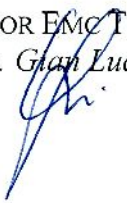


   	
G.S.D. S.r.l. PISA - Italy Test Report n. 12077-FCC-IC Rev. 02	
Manufacturer	TWS S.r.l.
Address	Via Zaccagna, 6 54033 Avenza Carrara (MS) Italy
Test Family Name	6658001 (WIFI-BT subsystem)
Frequency Range / RF Power Rating	2402-2480 MHz (Bluetooth): -9.8 dBm 2412-2462 MHz (802.11b/g/n): 13.3 dBm
Bandwidths	18.9/19.6/19.9 MHz 802.11b/g/n; 840/840/836 kHz BDR-EDR
Modulations	DBPSK, DQPSK, QAM 802.11b,g,n; GFSK BDR; GFSK - PSK EDR
Emission designators	2402-2480 MHz (Bluetooth BDR): 840KF1D 2402-2480 MHz (Bluetooth EDR): 840KF1D 2402-2480 MHz (Bluetooth EDR): 836KG1D 2412-2462 MHz (802.11b,g,n): 19M9D1D
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 IC Listed: Registration Number: 9353A
Location and Date of Issue	Pisa, 2012 September 27
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	3
2. REFERENCE STANDARDS.....	7
3. RESULT, CONDITION, MEASUREMENT UNCERTAINTY	8
4. 6 DB BANDWIDTH.....	9
5. MAXIMUM PEAK OUTPUT POWER.....	29
6. BAND EDGE AND CONDUCTED SPURIOUS EMISSIONS.....	30
7. PEAK POWER SPECTRAL DENSITY.....	49
8. CONDUCTED EMISSIONS.....	77
9. RADIATED EMISSIONS.....	80
10. BLUETOOTH: LIMIT OF HOPPING FREQUENCY – AVERAGE TIME OF OCCUPANCY – CHANNEL BANDWIDTH – CHANNEL SEPARATION - PEAK OUTPUT POWER – SPURIOUS RF EMISSION – BAND EDGE.....	117
11. MAXIMUM PERMISSIBLE EXPOSURE.....	173
12. PHOTO.....	174

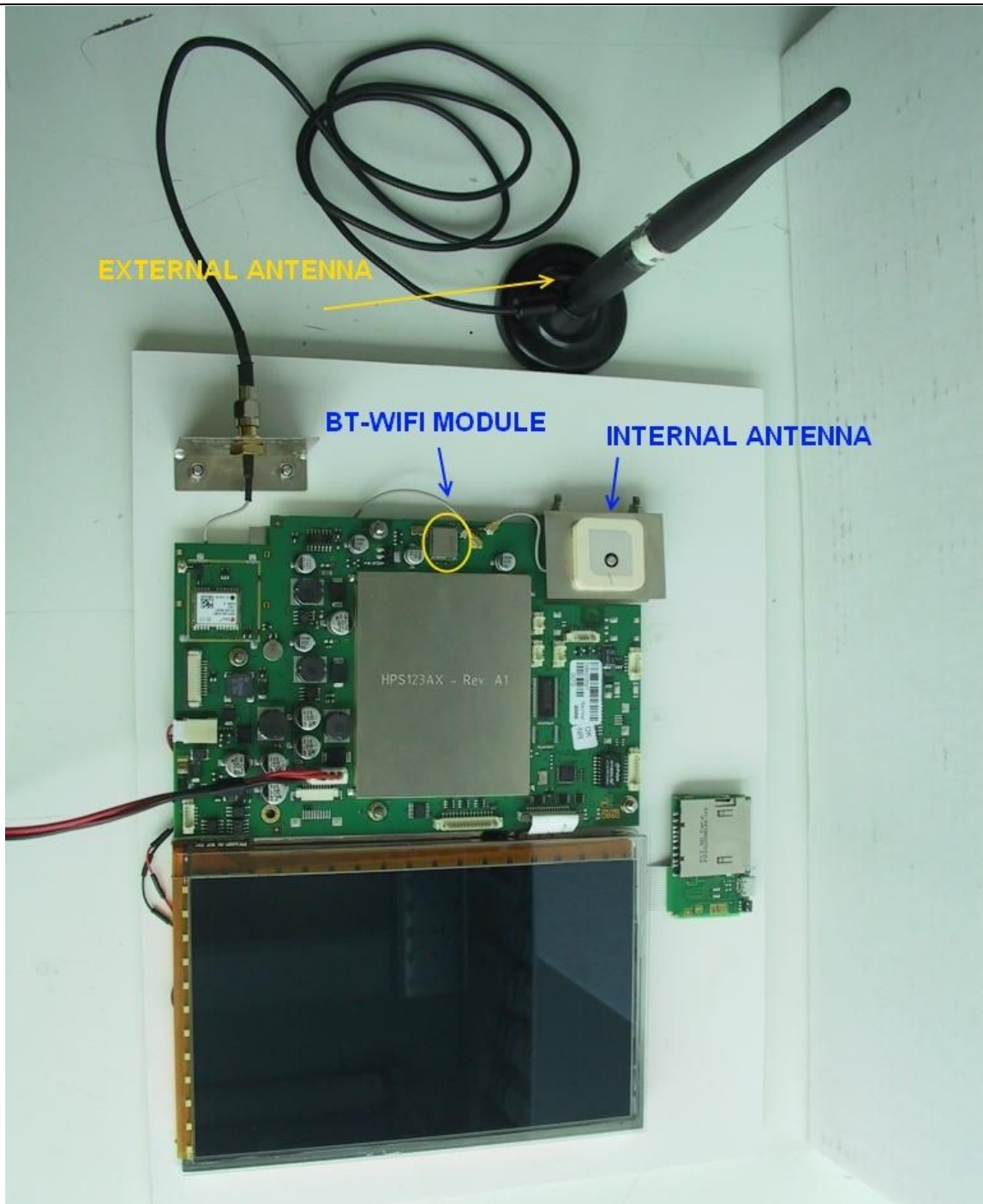
1. MANUFACTURER AND EUT IDENTIFICATION¹	
Manufacturer	TWS S.r.l..
Address	Via Zaccagna, 6 54033 Avenza Carrara (MS) Italy
Test Family Name	6658001 (WIFI-BT subsystem)
Date of reception	2012 March 08
Sampling	Laboratory sample for certification
Test Item Description	WiFi and Bluetooth Device
	The transmitting system is made by a BT (v2.1+EDR)&WIFI module (APM6658), a low pass-filter (LFB2H2G45SG7A158), an antenna switch (XM0860SP-DL0601), internal antenna and external antenna connector. This system is controlled by an external CPU using a digital signals (SD I/O bus)
Nominal Input Voltage	3.3 Vdc
Software	PDA UniTest eeprom 25u.exe
FCC ID	CU9-6658001
IC ID	10307A-6658001
Frequency Range / RF Power Rating	2402-2480 MHz (Bluetooth): -9.8 dBm 2412-2462 MHz (802.11b/g/n): 13.3 dBm
Bandwidths	18.9/19.6/19.9 MHz 802.11b/g/n; 840/840/836 kHz BDR-EDR
Modulations	DBPSK, DQPSK, QAM 802.11b,g,n; GFSK BDR; GFSK - PSK EDR
Emission designators	2402-2480 MHz (Bluetooth BDR): 840KF1D 2402-2480 MHz (Bluetooth EDR): 840KF1D 2402-2480 MHz (Bluetooth EDR): 836KG1D 2412-2462 MHz (802.11b,g,n): 19M9D1D
Antenna Information	External Antenna used: INTELLINET - I-WL2-ANT3 - 5dBi Internal Antenna: TAOGLAS model WLP2450 - 5dBi

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. 12077-FCC-IC Rev. 02, page 3 / 176



*Fig. 1.1
Equipment Under Test - Photo*

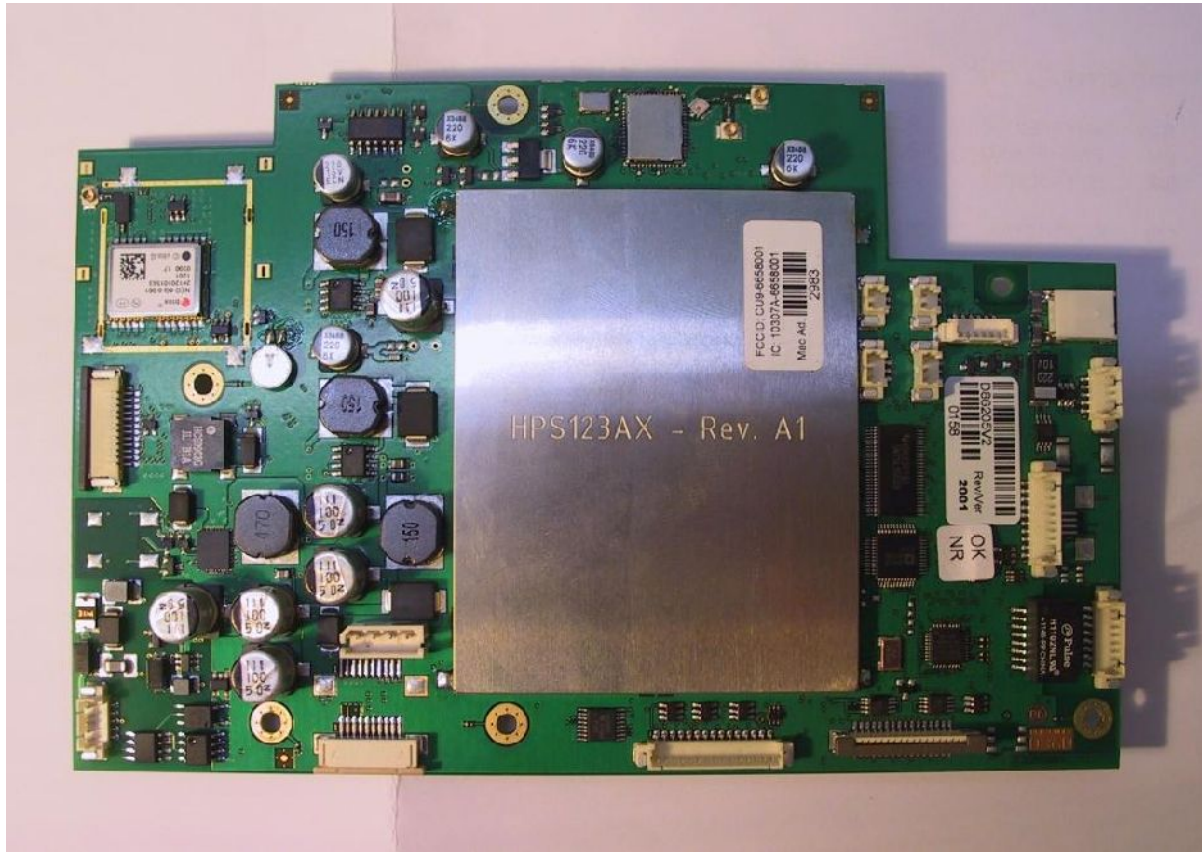


Fig. 1.2
Equipment Under Test - Photo

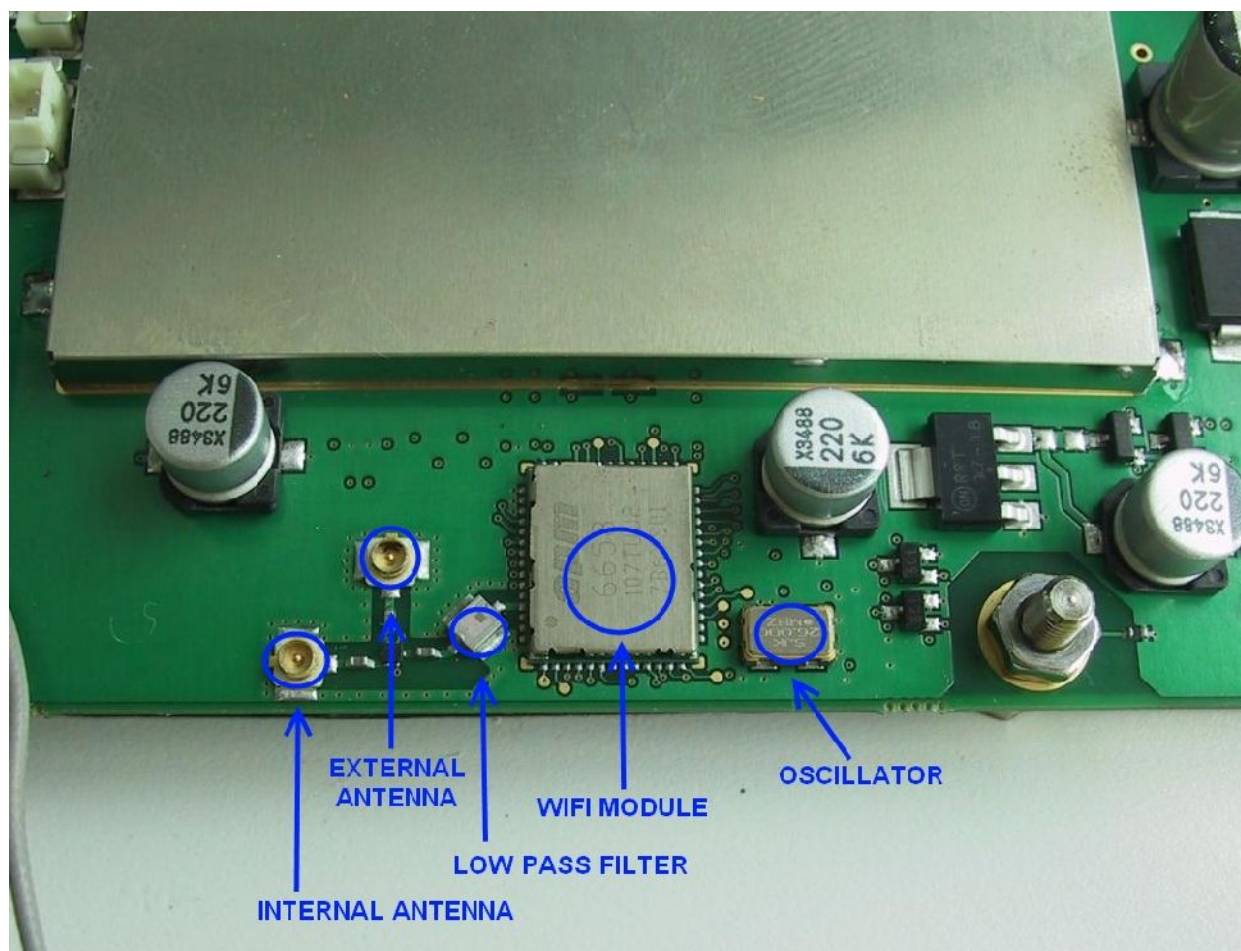


Fig. 1.3
Equipment Under Test - Photo

2. REFERENCE STANDARDS

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

<i>TEST</i>	<i>STANDARD</i>
Operation within the band 2400-2483,5 MHz: Test Procedures 15.247 (a)(2), (b)(3), (d), (e) and 15.247 (a)(1)(i)(iii), (b)(1)	FCC Rules ad Regulations, Title 47 (2008) Part 15 – Sub part B DA 00-705 (30 March 2010) – Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems 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
Annex 8, Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz	RSS-210 Issue 8 Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
Maximum Permissible Exposure	OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields FCC Rules ad Regulations, Title 47 (2008) 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 UNCERTAINTYSummary of Test Results

<i>TEST</i>	<i>RESULT</i>
6 dB bandwidth 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

<i>TEST</i>	<i>EXPANDED UNCERTAINTY</i>
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

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

Power during the tests: 12 Vdc

External Antenna used: INTELLINET - I-WL2-ANT3 - 5dBi

Internal Antenna: TAOGLAS model WLP2450 - 5dBi

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. 12077-FCC-IC Rev. 02, page 8 / 176

4. 6 dB BANDWIDTH

Peak Output Power

Equipment shall meet the limits below .

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

Results: 6dB Bandwidth > 500 kHz

<i>BW_{6dB}</i> (MHz)	<i>Mode / Data rate (Mb/s)</i>					
	<i>802.11b</i>		<i>802.11g</i>		<i>802.11n</i>	
	<i>1</i>	<i>11</i>	<i>6</i>	<i>54</i>	<i>6.5</i>	<i>65</i>
<i>Ch. Low</i>	10.10	9.58	16.05	15.84	16.90	17.63
<i>Ch. Mid</i>	10.09	9.59	16.06	16.40	15.47	17.59
<i>Ch. High</i>	10.09	9.59	15.39	16.40	16.06	17.60

<i>BW_{26dB}</i> (MHz)	<i>Mode / Data rate (Mb/s)</i>					
	<i>802.11b</i>		<i>802.11g</i>		<i>802.11n</i>	
	<i>1</i>	<i>11</i>	<i>6</i>	<i>54</i>	<i>6.5</i>	<i>65</i>
<i>Ch. Low</i>	18,62	18,89	19,54	19,48	19,87	19,85
<i>Ch. Mid</i>	18,58	18,91	19,57	19,43	19,89	19,81
<i>Ch. High</i>	18,55	18,91	19,34	19,46	19,84	19,82

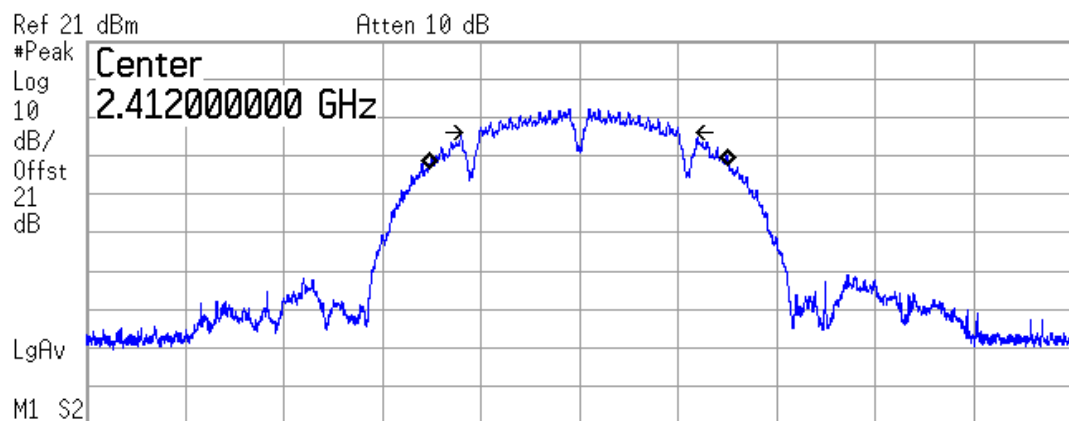
<i>BW_{99%}</i> (MHz)	<i>Mode / Data rate (Mb/s)</i>					
	<i>802.11b</i>		<i>802.11g</i>		<i>802.11n</i>	
	<i>1</i>	<i>11</i>	<i>6</i>	<i>54</i>	<i>6.5</i>	<i>65</i>
<i>Ch. Low</i>	15,15	15,18	16,36	16,35	17,57	17,59
<i>Ch. Mid</i>	15,18	15,2	16,37	16,34	17,56	17,58
<i>Ch. High</i>	15,2	15,23	16,38	16,35	17,56	17,59

<u>Test Equipment</u>			
EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
EMI Receiver	Agilent	E4440A	01/2013
<u>Test procedure: APR01</u>			
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			

6dB Bandwidth Low Channel (802.11b mode)

Agilent 16:27:52 5 Sep 2012

R T



Center 2.412 000 GHz Span 50 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 4.915 ms (8192 pts)

Occupied Bandwidth
15.1548 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -21.852 kHz
x dB Bandwidth 10.097 MHz

BW_{6dB} = 10.10 MHz

BW_{26dB} = 18.62 MHz

Note:

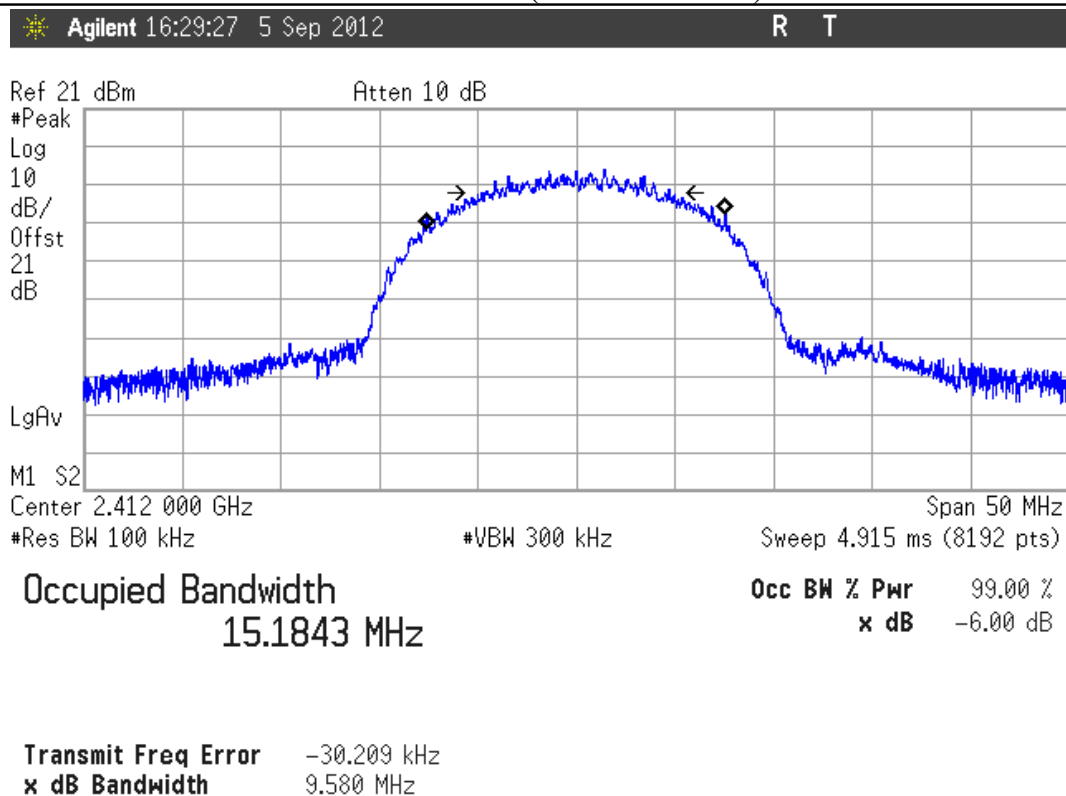
Data Rate = 1 Mb/s

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. 12077-FCC-IC Rev. 02, page 11 / 176

6dB Bandwidth Low Channel (802.11b mode)



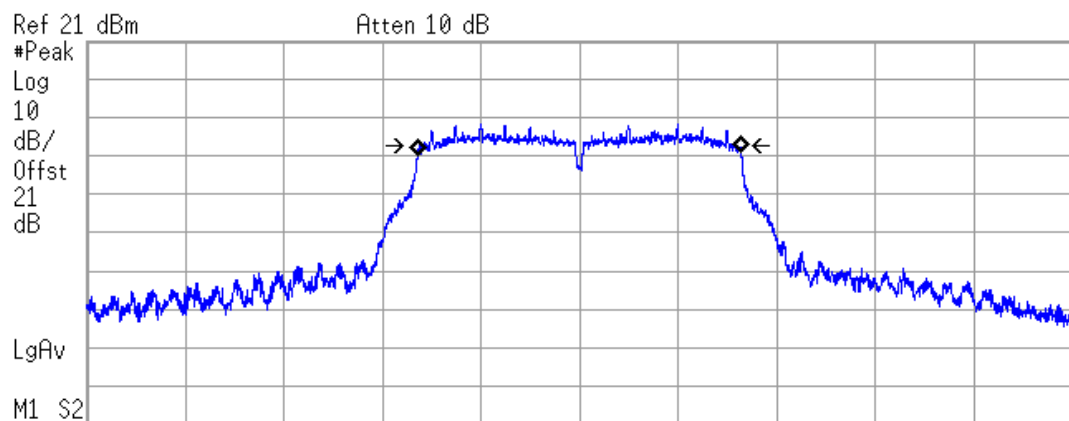
$BW_{6dB} = 9.58 \text{ MHz}$
 $BW_{26dB} = 18.89 \text{ MHz}$

Note:

Data Rate = 11 Mb/s

6dB Bandwidth Low Channel (802.11g mode)

Agilent 16:42:15 5 Sep 2012 R T



Center 2.412 000 GHz Span 50 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 4.915 ms (8192 pts)

Occupied Bandwidth
 16.3605 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -3.396 kHz
x dB Bandwidth 16.052 MHz

$BW_{6dB} = 16.05 \text{ MHz}$

$BW_{26dB} = 19.54 \text{ MHz}$

Note:

Data Rate = 6 Mb/s

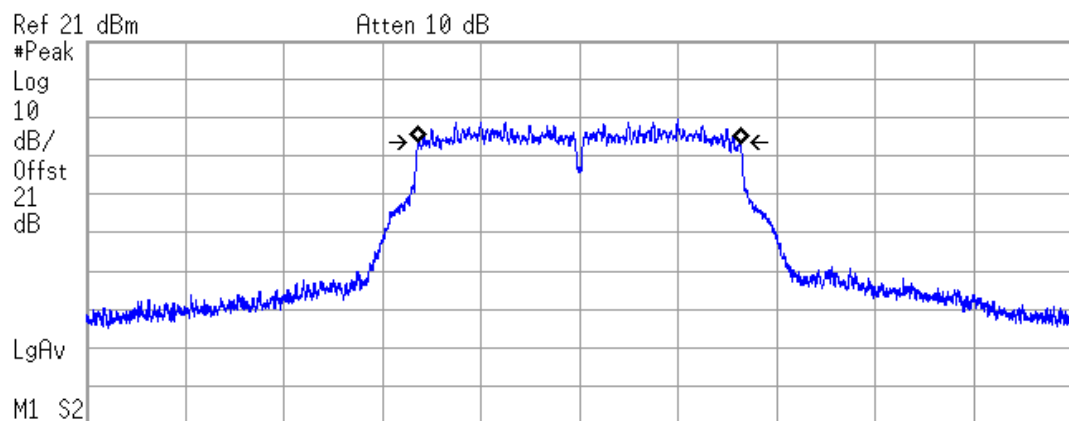
This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 13 / 176

6dB Bandwidth Low Channel (802.11g mode)

Agilent 16:44:18 5 Sep 2012 R T



Center 2.412 000 GHz Span 50 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 4.915 ms (8192 pts)

Occupied Bandwidth
 16.3465 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -9.017 kHz
x dB Bandwidth 15.842 MHz

