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1. MANUFACTURER AND EUT IDENTIFICATION¹	
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

¹A 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:

<i>TEST</i>	<i>STANDARD</i>
Emissions: Radiated – Section 15.109	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
Emissions: Conducted – Section 15.107	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

3. TEST GENERALITY, RESULT, CONDITION, MEASUREMENT UNCERTAINTY**Sub-part 2.1033(b)****Test And Measurement Data**

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2 and the following individual Parts: 15.109; Unintentional Radiators

Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing: In accordance with ANSI C63.4-2014, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures.

All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst-case measurements.

Summary of Test Results

<i>TEST</i>	<i>RESULT</i>
<i>Emissions: conducted Section 15.107</i>	<i>Pass</i>
<i>Emissions: radiated Section 15.109</i>	<i>Pass</i>

Measurement uncertainty

<i>TEST</i>	<i>EXPANDED UNCERTAINTY</i>
Conducted Emission – 50Ω/50μH (150 kHz - 30 MHz)	± 3.5 dB
Radiated Emission – (Semianechoic Room) (30 MHz - 18 GHz)	± 4.7 dB

Climatic Conditions

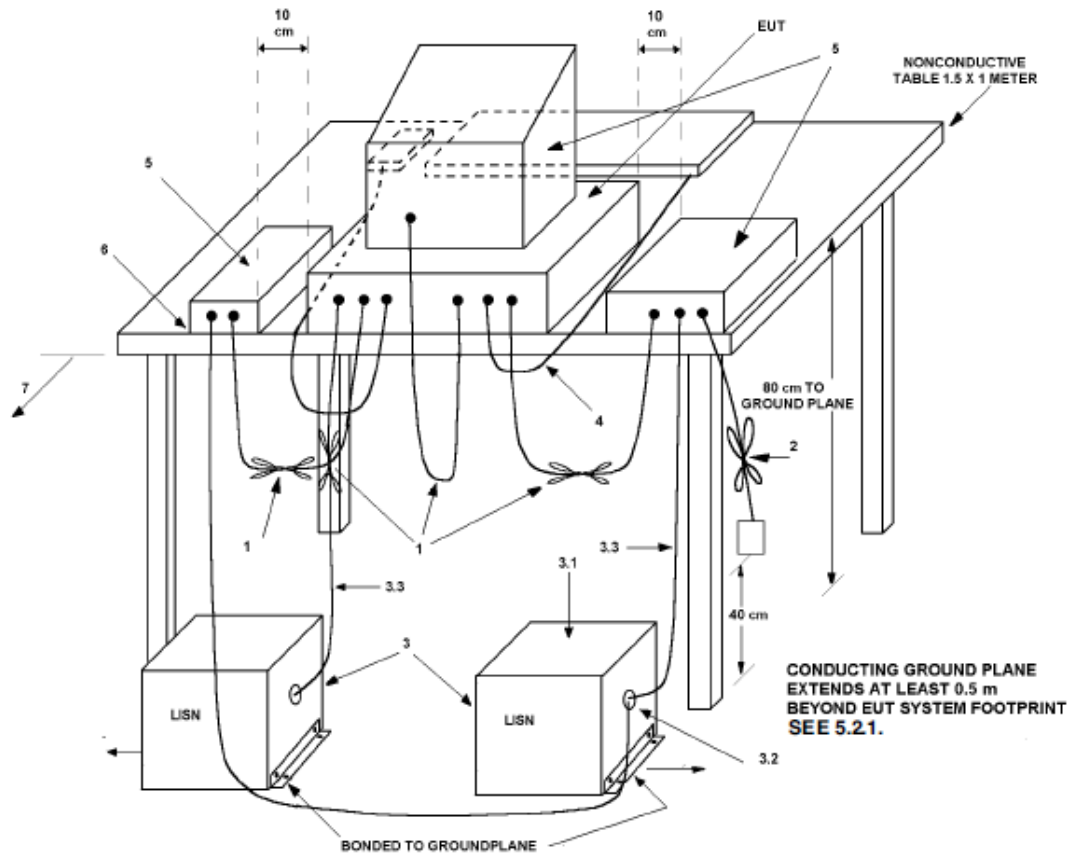
<i>PARAMETER</i>	<i>VALUE</i>
Temperature	(293 ± 3) K
Relative humidity	(50 ± 5) %

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)	<i>Field Strength</i> <i>QUASI-PEAK LIMITS</i> [dB (μ V/m)]
30 ÷ 88	40
88 ÷ 216	43,5
216 ÷ 960	46
Above 960	54

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
EMI Receiver	HP	HP8546A	01/2018
EMI Receiver Filter Section	HP	HP85460A	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
LISN	GSD	NTW06	01/2018

Test procedure: RE22R02Notes

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 $e > 100$) 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-17238B
 Test Name Radiated Emissions
 EUT Name CAEN RFID s.r.l. - R1170IU

