Laboratories GSD SRL

CE MARKING

ELECTROMAGNETIC COMPATIBILITY
ELECTRICAL SAFETY
LASER SPECTROSCOPY
ENVIRONMENTAL PHYSIC

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. S.r.l **PISA - Italy**	***Test Report n. 15850-FCC***	Rev. 03

Manufacturer	**Power-One Italy S.p.A.**
Address	Via San Giorgio, 642 52028 Terranuova Bracciolini (AR) Italy
Test Family Name	**VSN400 CELLULAR LOGGER CARD**
Testing Laboratory Name	**G.S.D. S.r.l.**
Address	Via Marmiceto, 8 56121 Ospedaletto Pisa (PI) Italy
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	FCC Listed: Registration Number: 424037
Location and Date of Issue	Pisa, 2016 October 26

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Report Revision History

Revision details

Date	***Page No.(s)***	***Details***
2015 November 30	93	Rev. 00 Initial draft issue
2015 November 30	93	Rev. 01 Minor changes
2016 October 26	93	Rev. 02 Test Item description changes
2016 October 26	93	Rev. 03 Report Revision History added

1. MANUFACTURER AND EUT IDENTIFICATION [1]

Manufacturer	**Power-One Italy S.p.A..**
Address	Via San Giorgio, 642 52028 Terranuova Bracciolini (AR) Italy
Test Family Name	**VSN400 CELLULAR LOGGER CARD**
Date of reception	**2015 November 12**
Sampling	**Laboratory sample for certification**
Test Item Description	**WiFi Device**
	Cellular card equipped with WiFi module EPCOS R078 (WL1801) / D7021 and an internal modem SIMCOM SIM7100A, FCC ID: UDV-SIM7100A
Nominal Input Voltage	**12 Vdc**
Frequency Range	2400-2483.5 MHz
Std 802.11	IEEE Std 802.11b, 802.11g and 802.11n
Modulation Technology	DSSS for 802.11b OFDM for 802.11g/n
Transfer Rate	802.11b: 11 / 5.5 / 2 / 1 Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps 802.11n: 65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5 Mbps
Antenna Connector /Types :	RSMA connector
Antenna Type	EA-79F
Antenna Gain	-1.87 dBi
FCC ID	**X6W-3N89E**

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

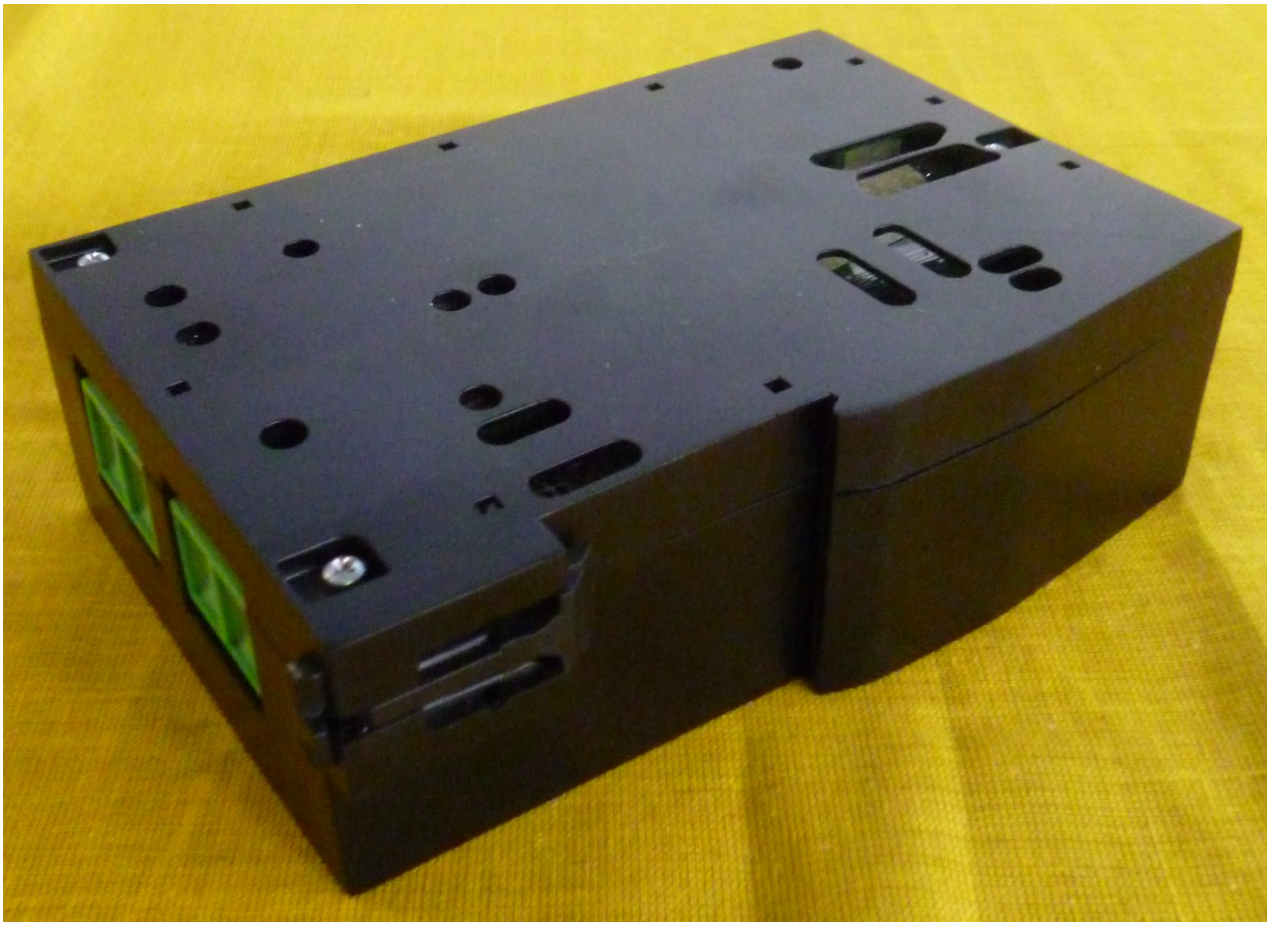


Fig. 1.1
Equipment Under Test - Photo

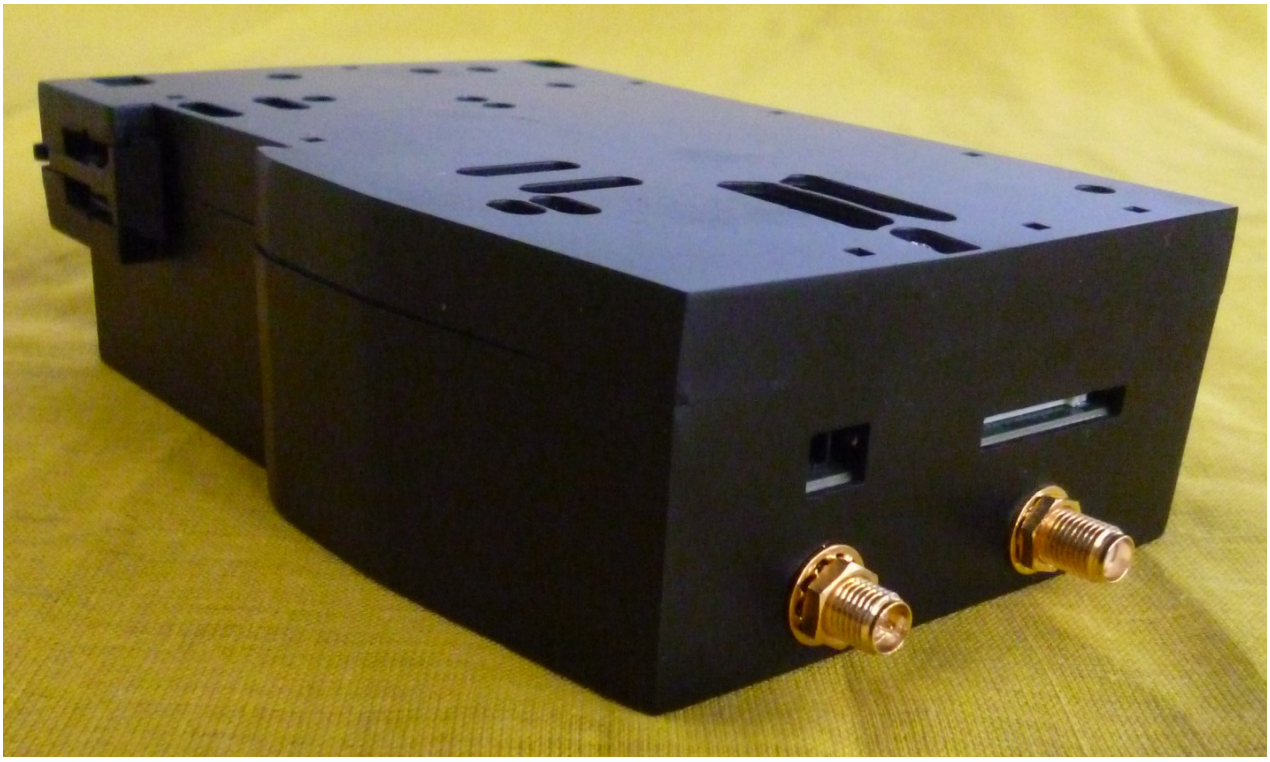


Fig. 1.2
Equipment Under Test - Photo

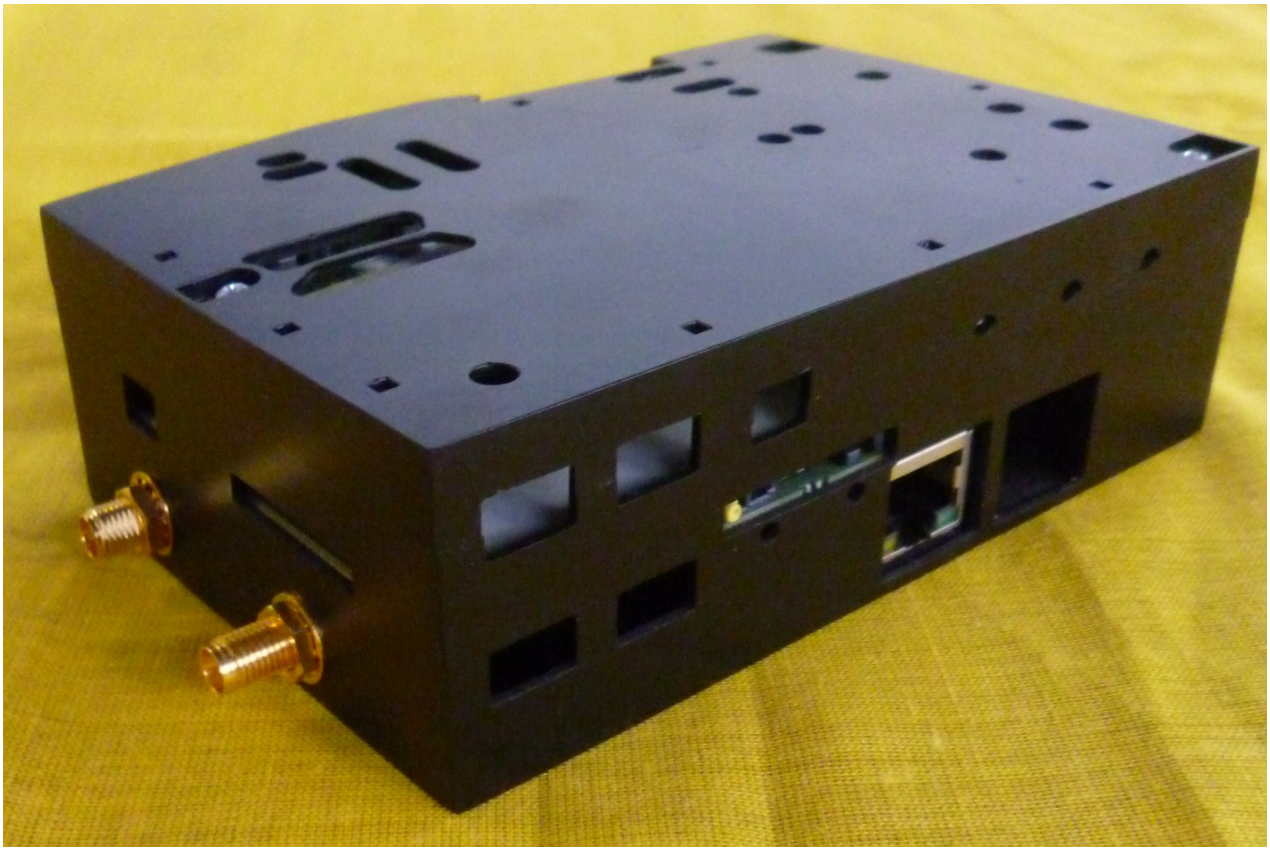


Fig. 1.3
Equipment Under Test - Photo

2. REFERENCE STANDARDS

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

TEST	***STANDARD***
Operation within the band 2400-2483,5 MHz: Test Procedures 15.247 (a)(2), (b)(3), (d), (e)	FCC Rules ad Regulations, Title 47 Part 15 – Sub part C ANSI C63.4 – 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: 2014 KDB 558074 D01 DTS Meas Guidance v03r04 Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 ANSI C63.10 - American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices: 2013
Maximum Permissible Exposure	OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields FCC Rules ad Regulations, Title 47 Part 15

3. Result, Condition, Measurement uncertainty, Antenna Requirements

Summary of Test Results

Test	*Result*
6 dB bandwidht *Section 15.247 (a) (2)*	*Pass*
Peak Conducted Output Power: *Section 15.247 (b) (3)*	*Pass*
Band Edge *Section 15.247 (d)*	*Pass*
Power Spectral Density *Section 15.247 (e)*	*Pass*
Power Line Conducted Emissions *Section 15.207*	*Pass*
Radiated Emissions *Section 15.209*	*Pass*

Internal Procedures:
APR01: internal procedure for antenna port measurement Revision 01
CE22R01: internal procedure for power lead port measurement Revision 01
RE22R02: internal procedure for radiated emissions measurement Revision 02

Measurement uncertainty

Test	*Expanded Uncertainty*
Conducted Emission – 50Ω/50µH AMN (150 kHz - 30 MHz)	± 3.5 dB
Radiated Emission – (Semianechoic Room) (30 MHz - 40 GHz)	± 4.7 dB

Climatic Conditions

Parameter	*Value*
Temperature	(293 ± 3) K
Relative humidity	(50 ± 5) %

Power during the tests: 12 Vdc

Antenna Requirements:

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to
ensure that no antenna other than that furnished by the responsible party shall be used with the device. And
according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater

than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.
Results:
The antennas used for this product are antenna with RPSMA, the maximum peak gain of the transmit antenna is only -1.87dBi.
Extensions
The results refer only to the sampled EUT and under the specified conditions.

4. 6 dB BANDWIDTH

Peak Output Power

Equipment shall meet the limits below .

FREQUENCY RANGE (MHz)	Limit
2400 2483,5	The minimum 6 dB Bandwidth shall be at least 500 kHz

Results: 6dB Bandwidth > 500 kHz

802.11b Mode, 11 Mbs

Channel	*Frequency (MHz)*	*6 dB Bandwidth (MHz)*	*Minimum Limit (MHz)*	*Margin (MHz)*
Low	2412	9.8	0.5	9.3
Mid	2437	9.65	0.5	9.15
High	2462	9.91	0.5	9.41

802.11g Mode, 54 Mbs

Channel	*Frequency (MHz)*	*6 dB Bandwidth (MHz)*	*Minimum Limit (MHz)*	*Margin (MHz)*
Low	2412	15.26	0.5	14.76
Mid	2437	16.33	0.5	15.83
High	2462	15.12	0.5	14.62

802.11n Mode, 65 Mbs

Channel	*Frequency (MHz)*	*6 dB Bandwidth (MHz)*	*Minimum Limit (MHz)*	*Margin (MHz)*
Low	2412	15.09	0.5	14.59
Mid	2437	15.08	0.5	14.58
High	2462	15.1	0.5	14.6

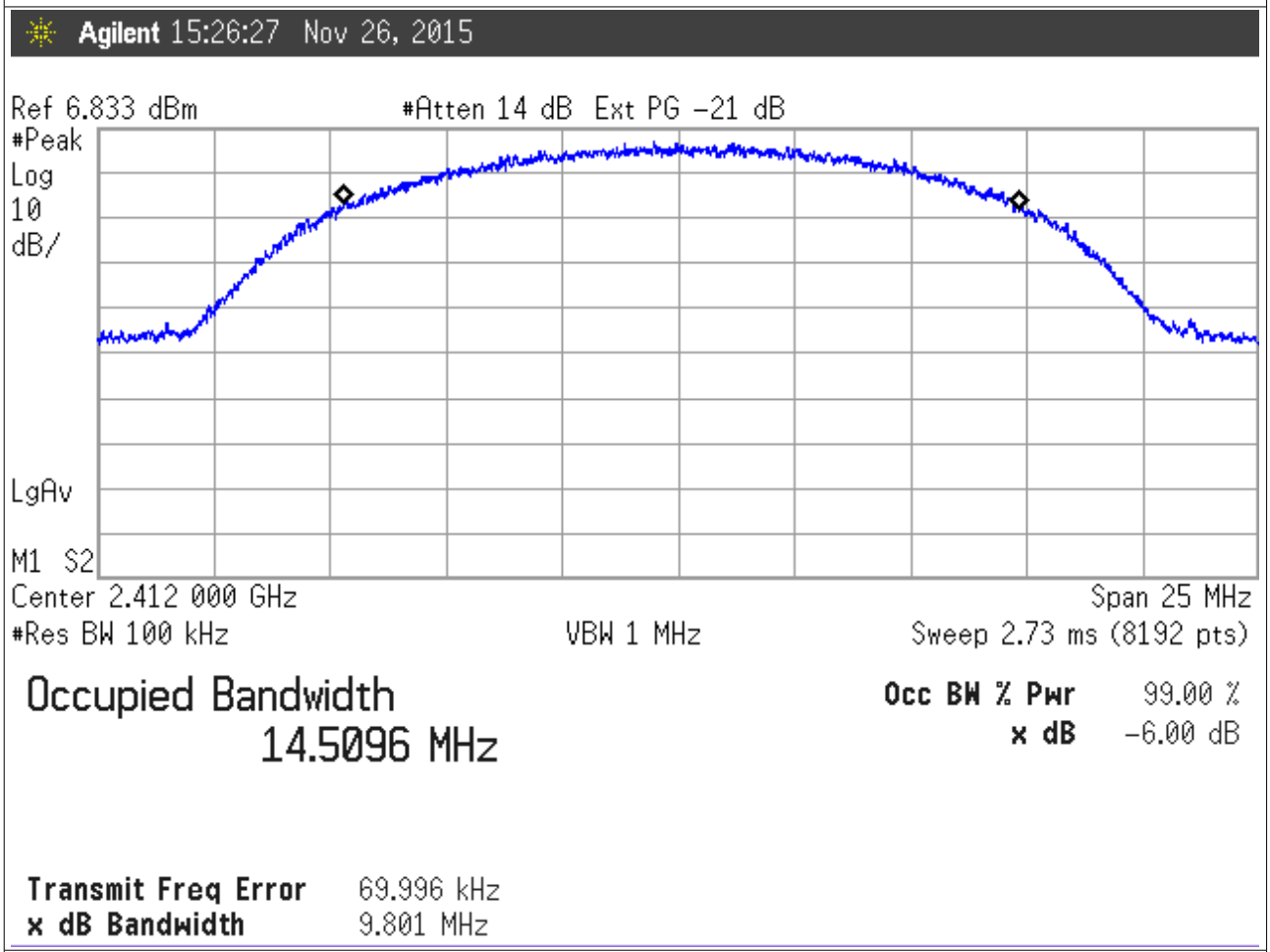
Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DATE
EMI Receiver	Agilent	E4440A	01/2016

Test procedure: APR01

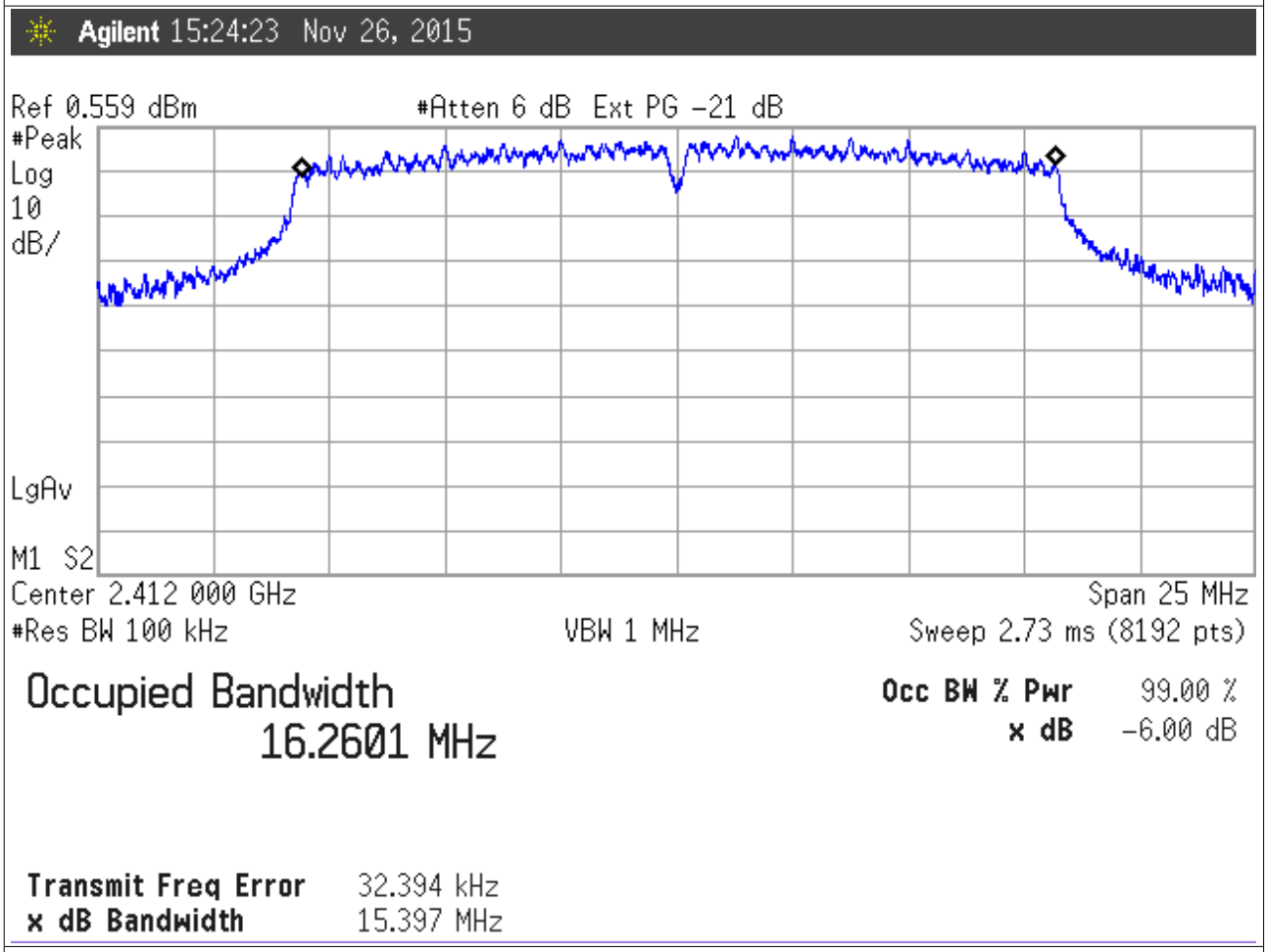
Test performed on low, middle and high channels and in the b,g,n protocols at maximum and minimum data rate for each protocol.

In the following graphs results are shown:



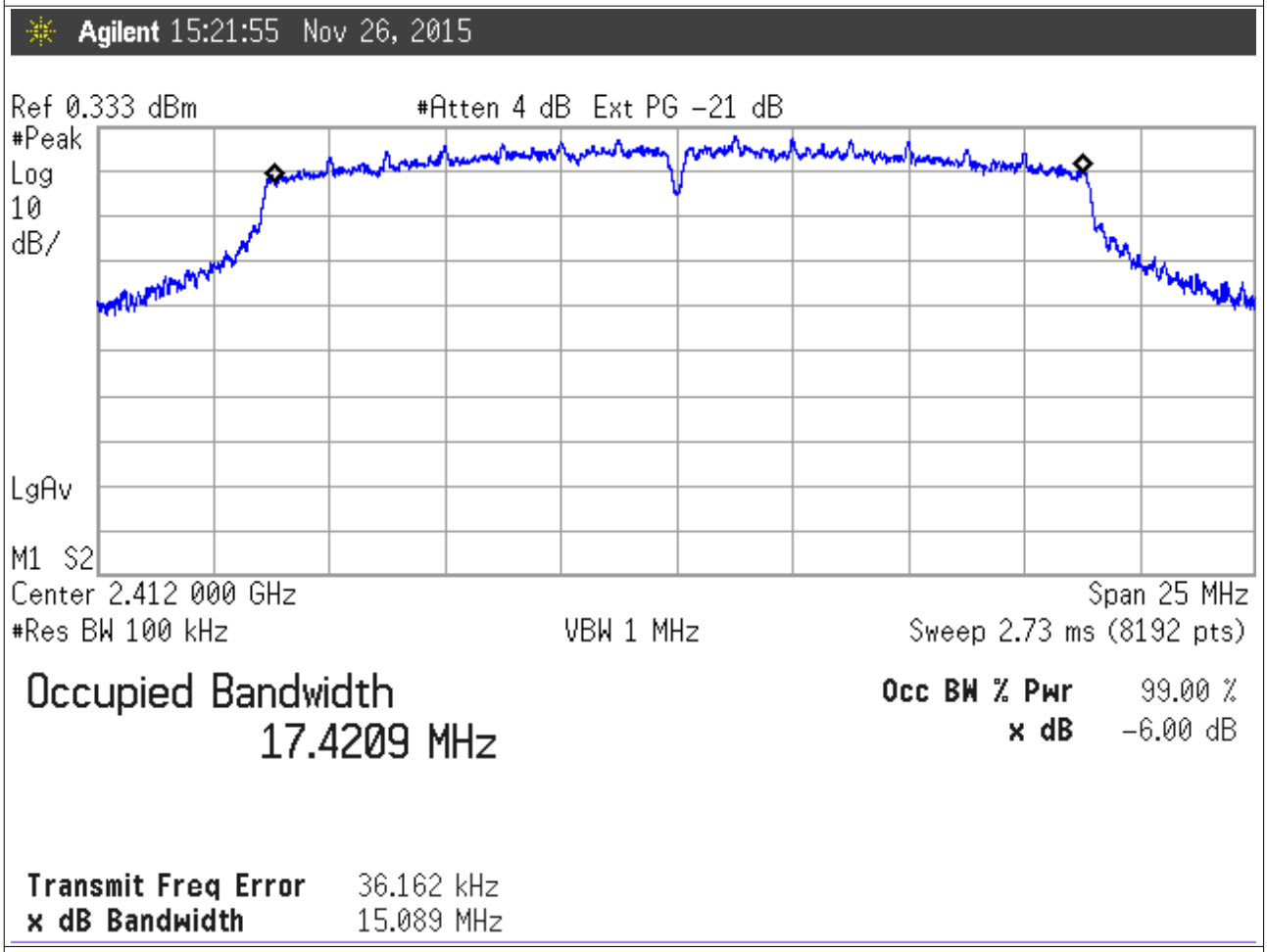
Note:

Channel 1; “11b” at 11Mbps
OBW (-6dB): 9.801 MHz



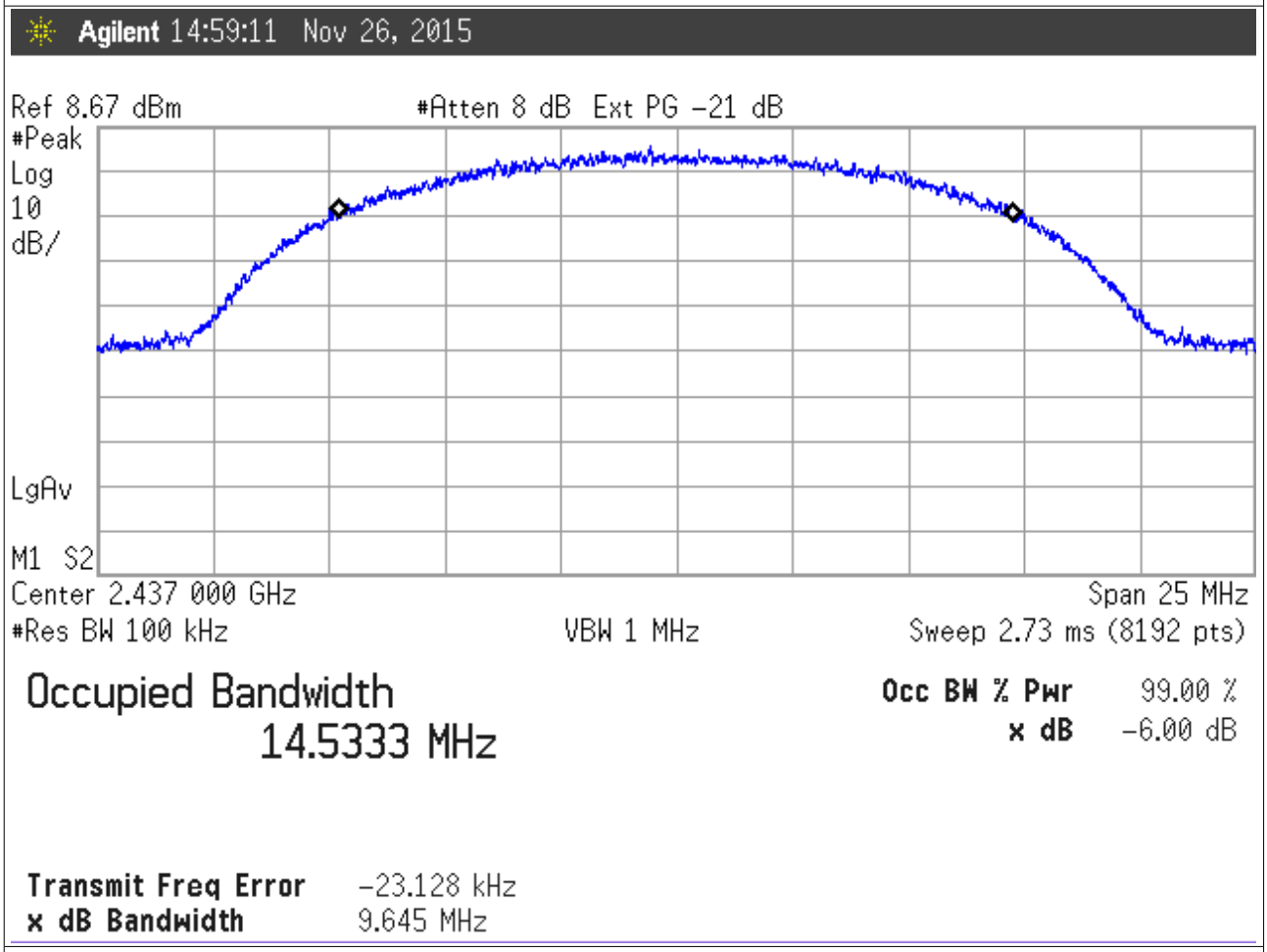
Note:

Channel 1; "11g" at 54Mbps
OBW (-6dB): 15.397 MHz



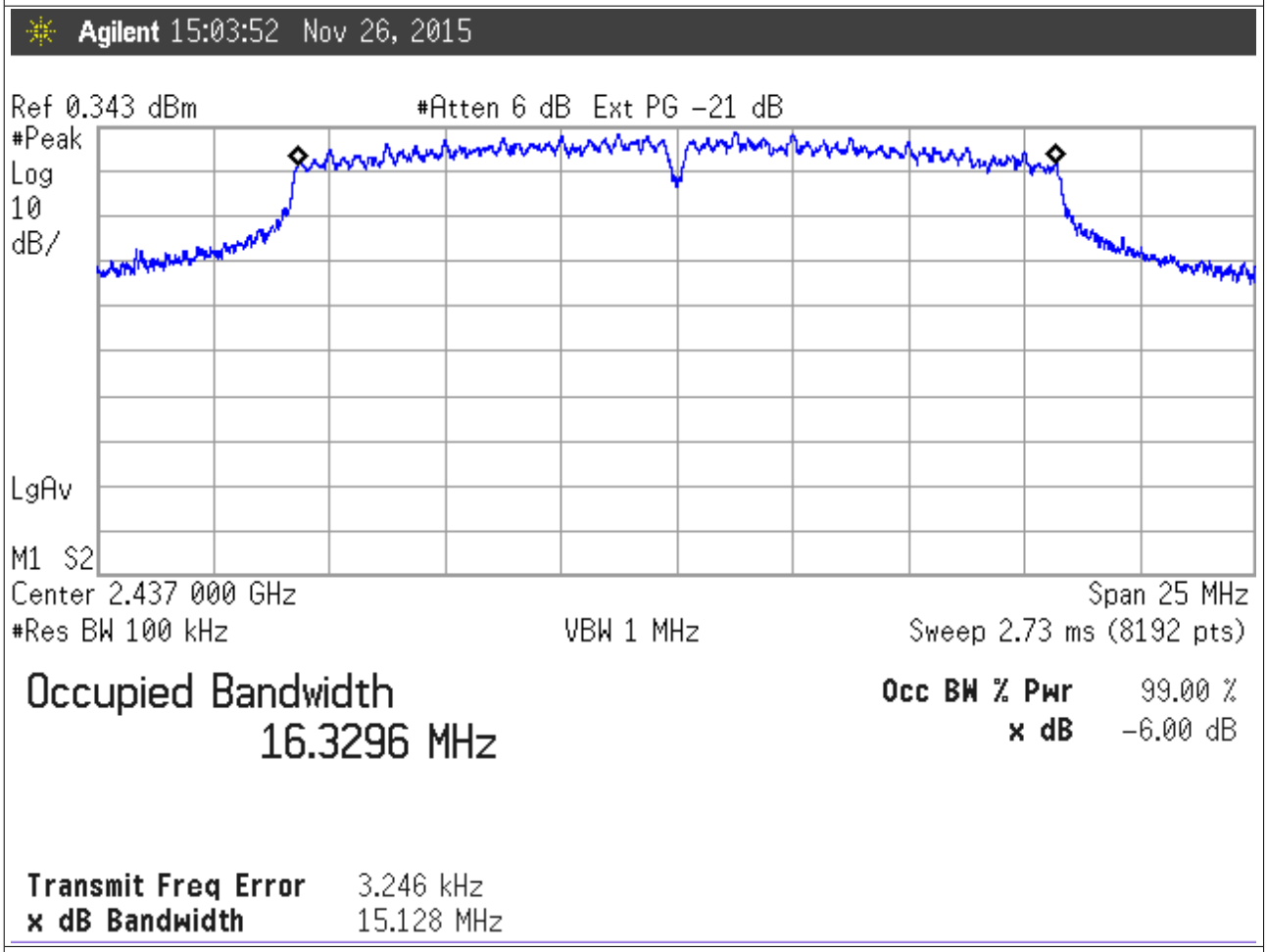
Note:

Channel 1; “11n” at 65Mbps
OBW (-6dB): 15.089 MHz



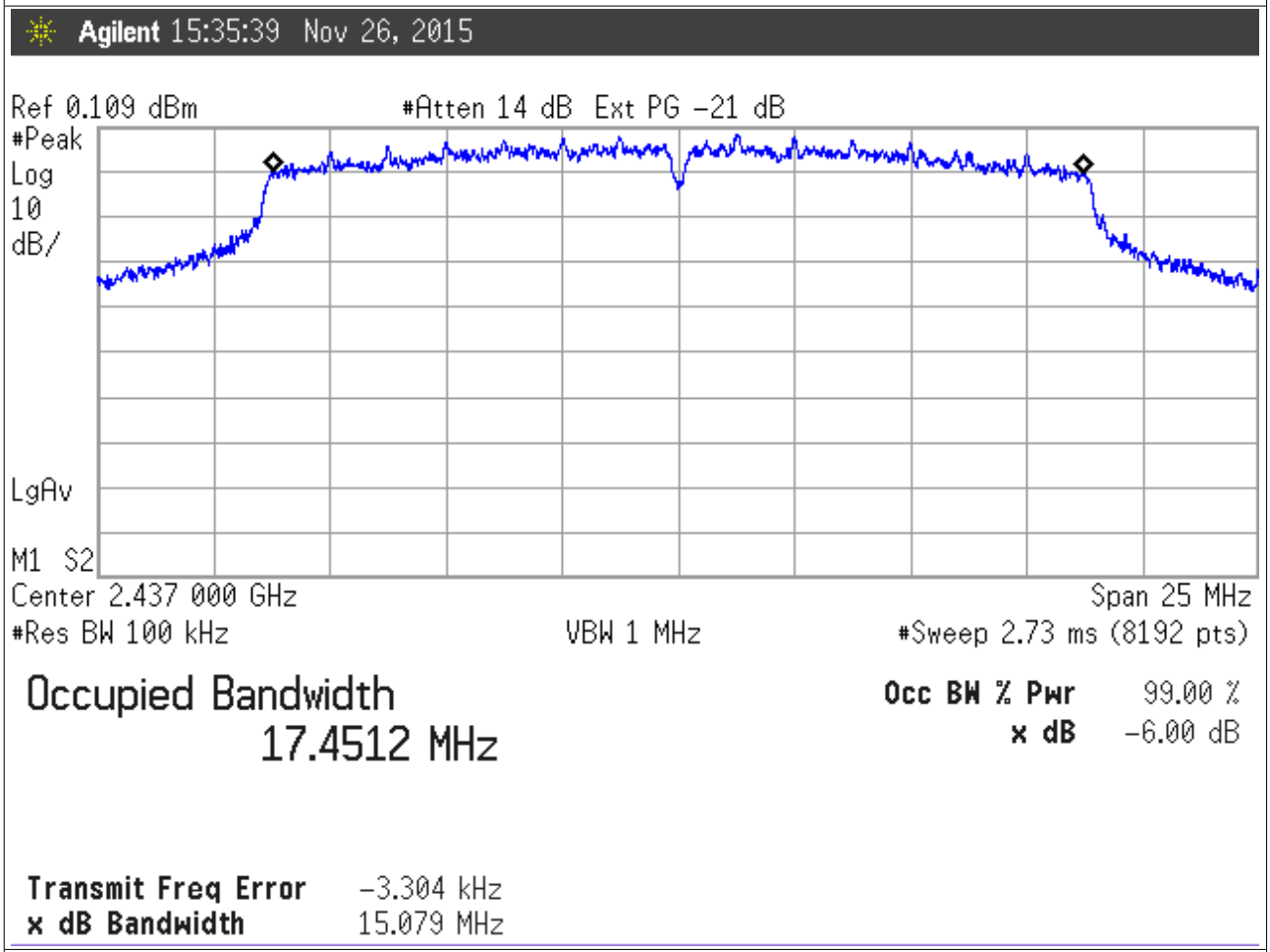
Note:

Channel 6; “11b” at 11Mbps
OBW (-6dB): 9.645 MHz



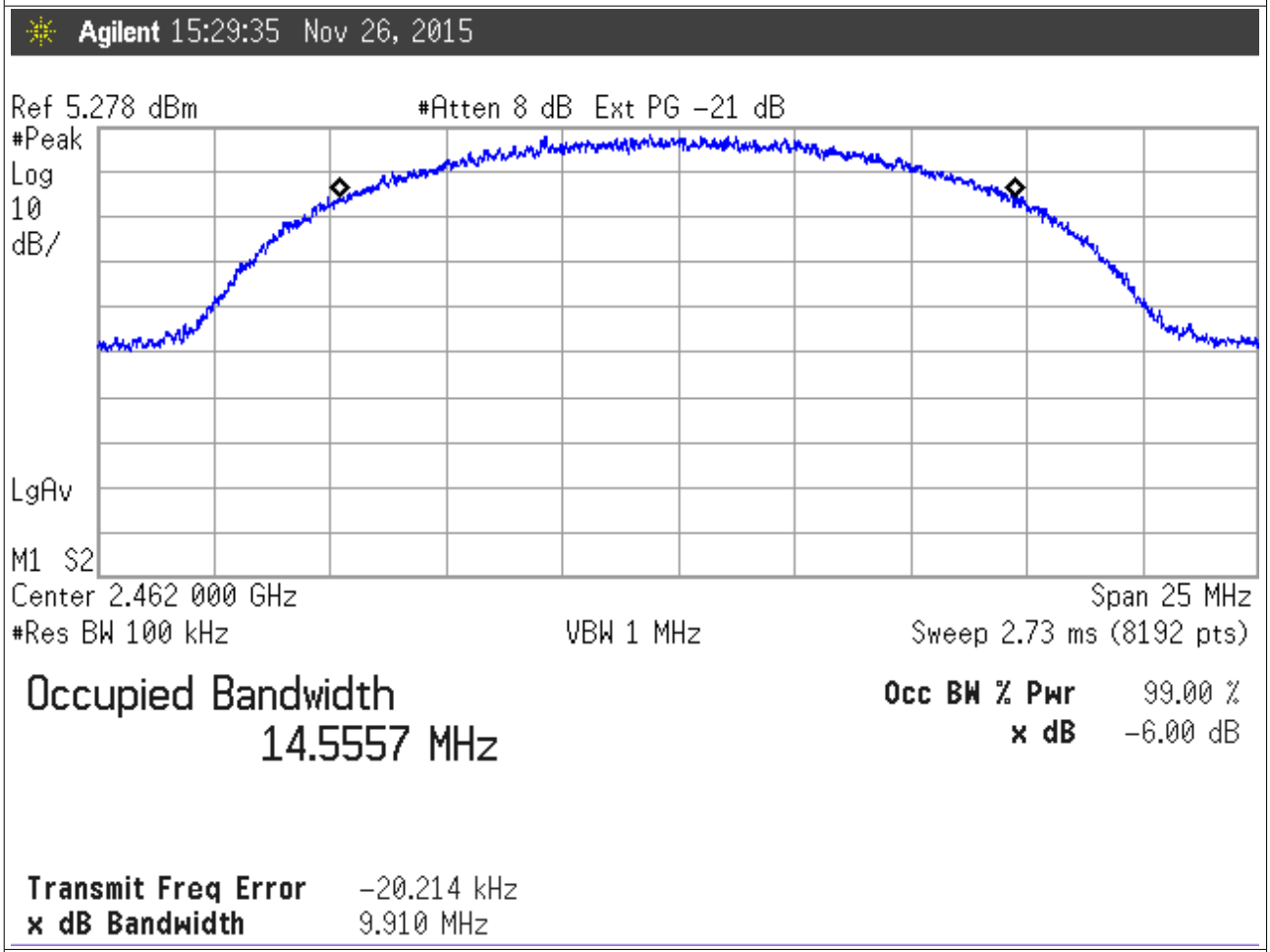
Note:

Channel 6; "11g" at 54Mbps
OBW (-6dB): 15.128 MHz



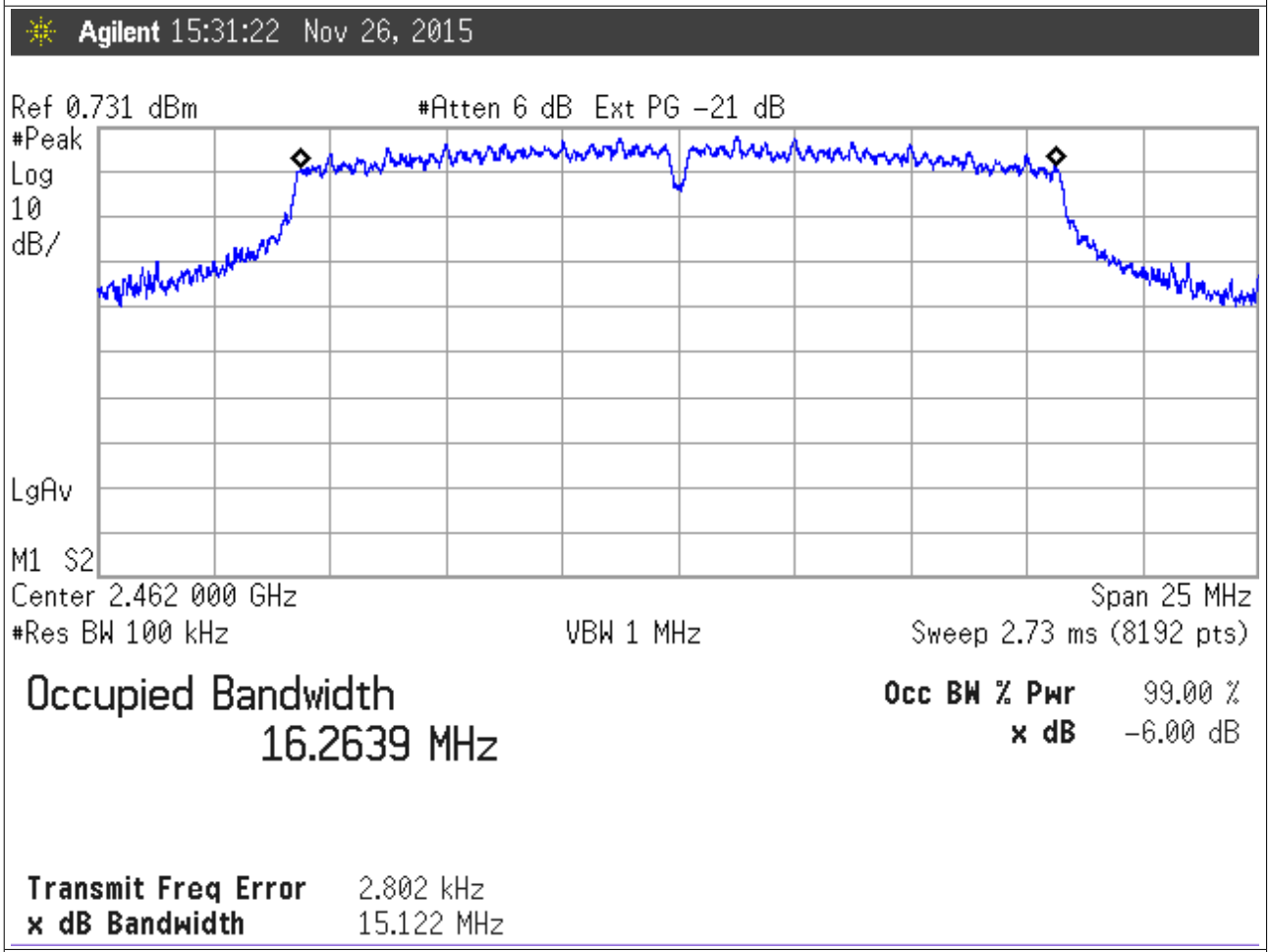
Note:

Channel 6; “11n” at 65Mbps
OBW (-6dB): 15.079 MHz



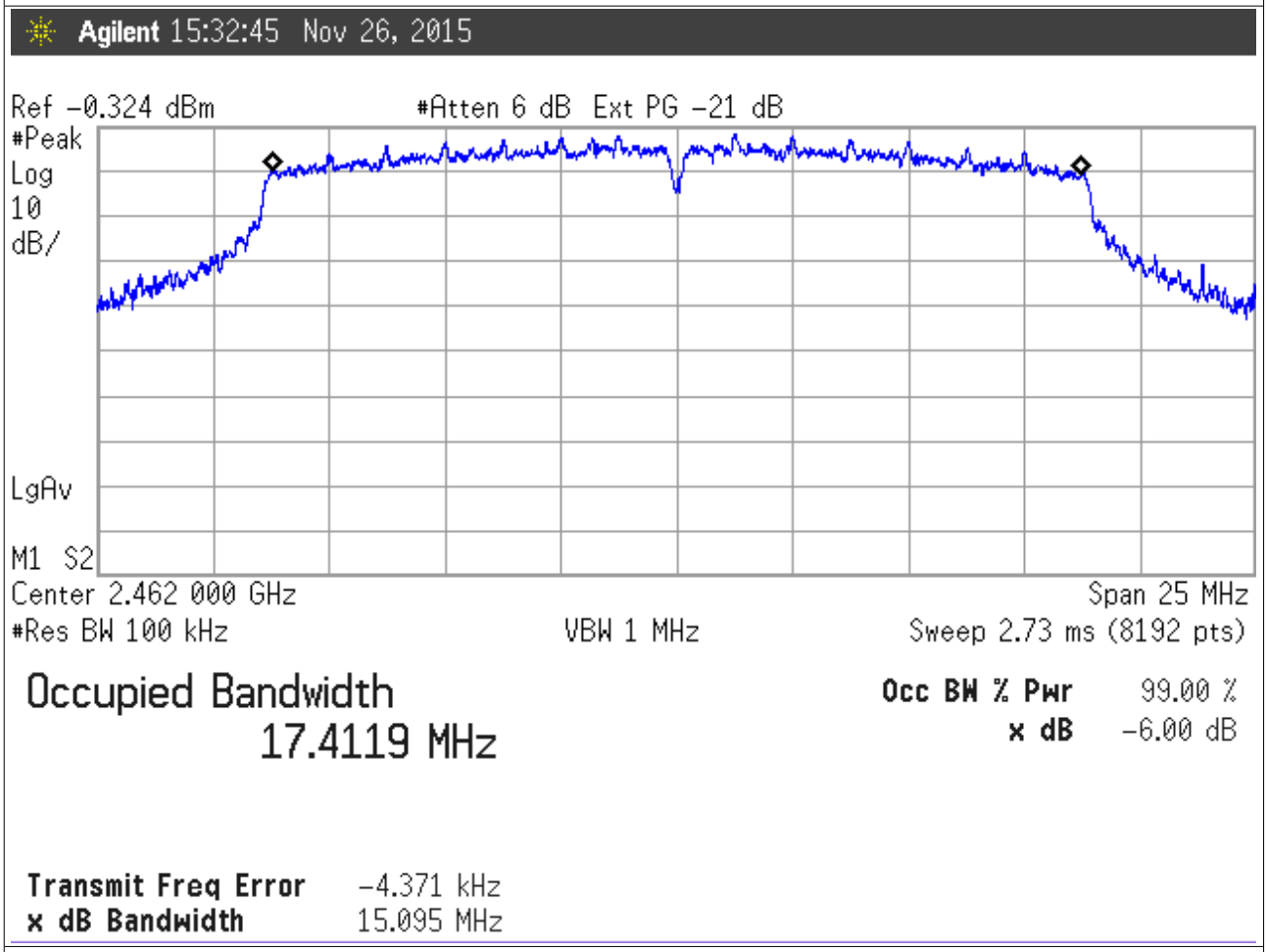
Note:

Channel 11; “11b” at 11Mbps
OBW (-6dB): 9.910 MHz



Note:

Channel 11; “11g” at 54Mbps
OBW (-6dB): 15.122 MHz



Note:

Channel 11; “11n” at 65Mbps
OBW (-6dB): 15.095 MHz

5. MAXIMUM PEAK OUTPUT POWER

Equipment shall meet the limits below .

For systems using digital modulation in the 2400-2483.5 MHz: 1 Watt (+30 dBm).

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DATE
EMI Receiver	Agilent	E4440A	01/2016
Peak Power Meter	Agilent	U2021X	01/2016

Test procedure: APR01

The transmitter output is connected to a spectrum analyzer and the analyzer internal channel power integration is used to integrate the power over a bandwidth greater than or equal to the 26 dB bandwidth.

Test performed on low, middle and high channels and in the b,g,n protocols at maximum data rate for each protocol.

Results:

No non-compliance noted

802.11b Mode, 11 Mbs				
Channel	*Frequency (MHz)*	*Peak Power (dBm)*	*Limit (dBm)*	*Margin (dB)*
Low	2412	14.89	30	-15.11
Mid	2437	16.96	30	-13.04
High	2462	16.94	30	-13.06

802.11g Mode, 54 Mbs				
Channel	*Frequency (MHz)*	*Peak Power (dBm)*	*Limit (dBm)*	*Margin (dB)*
Low	2412	16.94	30	-13.06
Mid	2437	17.73	30	-12.27
High	2462	17.54	30	-12.46

802.11n Mode, 65Mbs				
Channel	*Frequency (MHz)*	*Peak Power (dBm)*	*Limit (dBm)*	*Margin (dB)*
Low	2412	14.81	30	-15.19
Mid	2437	17.15	30	-12.85
High	2462	17.05	30	-12.95

6. Band Edge and Conducted Spurious Emissions

Equipment shall meet the limits below .

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.

Test Equipment

Equipment	Manufacturer	Model	Cal. Date
EMI Receiver	Agilent	E4440A	01/2016

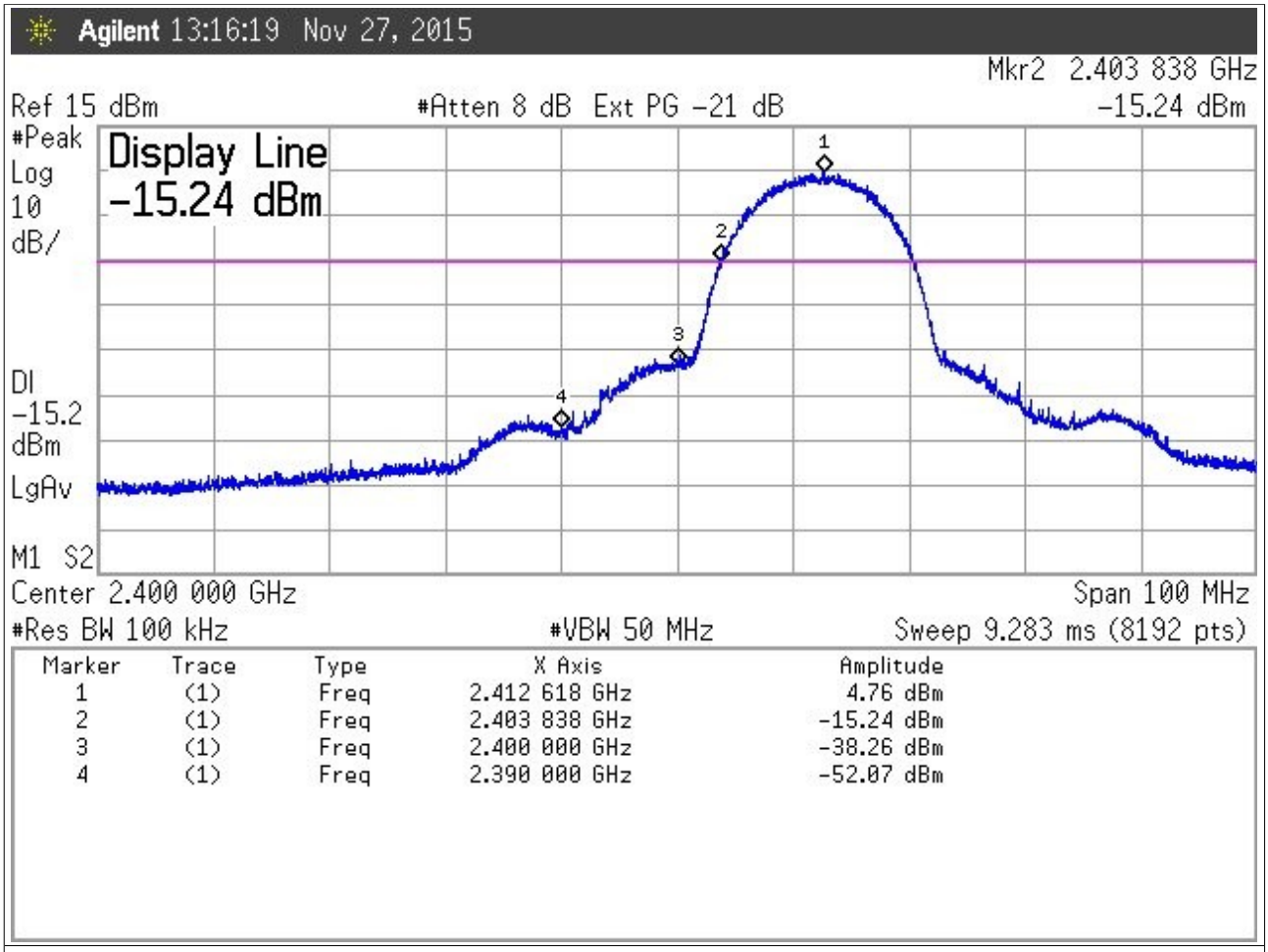
Test procedure: APR01

Test performed on low, middle and high channels and in the b,g,n protocols at maximum and minimum data rate for each protocol.

Results:

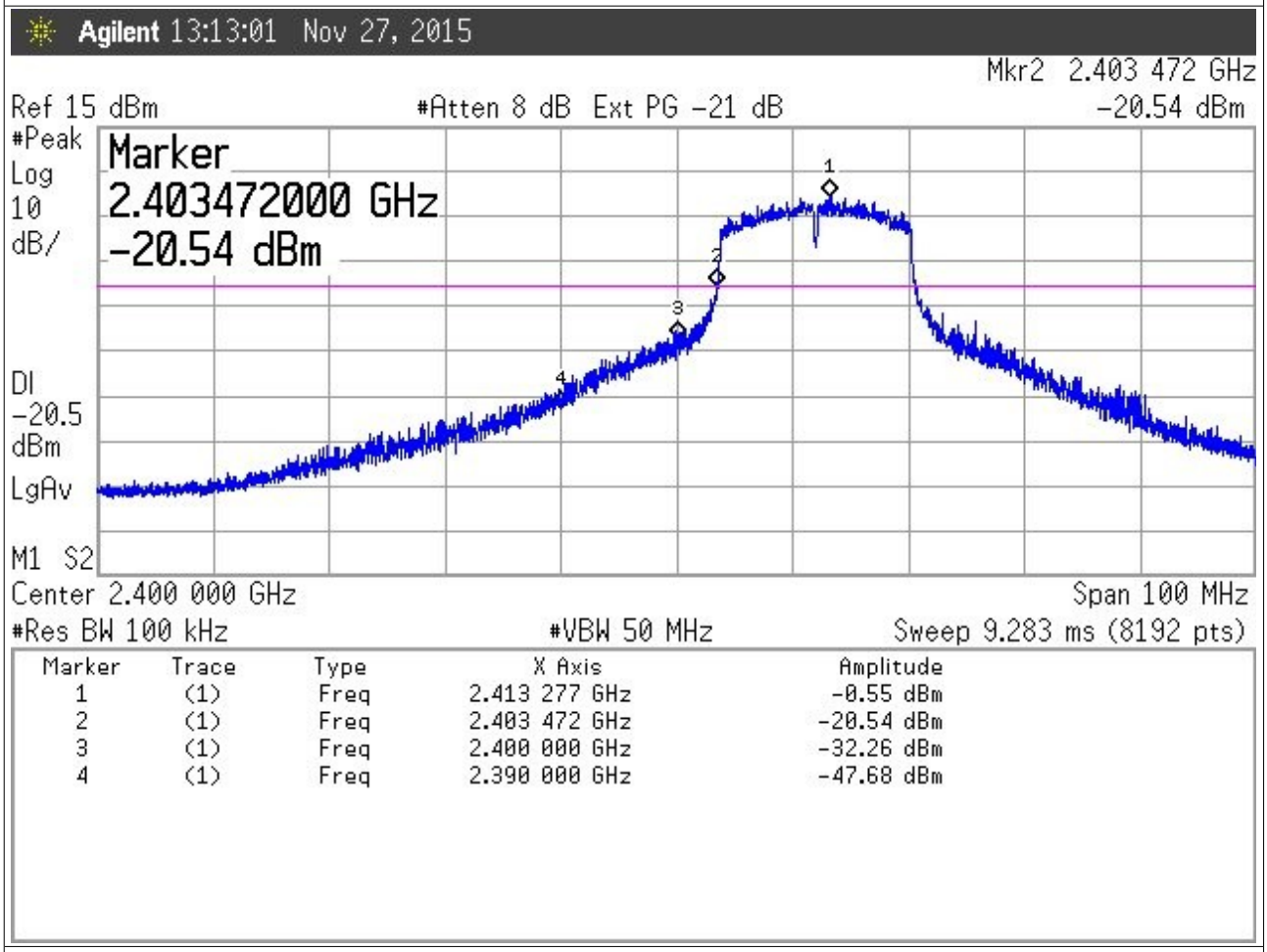
No non-compliance noted

The following figures show the results.



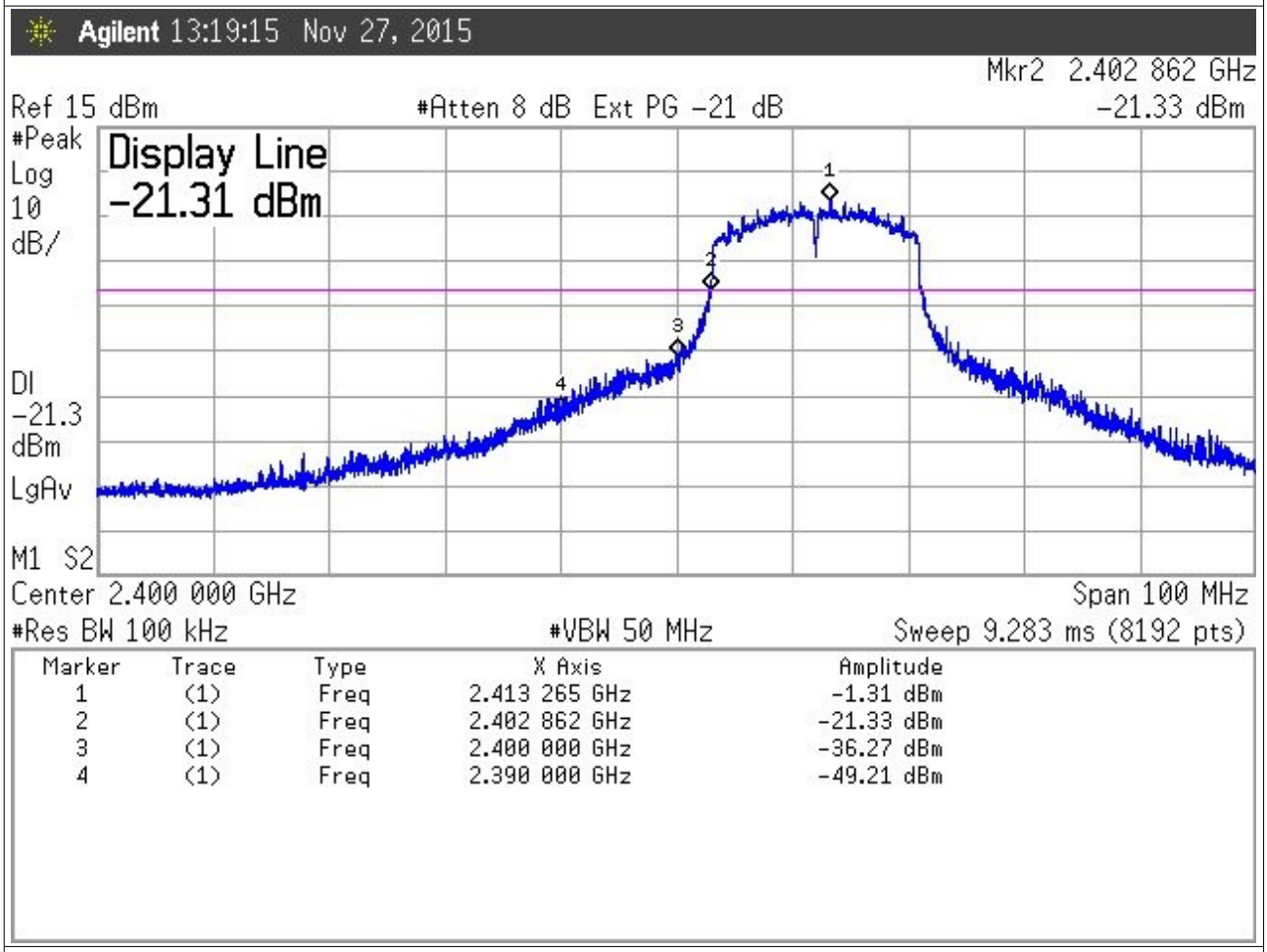
Note:

Channel 1; “11b” at 11Mbps



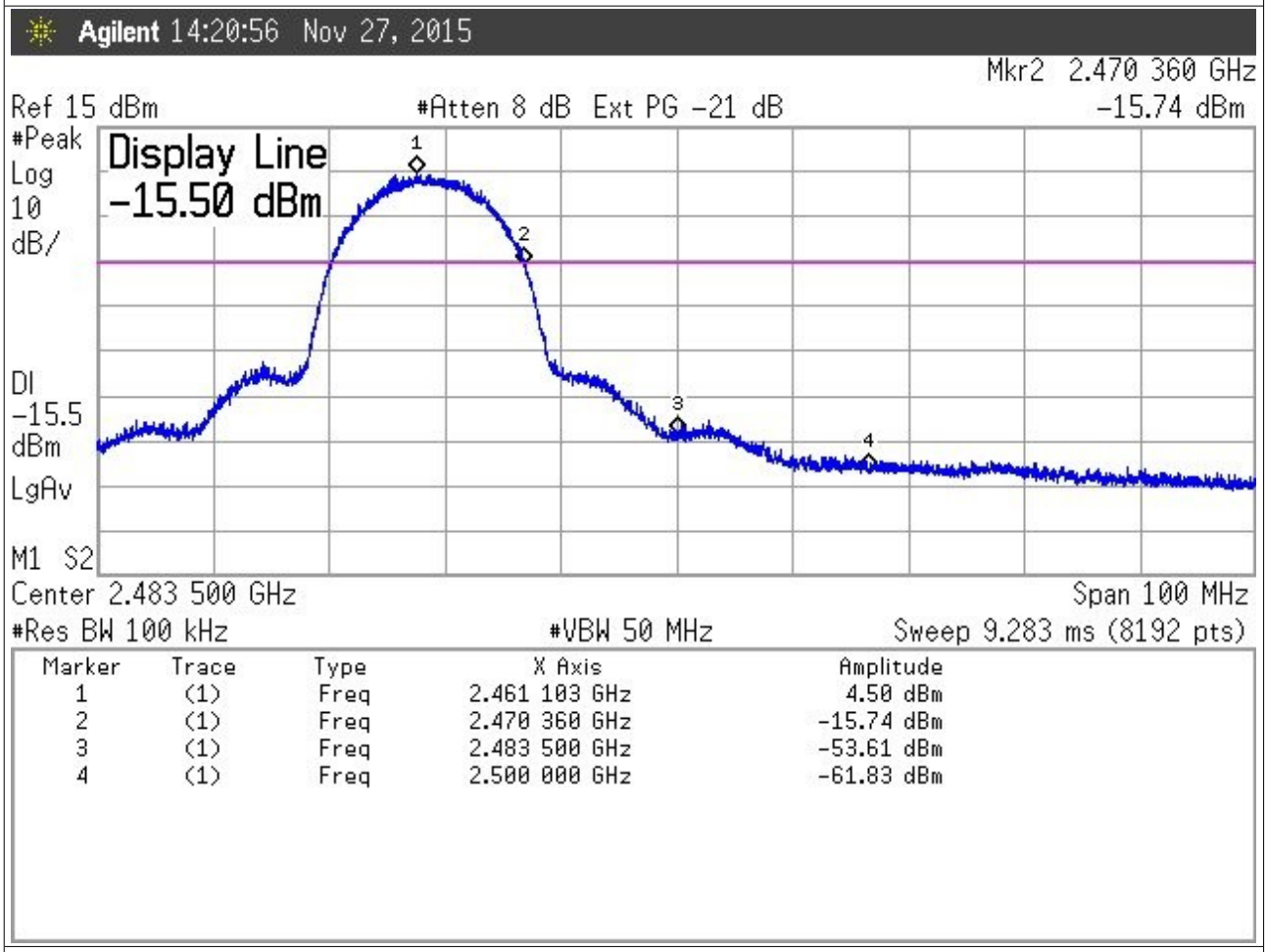
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.413 277 GHz	-0.55 dBm
2	(1)	Freq	2.403 472 GHz	-20.54 dBm
3	(1)	Freq	2.400 000 GHz	-32.26 dBm
4	(1)	Freq	2.390 000 GHz	-47.68 dBm

Note:
Channel 1; “11g” at 54Mbps

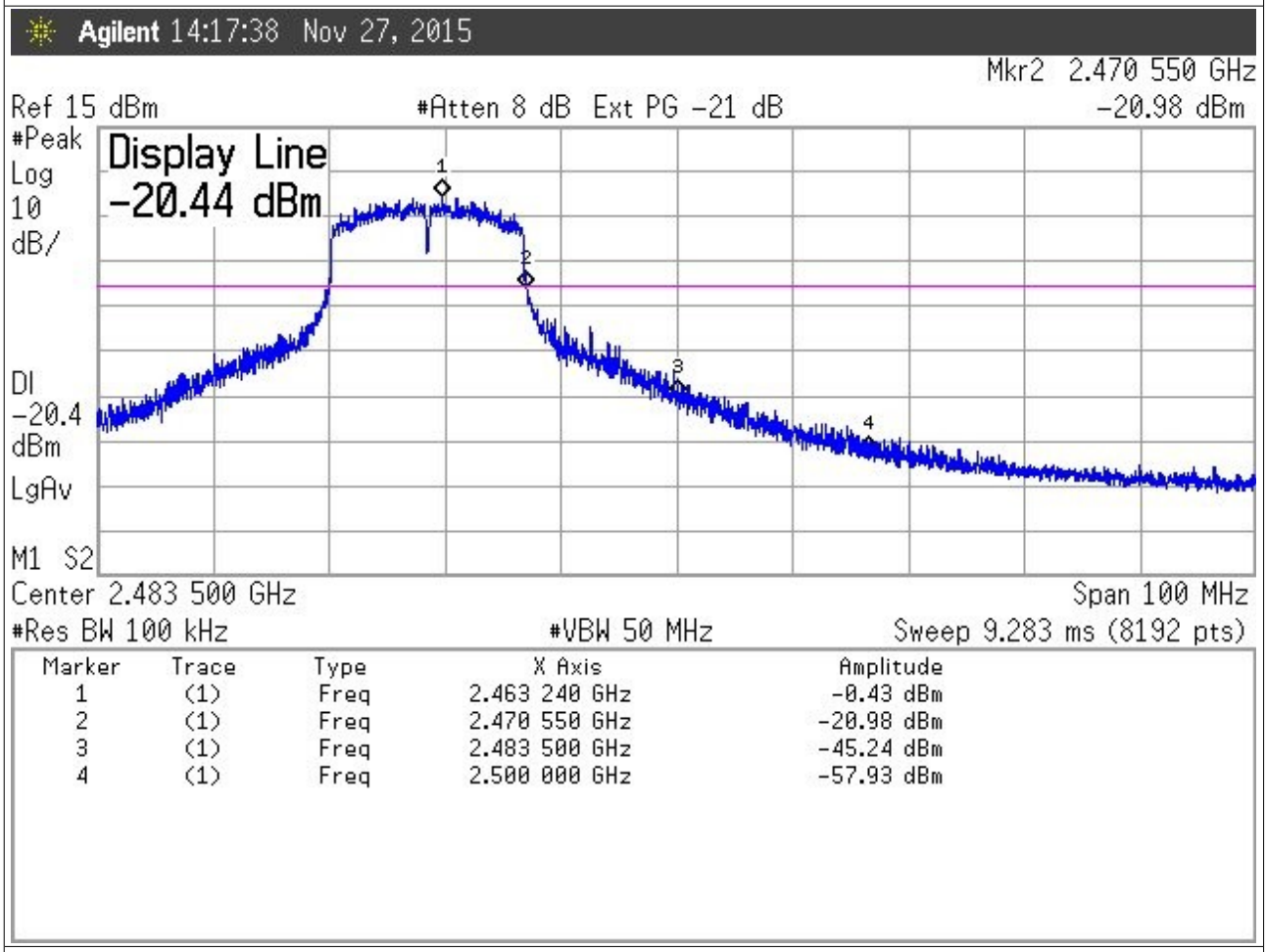


Note:

Channel 1; “11n” at 65Mbps

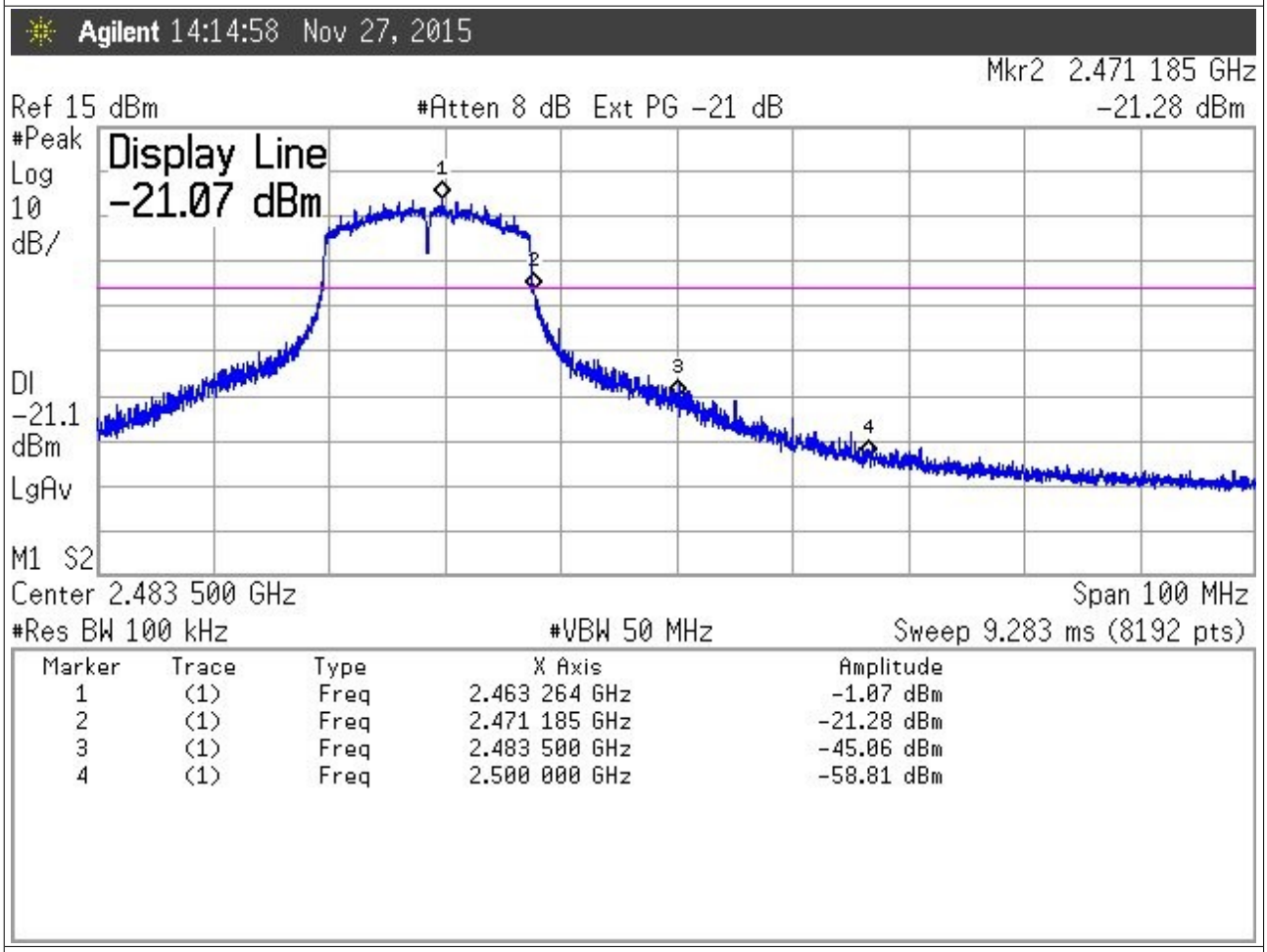


Note:
Channel 11; “11b” at 11Mbps



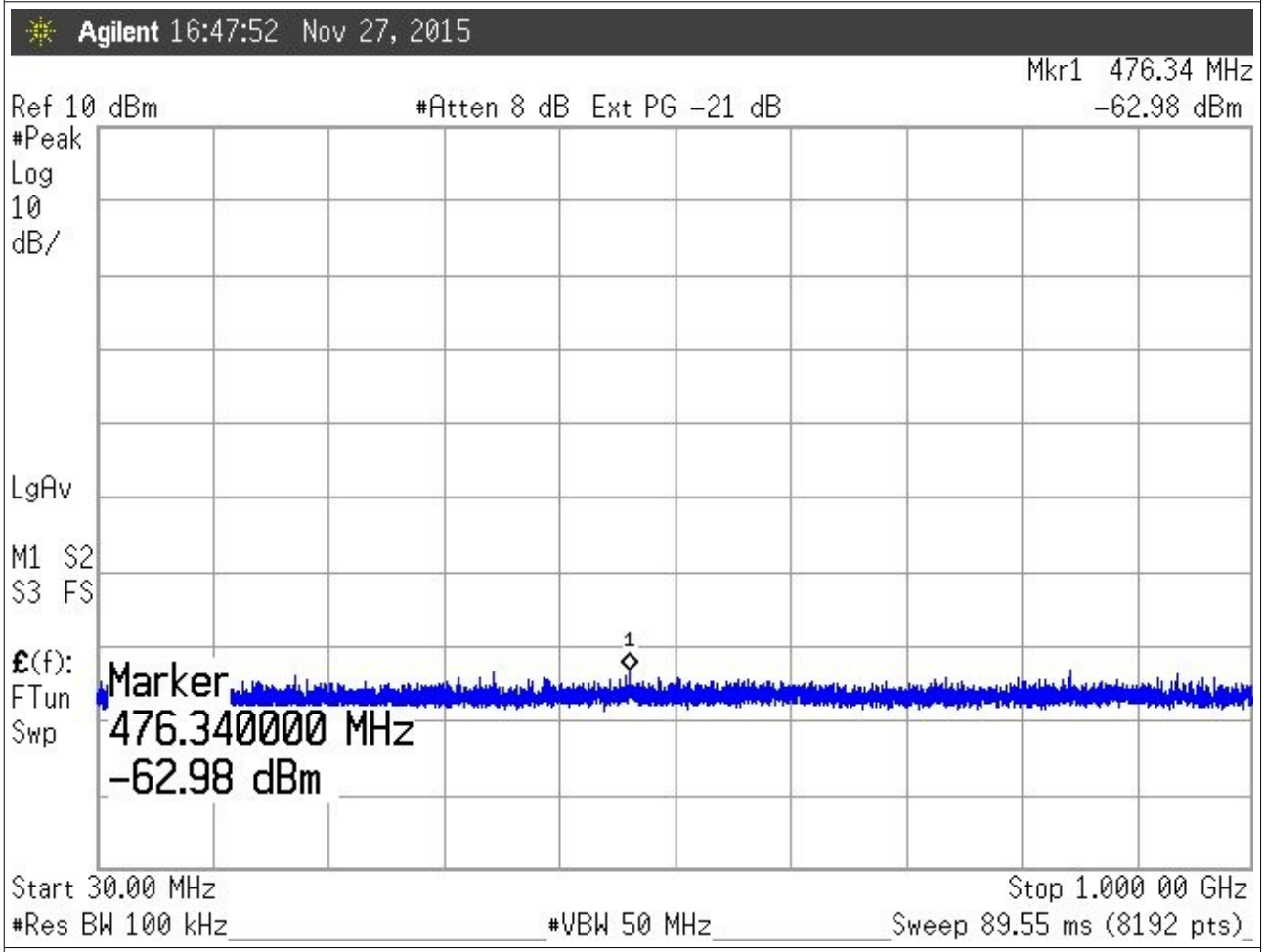
Note:

Channel 11; “11g” at 54Mbps

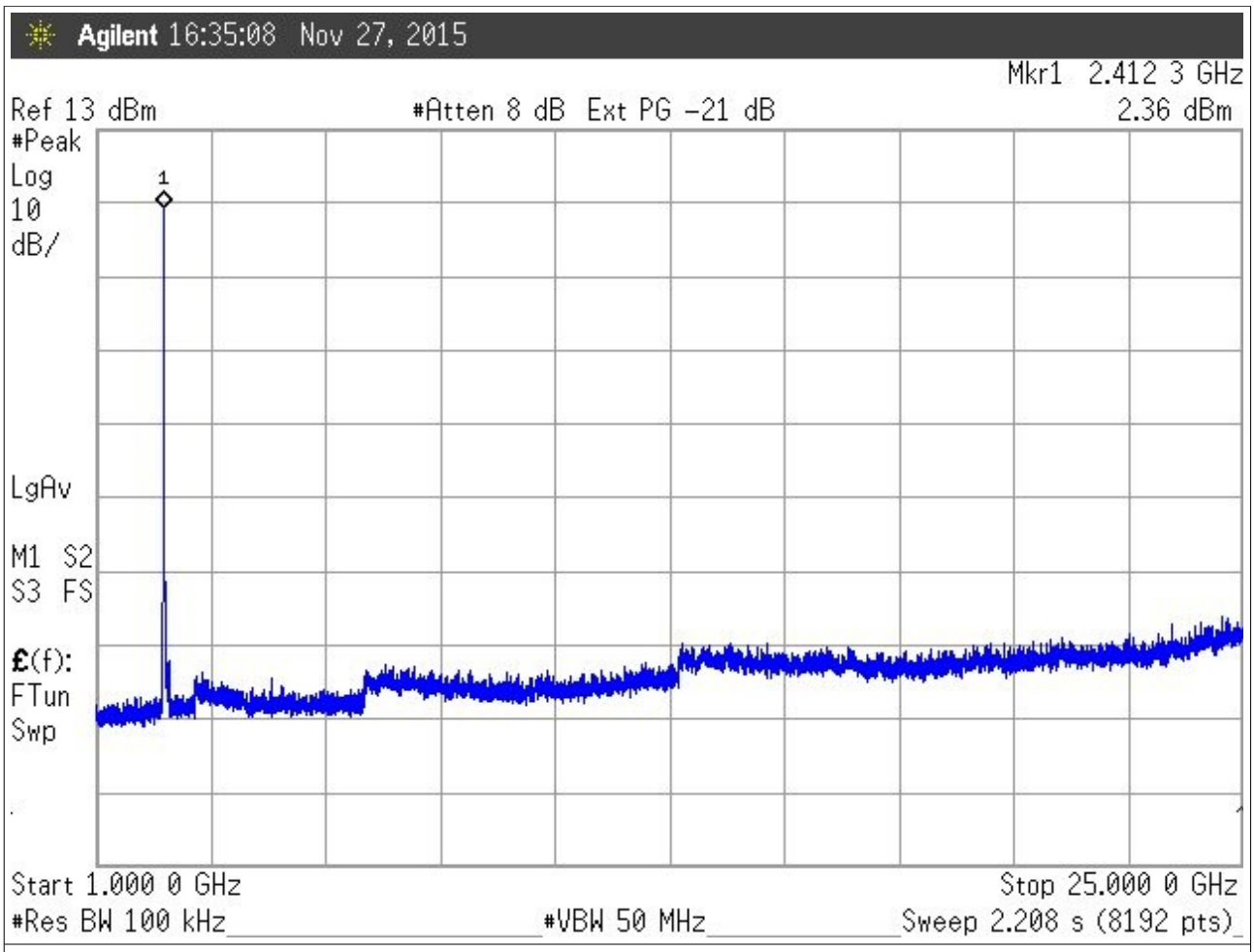


Note:

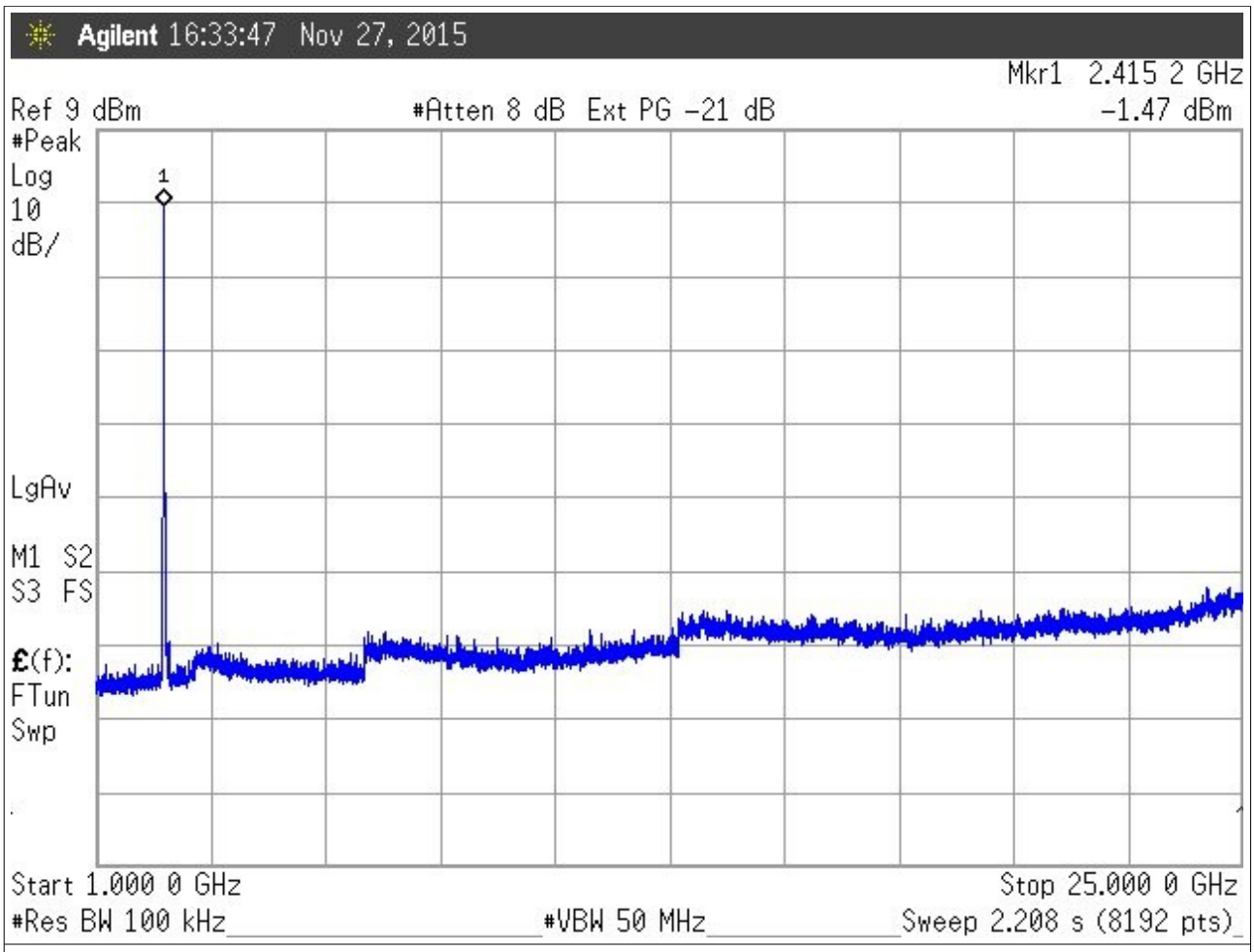
Channel 11; “11n” at 65Mbps



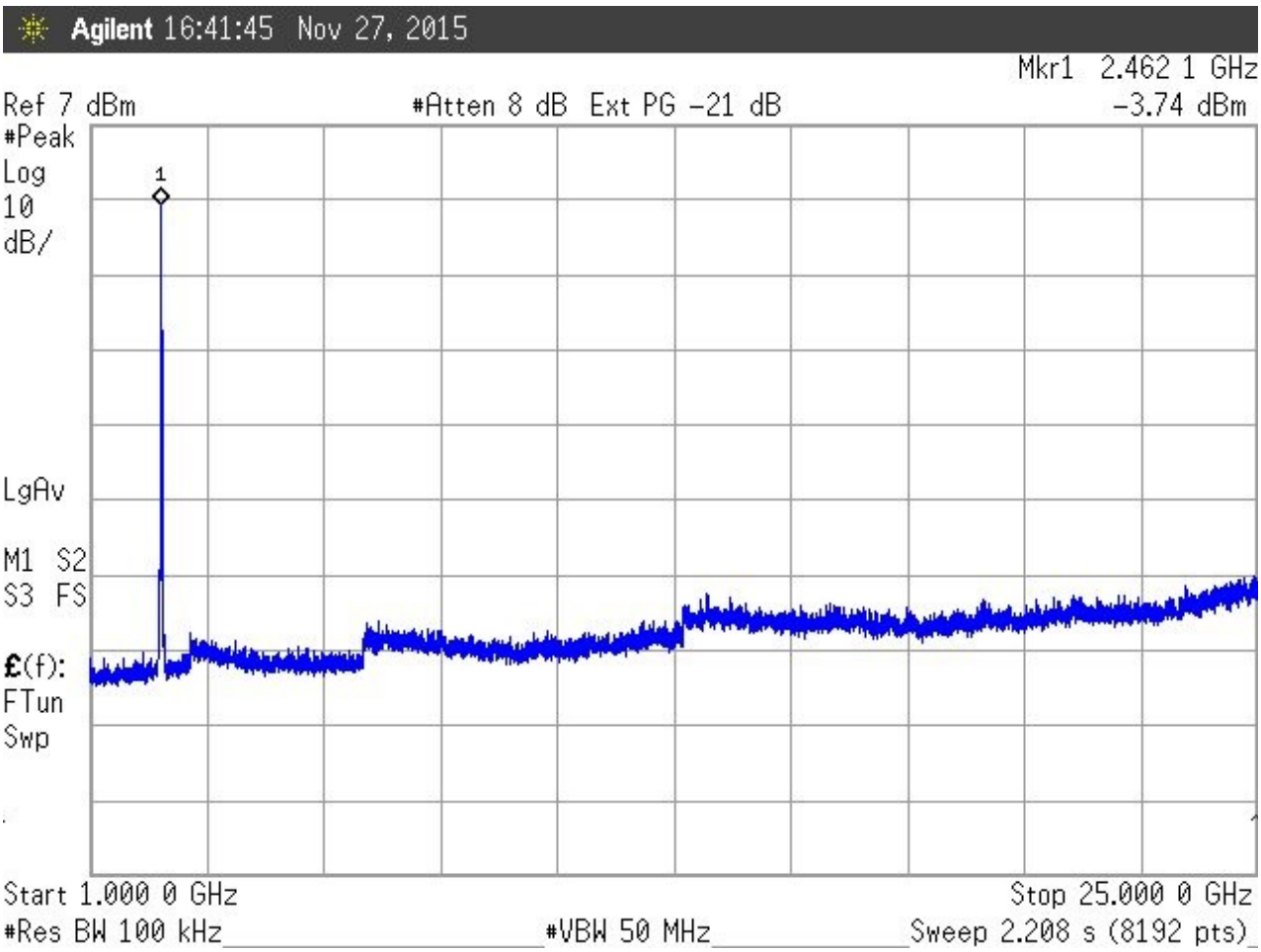
30 – 1000 MHz



1 GHz – 25 GHz – b mode



1 GHz – 25 GHz – G mode



1 GHz – 25 GHz – N mode

7. PEAK POWER SPECTRAL DENSITY

Equipment shall meet the limits below .

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DATE
EMI Receiver	Agilent	E4440A	01/2016

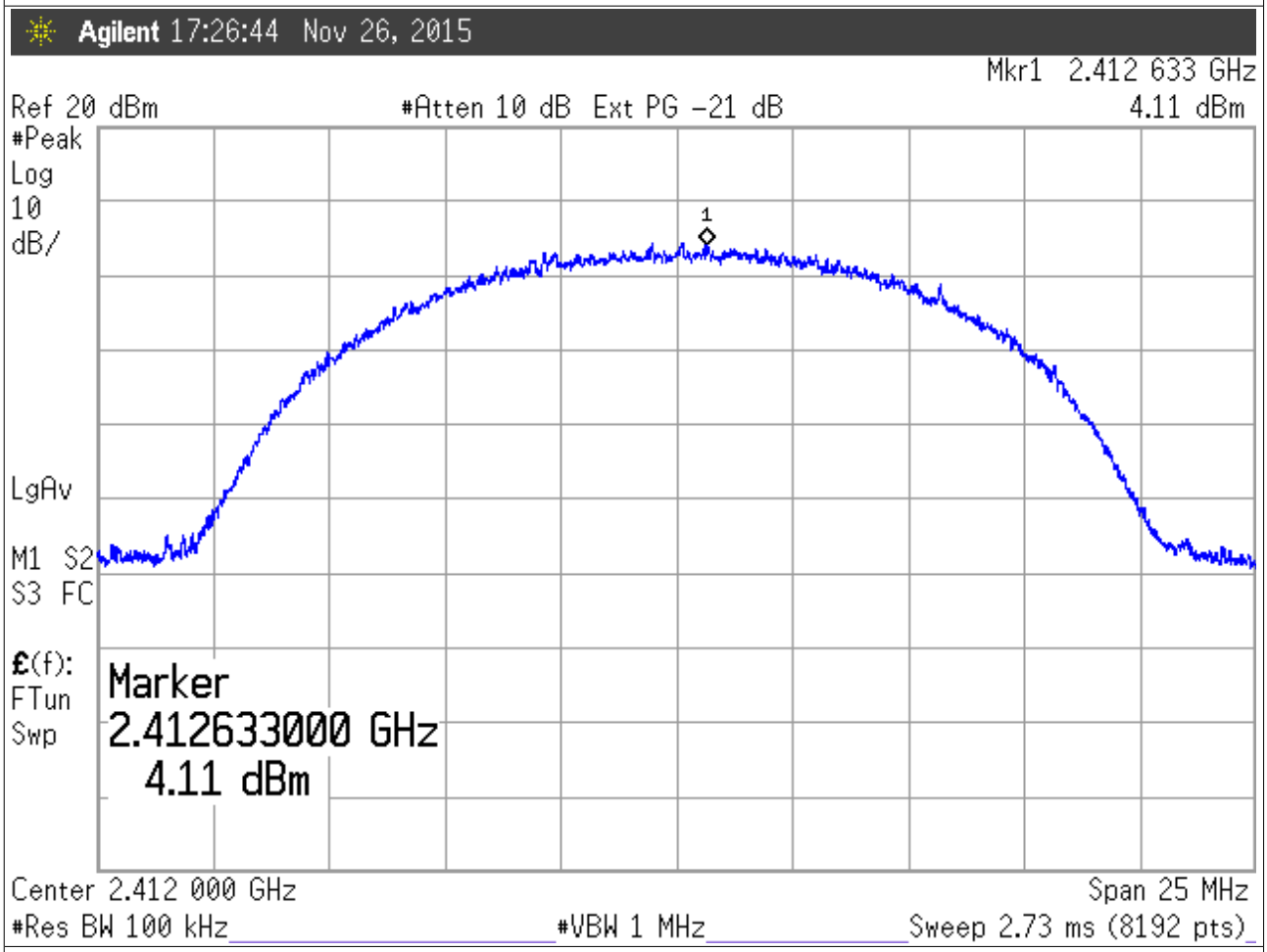
Test procedure: APR01

Test performed on low, middle and high channels and in the b,g,n protocols at maximum and minimum data rate for each protocol.

Results:

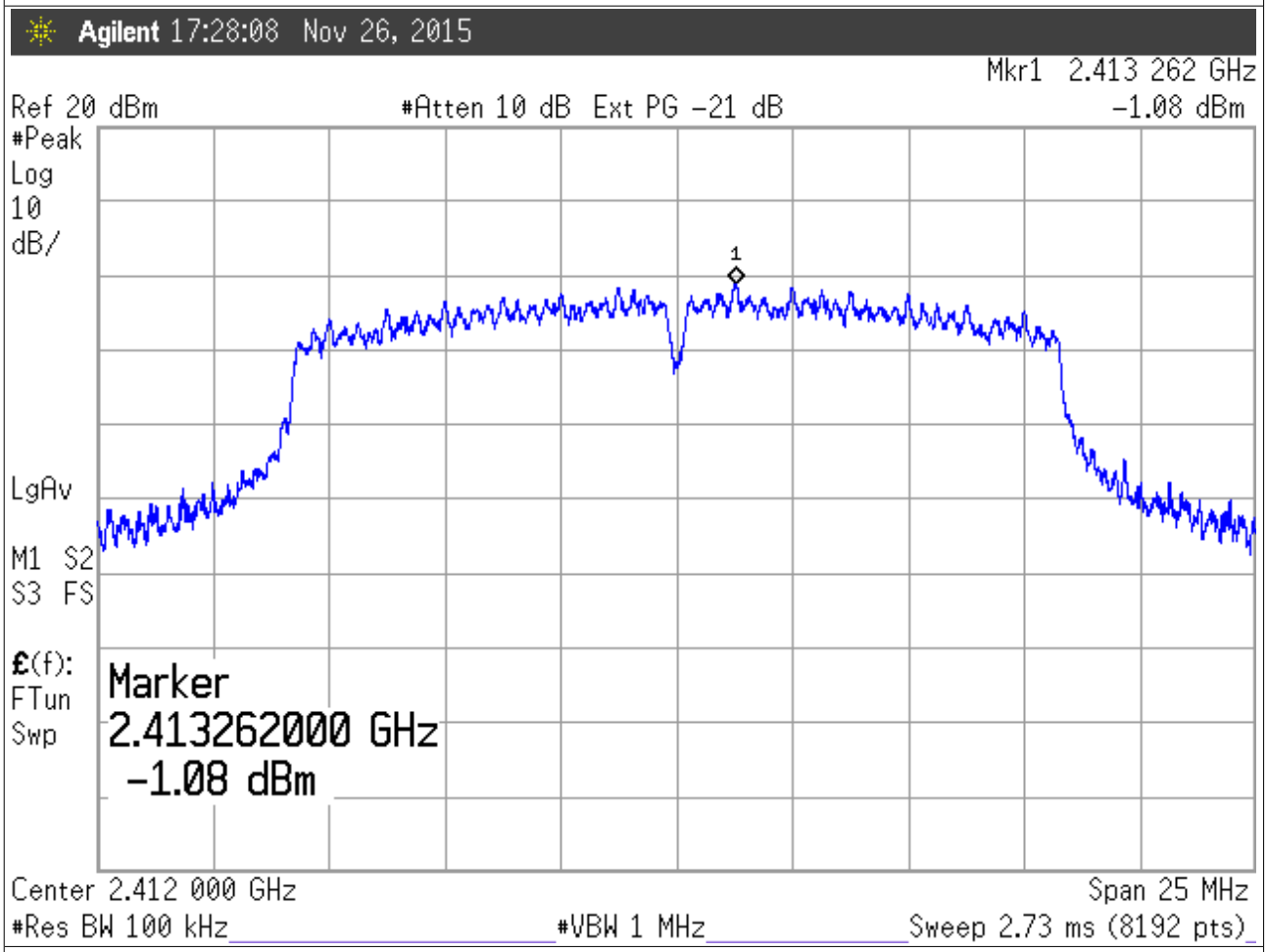
No non-compliance noted

802.11b Mode, 11 Mbs				
Channel	*Frequency (MHz)*	*PPSD (dBm)*	*Limit (dBm)*	*Margin (dB)*
Low	2412	4.11	8	-3.89
Mid	2437	4.77	8	-3.23
High	2462	4.11	8	-3.89
802.11g Mode, 54 Mbs				
Channel	*Frequency (MHz)*	*PPSD (dBm)*	*Limit (dBm)*	*Margin (dB)*
Low	2412	-1.08	8	-9.08
Mid	2437	-0.39	8	-8.39
High	2462	-1.27	8	-9.27
802.11n Mode, 65 Mbs				
Channel	*Frequency (MHz)*	*PPSD (dBm)*	*Limit (dBm)*	*Margin (dB)*
Low	2412	-1.08	8	-9.08
Mid	2437	-1.38	8	-9.38
High	2462	-1.77	8	-9.77
The following figures show the results.				



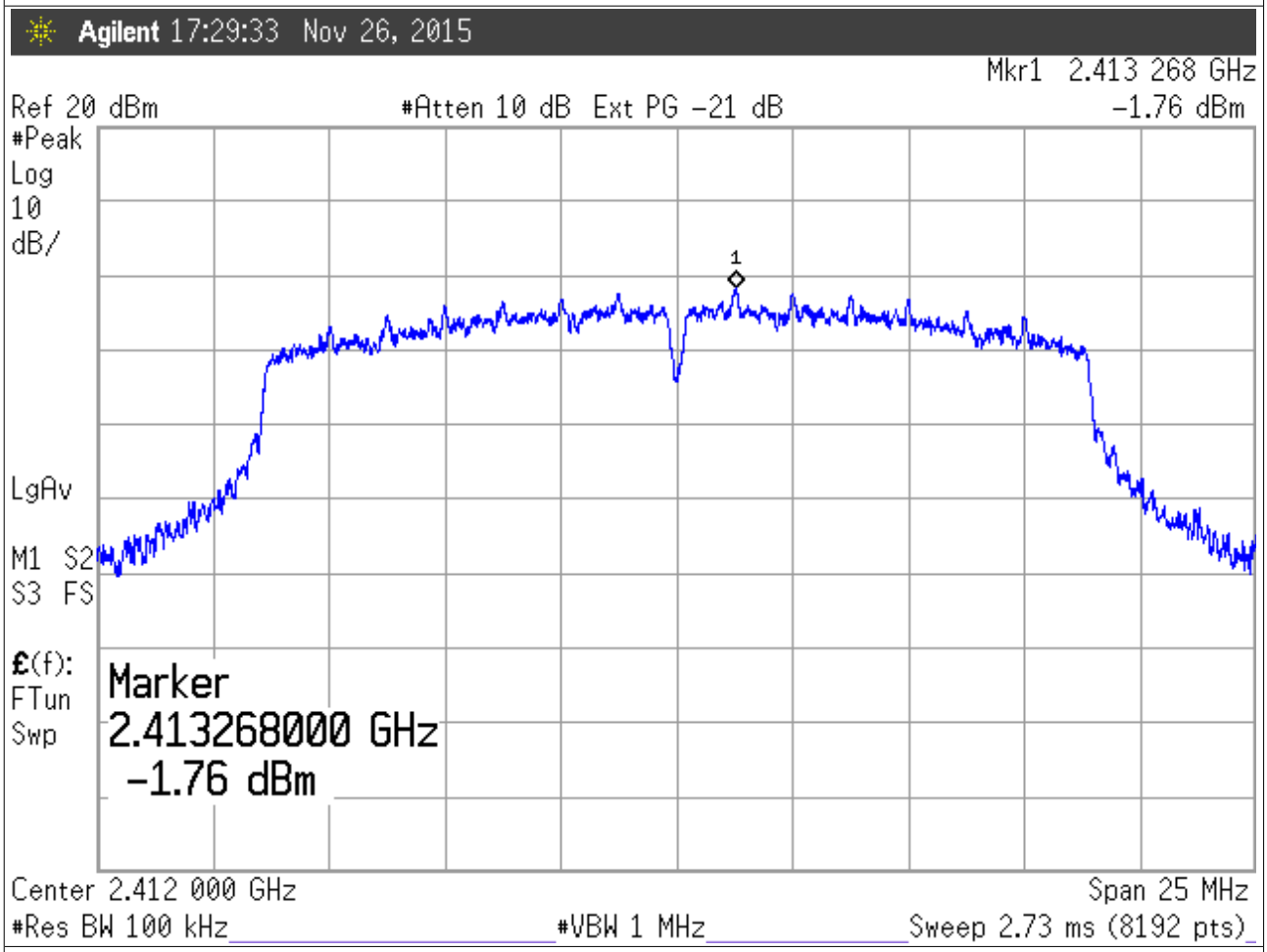
Note:

Channel 1; "11b" at 11Mbps
Maximum Spectral Density: 4.11 dBm



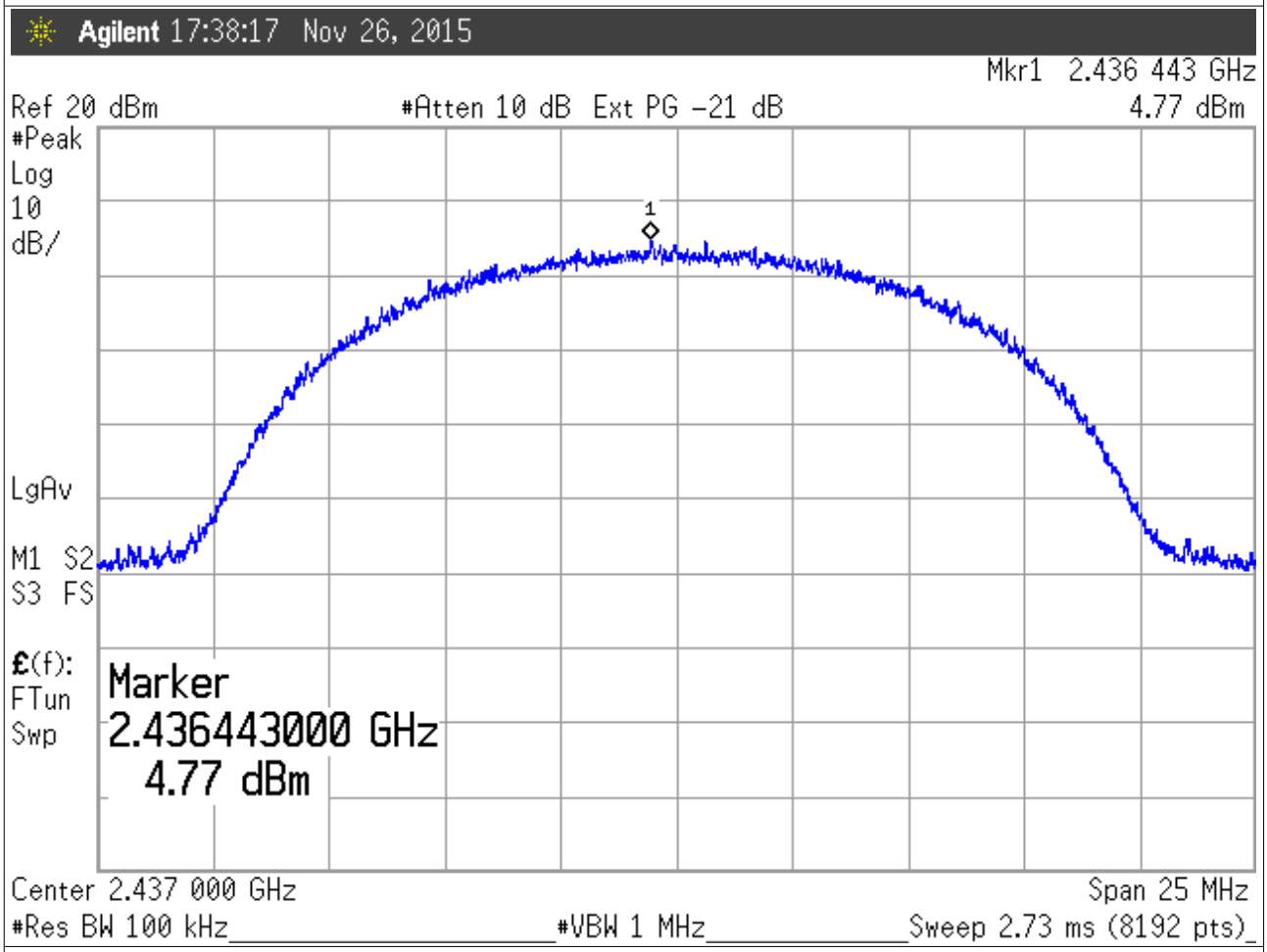
Note:

Channel 1; "11g" at 54Mbps
Maximum Spectral Density: -1.08 dBm



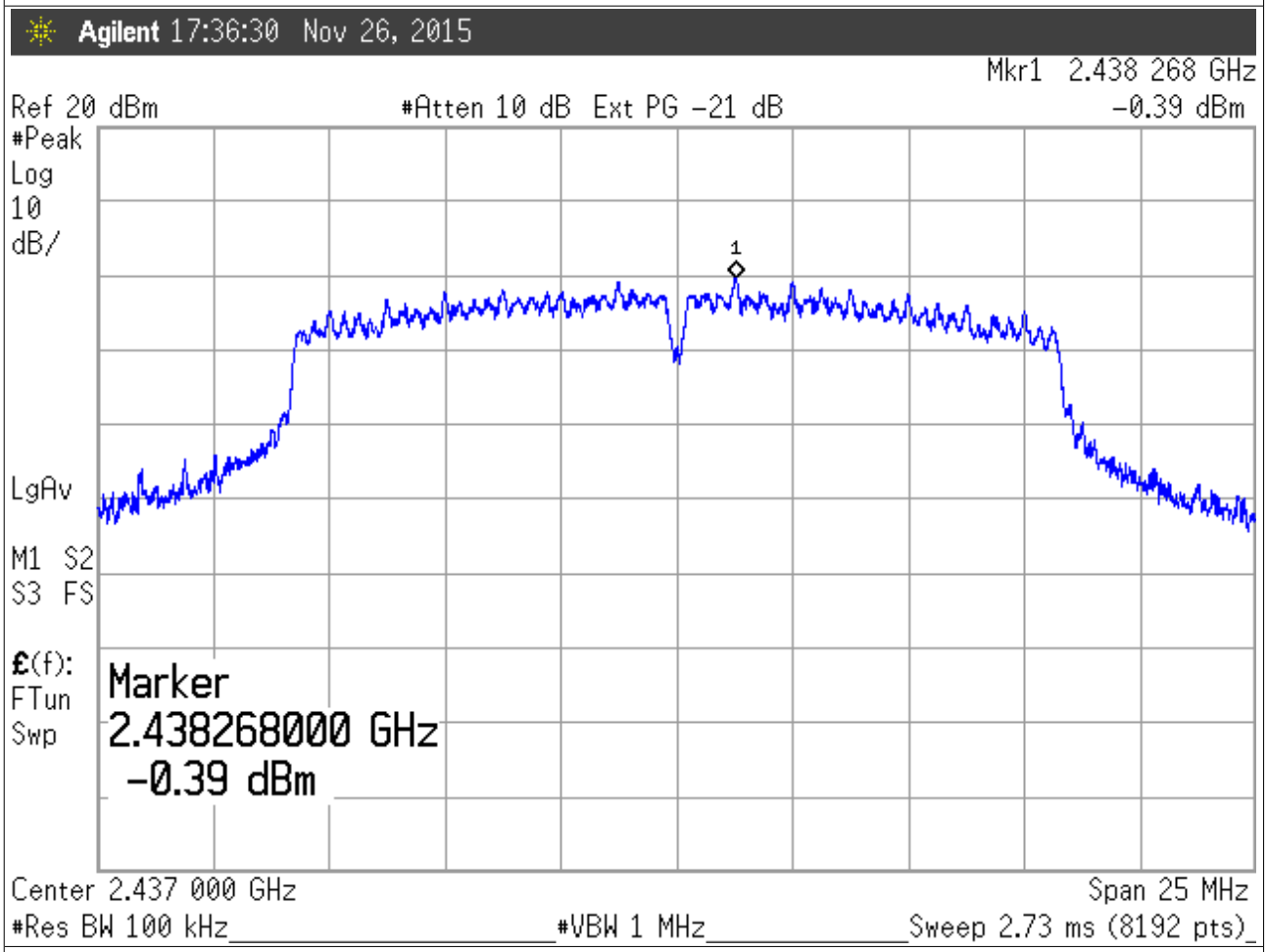
Note:

Channel 1; "11n" at 65Mbps
Maximum Spectral Density: -1.08 dBm



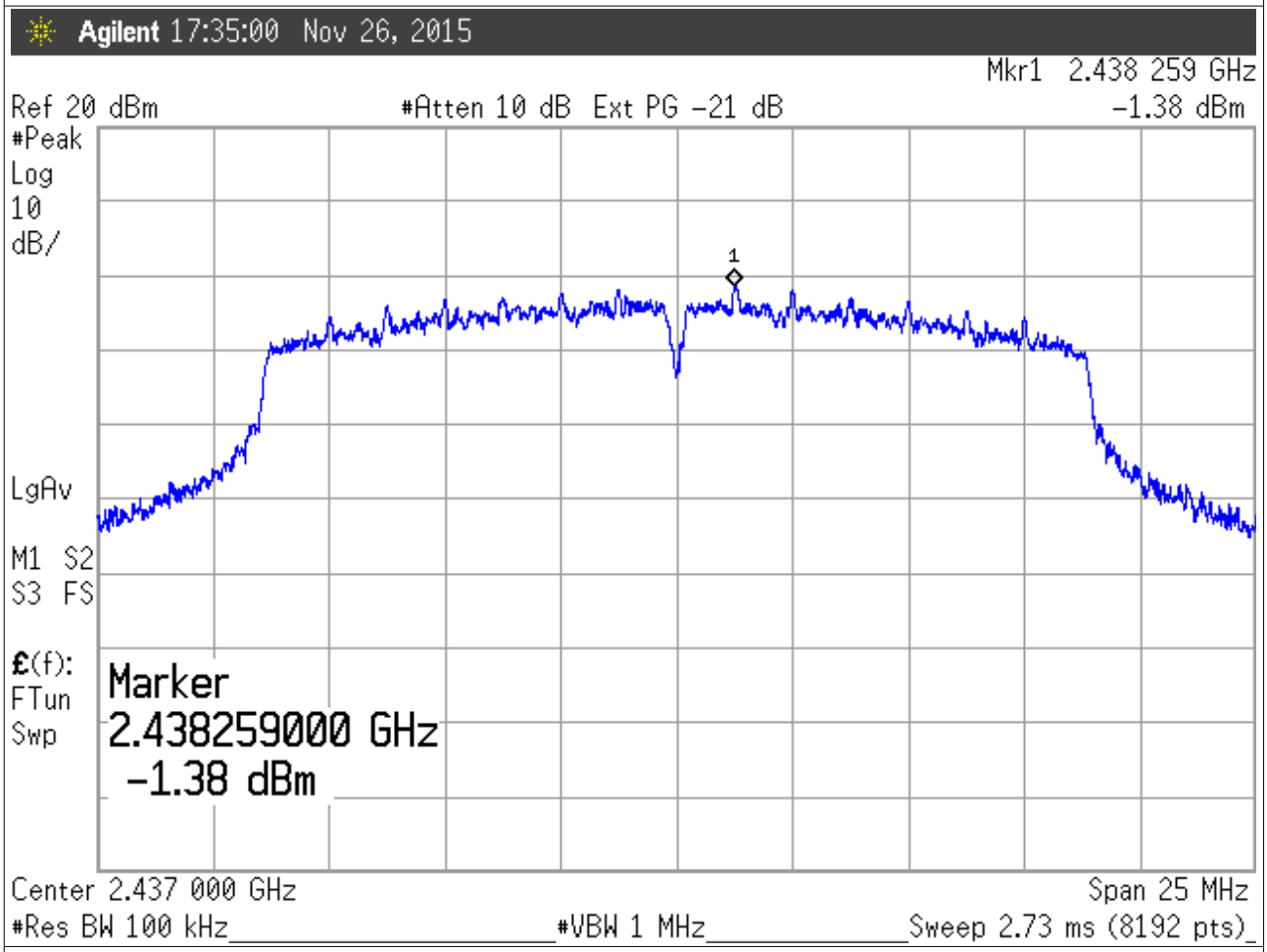
Note:

Channel 6; "11b" at 11Mbps
Maximum Spectral Density: 4.77 dBm



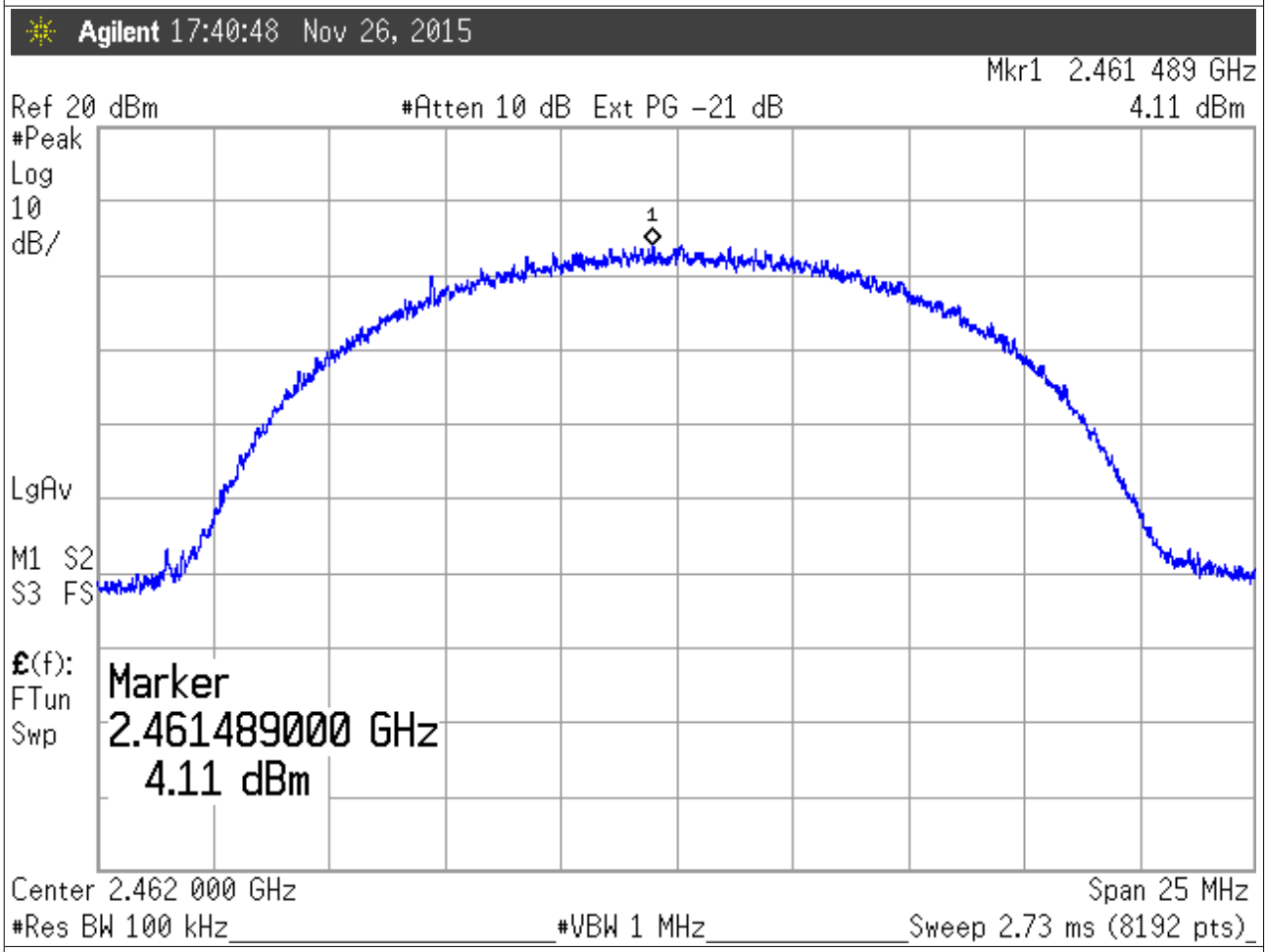
Note:

Channel 6; "11g" at 54Mbps
Maximum Spectral Density: -0.39 dBm



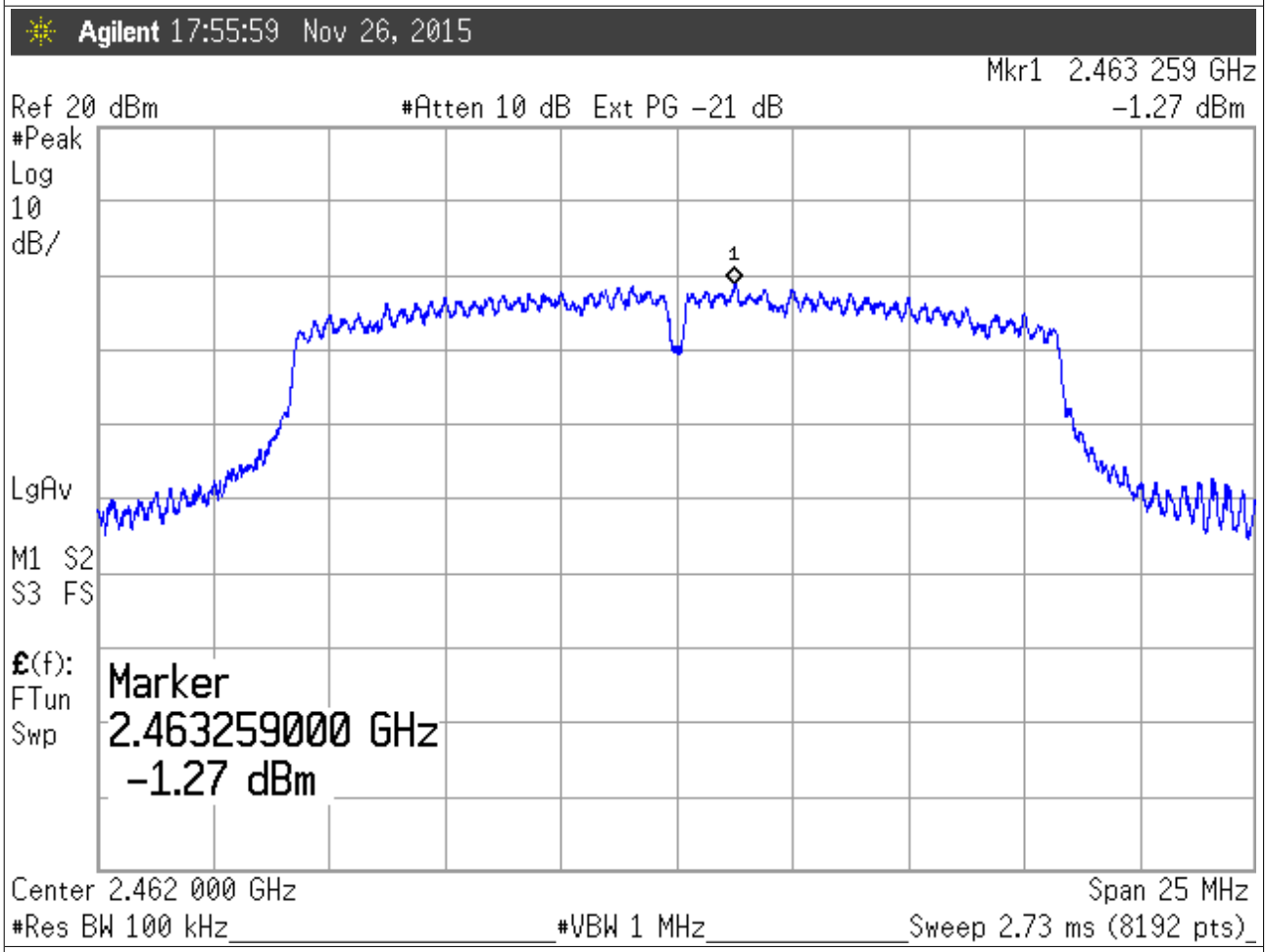
Note:

Channel 6; "11n" at 65Mbps
Maximum Spectral Density: -1.38 dBm



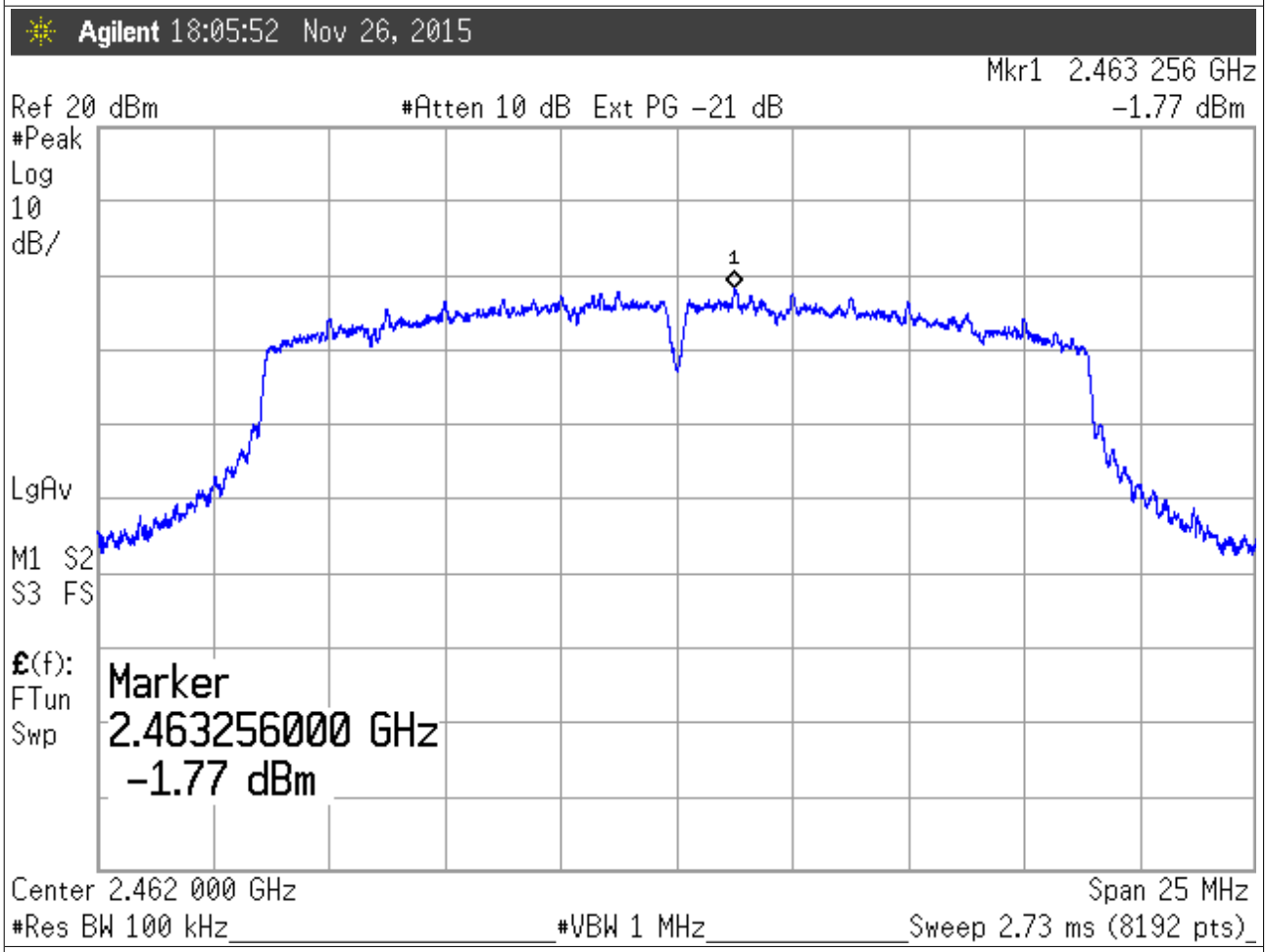
Note:

Channel 11; “11b” at 11Mbps
Maximum Spectral Density: 4.11 dBm



Note:

Channel 11; “11g” at 54Mbps
Maximum Spectral Density: -1.27 dBm



Note:

Channel 11; “11n” at 65Mbps
Maximum Spectral Density: -1.77 dBm

8. CONDUCTED EMISSIONS

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

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

FCC, EN 55022 Class B Limit

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. DATE
EMI Receiver	HP	HP8546A	01/2016
EMI Receiver Filter Section	HP	HP85460A	01/2016
LISN	GSD	NTW01	01/2016
Screened Room	GSD	CSC01	01/2016

Test procedure: CE22R01

Test method

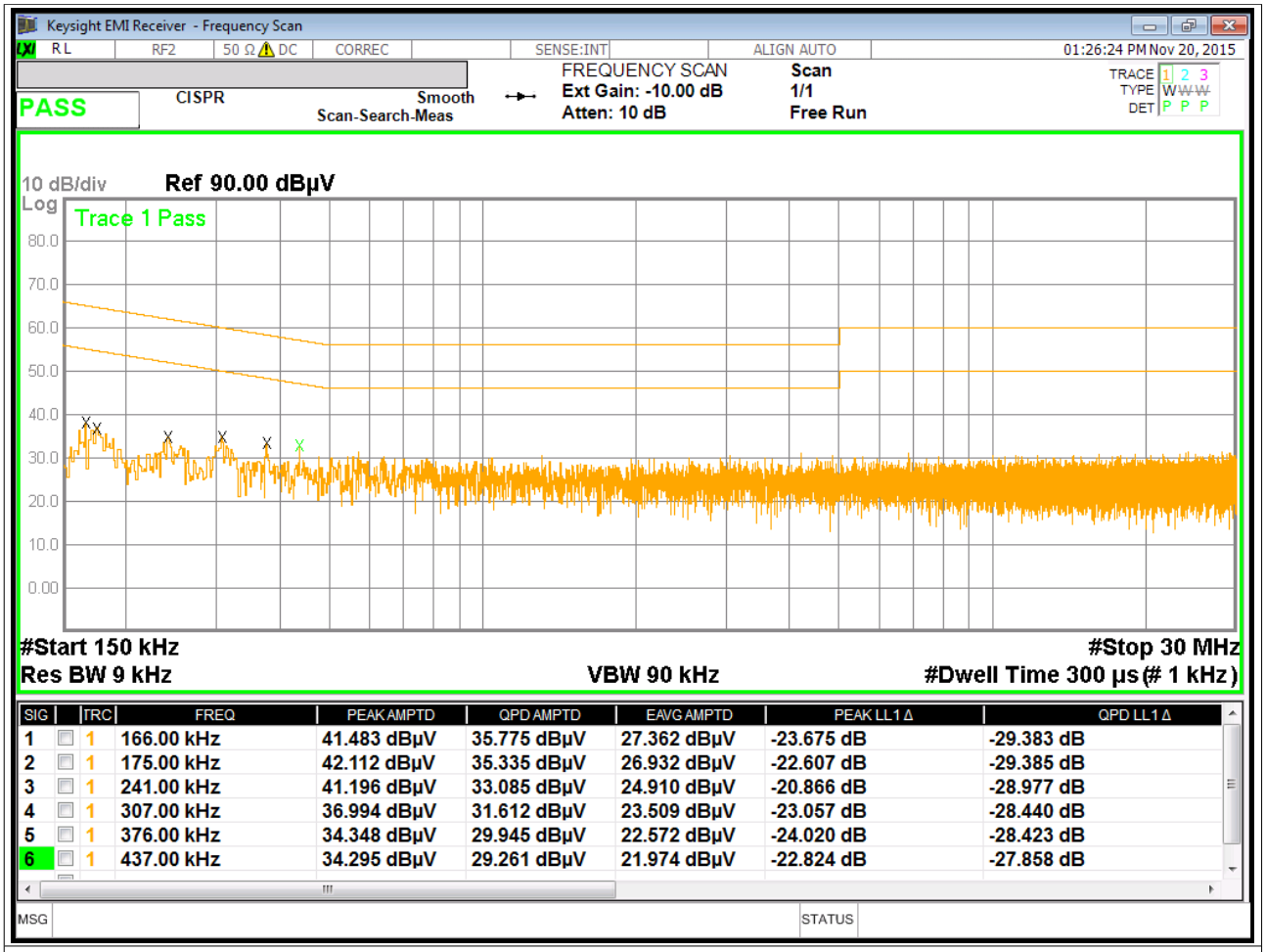
Test method was in accordance with the reference standard.

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

Results

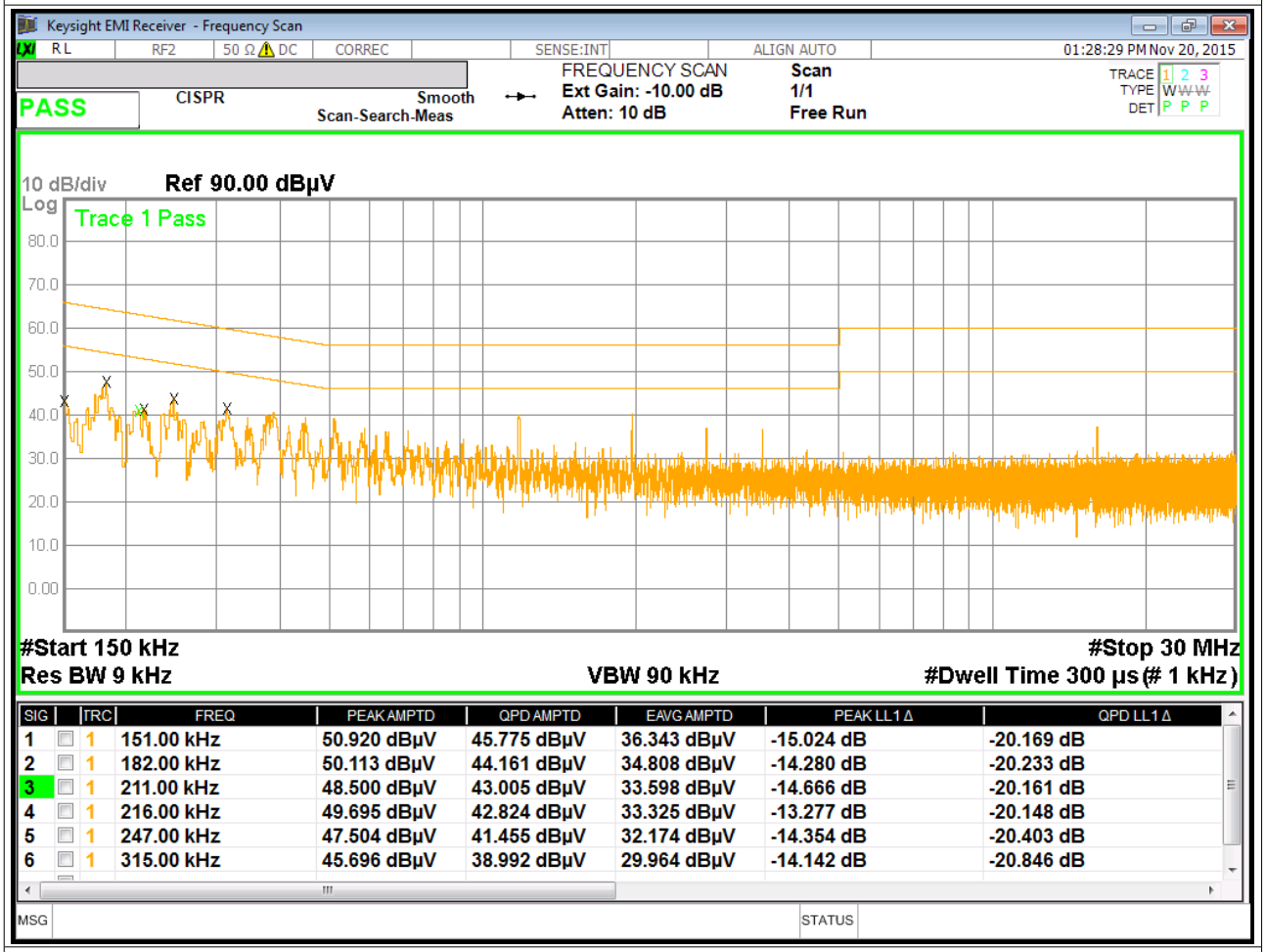
Equipment complied with the test specification limits.

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



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ
1	1	166.00 kHz	41.483 dBµV	35.775 dBµV	27.362 dBµV	-23.675 dB	-29.383 dB
2	1	175.00 kHz	42.112 dBµV	35.335 dBµV	26.932 dBµV	-22.607 dB	-29.385 dB
3	1	241.00 kHz	41.196 dBµV	33.085 dBµV	24.910 dBµV	-20.866 dB	-28.977 dB
4	1	307.00 kHz	36.994 dBµV	31.612 dBµV	23.509 dBµV	-23.057 dB	-28.440 dB
5	1	376.00 kHz	34.348 dBµV	29.945 dBµV	22.572 dBµV	-24.020 dB	-28.423 dB
6	1	437.00 kHz	34.295 dBµV	29.261 dBµV	21.974 dBµV	-22.824 dB	-27.858 dB

Note:
phase 2



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ
1	1	151.00 kHz	50.920 dBµV	45.775 dBµV	36.343 dBµV	-15.024 dB	-20.169 dB
2	1	182.00 kHz	50.113 dBµV	44.161 dBµV	34.808 dBµV	-14.280 dB	-20.233 dB
3	1	211.00 kHz	48.500 dBµV	43.005 dBµV	33.598 dBµV	-14.666 dB	-20.161 dB
4	1	216.00 kHz	49.695 dBµV	42.824 dBµV	33.325 dBµV	-13.277 dB	-20.148 dB
5	1	247.00 kHz	47.504 dBµV	41.455 dBµV	32.174 dBµV	-14.354 dB	-20.403 dB
6	1	315.00 kHz	45.696 dBµV	38.992 dBµV	29.964 dBµV	-14.142 dB	-20.846 dB

Note:

phase 1

9. RADIATED EMISSIONS

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

FCC

DISTANCE (m)	*FREQUENCY RANGE (MHz)*	*QUASI-PEAK LIMITS [dB (µV/m)]*	*AVERAGE LIMITS [dB (µV/m)]*
300	0,009 – 0,49	48,52 – 13,8	
30	0,49 – 1,705	33,8 – 22,97	
30	1,705 - 30	29.54	
3	30 – 88	40	--
3	88 – 216	43,5	--
3	216 – 960	46	--
3	960 – 1000	54	--
3	Above 1000	--	54

Test Equipment

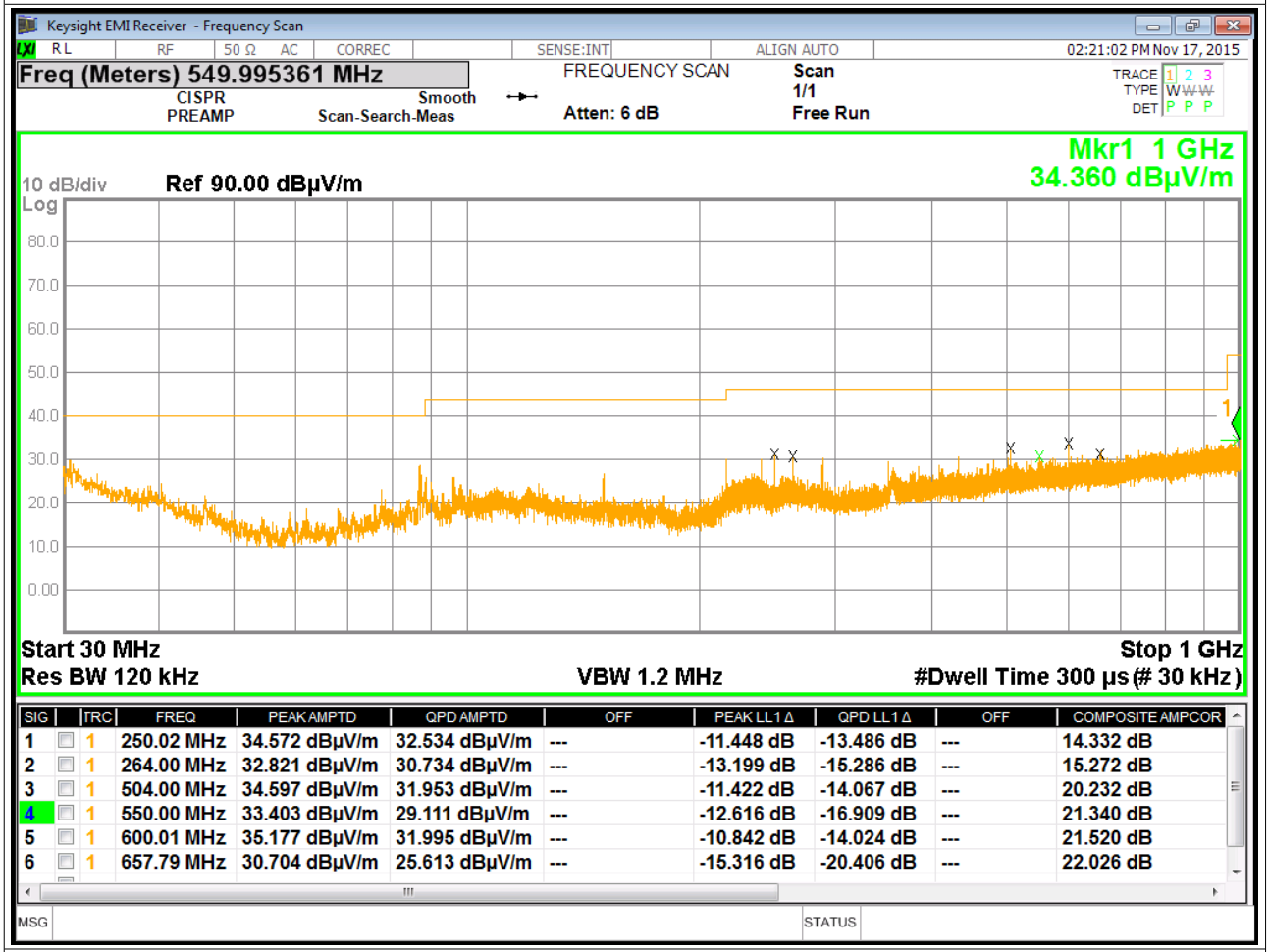
EQUIPMENT	MANUFACTURER	MODEL	CAL. DATE
EMI Receiver	HP	HP8546A	01/2016
EMI Receiver Filter Section	HP	HP85460A	01/2016
EMI Receiver	Agilent	E4440A	01/2016
EMI Receiver Filter Section	Agilent	N9039A	01/2016
Anechoic Chamber	Comtest	CSA01	01/2016
Horn Antenna (1-18 GHz)	EMCO	3115	01/2016
Loop Antenna	EMCO	6512	01/2016
Horn Antenna (18-26.5 GHz)	Alpha Ind. Inc.	100655A	01/2016
Bilog Antenna	Schaffner	CBL6112B	01/2016
Controller	Deisel	HD100	01/2016
Turn Table	Deisel	MA240	01/2016

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 e>100) expressed in cm.
Antenna horizontal polarisation is indicated by POL=H.
Antenna vertical polarisation is indicated by POL=V.
Accordingly to reference standard, a limit relaxing factor equal to 20 dB for decade for measurements performed at 3 m has been used.
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.