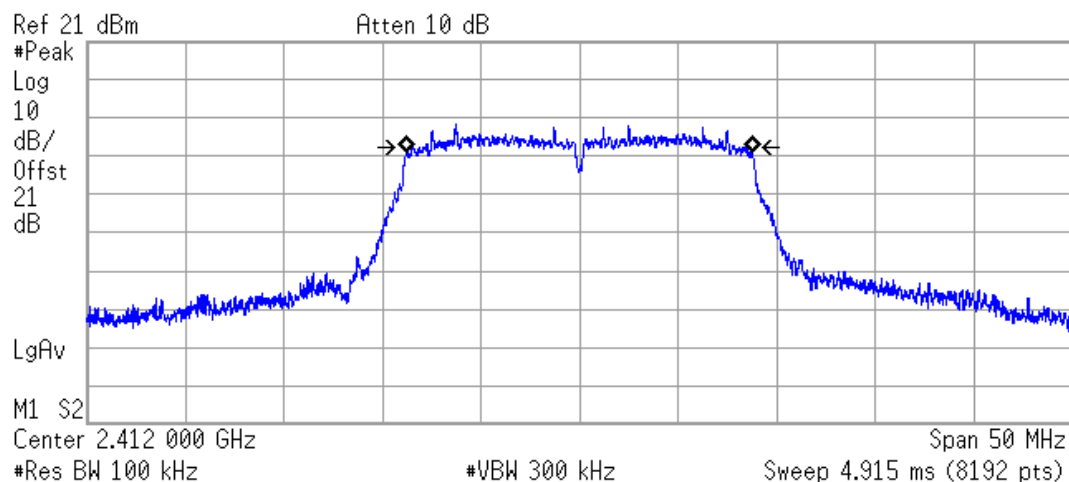
$BW_{6dB} = 15.84 \text{ MHz}$
 $BW_{26dB} = 19.48 \text{ MHz}$

Note:

Data Rate = 54 Mb/s

6dB Bandwidth Low Channel (802.11n mode)

Agilent 16:45:54 5 Sep 2012 R T



Occupied Bandwidth
17.5664 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -6.741 kHz
x dB Bandwidth 16.900 MHz

$BW_{6dB} = 16.90 \text{ MHz}$
 $BW_{26dB} = 19.87 \text{ MHz}$

Note:

Data Rate = 6.5 Mb/s

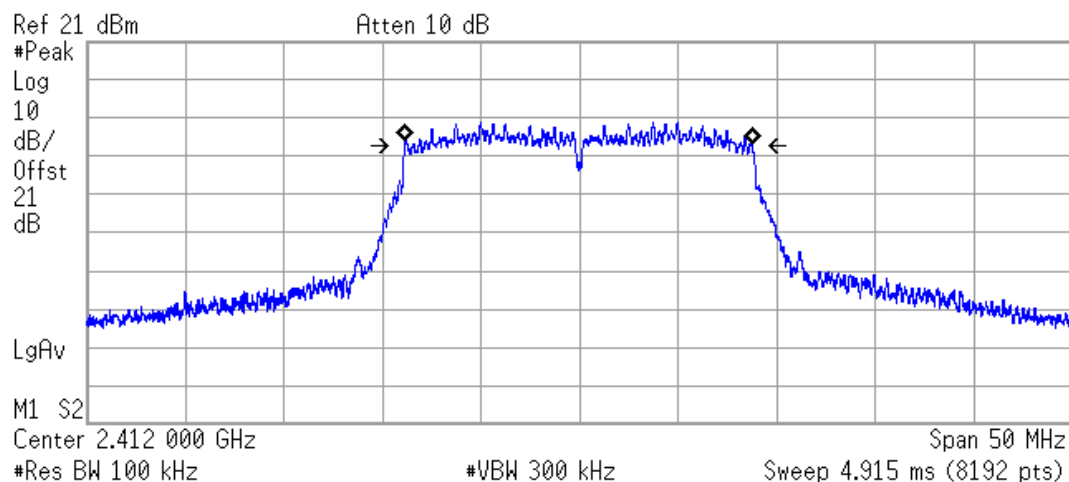
This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 15 / 176

6dB Bandwidth Low Channel (802.11n mode)

Agilent 16:47:58 5 Sep 2012 R T



Occupied Bandwidth
17.5895 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -29.764 kHz
x dB Bandwidth 17.632 MHz

$BW_{6dB} = 17.63 \text{ MHz}$
 $BW_{26dB} = 19.85 \text{ MHz}$

Note:

Data Rate = 65 Mb/s

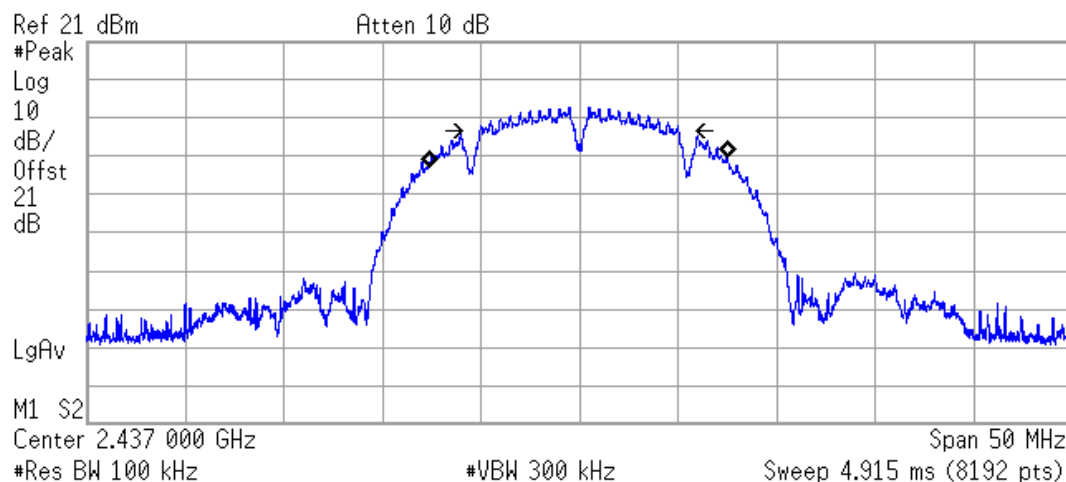
This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 16 / 176

6dB Bandwidth Mid Channel (802.11b mode)

Agilent 16:49:52 5 Sep 2012 R T



Occupied Bandwidth
15.1827 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -51.156 kHz
x dB Bandwidth 10.092 MHz

BW_{6dB} = 10.09 MHz
BW_{26dB} = 18.58 MHz

Note:

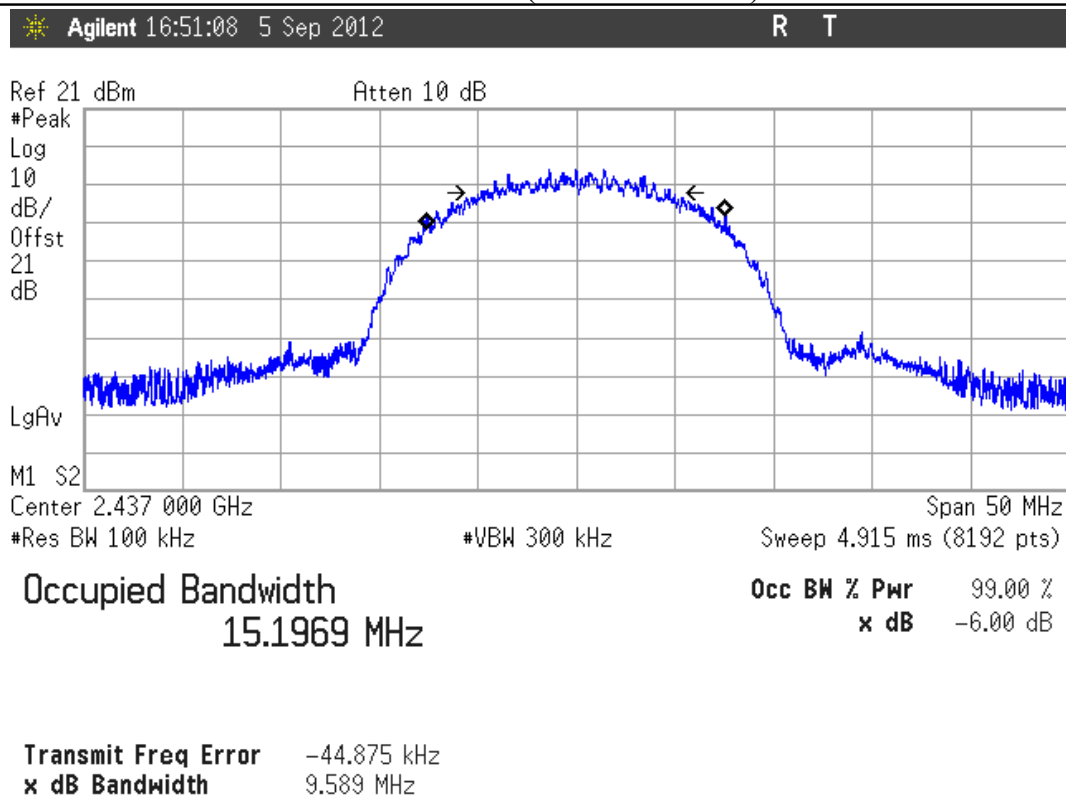
Data Rate = 1 Mb/s

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. 12077-FCC-IC Rev. 02, page 17 / 176

6dB Bandwidth Mid Channel (802.11b mode)



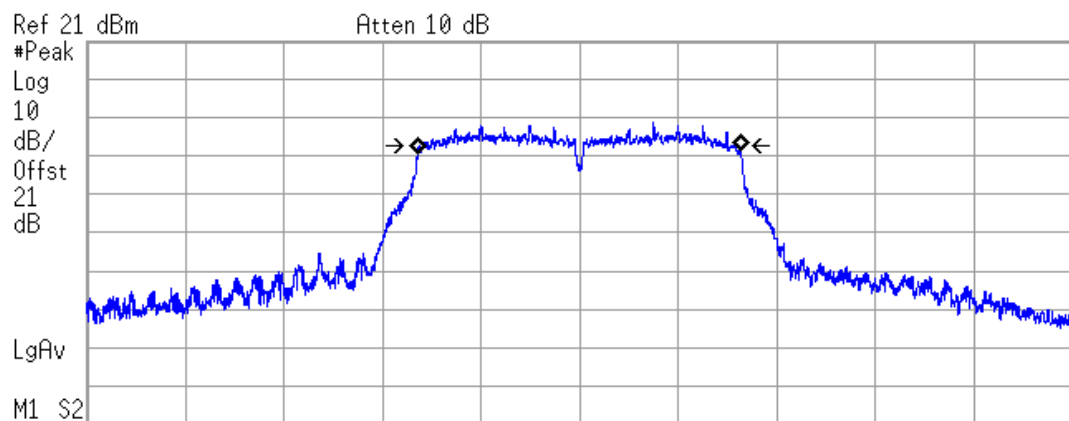
$BW_{6dB} = 9.59 \text{ MHz}$
 $BW_{26dB} = 18.91 \text{ MHz}$

Note:

Data Rate = 11 Mb/s

6dB Bandwidth Mid Channel (802.11n mode)

Agilent 16:52:14 5 Sep 2012 R T



Center 2.437 000 GHz Span 50 MHz

#Res BW 100 kHz #VBW 300 kHz Sweep 4.915 ms (8192 pts)

Occupied Bandwidth
16.3658 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -14.446 kHz
x dB Bandwidth 16.056 MHz

BW_{6dB} = 16.06 MHz

BW_{26dB} = 19.57 MHz

Note:

Data Rate = 6 Mb/s

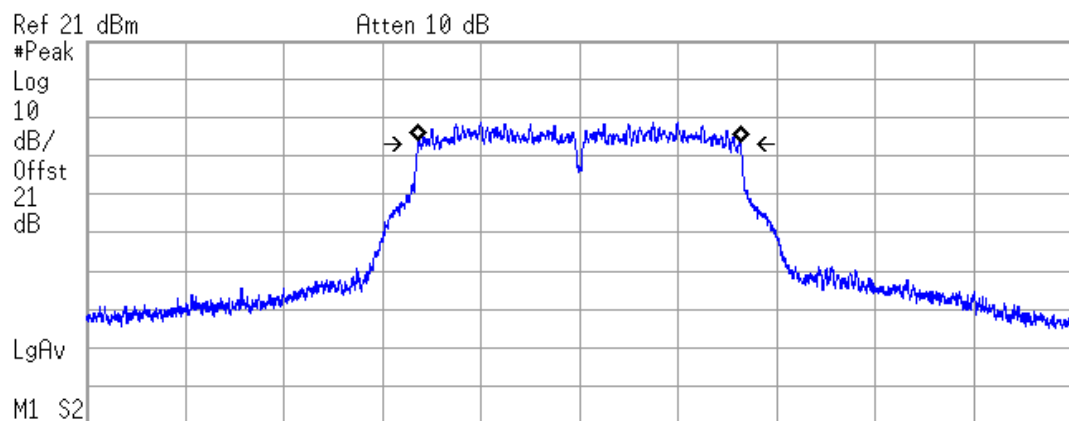
This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 19 / 176

6dB Bandwidth Mid Channel (802.11n mode)

Agilent 16:53:14 5 Sep 2012 R T



Center 2.437 000 GHz Span 50 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 4.915 ms (8192 pts)

Occupied Bandwidth
16.3445 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -9.380 kHz
x dB Bandwidth 16.396 MHz

BW_{6dB} = 16.40 MHz

BW_{26dB} = 19.43 MHz

Note:

Data Rate = 54 Mb/s

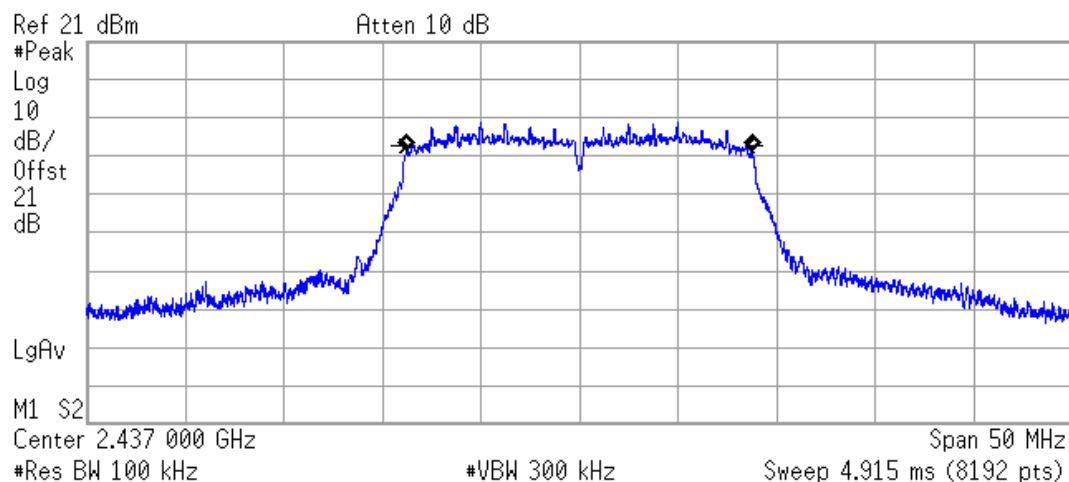
This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 20 / 176

6dB Bandwidth Mid Channel (802.11n mode)

Agilent 16:55:11 5 Sep 2012 R T



Occupied Bandwidth
17.5621 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -12.012 kHz
x dB Bandwidth 15.469 MHz

BW_{6dB} = 15.47 MHz

BW_{26dB} = 19.89 MHz

Note:

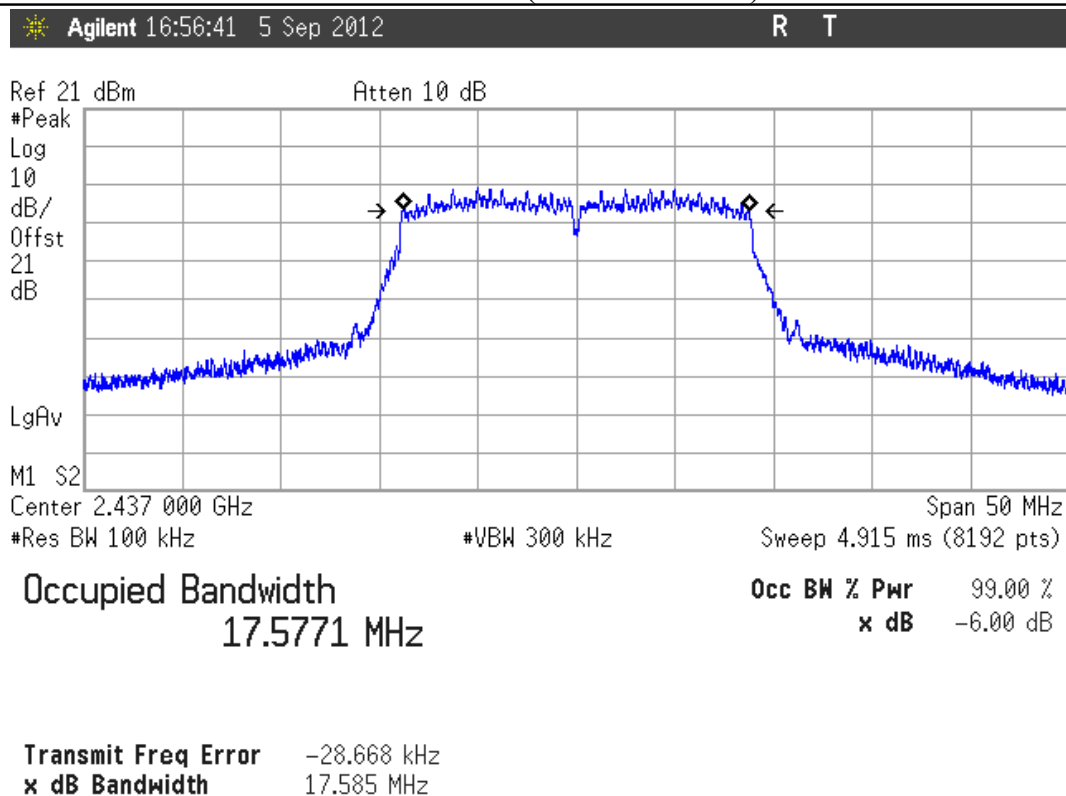
Data Rate = 6.5 Mb/s

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. 12077-FCC-IC Rev. 02, page 21 / 176

6dB Bandwidth Mid Channel (802.11n mode)



$BW_{6dB} = 17.59 \text{ MHz}$

$BW_{26dB} = 19.81 \text{ MHz}$

Note:

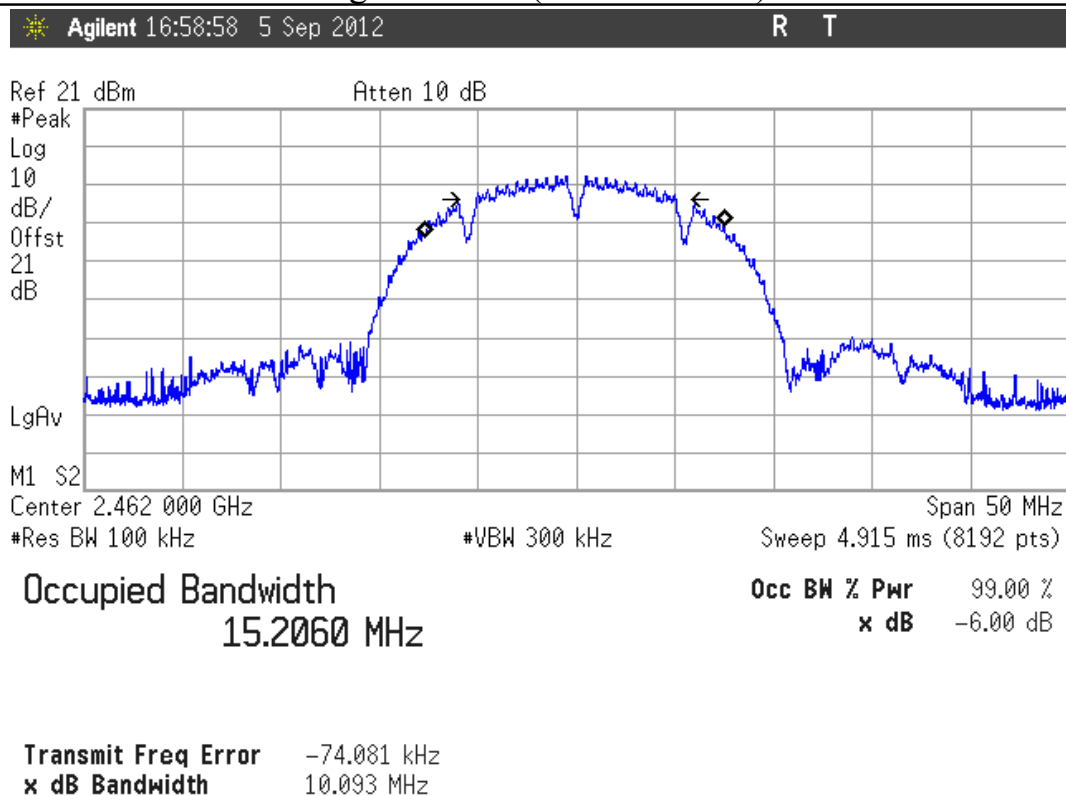
Data Rate = 65 Mb/s

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. 12077-FCC-IC Rev. 02, page 22 / 176

6dB Bandwidth High Channel (802.11b mode)



$BW_{6dB} = 10.09 \text{ MHz}$

$BW_{26dB} = 18.55 \text{ MHz}$

Note:

Data Rate = 1 Mb/s

This document may be only fully reproduced.

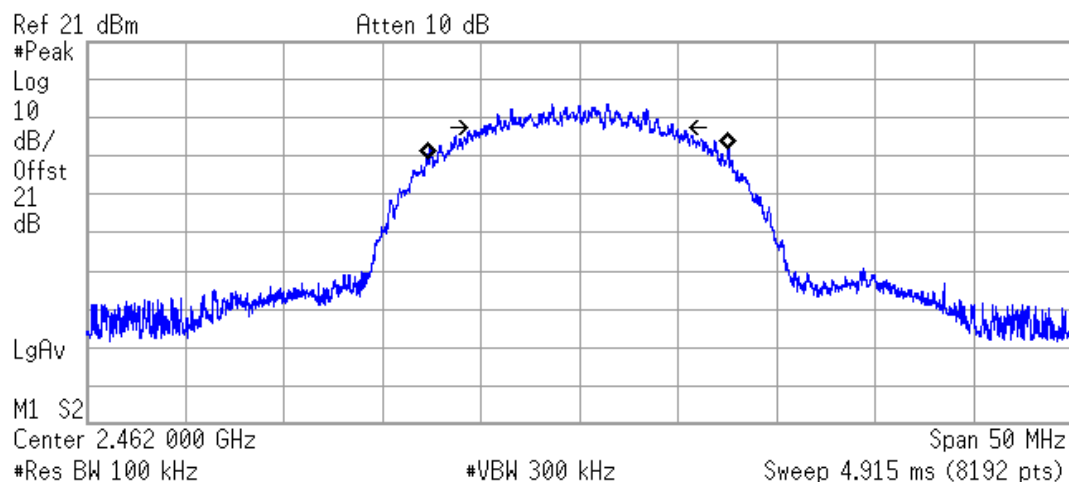
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. 12077-FCC-IC Rev. 02, page 23 / 176

6dB Bandwidth High Channel (802.11b mode)

Agilent 17:00:24 5 Sep 2012

R T



Occupied Bandwidth
15.2272 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -69.357 kHz
x dB Bandwidth 9.590 MHz

BW_{6dB} = 9.59 MHz
BW_{26dB} = 18.91 MHz

Note:

Data Rate = 11 Mb/s

This document may be only fully reproduced.

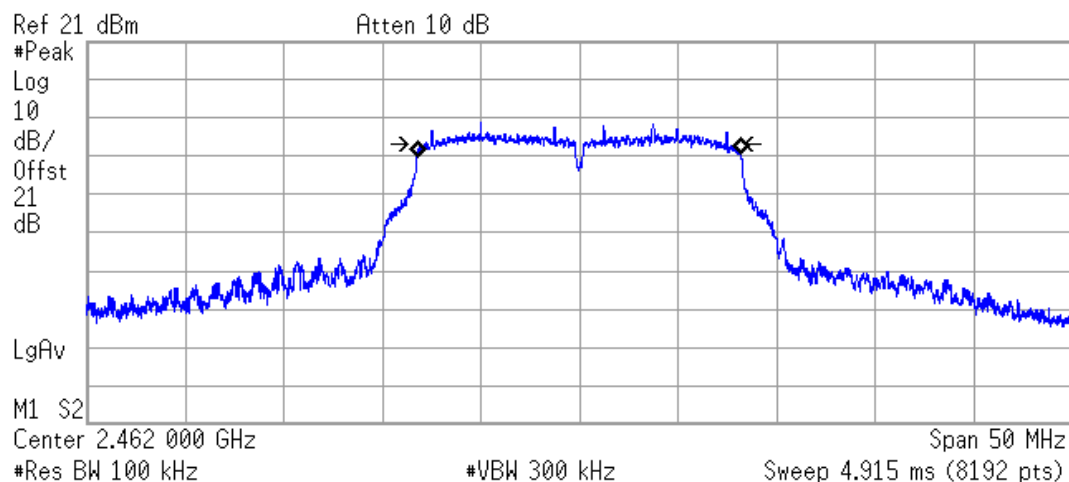
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. 12077-FCC-IC Rev. 02, page 24 / 176

6dB Bandwidth High Channel (802.11g mode)

Agilent 17:01:44 5 Sep 2012

R T



Occupied Bandwidth
16.3776 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -17.549 kHz
x dB Bandwidth 15.388 MHz

BW_{6dB} = 15.39 MHz

BW_{26dB} = 19.34 MHz

Note:

Data Rate = 6 Mb/s

This document may be only fully reproduced.

