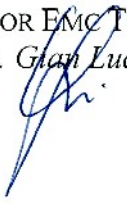


   Organizzazione con Sistema di Gestione certificato Company with Management System certified ISO 9001:2008  ELECTROMAGNETIC COMPATIBILITY ELECTRICAL SAFETY LASER SPECTROSCOPY ENVIRONMENTAL PHYSICS		
G.S.D. Srl PISA - Italy	Test Report n. FCC-15806	Rev. 01
Manufacturer	Reha Technology AG	
Address	Industriestrasse 78 4600 Olten Switzerland	
Test Family Name	Armotion	
Testing Laboratory Name	G.S.D. S.r.l.	
Address	Via Marmiceto, 8 56121 Ospedaletto 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, 2015 December 21	
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 <i>Dr. Gian Luca Genovesi</i>  QUALITY MANAGER <i>Dr. David Pelliccia</i> 		

INDEX	
1. MANUFACTURER AND EUT IDENTIFICATION	3
2. REFERENCE STANDARDS.....	5
3. RESULT, CONDITION, MEASUREMENT UNCERTAINTY.....	6
4. RADIATED EMISSIONS.....	7
5. OPERATION WITHIN THE BAND 2400 - 2483.5 MHZ: PEAK OUTPUT POWER – SPURIOUS RF EMISSION – BAND EDGE - RESTRICTED BAND OF OPERATION – TRASMISSION TIME.....	18
6. PHOTO.....	34

This document may be only fully reproduced.

Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 2 / 36

1. MANUFACTURER AND EUT IDENTIFICATION¹	
Manufacturer	Reha Technology AG.
Address	Industriestrasse 78 4600 Olten Switzerland
Test Family Name	Armotion
Date of reception	2015 September 24
Sampling	Laboratory sample for certification
Test Item Description	Robotic Solution wiht Bluetooth Device
Nominal Input Voltage	11.1 Vdc
FCC ID	2AF6XRTAM1000

¹A detailed documentation is preserved in the internal fascicle.

This document may be only fully reproduced.

Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 3 / 36



*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: Conducted and Radiated – Section 15.207 and 15.209	FCC Rules and 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 and 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
Antenna Requirement: §15.203	FCC Rules and Regulations, Title 47 Part 15 – Sub part C

This document may be only fully reproduced.

Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 5 / 36

3. RESULT, CONDITION, MEASUREMENT UNCERTAINTYSummary of Test Results

<i>TEST</i>	<i>RESULT</i>
Antenna Requirement: 15.203 (*)	Pass
Restricted Band: 15.205	Pass
Emissions: radiated Section 15.209	Pass
Bandwidth, Dwell Time and Numer of Hopping Frequencies Section 15.247 (a)	Pass
Operation within the band 2402-2483.5 MHz: Section 15.247 (b) and (c)	Pass
Band Edge Section 15.247 (d)	Pass

(*) Antenna is integrated in the device

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
Radiated Emission – (Semianechoic Room) (18 GHz - 40 GHz)	± 5.1 dB

Climatic Conditions

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

General Conditions

Antenna conducted tests cannot be performed on this device, radiated tests to accordingly to DA 00-705 were performed.

Extensions

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

This document may be only fully reproduced.

Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 6 / 36

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 (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
88 ÷ 216	43,5
216 ÷ 960	46
Above 960	54

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
MXE EMI Receiver	Agilent	N9038A	01/2016
Anechoic Chamber	Comtest	CSA01	01/2016
High Pass Filter	MiniCircuits	VHP-39	01/2016
Notch Filter	K&L	3N45-2442/T84	01/2016
Preamplifier	SHF	97AP	01/2016
Loop Antenna	ETS	6509	01/2016
Bilog Antenna	Schaffner	CBL6112B	01/2016
Horn Antenna	EMCO	3115	01/2016
Horn Antenna	Alpha Industries	61932500	01/2016
Controller	Deisel	HD100	01/2016
Turn Table	Deisel	MA240	01/2016
LISN	GSD	NTW06	01/2016

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 polarization is indicated by POL=H. Antenna vertical polarization is indicated by POL=V. EUT was tested in the three orthogonal planes.

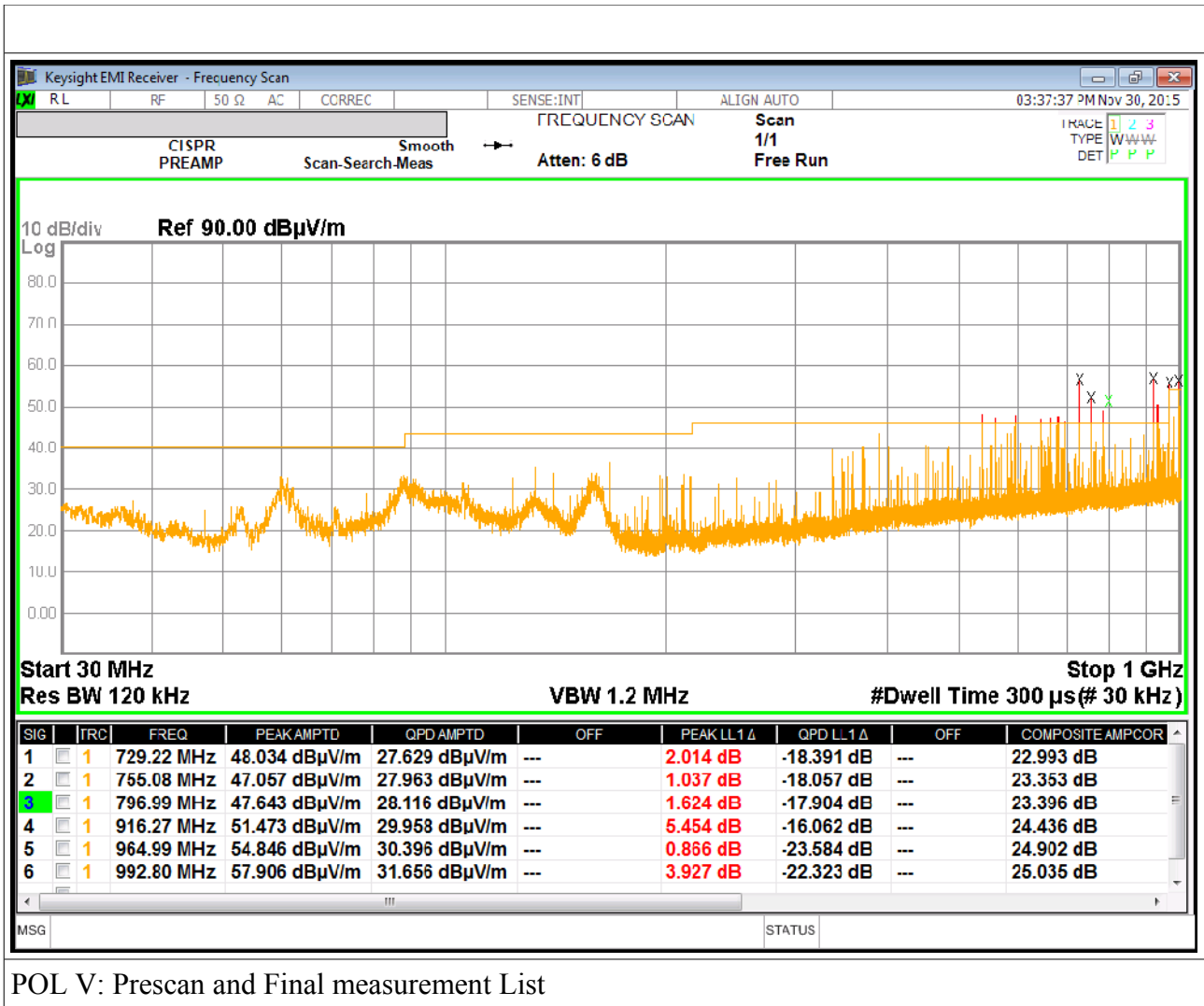
Results and conclusions

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

This document may be only fully reproduced.

Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

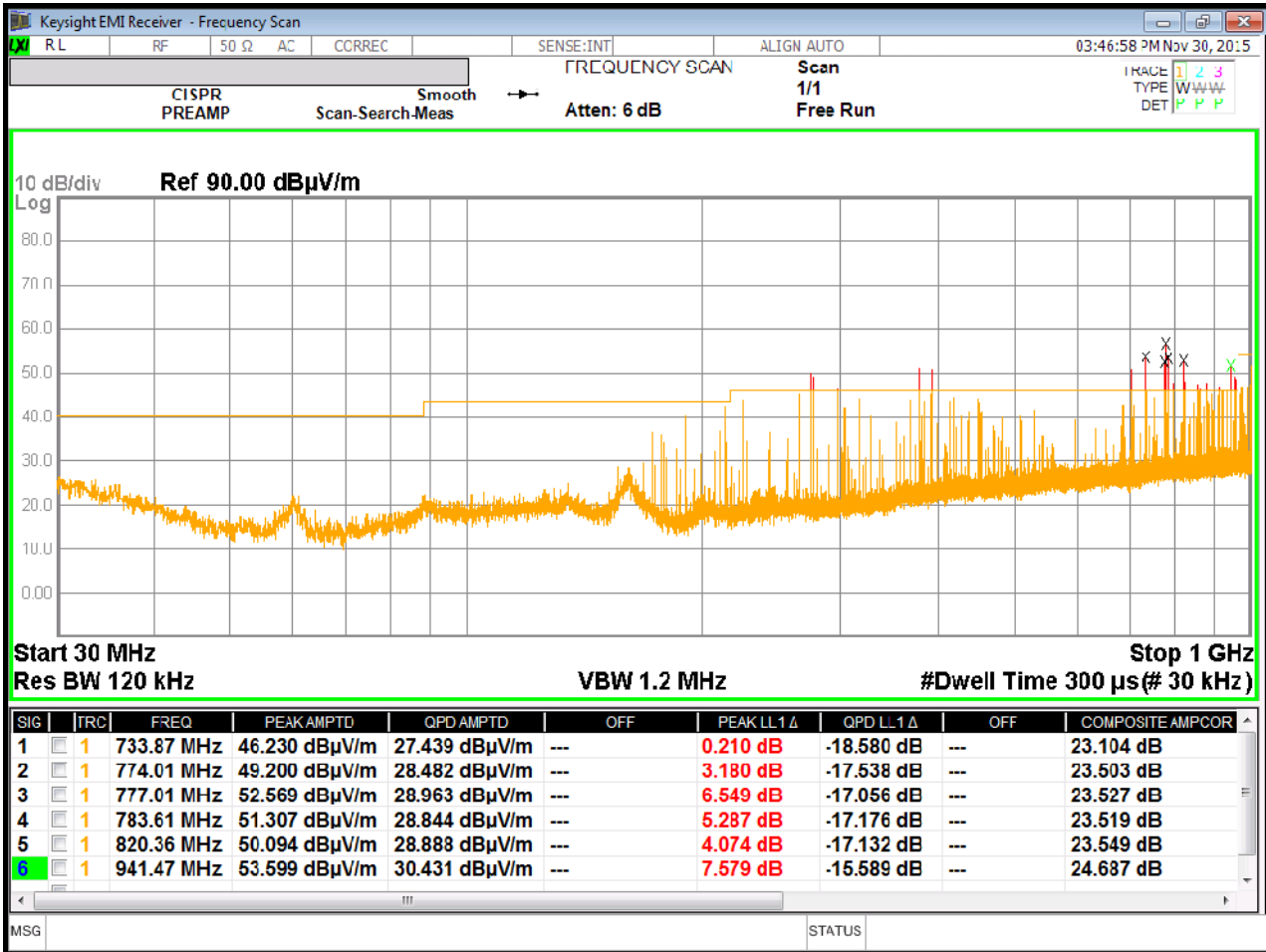
Report n. FCC-15806 Rev. 01, page 7 / 36