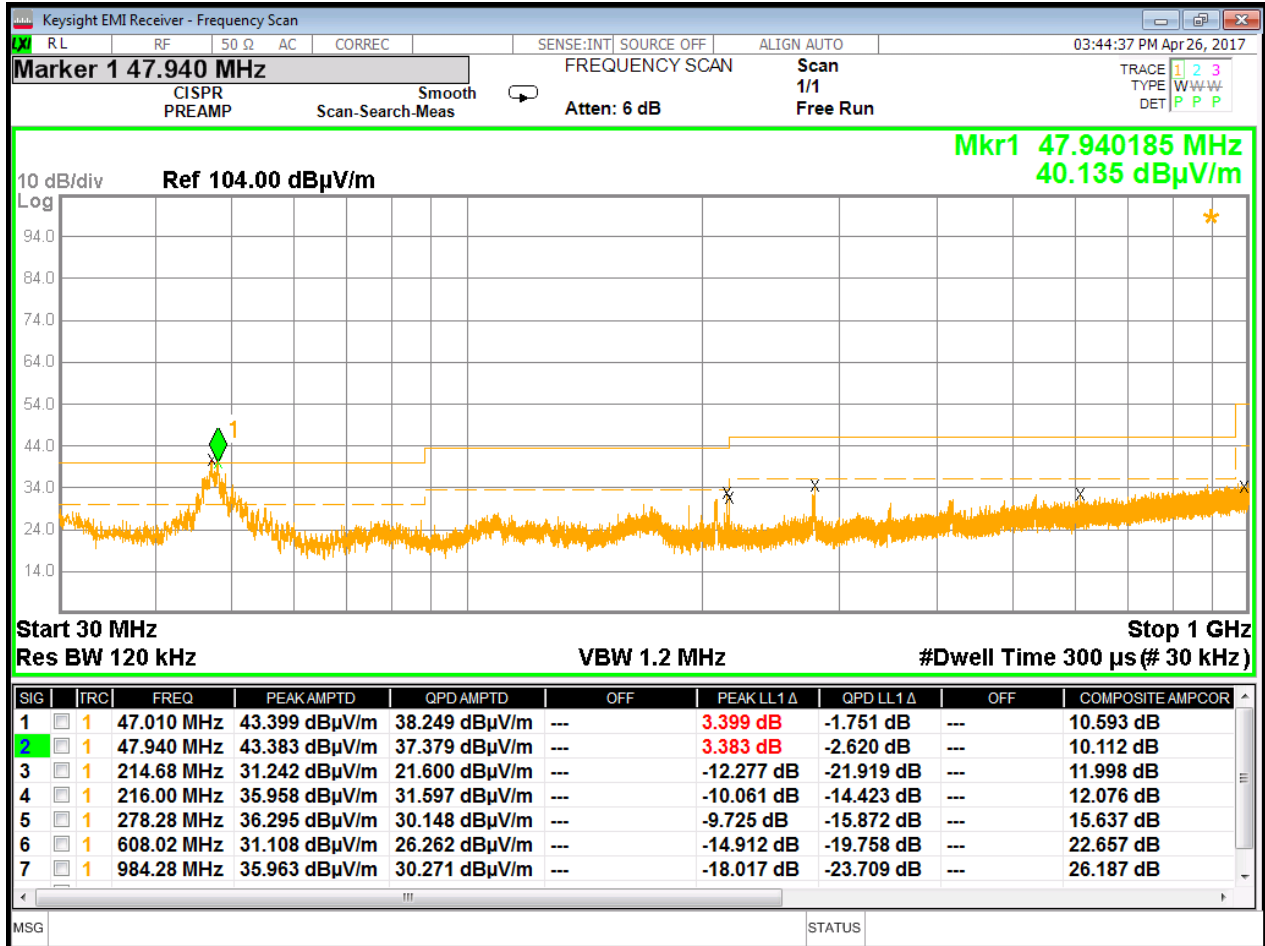


Fig. 4.1 - standby

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

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

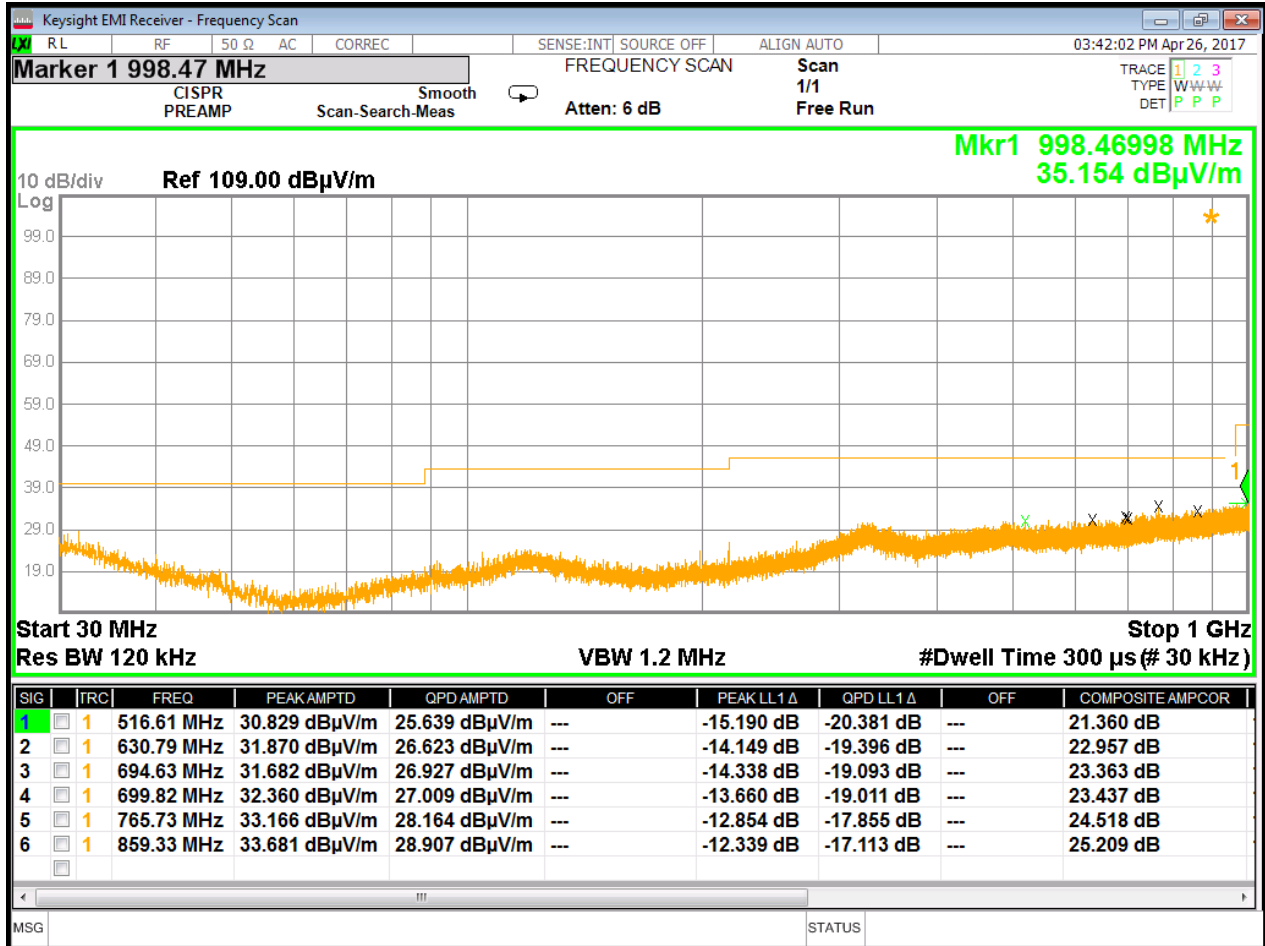


Fig. 4.2 - standby

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

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

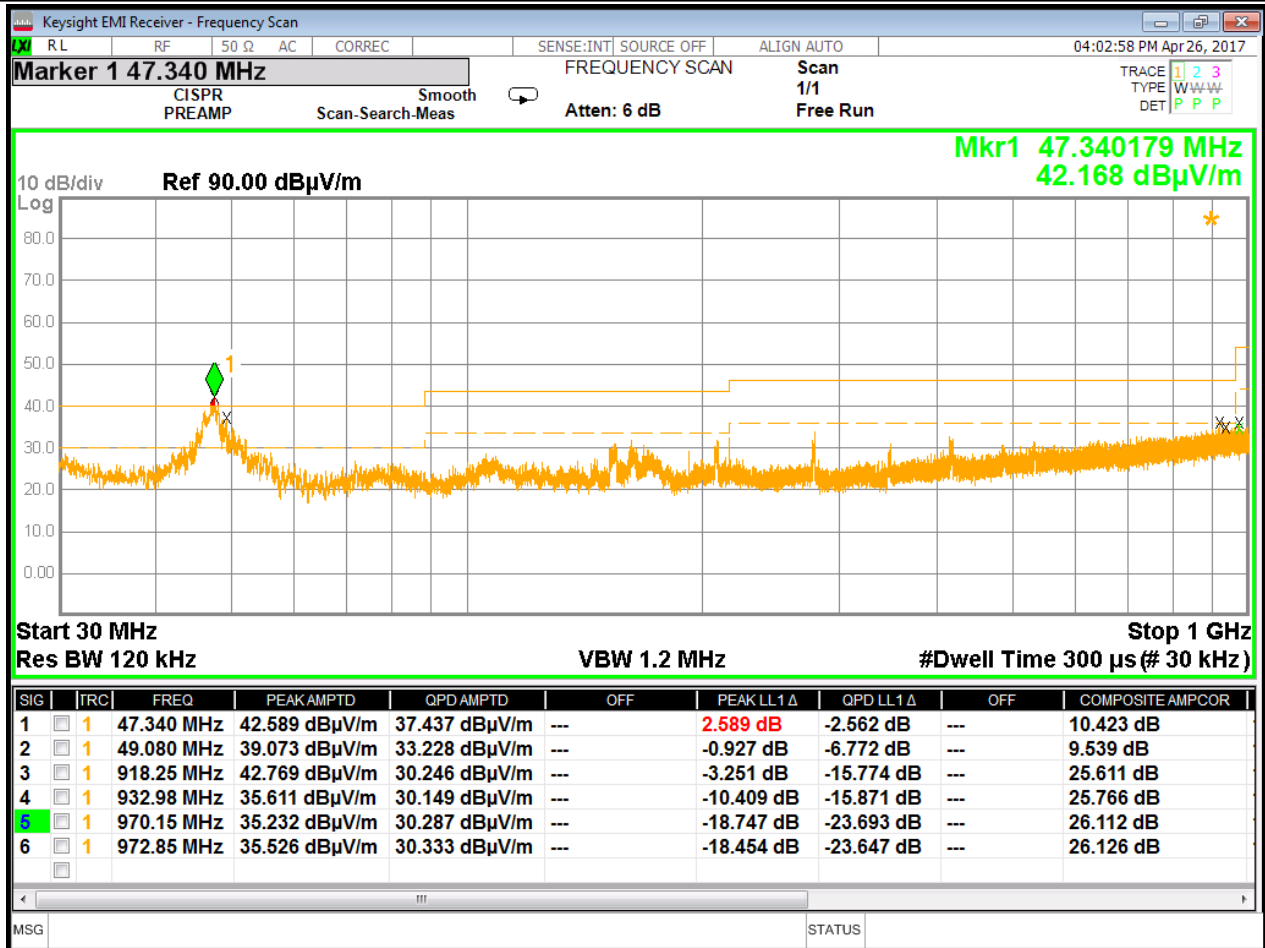


Fig. 4.3

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