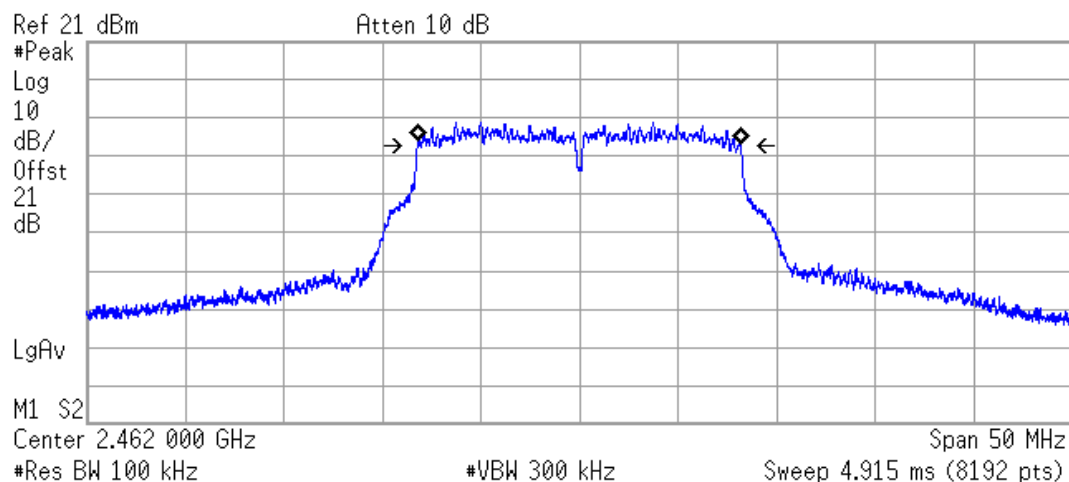
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. 12077-FCC-IC Rev. 02, page 25 / 176

6dB Bandwidth High Channel (802.11g mode)

Agilent 17:03:49 5 Sep 2012

R T



Occupied Bandwidth
16.3451 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -15.056 kHz
x dB Bandwidth 16.403 MHz

BW_{6dB} = 16.40 MHz

BW_{26dB} = 19.46 MHz

Note:

Data Rate = 54 Mb/s

This document may be only fully reproduced.

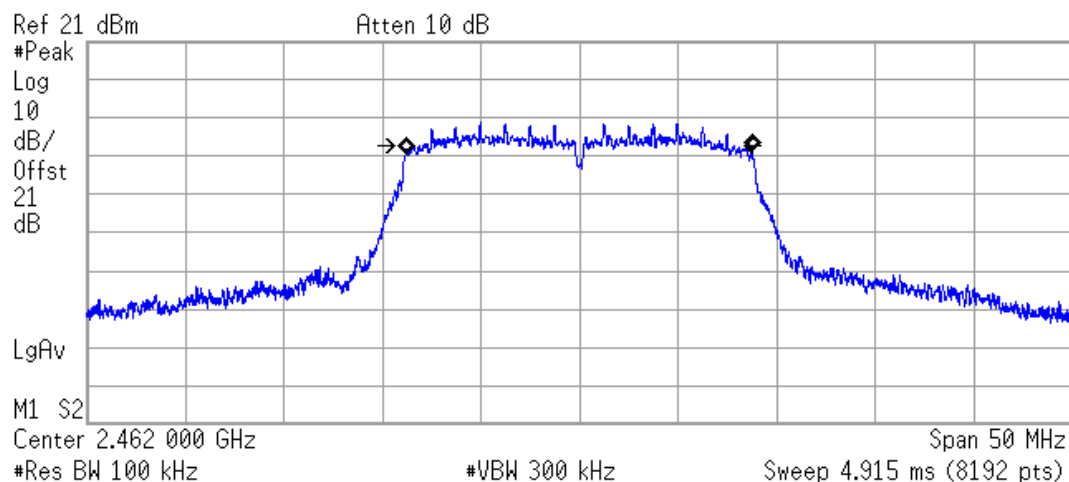
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. 12077-FCC-IC Rev. 02, page 26 / 176

6dB Bandwidth High Channel (802.11n mode)

Agilent 17:05:26 5 Sep 2012

R T



Occupied Bandwidth
17.5648 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -19.039 kHz
x dB Bandwidth 16.058 MHz

BW_{6dB} = 16.06 MHz

BW_{26dB} = 19.84 MHz

Note:

Data Rate = 6.5 Mb/s

This document may be only fully reproduced.

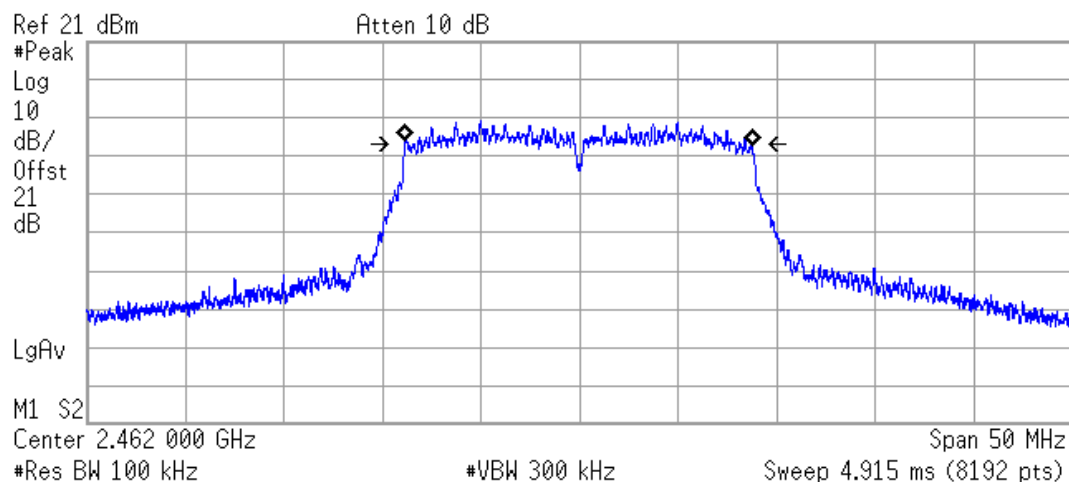
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. 12077-FCC-IC Rev. 02, page 27 / 176

6dB Bandwidth High Channel (802.11n mode)

Agilent 17:06:40 5 Sep 2012

R T



Occupied Bandwidth
17.5903 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -34.899 kHz
x dB Bandwidth 17.601 MHz

$BW_{6dB} = 17.60 \text{ MHz}$

$BW_{26dB} = 19.82 \text{ MHz}$

Note:

Data Rate = 65 Mb/s

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. 12077-FCC-IC Rev. 02, page 28 / 176

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. DUE
EMI Receiver	Agilent	E4440A	01/2013

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

Channel Power (dBm)	<i>Mode / Data rate (Mb/s)</i>					
	<i>802.11b</i>		<i>802.11g</i>		<i>802.11n</i>	
	<i>1</i>	<i>11</i>	<i>6</i>	<i>54</i>	<i>6.5</i>	<i>65</i>
<i>Ch. Low</i>	13.28	12.97	11.20	10.69	11.09	10.59
<i>Ch. Mid</i>	13.12	13.24	11.19	10.92	10.97	10.68
<i>Ch. High</i>	13.20	13.21	10.76	10.51	10.62	10.40

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. 12077-FCC-IC Rev. 02, page 29 / 176

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. DUE
EMI Receiver	Agilent	E4440A	01/2013

Test procedure: APR01

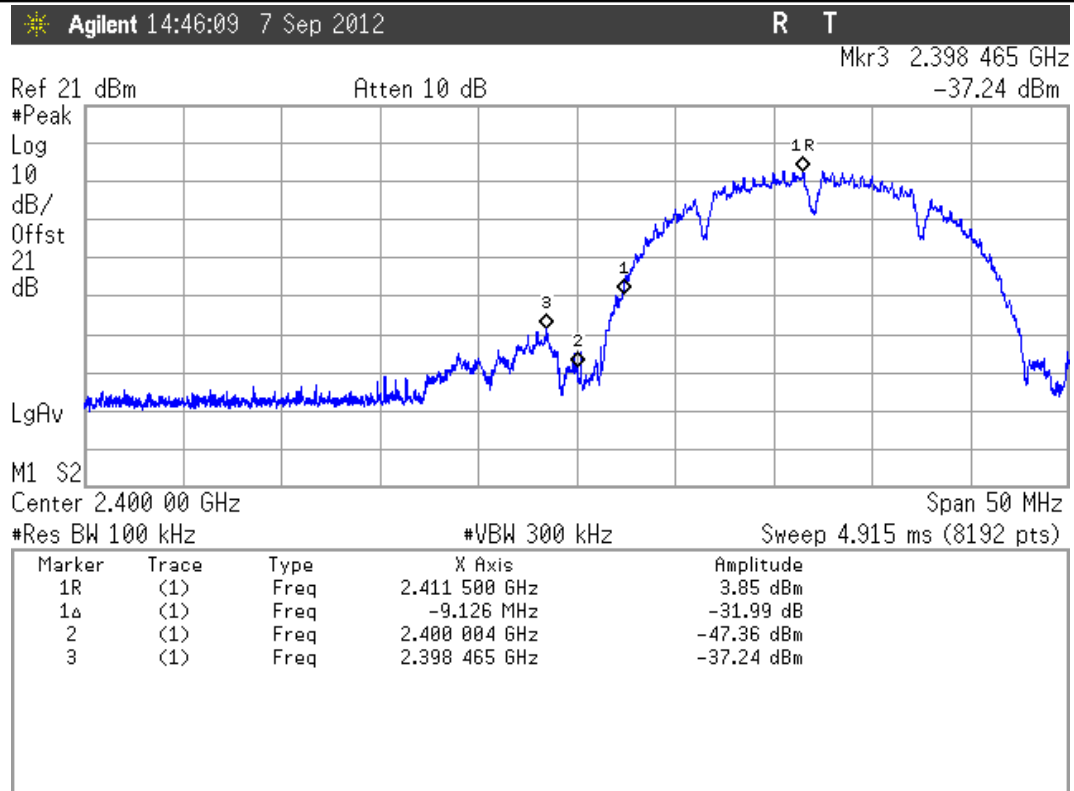
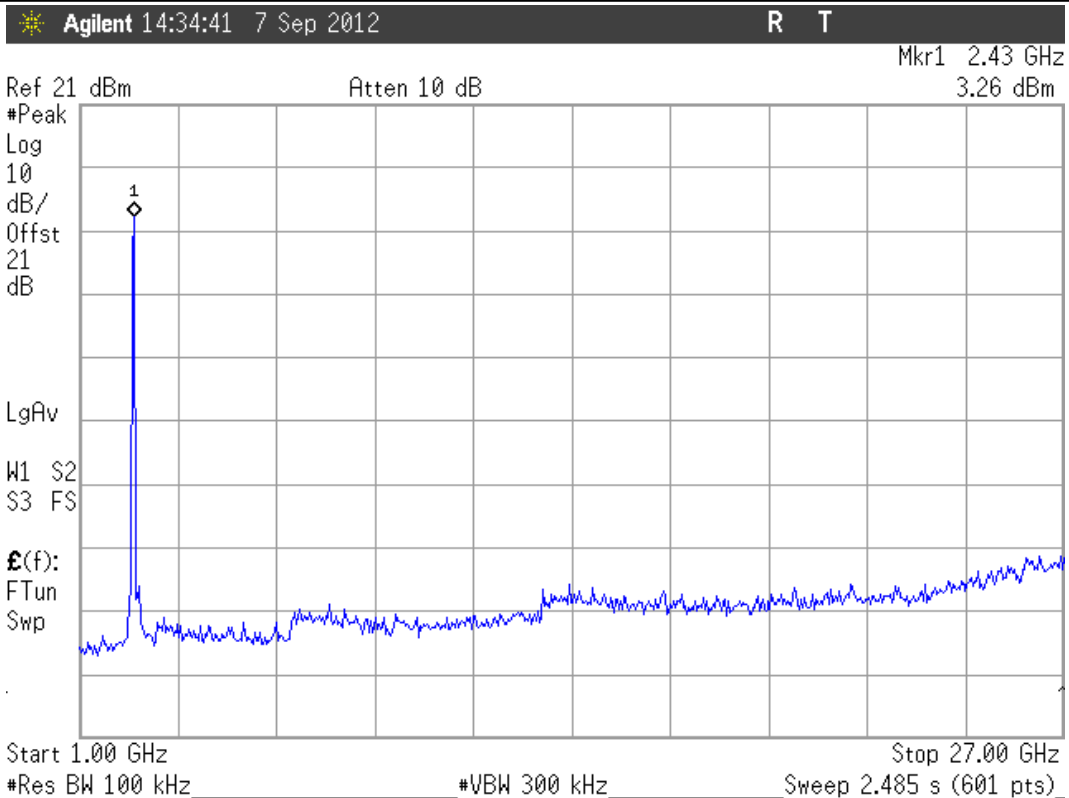
Test performed on low, middle and high channels and in the b,g,n protocols at maximum and minimum data rate for each protocol.

Results:

No non-compliance noted

The following figures show the results.

Conducted Spurious Emissions Low Channel (802.11b mode)



Note:

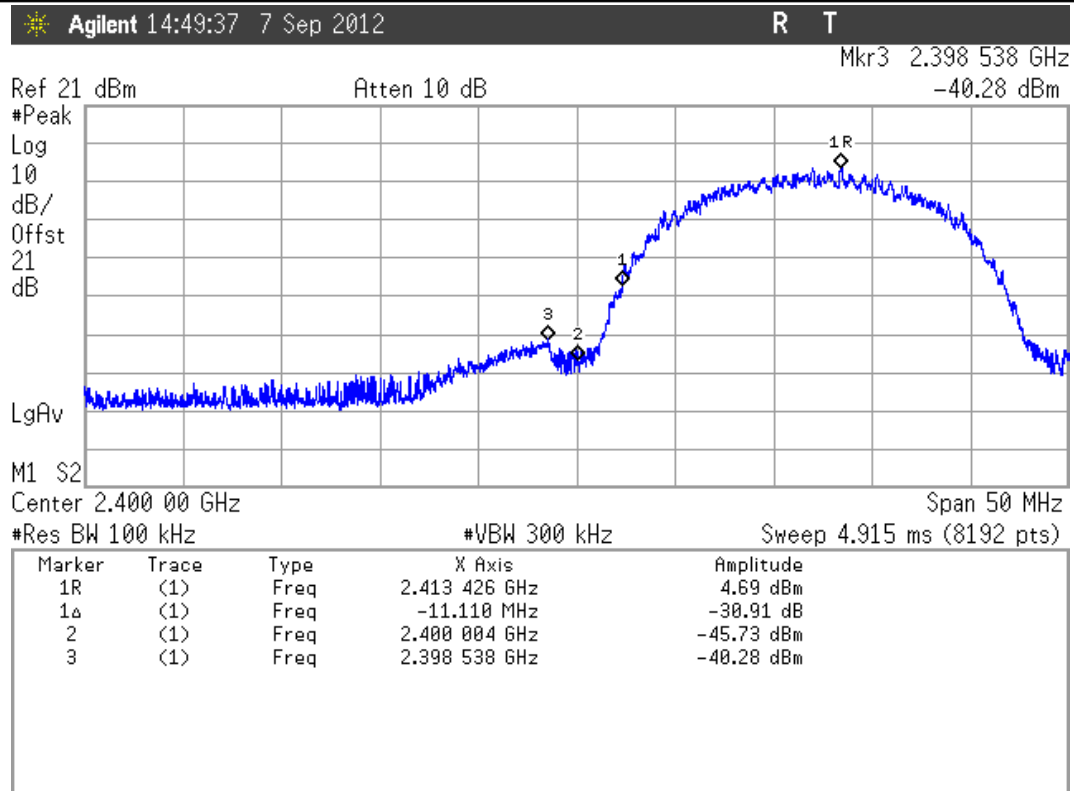
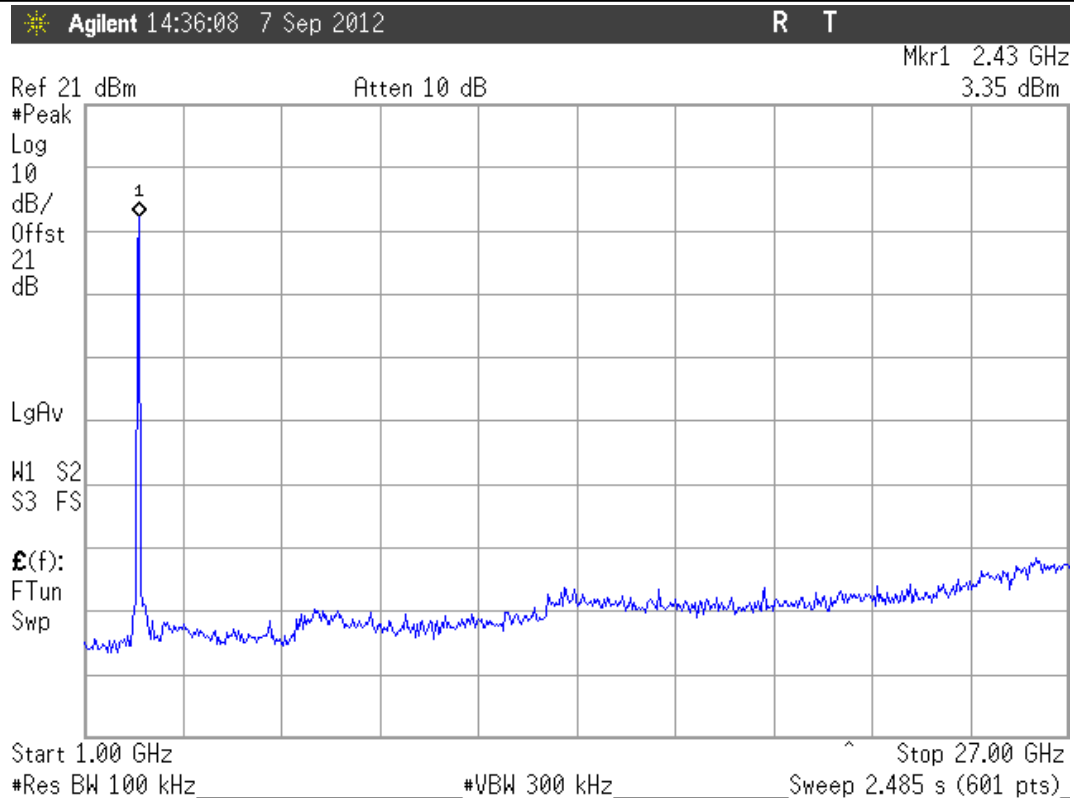
Data Rate = 1 Mb/s

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. 12077-FCC-IC Rev. 02, page 31 / 176

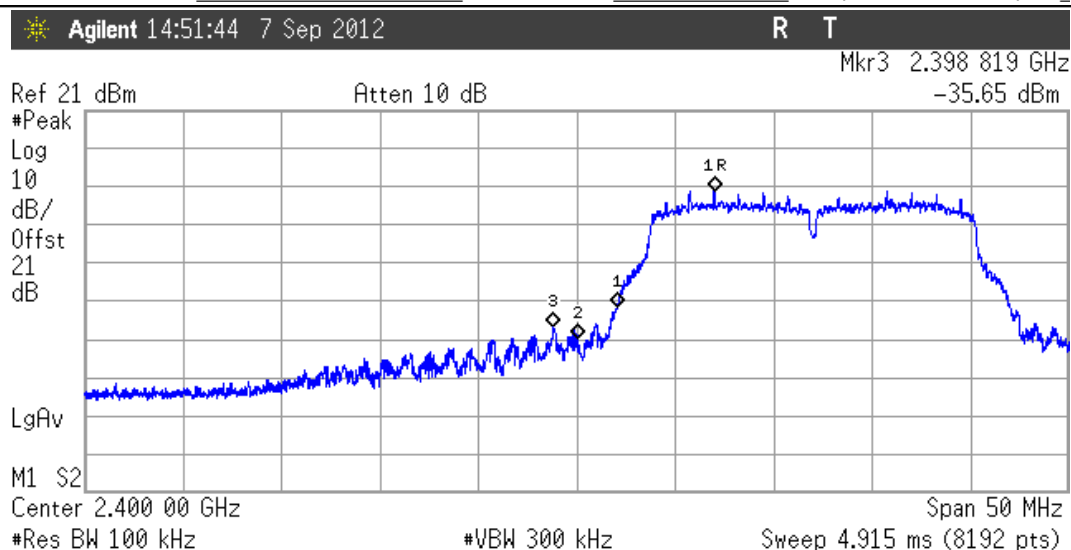
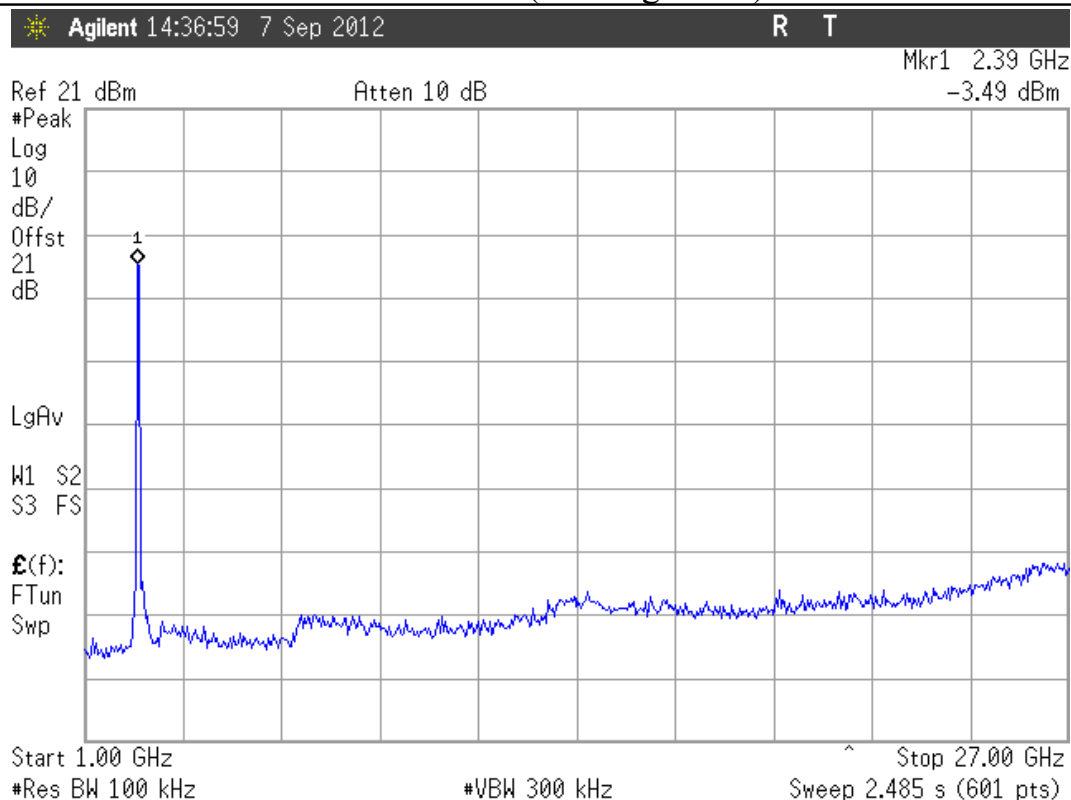
Conducted Spurious Emissions Low Channel (802.11b mode)



Note:

Data Rate = 11 Mb/s

Conducted Spurious Emissions Low Channel (802.11g mode)



Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Freq	2.406 988 GHz	-0.85 dBm
1a	(1)	Freq	-4.902 MHz	-30.34 dB
2	(1)	Freq	2.400 004 GHz	-38.53 dBm
3	(1)	Freq	2.398 819 GHz	-35.65 dBm

Note:

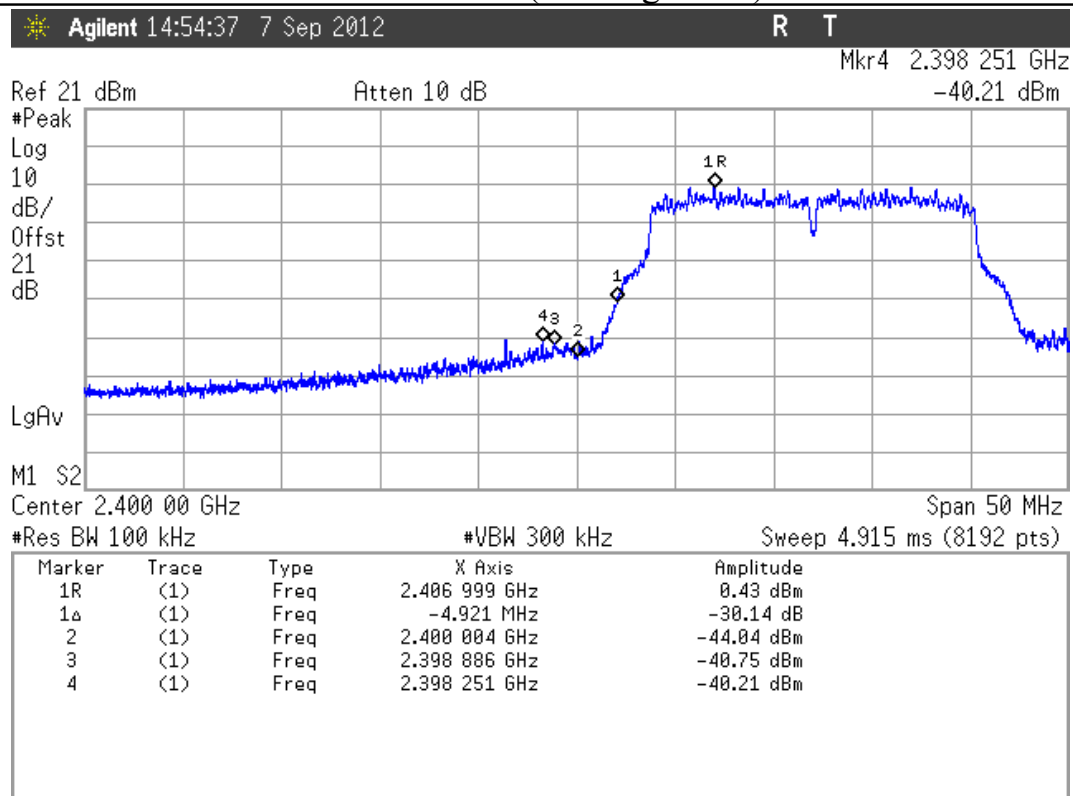
Data Rate = 6 Mb/s

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. 12077-FCC-IC Rev. 02, page 33 / 176

Conducted Spurious Emissions Low Channel (802.11g mode)



Note:

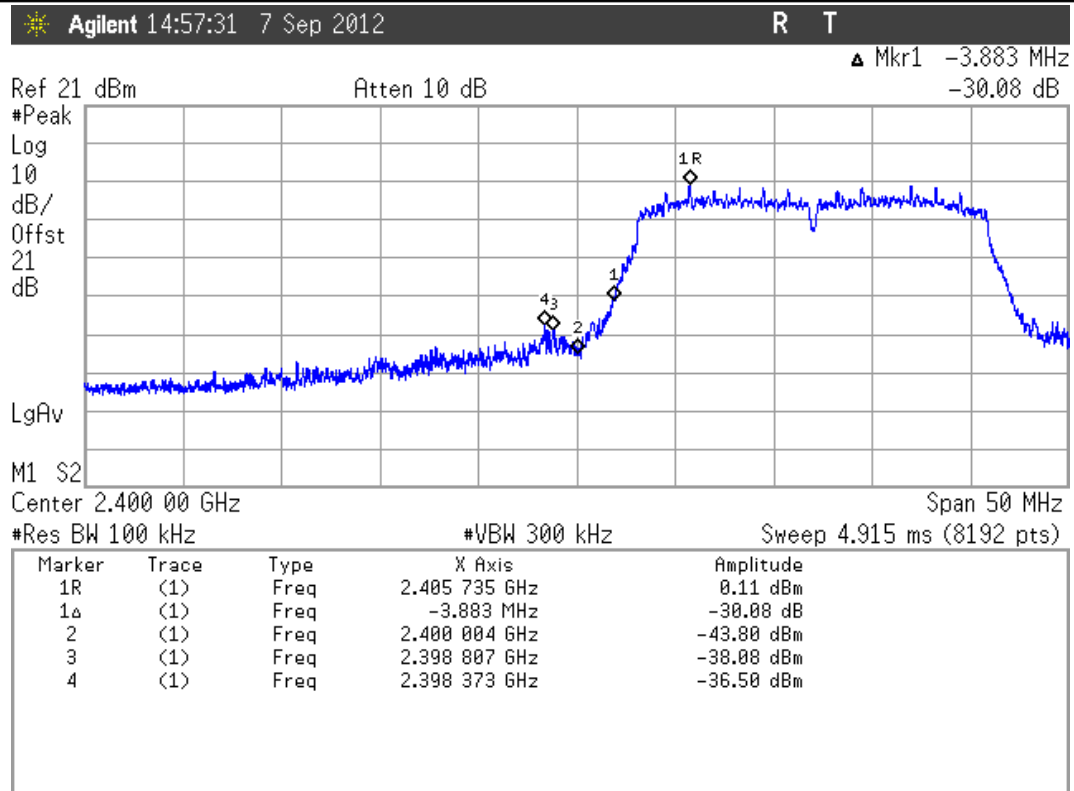
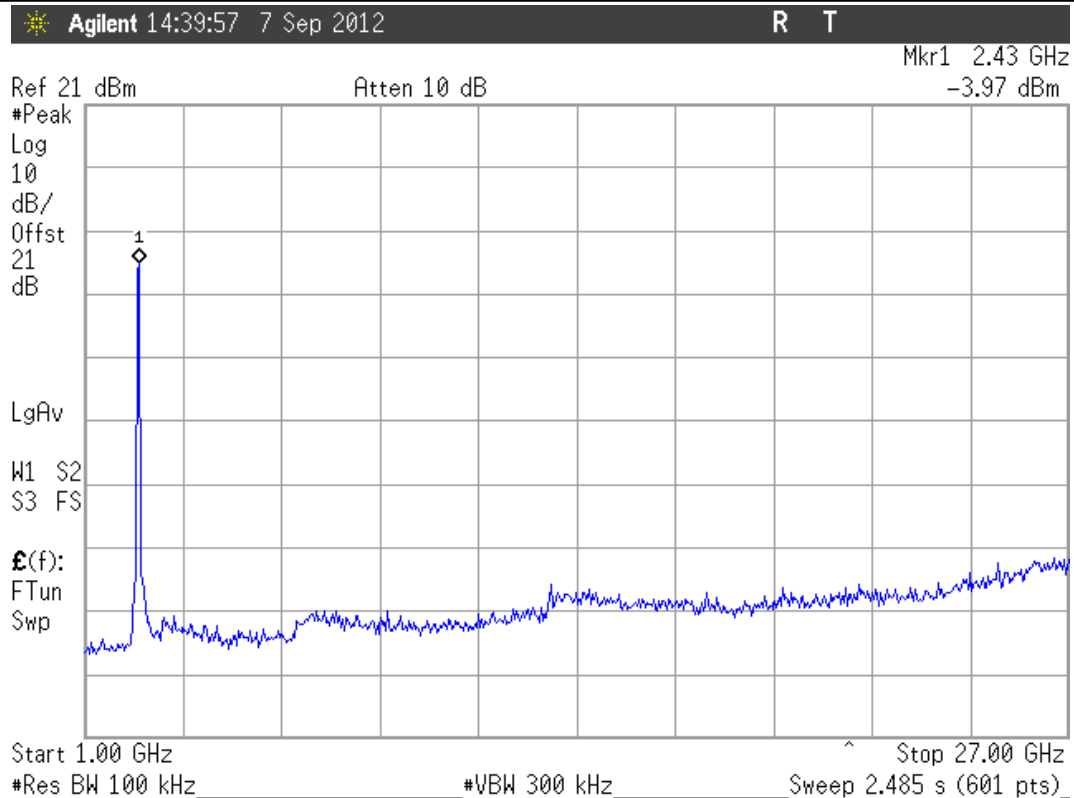
Data Rate = 54 Mb/s

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. 12077-FCC-IC Rev. 02, page 34 / 176

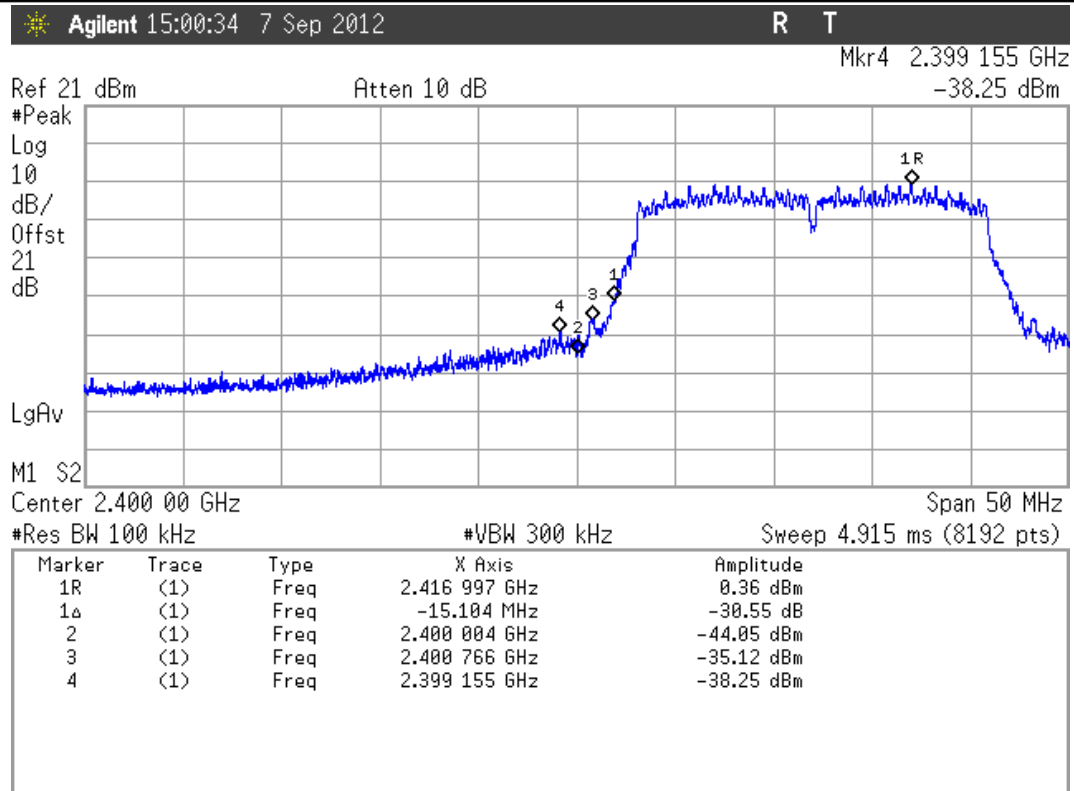
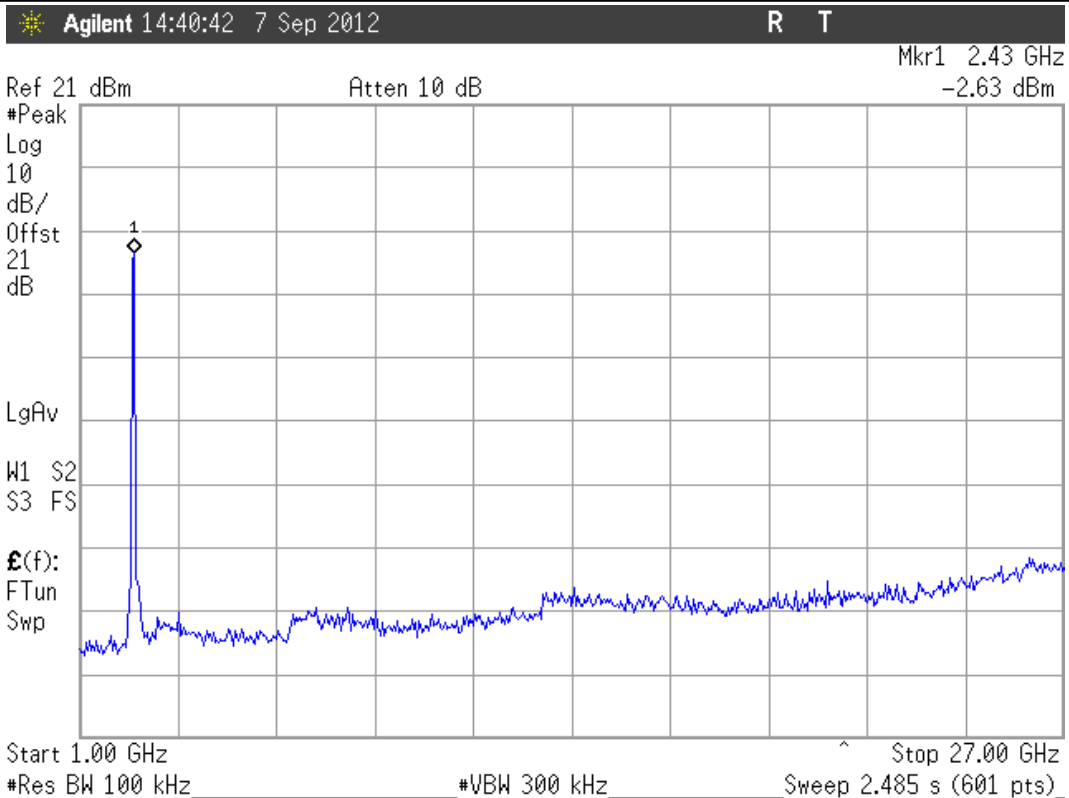
Conducted Spurious Emissions Low Channel (802.11n mode)



Note:

Data Rate = 6.5 Mb/s

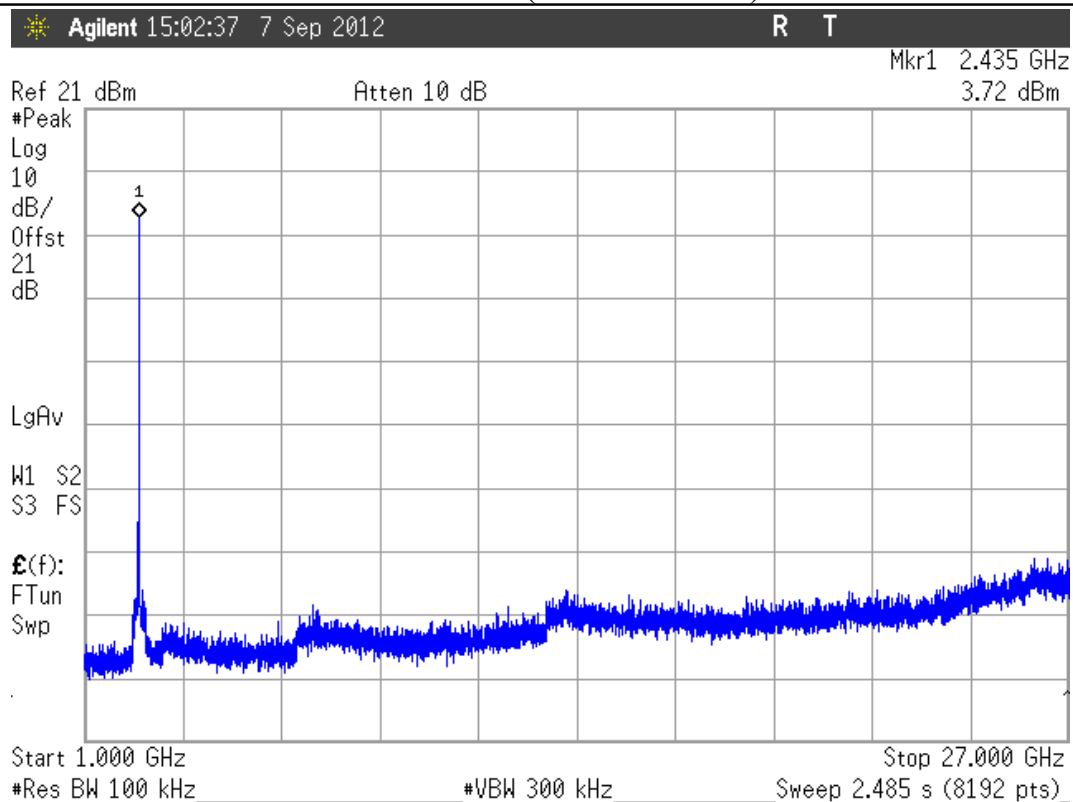
Conducted Spurious Emissions Low Channel (802.11n mode)



Note:

Data Rate = 65 Mb/s

Conducted Spurious Emissions Mid Channel (802.11b mode)



Note:

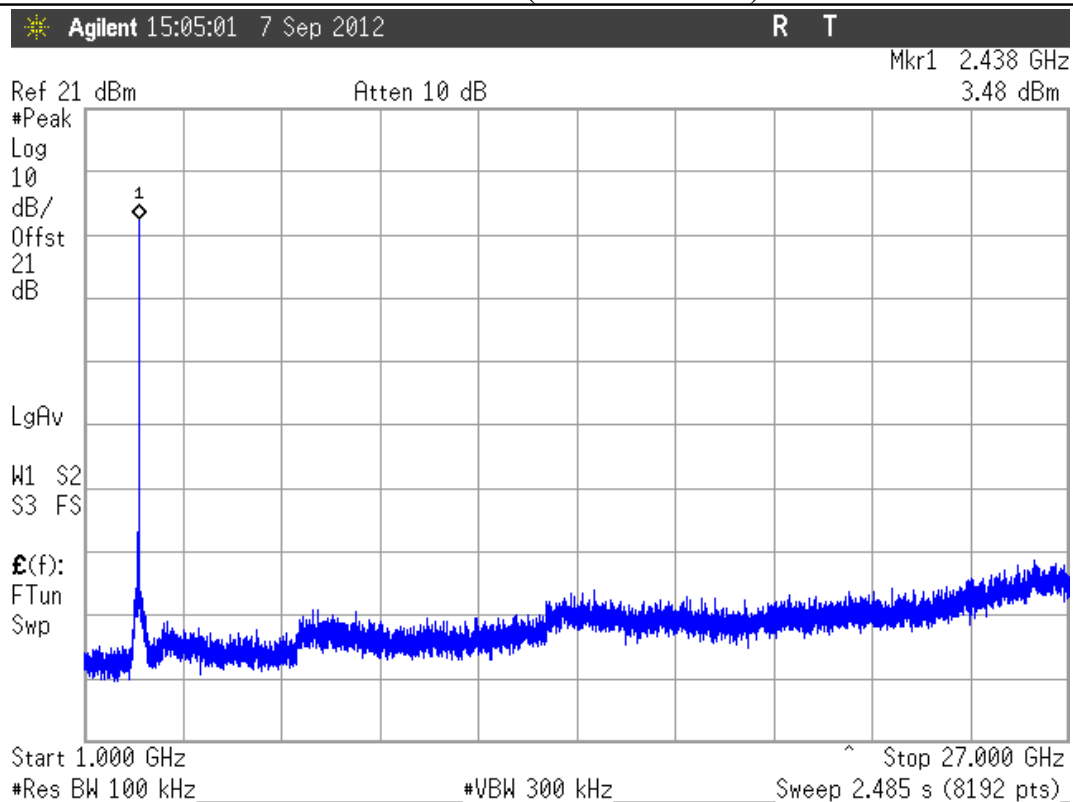
Data Rate = 1 Mb/s

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. 12077-FCC-IC Rev. 02, page 37 / 176

Conducted Spurious Emissions Mid Channel (802.11b mode)



Note:

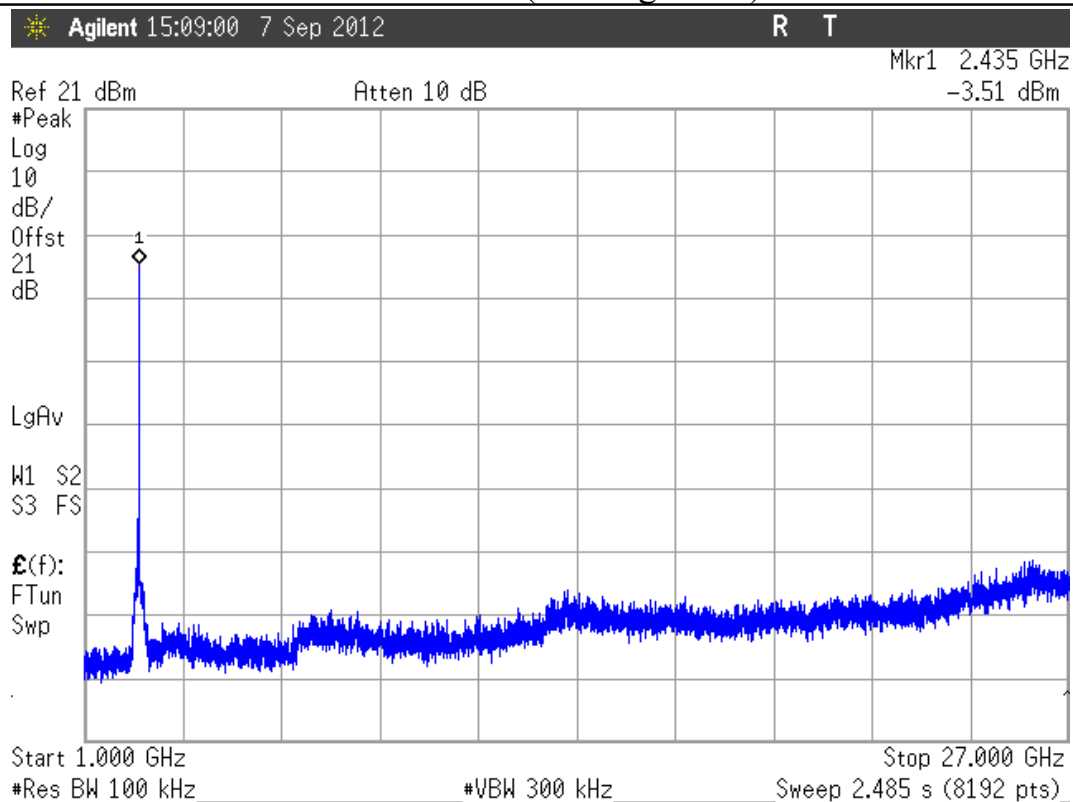
Data Rate = 11 Mb/s

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. 12077-FCC-IC Rev. 02, page 38 / 176

Conducted Spurious Emissions Mid Channel (802.11g mode)



Note:

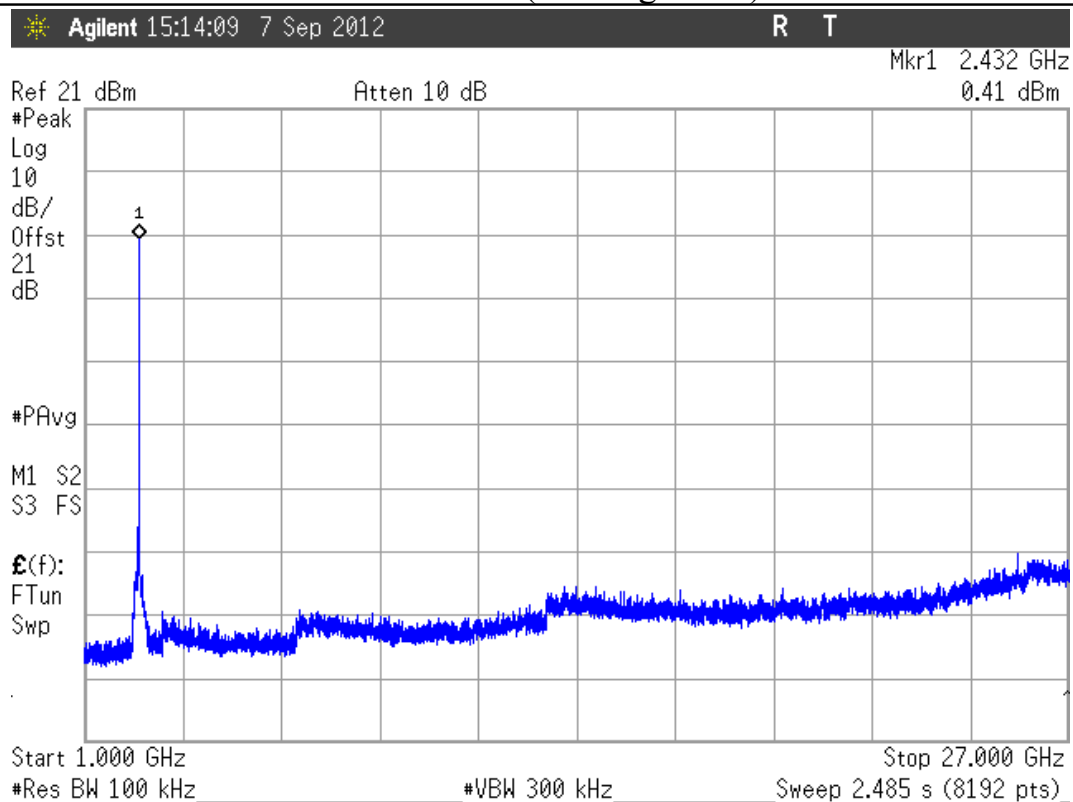
Data Rate = 6 Mb/s

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. 12077-FCC-IC Rev. 02, page 39 / 176

Conducted Spurious Emissions Mid Channel (802.11g mode)



Note:

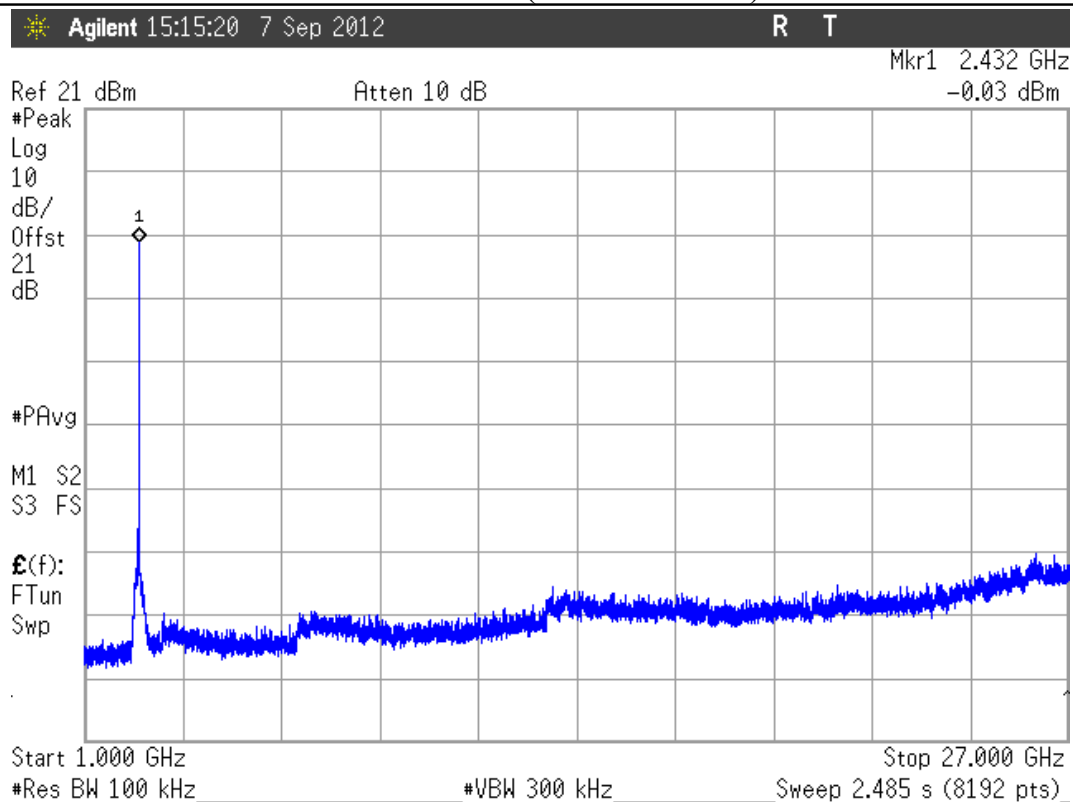
Data Rate = 54 Mb/s

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. 12077-FCC-IC Rev. 02, page 40 / 176

Conducted Spurious Emissions Mid Channel (802.11n mode)



Note:

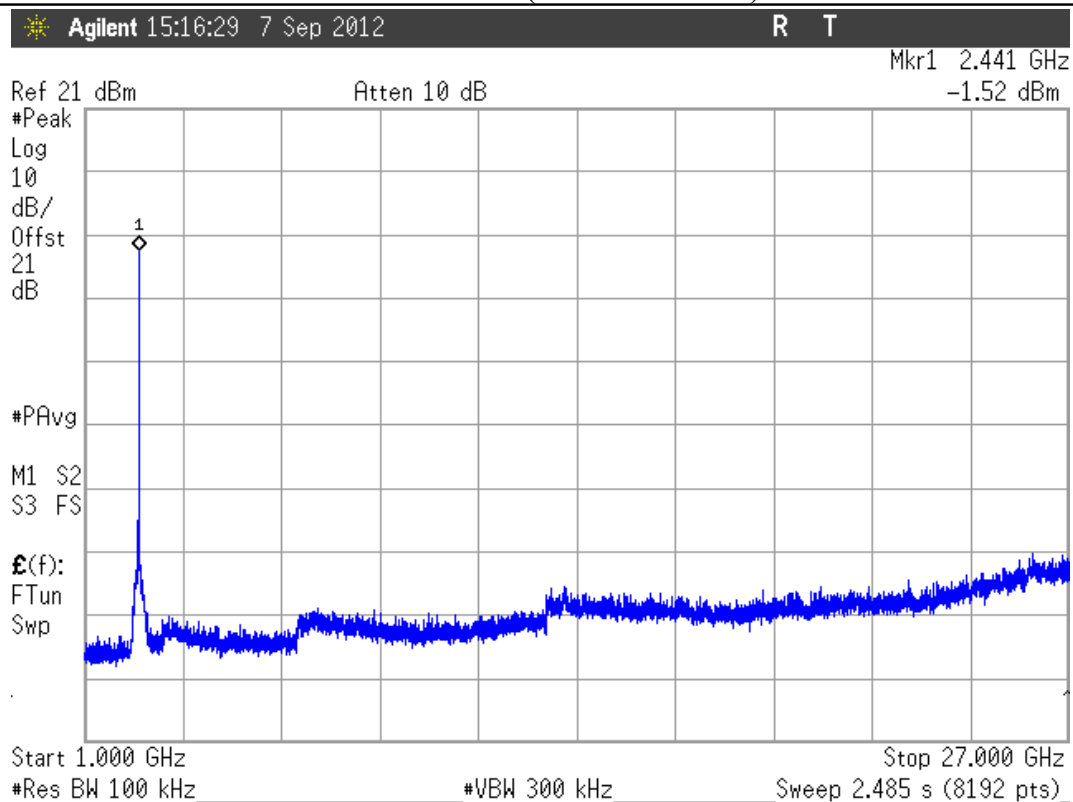
Data Rate = 6.5 Mb/s

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. 12077-FCC-IC Rev. 02, page 41 / 176