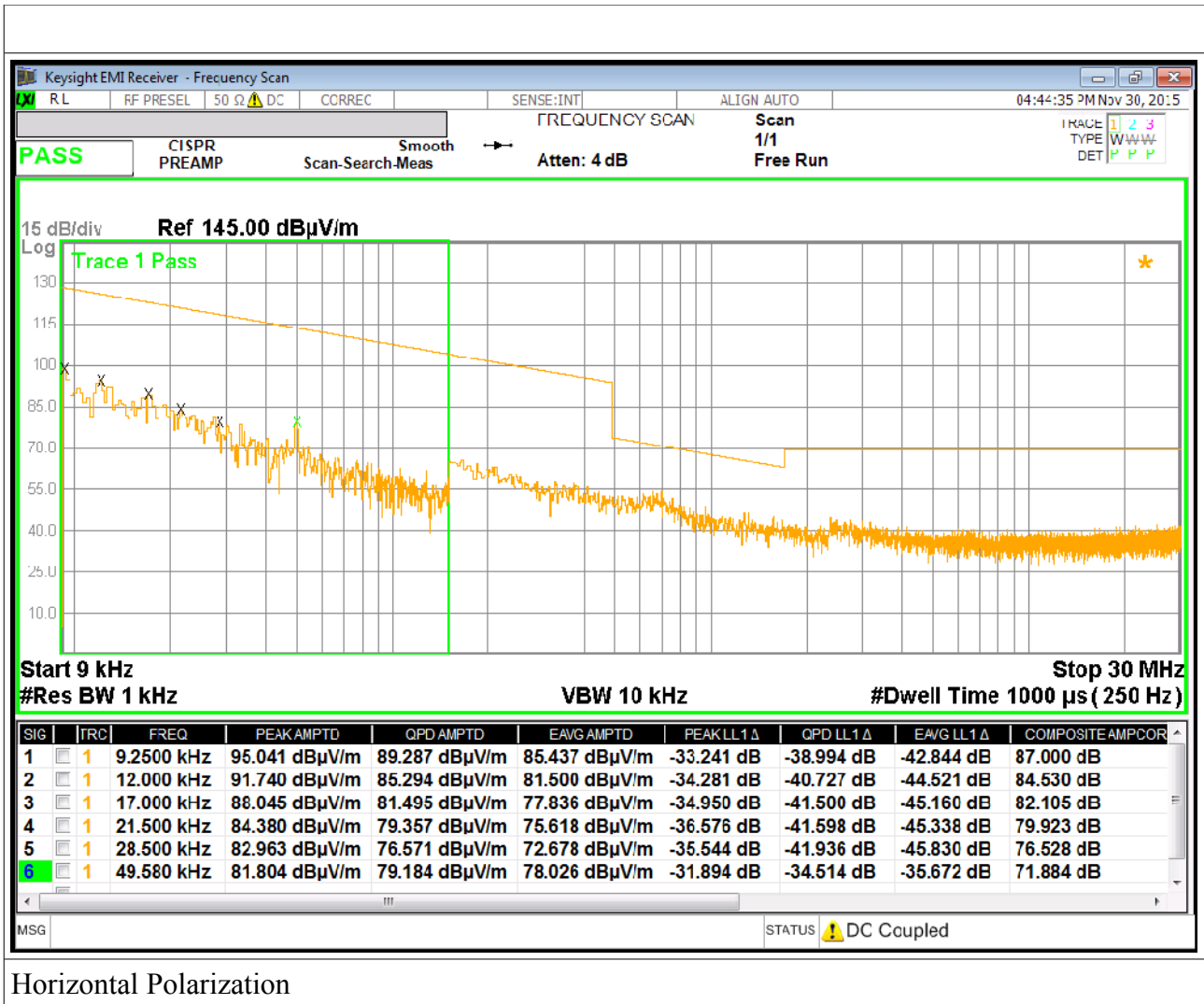
This document may be only fully reproduced.

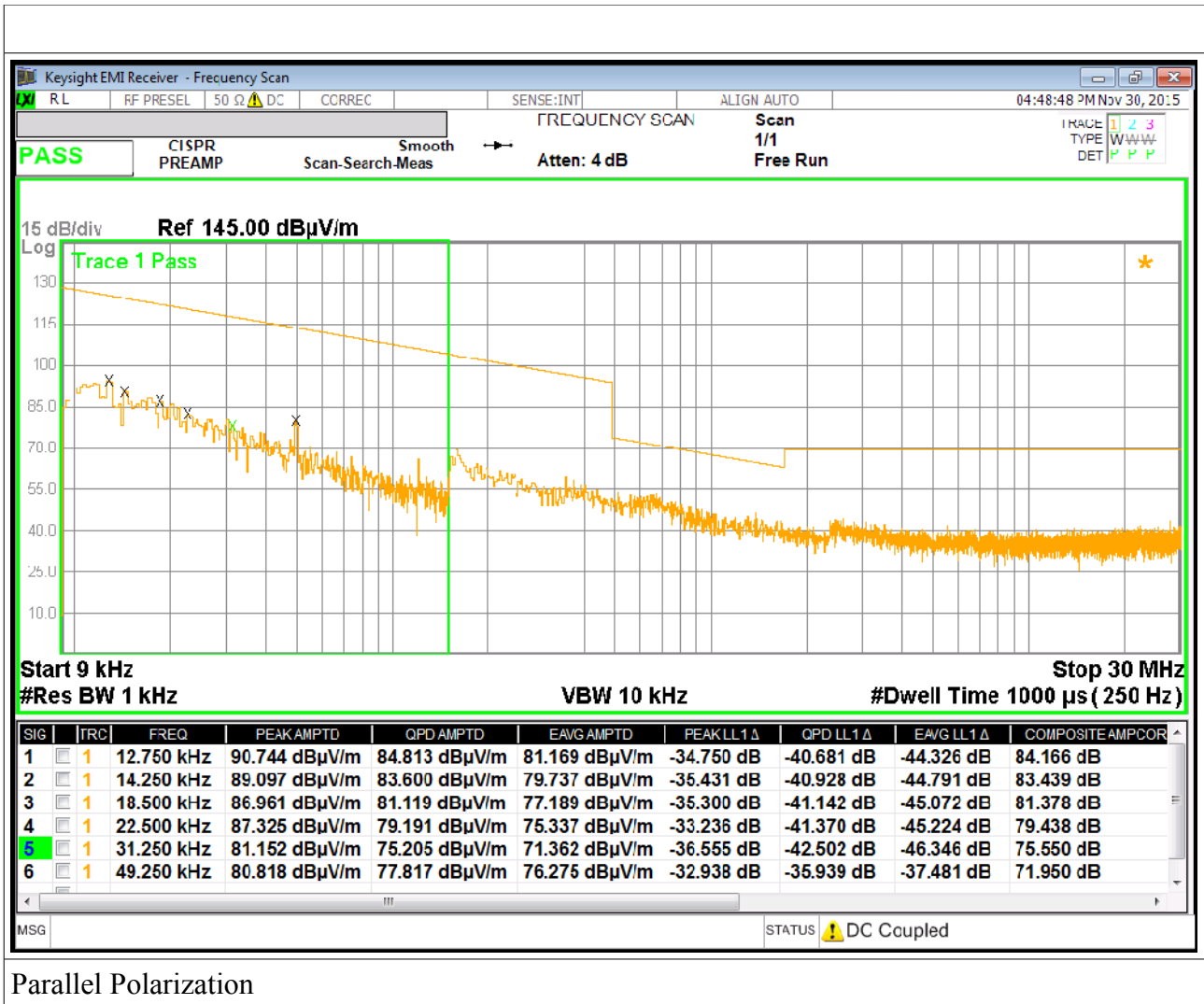
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

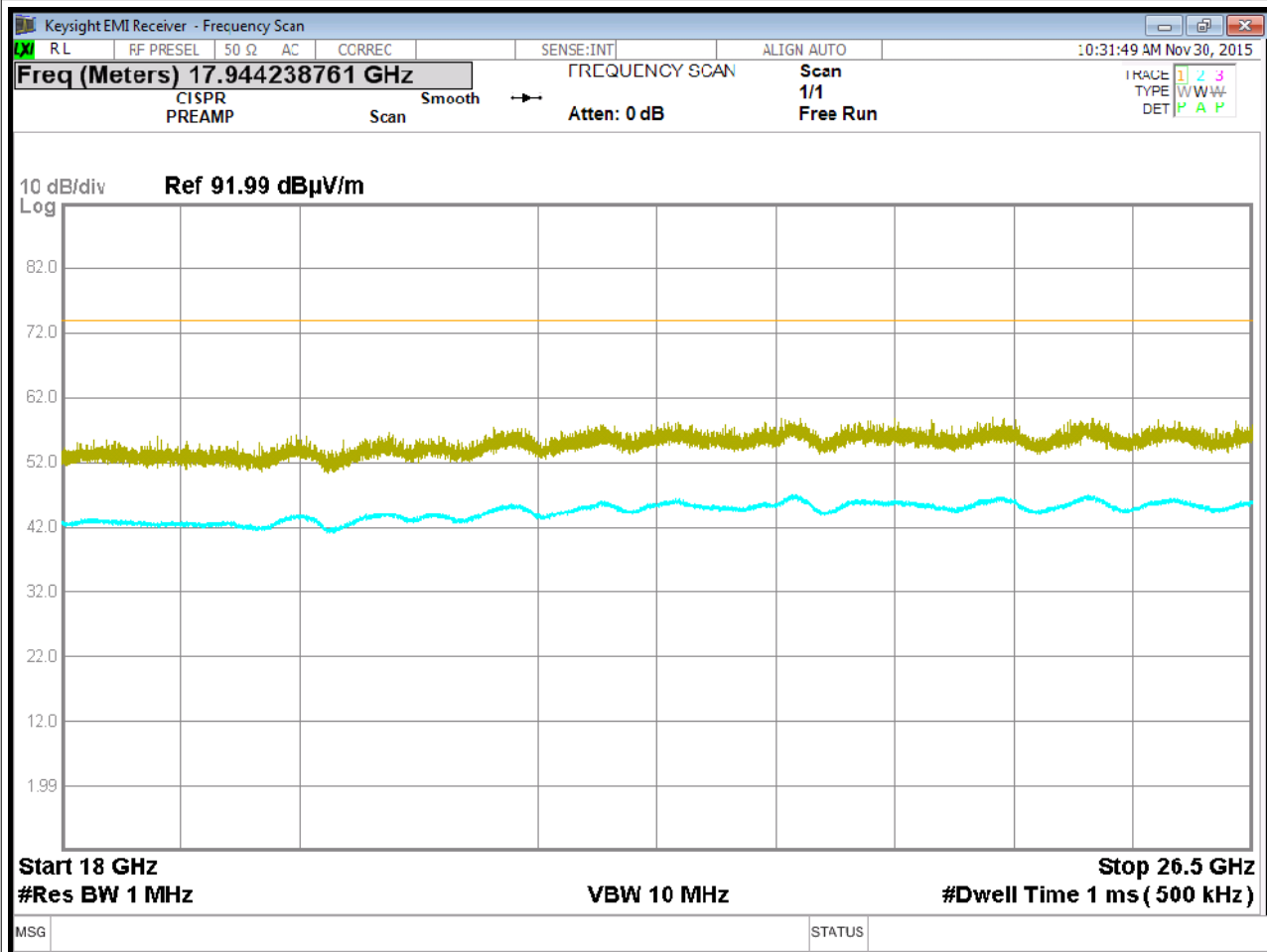
Report n. FCC-15806 Rev. 01, page 8 / 36



