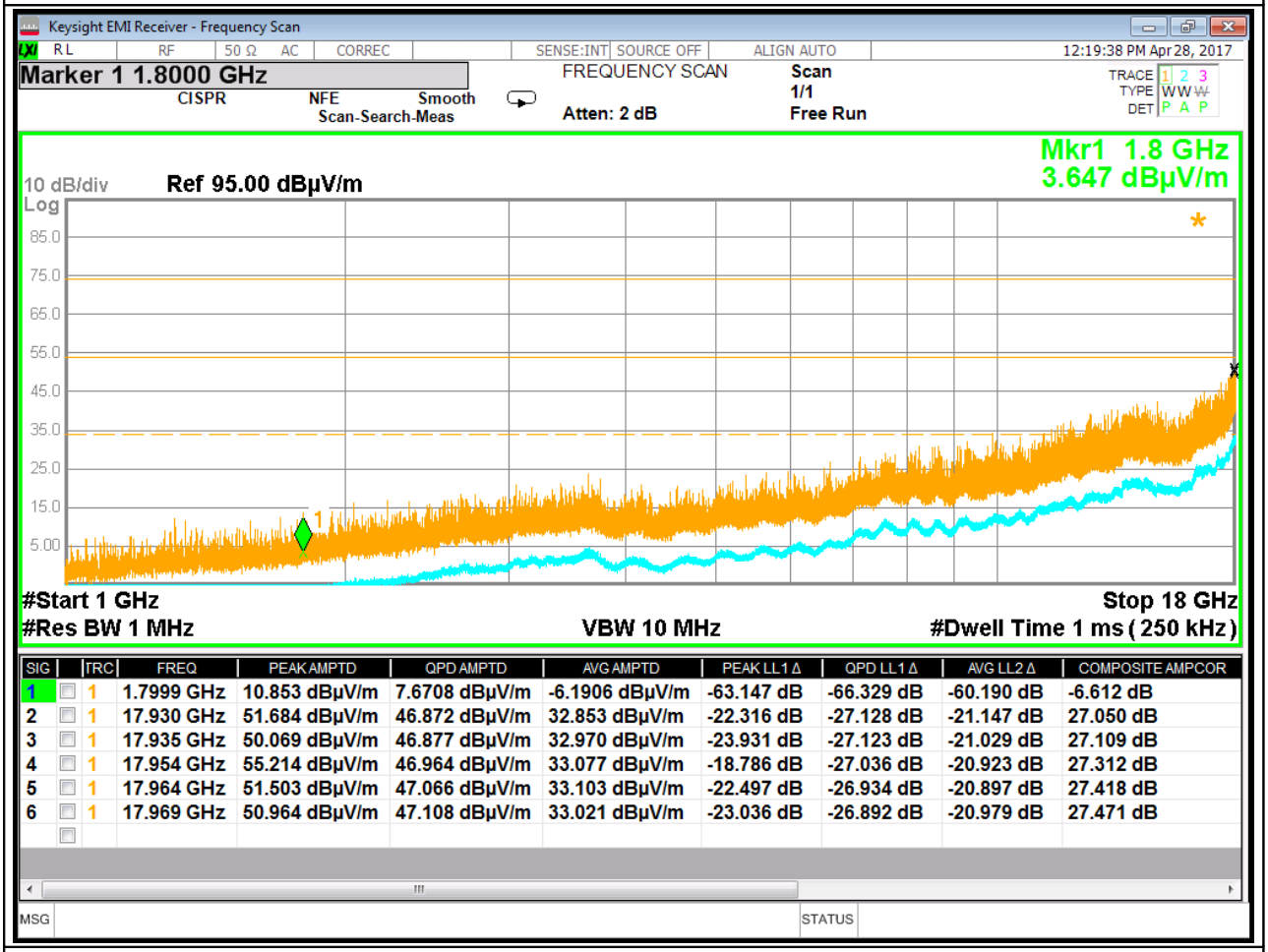


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	17.813 GHz	52.431 dBµV/m	47.398 dBµV/m	33.076 dBµV/m	-21.568 dB	-26.602 dB	-20.923 dB	25.816 dB
2	1	17.826 GHz	53.793 dBµV/m	47.633 dBµV/m	33.328 dBµV/m	-20.207 dB	-26.367 dB	-20.672 dB	25.959 dB
3	1	17.860 GHz	51.135 dBµV/m	48.250 dBµV/m	34.318 dBµV/m	-22.865 dB	-25.750 dB	-19.682 dB	26.313 dB
4	1	17.894 GHz	55.686 dBµV/m	48.865 dBµV/m	34.913 dBµV/m	-18.314 dB	-25.135 dB	-19.086 dB	26.675 dB
5	1	17.978 GHz	56.008 dBµV/m	49.448 dBµV/m	35.193 dBµV/m	-17.992 dB	-24.552 dB	-18.807 dB	27.558 dB
6	1	17.980 GHz	55.949 dBµV/m	49.520 dBµV/m	35.203 dBµV/m	-18.051 dB	-24.480 dB	-18.797 dB	27.581 dB

Fig. 4.6 - standby

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

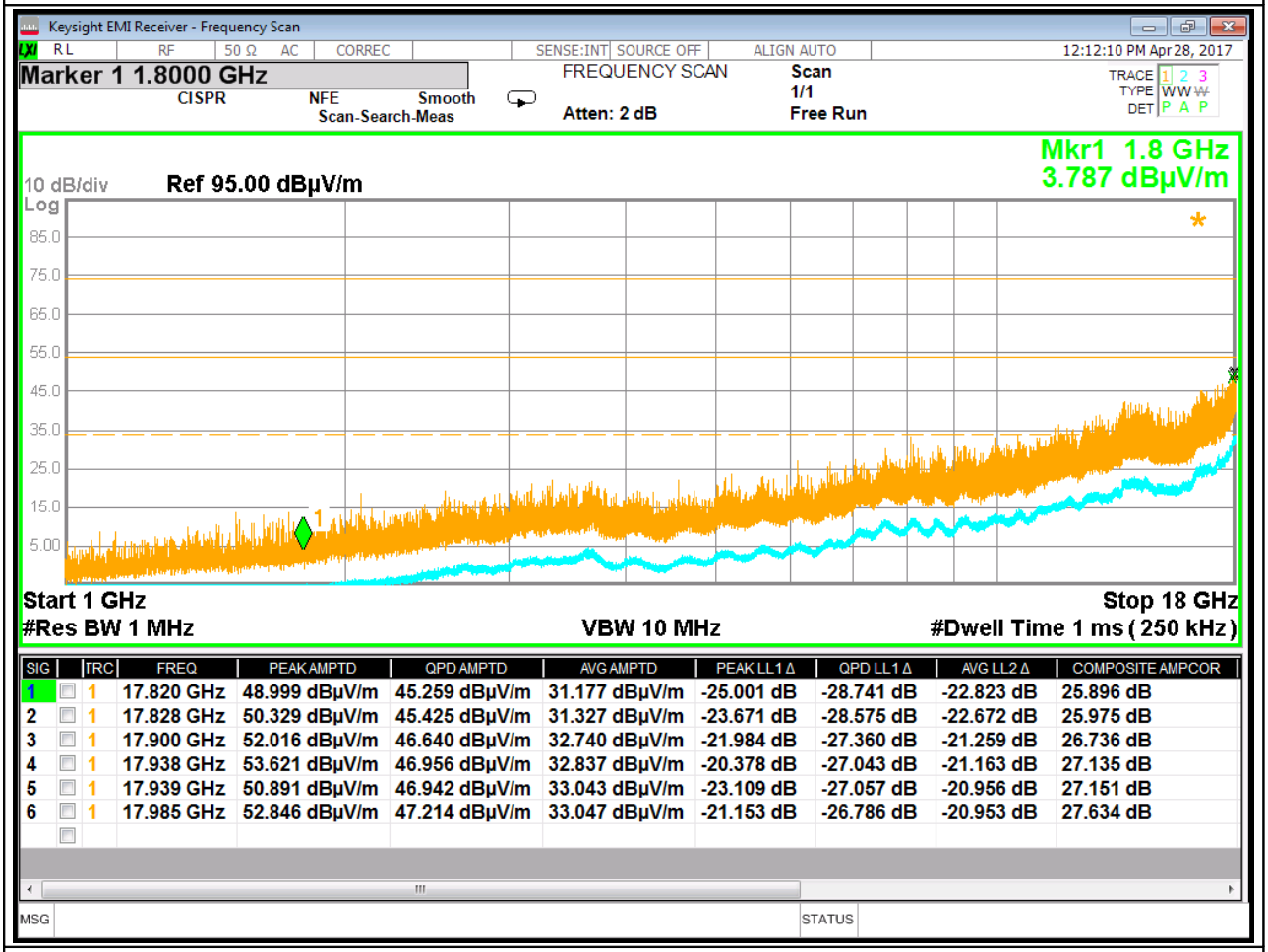


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	1.7999 GHz	10.853 dBµV/m	7.6708 dBµV/m	-6.1906 dBµV/m	-63.147 dB	-66.329 dB	-60.190 dB	-6.612 dB
2	1	17.930 GHz	51.684 dBµV/m	46.872 dBµV/m	32.853 dBµV/m	-22.316 dB	-27.128 dB	-21.147 dB	27.050 dB
3	1	17.935 GHz	50.069 dBµV/m	46.877 dBµV/m	32.970 dBµV/m	-23.931 dB	-27.123 dB	-21.029 dB	27.109 dB
4	1	17.954 GHz	55.214 dBµV/m	46.964 dBµV/m	33.077 dBµV/m	-18.786 dB	-27.036 dB	-20.923 dB	27.312 dB
5	1	17.964 GHz	51.503 dBµV/m	47.066 dBµV/m	33.103 dBµV/m	-22.497 dB	-26.934 dB	-20.897 dB	27.418 dB
6	1	17.969 GHz	50.964 dBµV/m	47.108 dBµV/m	33.021 dBµV/m	-23.036 dB	-26.892 dB	-20.979 dB	27.471 dB

Fig. 4.7

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

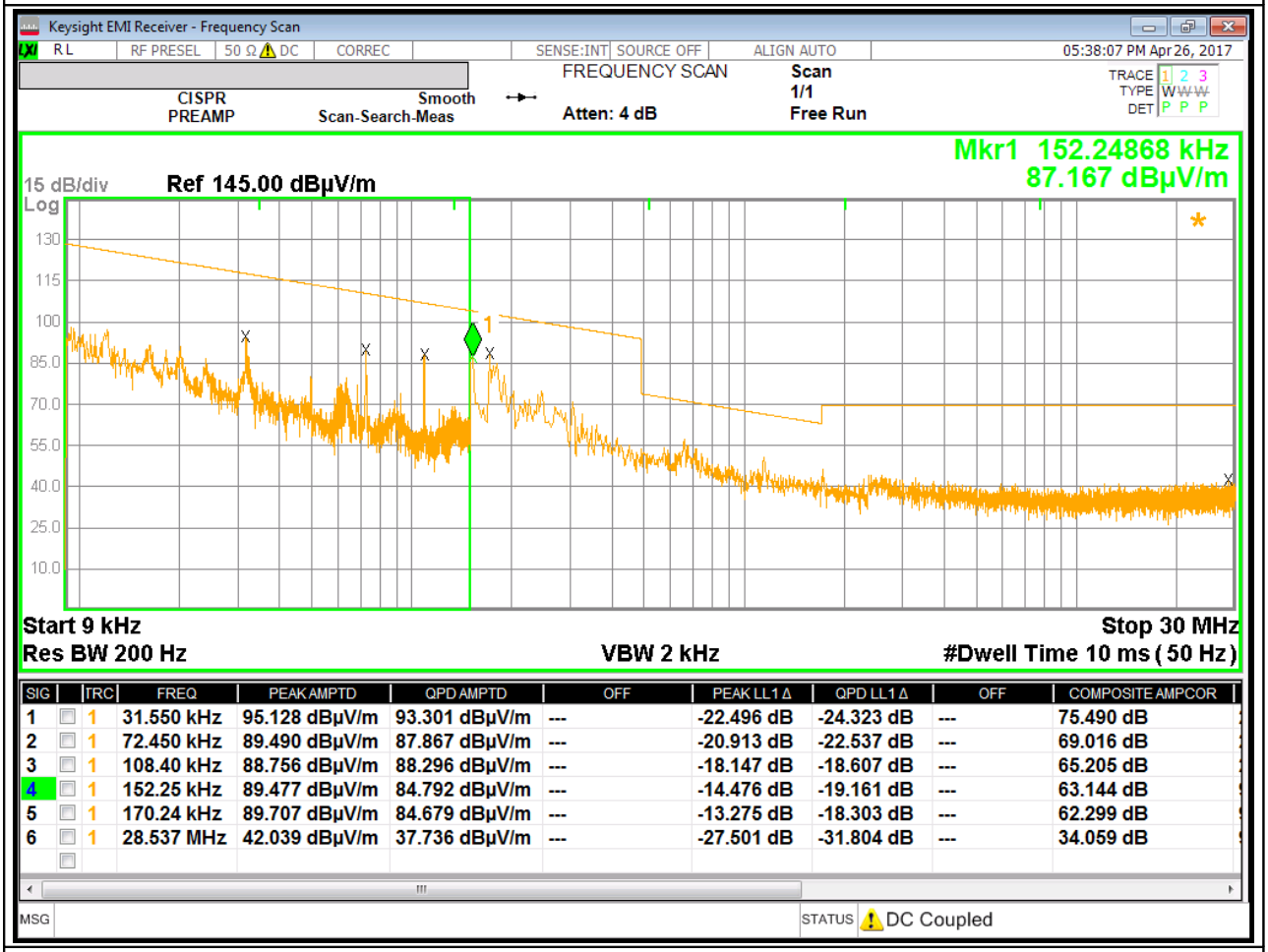


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	17.820 GHz	48.999 dBµV/m	45.259 dBµV/m	31.177 dBµV/m	-25.001 dB	-28.741 dB	-22.823 dB	25.896 dB
2	1	17.828 GHz	50.329 dBµV/m	45.425 dBµV/m	31.327 dBµV/m	-23.671 dB	-28.575 dB	-22.672 dB	25.975 dB
3	1	17.900 GHz	52.016 dBµV/m	46.640 dBµV/m	32.740 dBµV/m	-21.984 dB	-27.360 dB	-21.259 dB	26.736 dB
4	1	17.938 GHz	53.621 dBµV/m	46.956 dBµV/m	32.837 dBµV/m	-20.378 dB	-27.043 dB	-21.163 dB	27.135 dB
5	1	17.939 GHz	50.891 dBµV/m	46.942 dBµV/m	33.043 dBµV/m	-23.109 dB	-27.057 dB	-20.956 dB	27.151 dB
6	1	17.985 GHz	52.846 dBµV/m	47.214 dBµV/m	33.047 dBµV/m	-21.153 dB	-26.786 dB	-20.953 dB	27.634 dB