Conducted Spurious Emissions Mid Channel (802.11n mode)



Note:

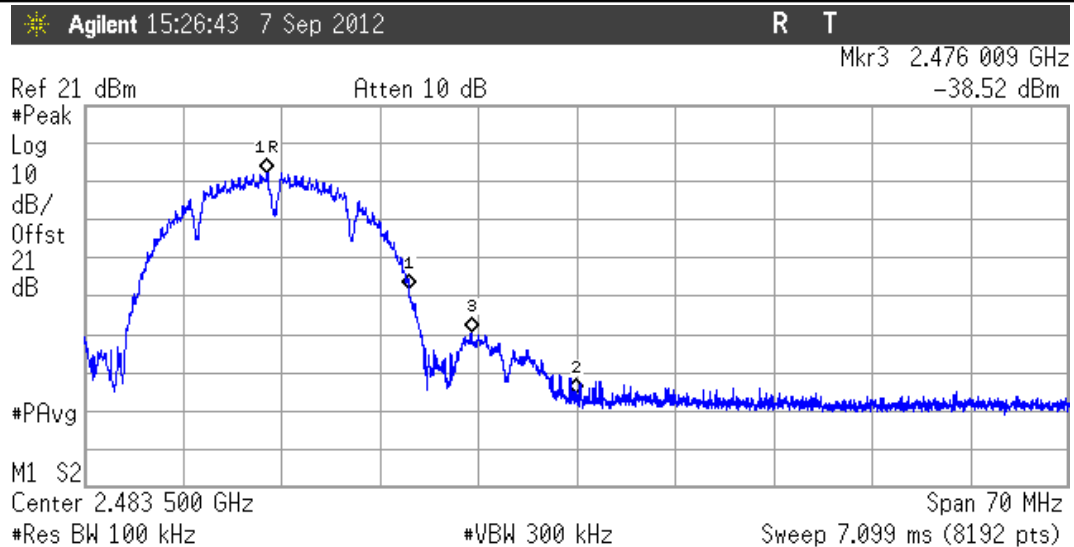
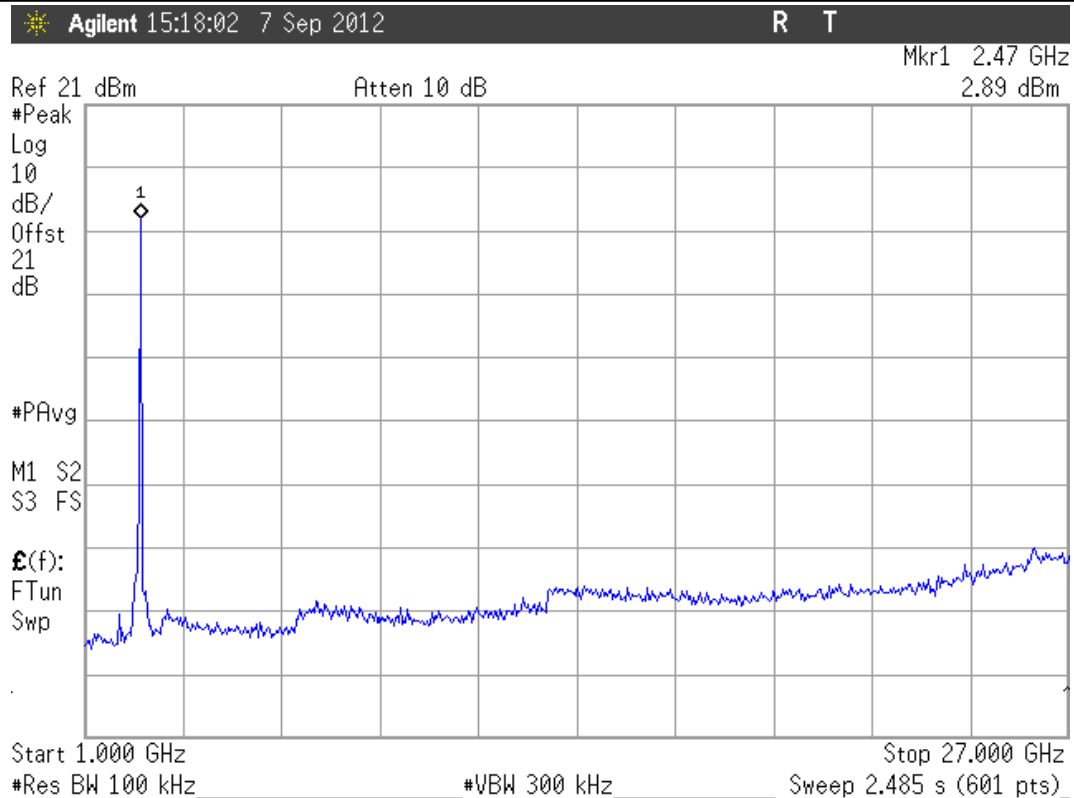
Data Rate = 65 Mb/s

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. 12077-FCC-IC Rev. 02, page 42 / 176

Conducted Spurious Emissions High Channel (802.11b mode)

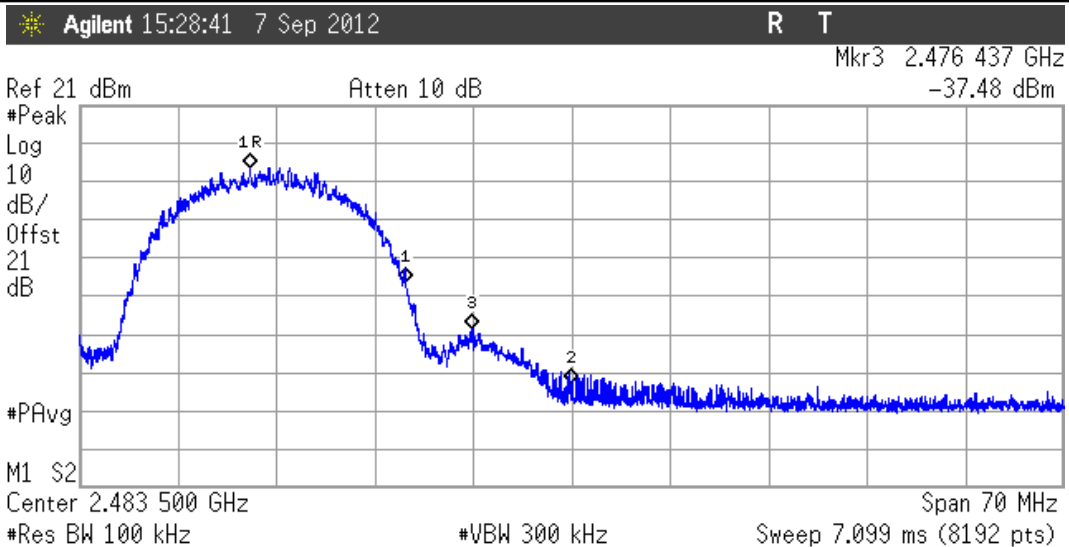
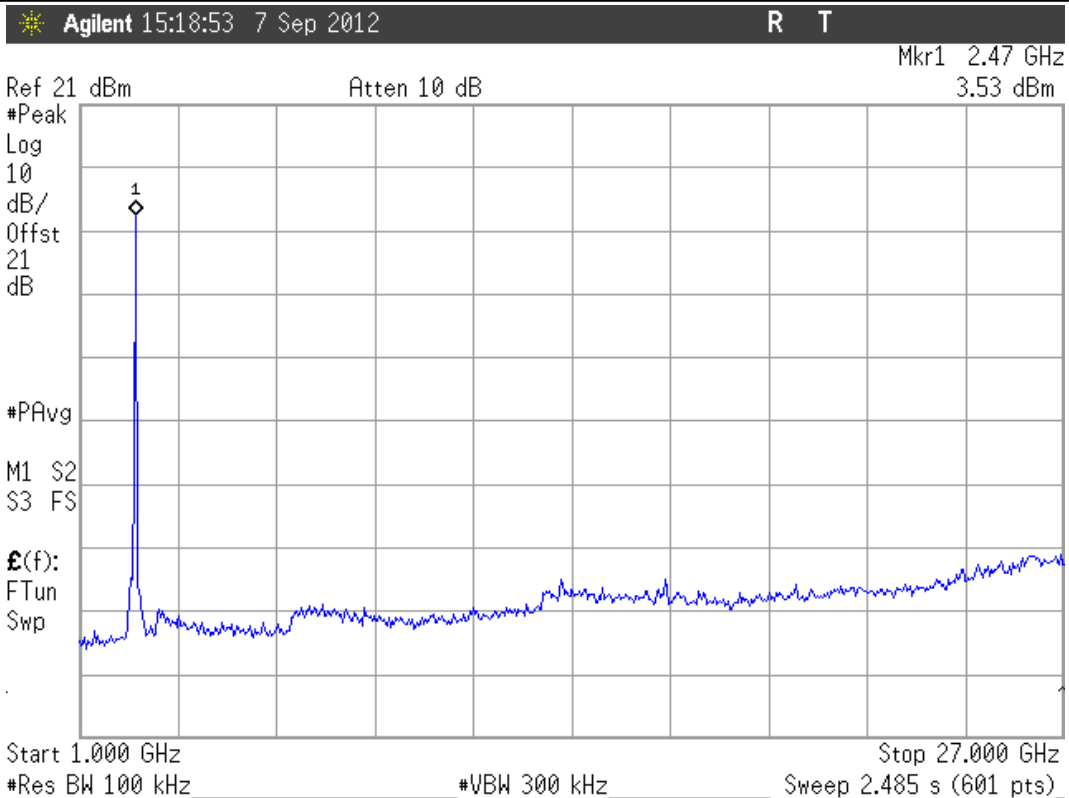


Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Freq	2.461 498 GHz	3.11 dBm
1a	(1)	Freq	10.069 MHz	-30.27 dB
2	(1)	Freq	2.483 496 GHz	-54.28 dBm
3	(1)	Freq	2.476 009 GHz	-38.52 dBm

Note:

Data Rate = 1 Mb/s

Conducted Spurious Emissions High Channel (802.11b mode)

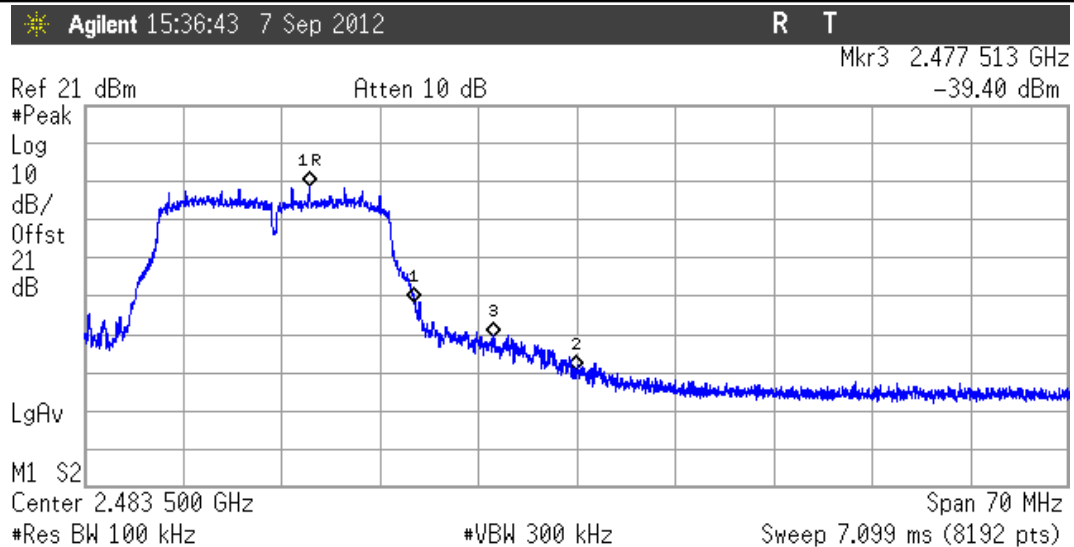
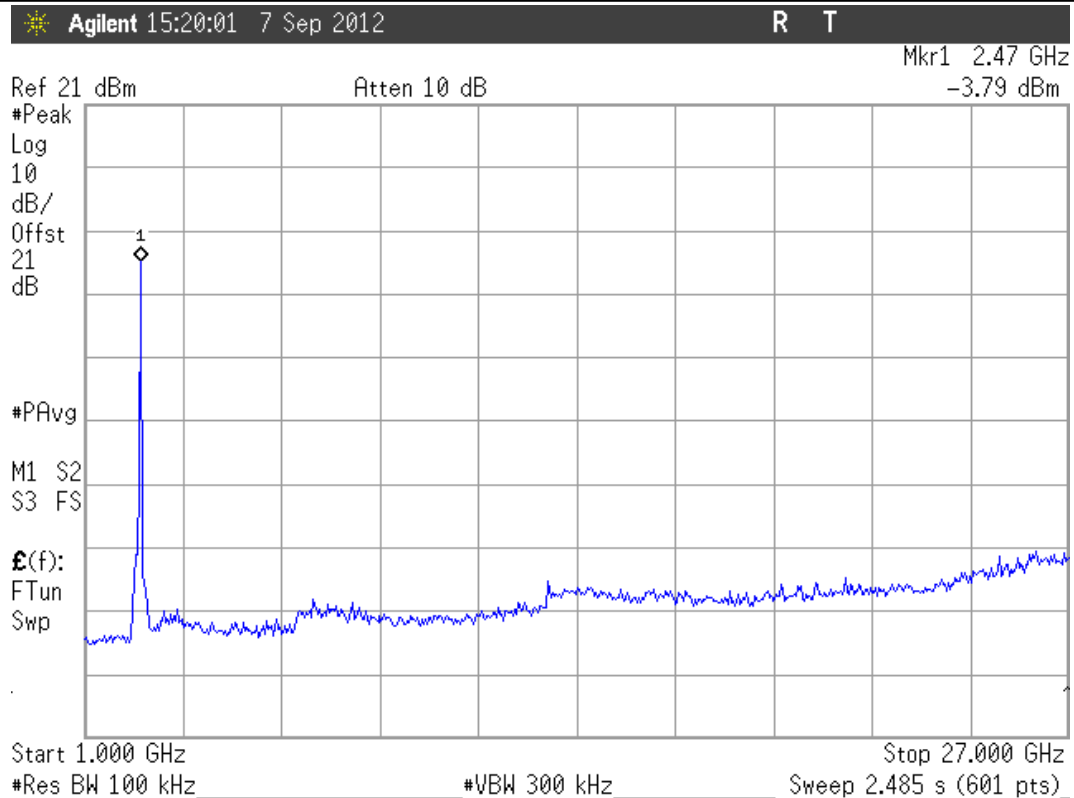


Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Freq	2.460 618 GHz	4.62 dBm
1	(1)	Freq	11.069 MHz	-30.16 dB
2	(1)	Freq	2.483 496 GHz	-51.69 dBm
3	(1)	Freq	2.476 437 GHz	-37.48 dBm

Note:

Data Rate = 11 Mb/s

Conducted Spurious Emissions High Channel (802.11g mode)



Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Freq	2.464 490 GHz	-0.31 dBm
1	(1)	Freq	7.419 MHz	-30.18 dB
2	(1)	Freq	2.483 496 GHz	-48.21 dBm
3	(1)	Freq	2.477 513 GHz	-39.40 dBm

Note:

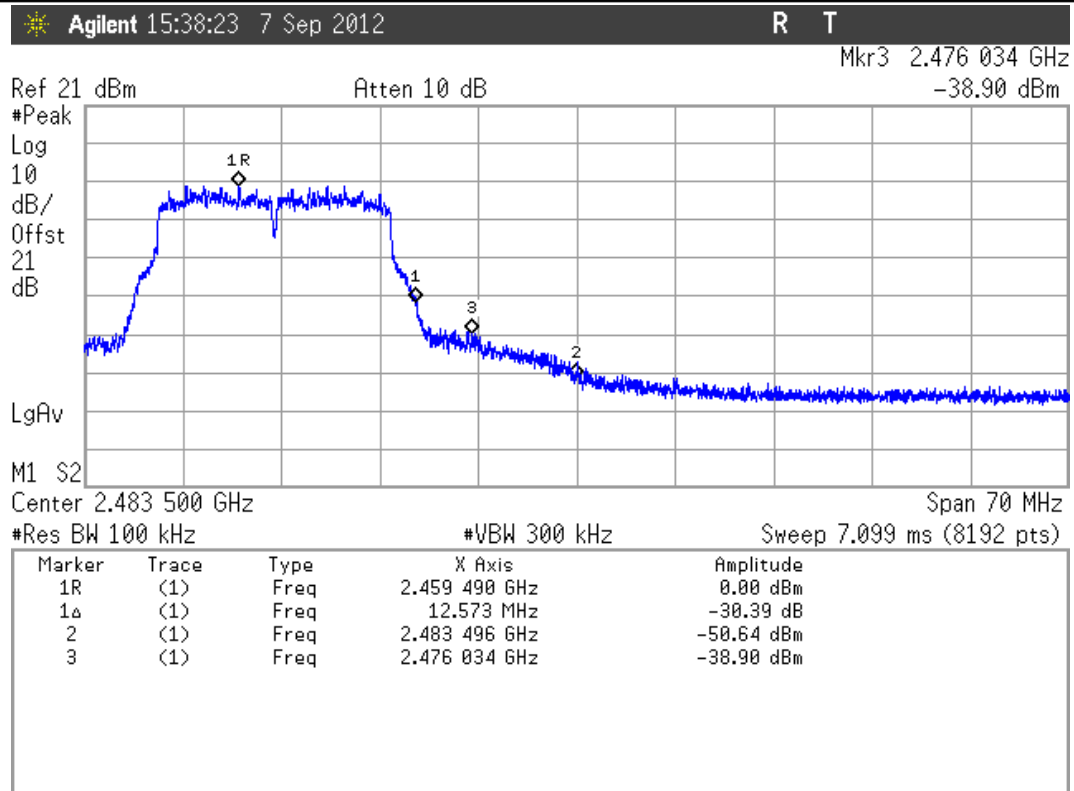
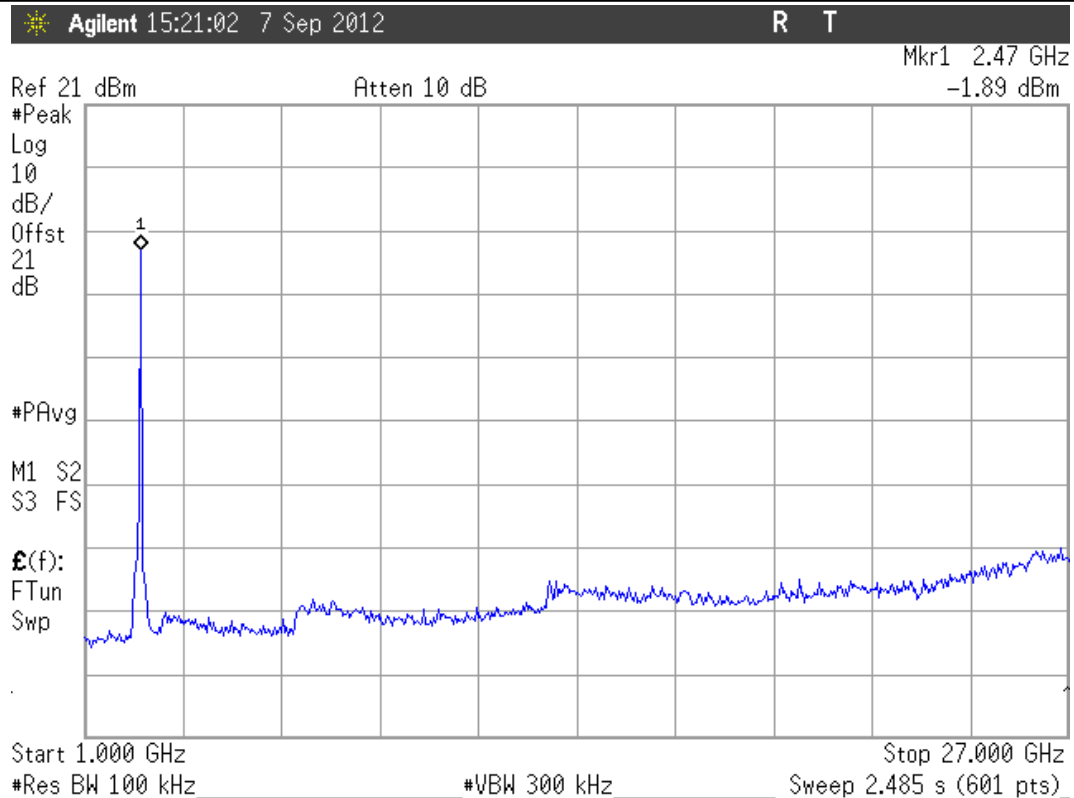
Data Rate = 6 Mb/s

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. 12077-FCC-IC Rev. 02, page 45 / 176

Conducted Spurious Emissions High Channel (802.11g mode)



Note:

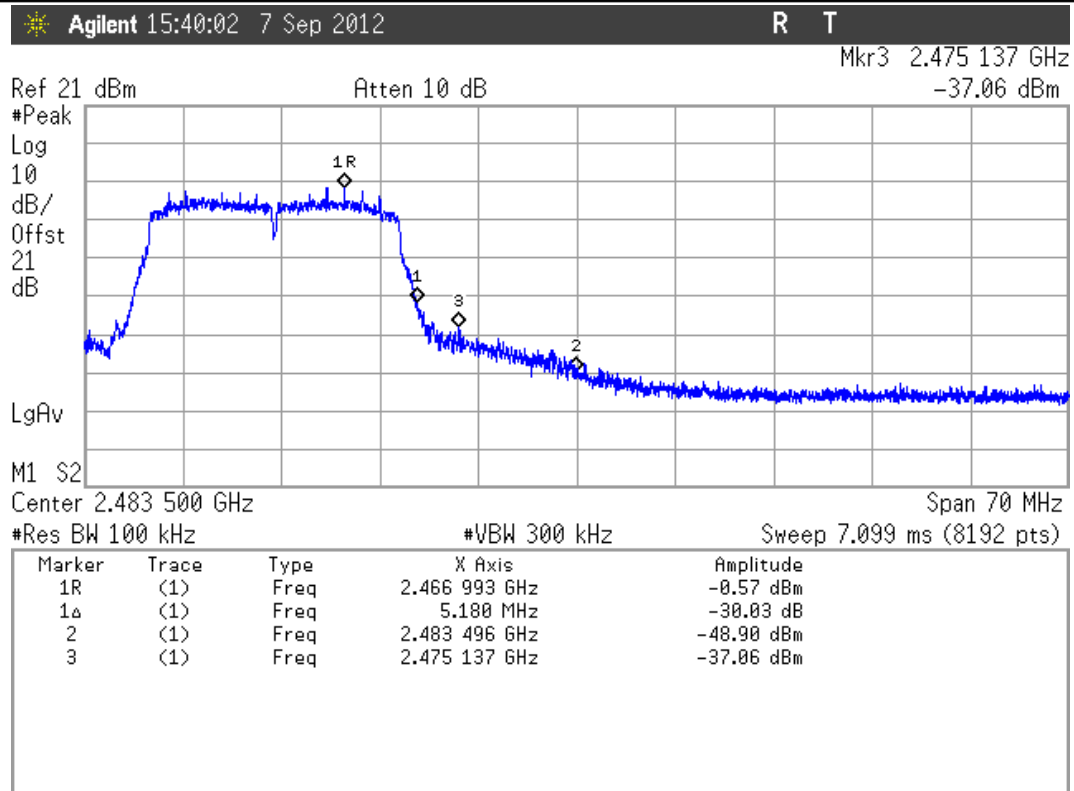
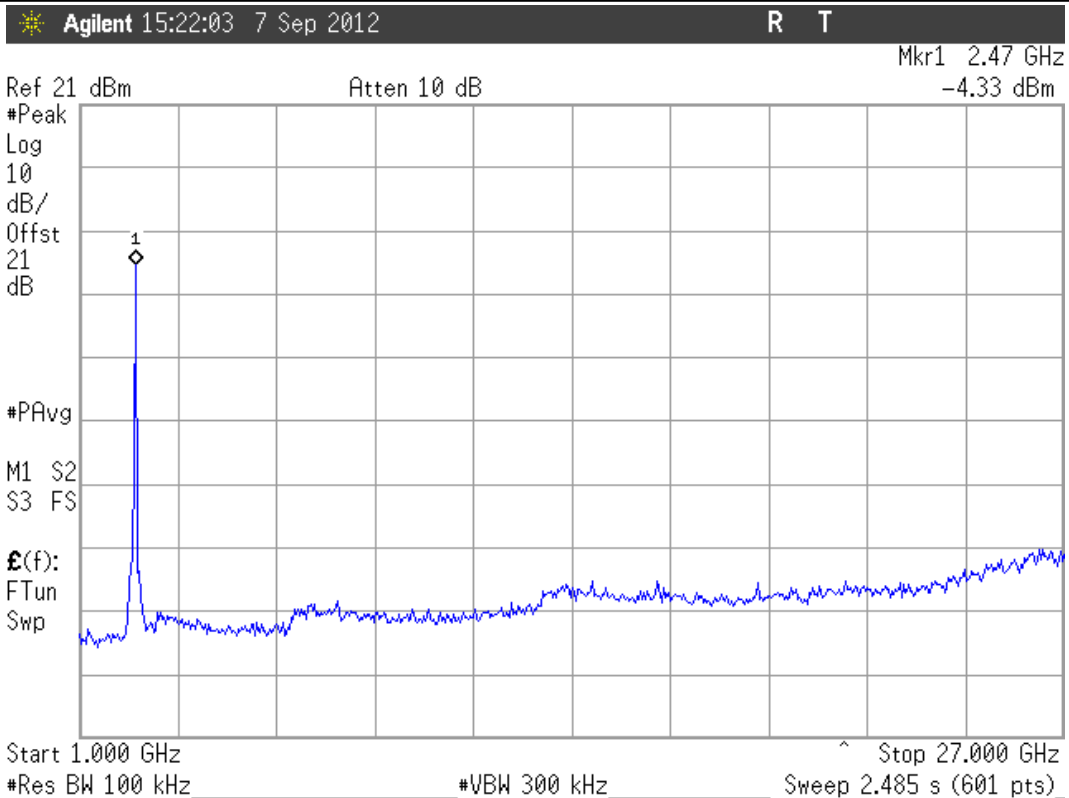
Data Rate = 54 Mb/s