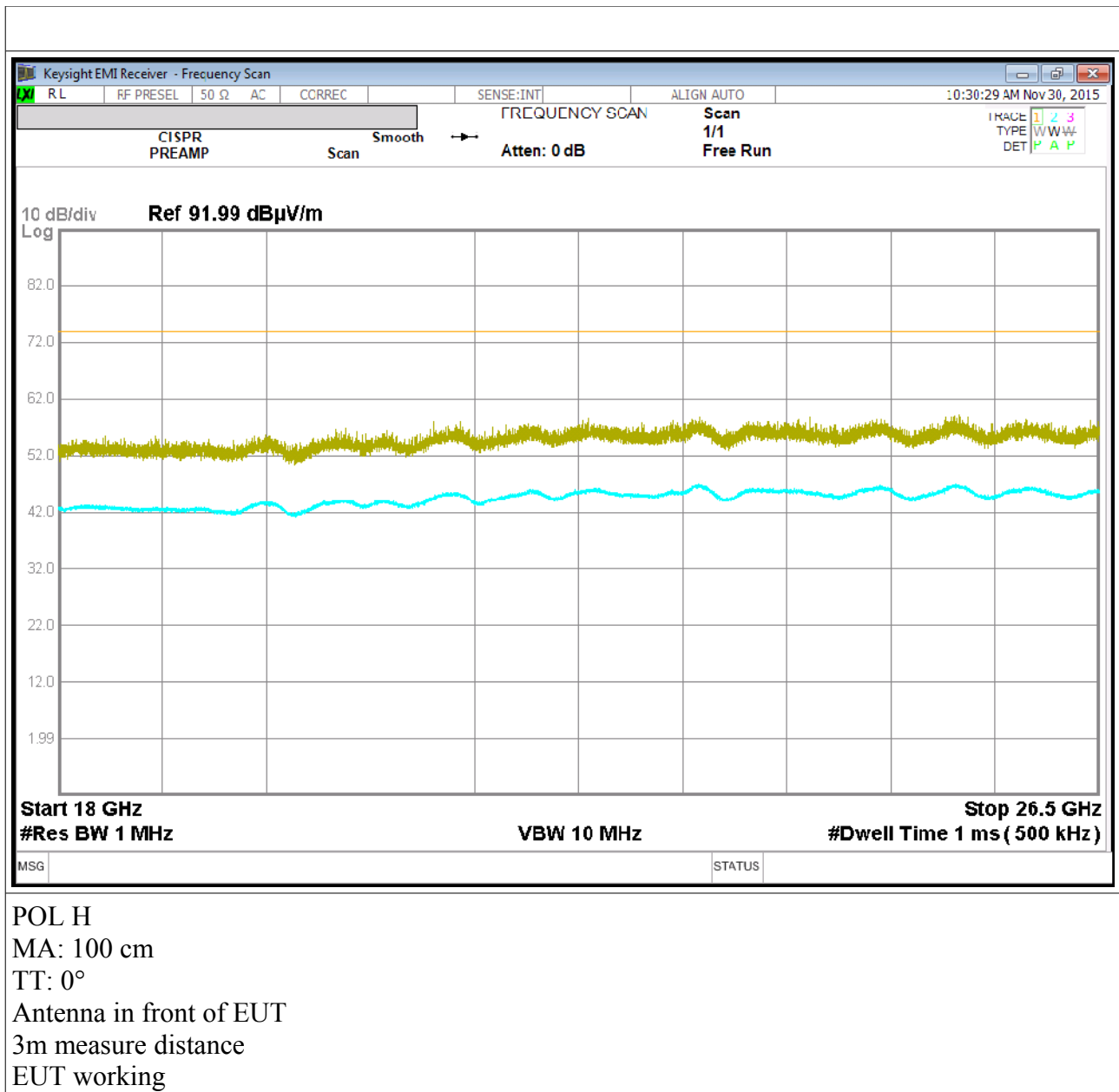
POL H: Prescan and Final measurement List