Fig. 4.8

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

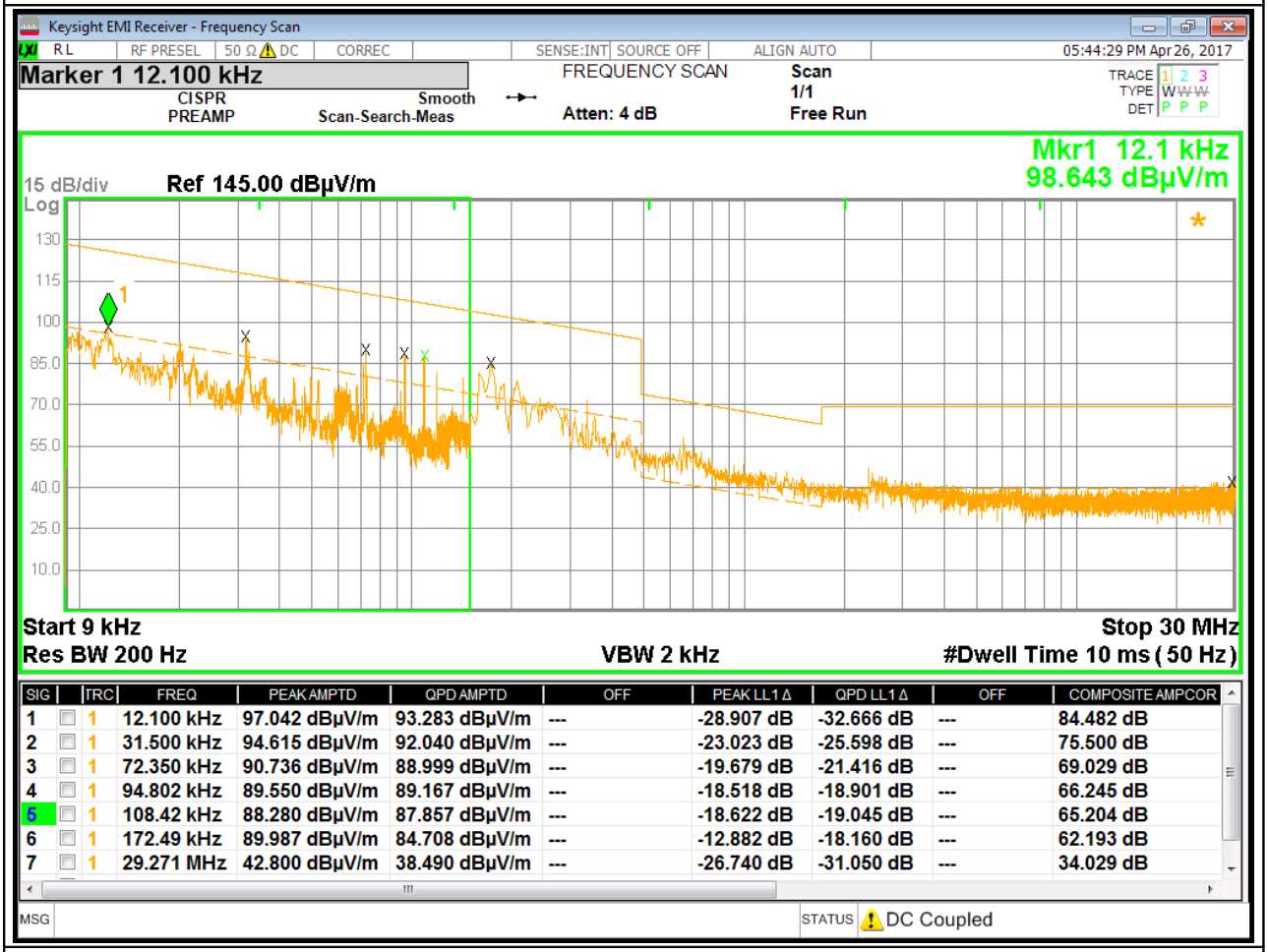


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	31.550 kHz	95.128 dBµV/m	93.301 dBµV/m	---	-22.496 dB	-24.323 dB	---	75.490 dB
2	1	72.450 kHz	89.490 dBµV/m	87.867 dBµV/m	---	-20.913 dB	-22.537 dB	---	69.016 dB
3	1	108.40 kHz	88.756 dBµV/m	88.296 dBµV/m	---	-18.147 dB	-18.607 dB	---	65.205 dB
4	1	152.25 kHz	89.477 dBµV/m	84.792 dBµV/m	---	-14.476 dB	-19.161 dB	---	63.144 dB
5	1	170.24 kHz	89.707 dBµV/m	84.679 dBµV/m	---	-13.275 dB	-18.303 dB	---	62.299 dB
6	1	28.537 MHz	42.039 dBµV/m	37.736 dBµV/m	---	-27.501 dB	-31.804 dB	---	34.059 dB

Fig. 4.9 - standby

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

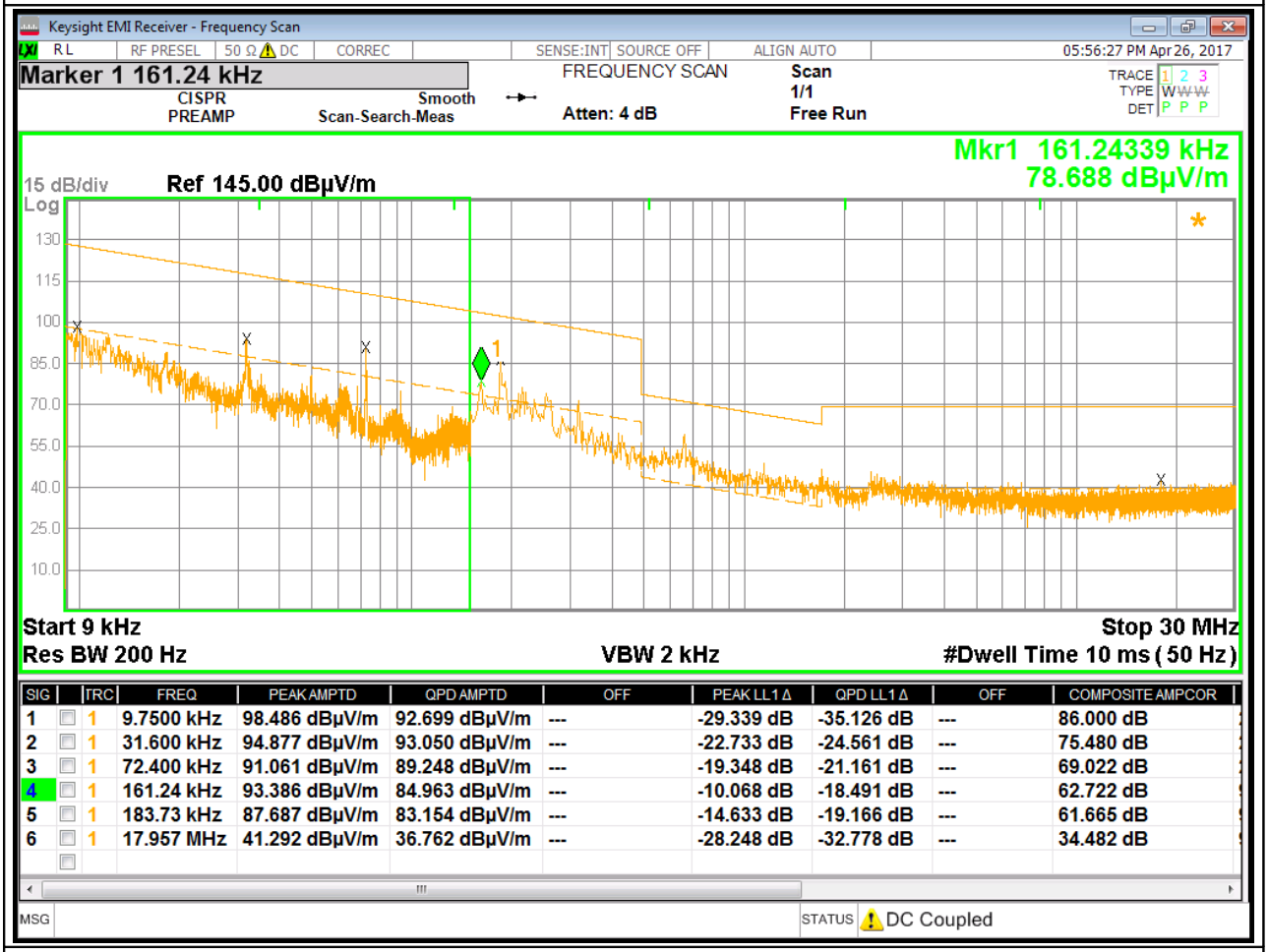


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	12.100 kHz	97.042 dBµV/m	93.283 dBµV/m	---	-28.907 dB	-32.666 dB	---	84.482 dB
2	1	31.500 kHz	94.615 dBµV/m	92.040 dBµV/m	---	-23.023 dB	-25.598 dB	---	75.500 dB
3	1	72.350 kHz	90.736 dBµV/m	88.999 dBµV/m	---	-19.679 dB	-21.416 dB	---	69.029 dB
4	1	94.802 kHz	89.550 dBµV/m	89.167 dBµV/m	---	-18.518 dB	-18.901 dB	---	66.245 dB
5	1	108.42 kHz	88.280 dBµV/m	87.857 dBµV/m	---	-18.622 dB	-19.045 dB	---	65.204 dB
6	1	172.49 kHz	89.987 dBµV/m	84.708 dBµV/m	---	-12.882 dB	-18.160 dB	---	62.193 dB
7	1	29.271 MHz	42.800 dBµV/m	38.490 dBµV/m	---	-26.740 dB	-31.050 dB	---	34.029 dB

Fig. 4.10 - standby

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU

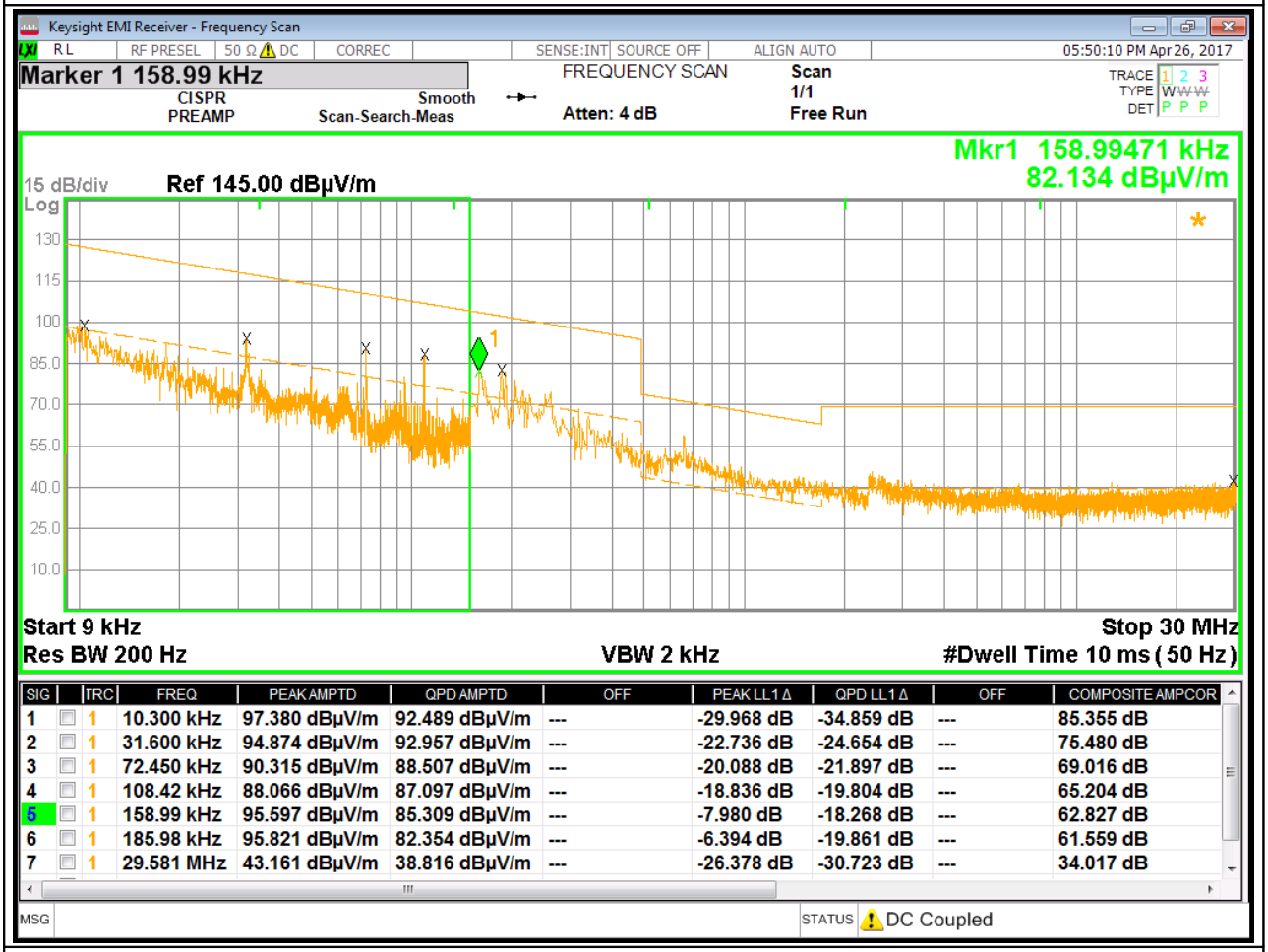


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	9.7500 kHz	98.486 dBµV/m	92.699 dBµV/m	---	-29.339 dB	-35.126 dB	---	86.000 dB
2	1	31.600 kHz	94.877 dBµV/m	93.050 dBµV/m	---	-22.733 dB	-24.561 dB	---	75.480 dB
3	1	72.400 kHz	91.061 dBµV/m	89.248 dBµV/m	---	-19.348 dB	-21.161 dB	---	69.022 dB
4	1	161.24 kHz	93.386 dBµV/m	84.963 dBµV/m	---	-10.068 dB	-18.491 dB	---	62.722 dB
5	1	183.73 kHz	87.687 dBµV/m	83.154 dBµV/m	---	-14.633 dB	-19.166 dB	---	61.665 dB
6	1	17.957 MHz	41.292 dBµV/m	36.762 dBµV/m	---	-28.248 dB	-32.778 dB	---	34.482 dB

Fig. 4.11

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

Job Number	FCC-17238
Test Name	Radiated Emissions
EUT Name	CAEN RFID S.r.l. - R1170IU



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	10.300 kHz	97.380 dBµV/m	92.489 dBµV/m	---	-29.968 dB	-34.859 dB	---	85.355 dB
2	1	31.600 kHz	94.874 dBµV/m	92.957 dBµV/m	---	-22.736 dB	-24.654 dB	---	75.480 dB
3	1	72.450 kHz	90.315 dBµV/m	88.507 dBµV/m	---	-20.088 dB	-21.897 dB	---	69.016 dB
4	1	108.42 kHz	88.066 dBµV/m	87.097 dBµV/m	---	-18.836 dB	-19.804 dB	---	65.204 dB
5	1	158.99 kHz	95.597 dBµV/m	85.309 dBµV/m	---	-7.980 dB	-18.268 dB	---	62.827 dB
6	1	185.98 kHz	95.821 dBµV/m	82.354 dBµV/m	---	-6.394 dB	-19.861 dB	---	61.559 dB
7	1	29.581 MHz	43.161 dBµV/m	38.816 dBµV/m	---	-26.378 dB	-30.723 dB	---	34.017 dB

Fig. 4.12

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	N9038A	01/2018
Screened Room	GSD	CSC01	01/2018
LISN	GSD	GSDA01	01/2018
LISN	COMTEST	---	01/2018

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.