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

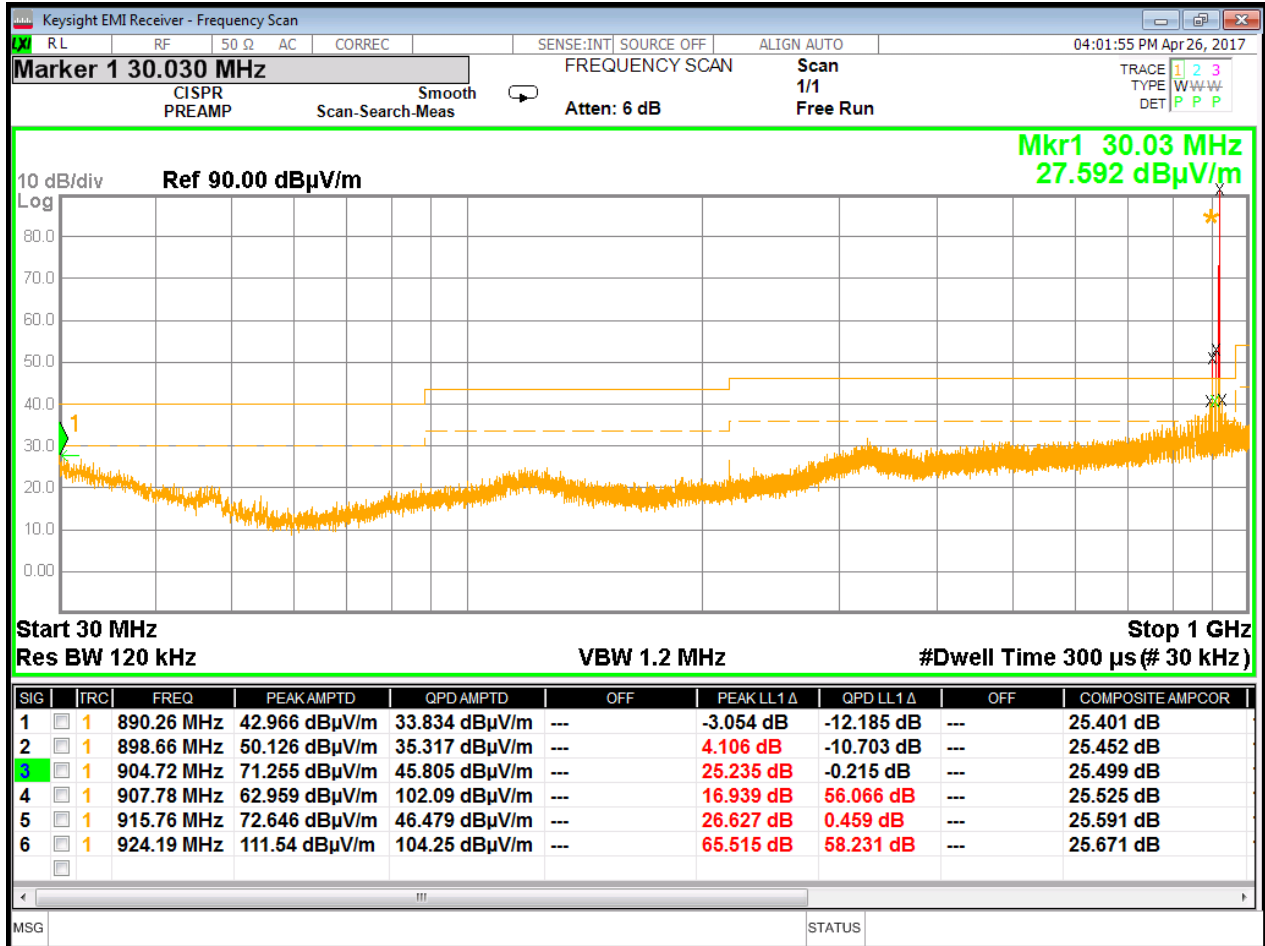


Fig. 4.4

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

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

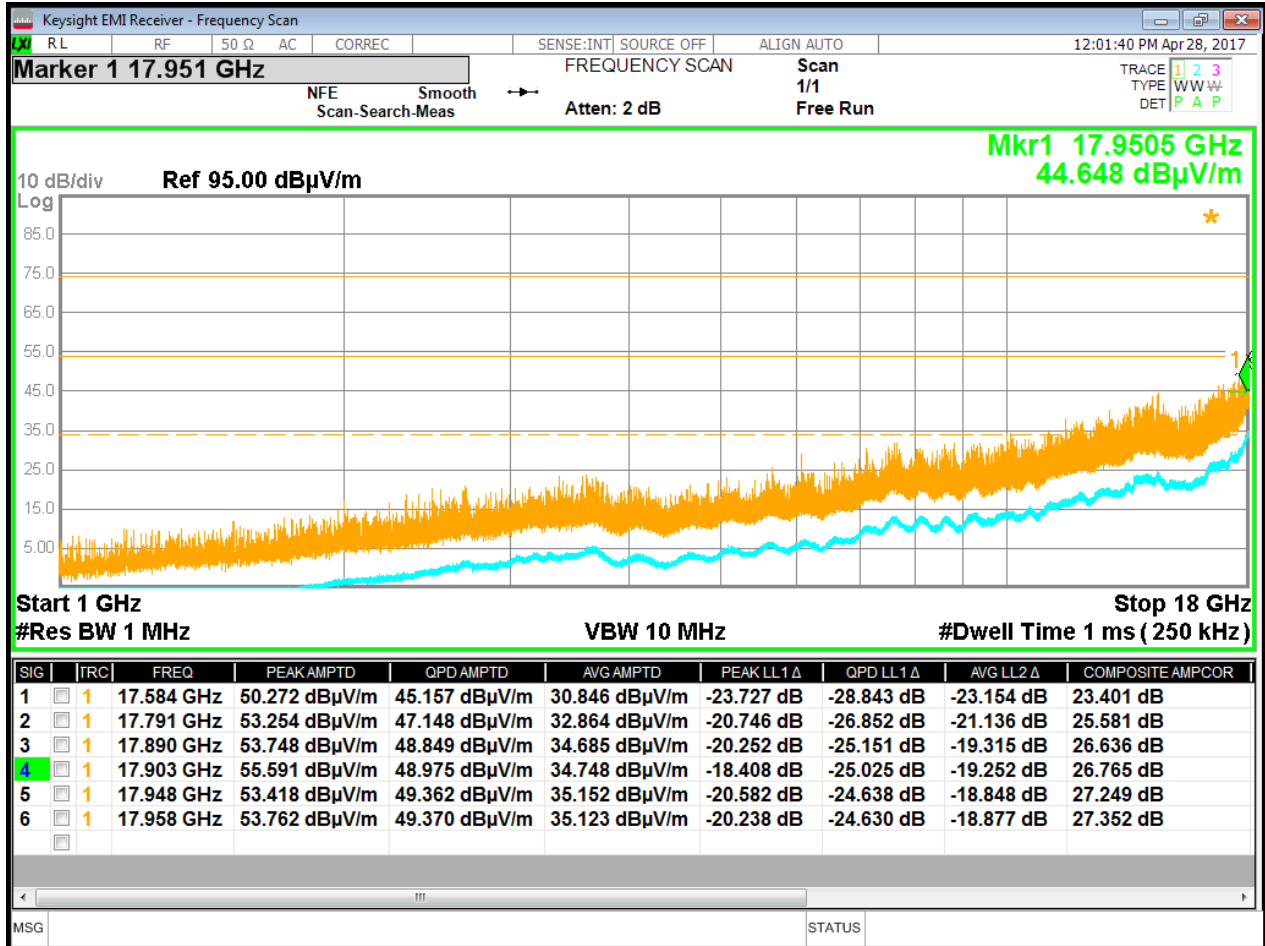


Fig. 4.5 - standby

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

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

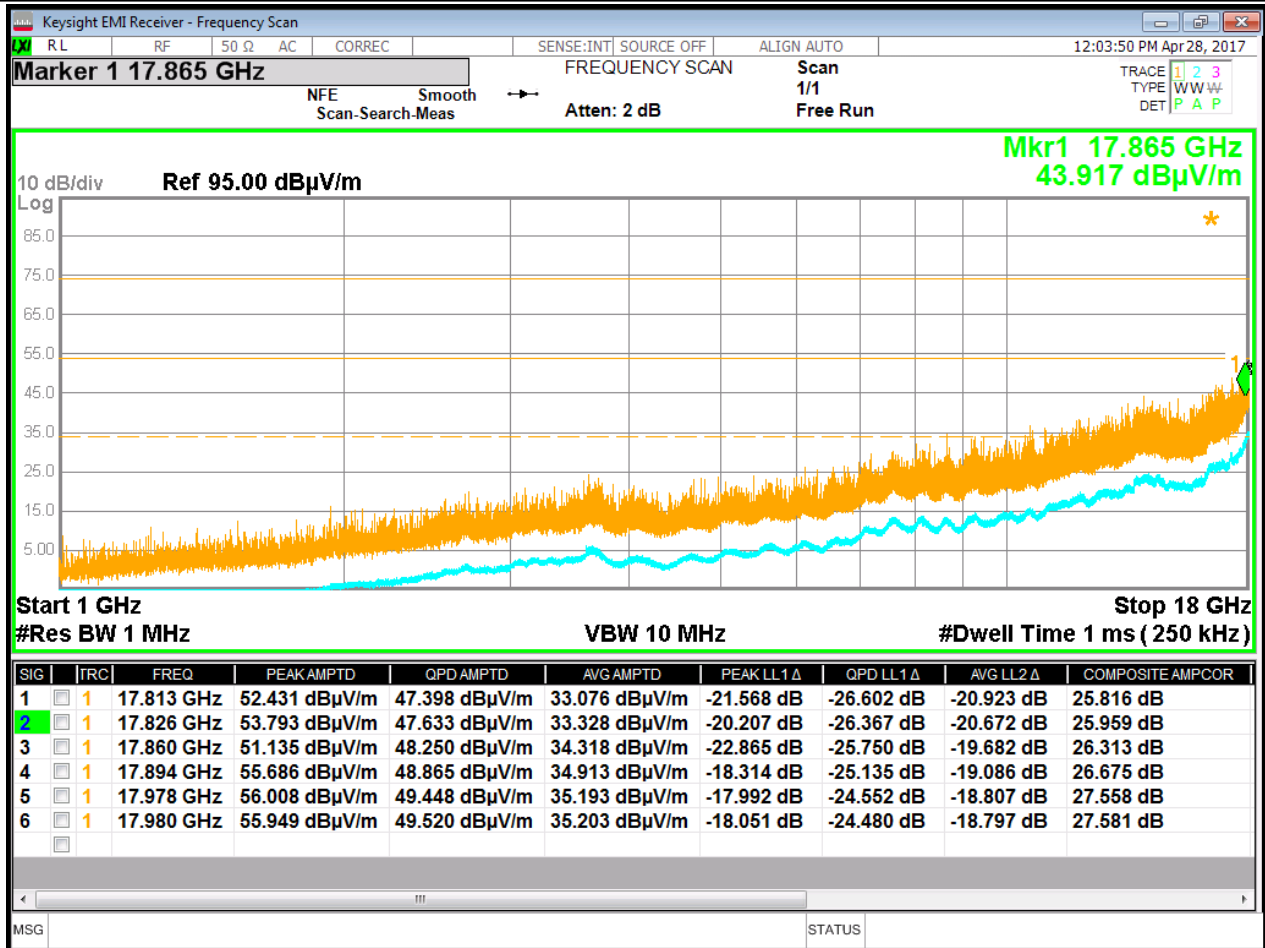


Fig. 4.6 - standby