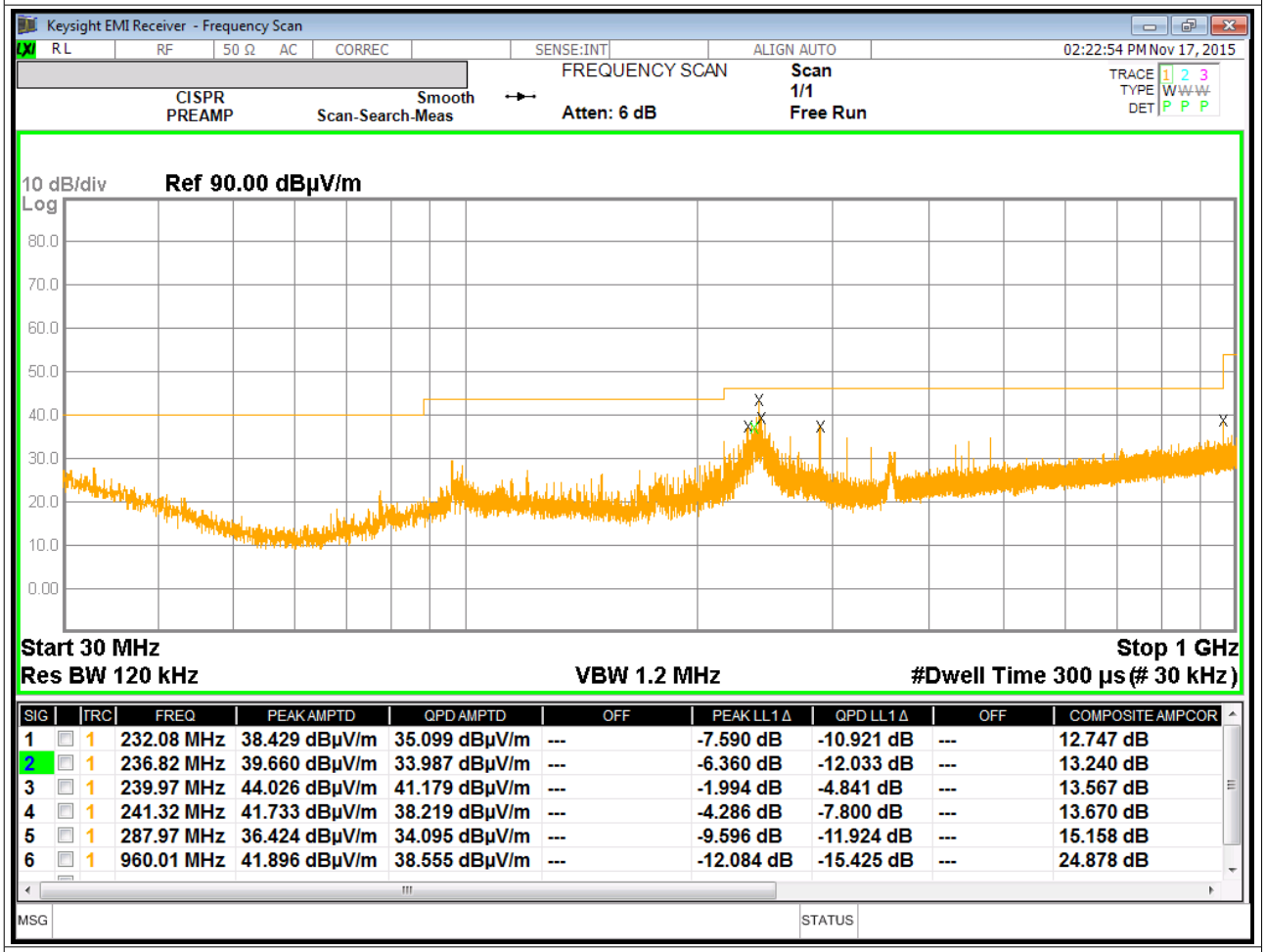


SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	250.02 MHz	34.572 dBµV/m	32.534 dBµV/m	---	-11.448 dB	-13.486 dB	---	14.332 dB
2	1	264.00 MHz	32.821 dBµV/m	30.734 dBµV/m	---	-13.199 dB	-15.286 dB	---	15.272 dB
3	1	504.00 MHz	34.597 dBµV/m	31.953 dBµV/m	---	-11.422 dB	-14.067 dB	---	20.232 dB
4	1	550.00 MHz	33.403 dBµV/m	29.111 dBµV/m	---	-12.616 dB	-16.909 dB	---	21.340 dB
5	1	600.01 MHz	35.177 dBµV/m	31.995 dBµV/m	---	-10.842 dB	-14.024 dB	---	21.520 dB
6	1	657.79 MHz	30.704 dBµV/m	25.613 dBµV/m	---	-15.316 dB	-20.406 dB	---	22.026 dB

Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6

modulation type b max speed (11 Mbps)



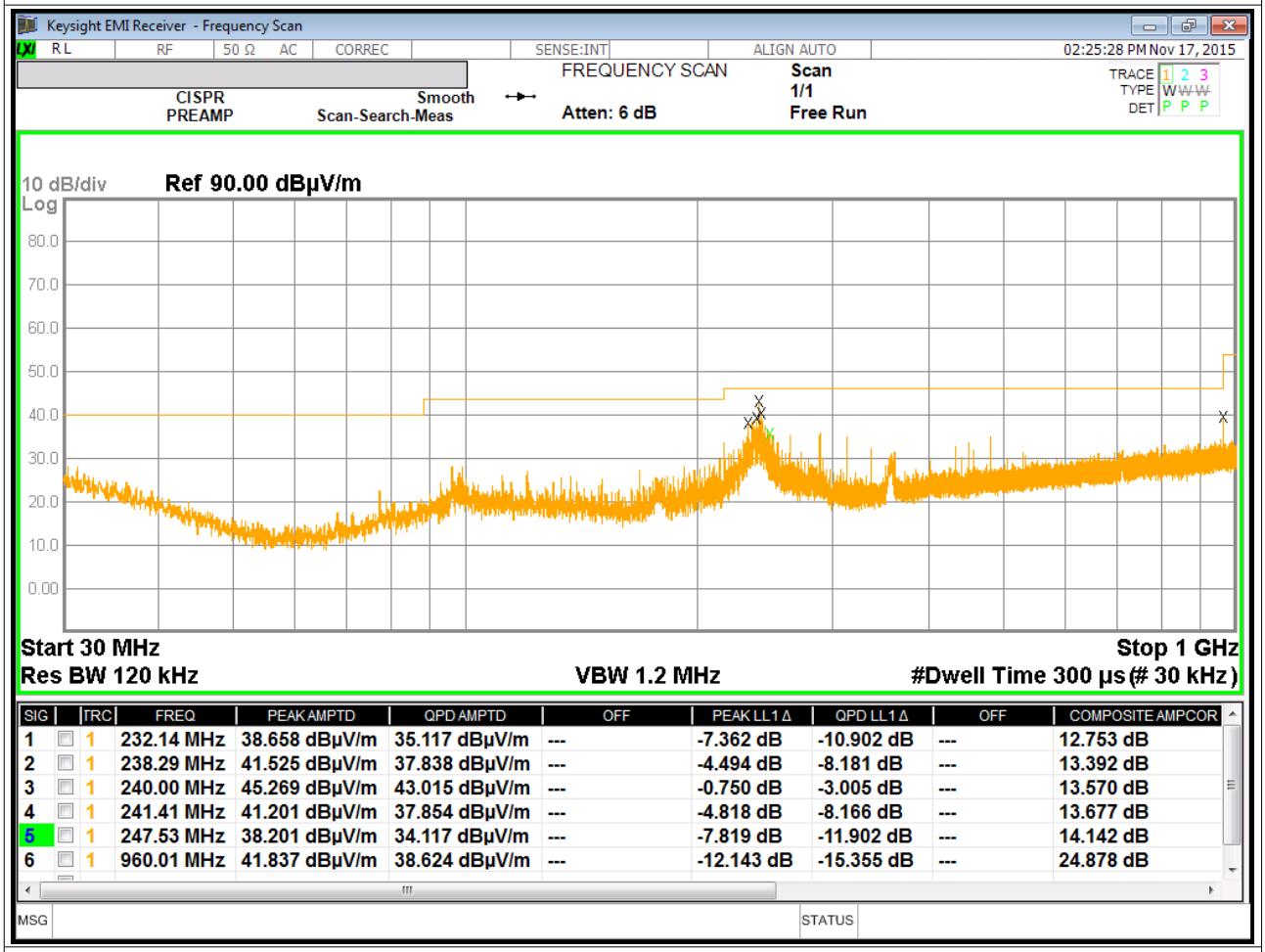
SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	232.08 MHz	38.429 dBµV/m	35.099 dBµV/m	---	-7.590 dB	-10.921 dB	---	12.747 dB
2	1	236.82 MHz	39.660 dBµV/m	33.987 dBµV/m	---	-6.360 dB	-12.033 dB	---	13.240 dB
3	1	239.97 MHz	44.026 dBµV/m	41.179 dBµV/m	---	-1.994 dB	-4.841 dB	---	13.567 dB
4	1	241.32 MHz	41.733 dBµV/m	38.219 dBµV/m	---	-4.286 dB	-7.800 dB	---	13.670 dB
5	1	287.97 MHz	36.424 dBµV/m	34.095 dBµV/m	---	-9.596 dB	-11.924 dB	---	15.158 dB
6	1	960.01 MHz	41.896 dBµV/m	38.555 dBµV/m	---	-12.084 dB	-15.425 dB	---	24.878 dB

MSG

STATUS

Note:

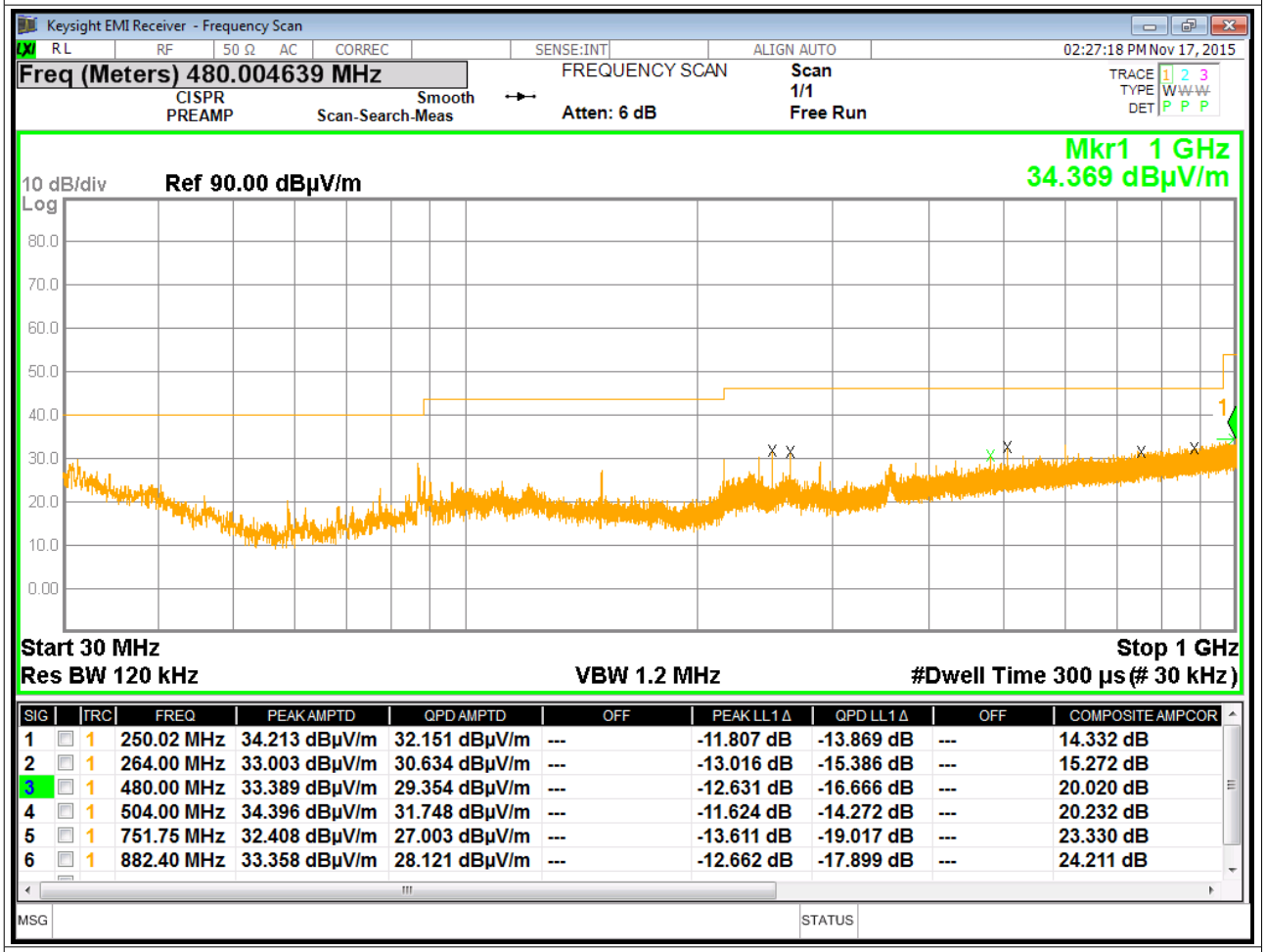
EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type b
max speed (11 Mbps)



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	232.14 MHz	38.658 dBµV/m	35.117 dBµV/m	---	-7.362 dB	-10.902 dB	---	12.753 dB
2	1	238.29 MHz	41.525 dBµV/m	37.838 dBµV/m	---	-4.494 dB	-8.181 dB	---	13.392 dB
3	1	240.00 MHz	45.269 dBµV/m	43.015 dBµV/m	---	-0.750 dB	-3.005 dB	---	13.570 dB
4	1	241.41 MHz	41.201 dBµV/m	37.854 dBµV/m	---	-4.818 dB	-8.166 dB	---	13.677 dB
5	1	247.53 MHz	38.201 dBµV/m	34.117 dBµV/m	---	-7.819 dB	-11.902 dB	---	14.142 dB
6	1	960.01 MHz	41.837 dBµV/m	38.624 dBµV/m	---	-12.143 dB	-15.355 dB	---	24.878 dB

Note:

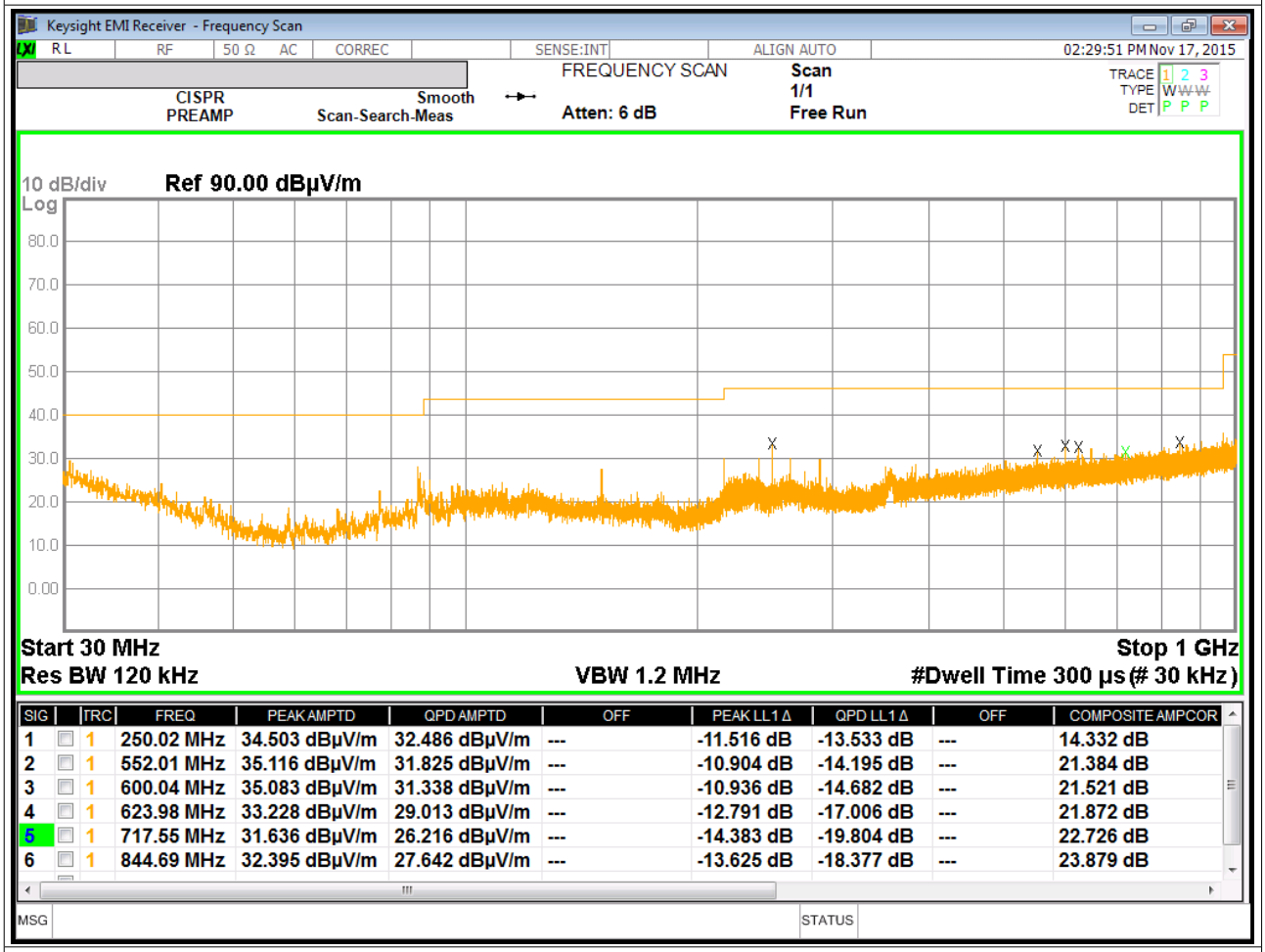
EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type g
max speed (54 Mbps)



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	250.02 MHz	34.213 dBµV/m	32.151 dBµV/m	---	-11.807 dB	-13.869 dB	---	14.332 dB
2	1	264.00 MHz	33.003 dBµV/m	30.634 dBµV/m	---	-13.016 dB	-15.386 dB	---	15.272 dB
3	1	480.00 MHz	33.389 dBµV/m	29.354 dBµV/m	---	-12.631 dB	-16.666 dB	---	20.020 dB
4	1	504.00 MHz	34.396 dBµV/m	31.748 dBµV/m	---	-11.624 dB	-14.272 dB	---	20.232 dB
5	1	751.75 MHz	32.408 dBµV/m	27.003 dBµV/m	---	-13.611 dB	-19.017 dB	---	23.330 dB
6	1	882.40 MHz	33.358 dBµV/m	28.121 dBµV/m	---	-12.662 dB	-17.899 dB	---	24.211 dB

Note:

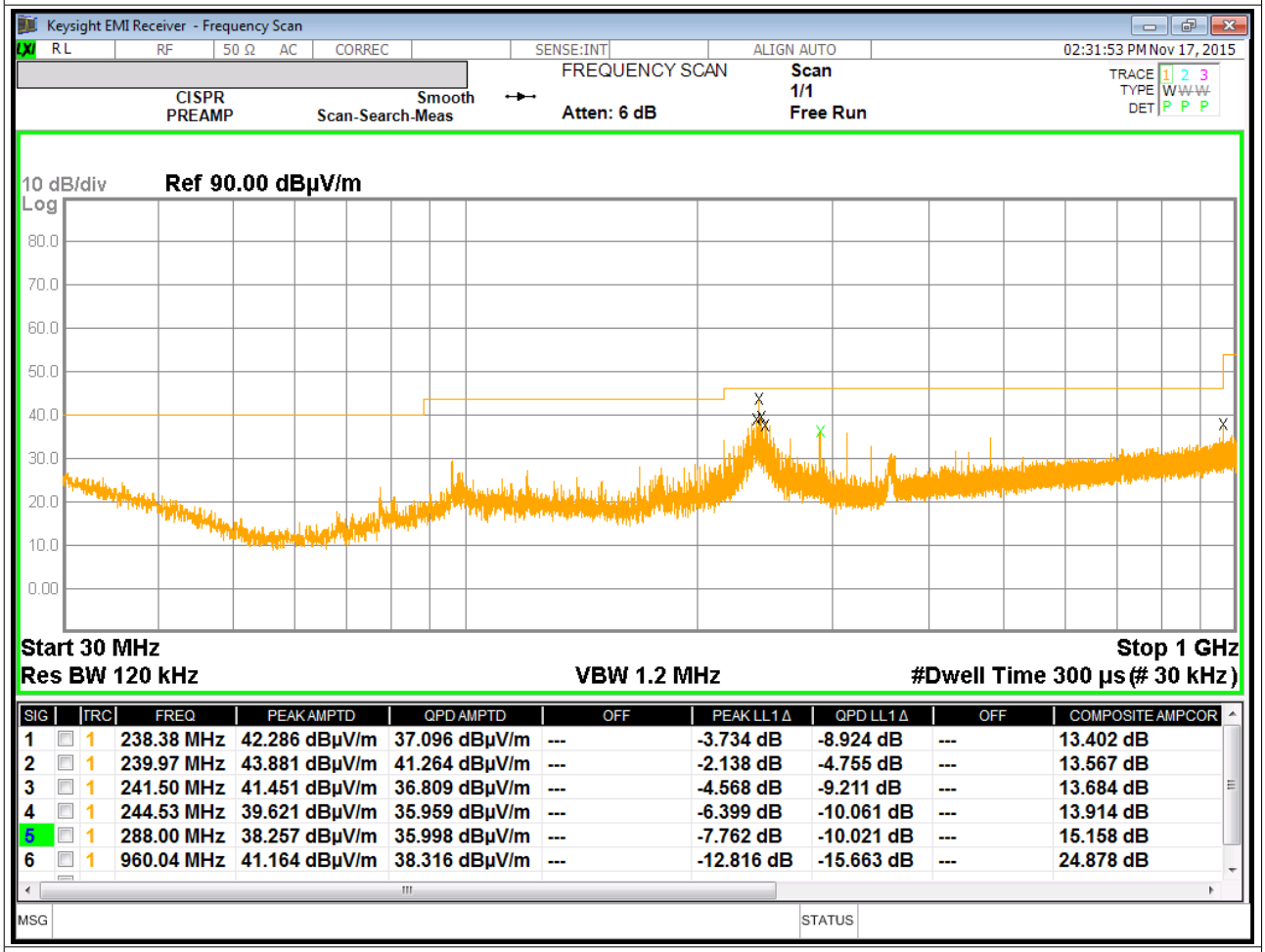
EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type g
max speed (54 Mbps)



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	250.02 MHz	34.503 dBµV/m	32.486 dBµV/m	---	-11.516 dB	-13.533 dB	---	14.332 dB
2	1	552.01 MHz	35.116 dBµV/m	31.825 dBµV/m	---	-10.904 dB	-14.195 dB	---	21.384 dB
3	1	600.04 MHz	35.083 dBµV/m	31.338 dBµV/m	---	-10.936 dB	-14.682 dB	---	21.521 dB
4	1	623.98 MHz	33.228 dBµV/m	29.013 dBµV/m	---	-12.791 dB	-17.006 dB	---	21.872 dB
5	1	717.55 MHz	31.636 dBµV/m	26.216 dBµV/m	---	-14.383 dB	-19.804 dB	---	22.726 dB
6	1	844.69 MHz	32.395 dBµV/m	27.642 dBµV/m	---	-13.625 dB	-18.377 dB	---	23.879 dB

Note:

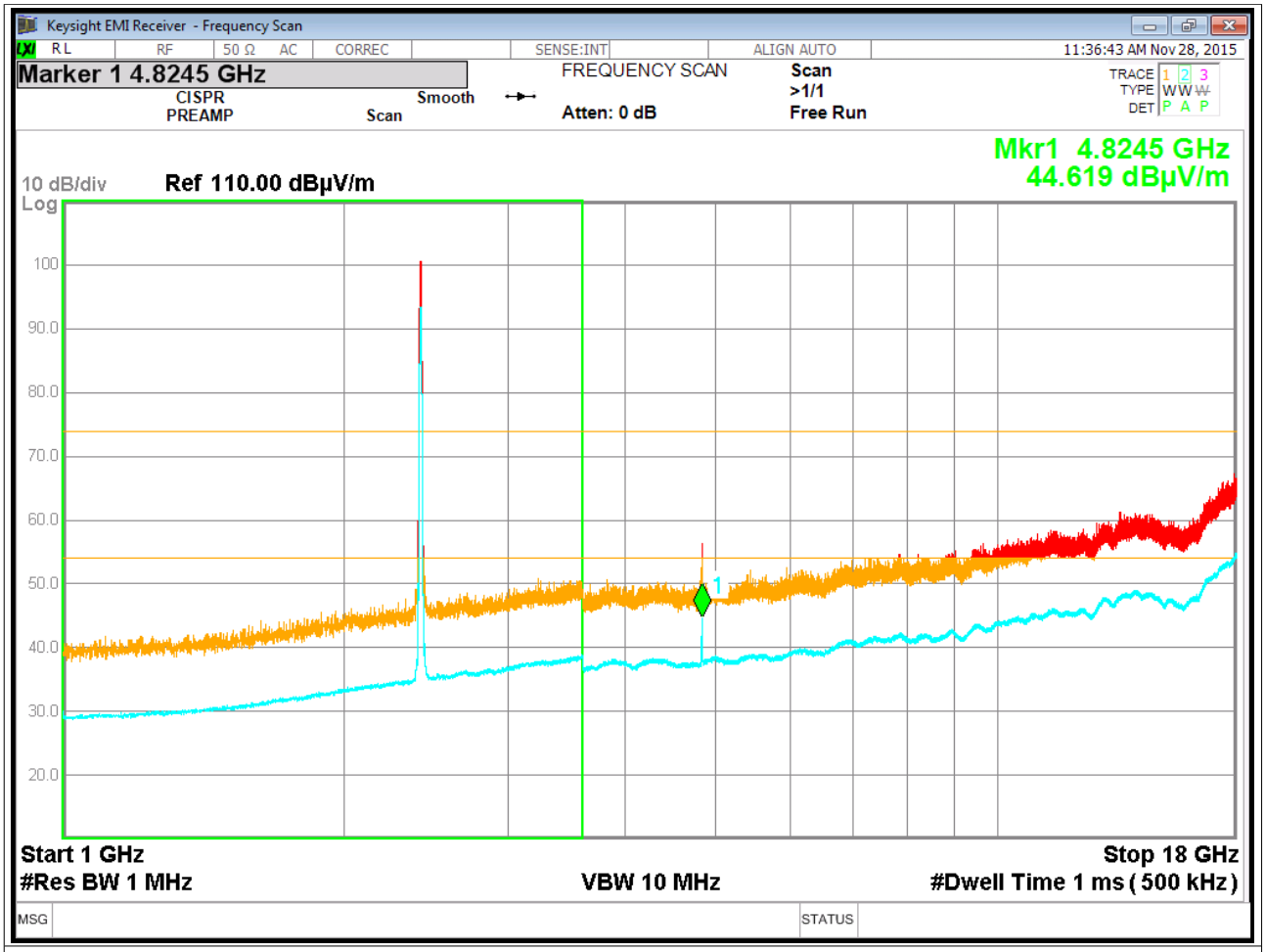
EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type n
max speed (65 Mbps)



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	238.38 MHz	42.286 dBµV/m	37.096 dBµV/m	---	-3.734 dB	-8.924 dB	---	13.402 dB
2	1	239.97 MHz	43.881 dBµV/m	41.264 dBµV/m	---	-2.138 dB	-4.755 dB	---	13.567 dB
3	1	241.50 MHz	41.451 dBµV/m	36.809 dBµV/m	---	-4.568 dB	-9.211 dB	---	13.684 dB
4	1	244.53 MHz	39.621 dBµV/m	35.959 dBµV/m	---	-6.399 dB	-10.061 dB	---	13.914 dB
5	1	288.00 MHz	38.257 dBµV/m	35.998 dBµV/m	---	-7.762 dB	-10.021 dB	---	15.158 dB
6	1	960.04 MHz	41.164 dBµV/m	38.316 dBµV/m	---	-12.816 dB	-15.663 dB	---	24.878 dB

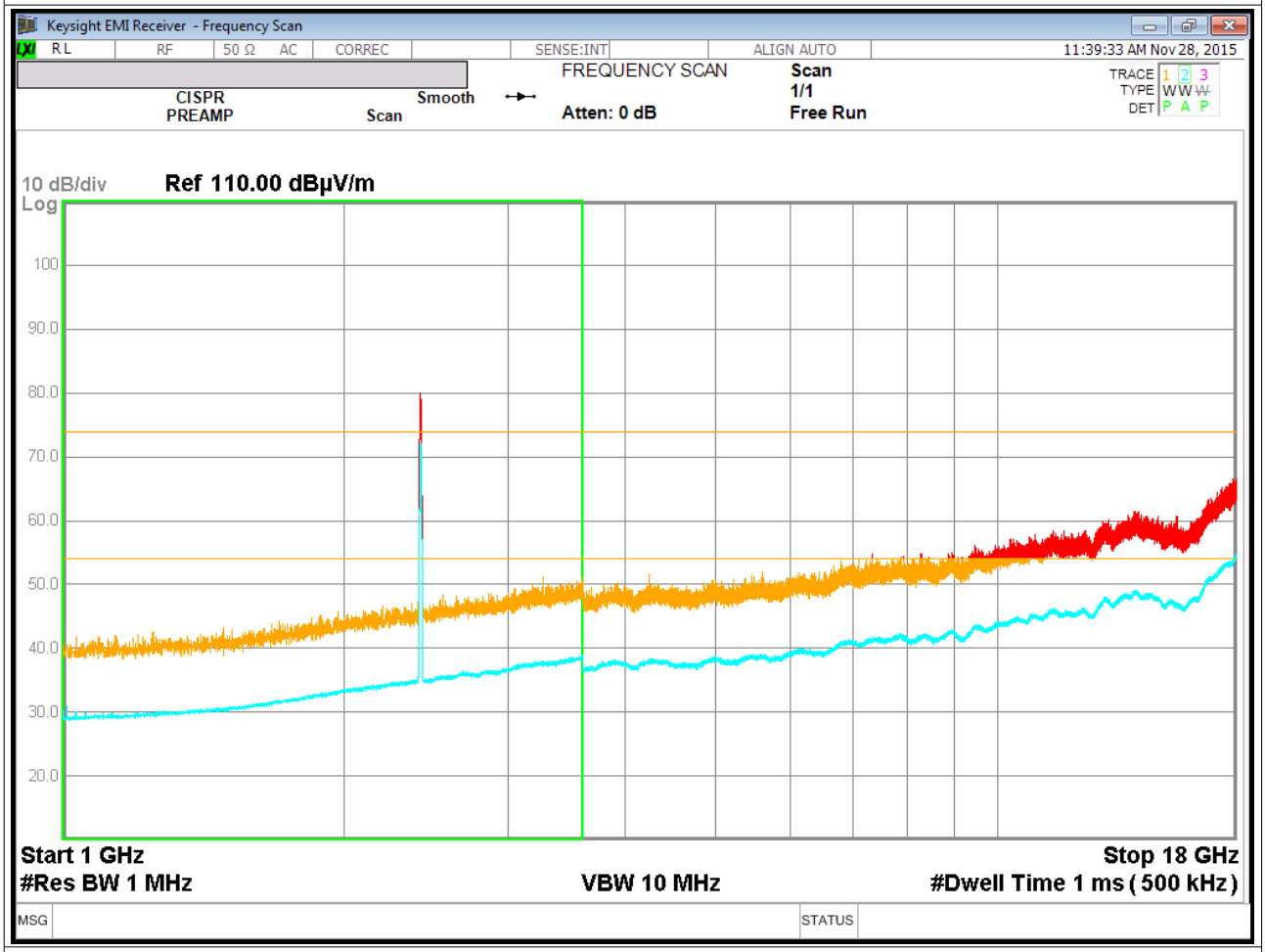
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type n
max speed (65 Mbps)



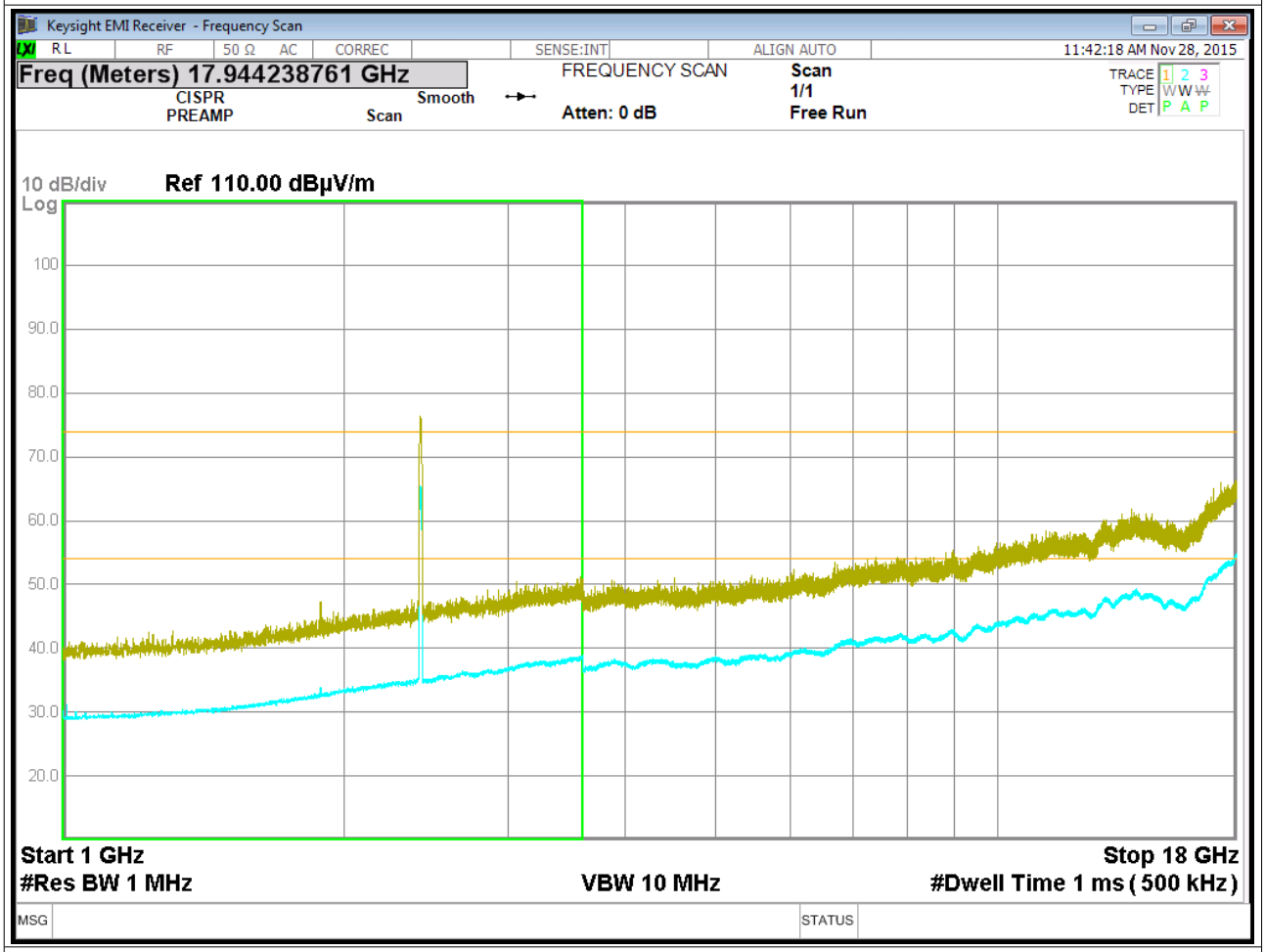
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 1
modulation type b
max speed (11 Mbps)
AVG 4.8 GHz= 44.6 dBuV
PK 4.8 GHz= 56.272 dBuV



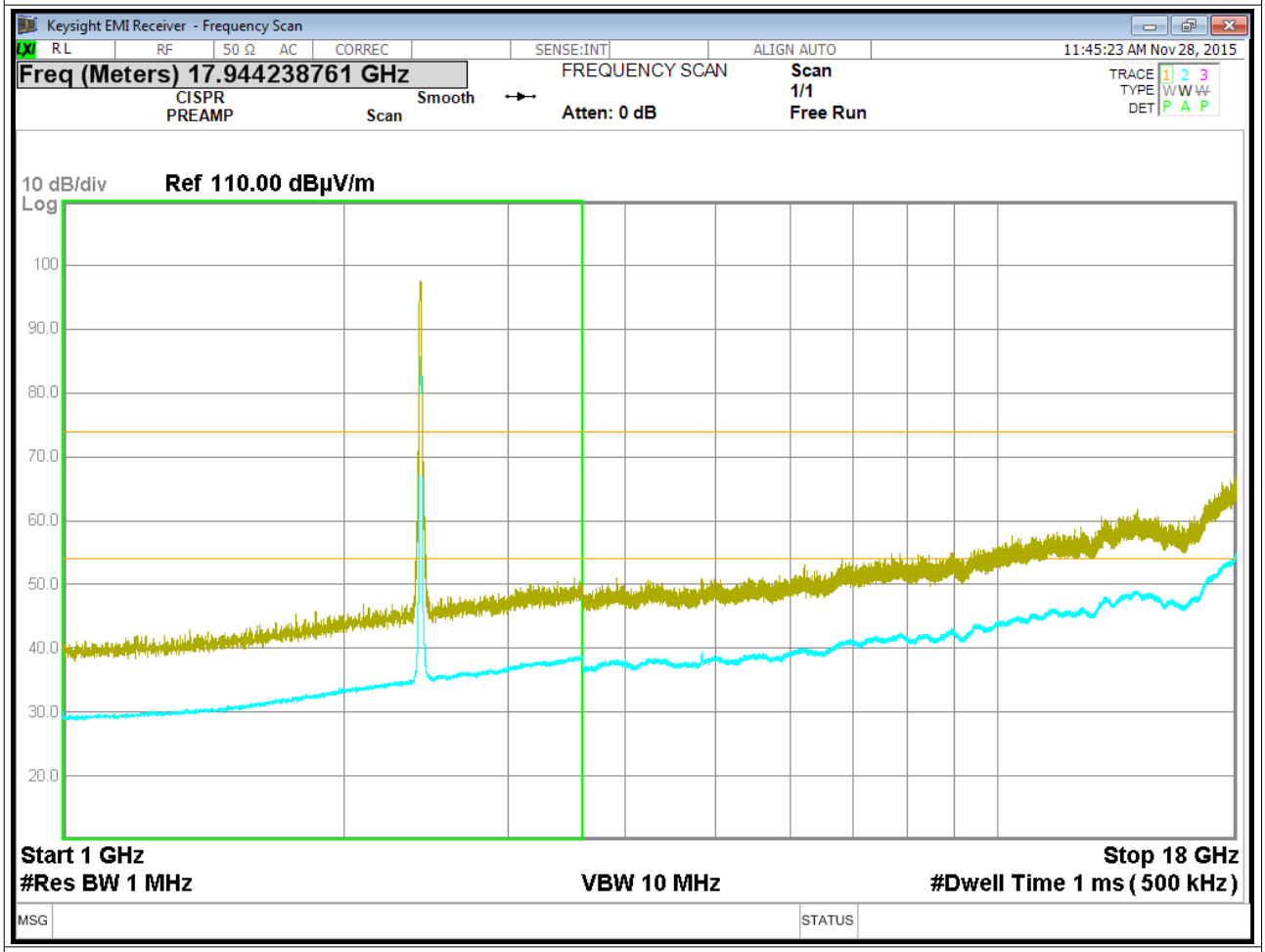
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 1
modulation type b
max speed (11 Mbps)