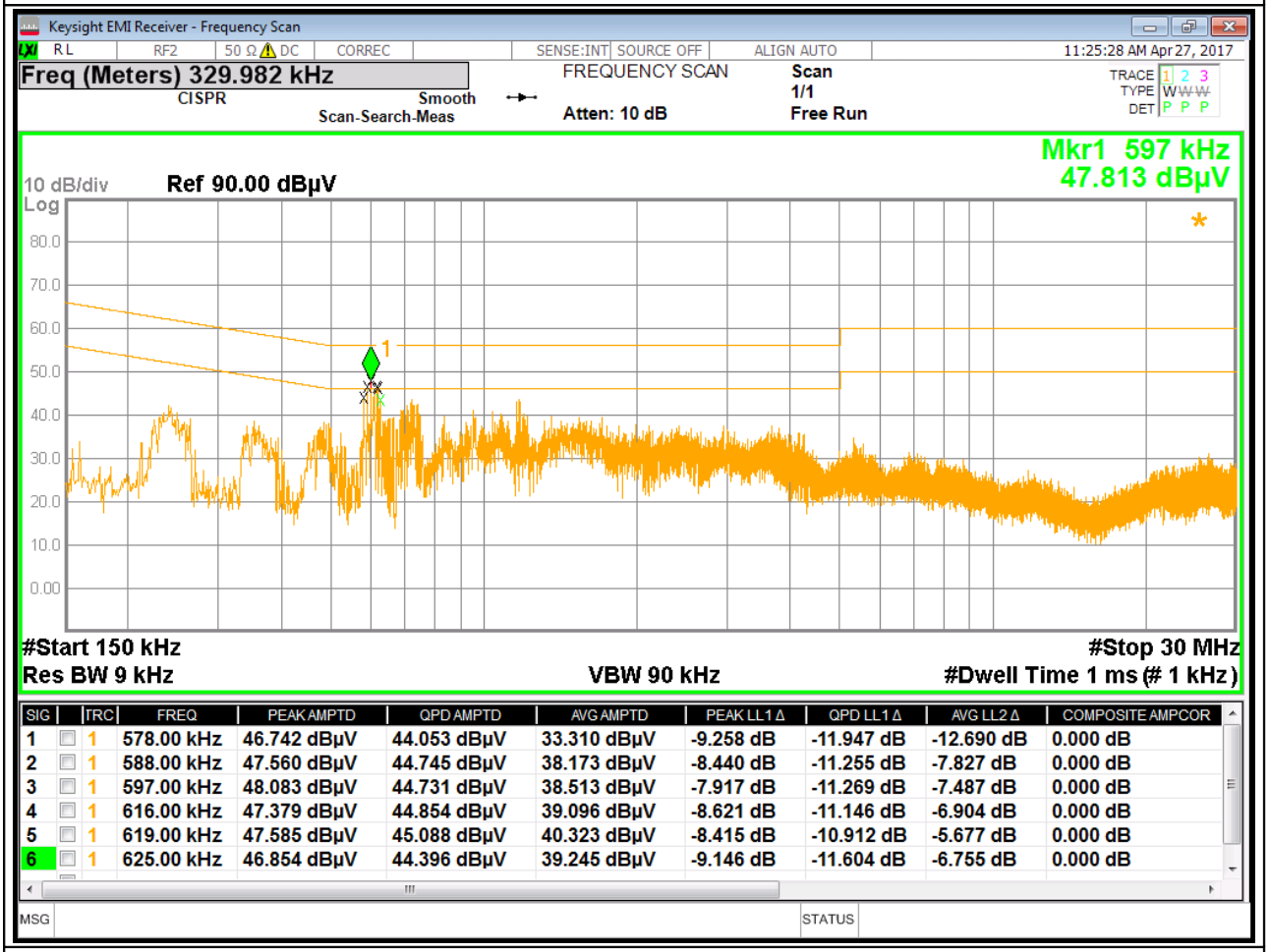
EUT modes of operations were tested in order to achieve the maximum level of emission.

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-17238
Test Name	Powerline Conducted Emissions FCC 15.207
EUT Name	R1170IU

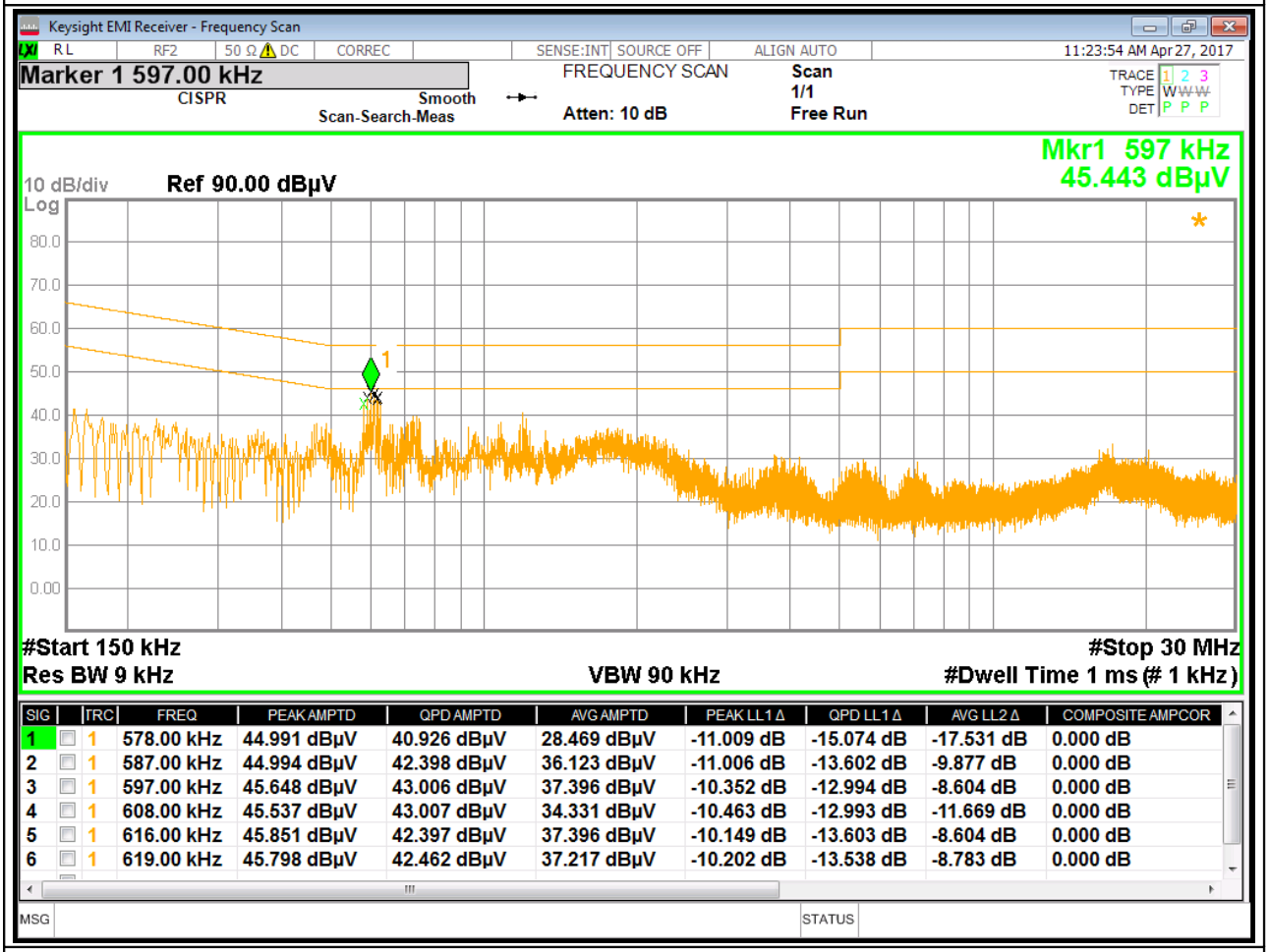


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	578.00 kHz	46.742 dBµV	44.053 dBµV	33.310 dBµV	-9.258 dB	-11.947 dB	-12.690 dB	0.000 dB
2	1	588.00 kHz	47.560 dBµV	44.745 dBµV	38.173 dBµV	-8.440 dB	-11.255 dB	-7.827 dB	0.000 dB
3	1	597.00 kHz	48.083 dBµV	44.731 dBµV	38.513 dBµV	-7.917 dB	-11.269 dB	-7.487 dB	0.000 dB
4	1	616.00 kHz	47.379 dBµV	44.854 dBµV	39.096 dBµV	-8.621 dB	-11.146 dB	-6.904 dB	0.000 dB
5	1	619.00 kHz	47.585 dBµV	45.088 dBµV	40.323 dBµV	-8.415 dB	-10.912 dB	-5.677 dB	0.000 dB
6	1	625.00 kHz	46.854 dBµV	44.396 dBµV	39.245 dBµV	-9.146 dB	-11.604 dB	-6.755 dB	0.000 dB

Fig. 5.1 – standby

B Band (0.15 – 30 MHz): line 1

Job Number	FCC-17238
Test Name	Powerline Conducted Emissions FCC 15.207
EUT Name	R1170IU



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	578.00 kHz	44.991 dBµV	40.926 dBµV	28.469 dBµV	-11.009 dB	-15.074 dB	-17.531 dB	0.000 dB
2	1	587.00 kHz	44.994 dBµV	42.398 dBµV	36.123 dBµV	-11.006 dB	-13.602 dB	-9.877 dB	0.000 dB
3	1	597.00 kHz	45.648 dBµV	43.006 dBµV	37.396 dBµV	-10.352 dB	-12.994 dB	-8.604 dB	0.000 dB
4	1	608.00 kHz	45.537 dBµV	43.007 dBµV	34.331 dBµV	-10.463 dB	-12.993 dB	-11.669 dB	0.000 dB
5	1	616.00 kHz	45.851 dBµV	42.397 dBµV	37.396 dBµV	-10.149 dB	-13.603 dB	-8.604 dB	0.000 dB
6	1	619.00 kHz	45.798 dBµV	42.462 dBµV	37.217 dBµV	-10.202 dB	-13.538 dB	-8.783 dB	0.000 dB

Fig. 5.2 – standby

B Band (0.15 – 30 MHz): line 2

Job Number	FCC-17238
Test Name	Powerline Conducted Emissions FCC 15.207
EUT Name	R1170IU

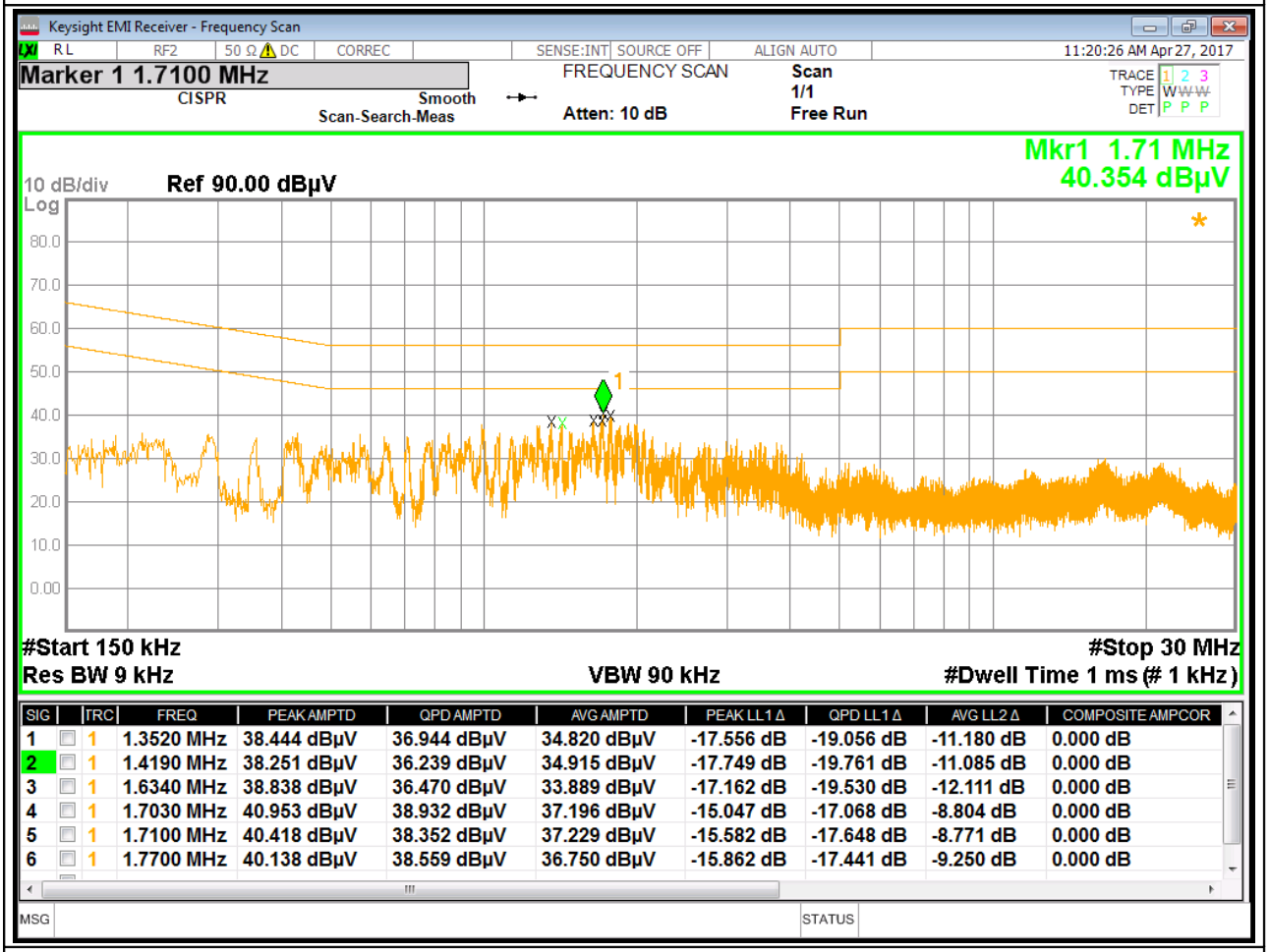
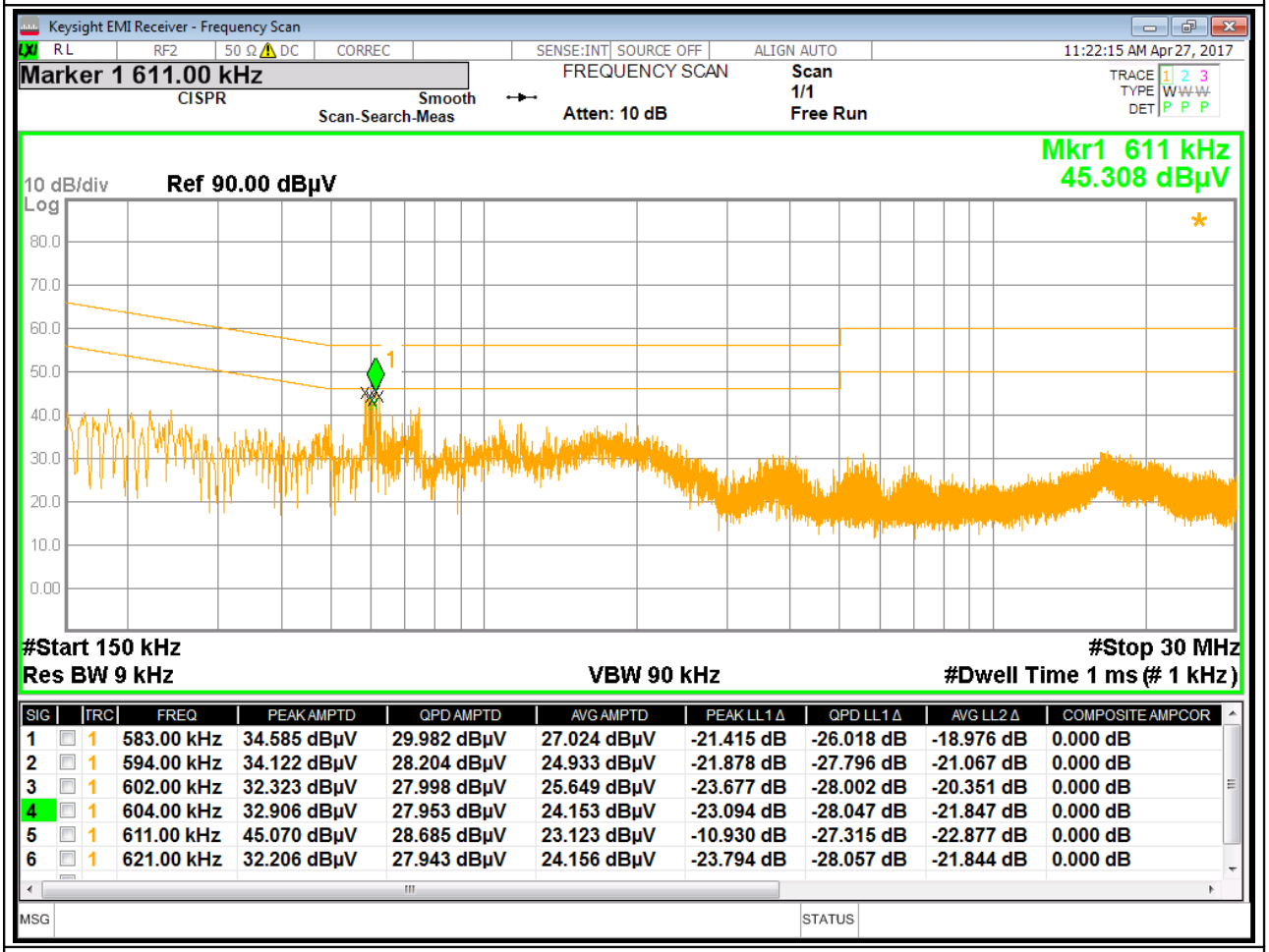