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

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

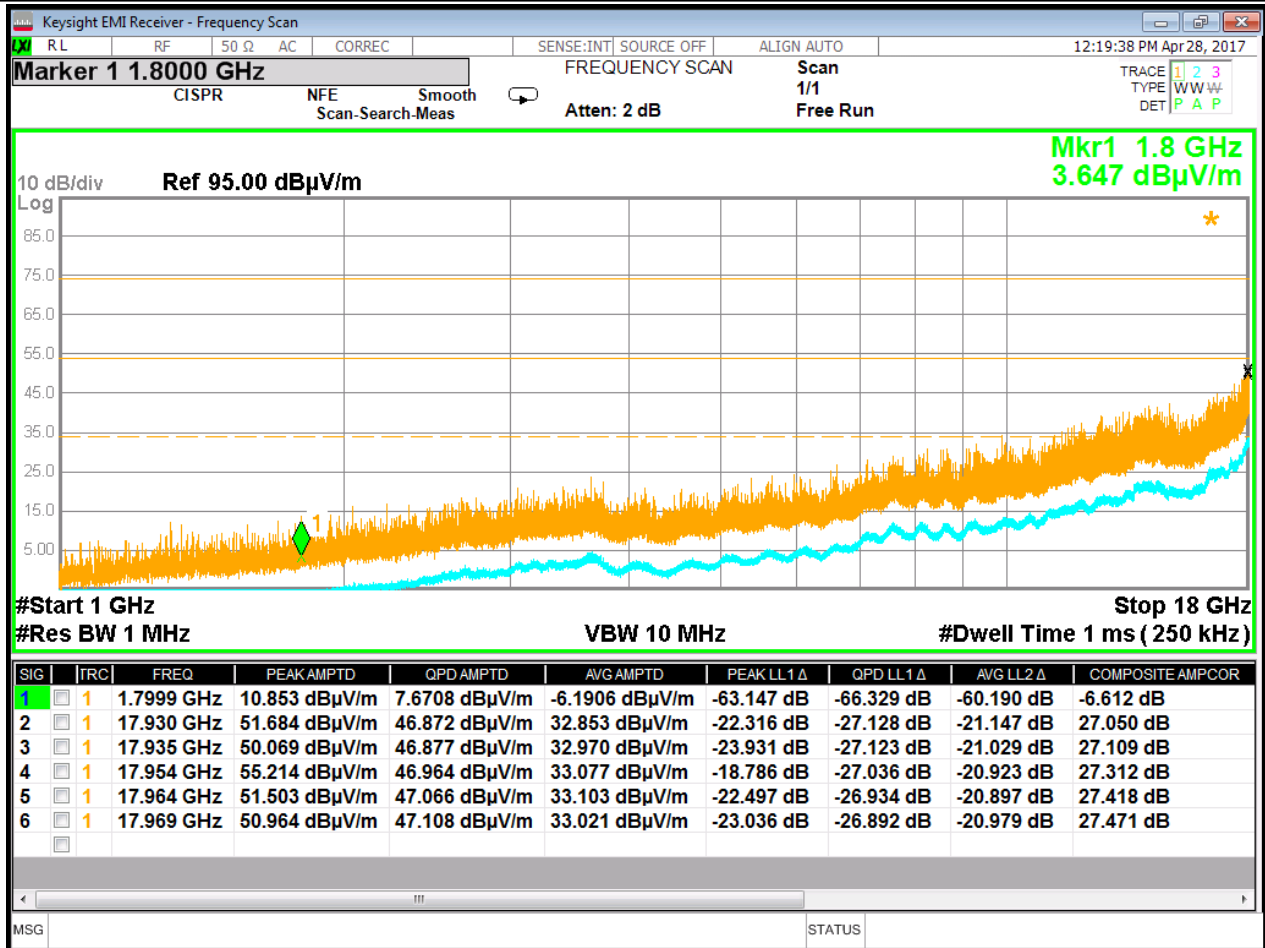


Fig. 4.7

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

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

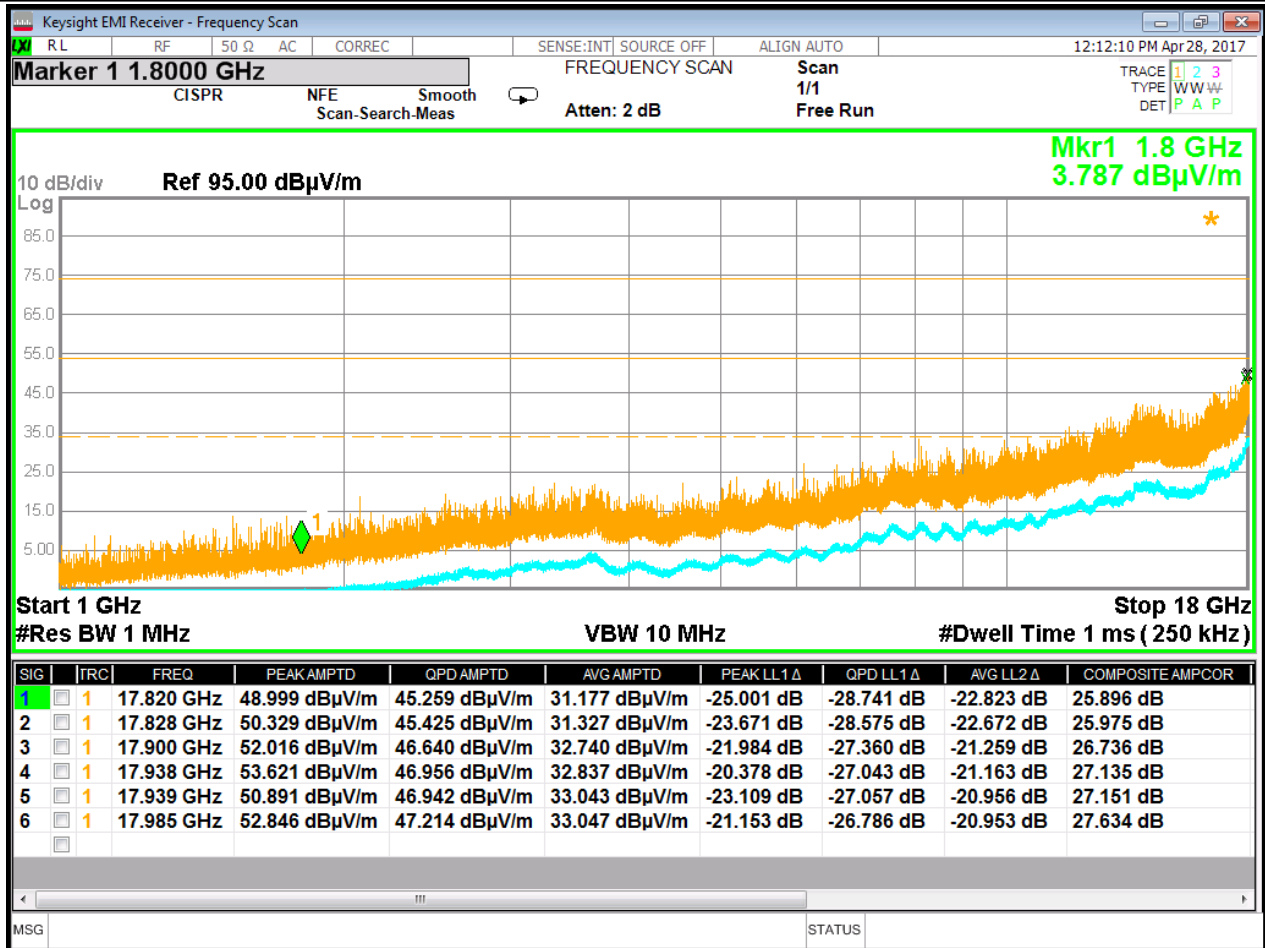


Fig. 4.8

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

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