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. 12077-FCC-IC Rev. 02, page 46 / 176

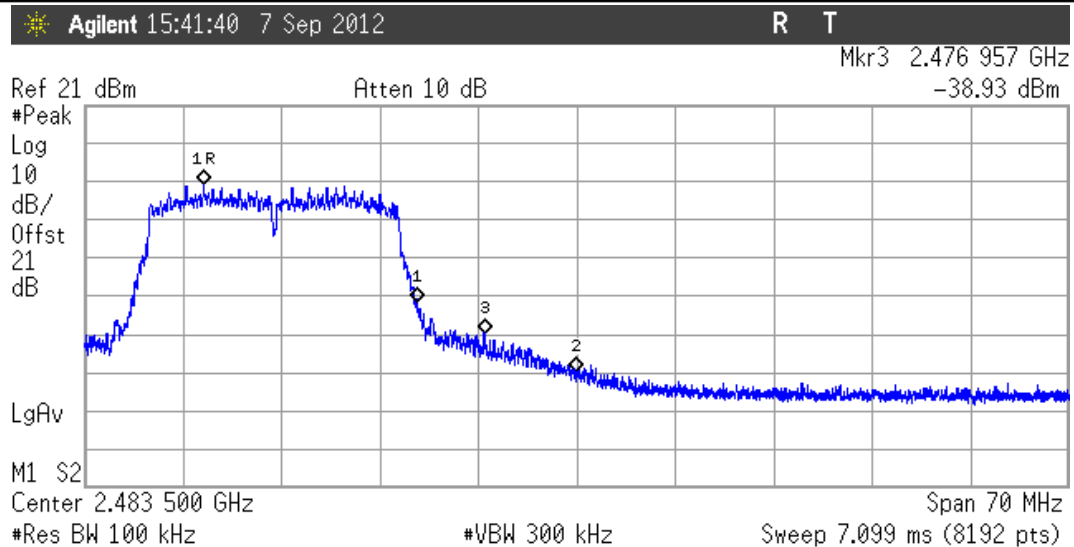
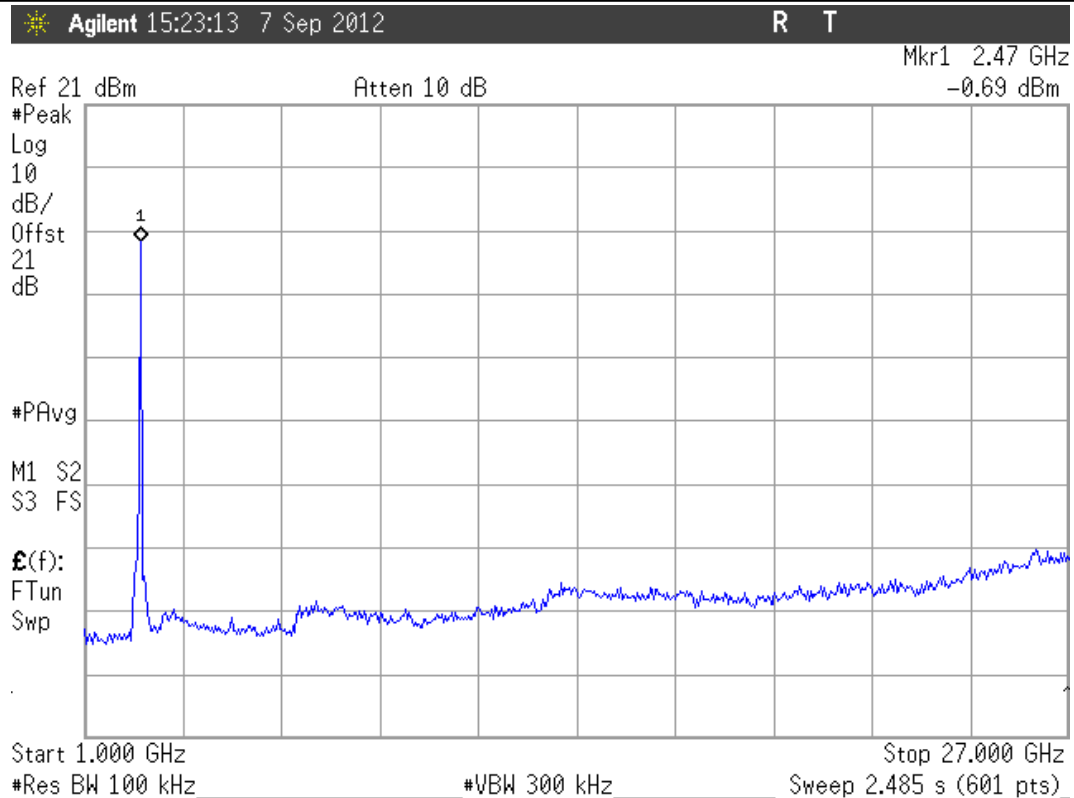
Conducted Spurious Emissions High Channel (802.11n mode)



Note:

Data Rate = 6.5 Mb/s

Conducted Spurious Emissions High Channel (802.11n mode)



Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Freq	2.456 986 GHz	0.11 dBm
1a	(1)	Freq	15.171 MHz	-30.46 dB
2	(1)	Freq	2.483 496 GHz	-48.90 dBm
3	(1)	Freq	2.476 957 GHz	-38.93 dBm

Note:

Data Rate = 65 Mb/s

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. 12077-FCC-IC Rev. 02, page 48 / 176

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. DUE
EMI Receiver	Agilent	E4440A	01/2013

Test procedure: APR01

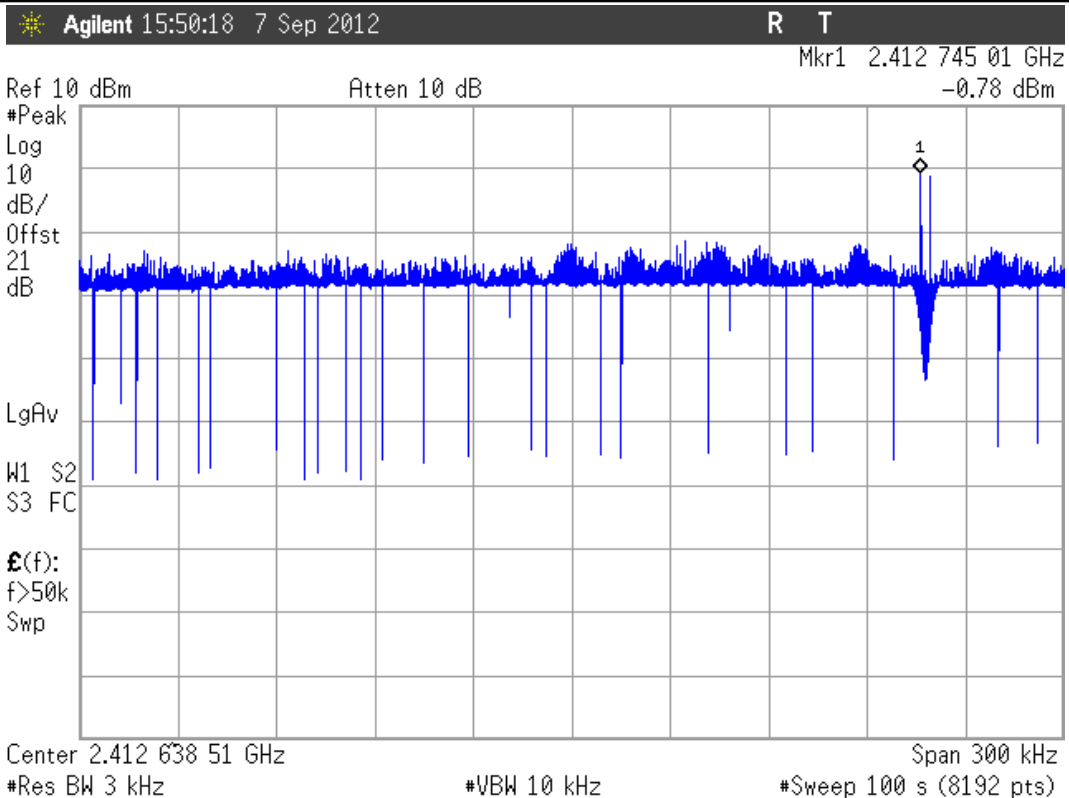
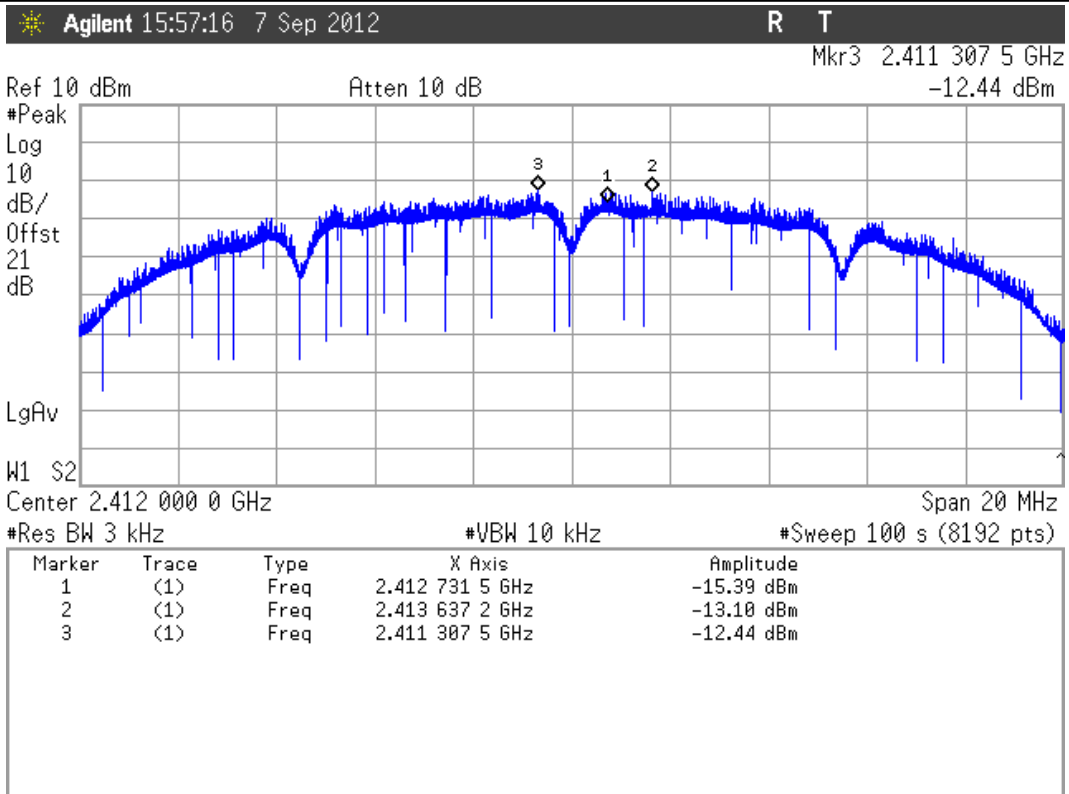
Test performed on low, middle and high channels and in the b,g,n protocols at maximum and minimum data rate for each protocol.

Results:

No non-compliance noted

802.11b Mode, 11 Mbs				
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>PPSD (dBm)</i>	<i>Limit (dBm)</i>	<i>Margin (dB)</i>
Low	2412	3,53	8	4,47
Mid	2437	0,92	8	7,08
High	2462	0,37	8	7,63
802.11g Mode, 54 Mbs				
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>PPSD (dBm)</i>	<i>Limit (dBm)</i>	<i>Margin (dB)</i>
Low	2412	-12,97	8	20,97
Mid	2437	-14,63	8	22,63
High	2462	-14,65	8	22,65
802.11n Mode, 65 Mbs				
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>PPSD (dBm)</i>	<i>Limit (dBm)</i>	<i>Margin (dB)</i>
Low	2412	-13,8	8	21,8
Mid	2437	-14,99	8	22,99
High	2462	-15,38	8	23,38
The following figures show the results				

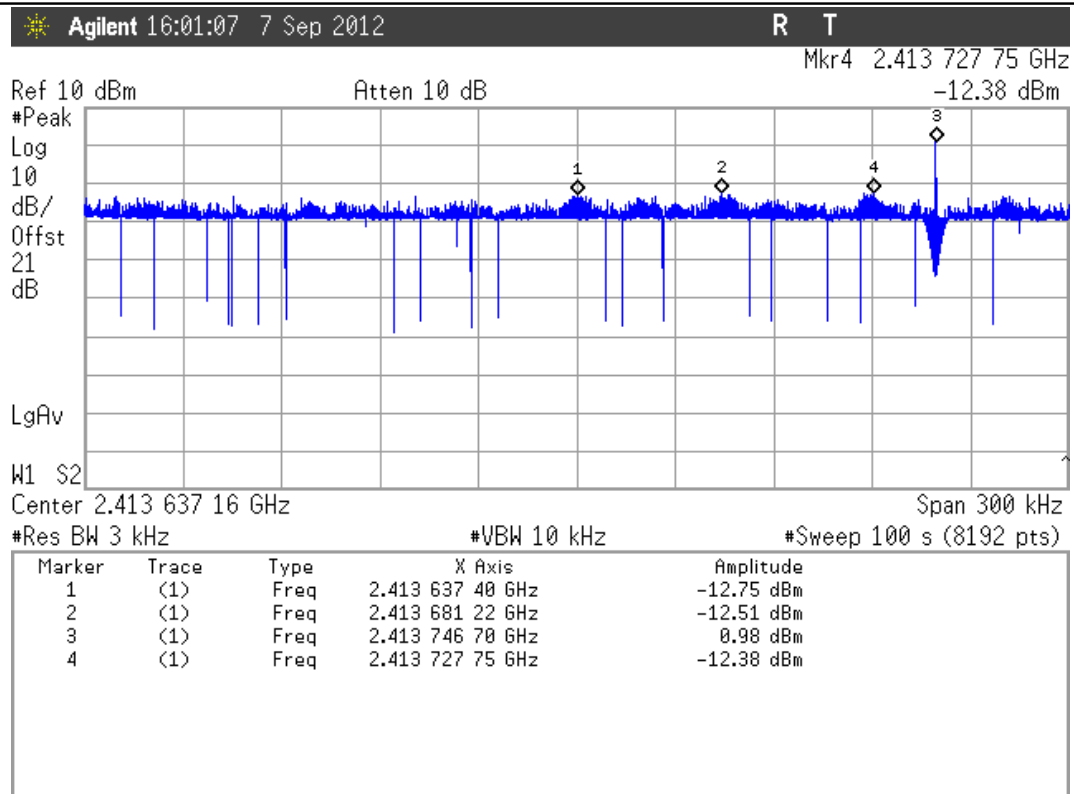
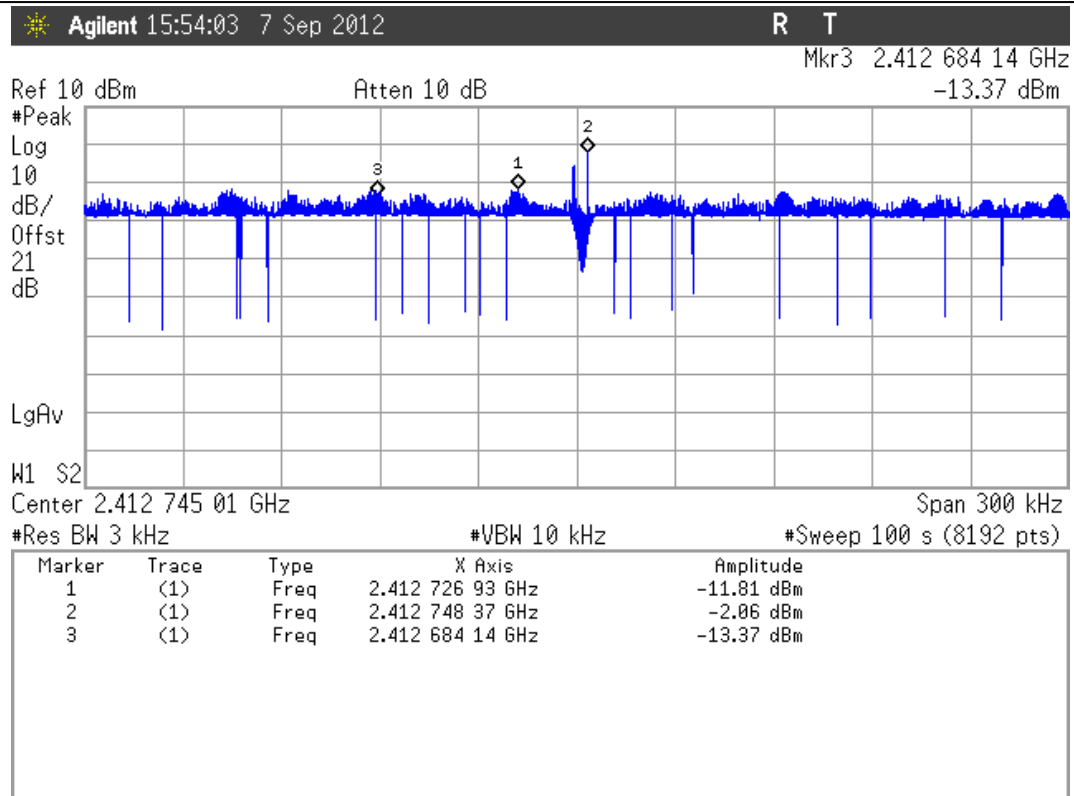
Peak Power Spectral Density Low Channel (802.11b mode)

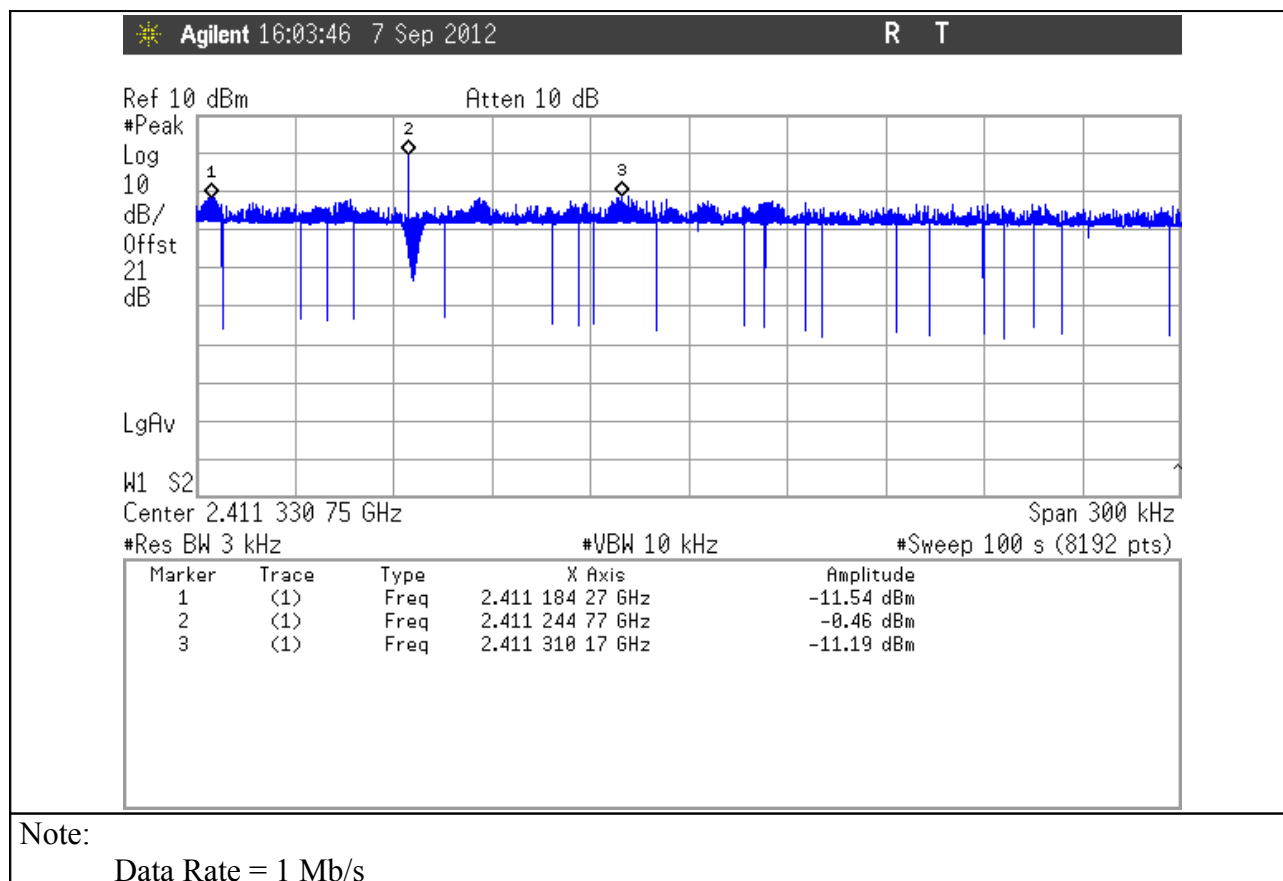


This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 51 / 176



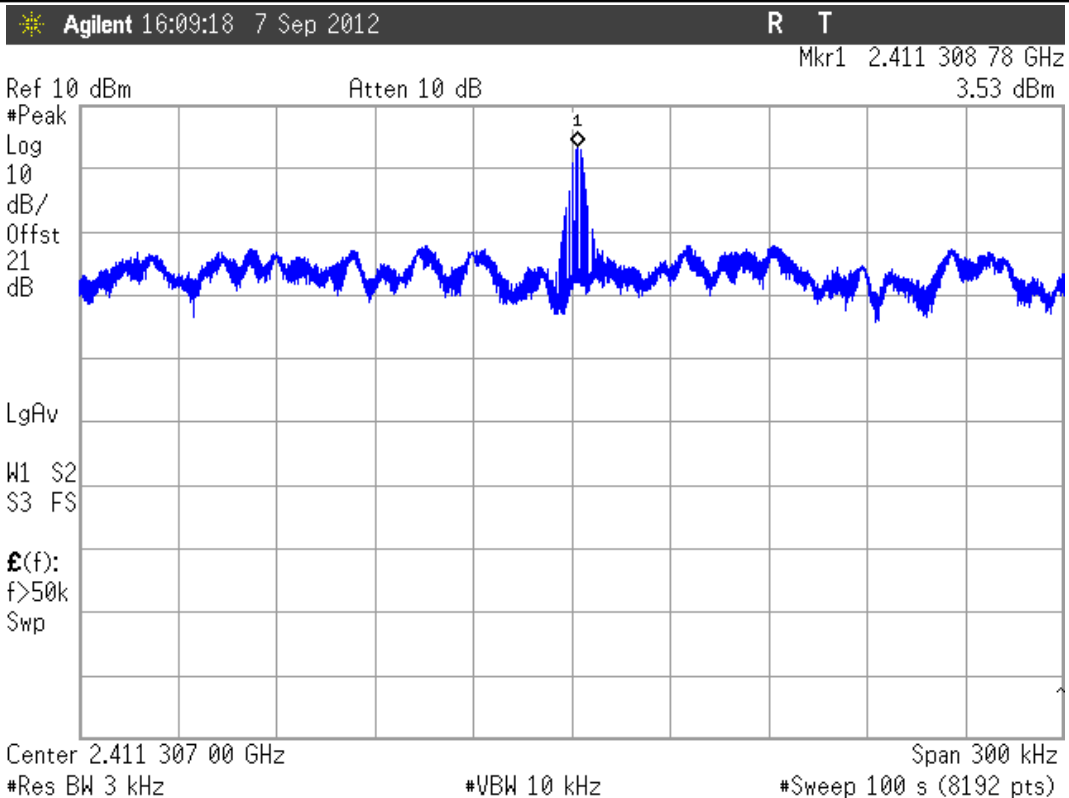
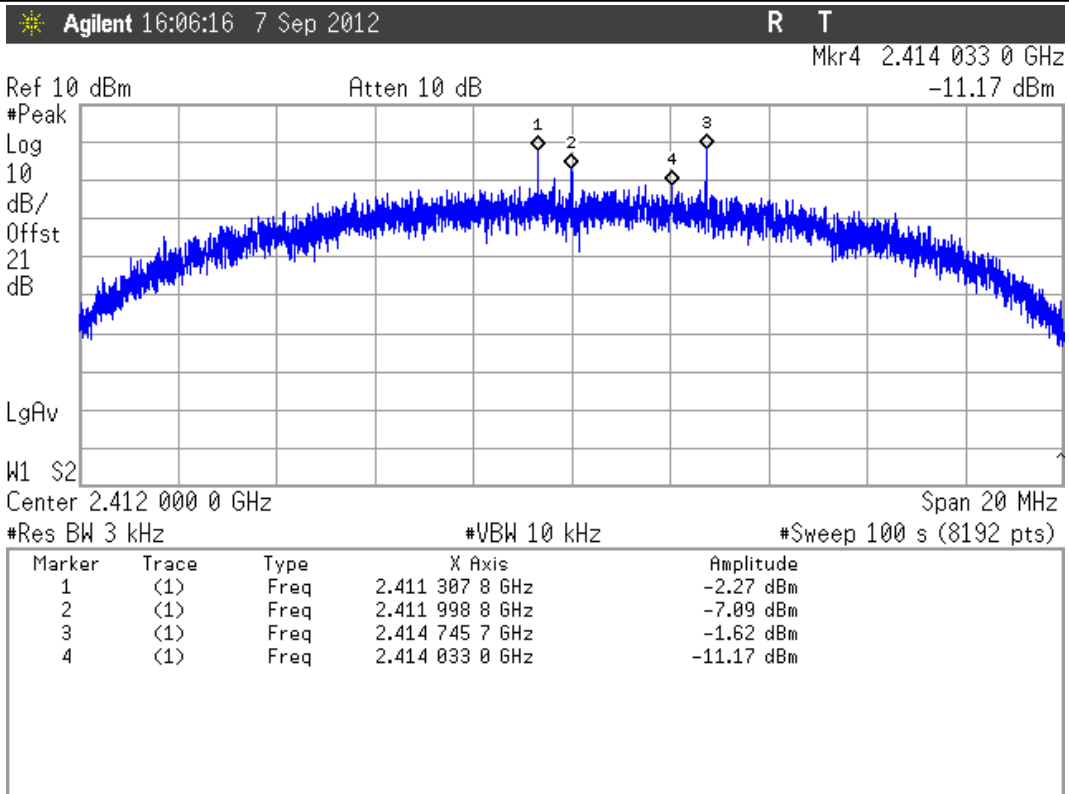


This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 53 / 176

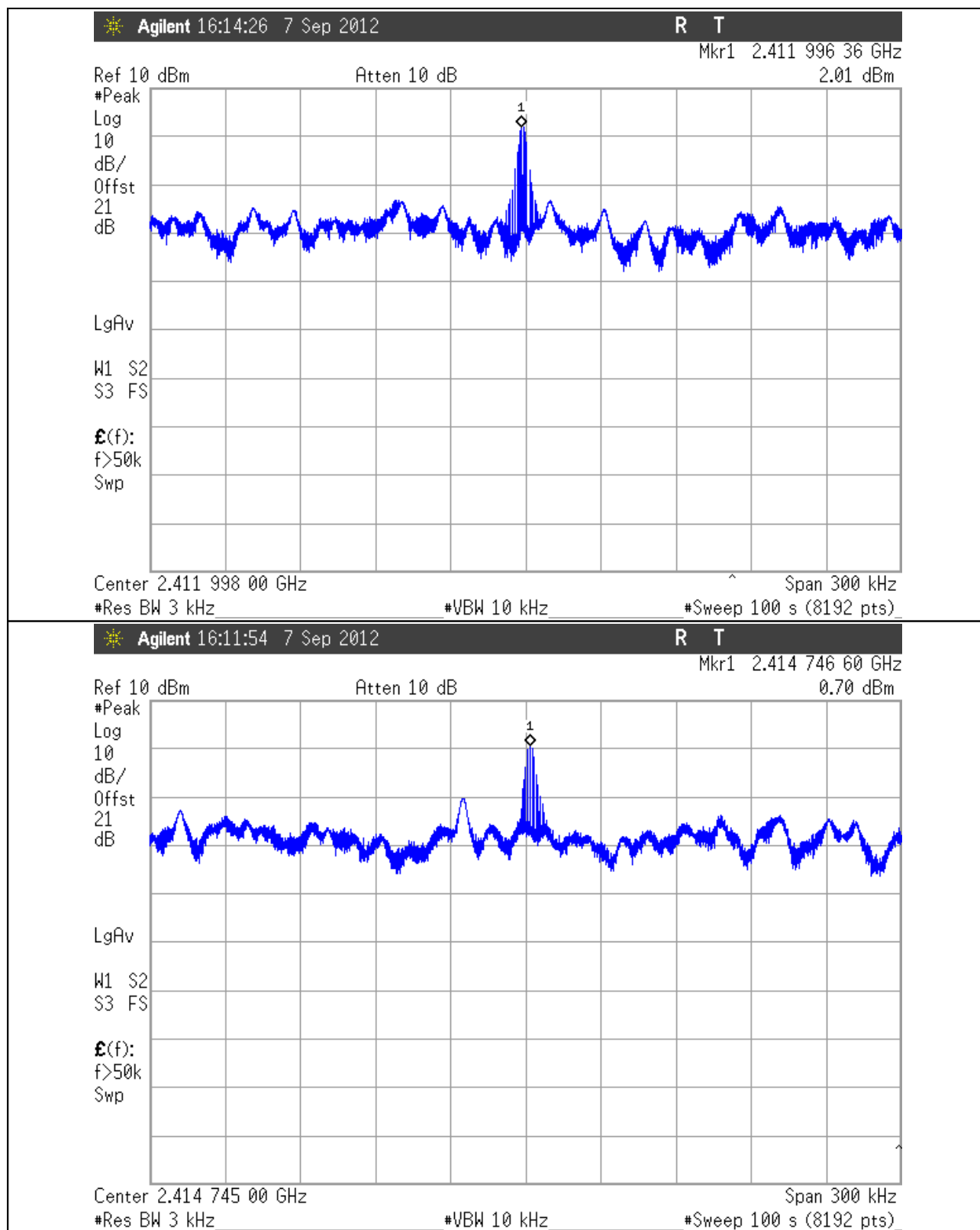
Peak Power Spectral Density Low Channel (802.11b mode)



This document may be only fully reproduced.