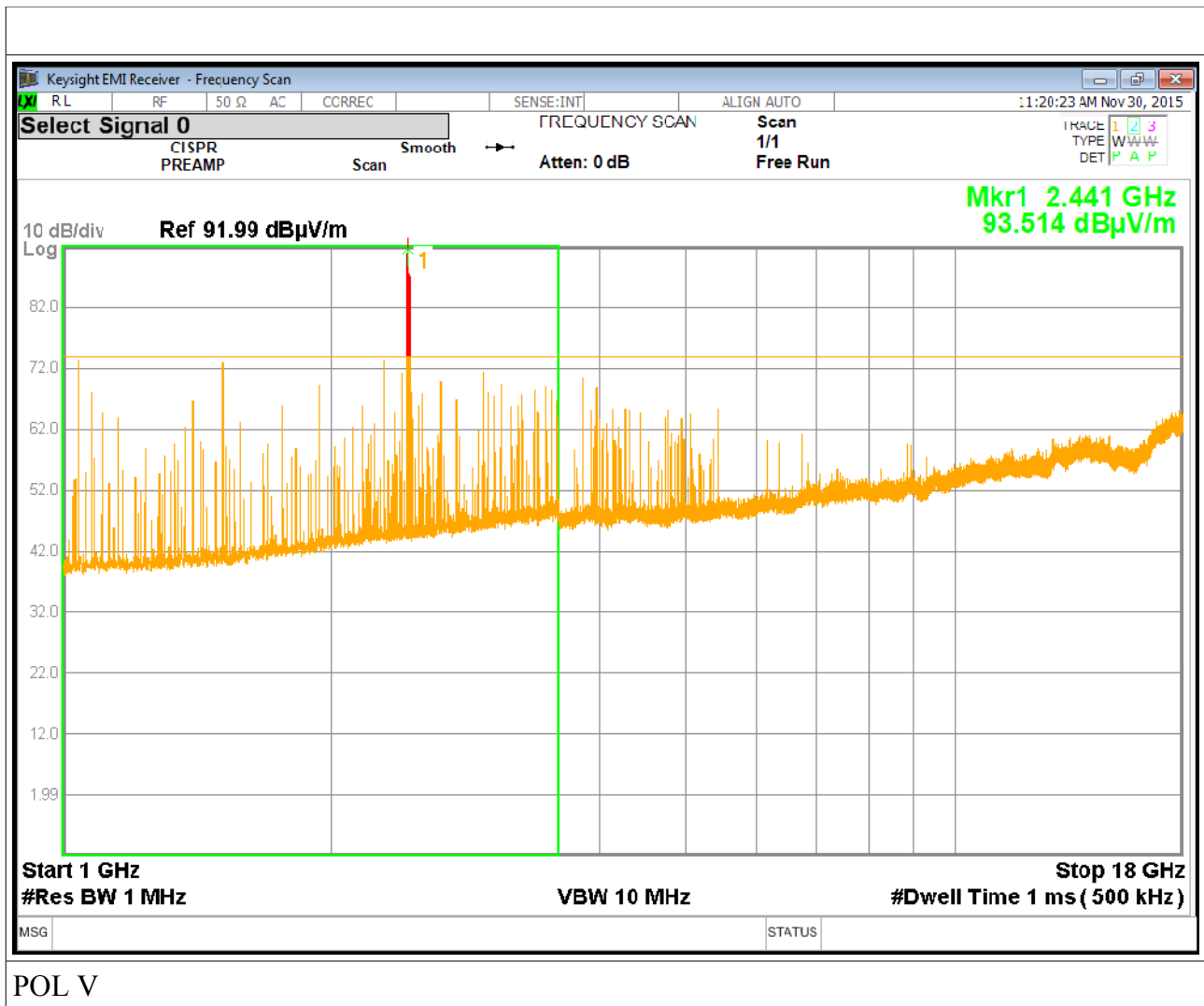


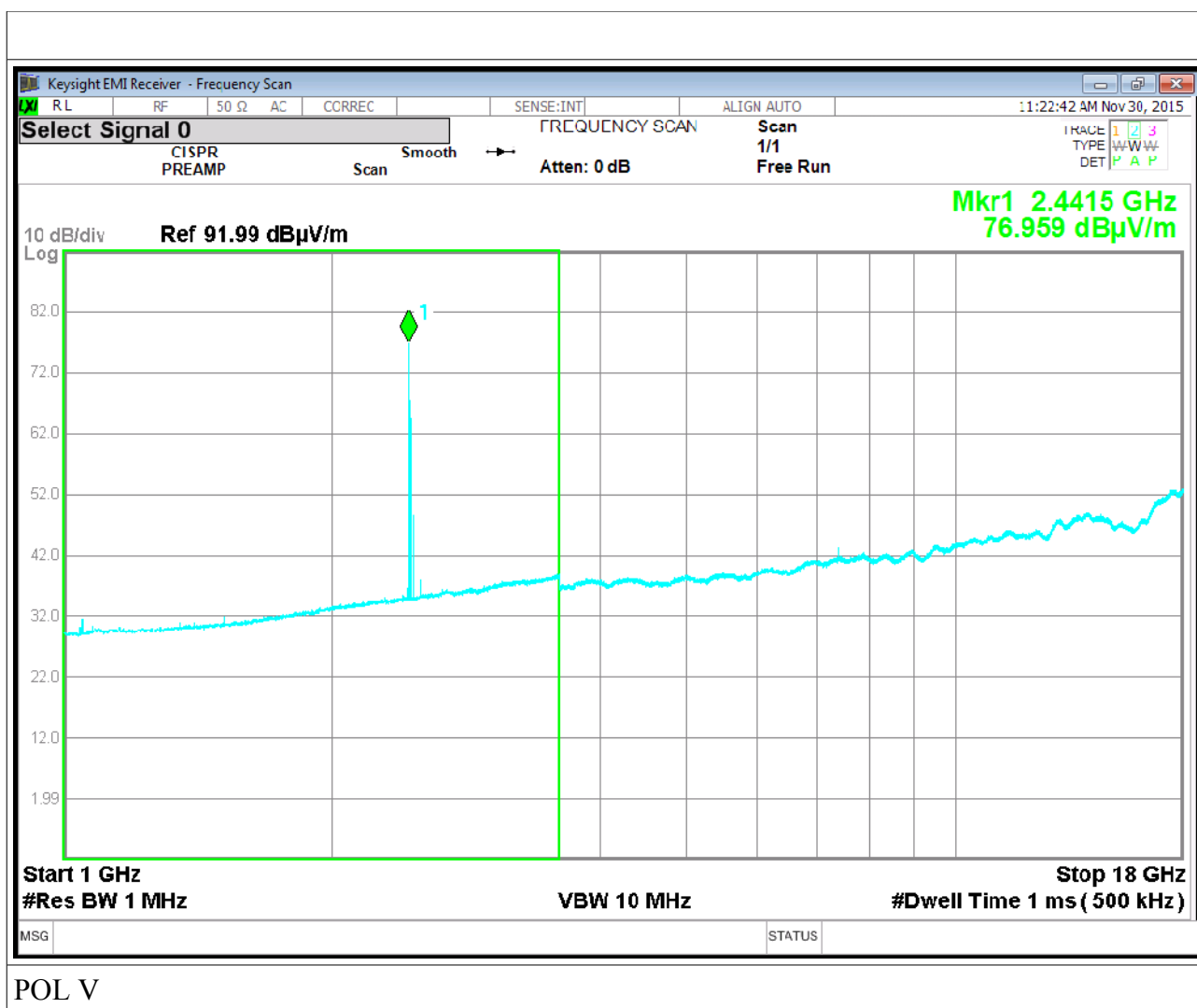


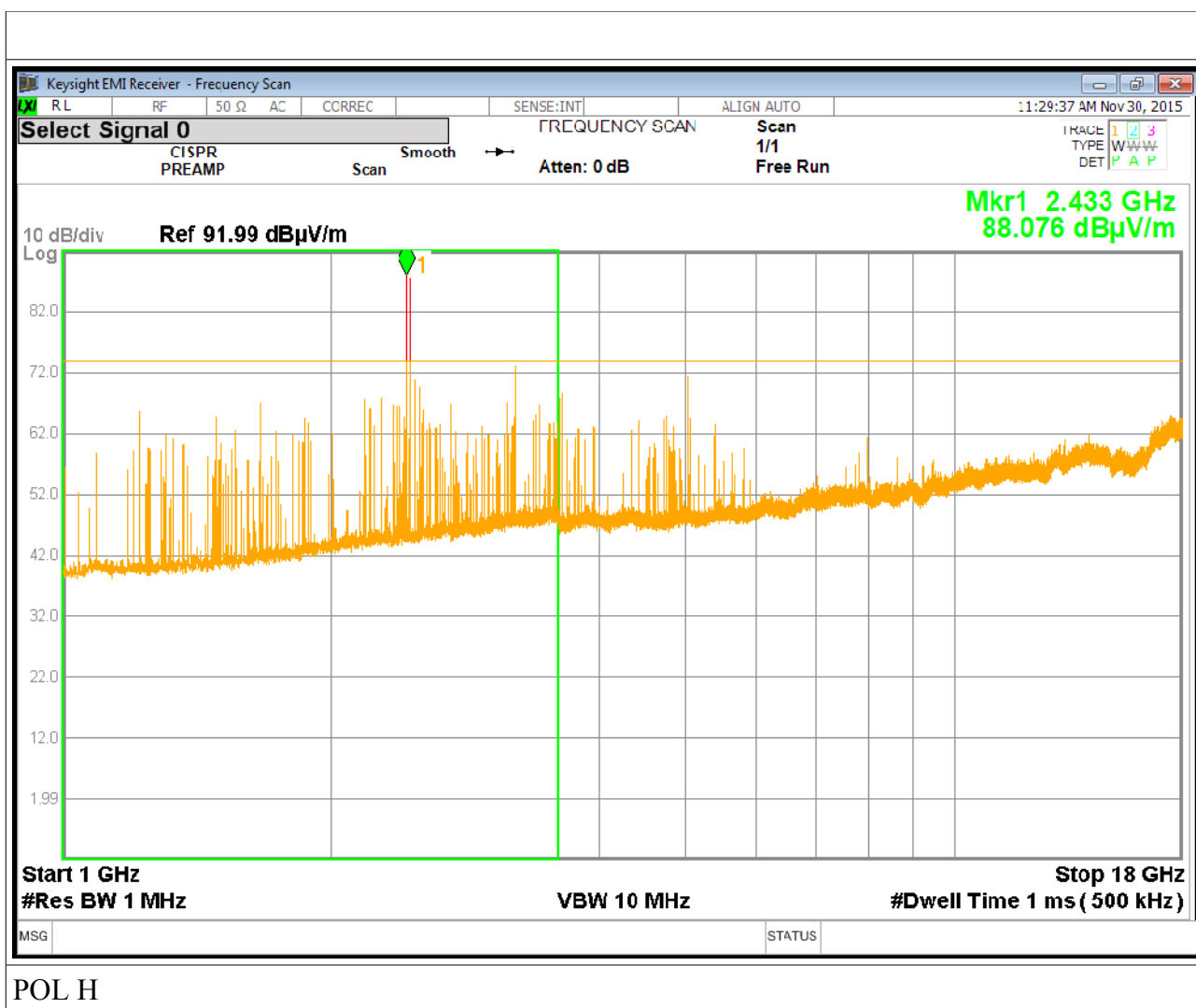


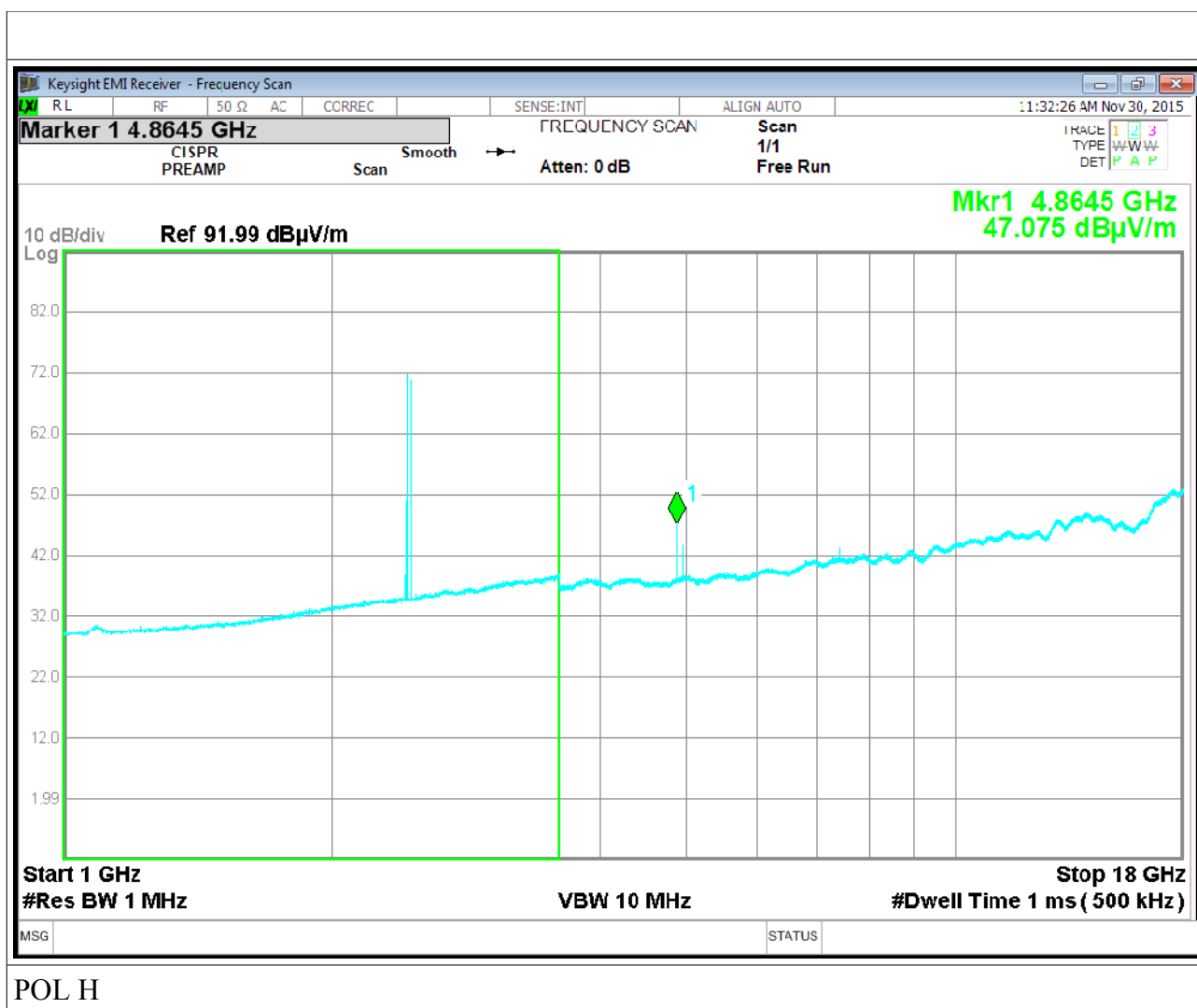
POL V
MA: 100 cm
TT: 0°
Antenna in front of EUT
3m measure distance
EUT working











5. OPERATION WITHIN THE BAND 2400 - 2483.5 MHz: PEAK OUTPUT POWER – SPURIOUS RF EMISSION – BAND EDGE - RESTRICTED BAND OF OPERATION – TRASMISSION TIME

Accordingly to DA 00-705 (30 March 2000), radiated measurement were performed.

Peak Output Power

Peak power was calculated accordingly to the following equation:

$$P=(Ed)^2/30G$$

E = measured maximum fundamental field strength in V/m

G = numeric gain of the transmitting antenna with reference to an isotropic radiator.

d = distance in meters from which the field strength was measured.

P = power in watts

Equipment shall meet the limits below.

<i>FREQUENCY RANGE</i> (MHz)	RF power output Limit dBm
2400-2483.5	30.0

E = 90.4 dBμV/m (0.033 V/m)

G=-1 dBi (Numerical Gain = 0.794)

d = 3m

Maximum calculated peak power = -3.87 dBm (0.41 mW)

Additional Measurement [15.247 (a)(1)]