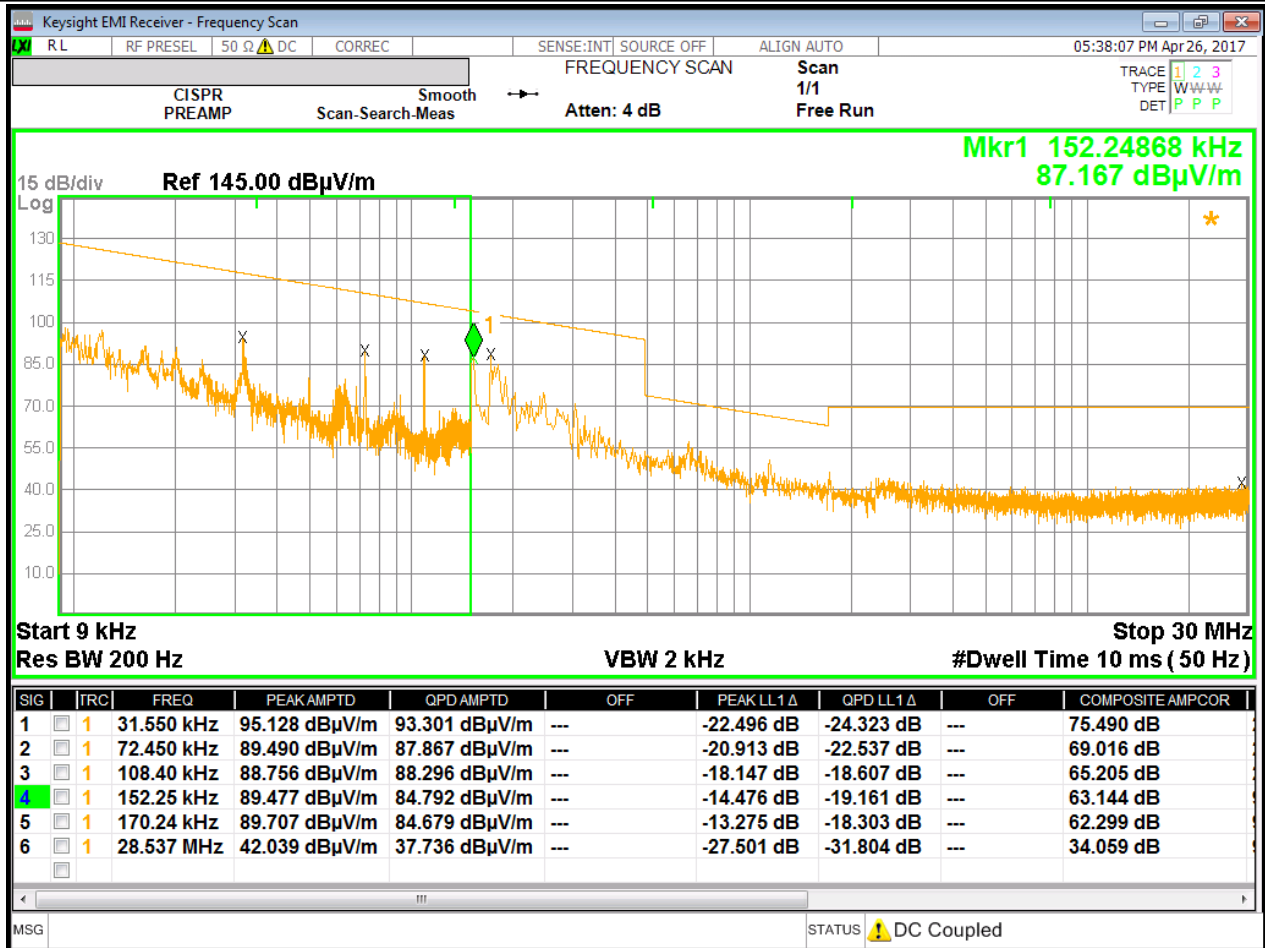


Fig. 4.9 - standby

Record of the measurement of radiated emissions (PK)

Maximum disturbance determined in the frequency range 0.009 – 30 MHz, Pol. Parallel.

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

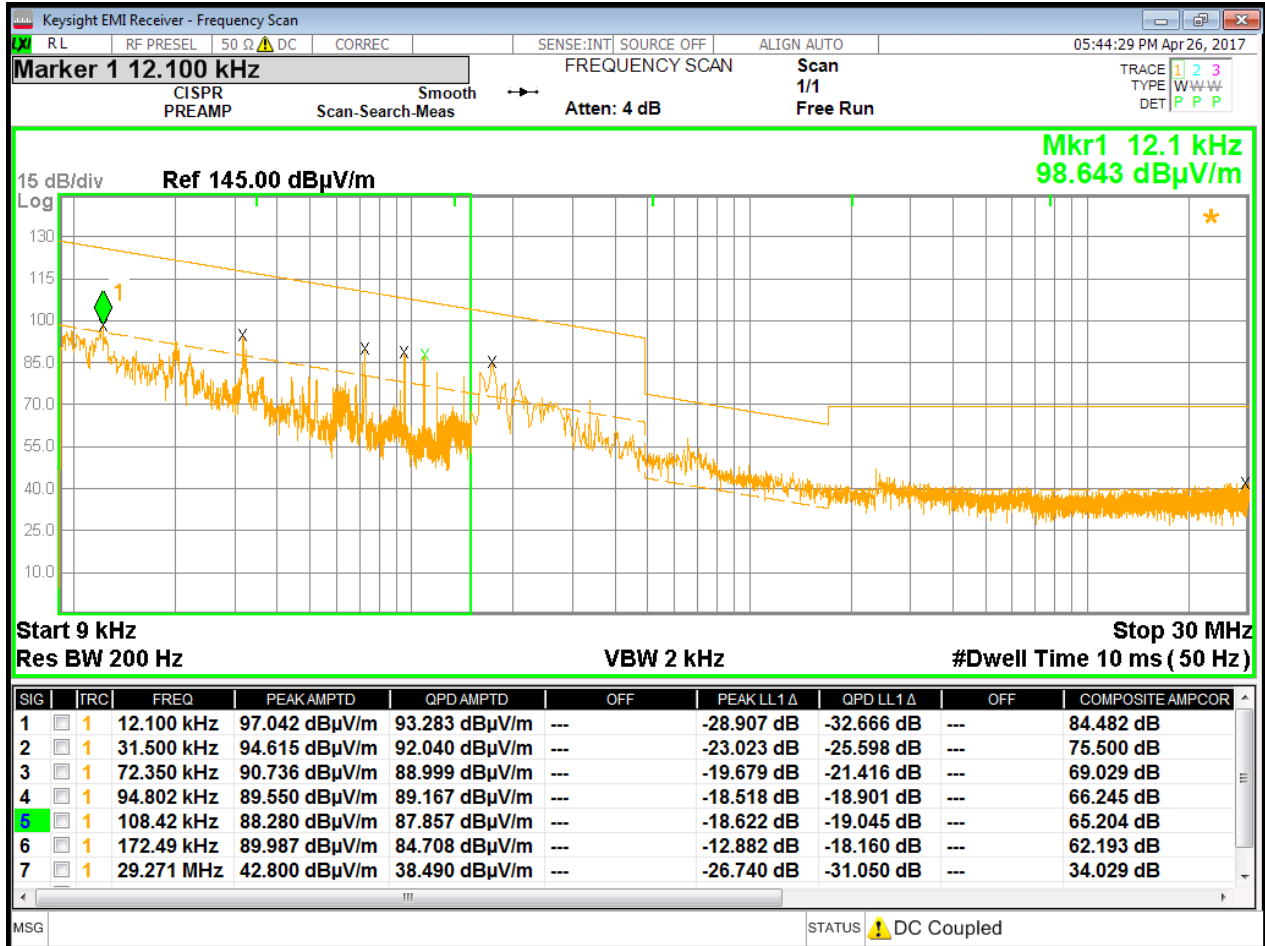


Fig. 4.10 - standby

Record of the measurement of radiated emissions (PK)

Maximum disturbance determined in the frequency range 0.009 – 30 MHz, Pol. Orthogonal.