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

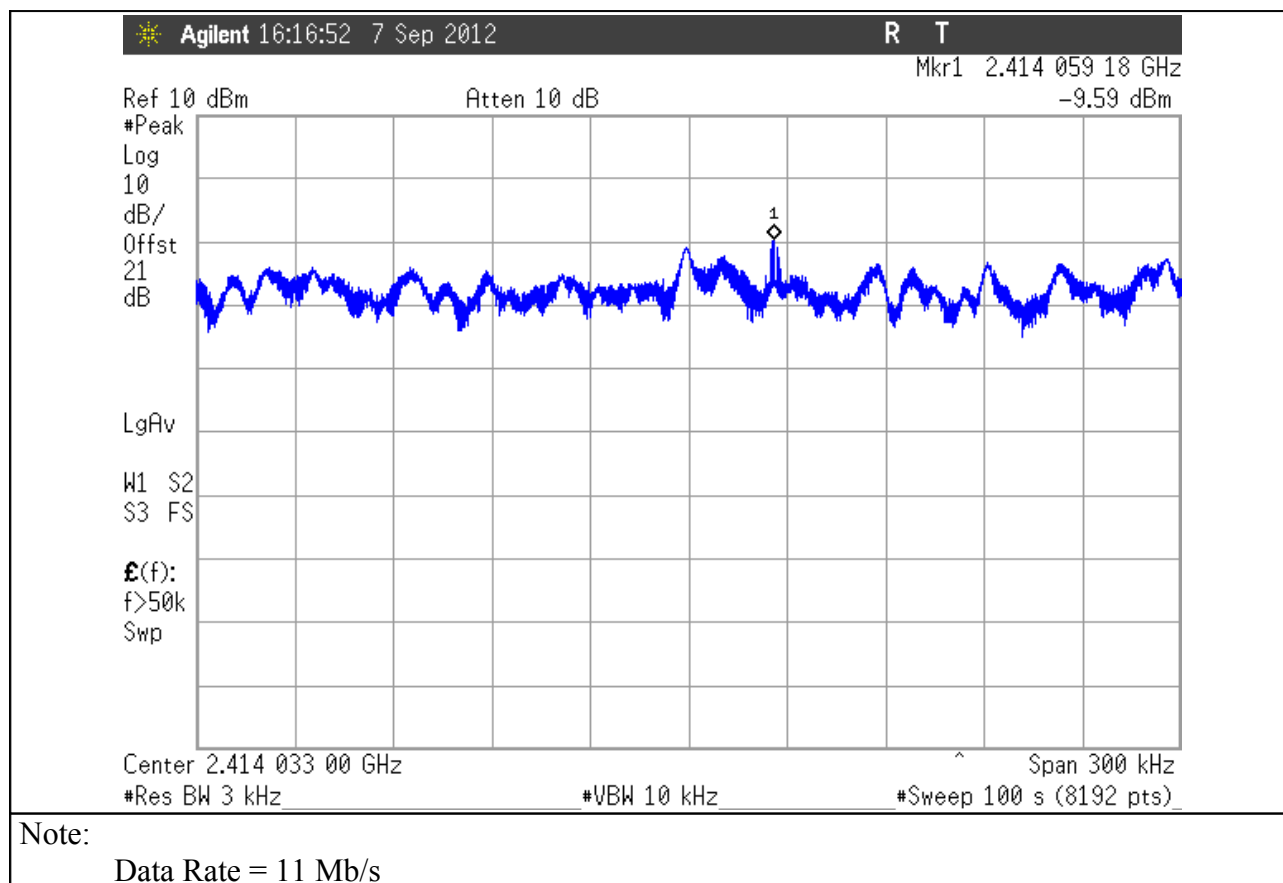
Report n. 12077-FCC-IC Rev. 02, page 54 / 176



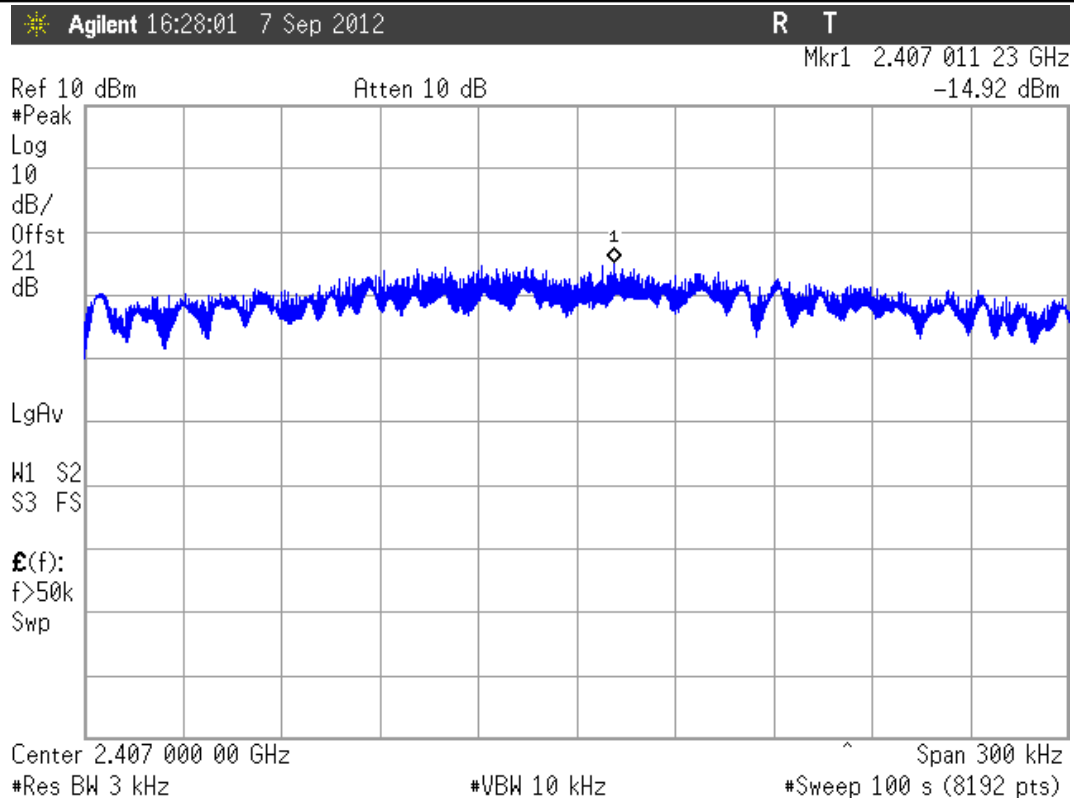
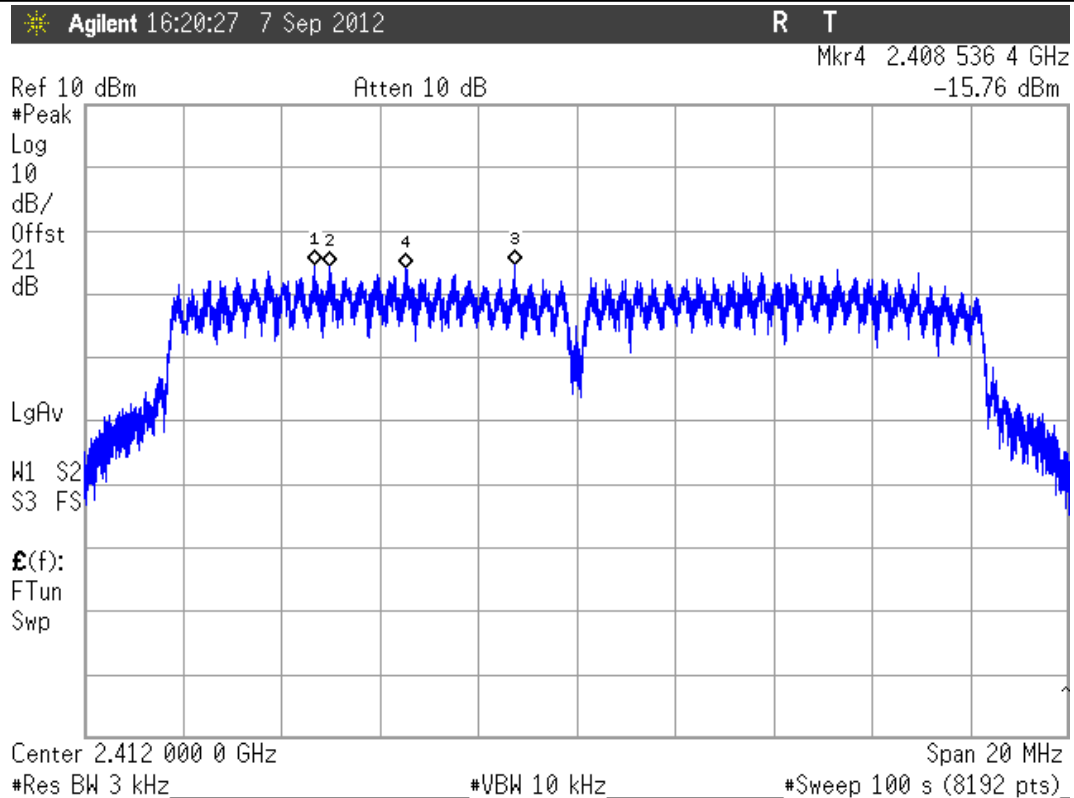
This document may be only fully reproduced.

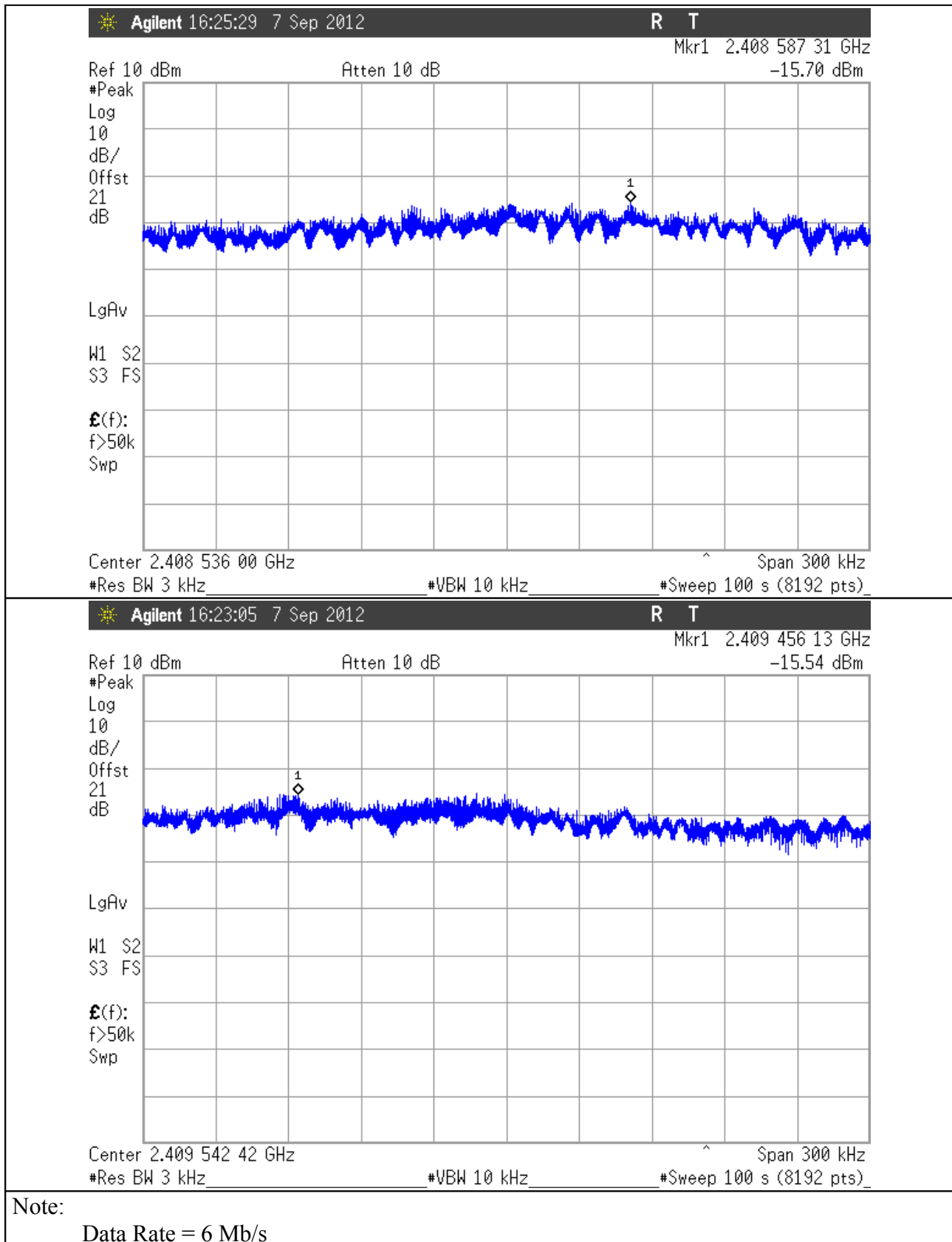
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. 12077-FCC-IC Rev. 02, page 55 / 176

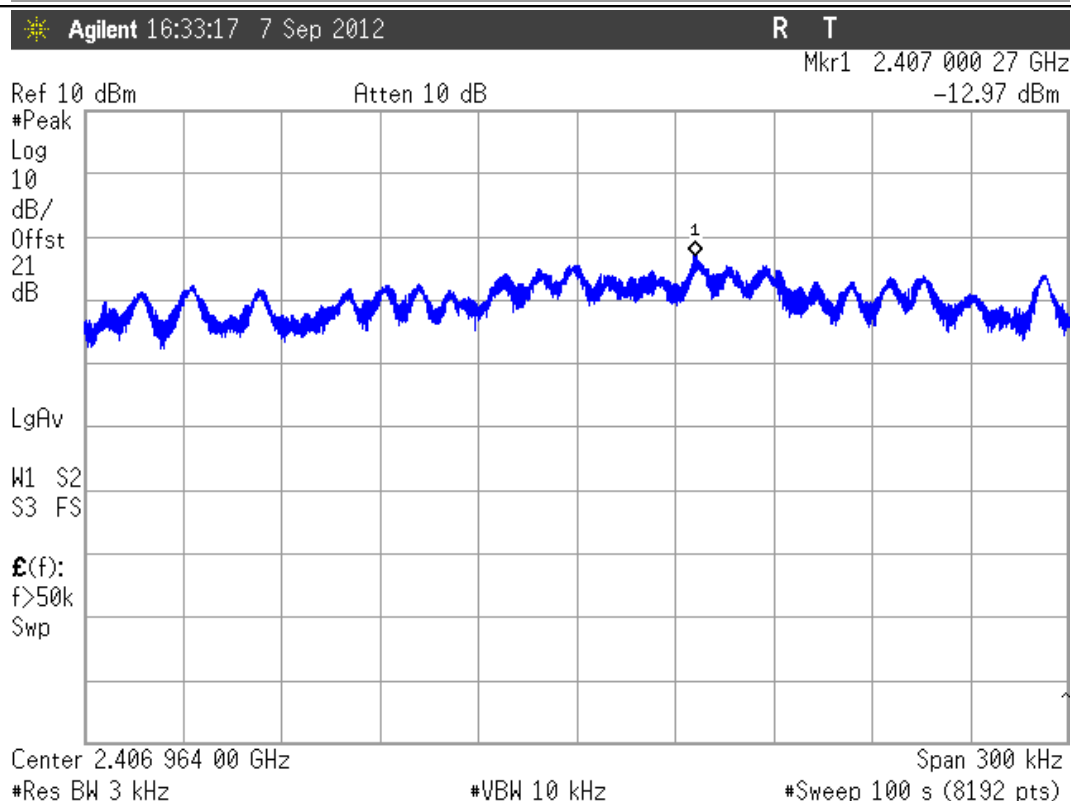
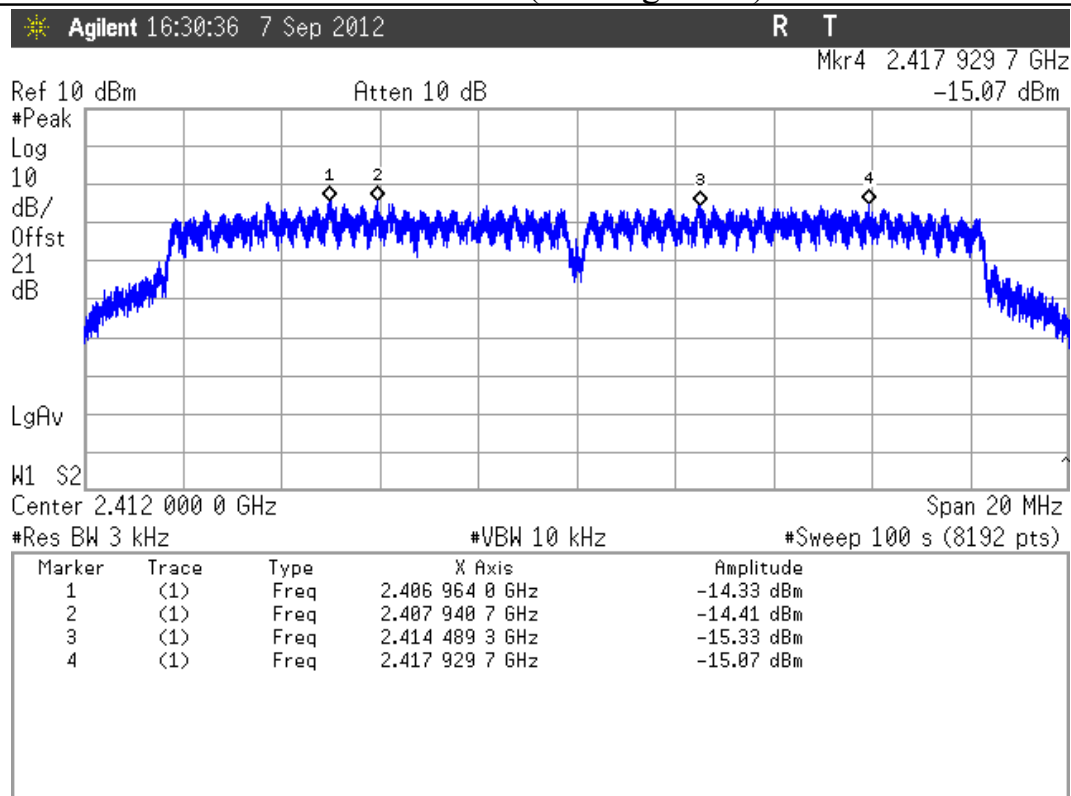


Peak Power Spectral Density Low Channel (802.11g mode)





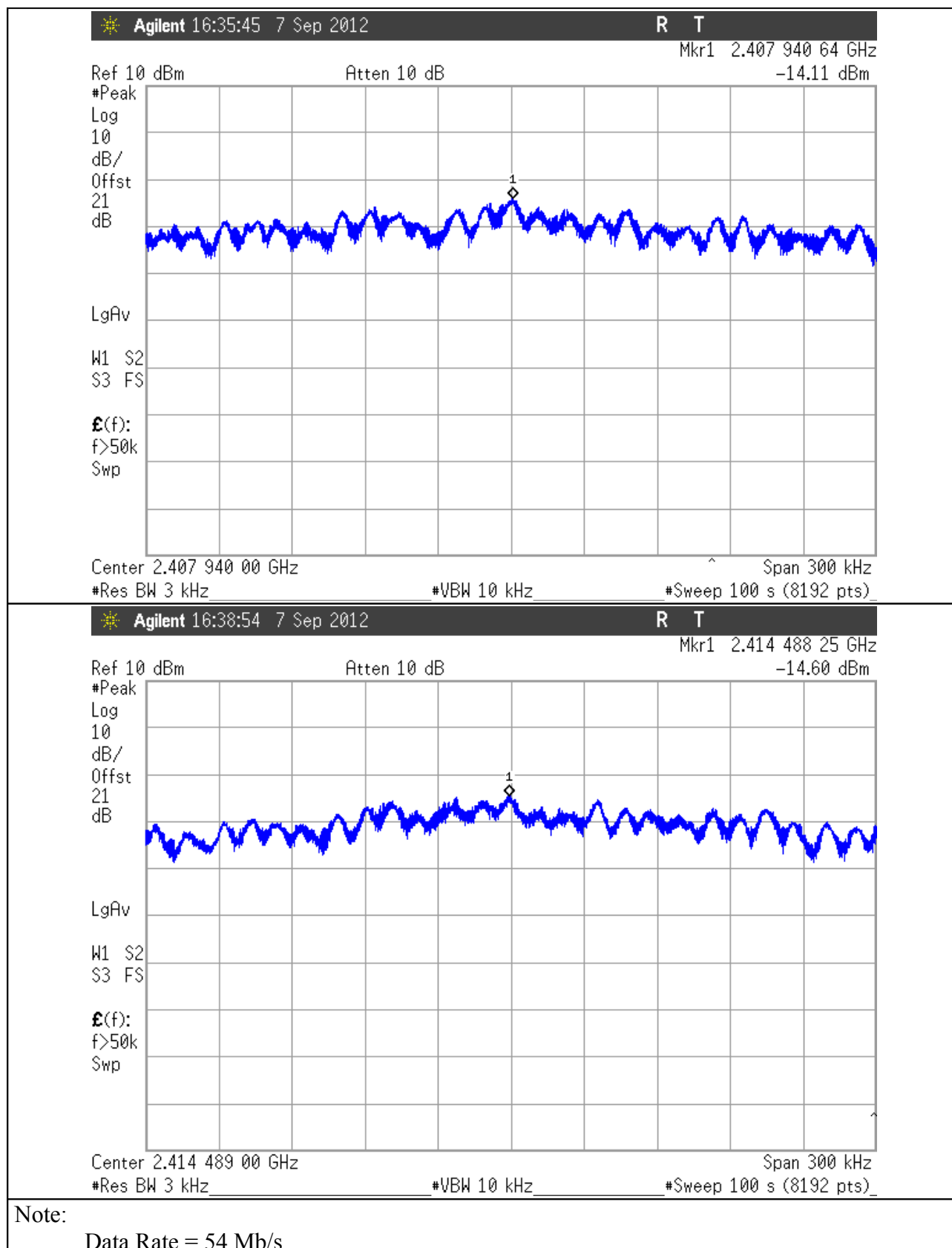
Peak Power Spectral Density Low Channel (802.11g mode)