Channel spacing= 0.999 MHz

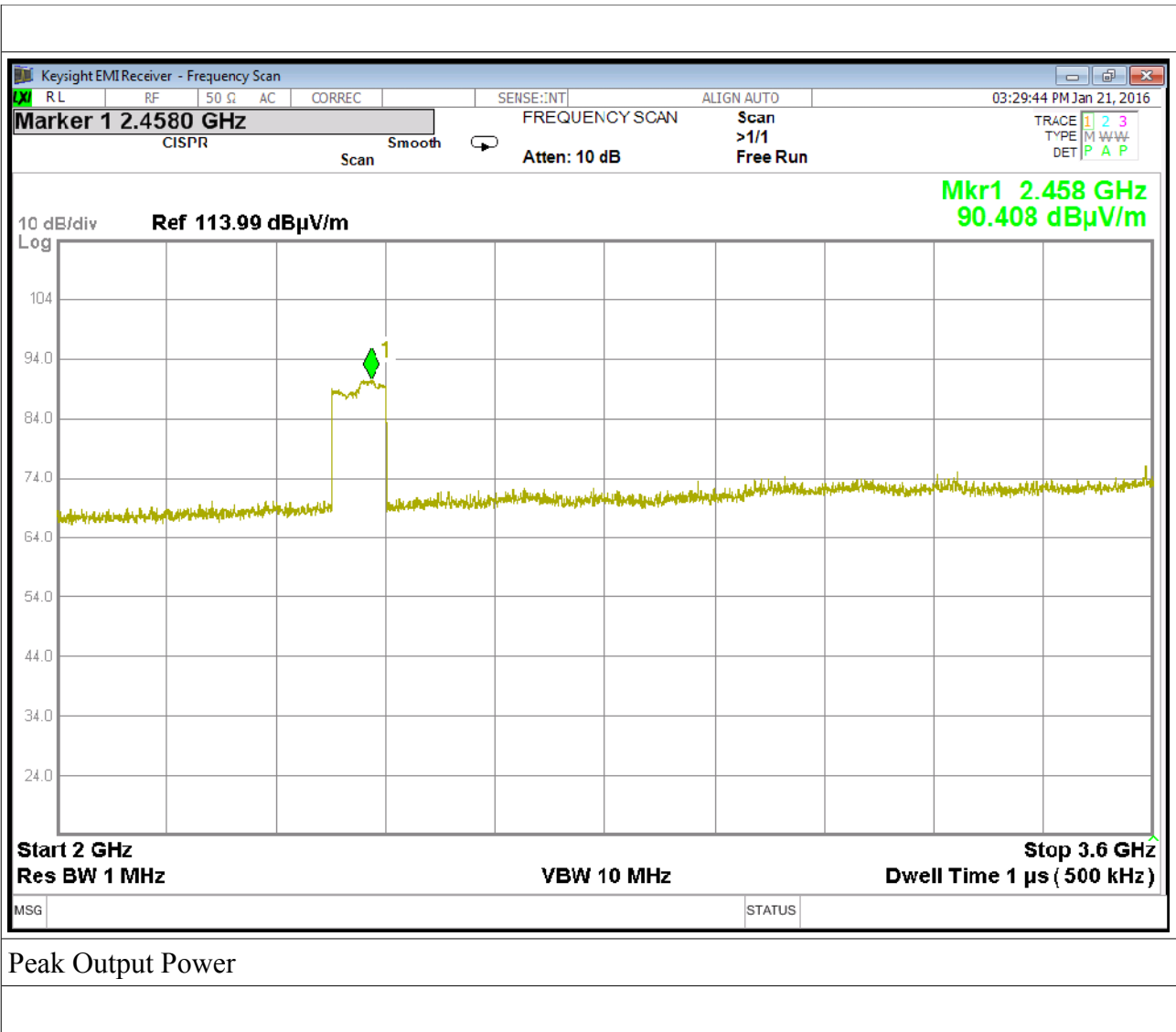
Number of hopping frequencies= 79

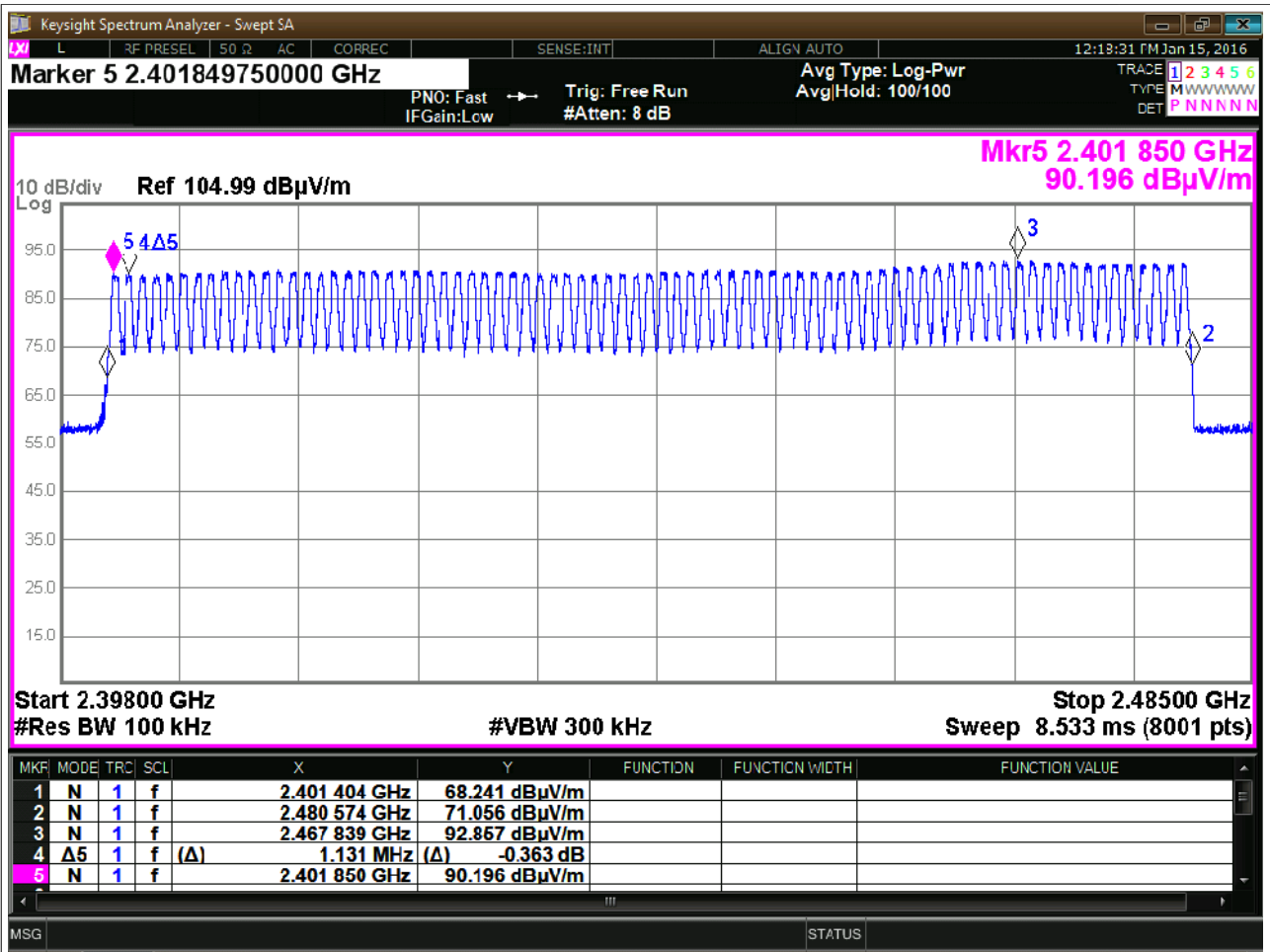
Frequencies are chosen from a pseudorandomly ordered list of hopping frequencies.

This document may be only fully reproduced.

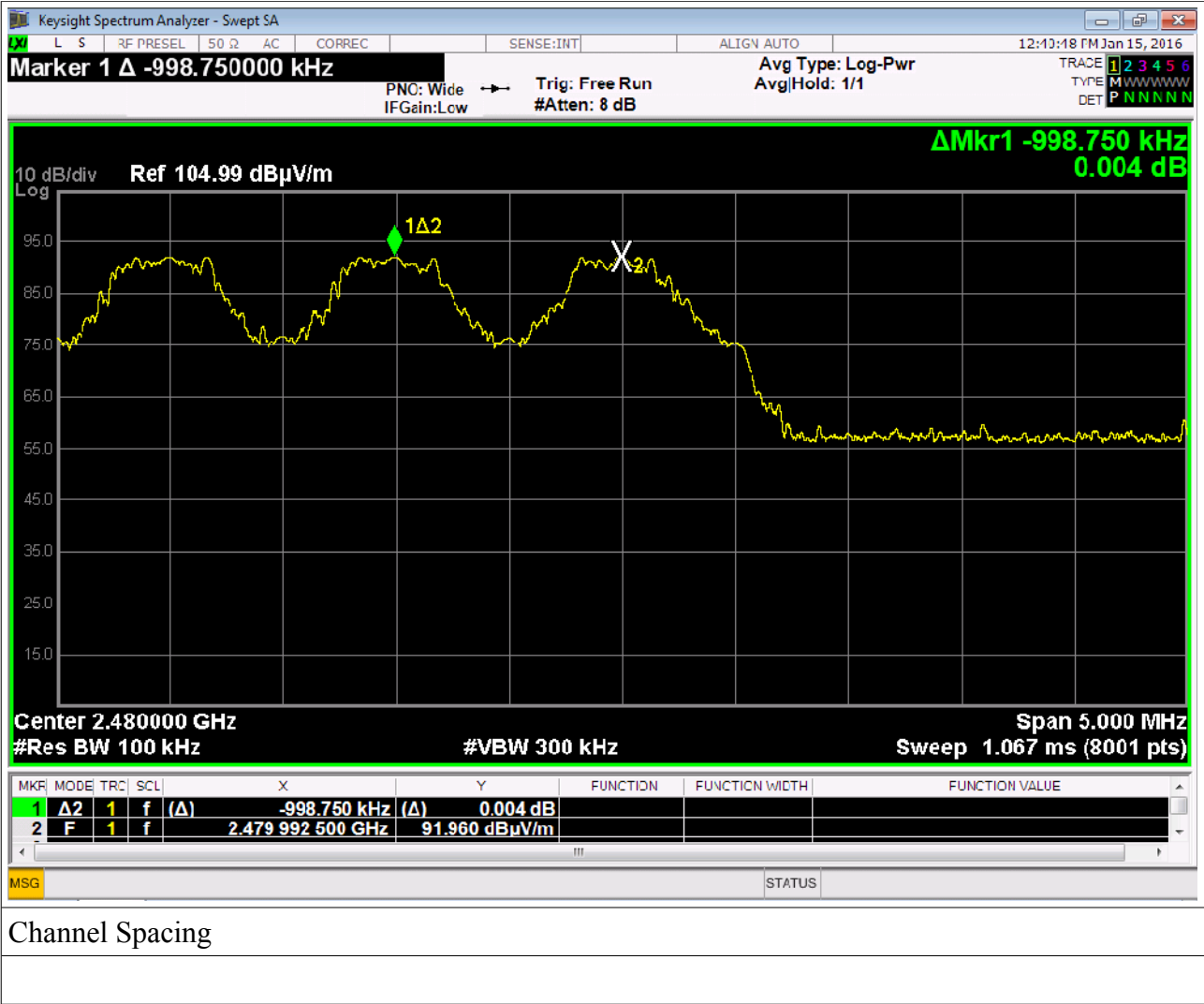
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 18 / 36





Number of hopping frequencies: 79

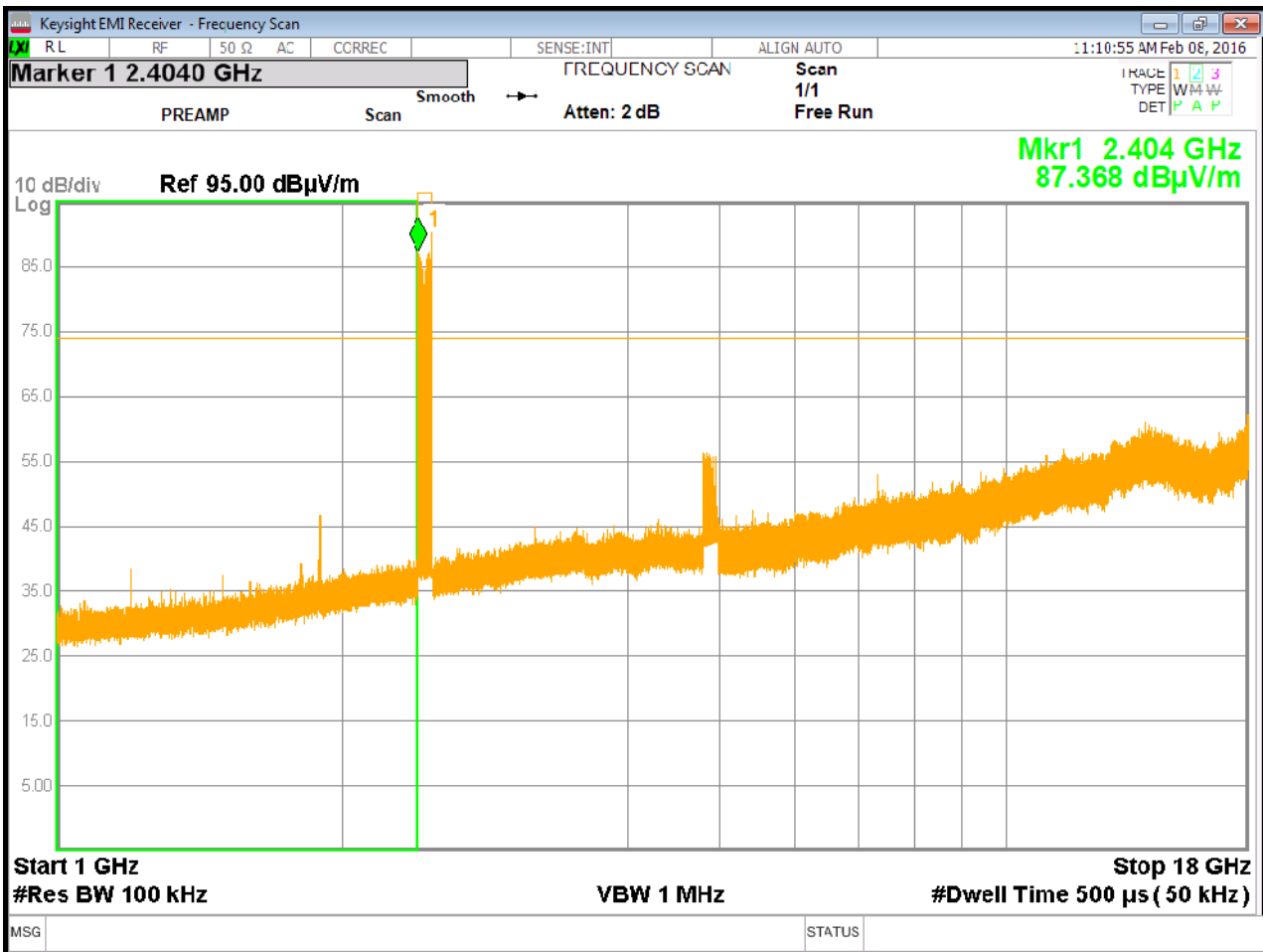


This document may be only fully reproduced.