Fig. 5.3

B Band (0.15 – 30 MHz): line 1

Job Number	FCC-17238
Test Name	Powerline Conducted Emissions FCC 15.207
EUT Name	R1170IU



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	AVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	AVG LL2 Δ	COMPOSITE AMPCOR
1	1	583.00 kHz	34.585 dBµV	29.982 dBµV	27.024 dBµV	-21.415 dB	-26.018 dB	-18.976 dB	0.000 dB
2	1	594.00 kHz	34.122 dBµV	28.204 dBµV	24.933 dBµV	-21.878 dB	-27.796 dB	-21.067 dB	0.000 dB
3	1	602.00 kHz	32.323 dBµV	27.998 dBµV	25.649 dBµV	-23.677 dB	-28.002 dB	-20.351 dB	0.000 dB
4	1	604.00 kHz	32.906 dBµV	27.953 dBµV	24.153 dBµV	-23.094 dB	-28.047 dB	-21.847 dB	0.000 dB
5	1	611.00 kHz	45.070 dBµV	28.685 dBµV	23.123 dBµV	-10.930 dB	-27.315 dB	-22.877 dB	0.000 dB
6	1	621.00 kHz	32.206 dBµV	27.943 dBµV	24.156 dBµV	-23.794 dB	-28.057 dB	-21.844 dB	0.000 dB

Fig. 5.4

B Band (0.15 – 30 MHz): line 2

6. OPERATION WITHIN THE BAND 902 - 928 MHz

6.1. NUMBER OF HOPPING FREQUENCIES

The frequency hopping systems operating in the 902-928 MHz band.

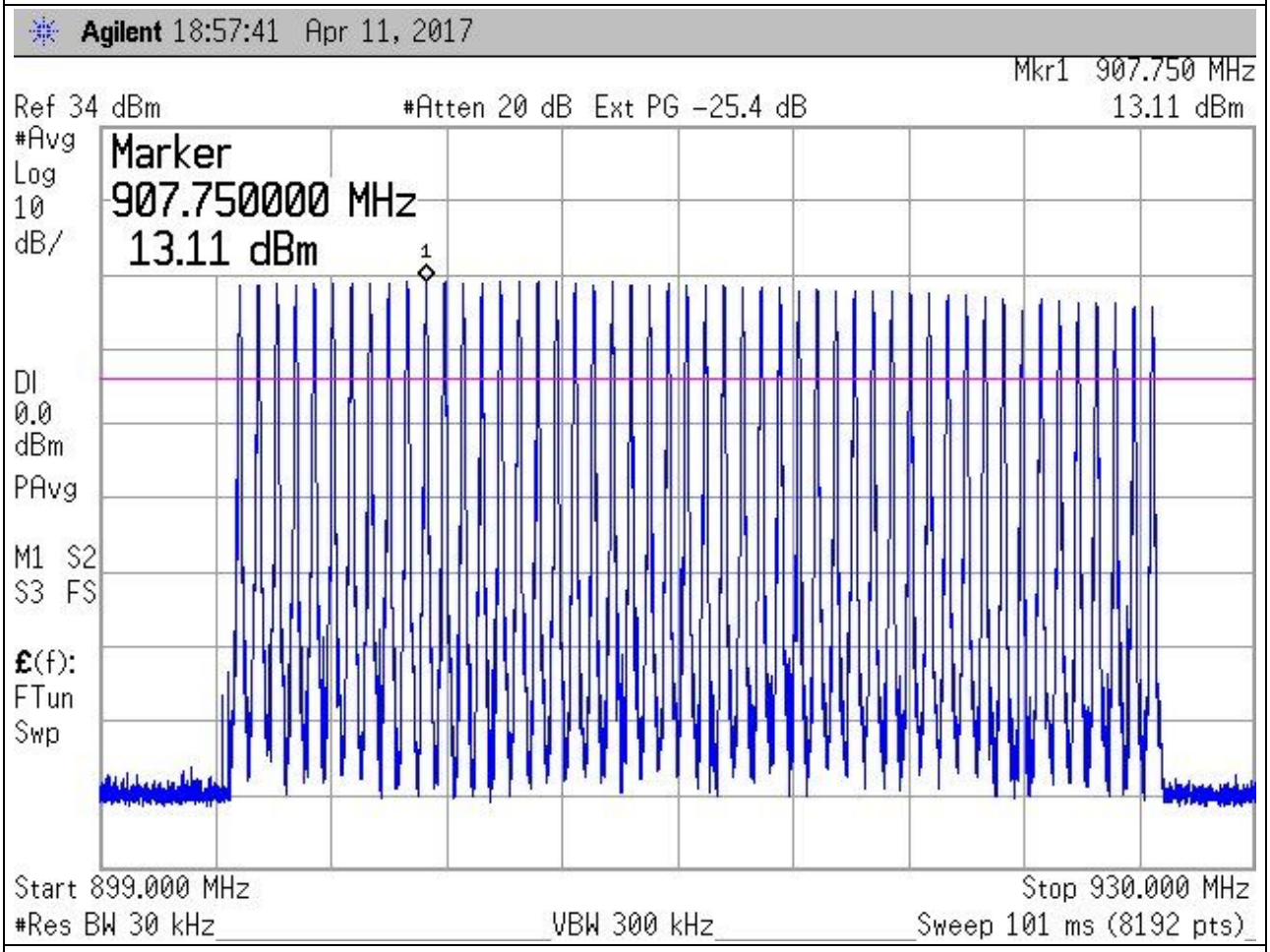


Fig. 6.1

The number of hopping frequencies is 50.

6.2. Carrier Frequency Separation

The frequency hopping systems operating in the 902-928 MHz band.

The measured values are:

Channel	Carrier Separation (kHz)
0	500.79
25	500.18
49	496.64

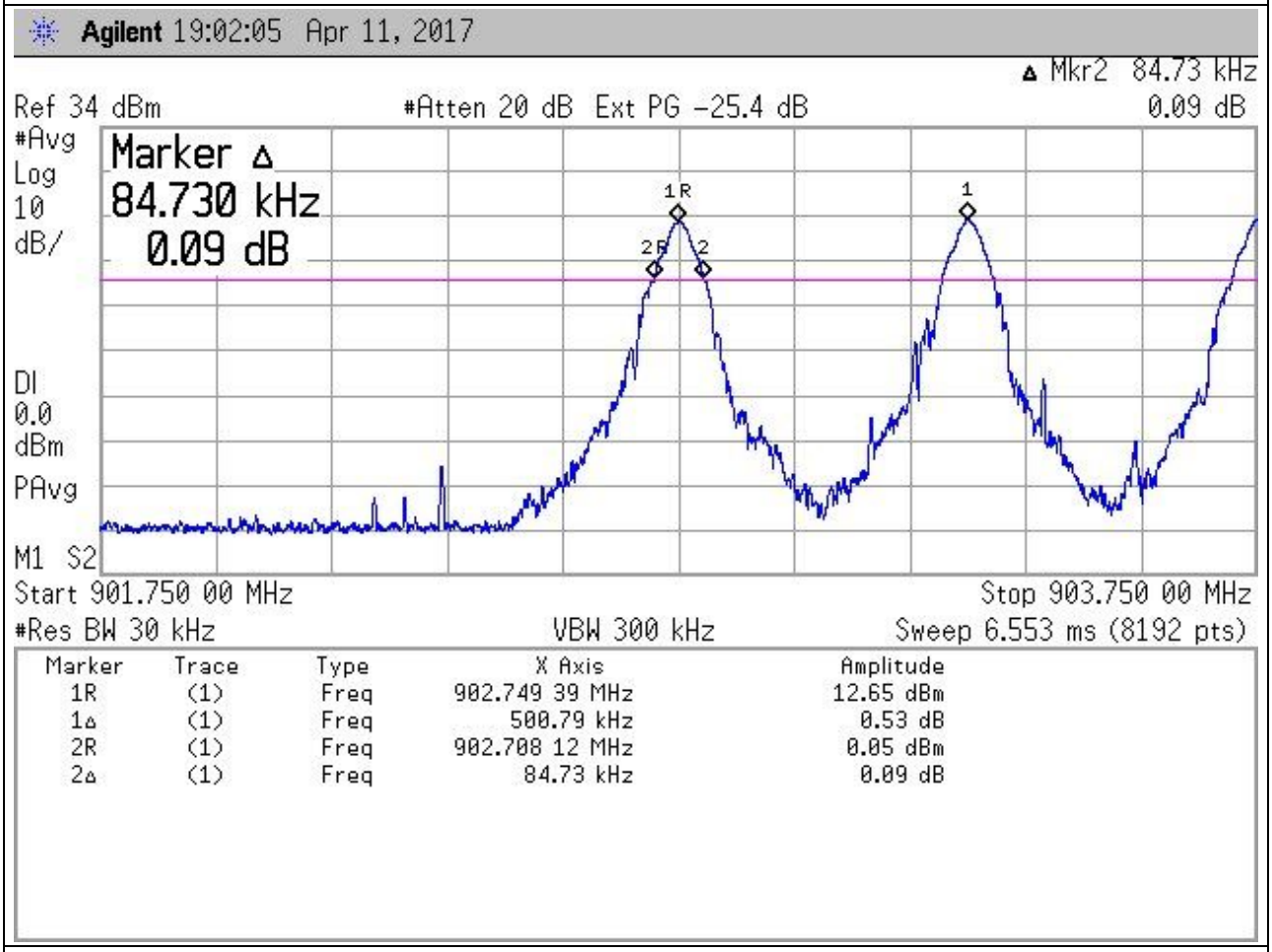


Fig. 6.2
Channel 0, Max Hold

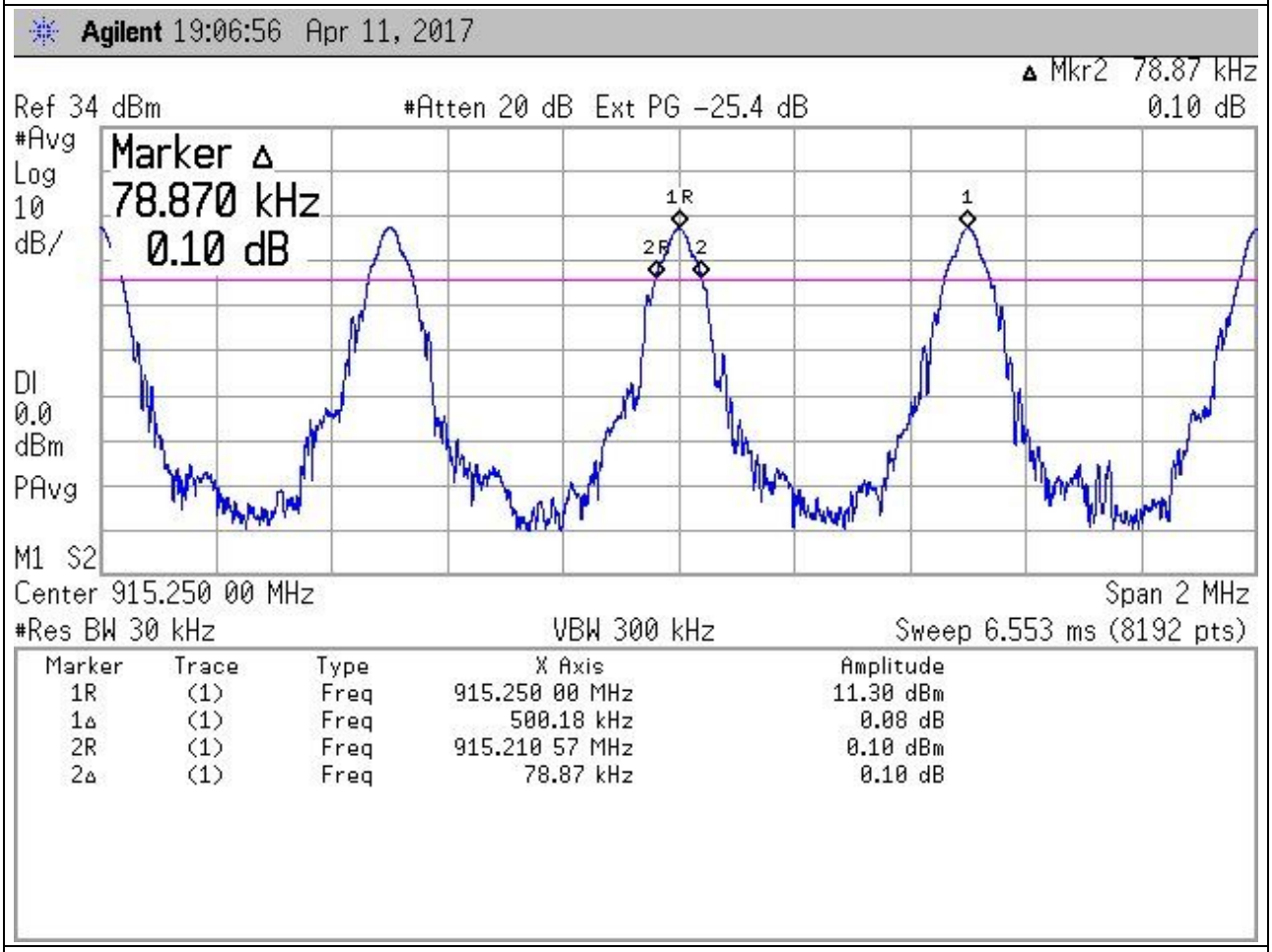


Fig. 6.3
Channel 25, Max Hold

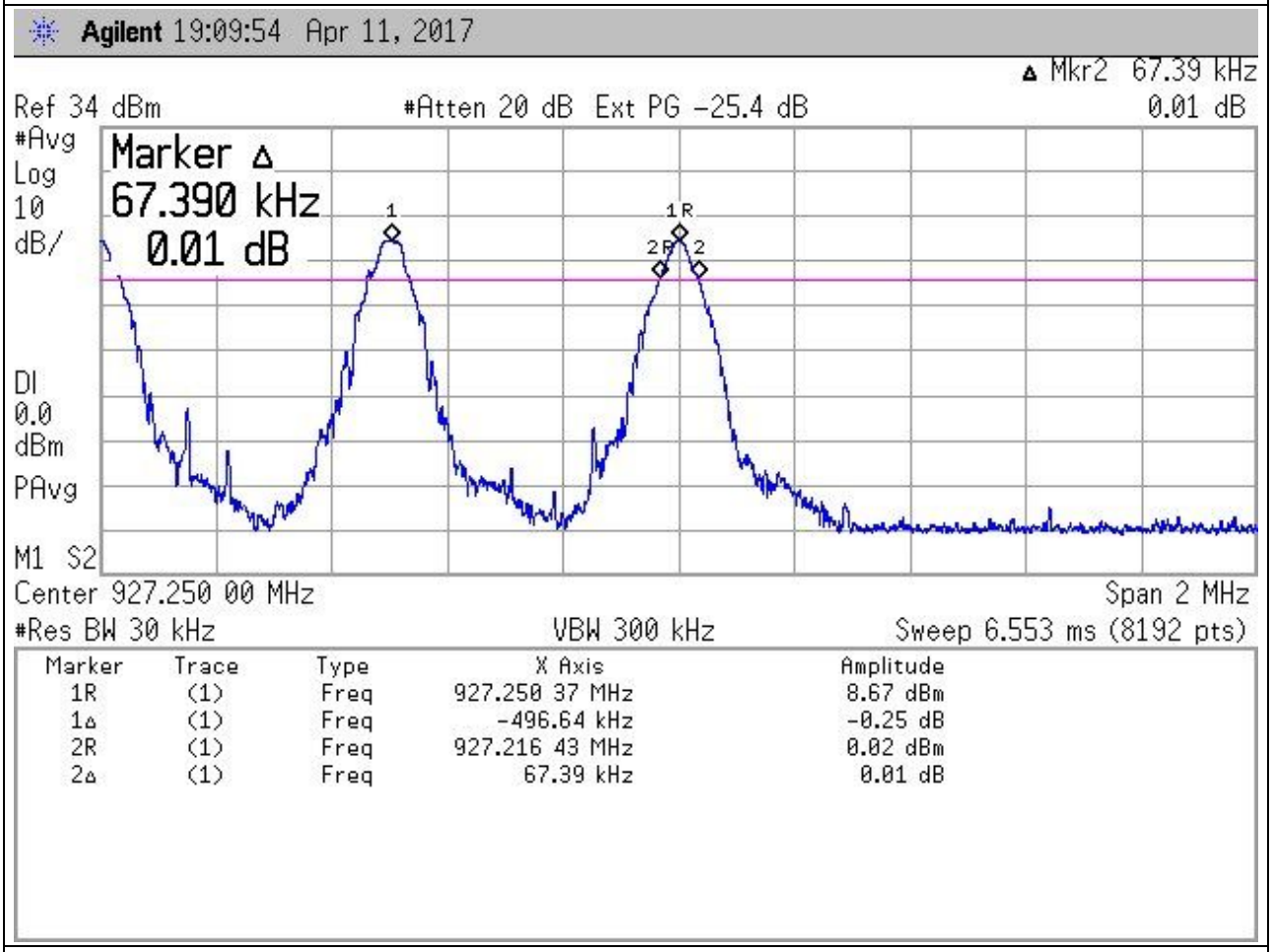


Fig. 6.4
Channel 49, Max Hold

6.3. PEAK OUTPUT POWER (RADIATED)

Equipment shall meet the limits below.

FREQUENCY RANGE (MHz)	***RF POWER OUTPUT LIMIT*** (dBm)
902 - 928	36.0

The measured values are:

Channel	Output Power	
	(dBµV/m)	(dBm erp)
0	111.36	16.1
25	113.15	17.9
49	112.07	16.8

The power was calculated according to the formula:

$$P_{erp} = \frac{(E \cdot d)^2}{30}$$

which comes from the document *"DA 00-705 (30 March 2010) – Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems"*

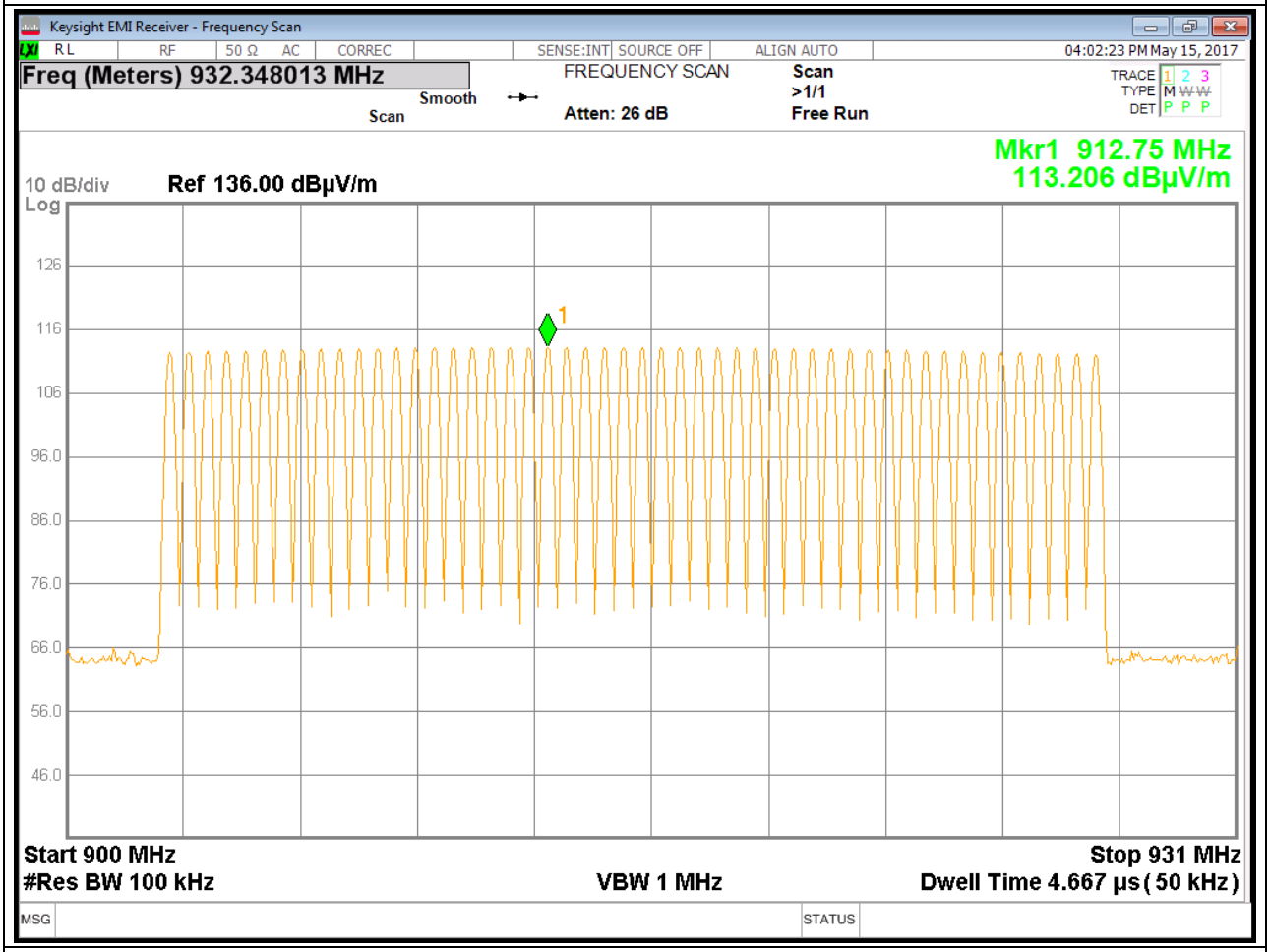


Fig. 6.5
Pol H, Max Hold

6.4. SPURIOUS EMISSIONS

In the following table, are shown the absolute maximum values (measured without making reference to the polarization of acquisition).

Nr Harmonics	AV Level (dBµV/m)						AV Limits (dBµV/m)	Remark
	Ch 0		Ch 25		Ch 49			
	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)		
2	1805.5	43.58	1830.5	40.35	1854.5	37.87	54.0	
3	2708.25	47.87	2745.75	43.78	2781.75	35.66	54.0	
4	3611	--	3661	--	3709	--	54.0	
5	4513.75	--	4576.25	43.09	1636.25	--	54.0	
6	5416.55	48.91	5491.5	47.38	5563.5	39.69	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)						Peak Limits (dBµV/m)	Remark
	Ch 0		Ch 25		Ch 49			
	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)		
2	1805.5	47.91	1830.5	45.69	1854.5	43.32	74.0	
3	2708.25	51.65	2745.75	48.95	2781.75	45.28	74.0	
4	3611	--	3661	--	3709	--	74.0	
5	4513.75	--	4576.25	49.65	1636.25	--	74.0	
6	5416.55		5491.5	53.09	5563.5	49.59	74.0	
7		--		--		--	74.0	
8		--		--		--	74.0	
9		--		--		--	74.0	
10		--		--		--	74.0	

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

6.5. 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.