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

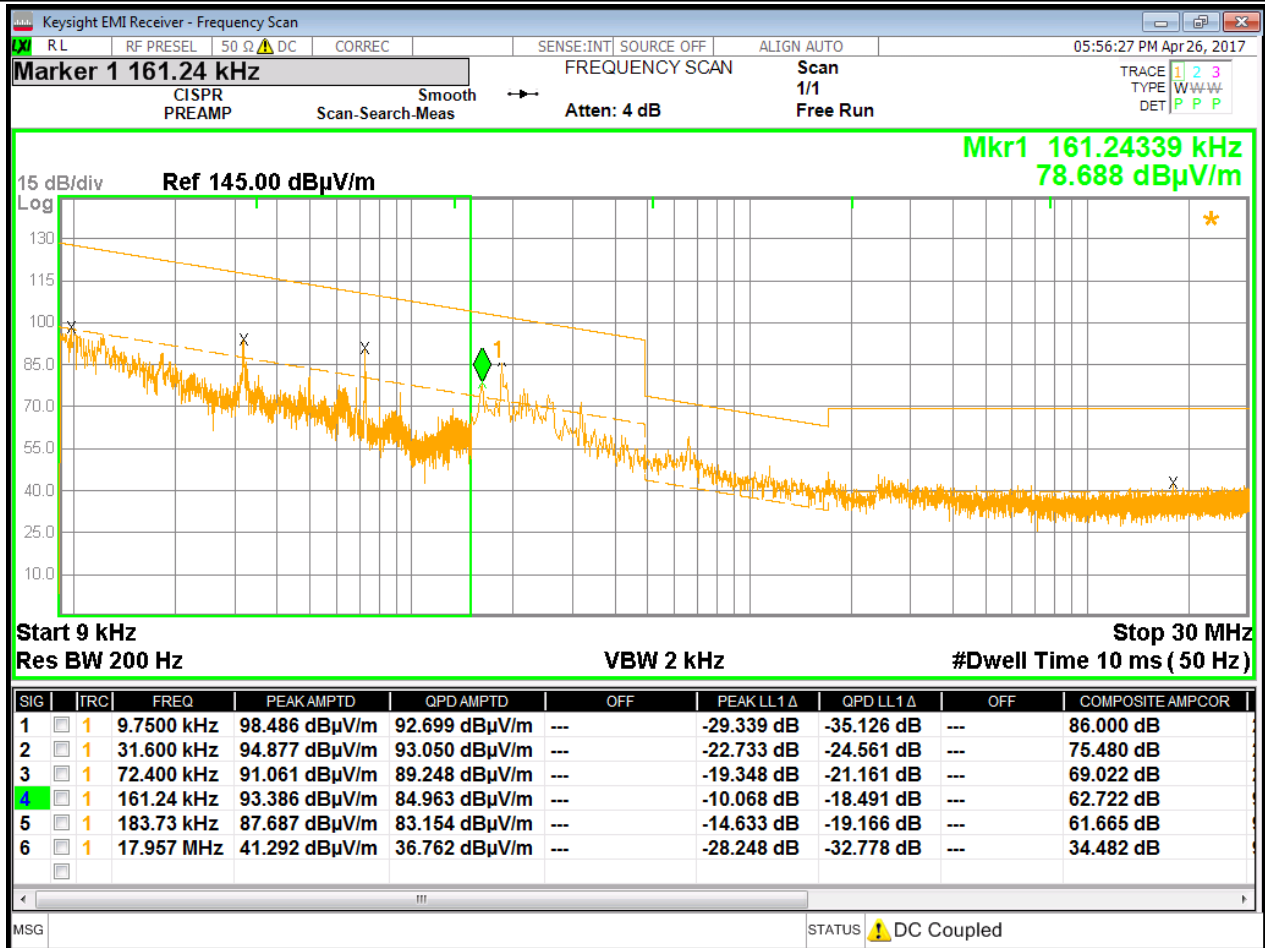


Fig. 4.11

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

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

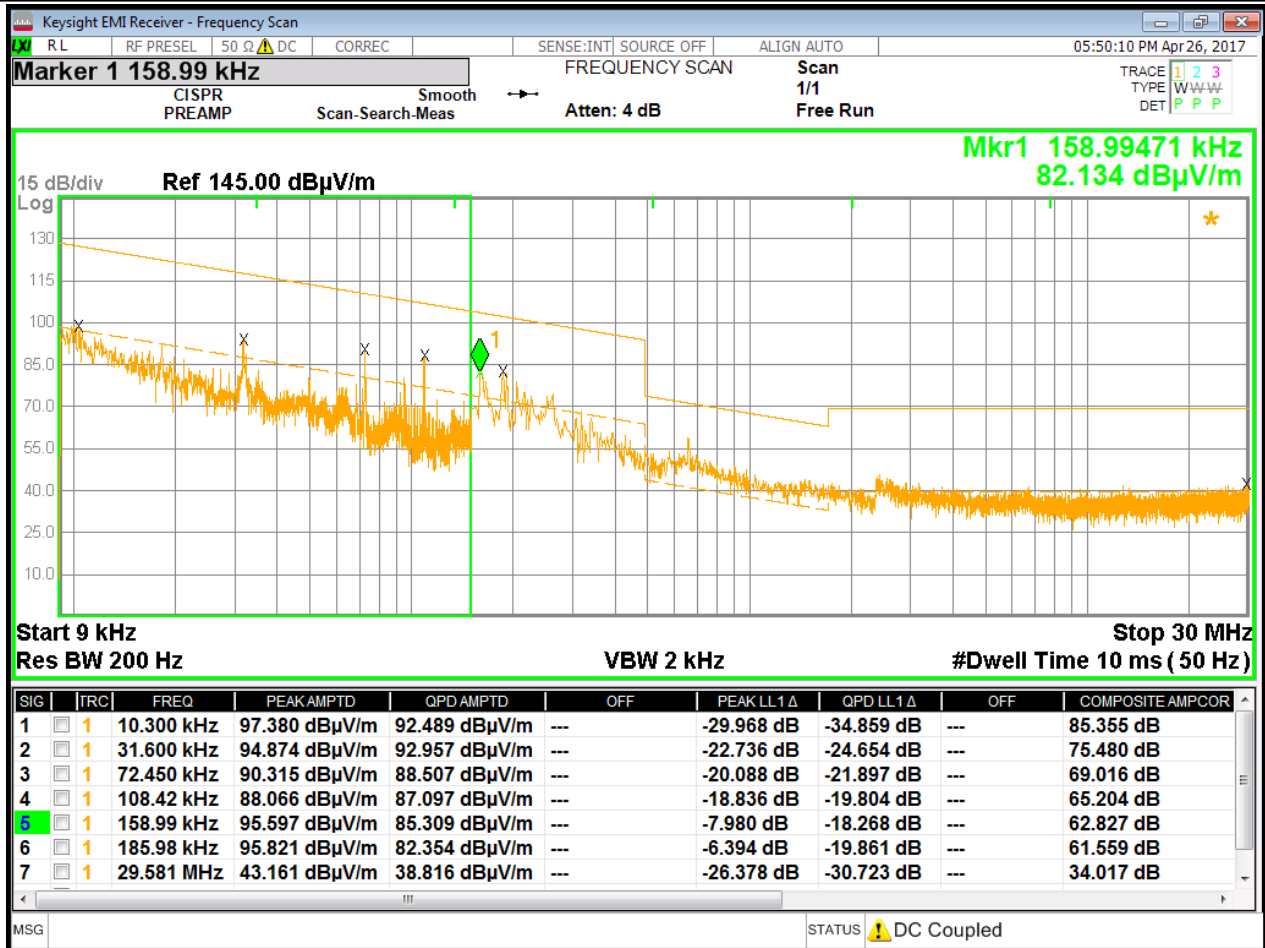


Fig. 4.12

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, 15.107

<i>FREQUENCY RANGE</i> (MHz)	<i>QUASI-PEAK LIMIT</i> [dB (μV)]	<i>AVERAGE LIMIT</i> [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
EMI Receiver	HP	HP8546A	01/2018
EMI Receiver Filter Section	HP	HP85460A	01/2018
Screened Room	GSD	CSC01	01/2018
Transient Limiter	HP	11947A	01/2018
LISN	GSD	GSDA01	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-17238B
 Test Name Powerline Conducted Emissions
 FCC 15.207
 EUT Name R1170IU