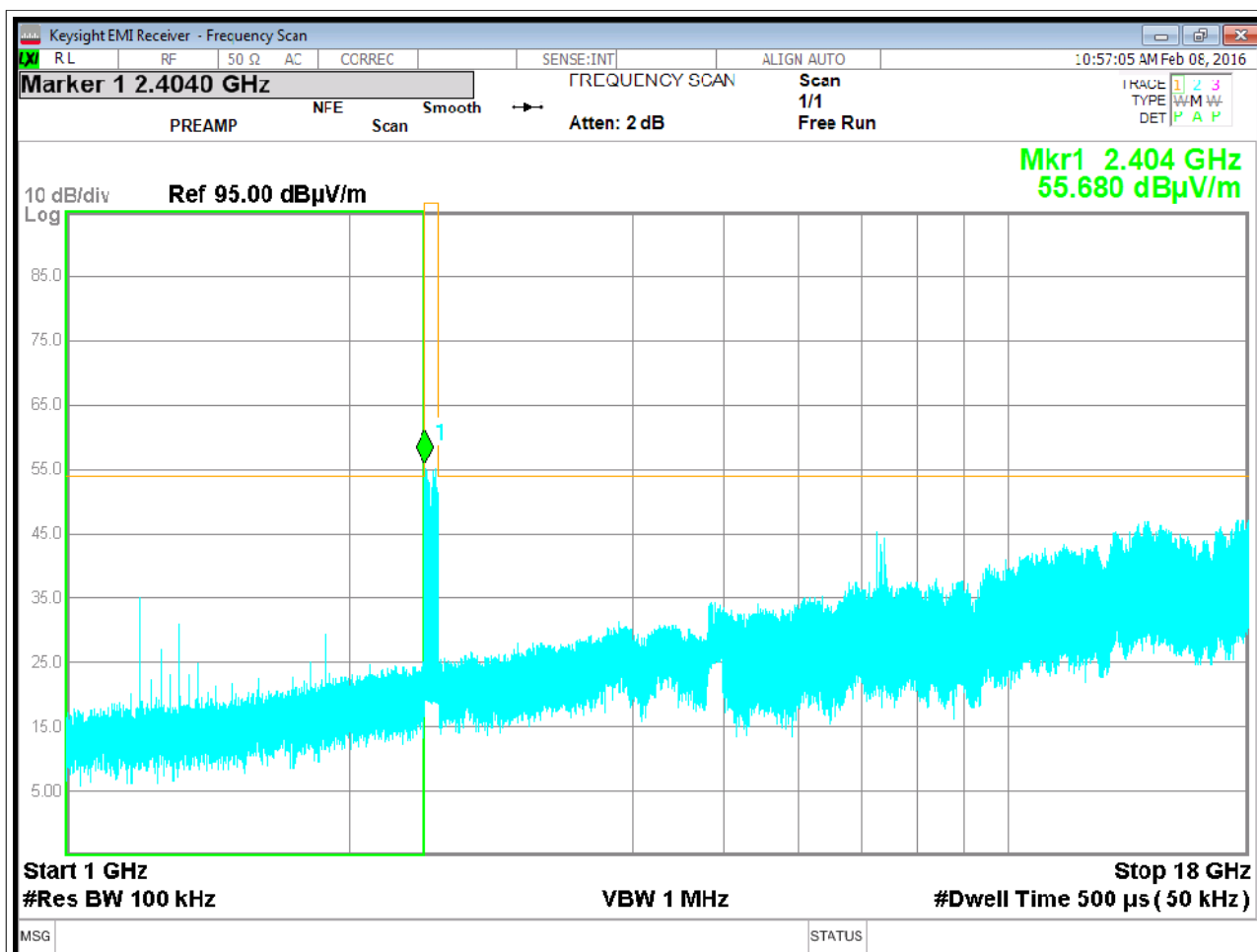
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 21 / 36

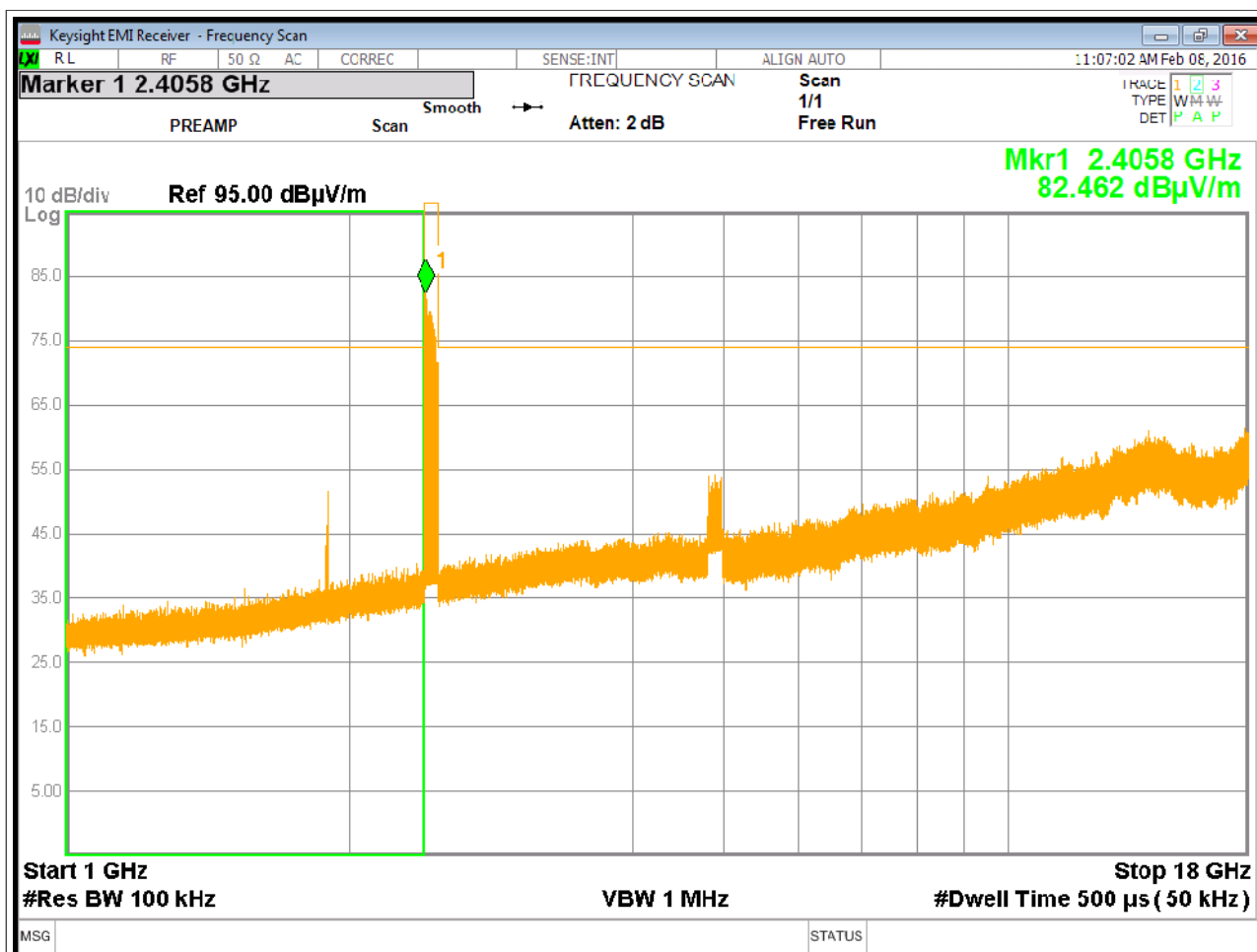
Spurious Emissions 15.247 (d)



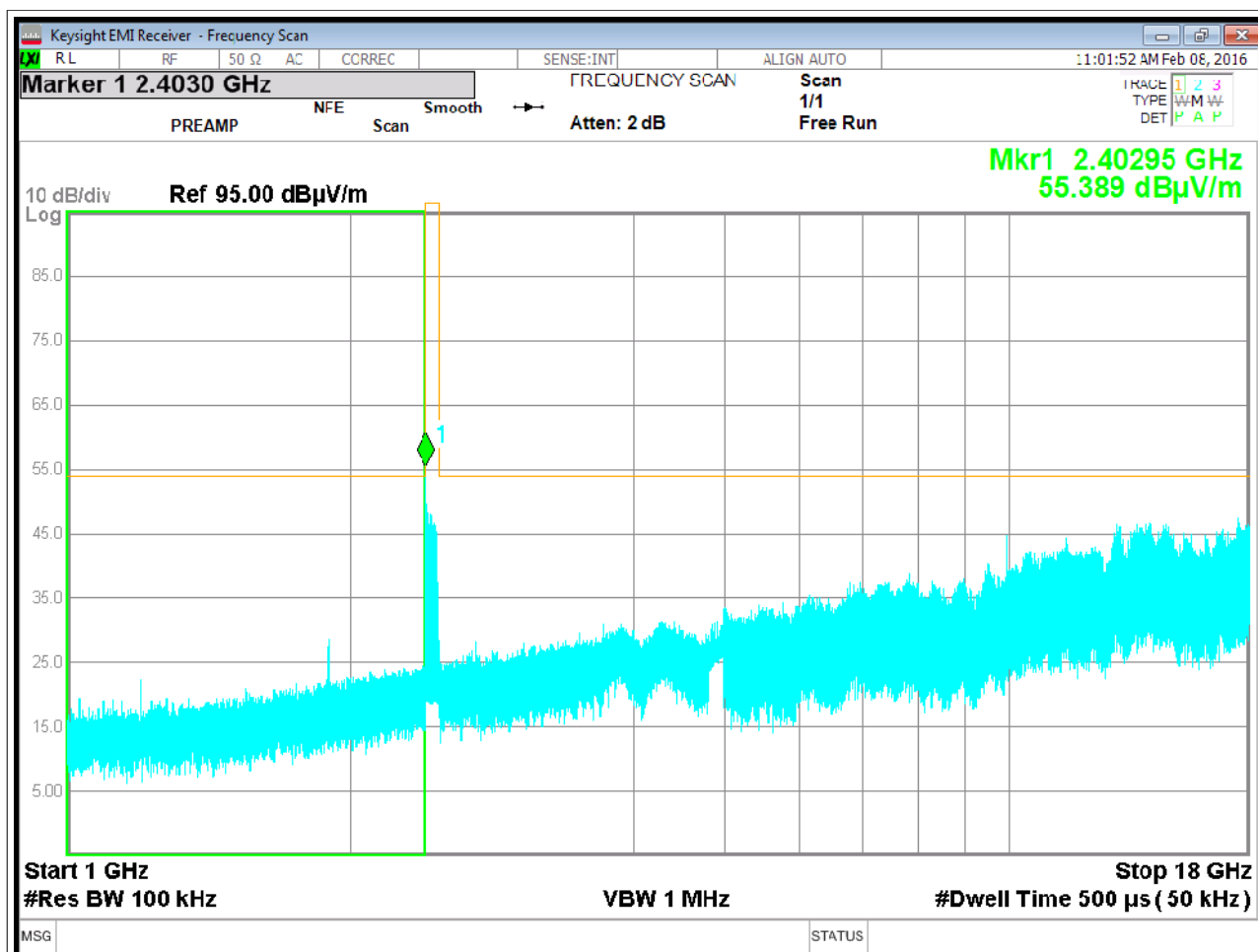
Spurious Emissions – Peak detector – Vertical Polarization



Spurious Emissions – Average detector – Vertical Polarization



Spurious Emissions – Peak detector – Horizontal Polarization



Spurious Emissions – Average detector – Horizontal Polarization

This document may be only fully reproduced.

Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 25 / 36

Spurious Emissions			
Nr Harmonics	AV Level (dBμV/m)	AV Limits (dBμV/m)	Remark
2	--	54.0	
3	45.2	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)	AV Limits (dBμV/m)	Remark
2	57.8	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 (--).			

This document may be only fully reproduced.