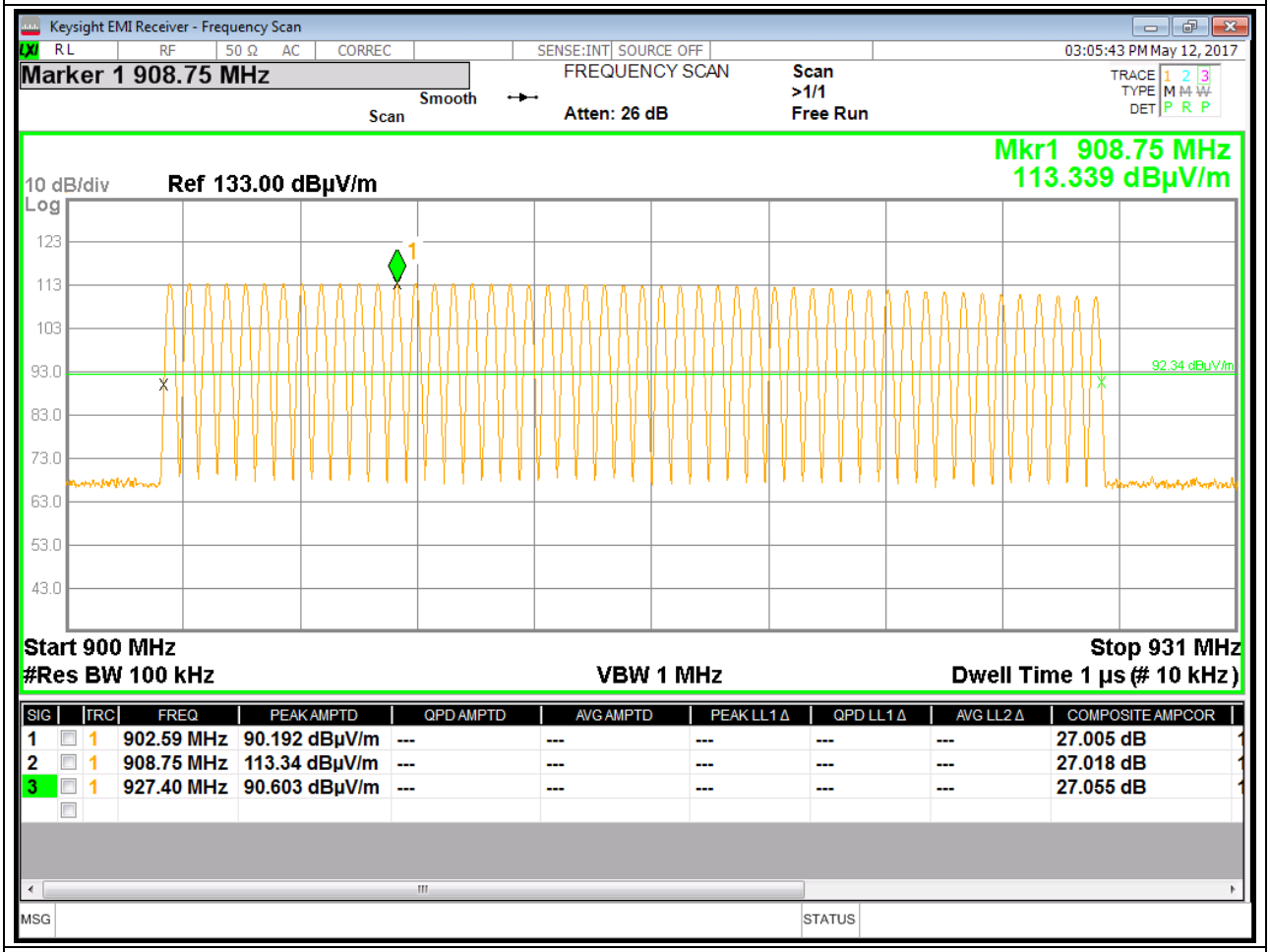


Fig. 6.6
Pol. H

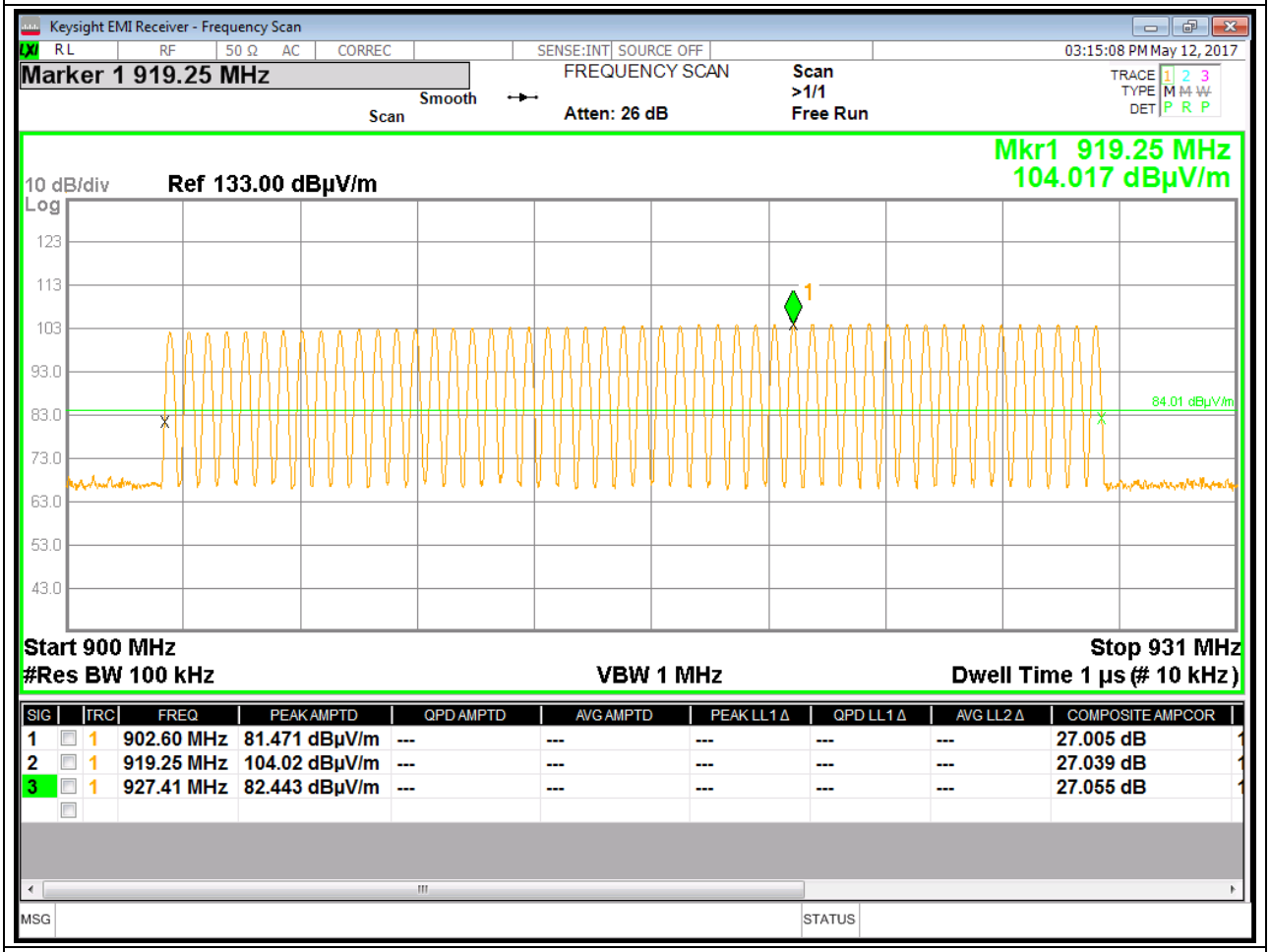


Fig. 6.7
Pol. V

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
MXE EMI Receiver	Agilent	N9038A	01/2018
Anechoic Chamber	Comtest	CSA01	01/2018
Bilog Antenna	Schaffner	CBL6112B	01/2018
Horn Antenna	EMCO	3115	01/2018
Controller	Deisel	HD100	01/2018
Turn Table	Deisel	MA240	01/2018
Attenuator	Narda	768-10	01/2018

Test procedure: CE22R01

7. BANDWIDTH AND AVERAGE TIME OF OCCUPANCY

Equipment shall meet the limits below.

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 and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

Bandwidth

Channel	Frequency [MHz]	Bandwidth [kHz]
0	902.74975	55.6
25	915.24950	58.4
49	927.25000	62.7

Ch 0: Bandwidth

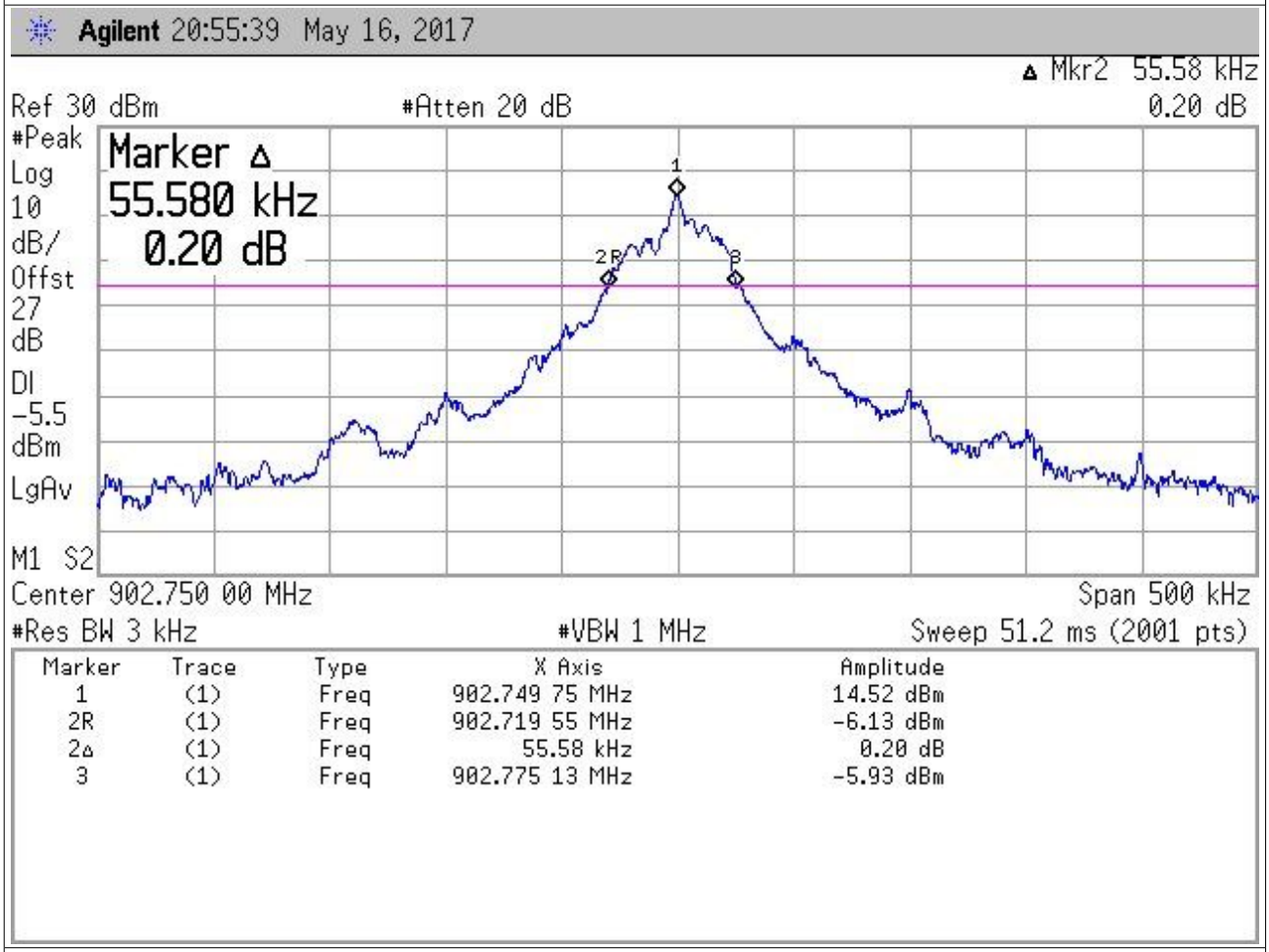


Fig. 7.1

Ch 25: Bandwidth

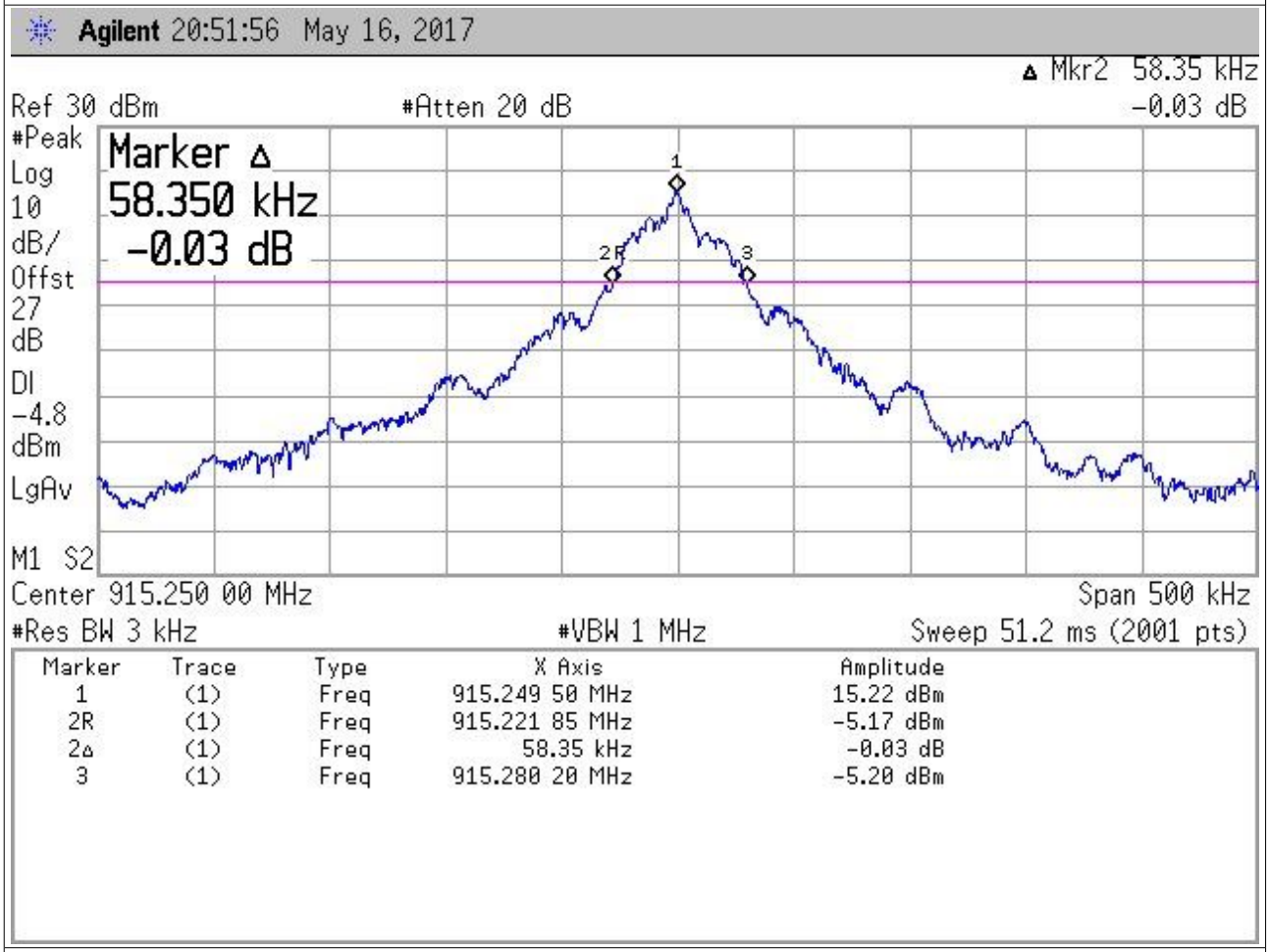


Fig. 7.2

Ch 49: Bandwidth

Fig. 7.3

Average Time of Occupancy:

Channel	**Dwell Time (ms)**	**Nr. of Transmission for channel** [average]	**Time of Occupancy (ms)** [average]
0	**33.06**	**4** [4.26]	**132.2** [141.0]
25	**33.99**	**4** [4.27]	**136.0** [145.2]
49	**33.06**	**4** [4.27]	**132.2** [141.3]