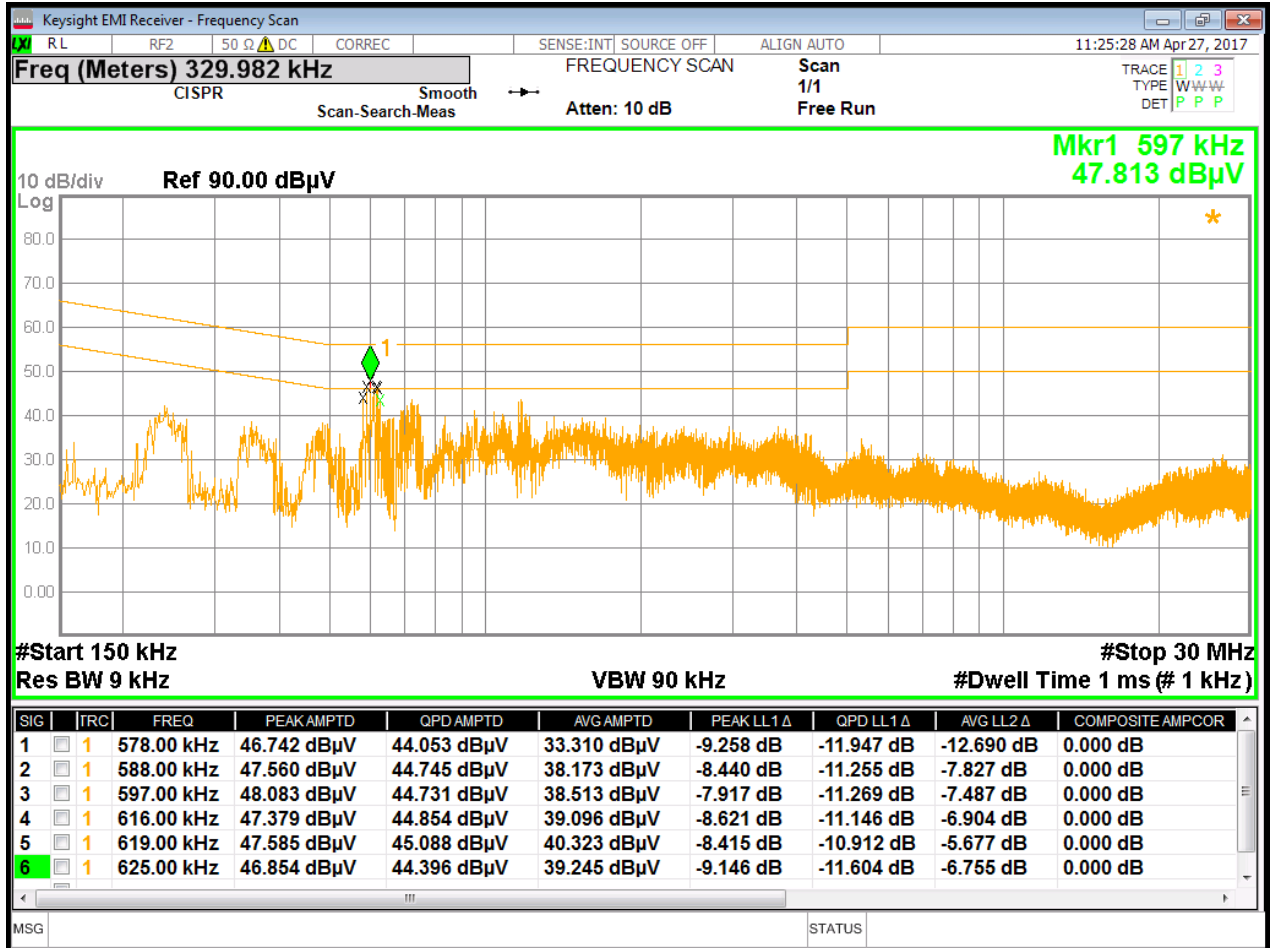


Fig. 5.1 – standby
 B Band (0.15 – 30 MHz): line 1

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

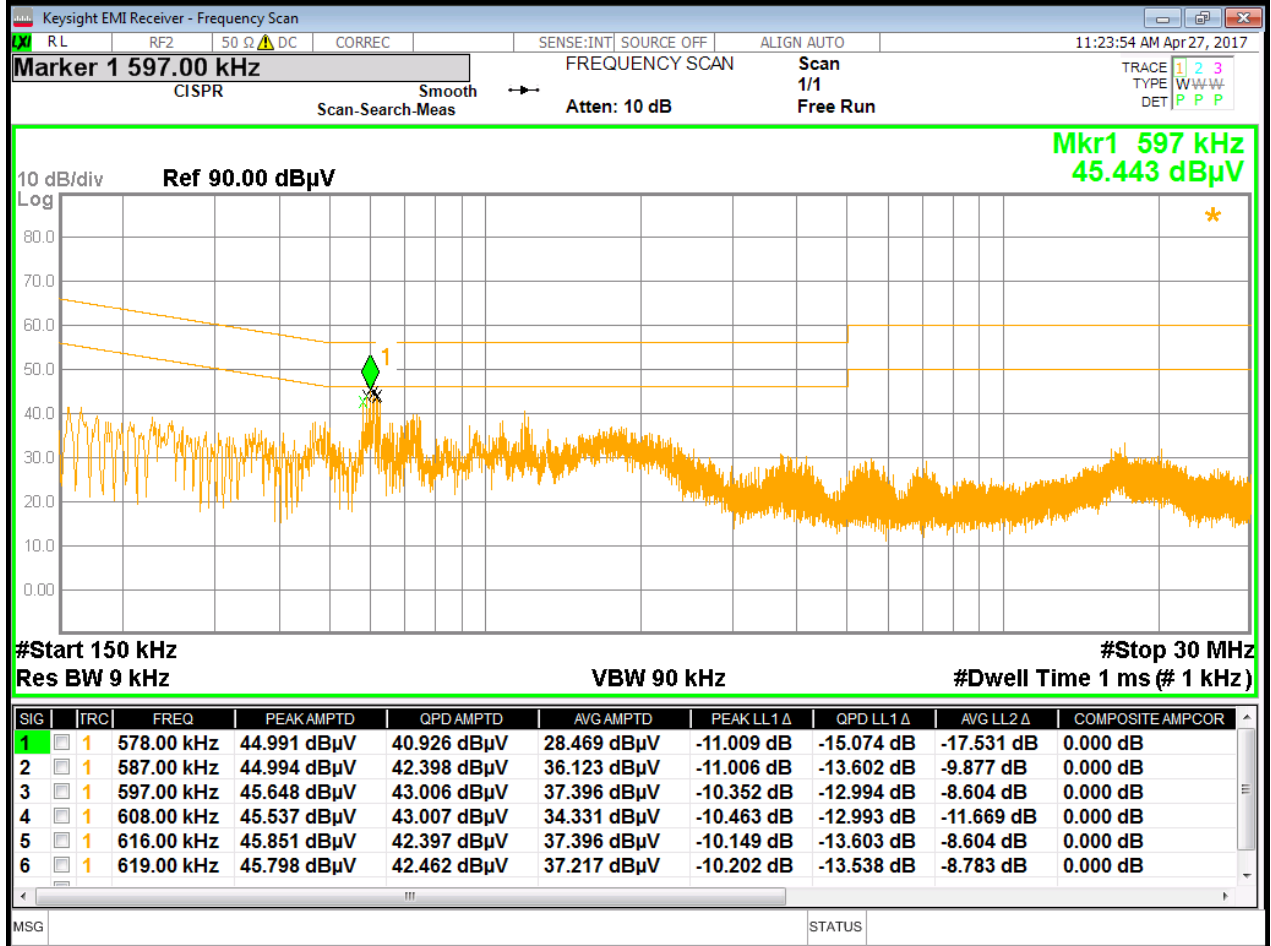


Fig. 5.2 – standby
 B Band (0.15 – 30 MHz): line 2

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

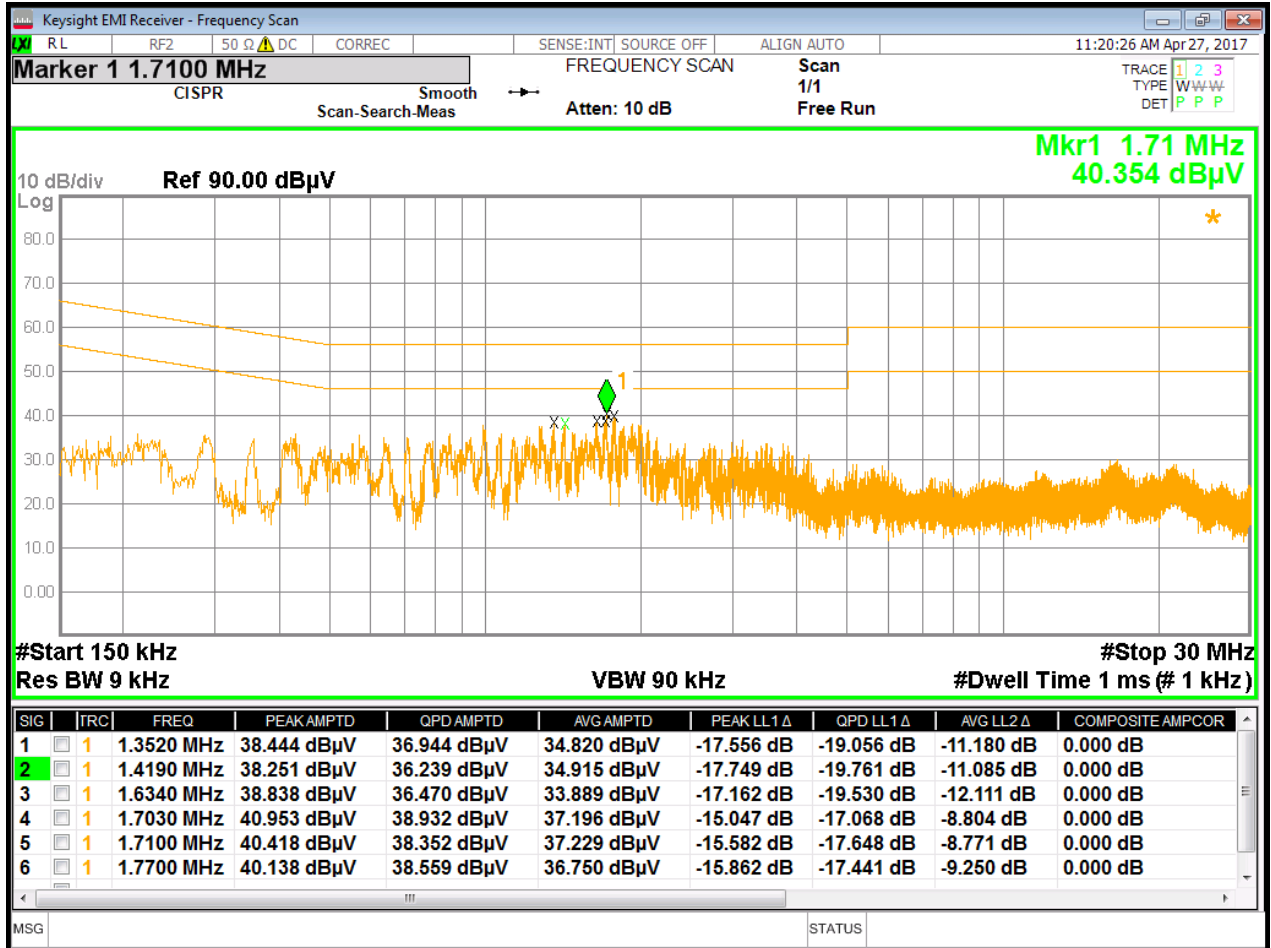


Fig. 5.3

B Band (0.15 – 30 MHz): line 1