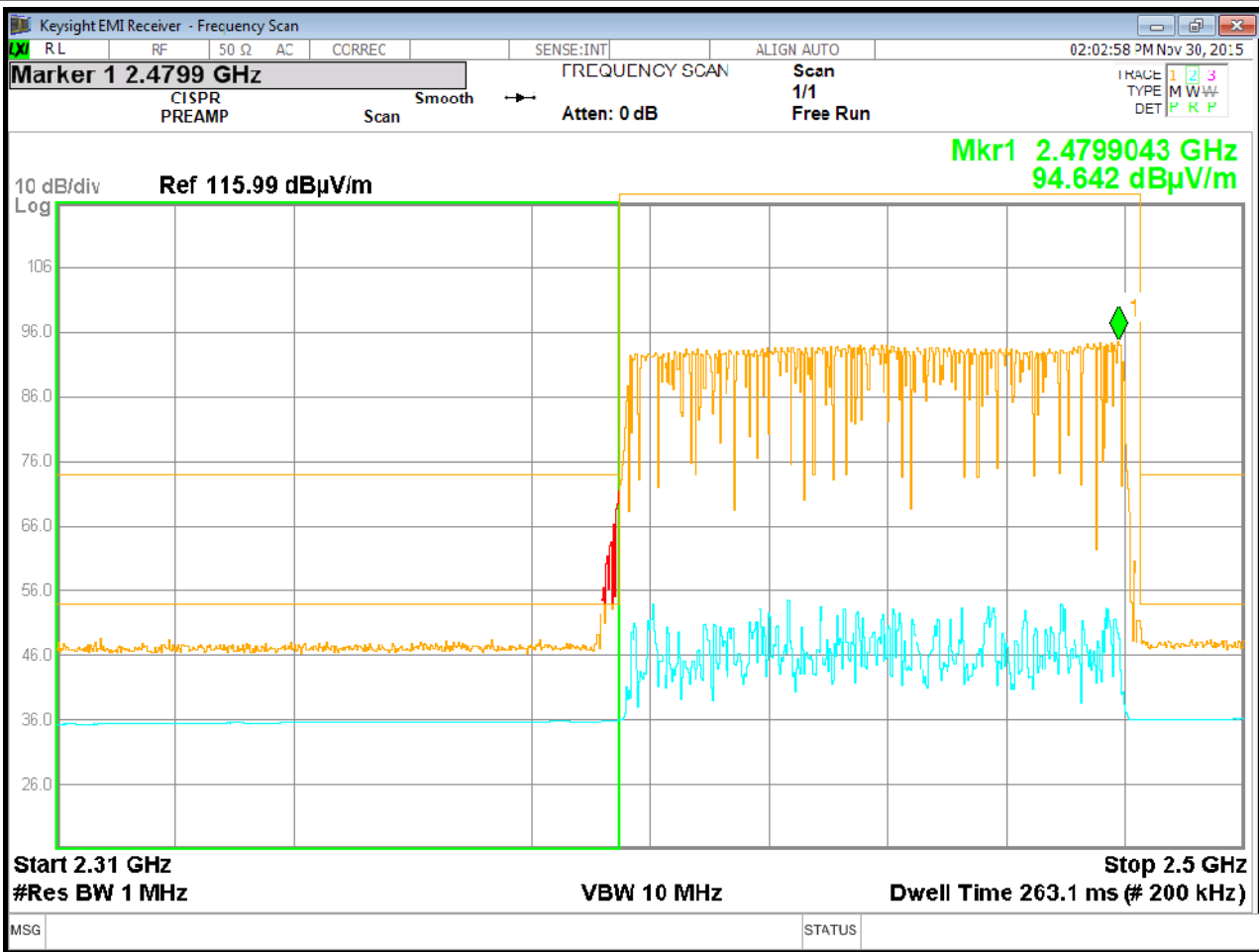
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 26 / 36

Band Edge and Restricted Band of Operation 15.247 (d)

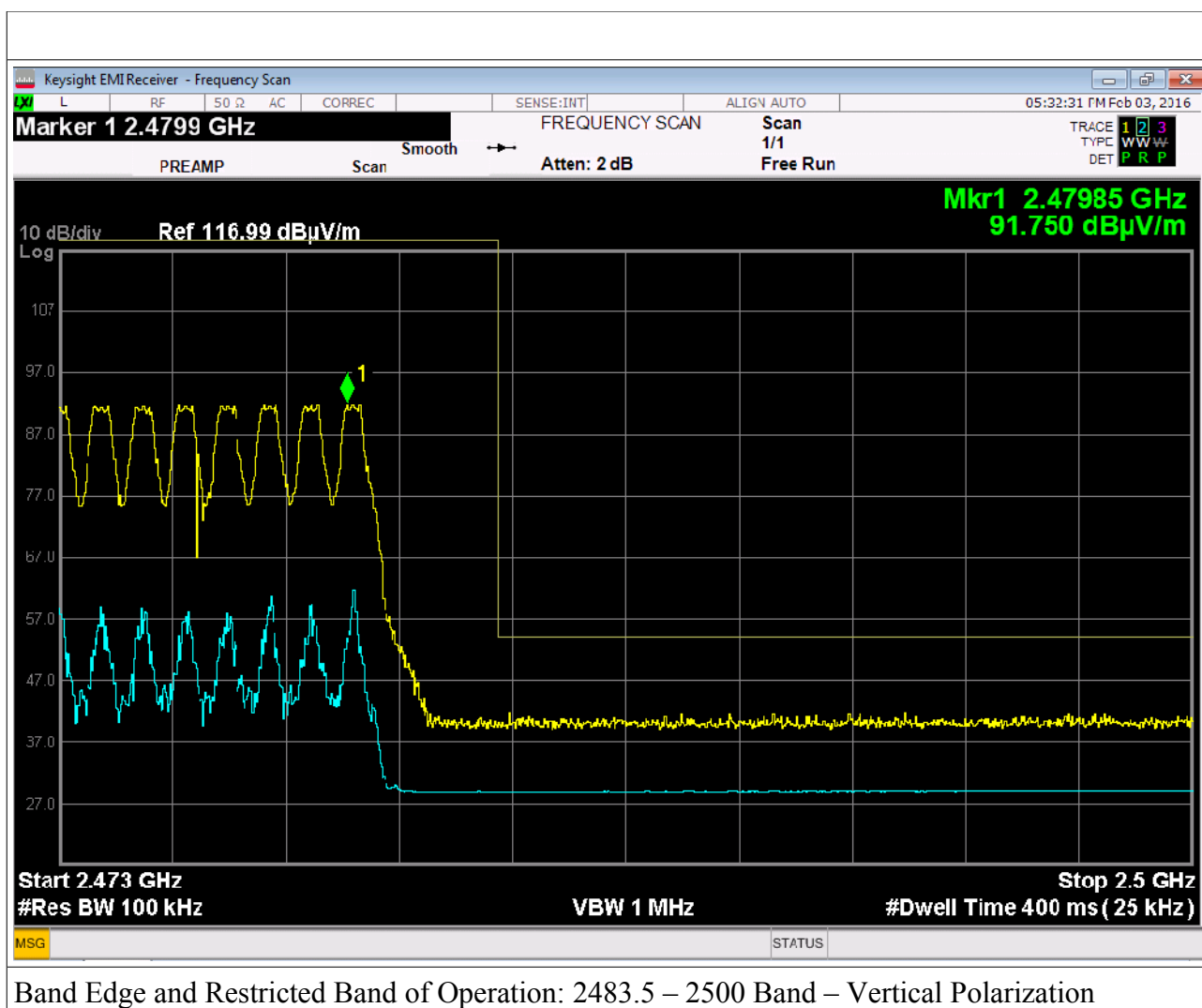
Emissions must be within the band 2400 – 2483.5 MHz.

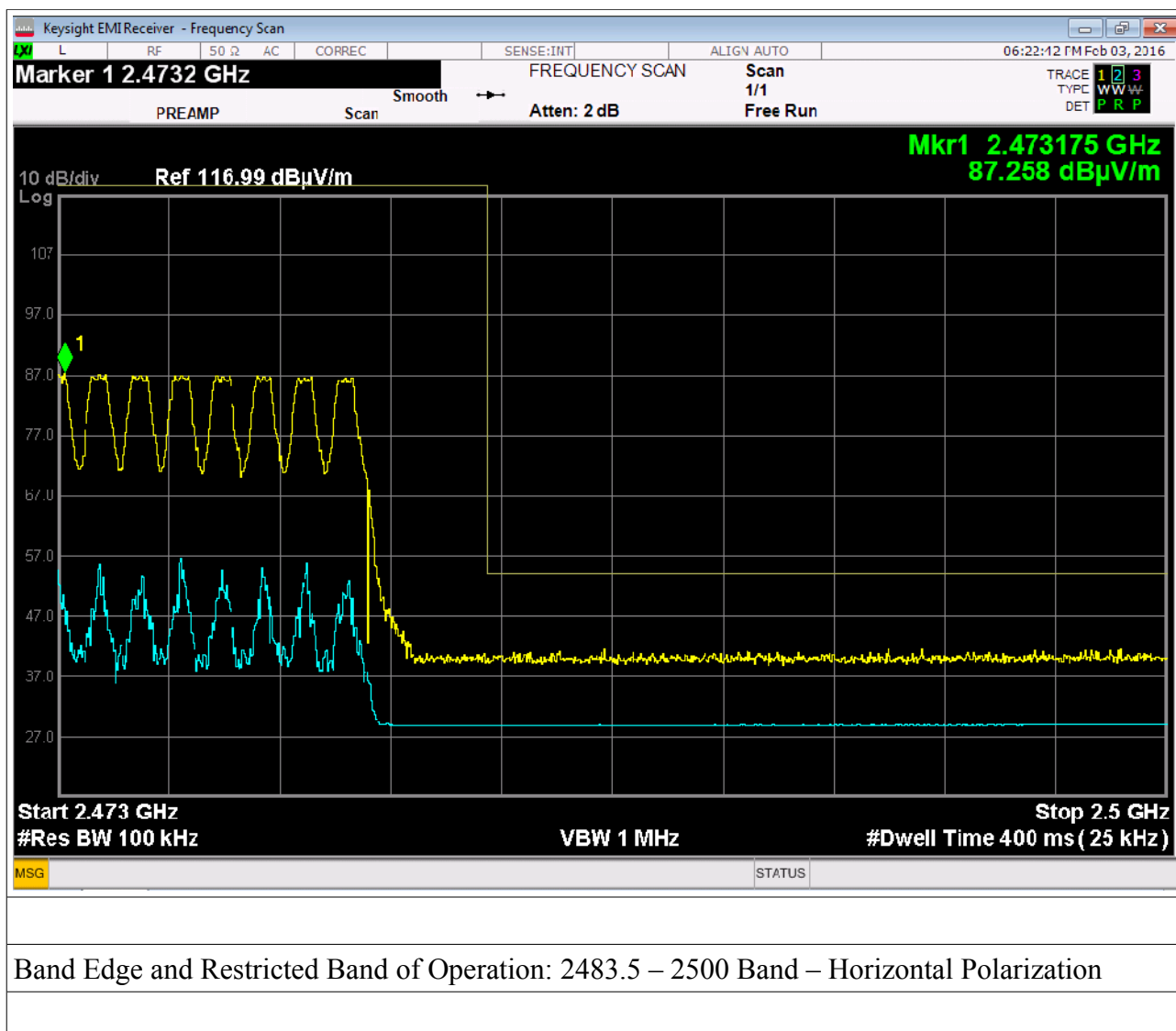
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.