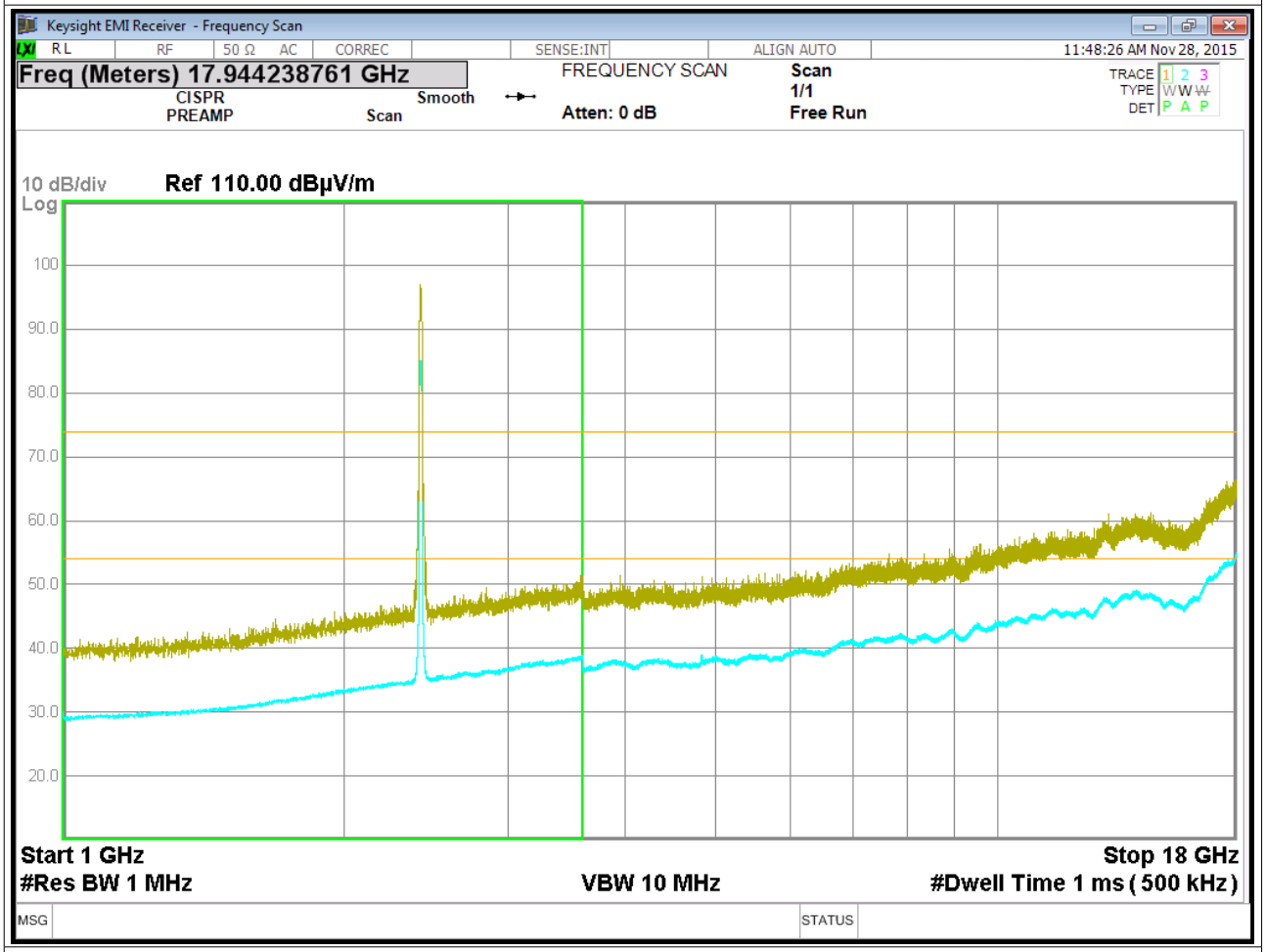
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 1
modulation type g
max speed (54 Mbps)



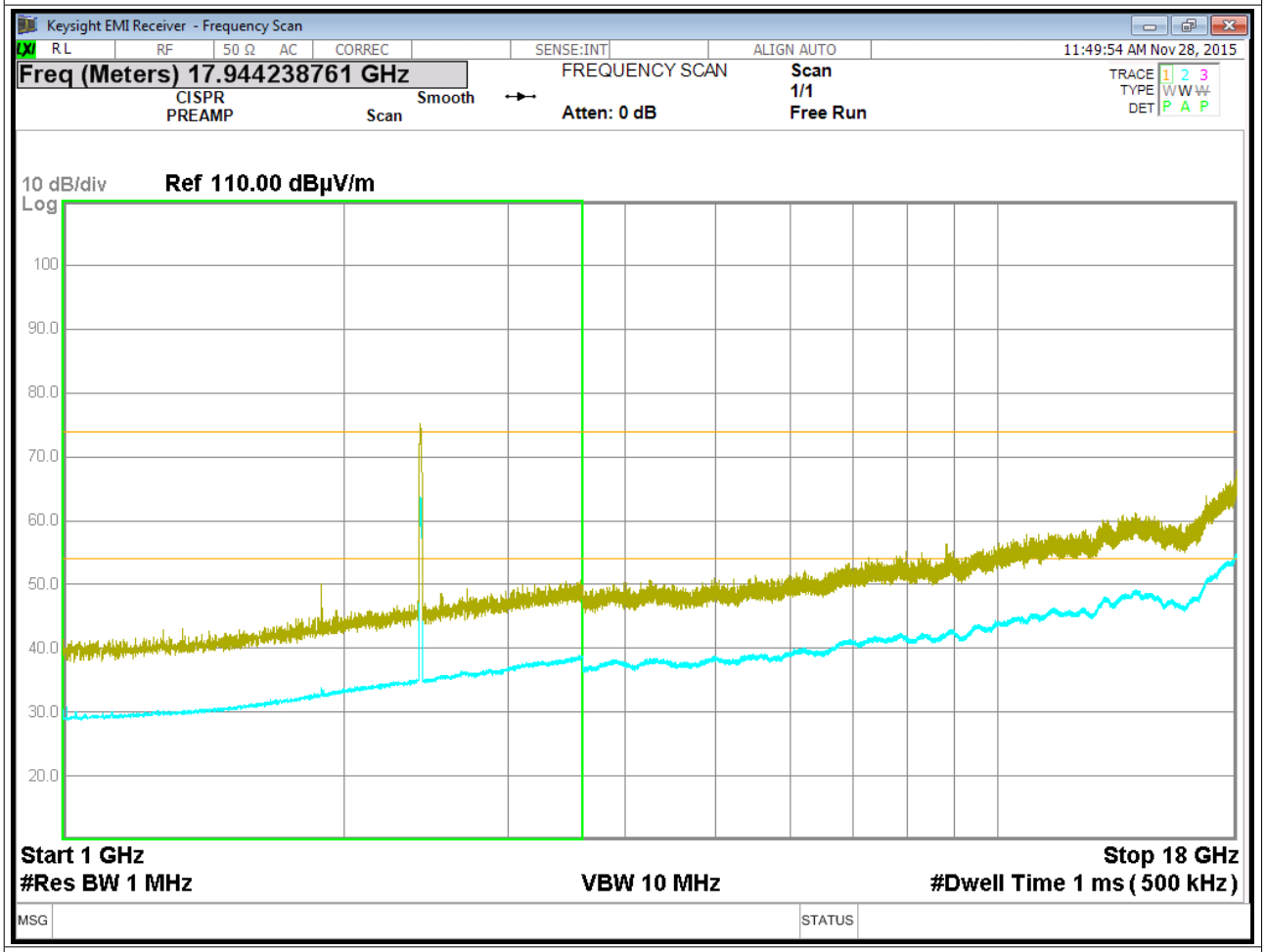
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 1
modulation type g
max speed (54 Mbps)



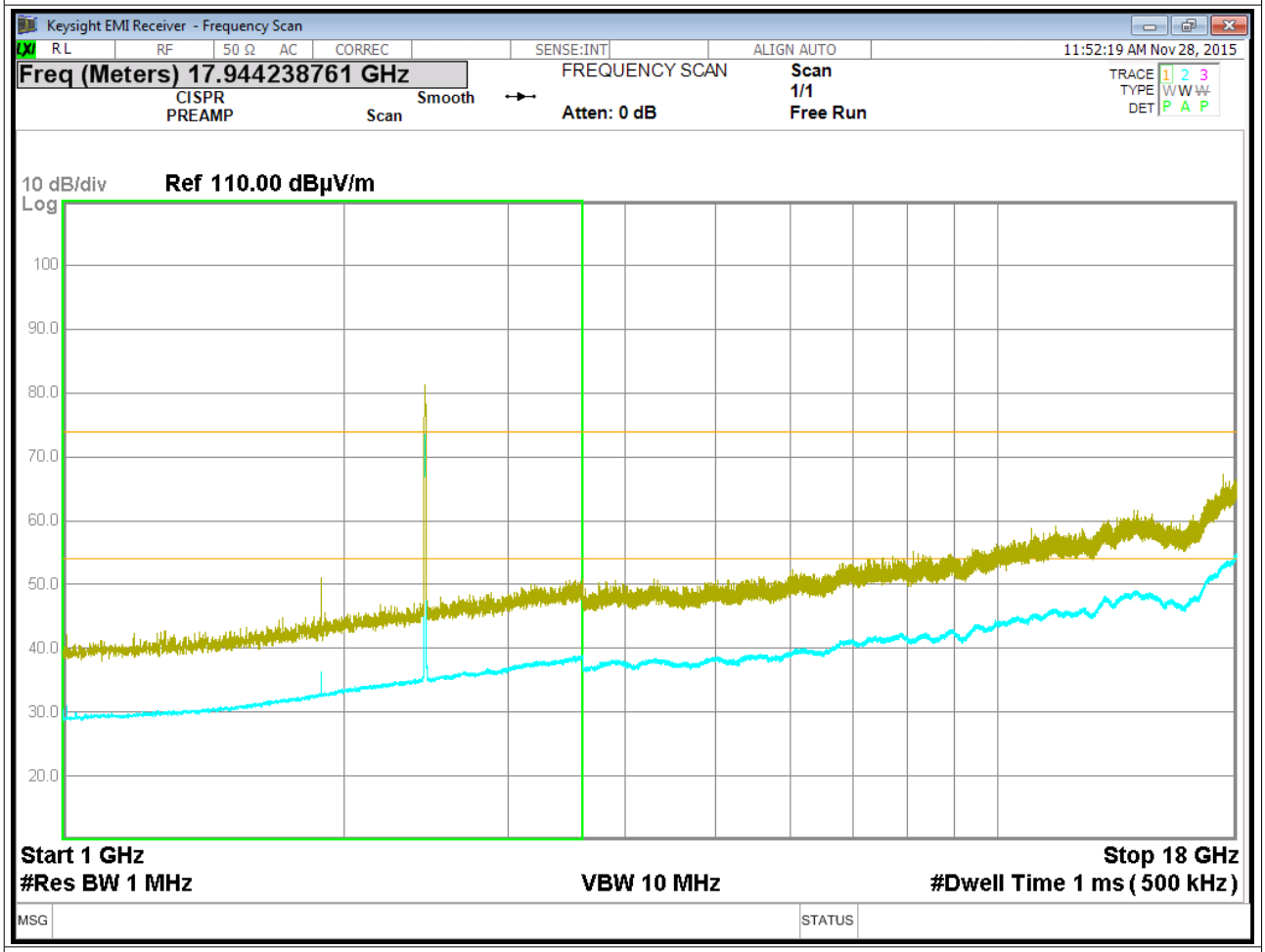
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 1
modulation type n
max speed (65 Mbps)



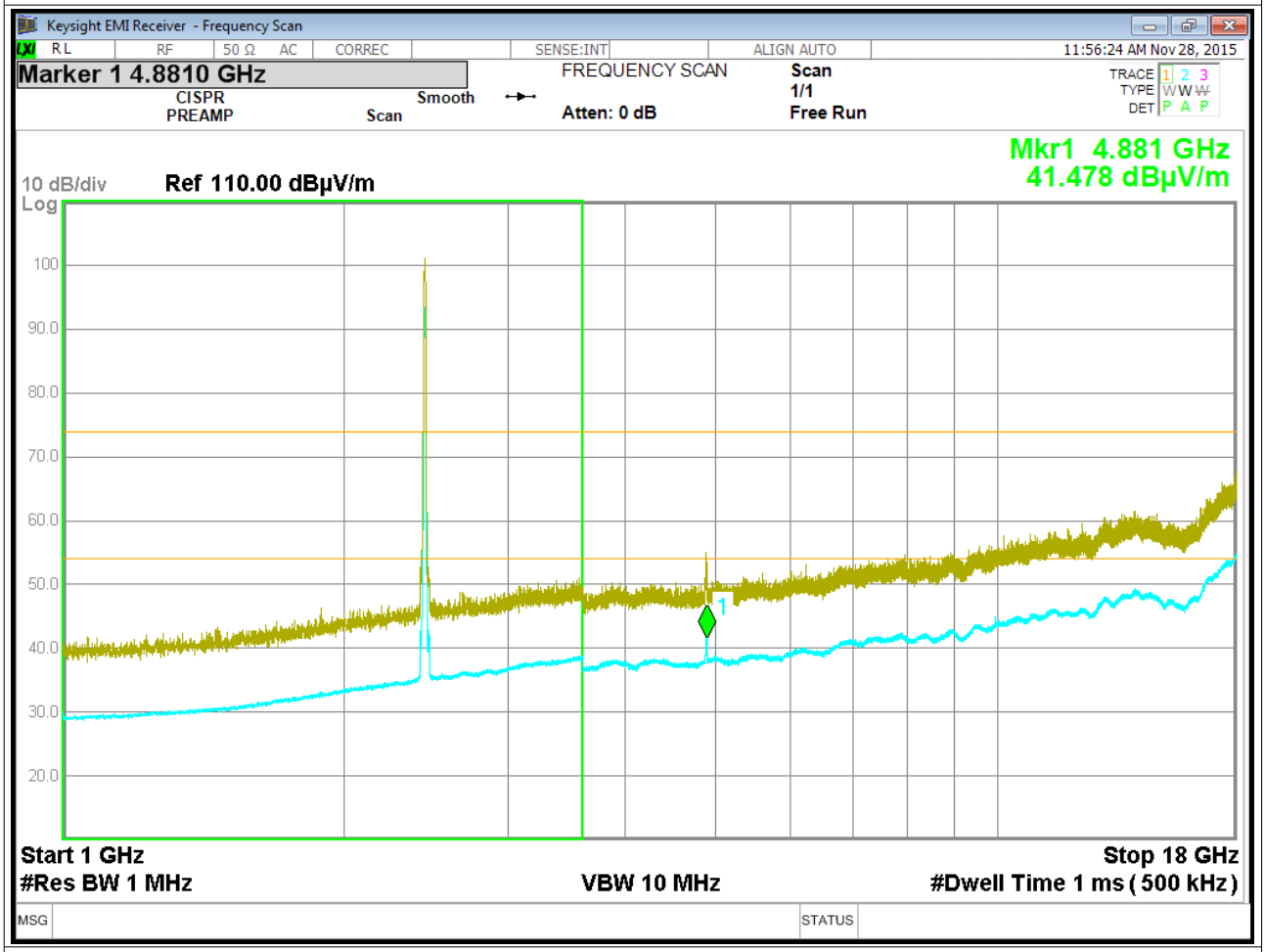
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 1
modulation type n
max speed (65 Mbps)



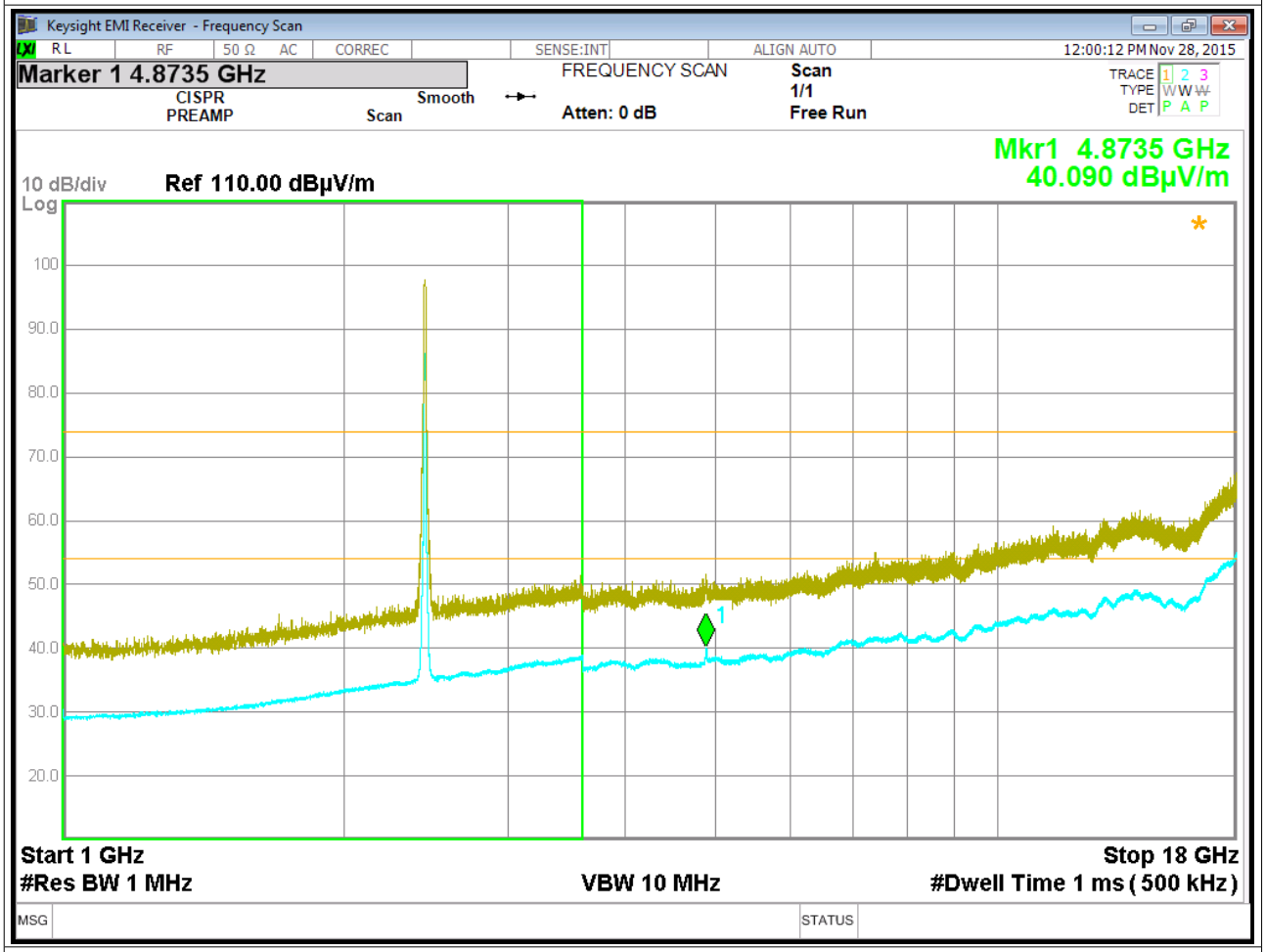
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type b
max speed (11 Mbps)



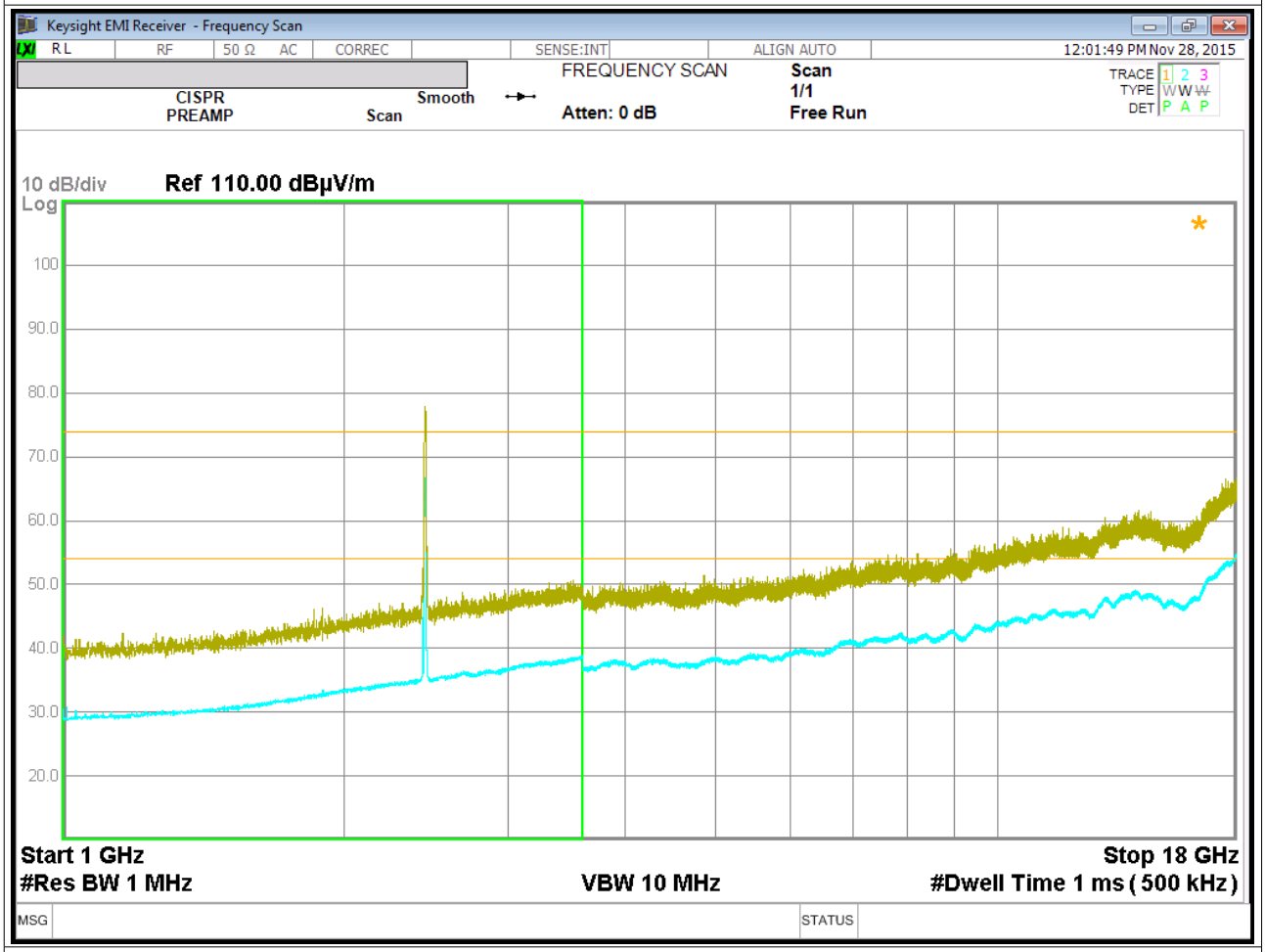
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type b
max speed (11 Mbps)
AVG 4.8 GHz= 43.03 dBuV
PK 4.8 GHz= 55.046 dBuV



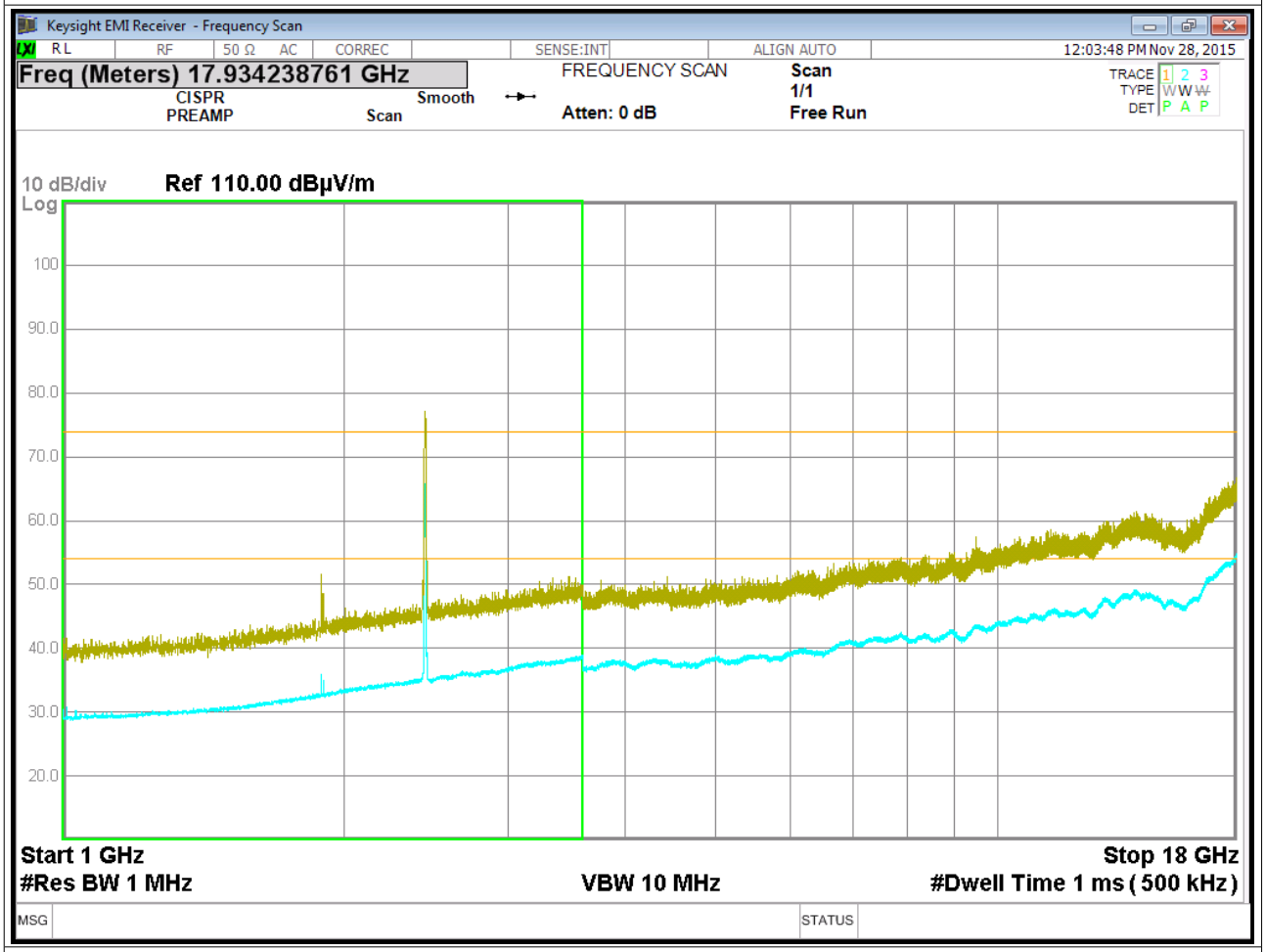
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type g
max speed (54 Mbps)
AVG 4.8 GHz= 40.09 dBuV
PK 4.8 GHz= at ambient noise level



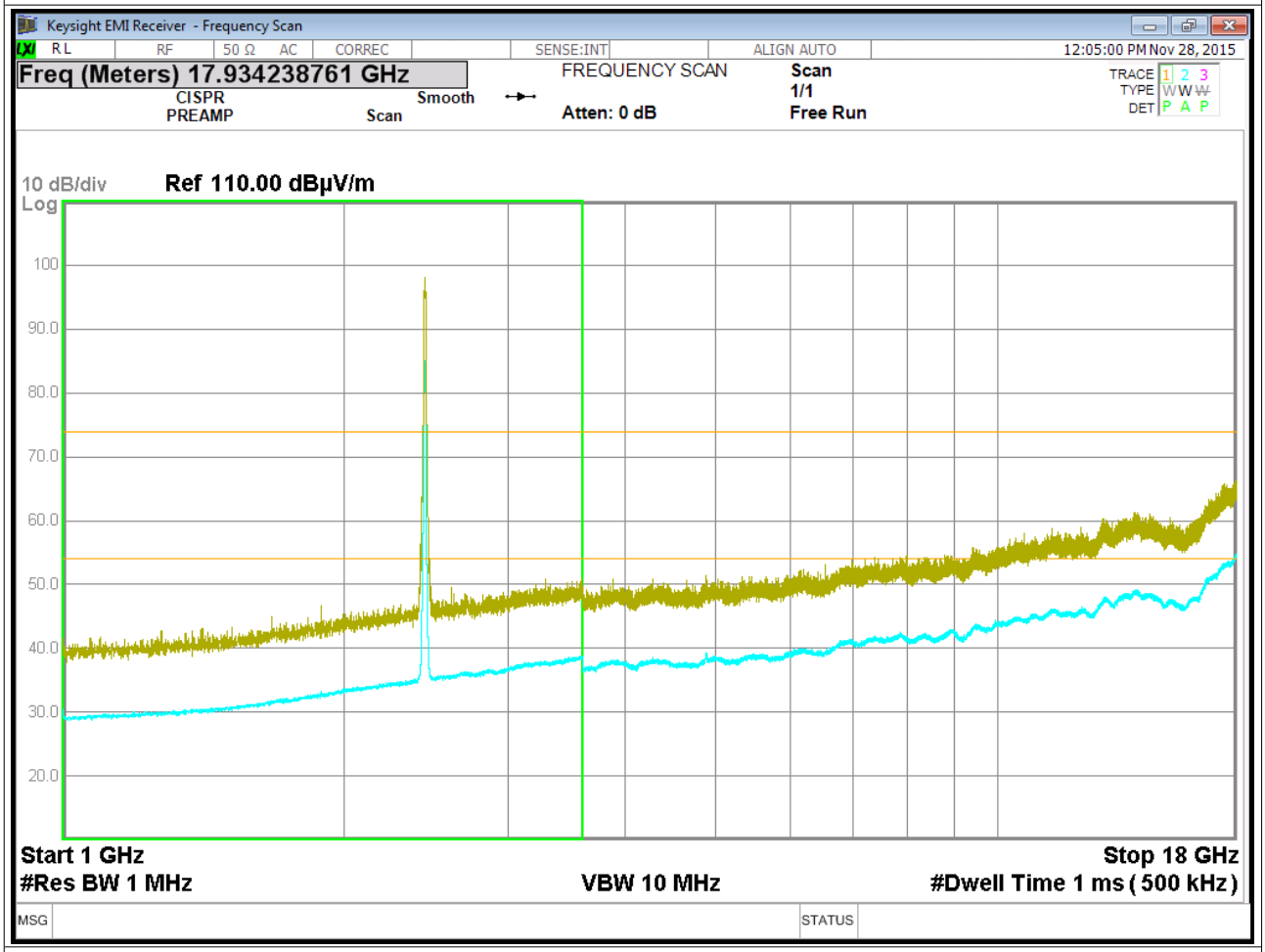
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type g
max speed (54 Mbps)
AVG 4.8 GHz= 40.09 dBuV
PK 4.8 GHz= at ambient noise level



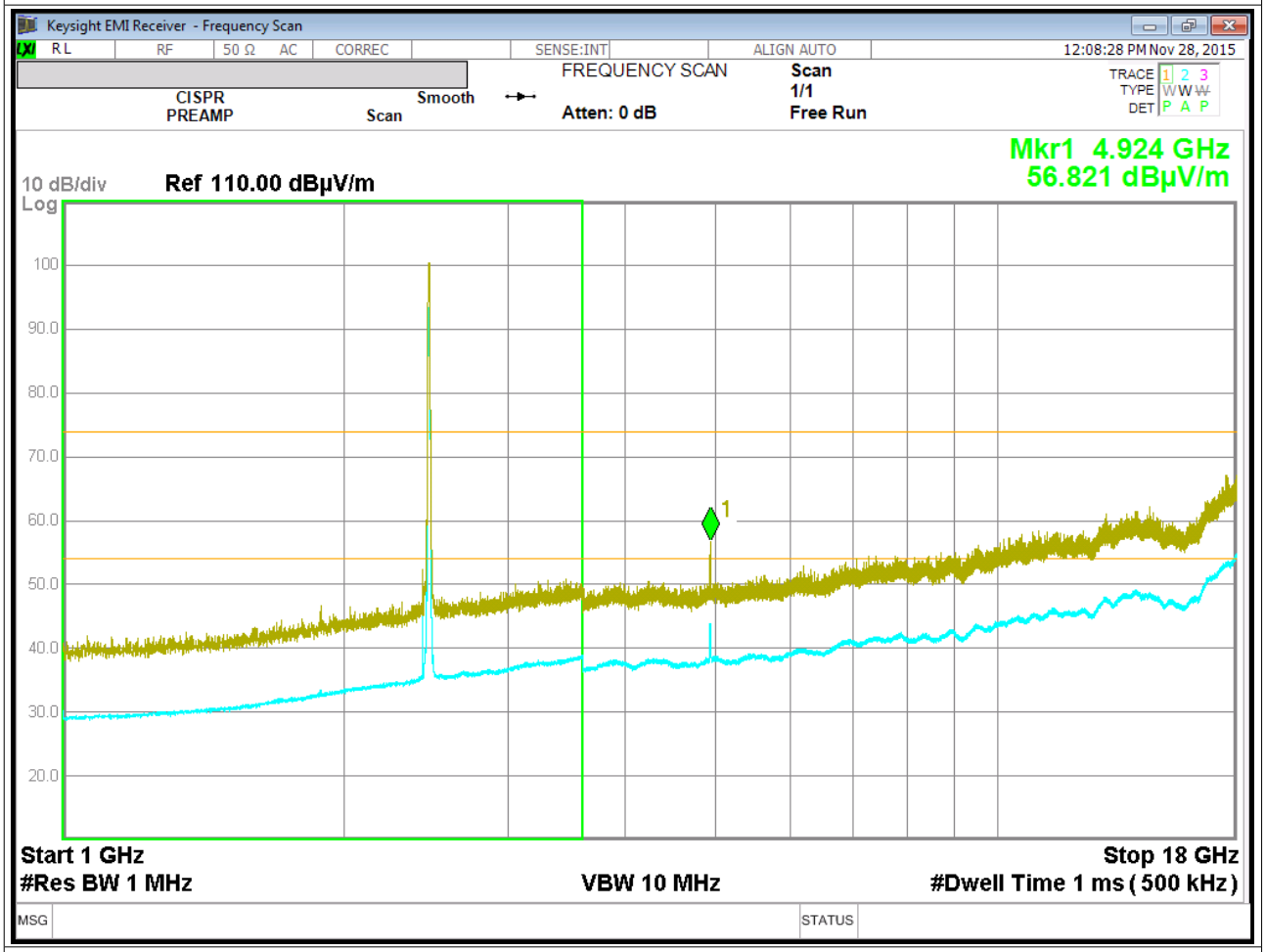
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type n
max speed (65 Mbps)



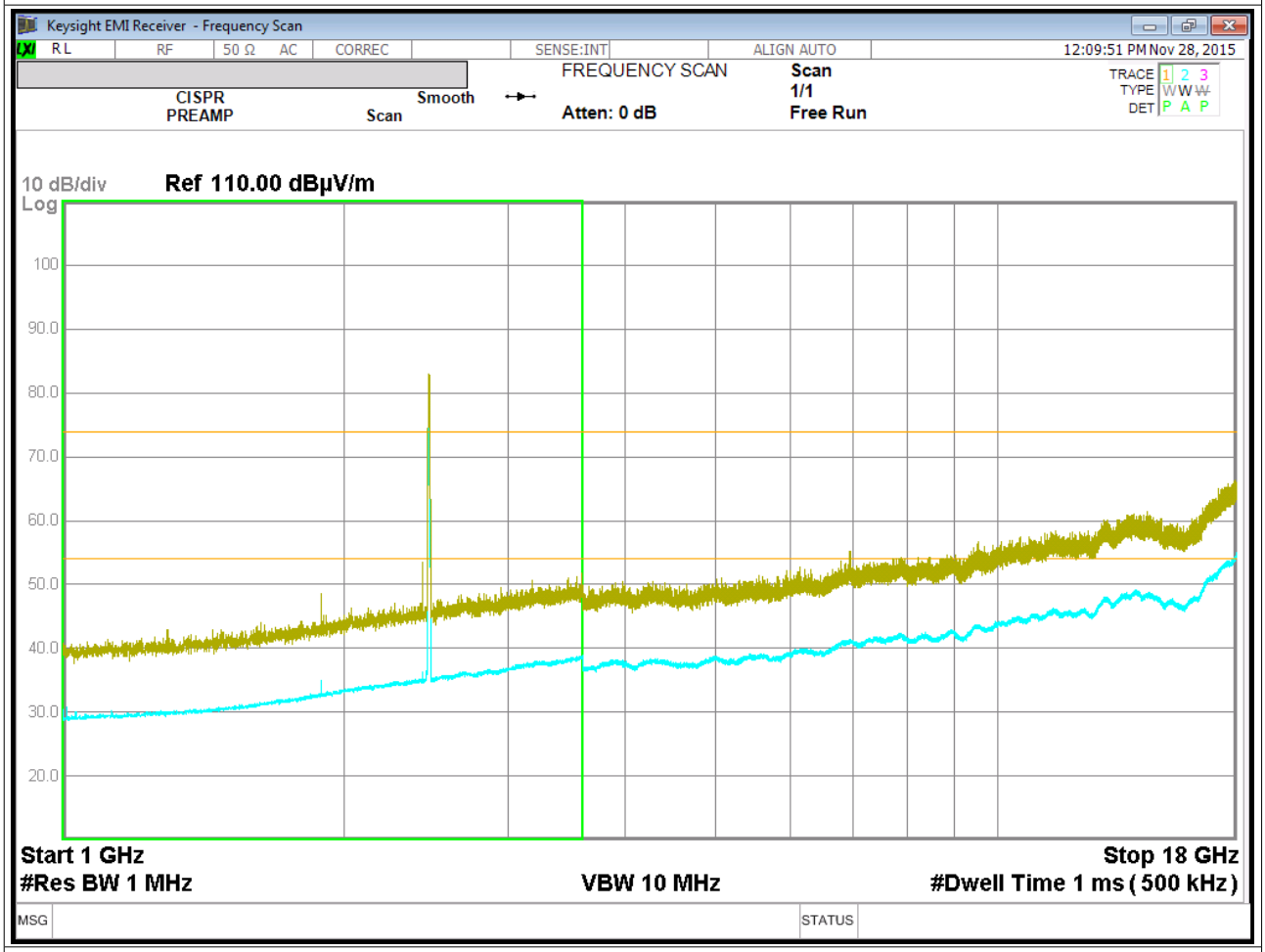
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 6
modulation type n
max speed (65 Mbps)