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

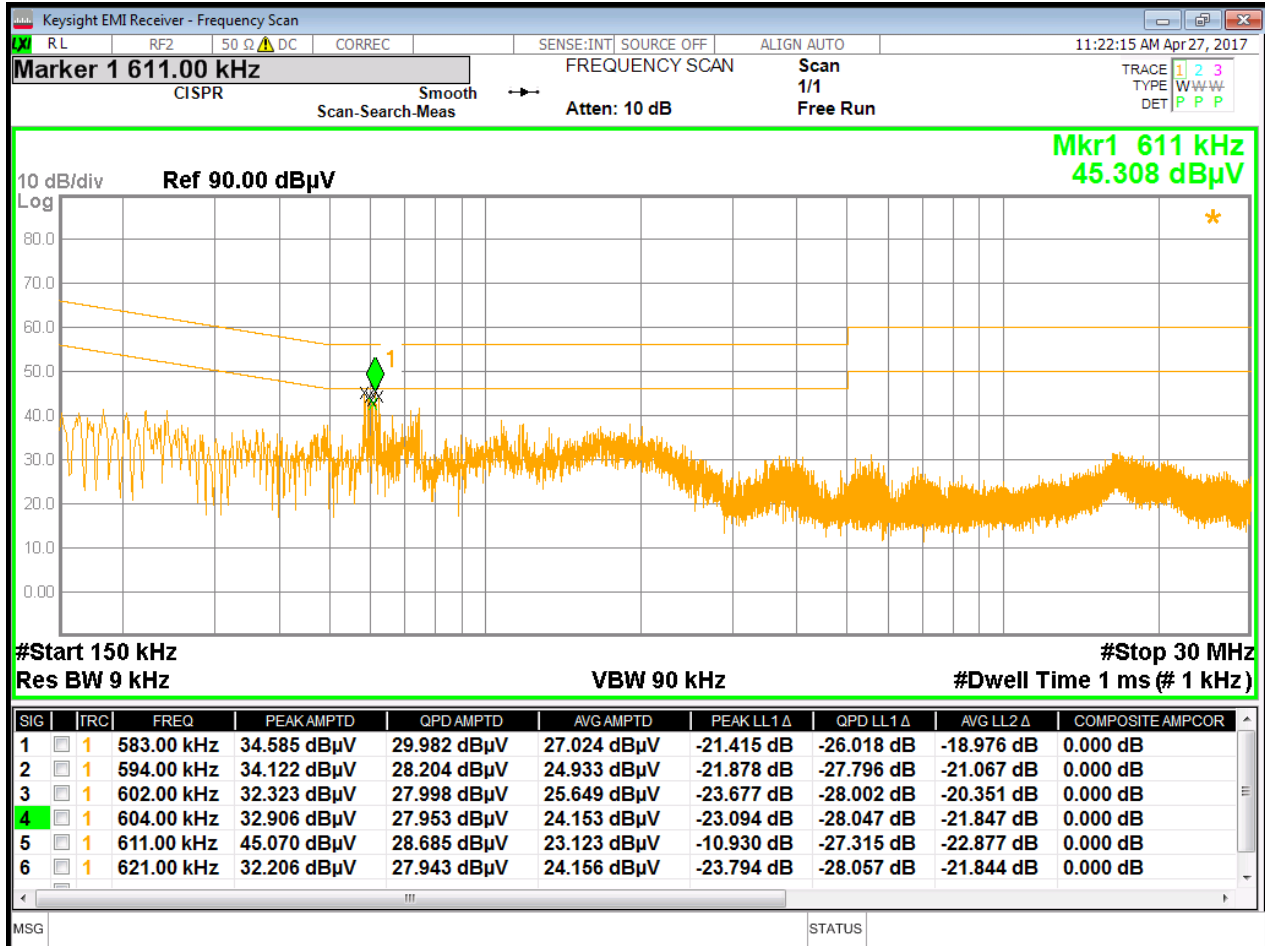


Fig. 5.4

B Band (0.15 – 30 MHz): line 2

6. PHOTO

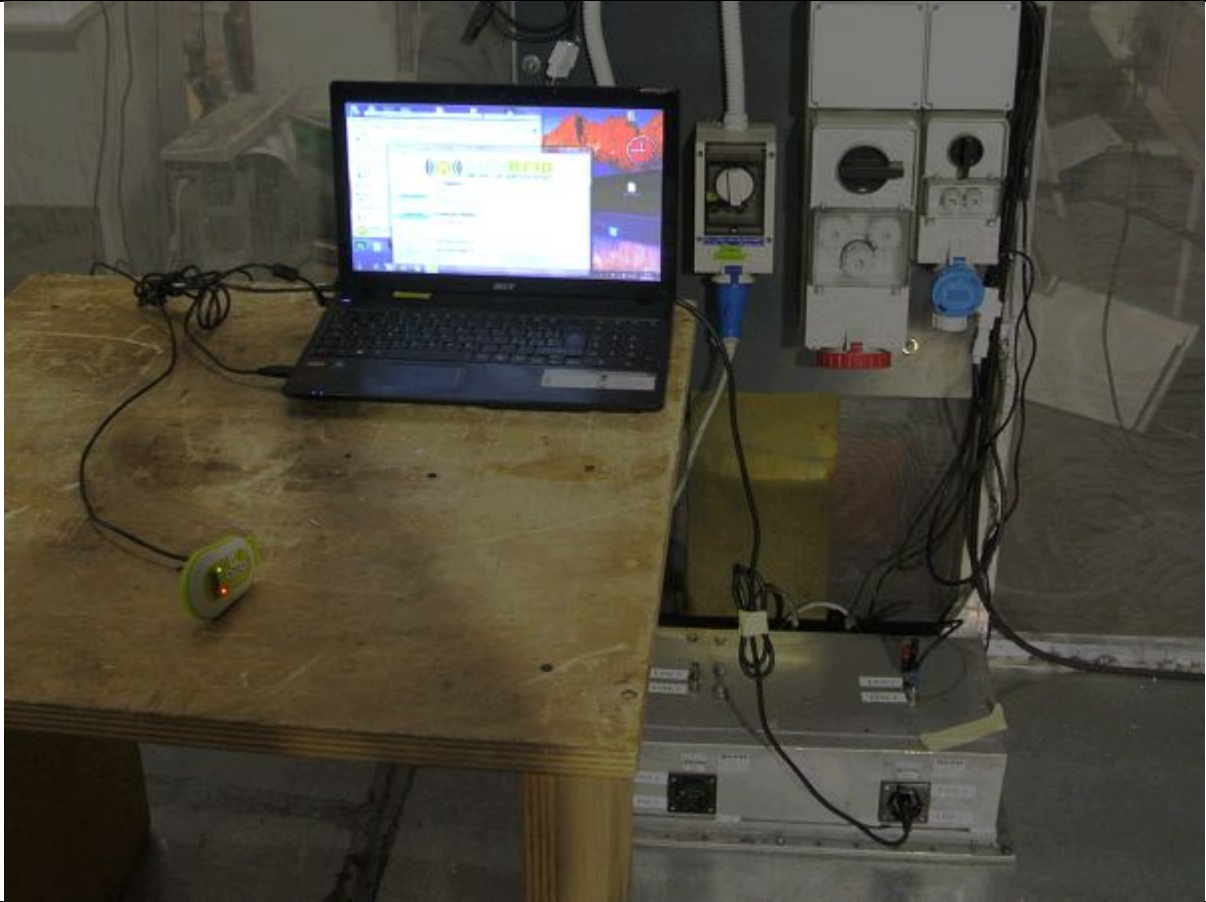


Fig. 6.1

Conducted Emissions Test Set-up

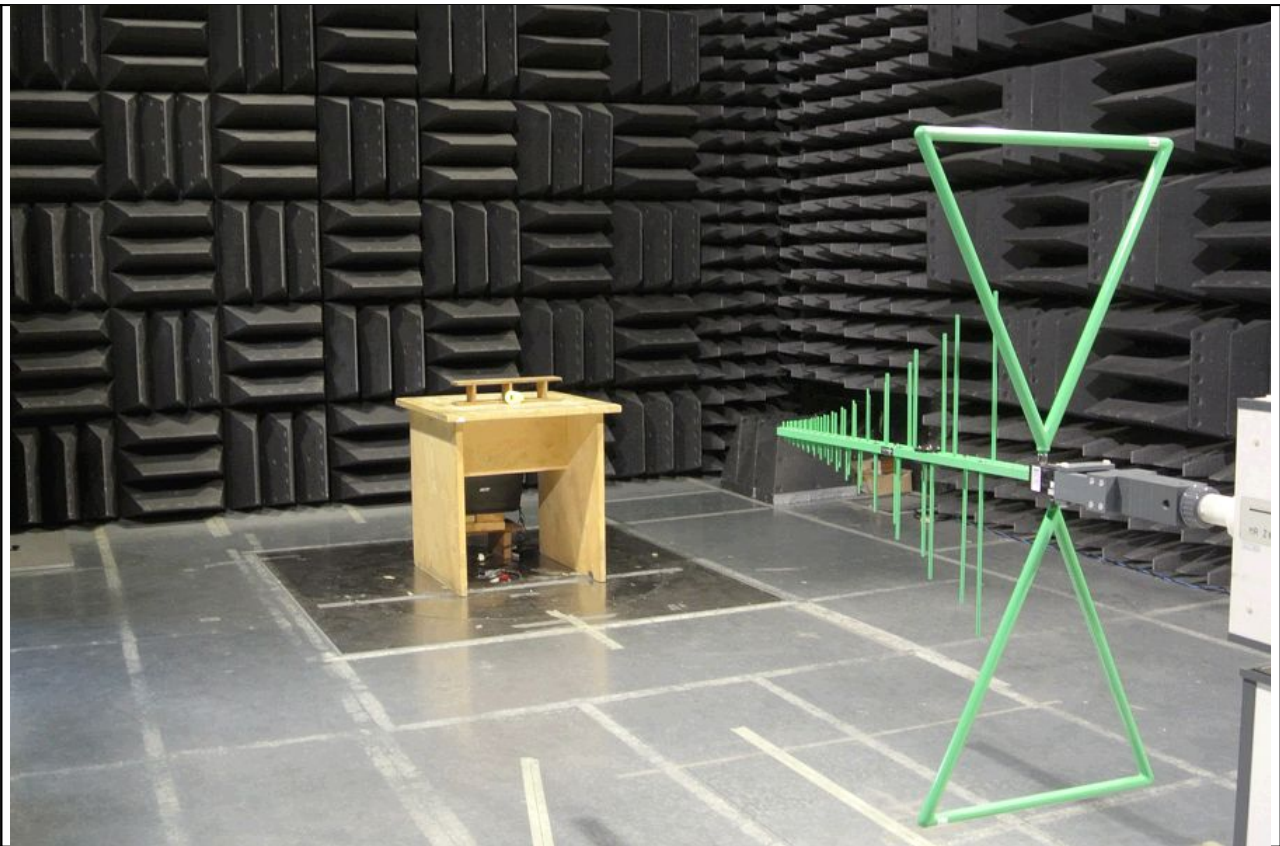


Fig. 6.2

Radiated Emissions Test Set-up



Fig. 6.3

Radiated Emissions Test Set-up