Time of transmission

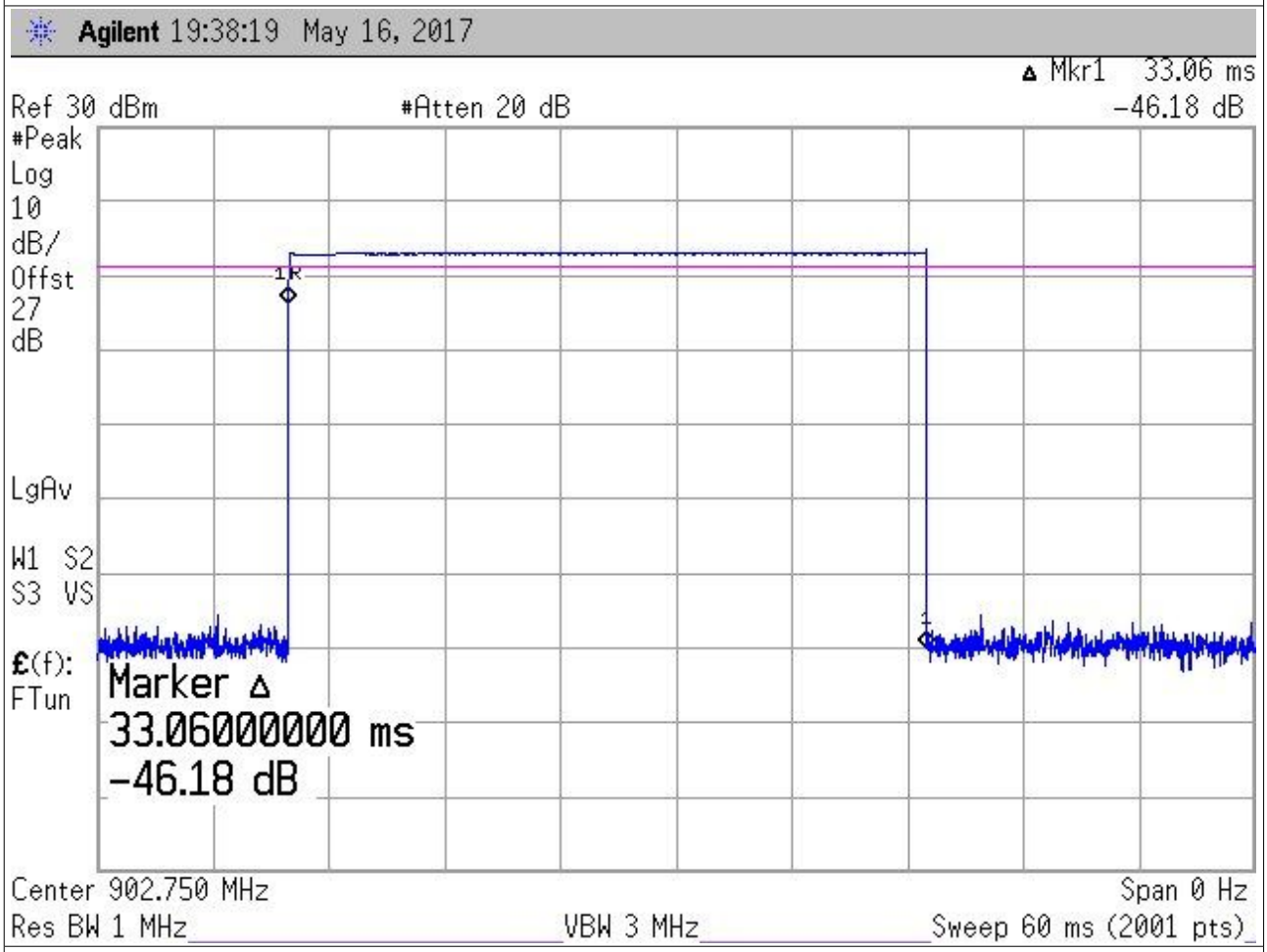


Fig. 7.4
Ch 0

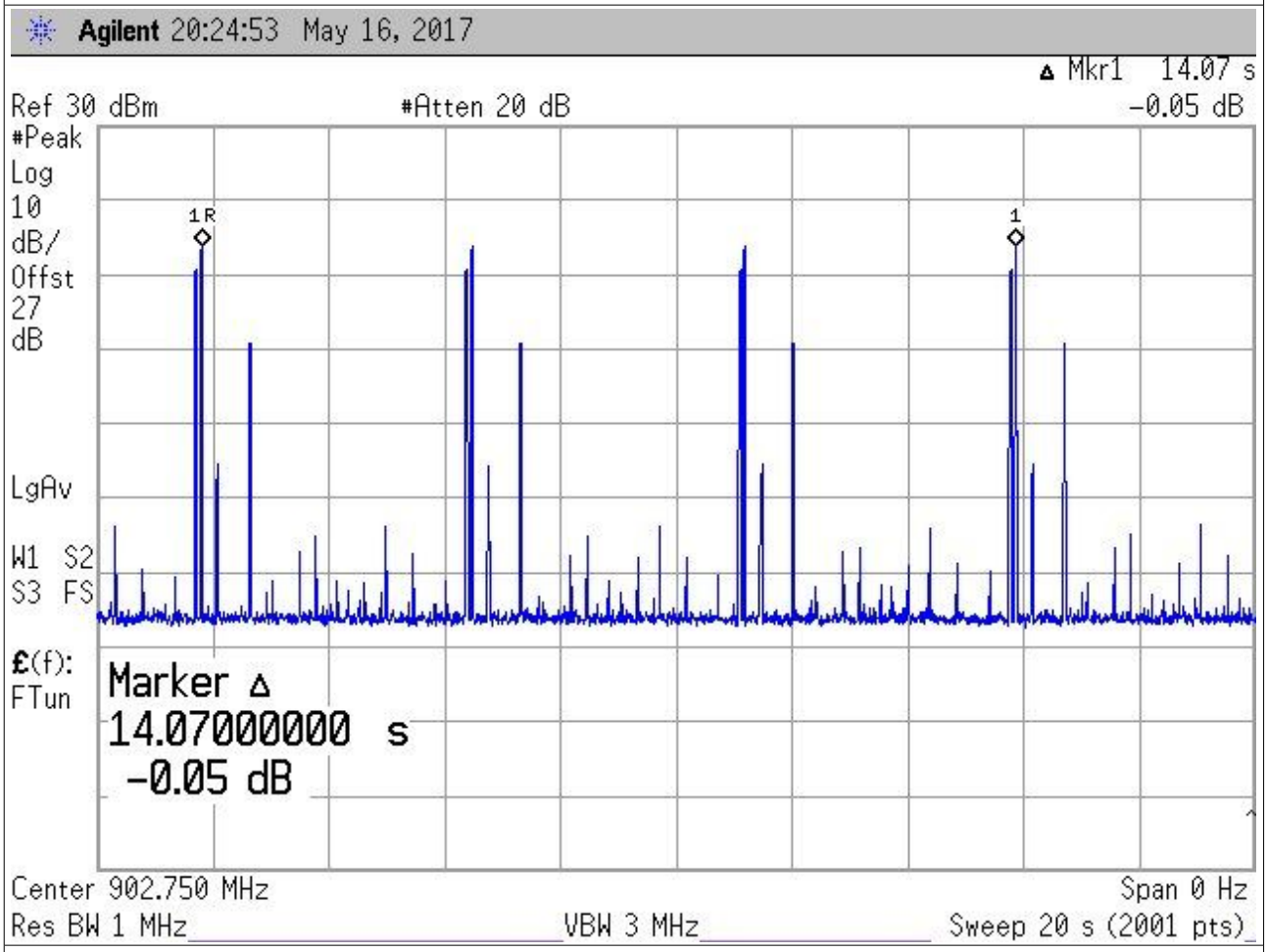


Fig. 7.5
Ch 0

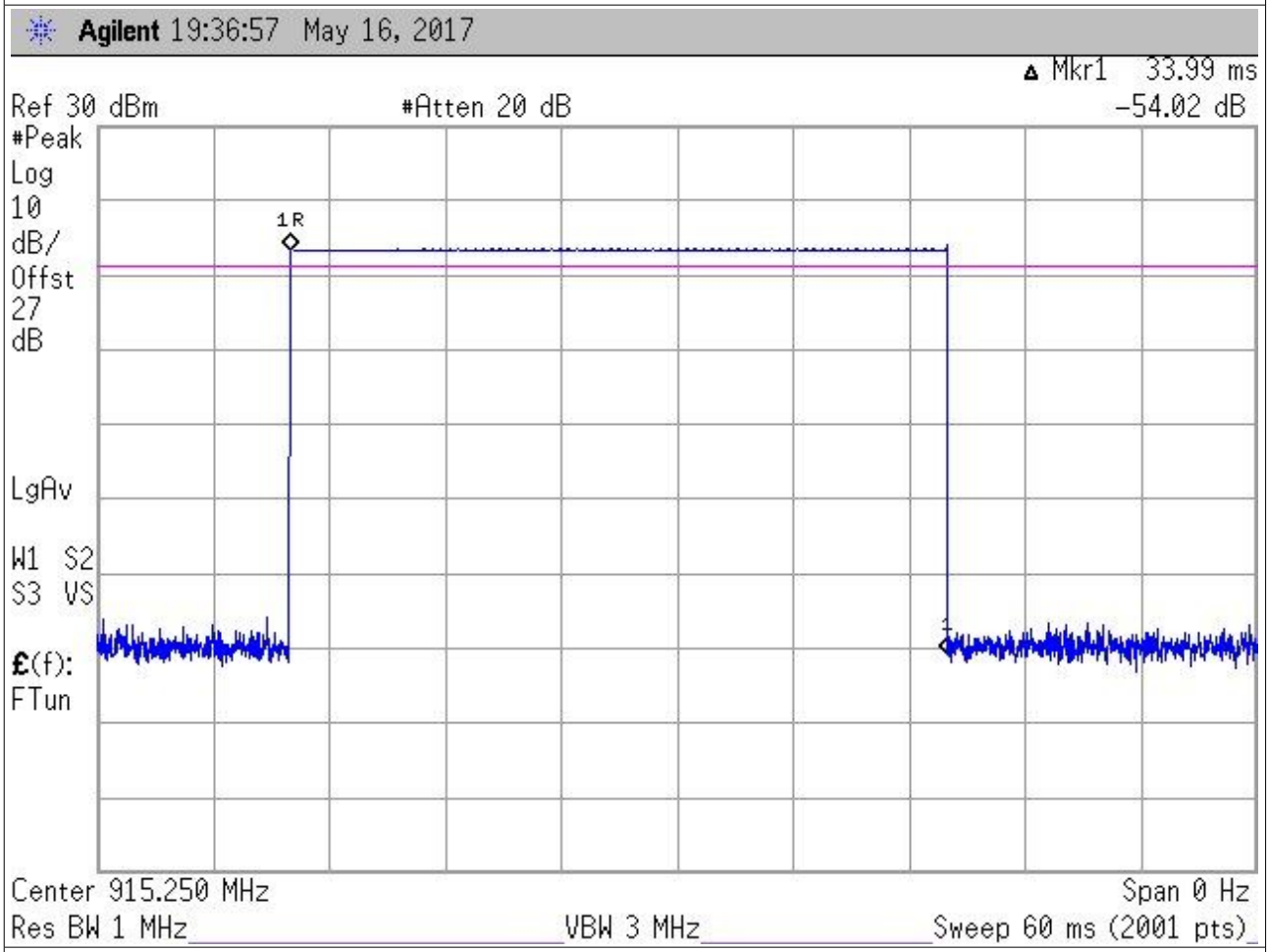


Fig. 7.6
Ch 25

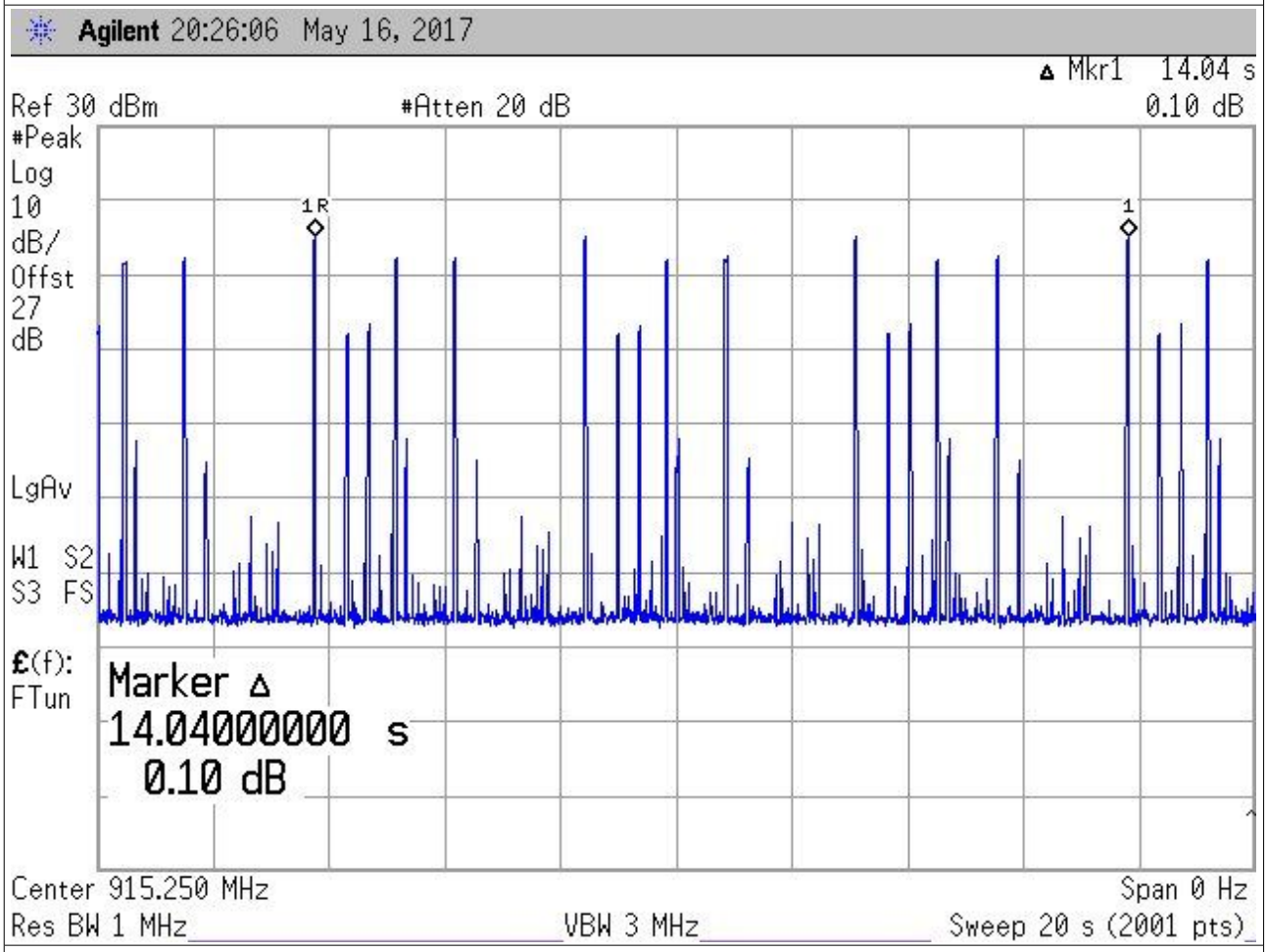


Fig. 7.7
Ch 25

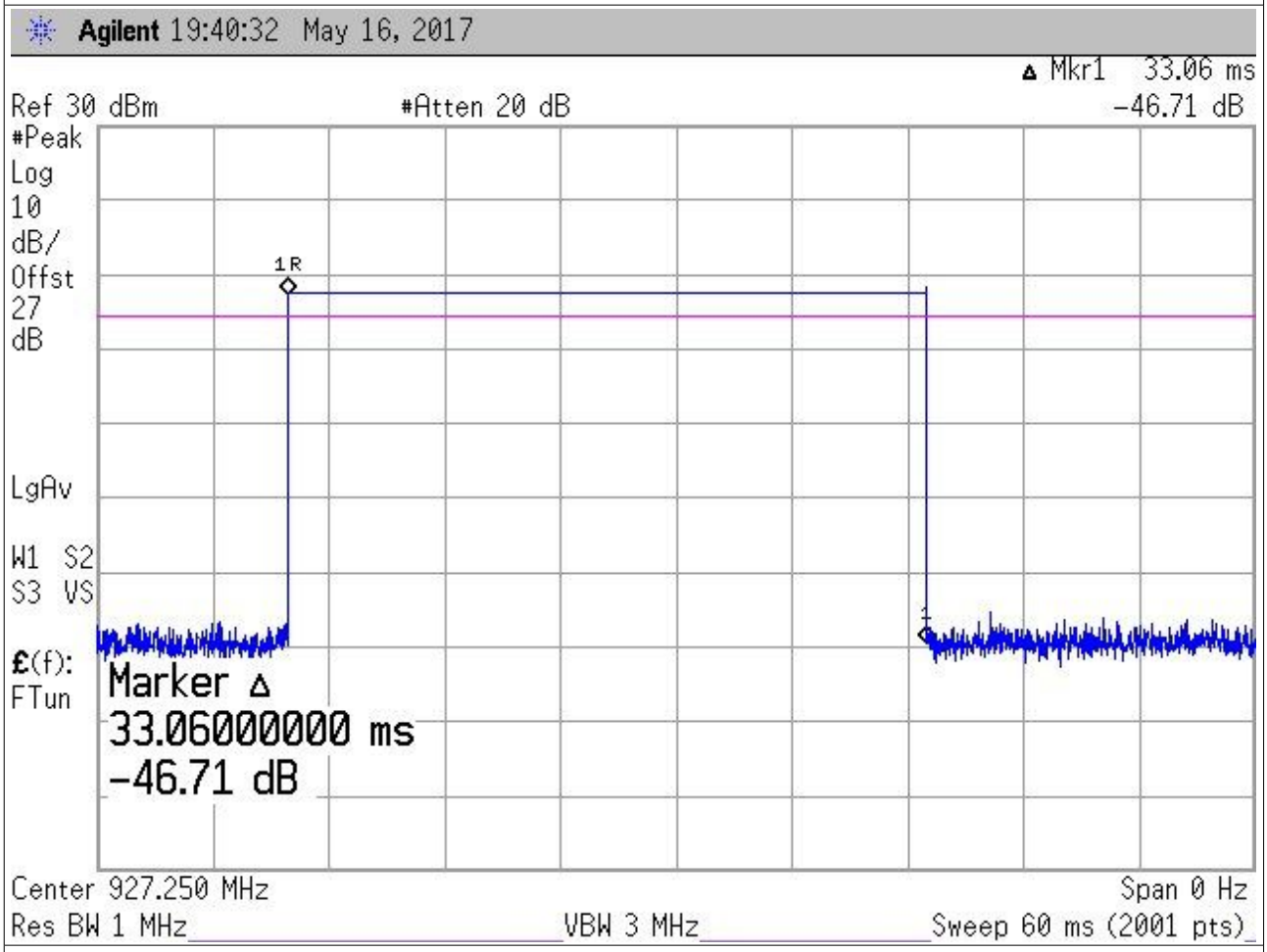

Agilent 19:40:32 May 16, 2017
Mkr1 33.06 ms
Ref 30 dBm
#Atten 20 dB
-46.71 dB
#Peak
Log
10
dB/
Offst
27
dB
1R
LgAv
W1 S2
S3 VS
£(f):
FTun
Marker Δ
33.06000000 ms
-46.71 dB
Center 927.250 MHz
Span 0 Hz
Res BW 1 MHz
VBW 3 MHz
Sweep 60 ms (2001 pts)