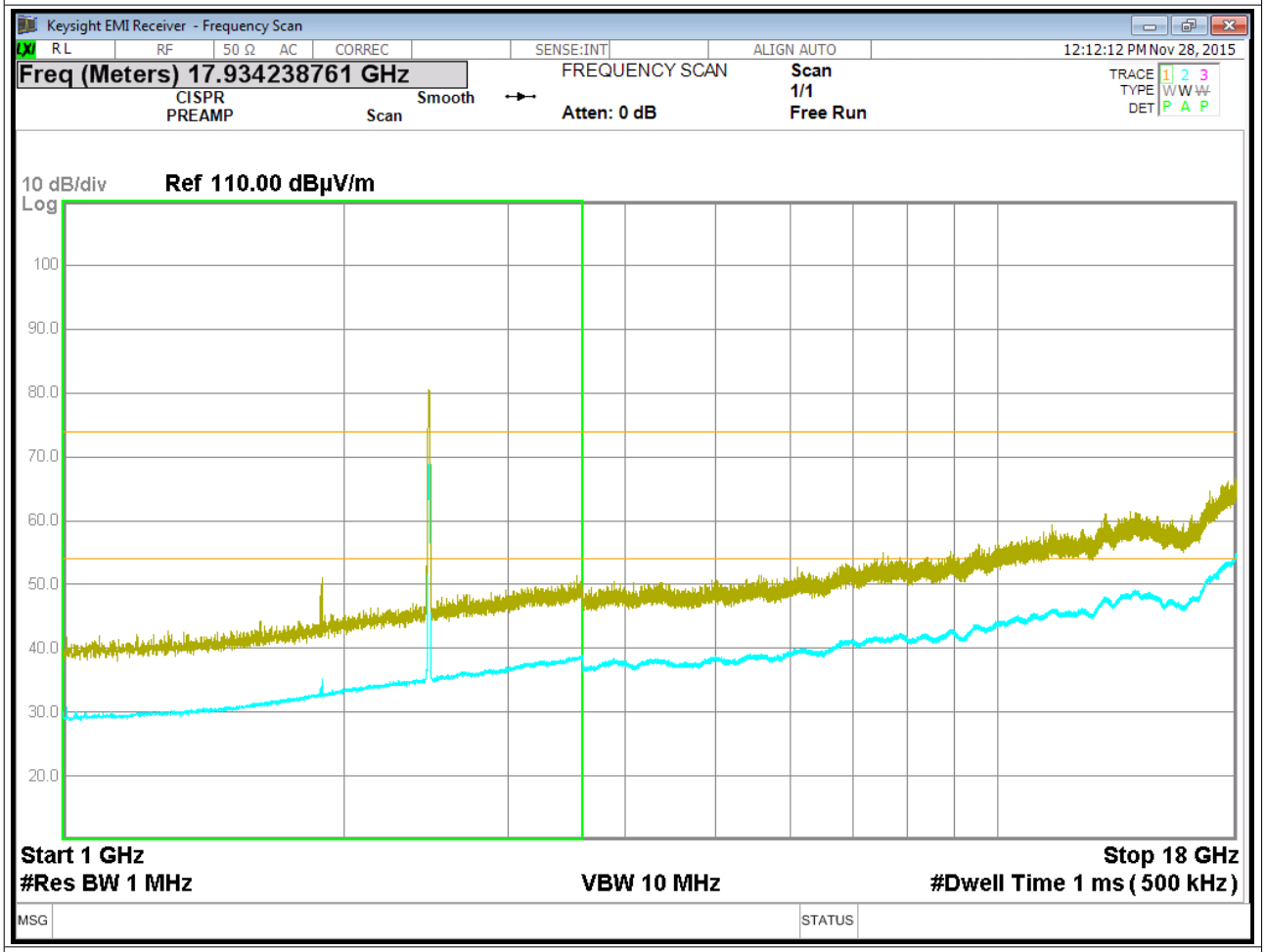
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 11
modulation type b
max speed (11 Mbps)
AVG 4.8 GHz= 42.42 dBuV
PK 4.8 GHz= 56.821 dBuV



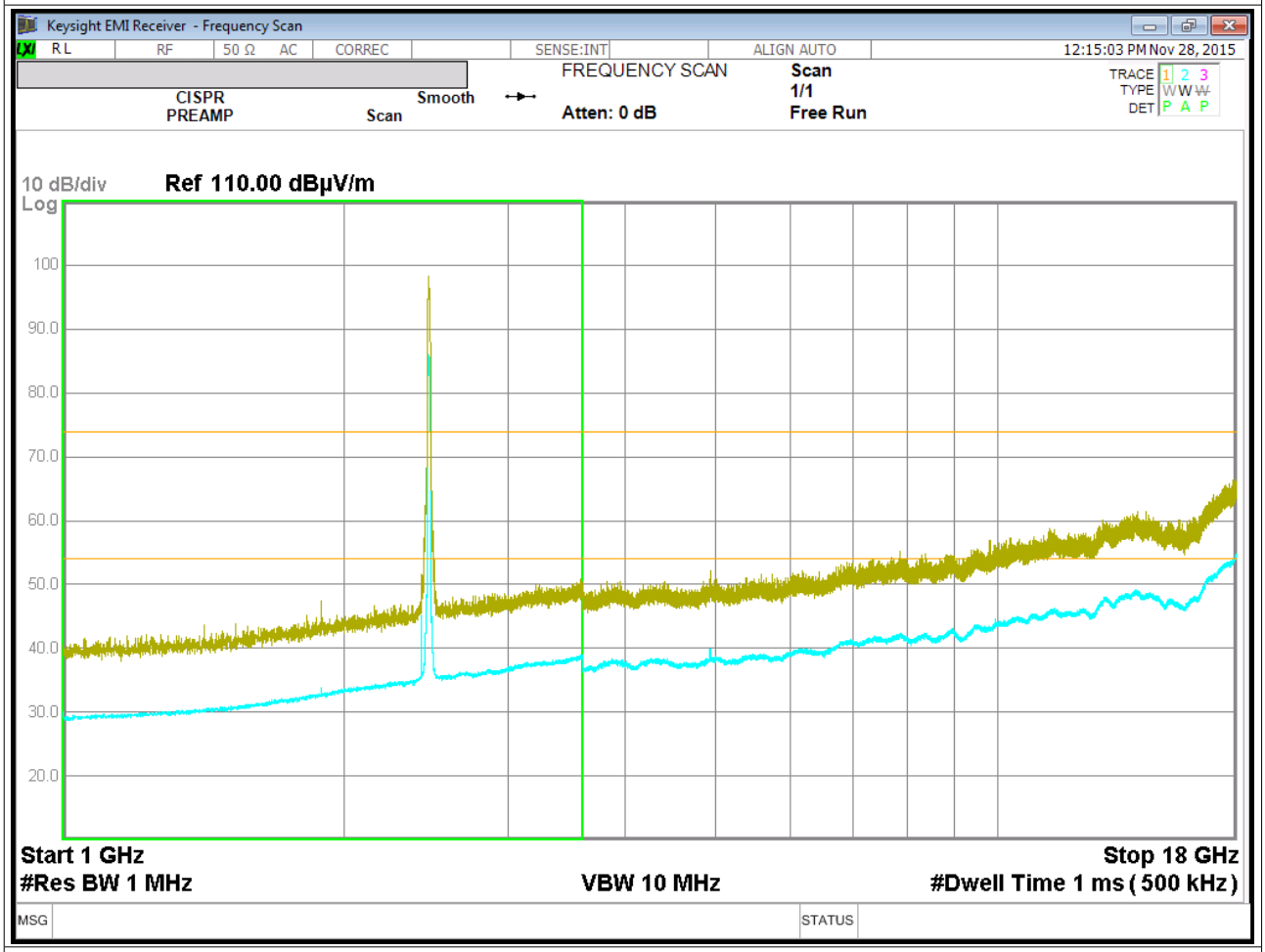
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 11
modulation type b
max speed (11 Mbps)



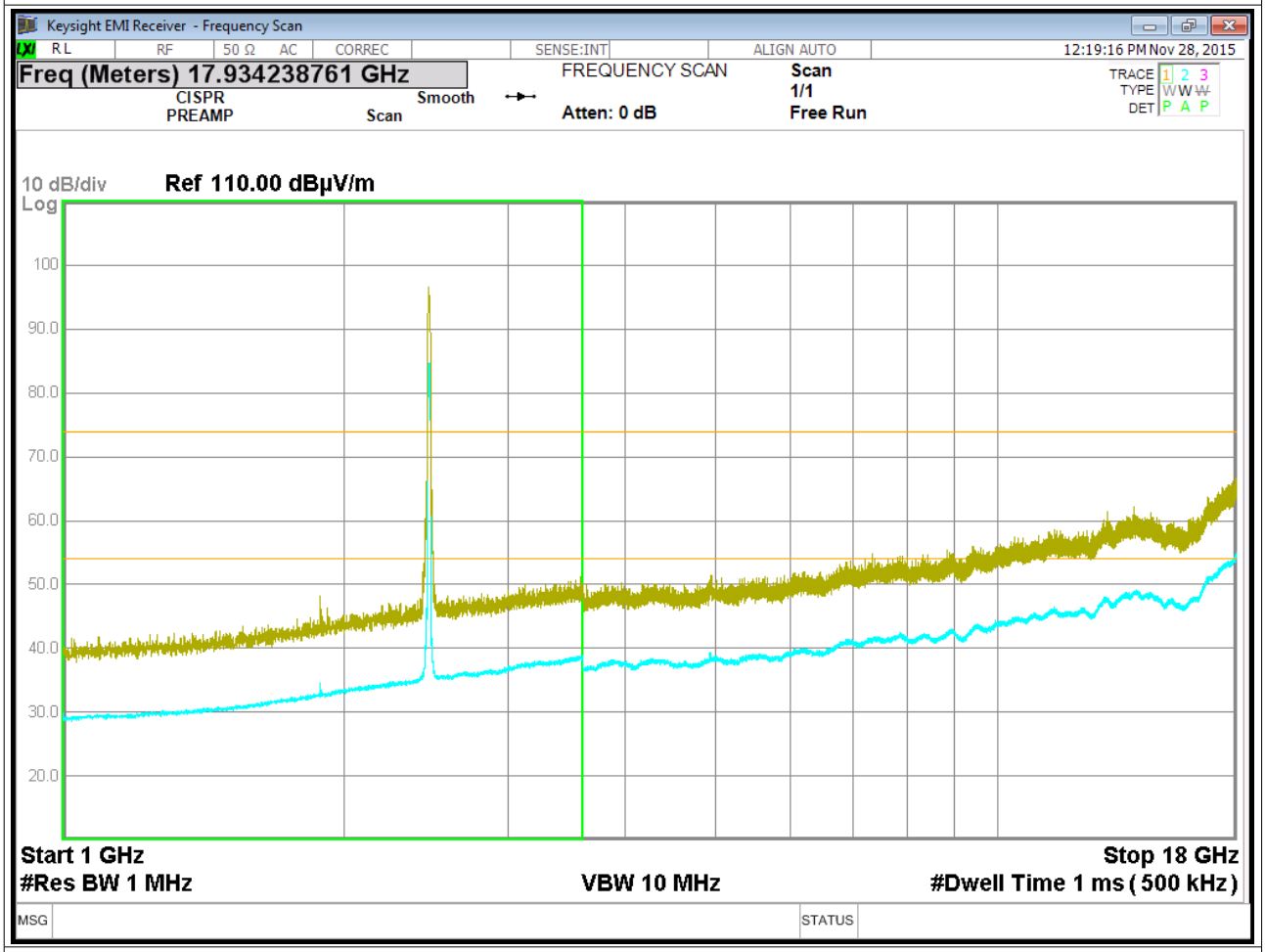
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 11
modulation type g
max speed (54 Mbps)



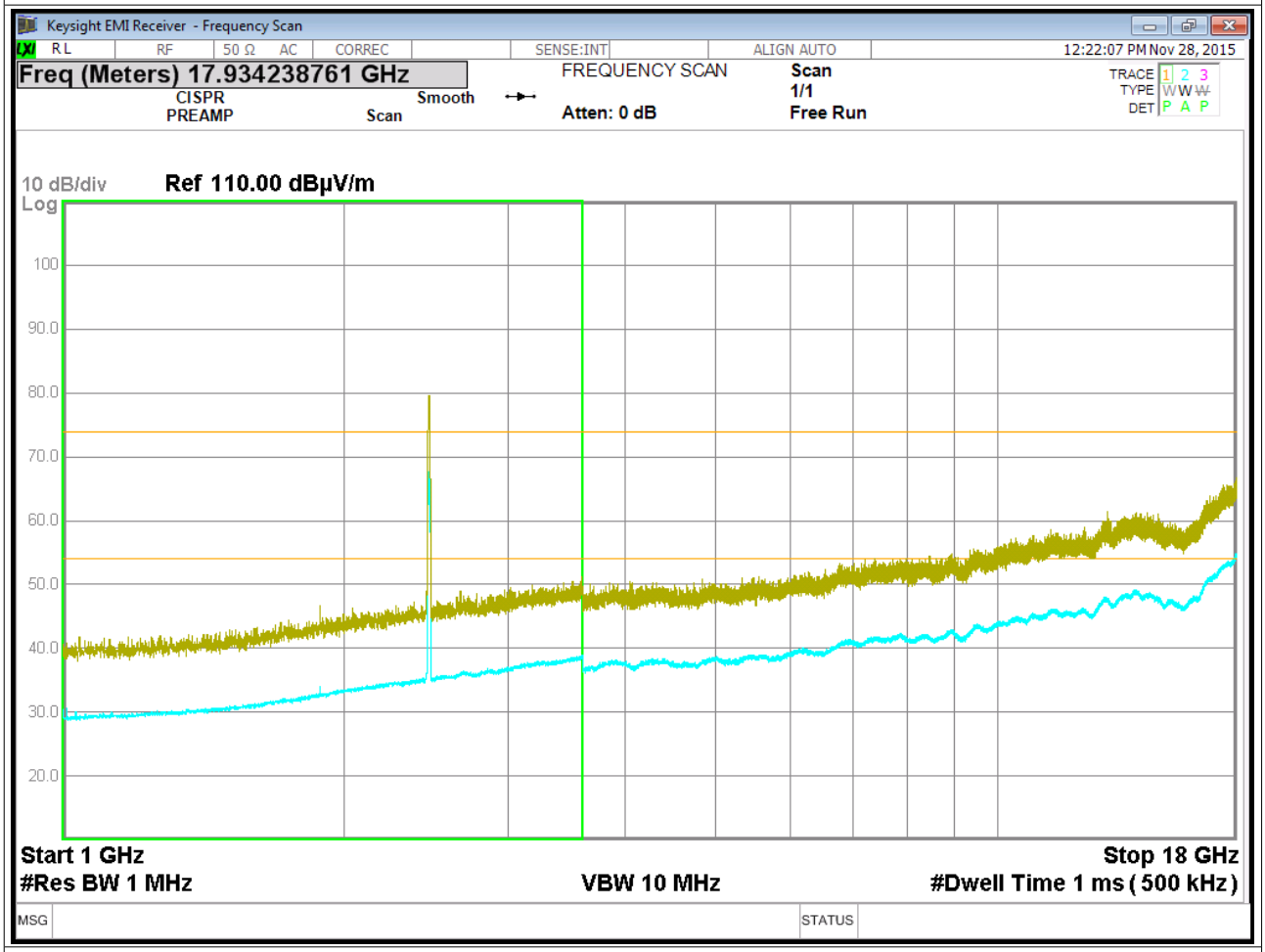
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 11
modulation type g
max speed (54 Mbps)
AVG 4.8 GHz= 39.28 dBuV
PK 4.8 GHz= 51.15 dBuV



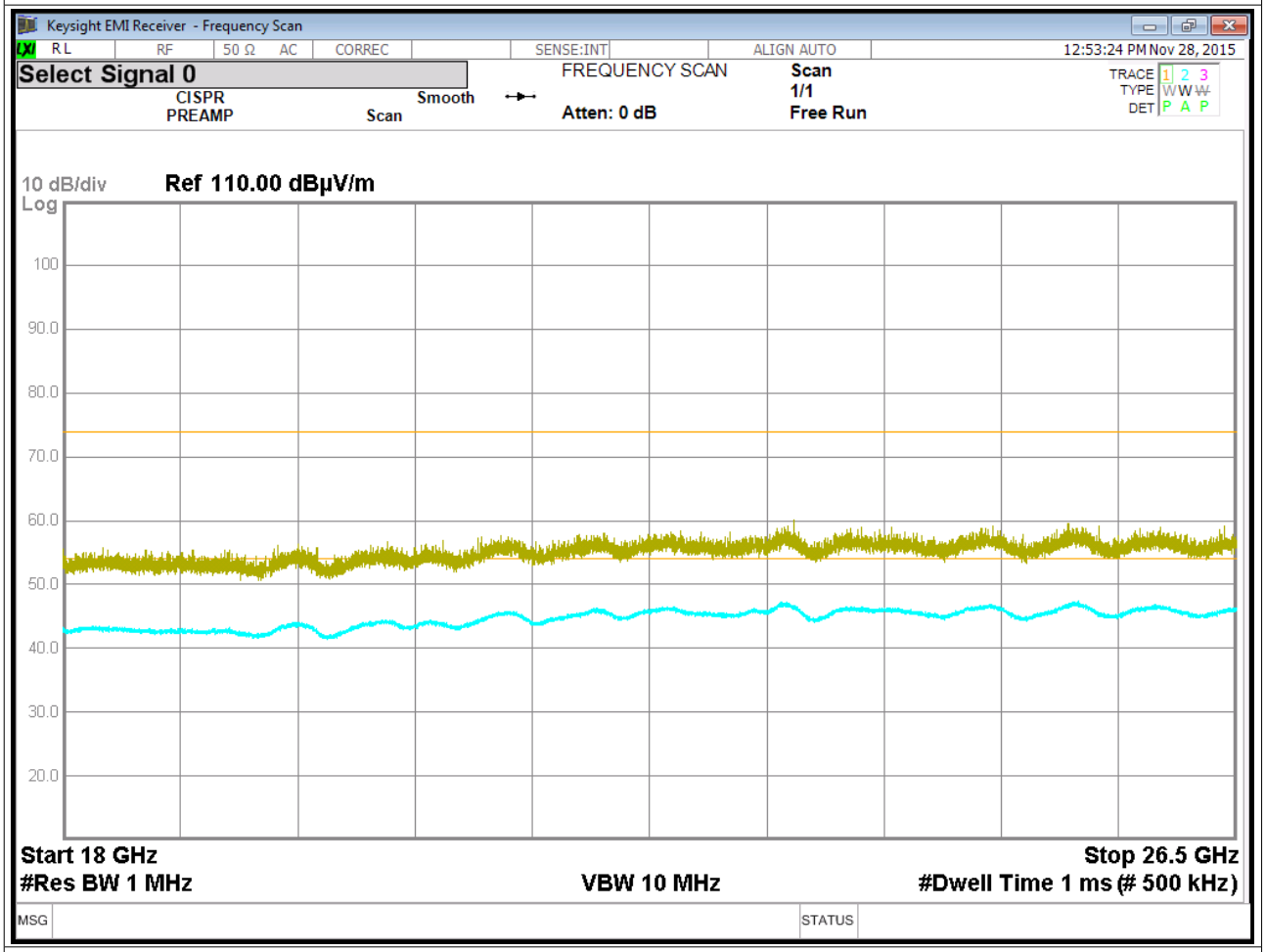
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 11
modulation type n
max speed (65 Mbps)
AVG 4.8 GHz= 39.178 dBuV
PK 4.8 GHz= 49.55 dBuV



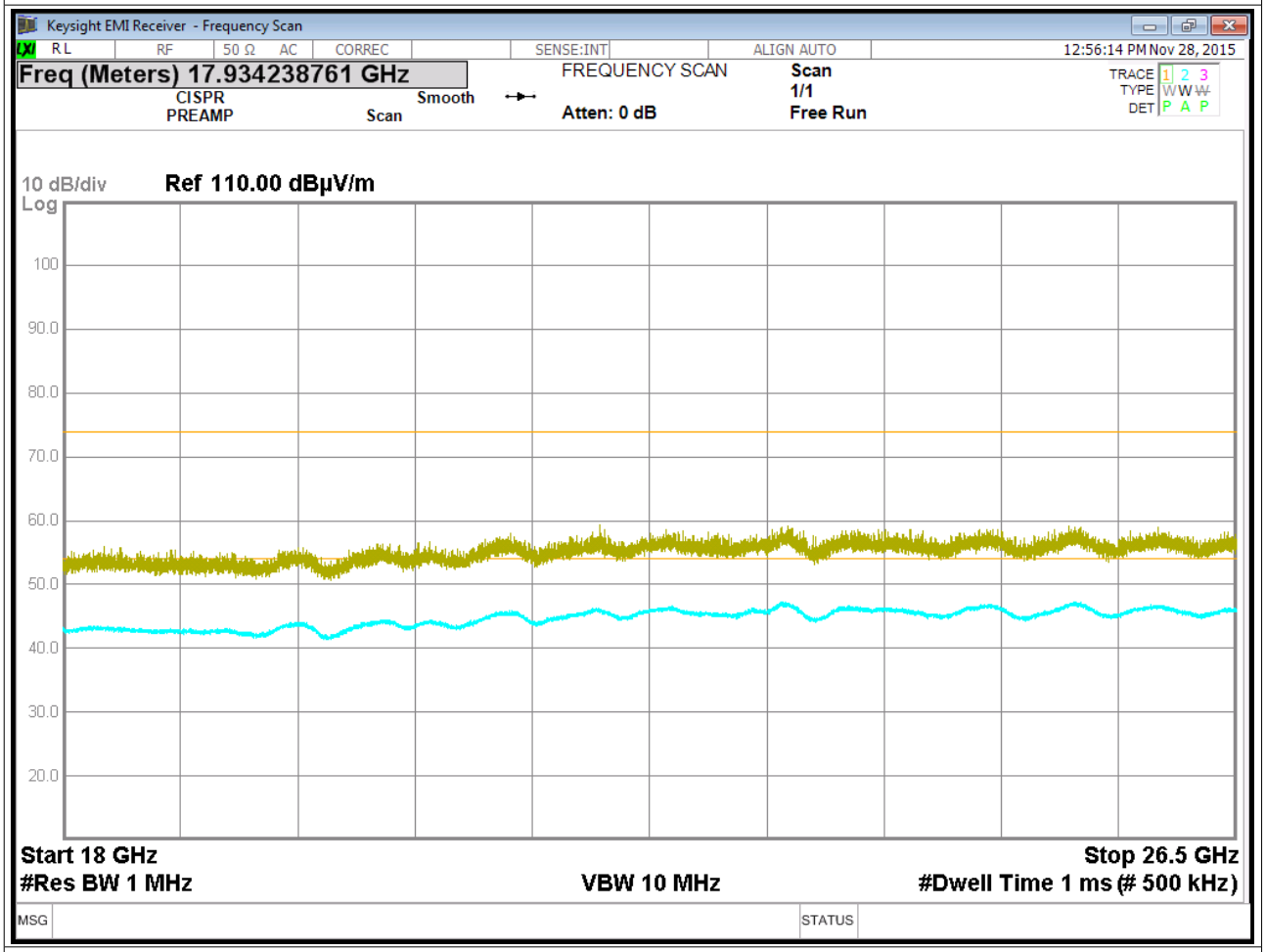
Note:

EUT
Pol. H
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 11
modulation type n
max speed (65 Mbps)



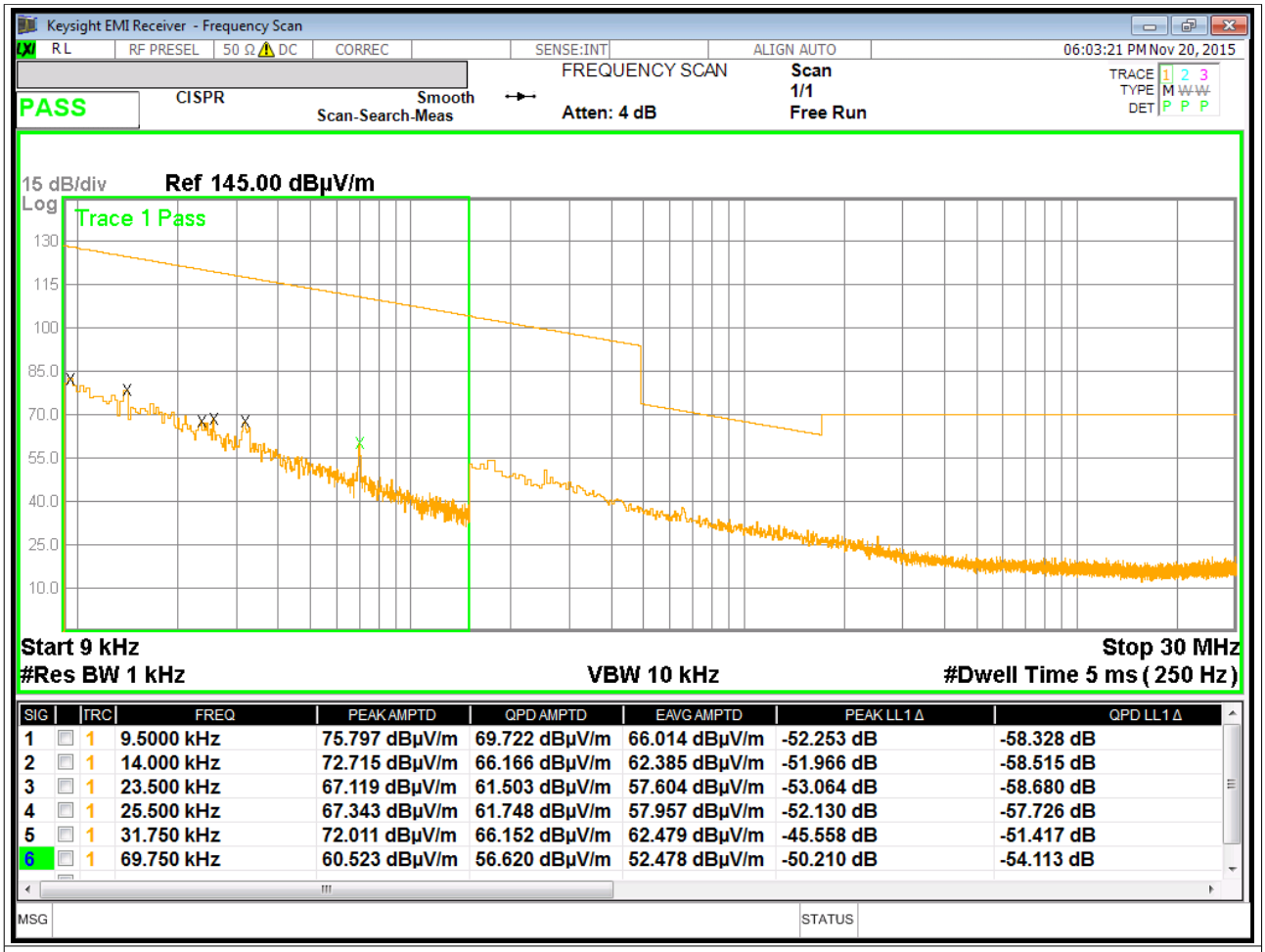
Note:

EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 11
modulation type n
max speed (65 Mbps)



Note:

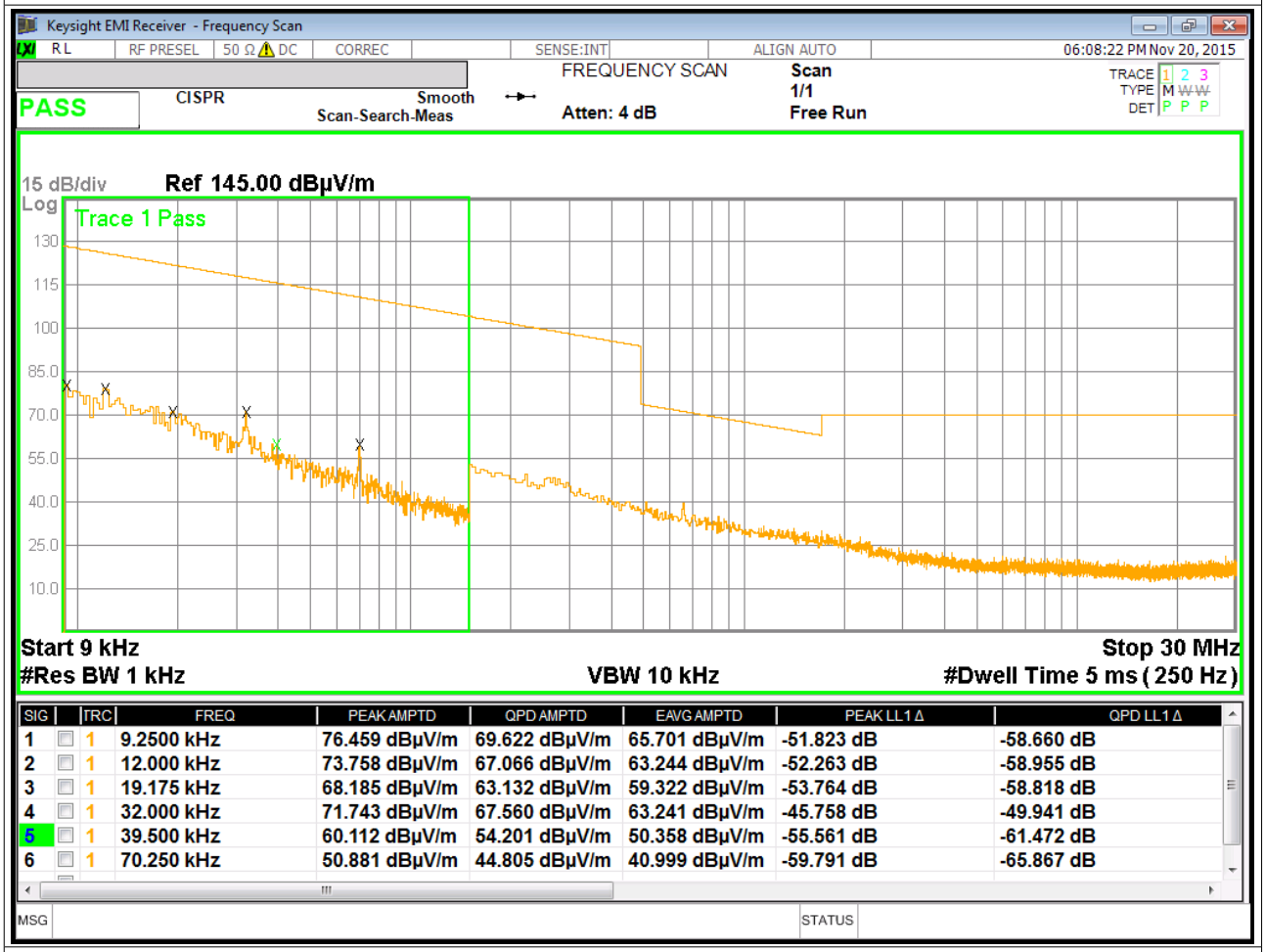
EUT
Pol. V
TT = 0°
MA = 100 cm
EUT mode: operative
Auxiliary apparatus: all ON
channel 11
modulation type b
max speed (11 Mbps)



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ
1	1	9.5000 kHz	75.797 dBµV/m	69.722 dBµV/m	66.014 dBµV/m	-52.253 dB	-58.328 dB
2	1	14.000 kHz	72.715 dBµV/m	66.166 dBµV/m	62.385 dBµV/m	-51.966 dB	-58.515 dB
3	1	23.500 kHz	67.119 dBµV/m	61.503 dBµV/m	57.604 dBµV/m	-53.064 dB	-58.680 dB
4	1	25.500 kHz	67.343 dBµV/m	61.748 dBµV/m	57.957 dBµV/m	-52.130 dB	-57.726 dB
5	1	31.750 kHz	72.011 dBµV/m	66.152 dBµV/m	62.479 dBµV/m	-45.558 dB	-51.417 dB
6	1	69.750 kHz	60.523 dBµV/m	56.620 dBµV/m	52.478 dBµV/m	-50.210 dB	-54.113 dB

Note:

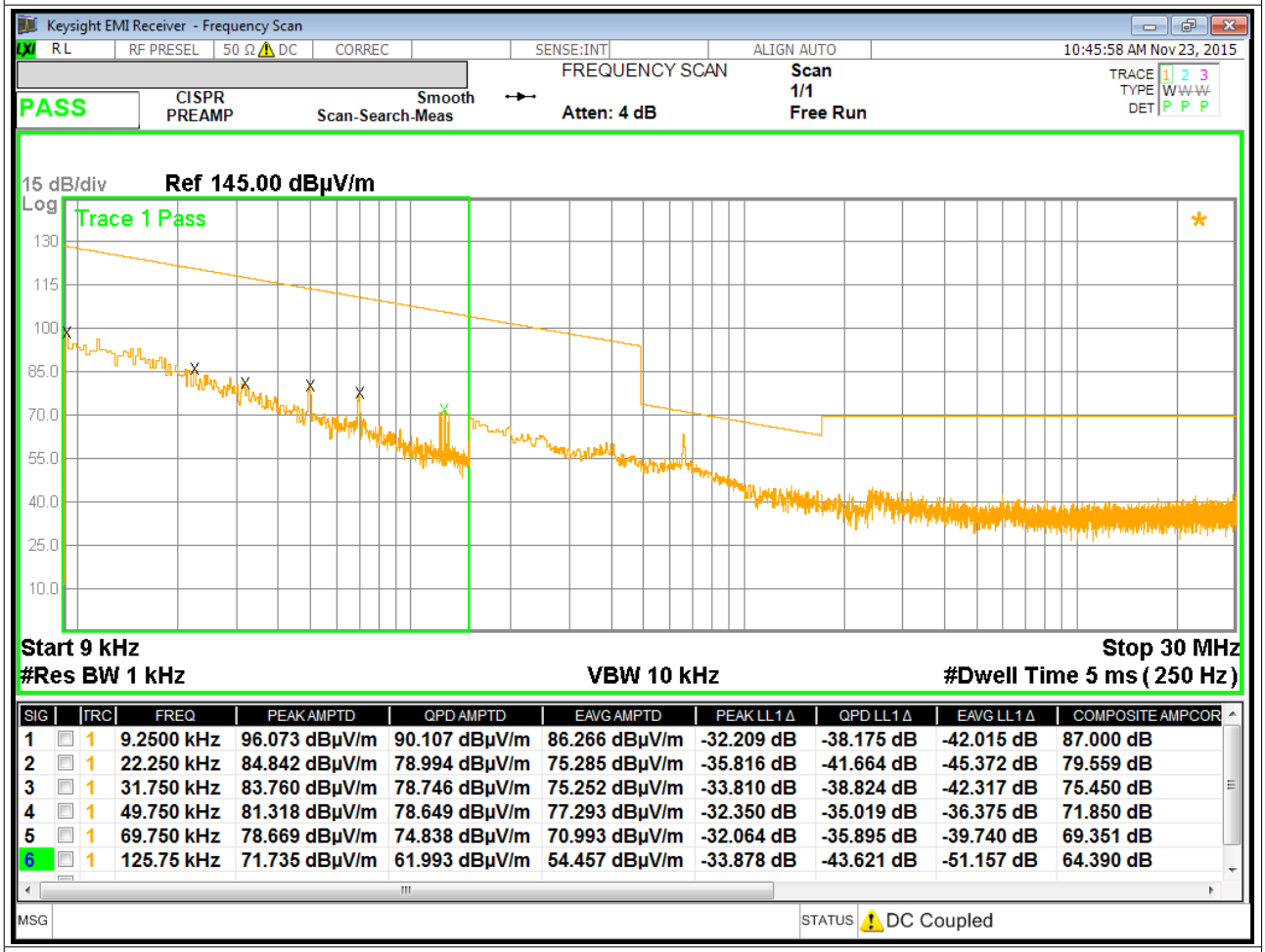
EUT
Hortogonal Polarization
TT = 0°
MA = 150 cm
EUT mode: Standby
Auxiliary apparatus: all ON



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ
1	1	9.2500 kHz	76.459 dBµV/m	69.622 dBµV/m	65.701 dBµV/m	-51.823 dB	-58.660 dB
2	1	12.000 kHz	73.758 dBµV/m	67.066 dBµV/m	63.244 dBµV/m	-52.263 dB	-58.955 dB
3	1	19.175 kHz	68.185 dBµV/m	63.132 dBµV/m	59.322 dBµV/m	-53.764 dB	-58.818 dB
4	1	32.000 kHz	71.743 dBµV/m	67.560 dBµV/m	63.241 dBµV/m	-45.758 dB	-49.941 dB
5	1	39.500 kHz	60.112 dBµV/m	54.201 dBµV/m	50.358 dBµV/m	-55.561 dB	-61.472 dB
6	1	70.250 kHz	50.881 dBµV/m	44.805 dBµV/m	40.999 dBµV/m	-59.791 dB	-65.867 dB