Band Edge and Restricted Band of Operation: 1 MHz BW

Limits specified in §15.209(a) are shown

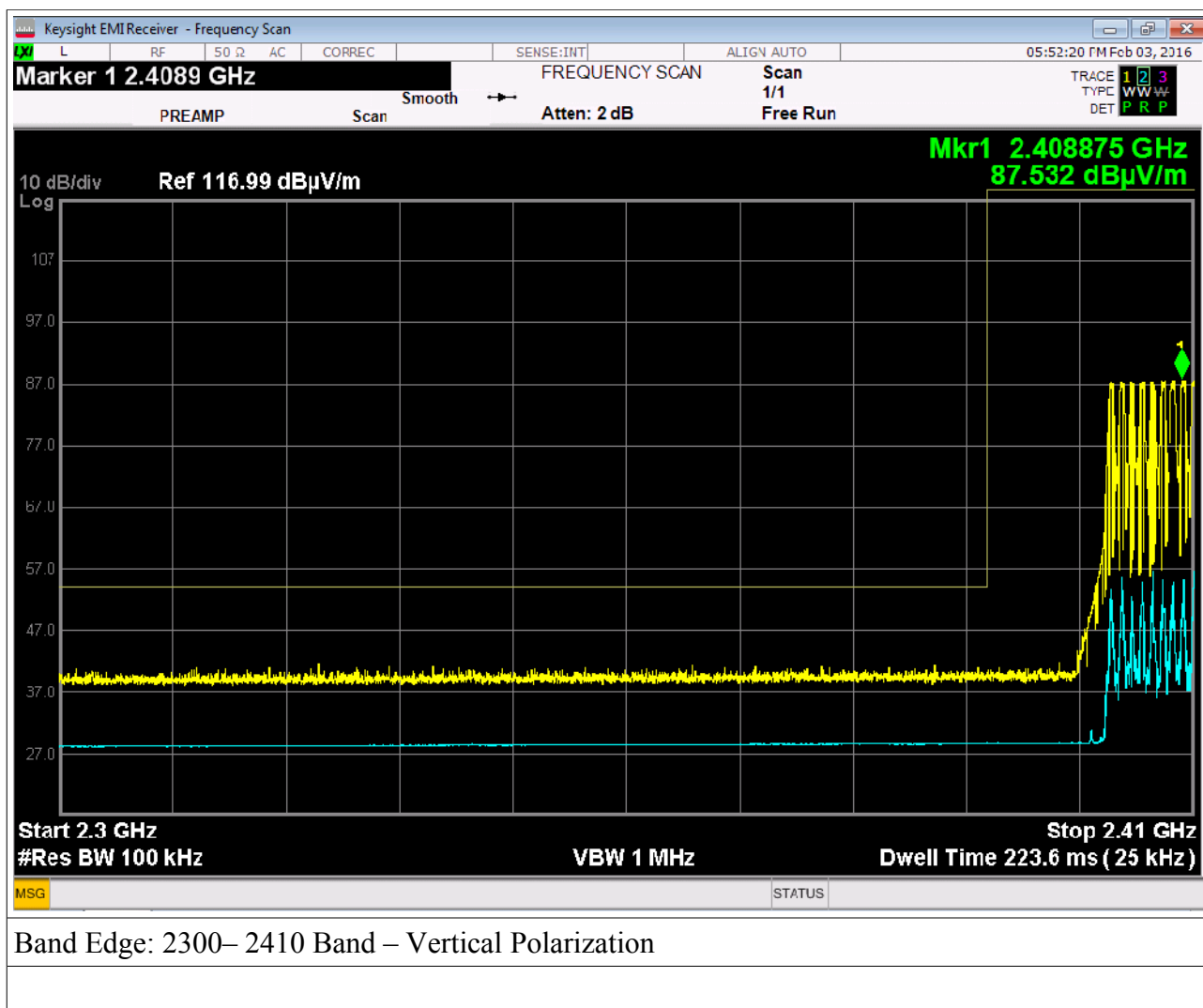




This document may be only fully reproduced.

Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

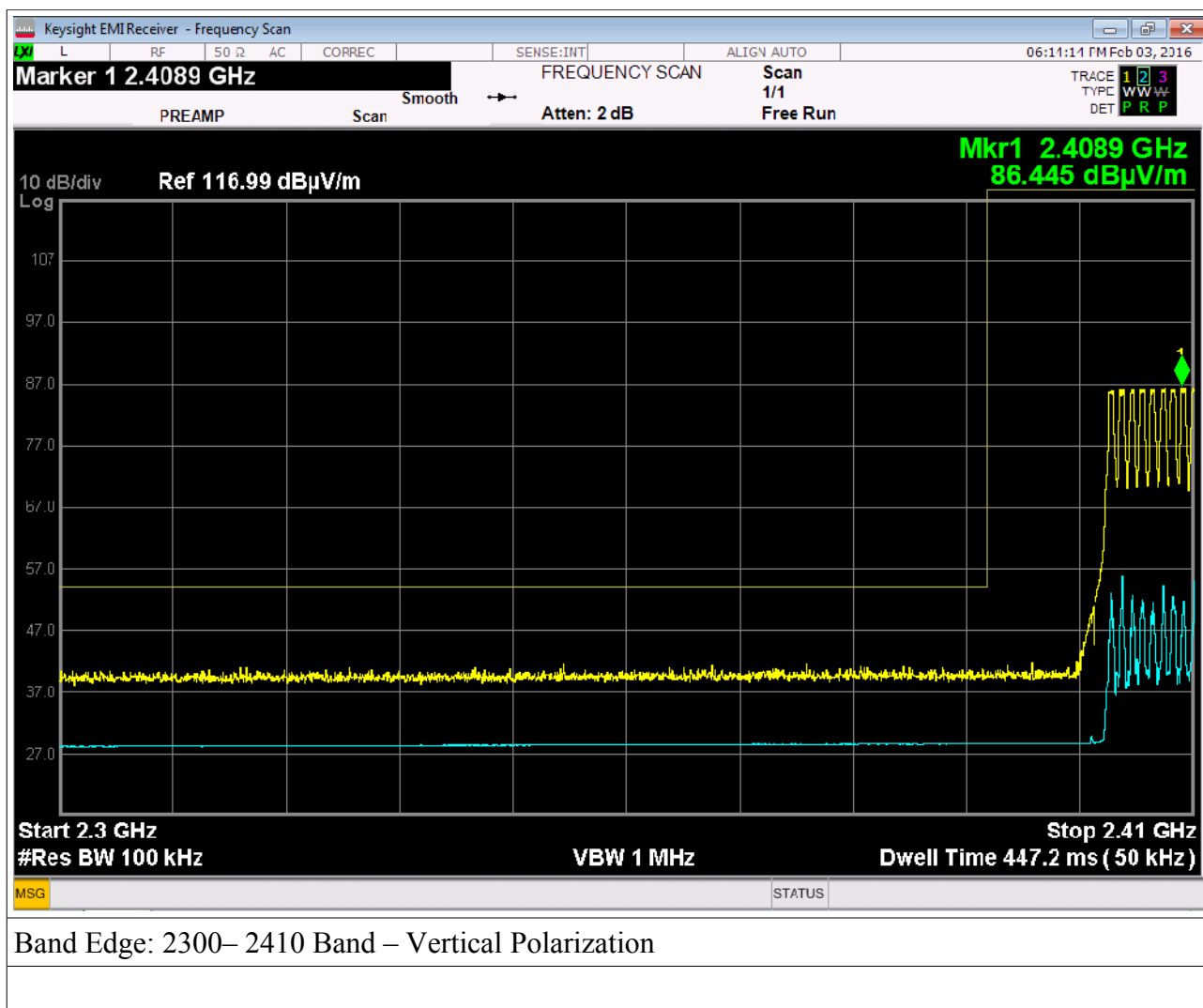
Report n. FCC-15806 Rev. 01, page 29 / 36



This document may be only fully reproduced.

Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 30 / 36



This document may be only fully reproduced.

Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. FCC-15806 Rev. 01, page 31 / 36

Transmission Time (15.247 (a)(1))



Length of Trasmission Time (msec) = 1.425 msec

Number of trasmission in a 31.6 sec = 200

Result: 0.285 sec

Limit: 0.4 sec

<u>Test Equipment</u>			
EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
MXE EMI Receiver	Agilent	N9038A	01/2016
Anechoic Chamber	Comtest	CSA01	01/2016
High Pass Filter	MiniCircuits	VHP-39	01/2016
Notch Filter	K&L	3N45-2442/T84	01/2016
Preamplifier	SHF	97AP	01/2016
Loop Antenna	ETS	6509	01/2016
Bilog Antenna	Schaffner	CBL6112B	01/2016
Horn Antenna	EMCO	3115	01/2016
Horn Antenna	Alpha Industries	61932500	01/2016
Controller	Deisel	HD100	01/2016
Turn Table	Deisel	MA240	01/2016
LISN	GSD	NTW06	01/2016
<u>Test procedure: CE22R01</u>			

6. PHOTO



Fig. 6.1

Radiated Emissions Test Set-up

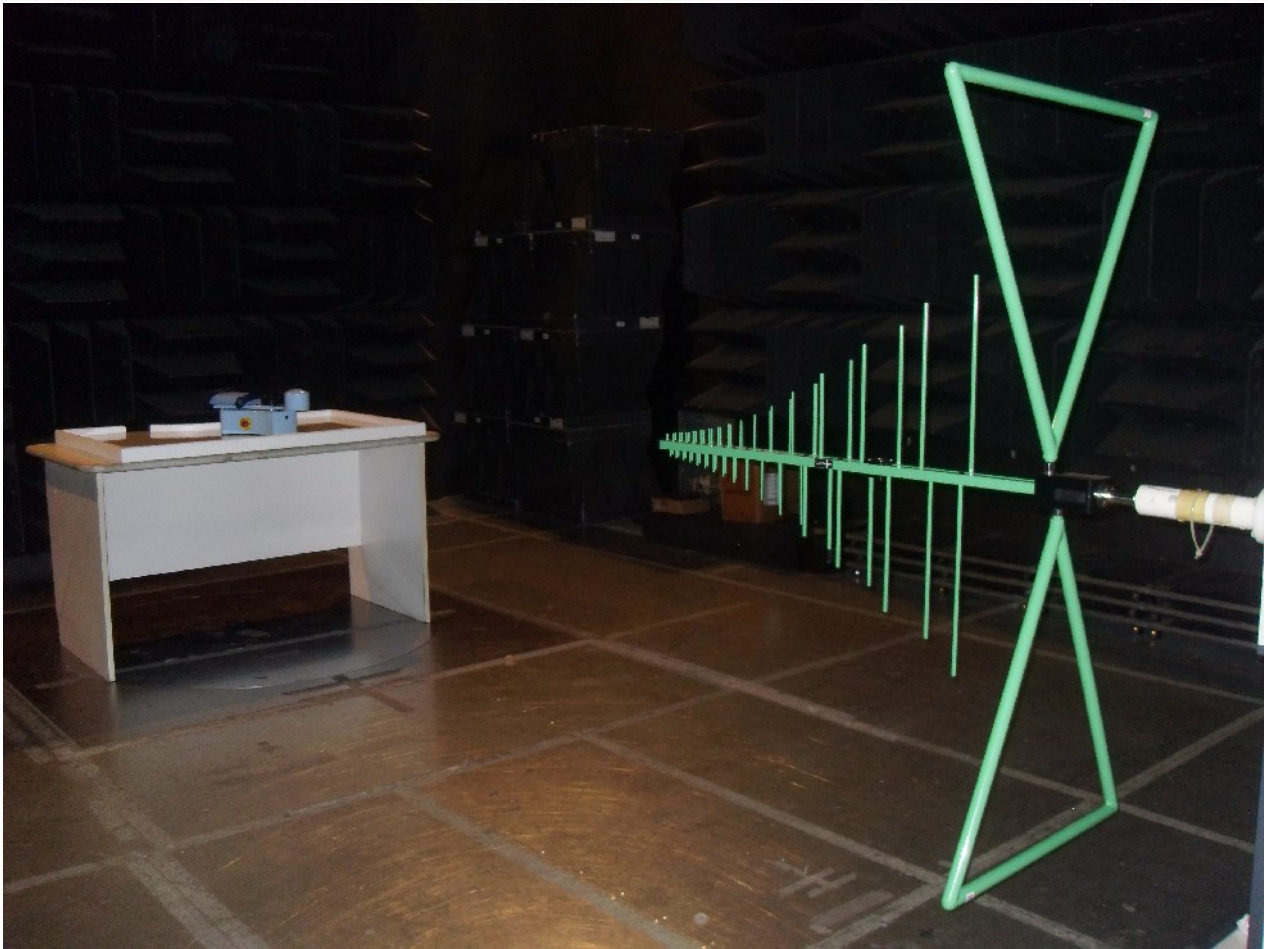


Fig. 6.2

Radiated Emissions Test Set-up



Fig. 6.3

Radiated Emissions Test Set-up