Fig. 7.8
Ch 49

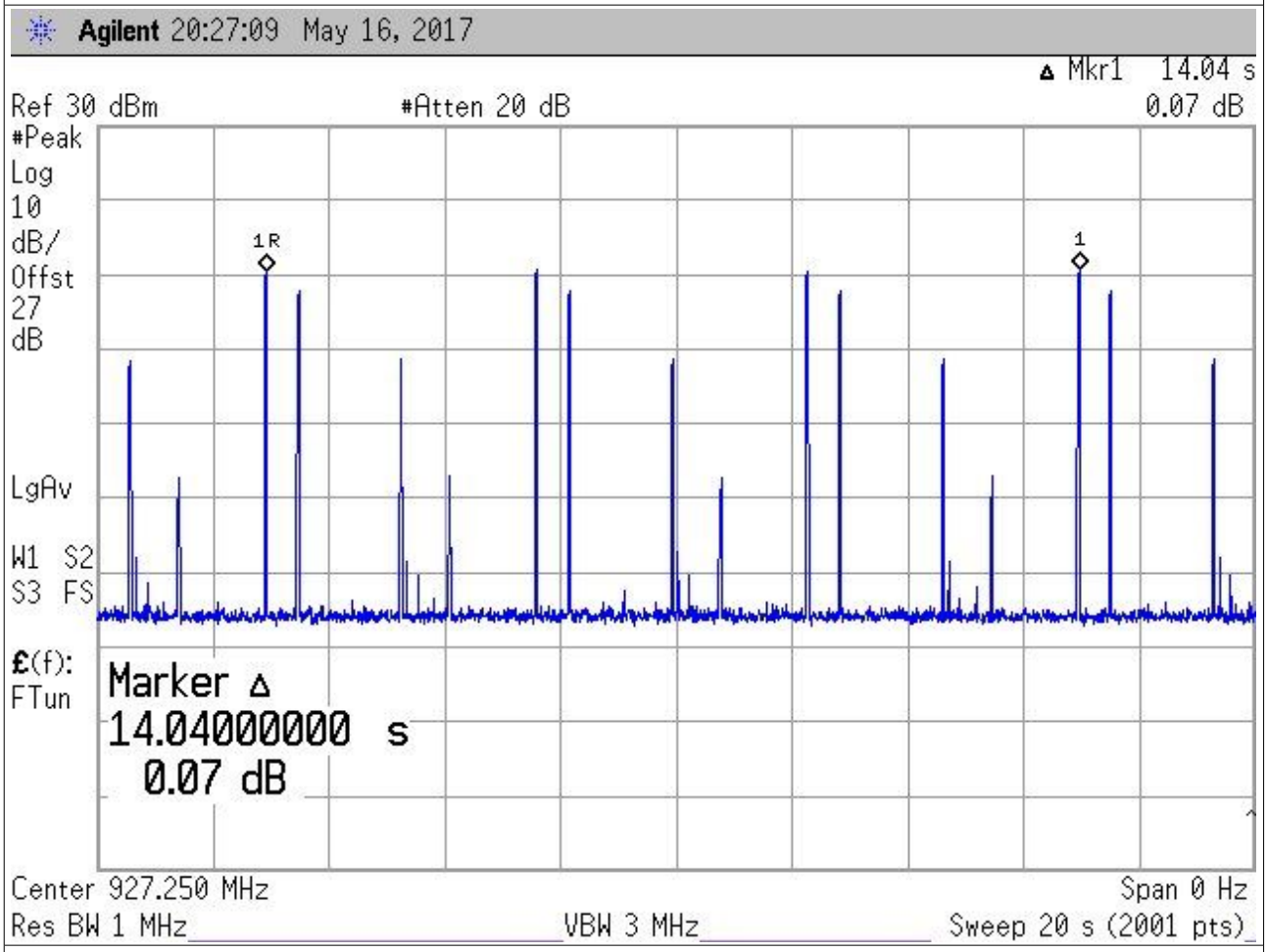


Fig. 7.9
Ch 49

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
PSA Spectrum Analyzer	Agilent	E4440	01/2018
RF Preselector	Agilent	N9039A	01/2018
Anechoic Chamber	Comtest	CSA01	01/2018
Bilog Antenna	Schaffner	CBL6112B	01/2018
Horn Antenna	EMCO	3115	01/2018
Controller	Deisel	HD100	01/2018
Turn Table	Deisel	MA240	01/2018

Test procedure: RE22R01

8. PHOTO

Fig. 8.1
Conducted Emissions Test Set-up

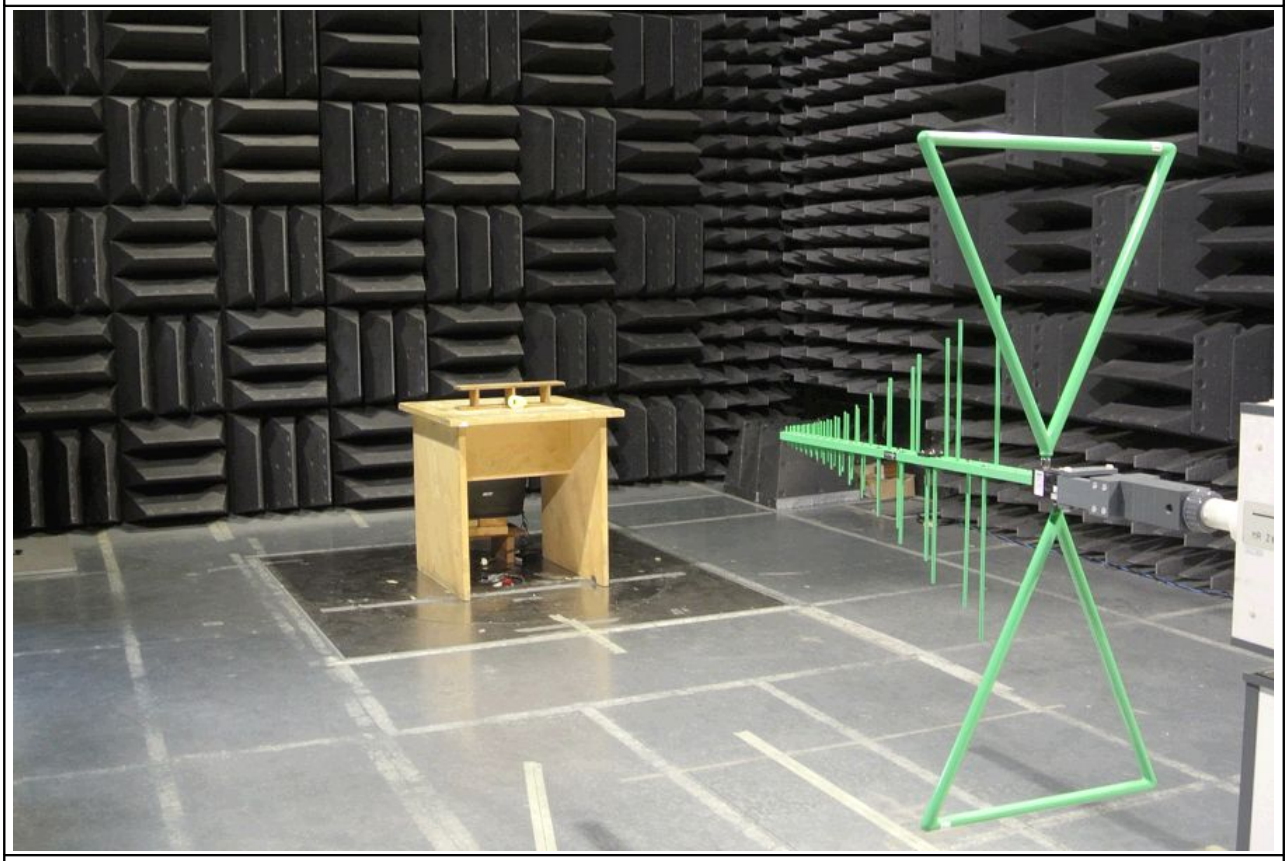


Fig. 8.2

Radiated Emissions Test Set-up

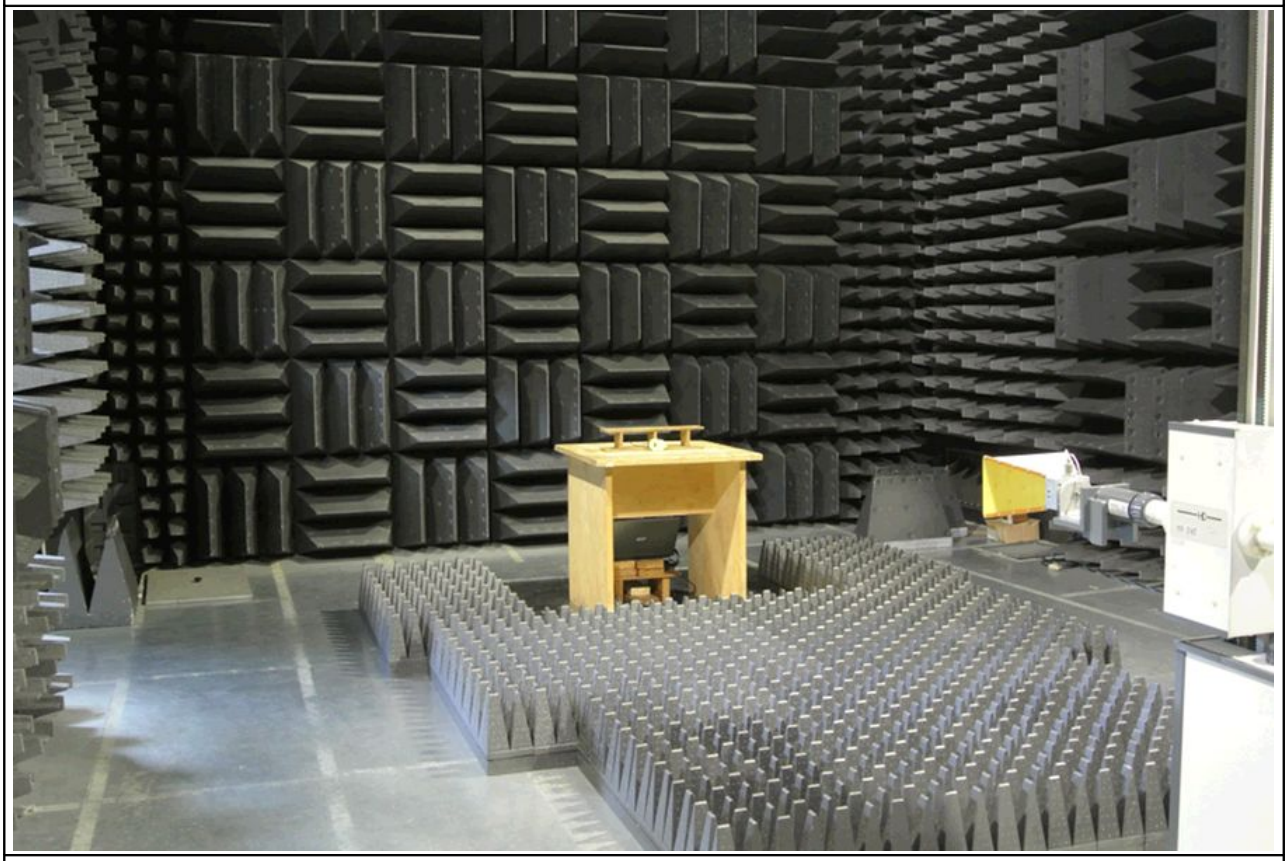


Fig. 8.3

Radiated Emissions Test Set-up

Fig. 8.4

Radiated Emissions Test Set-up

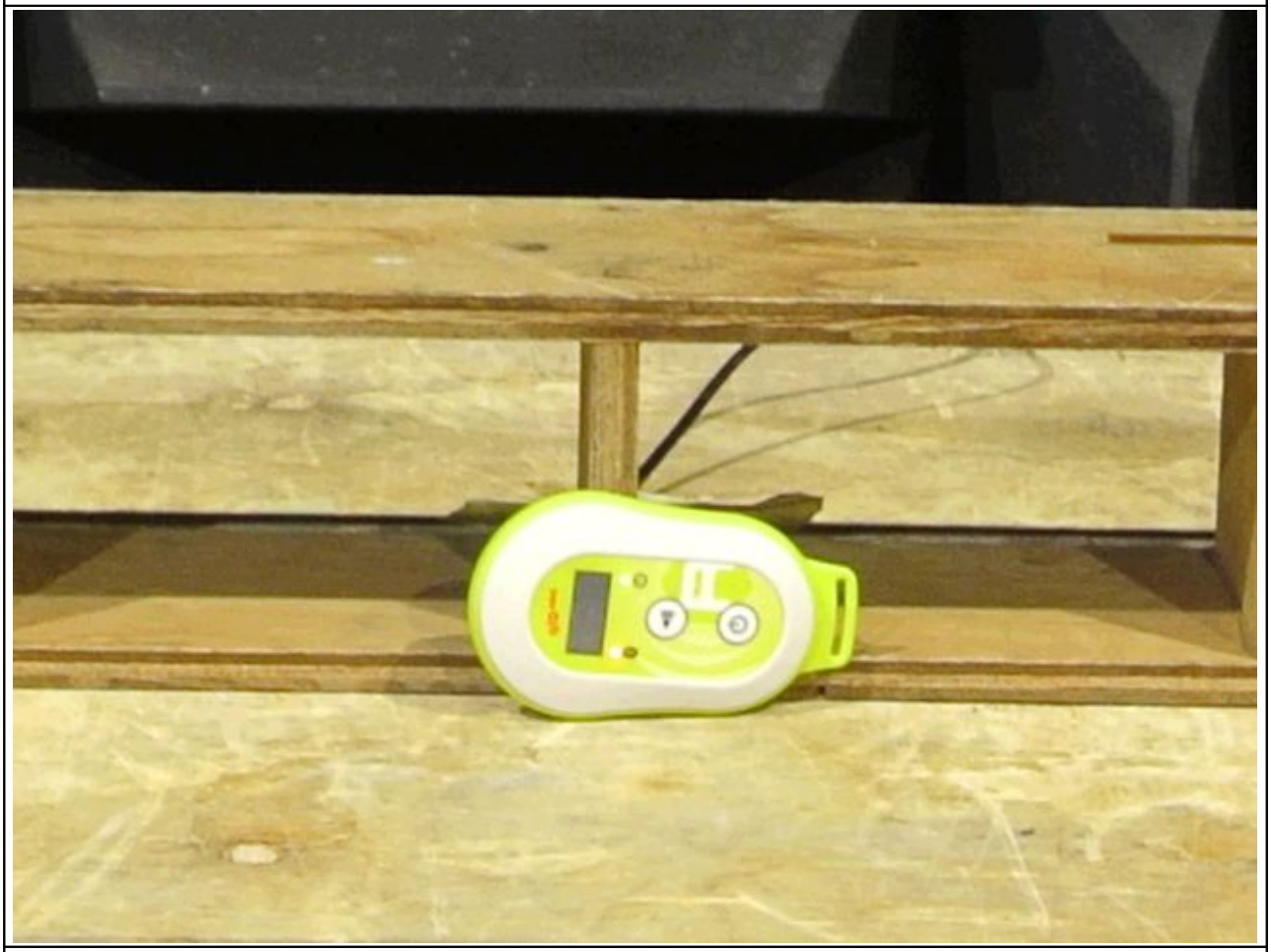


Fig. 8.5 - Particular
Radiated Emissions Test Set-up