Note:

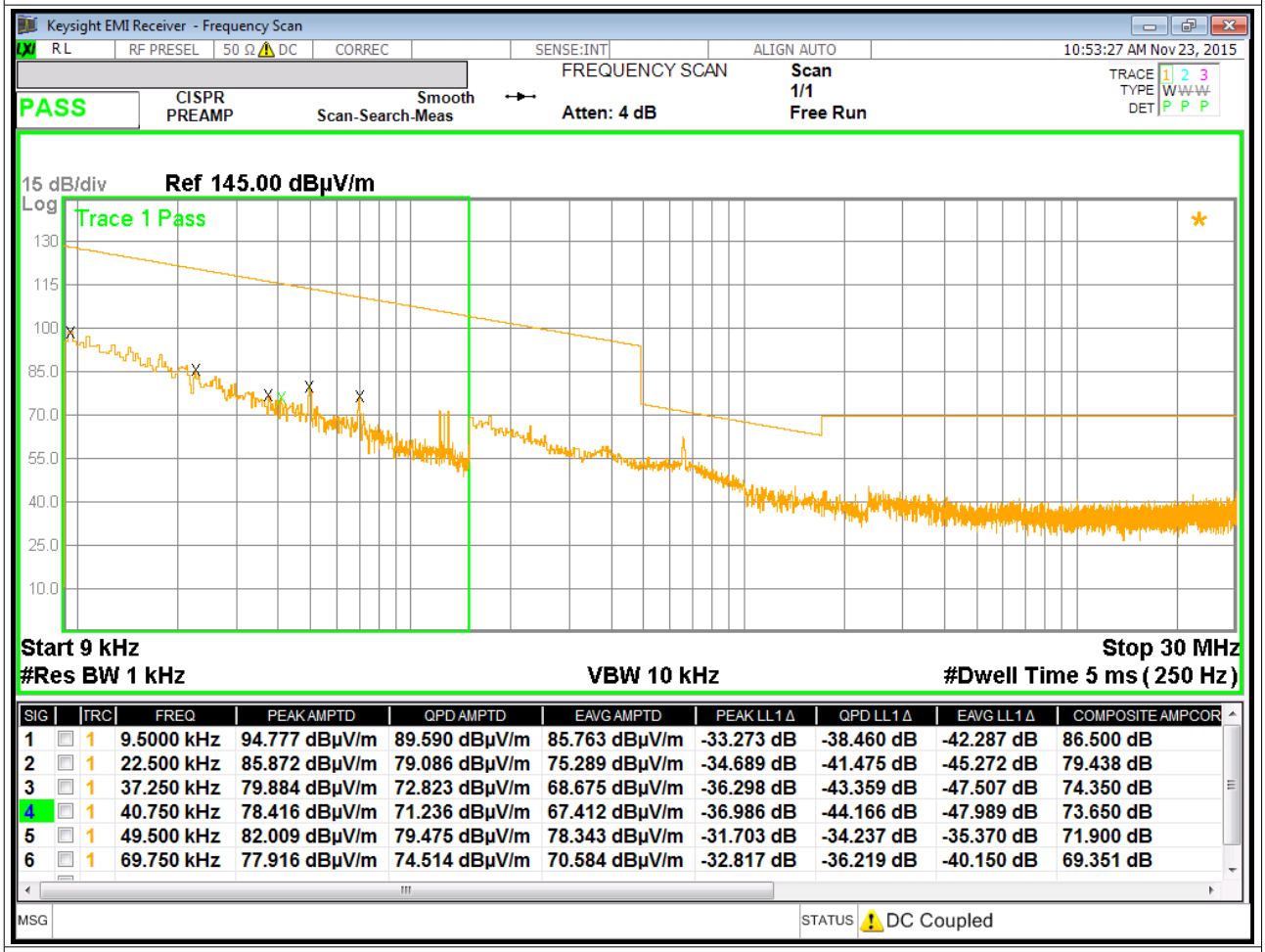
EUT
Parallel Polarization
TT = 0°
MA = 150 cm
EUT mode: Standby
Auxiliary apparatus: all ON



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	EAVG LL1 Δ	COMPOSITE AMPCOR
1	1	9.2500 kHz	96.073 dBµV/m	90.107 dBµV/m	86.266 dBµV/m	-32.209 dB	-38.175 dB	-42.015 dB	87.000 dB
2	1	22.250 kHz	84.842 dBµV/m	78.994 dBµV/m	75.285 dBµV/m	-35.816 dB	-41.664 dB	-45.372 dB	79.559 dB
3	1	31.750 kHz	83.760 dBµV/m	78.746 dBµV/m	75.252 dBµV/m	-33.810 dB	-38.824 dB	-42.317 dB	75.450 dB
4	1	49.750 kHz	81.318 dBµV/m	78.649 dBµV/m	77.293 dBµV/m	-32.350 dB	-35.019 dB	-36.375 dB	71.850 dB
5	1	69.750 kHz	78.669 dBµV/m	74.838 dBµV/m	70.993 dBµV/m	-32.064 dB	-35.895 dB	-39.740 dB	69.351 dB
6	1	125.75 kHz	71.735 dBµV/m	61.993 dBµV/m	54.457 dBµV/m	-33.878 dB	-43.621 dB	-51.157 dB	64.390 dB

Note:

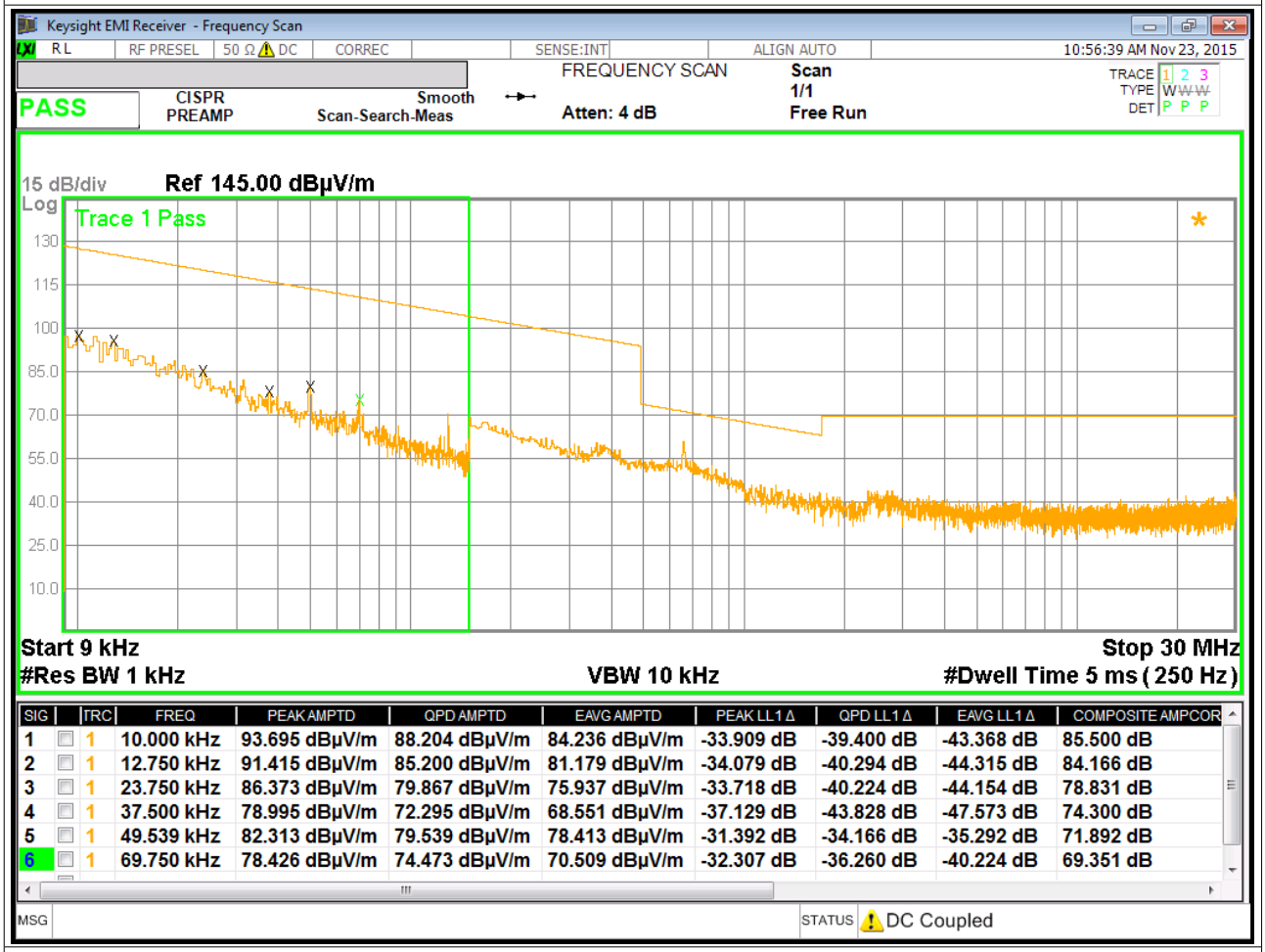
EUT
Parallel Polarization
TT = 0°
MA = 150 cm
EUT mode: Operative
channel 6
modulation type g
max speed (54 Mbps)
Auxiliary apparatus: all ON



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	EAVG LL1 Δ	COMPOSITE AMPCOR
1	1	9.5000 kHz	94.777 dBµV/m	89.590 dBµV/m	85.763 dBµV/m	-33.273 dB	-38.460 dB	-42.287 dB	86.500 dB
2	1	22.500 kHz	85.872 dBµV/m	79.086 dBµV/m	75.289 dBµV/m	-34.689 dB	-41.475 dB	-45.272 dB	79.438 dB
3	1	37.250 kHz	79.884 dBµV/m	72.823 dBµV/m	68.675 dBµV/m	-36.298 dB	-43.359 dB	-47.507 dB	74.350 dB
4	1	40.750 kHz	78.416 dBµV/m	71.236 dBµV/m	67.412 dBµV/m	-36.986 dB	-44.166 dB	-47.989 dB	73.650 dB
5	1	49.500 kHz	82.009 dBµV/m	79.475 dBµV/m	78.343 dBµV/m	-31.703 dB	-34.237 dB	-35.370 dB	71.900 dB
6	1	69.750 kHz	77.916 dBµV/m	74.514 dBµV/m	70.584 dBµV/m	-32.817 dB	-36.219 dB	-40.150 dB	69.351 dB

Note:

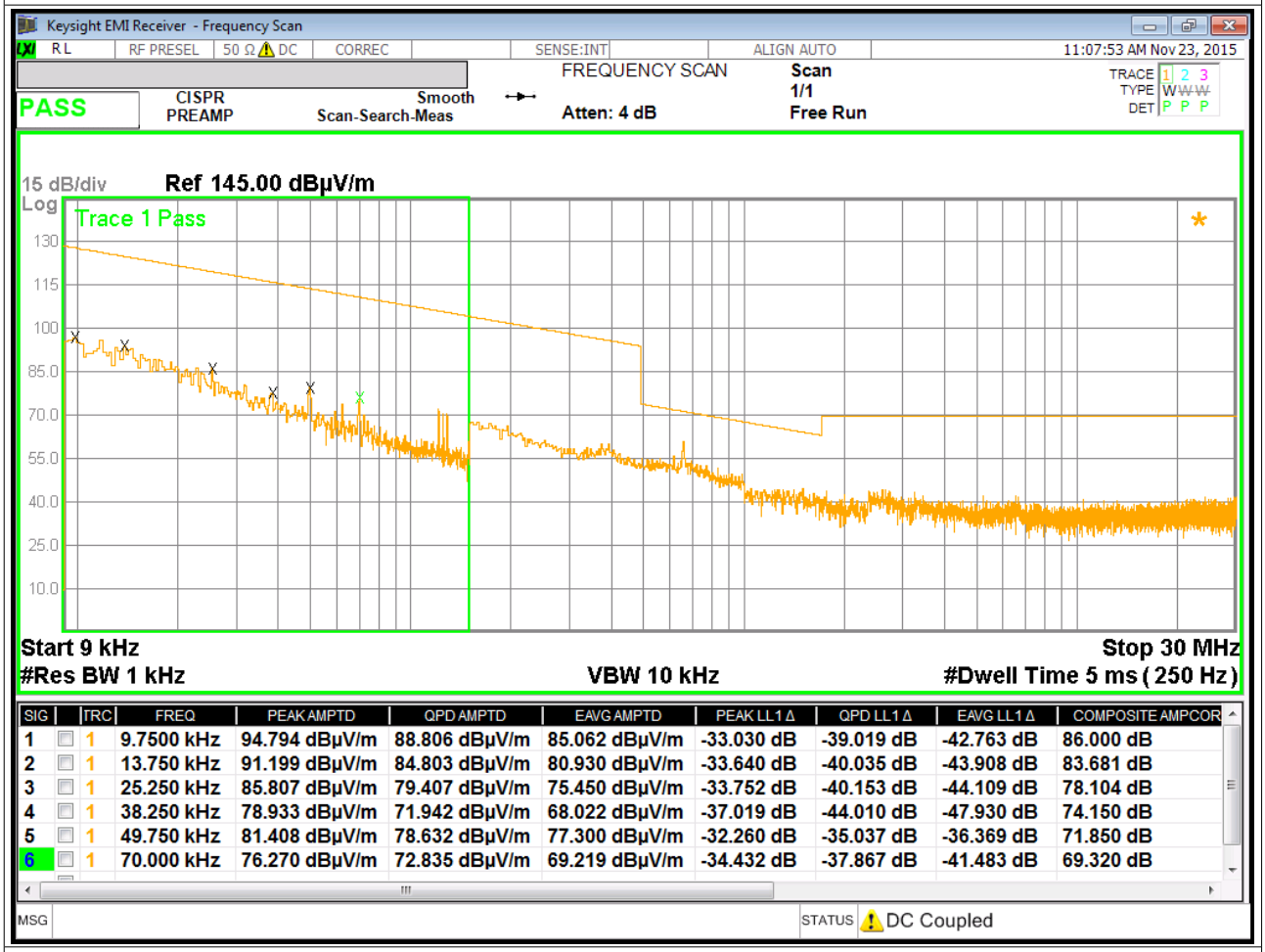
EUT
Parallel Polarization
TT = 0°
MA = 150 cm
EUT mode: Operative
channel 6
modulation type b
max speed (11 Mbps)
Auxiliary apparatus: all ON



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	EAVG LL1 Δ	COMPOSITE AMPCOR
1	1	10.000 kHz	93.695 dBµV/m	88.204 dBµV/m	84.236 dBµV/m	-33.909 dB	-39.400 dB	-43.368 dB	85.500 dB
2	1	12.750 kHz	91.415 dBµV/m	85.200 dBµV/m	81.179 dBµV/m	-34.079 dB	-40.294 dB	-44.315 dB	84.166 dB
3	1	23.750 kHz	86.373 dBµV/m	79.867 dBµV/m	75.937 dBµV/m	-33.718 dB	-40.224 dB	-44.154 dB	78.831 dB
4	1	37.500 kHz	78.995 dBµV/m	72.295 dBµV/m	68.551 dBµV/m	-37.129 dB	-43.828 dB	-47.573 dB	74.300 dB
5	1	49.539 kHz	82.313 dBµV/m	79.539 dBµV/m	78.413 dBµV/m	-31.392 dB	-34.166 dB	-35.292 dB	71.892 dB
6	1	69.750 kHz	78.426 dBµV/m	74.473 dBµV/m	70.509 dBµV/m	-32.307 dB	-36.260 dB	-40.224 dB	69.351 dB

Note:

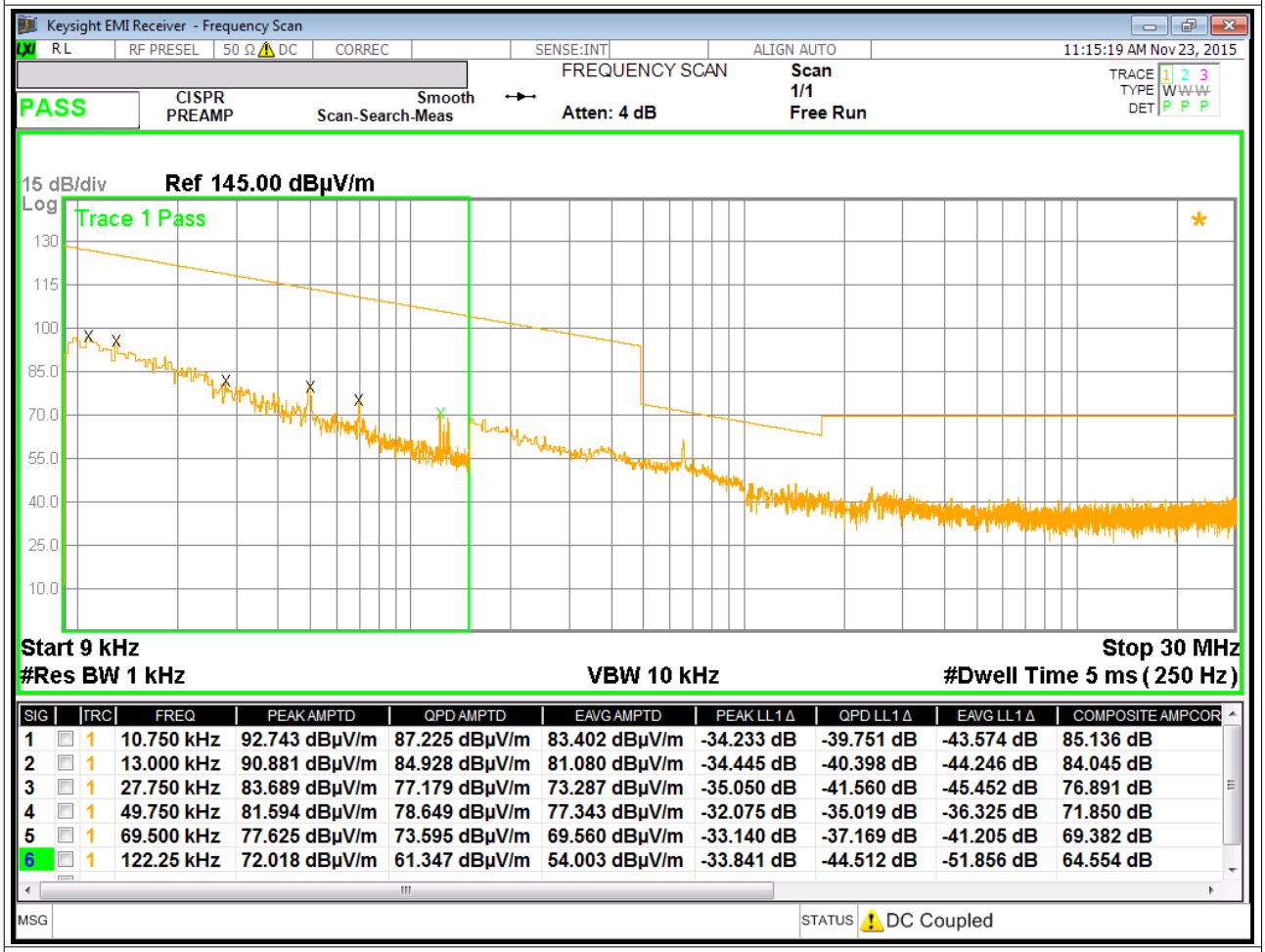
EUT
Parallel Polarization
TT = 0°
MA = 150 cm
EUT mode: Operative
channel 6
modulation type n
max speed (65 Mbps)
Auxiliary apparatus: all ON



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	EAVG LL1 Δ	COMPOSITE AMPCOR
1	1	9.7500 kHz	94.794 dBµV/m	88.806 dBµV/m	85.062 dBµV/m	-33.030 dB	-39.019 dB	-42.763 dB	86.000 dB
2	1	13.750 kHz	91.199 dBµV/m	84.803 dBµV/m	80.930 dBµV/m	-33.640 dB	-40.035 dB	-43.908 dB	83.681 dB
3	1	25.250 kHz	85.807 dBµV/m	79.407 dBµV/m	75.450 dBµV/m	-33.752 dB	-40.153 dB	-44.109 dB	78.104 dB
4	1	38.250 kHz	78.933 dBµV/m	71.942 dBµV/m	68.022 dBµV/m	-37.019 dB	-44.010 dB	-47.930 dB	74.150 dB
5	1	49.750 kHz	81.408 dBµV/m	78.632 dBµV/m	77.300 dBµV/m	-32.260 dB	-35.037 dB	-36.369 dB	71.850 dB
6	1	70.000 kHz	76.270 dBµV/m	72.835 dBµV/m	69.219 dBµV/m	-34.432 dB	-37.867 dB	-41.483 dB	69.320 dB

Note:

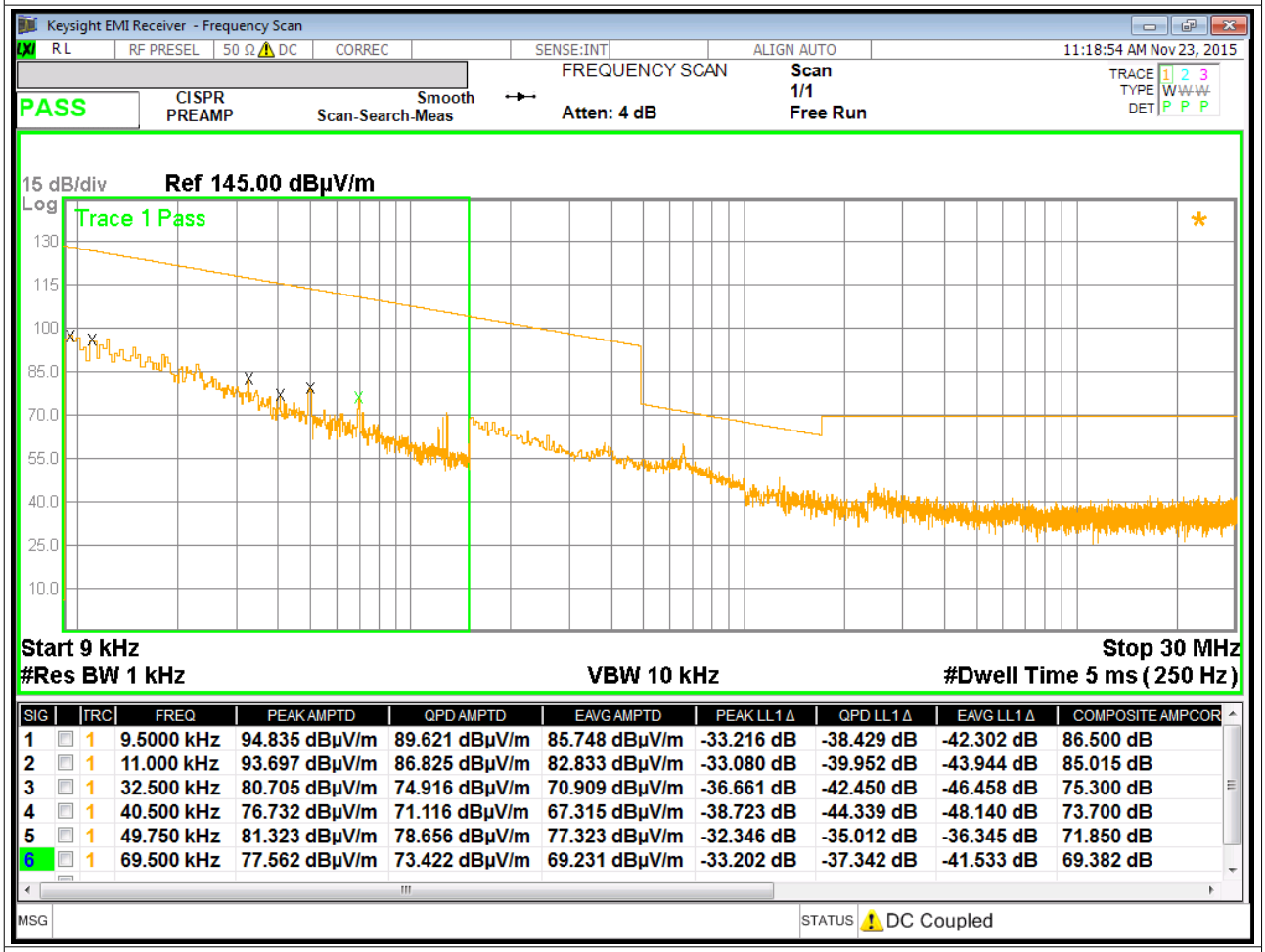
EUT
Hortogonal Polarization
TT = 0°
MA = 150 cm
EUT mode: Operative
channel 6
modulation type n
max speed (65 Mbps)
Auxiliary apparatus: all ON



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	EAVG LL1 Δ	COMPOSITE AMPCOR
1	1	10.750 kHz	92.743 dBµV/m	87.225 dBµV/m	83.402 dBµV/m	-34.233 dB	-39.751 dB	-43.574 dB	85.136 dB
2	1	13.000 kHz	90.881 dBµV/m	84.928 dBµV/m	81.080 dBµV/m	-34.445 dB	-40.398 dB	-44.246 dB	84.045 dB
3	1	27.750 kHz	83.689 dBµV/m	77.179 dBµV/m	73.287 dBµV/m	-35.050 dB	-41.560 dB	-45.452 dB	76.891 dB
4	1	49.750 kHz	81.594 dBµV/m	78.649 dBµV/m	77.343 dBµV/m	-32.075 dB	-35.019 dB	-36.325 dB	71.850 dB
5	1	69.500 kHz	77.625 dBµV/m	73.595 dBµV/m	69.560 dBµV/m	-33.140 dB	-37.169 dB	-41.205 dB	69.382 dB
6	1	122.25 kHz	72.018 dBµV/m	61.347 dBµV/m	54.003 dBµV/m	-33.841 dB	-44.512 dB	-51.856 dB	64.554 dB

Note:

EUT
Hortogonal Polarization
TT = 0°
MA = 150 cm
EUT mode: Operative
channel 6
modulation type g
max speed (54 Mbps)
Auxiliary apparatus: all ON



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	EAVG LL1 Δ	COMPOSITE AMPCOR
1	1	9.5000 kHz	94.835 dBµV/m	89.621 dBµV/m	85.748 dBµV/m	-33.216 dB	-38.429 dB	-42.302 dB	86.500 dB
2	1	11.000 kHz	93.697 dBµV/m	86.825 dBµV/m	82.833 dBµV/m	-33.080 dB	-39.952 dB	-43.944 dB	85.015 dB
3	1	32.500 kHz	80.705 dBµV/m	74.916 dBµV/m	70.909 dBµV/m	-36.661 dB	-42.450 dB	-46.458 dB	75.300 dB
4	1	40.500 kHz	76.732 dBµV/m	71.116 dBµV/m	67.315 dBµV/m	-38.723 dB	-44.339 dB	-48.140 dB	73.700 dB
5	1	49.750 kHz	81.323 dBµV/m	78.656 dBµV/m	77.323 dBµV/m	-32.346 dB	-35.012 dB	-36.345 dB	71.850 dB
6	1	69.500 kHz	77.562 dBµV/m	73.422 dBµV/m	69.231 dBµV/m	-33.202 dB	-37.342 dB	-41.533 dB	69.382 dB

Note:

EUT
Hortogonal Polarization
TT = 0°
MA = 150 cm
EUT mode: Operative
channel 6
modulation type b
max speed (11 Mbps)
Auxiliary apparatus: all ON

RADIATED SPURIOUS EMISSIONS EXTERNAL ANTENNA

Low Channel 802.11b mode, 11 Mbs

F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4.824	H	-	-	74.0	54.0
4.824	V	56.3	44.6	74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0

NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR

Low Channel 802.11g mode, 54 Mbs

F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4.824	H	-	-	74.0	54.0
4.824	V	-	-	74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0

NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR

Low Channel 802.11n mode, 65 Mbs					
F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4.824	H	-	-	74.0	54.0
4.824	V	-	-	74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR					
Mid Channel 802.11b mode, 11 Mbs					
F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4.874	H	-	-	74.0	54.0
4.824	V	55.1	43	74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOORS					

Mid Channel 802.11g mode, 54 Mbs					
F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4.874	H	-	-	74.0	54.0
4.824	V	49.1	-	74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR					
Mid Channel 802.11n mode, 65 Mbs					
F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4.874	H	-	-	74.0	54.0
4.824	V	-	-	74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR					

High Channel 802.11b mode, 11 Mbs					
F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4.924	H	-	-	74.0	54.0
4.924	V	56.9	42.4	74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR					
High Channel 802.11g mode, 54 Mbs					
F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4.924	H	-	-	74.0	54.0
4.924	V	51.2	39.3	74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
				74.0	54.0
NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR					

High Channel 802.11n mode, 65 Mbs					
F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4.924	H	-	-	74.0	54.0
4.924	V	49.6	39.2	74.0	54.0
NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR					

10. PHOTO

Fig. 10.1

Radiated Emissions Test Set-up (9kHz - 30MHz)

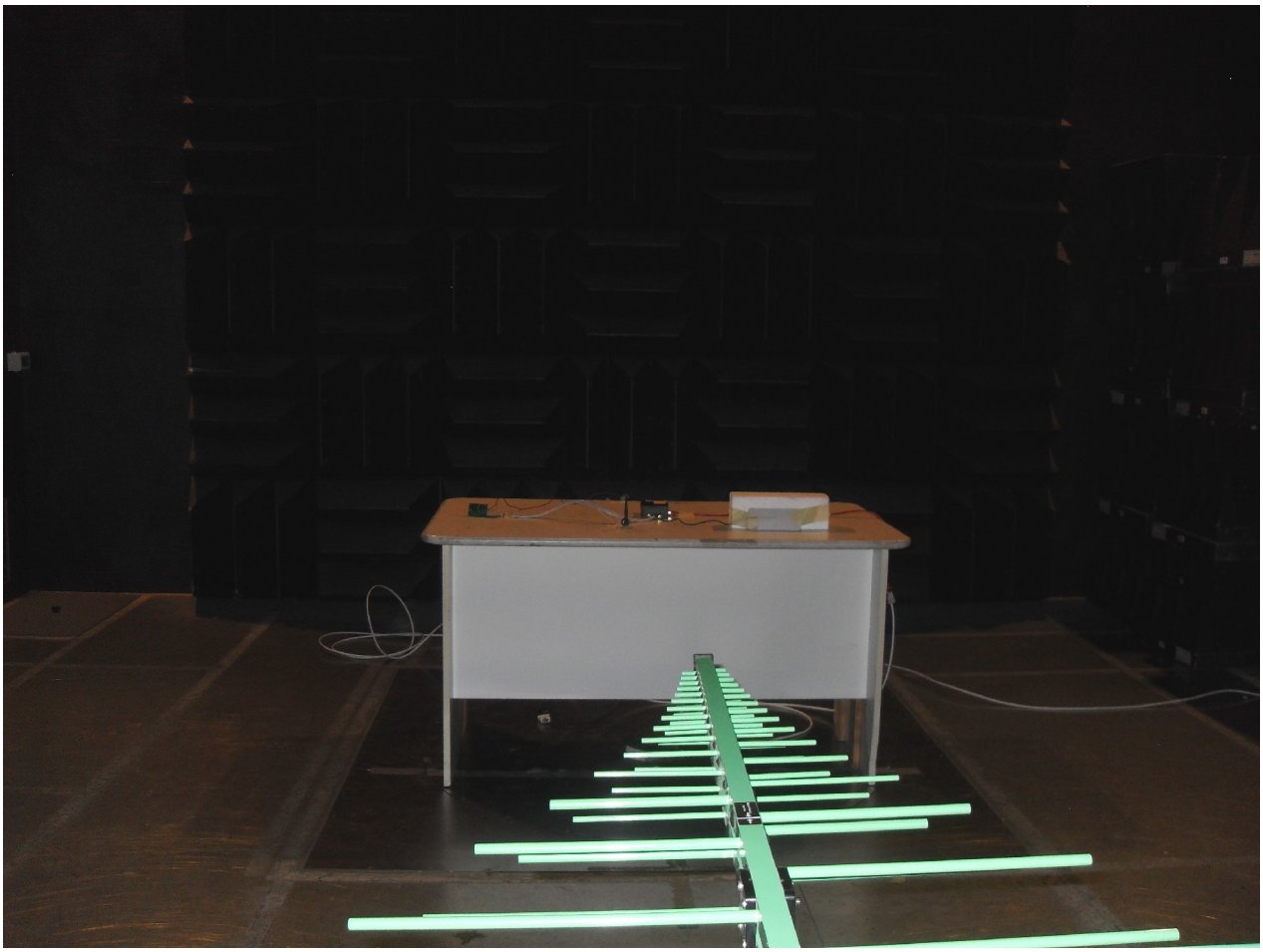


Fig. 10.2

Radiated Emissions Test Set-up (30MHz – 1 GHz)

Fig. 10.3

Radiated Emissions Test Set-up (1GHz - 26GHz)

Fig. 10.4

Power Line Conducted Emissions Test Set-up

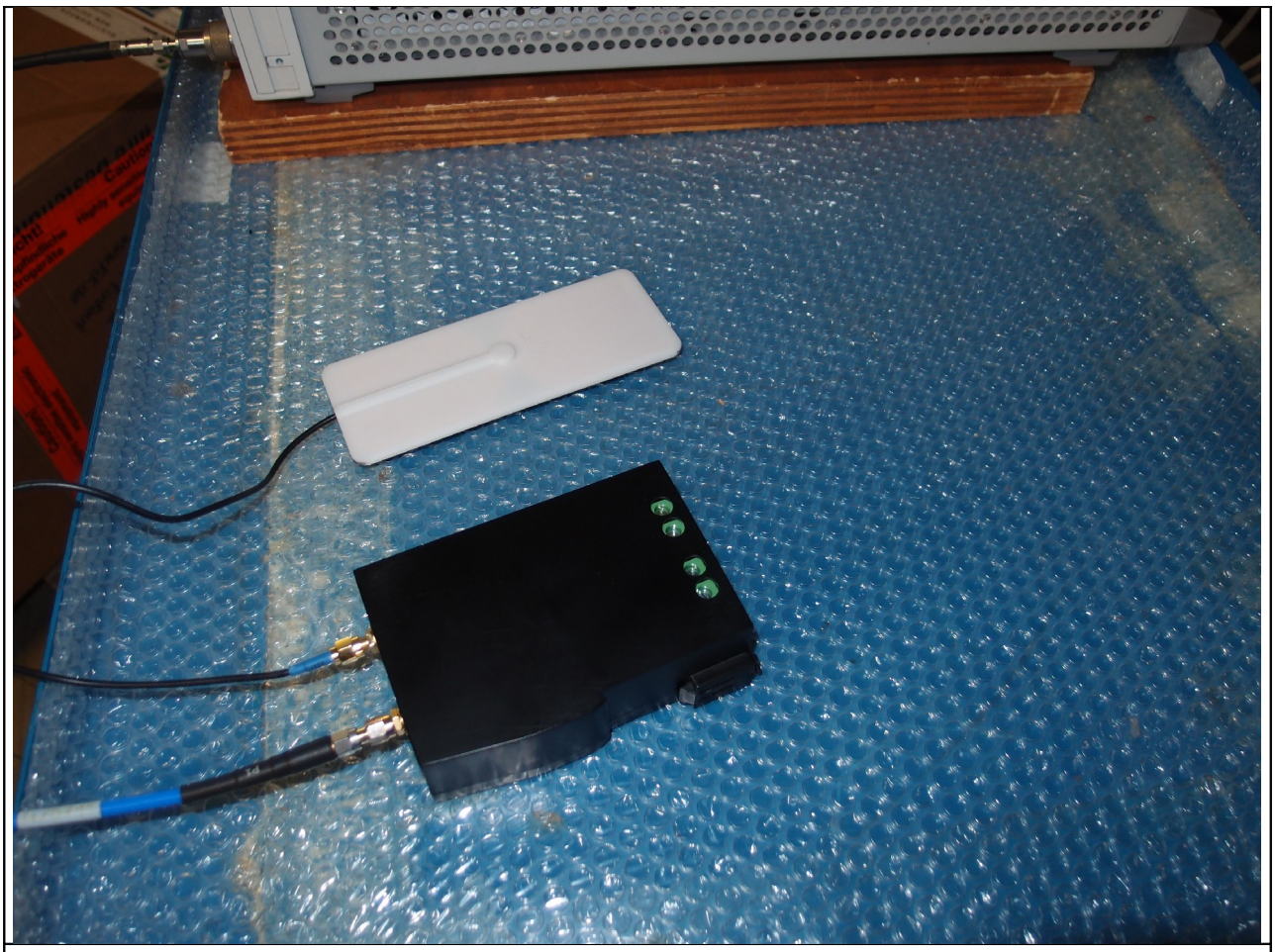


Fig. 10.5

Antenna Port Conducted Emissions Test Set-up