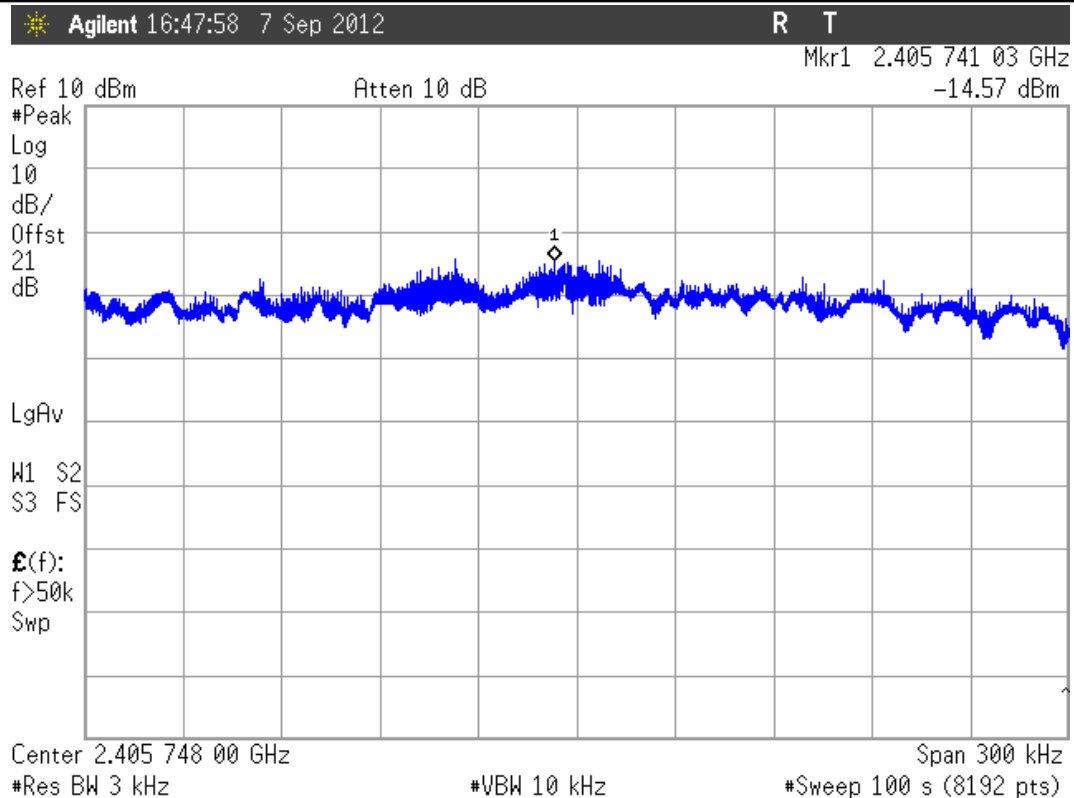
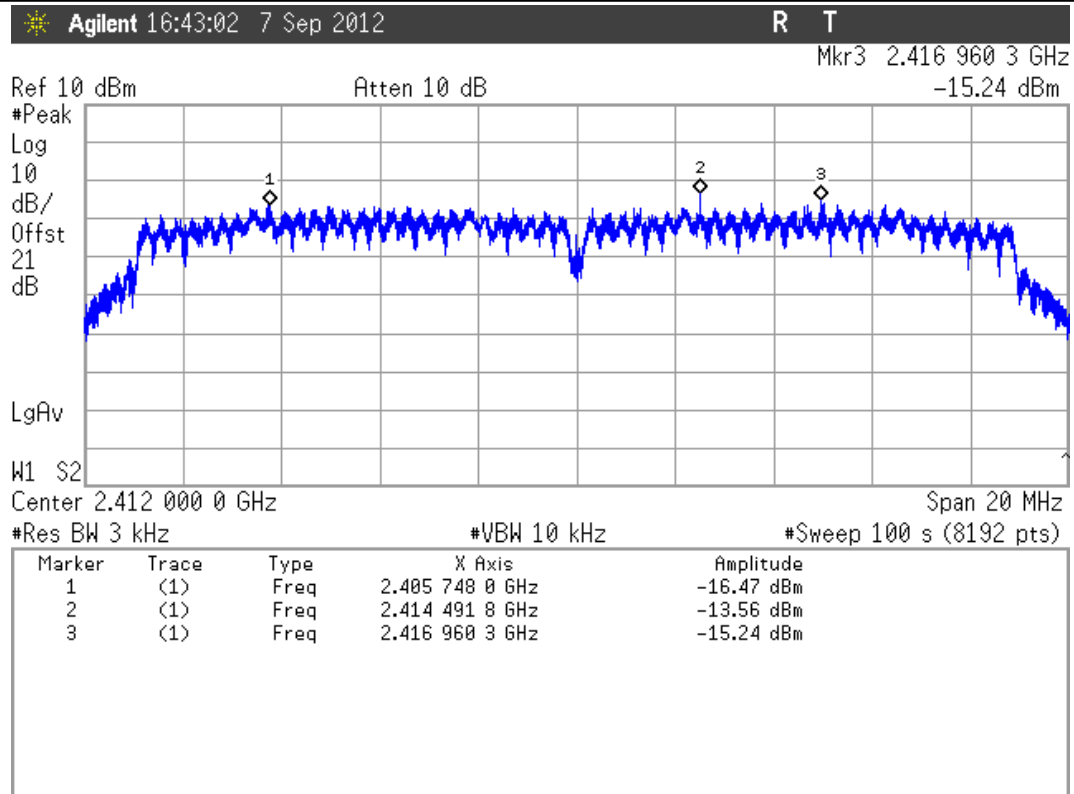
This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 59 / 176



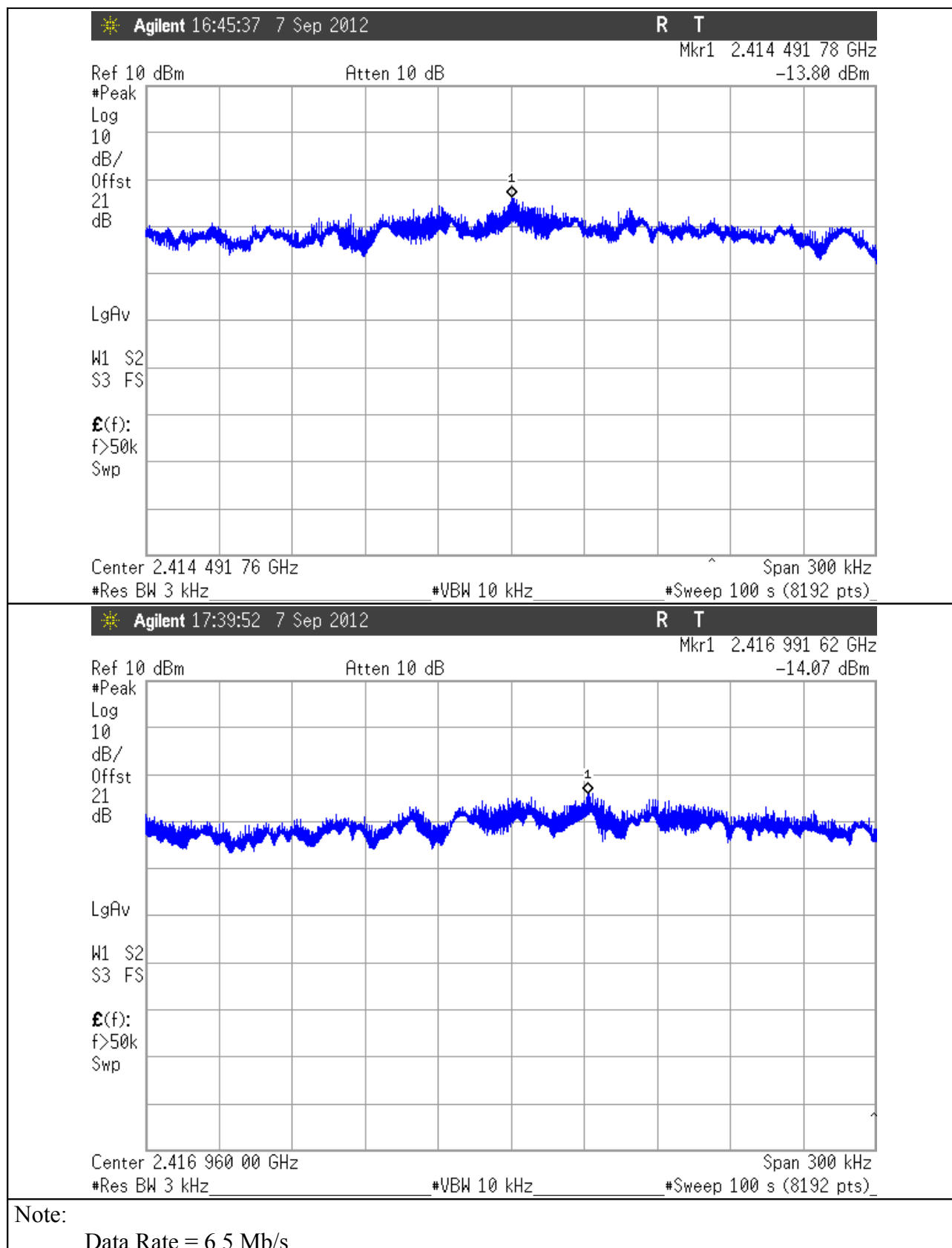
Peak Power Spectral Density Low Channel (802.11n mode)



This document may be only fully reproduced.

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

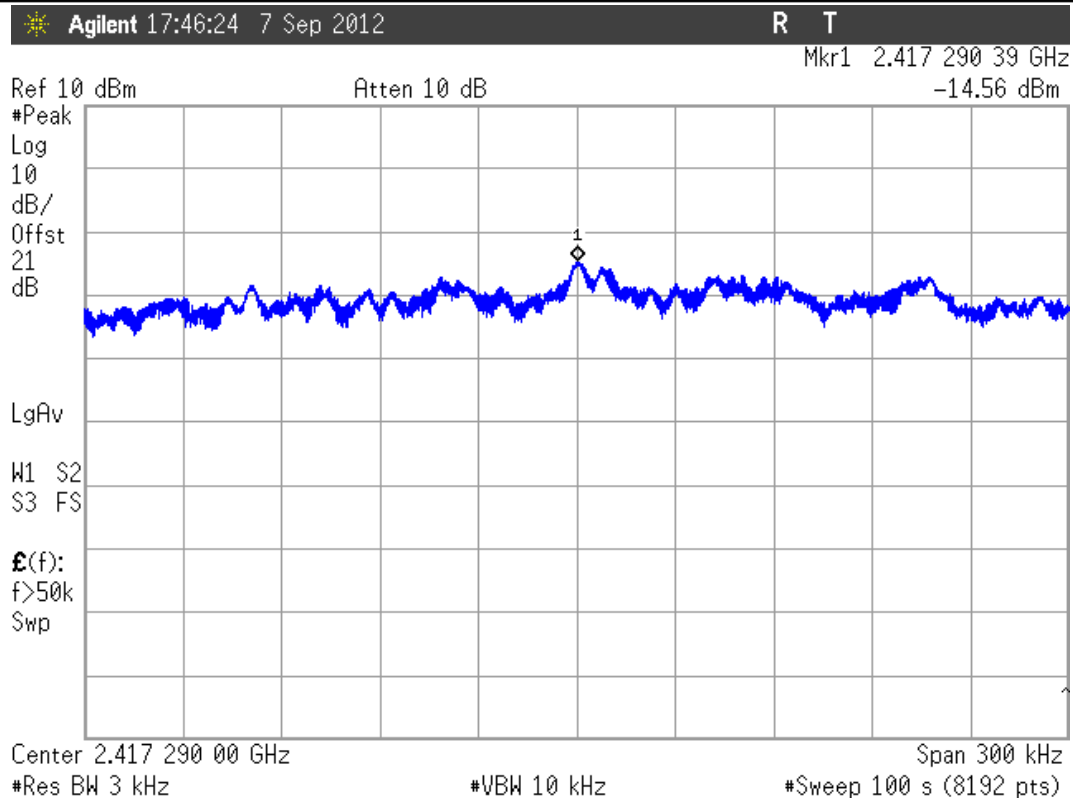
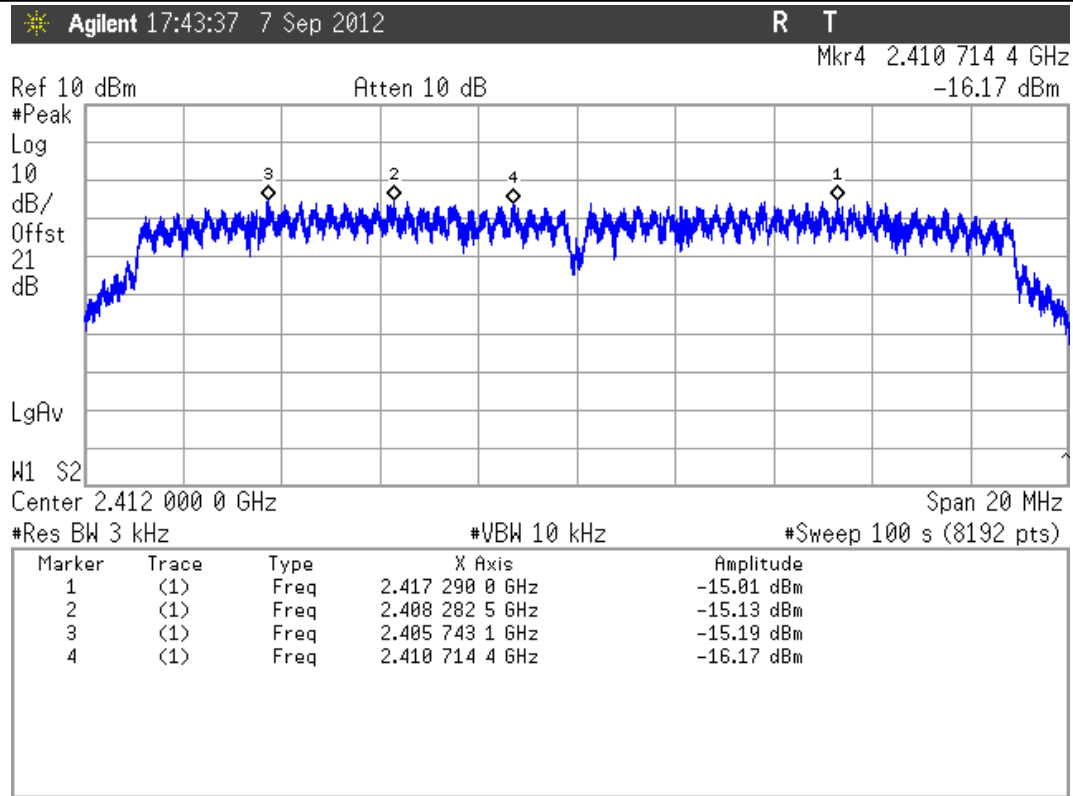
Report n. 12077-FCC-IC Rev. 02, page 61 / 176



Note:

Data Rate = 6.5 Mb/s

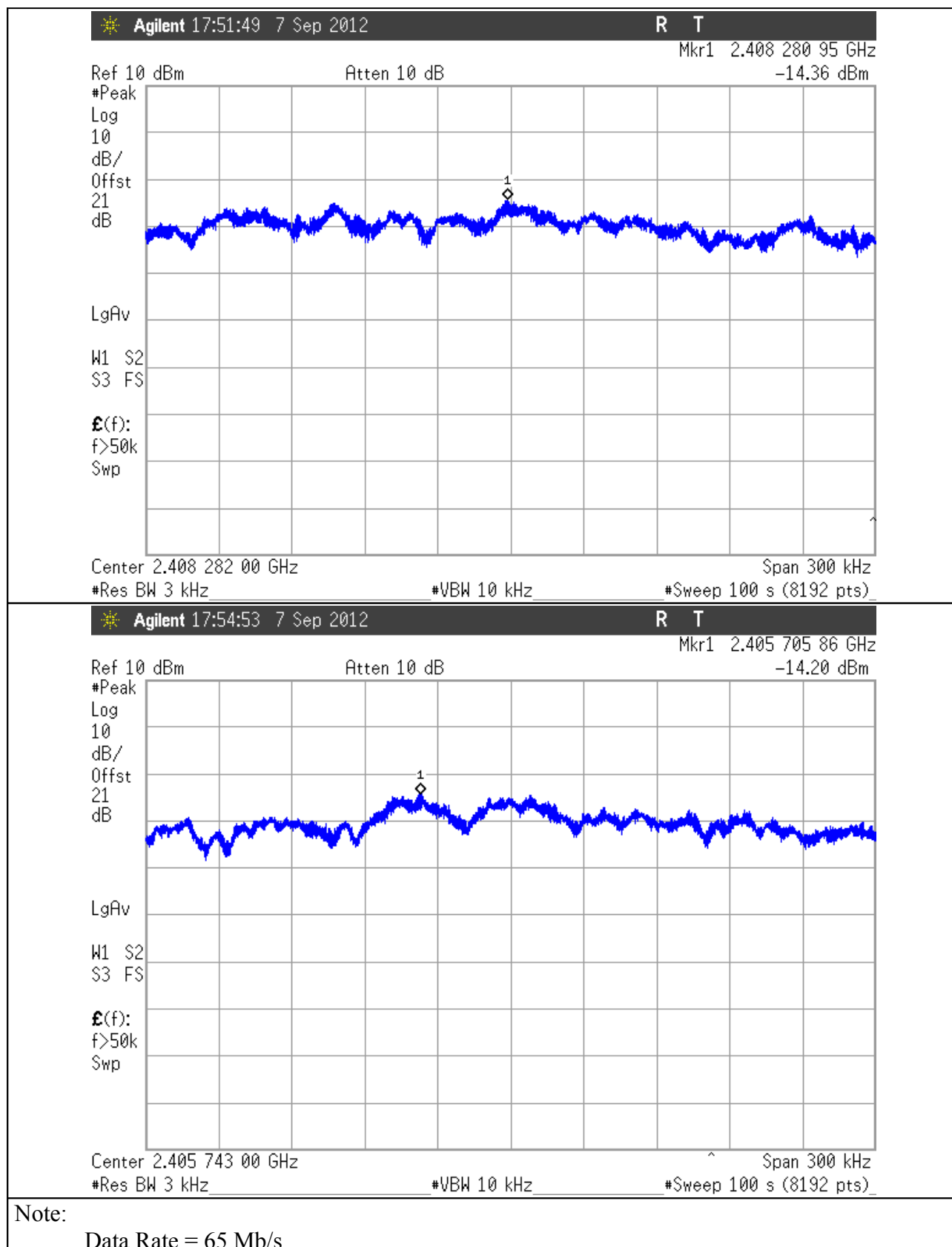
Peak Power Spectral Density Low Channel (802.11n mode)



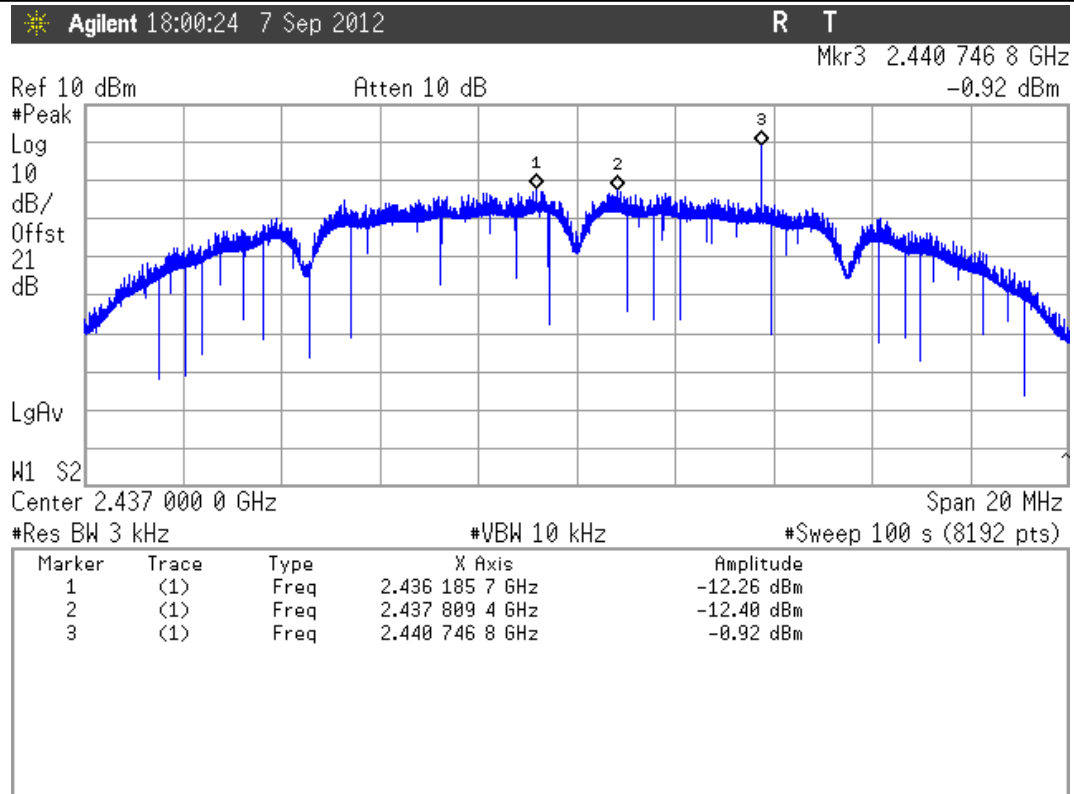
This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 63 / 176



Peak Power Spectral Density Mid Channel (802.11b mode)



Note:

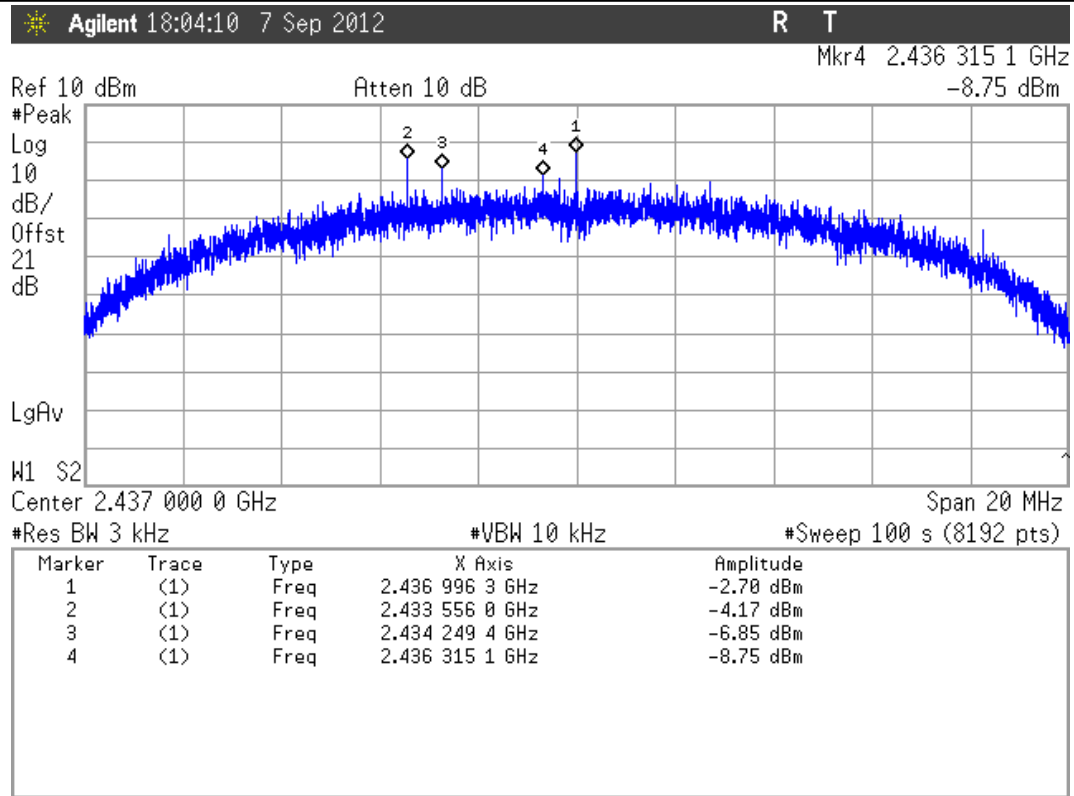
Data Rate = 1 Mb/s

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. 12077-FCC-IC Rev. 02, page 65 / 176

Peak Power Spectral Density Mid Channel (802.11b mode)



Note:

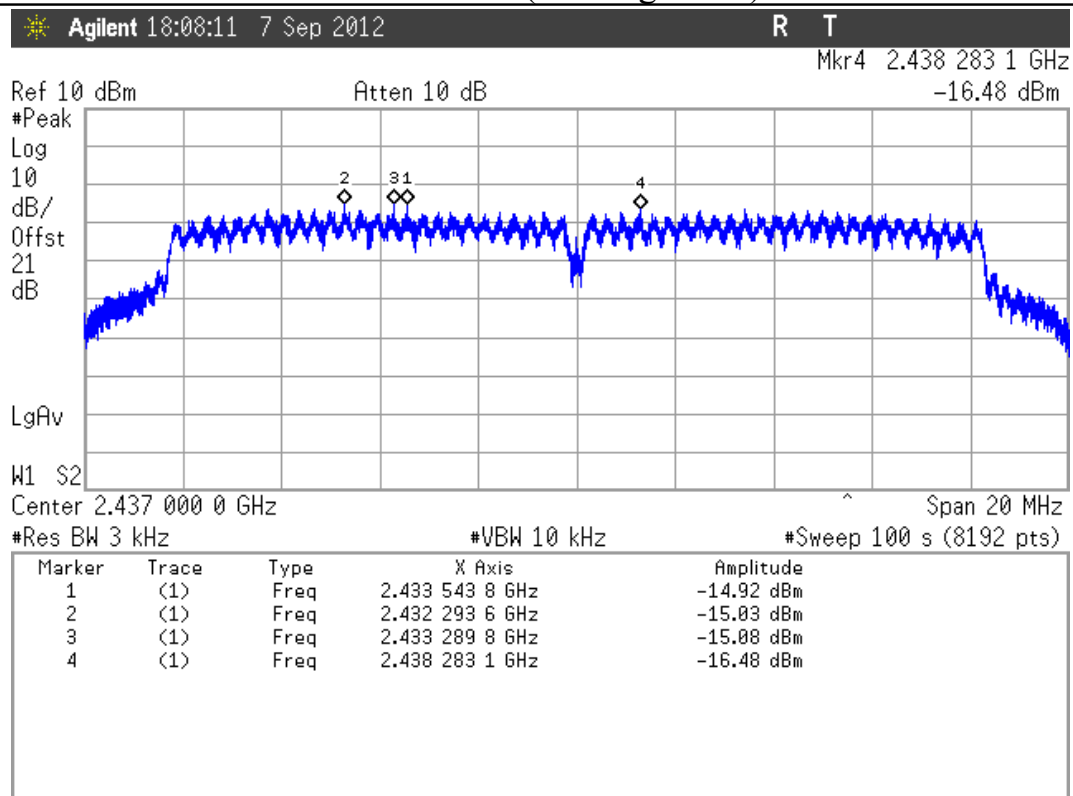
Data Rate = 11 Mb/s

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. 12077-FCC-IC Rev. 02, page 66 / 176

Peak Power Spectral Density Mid Channel (802.11g mode)



Note:

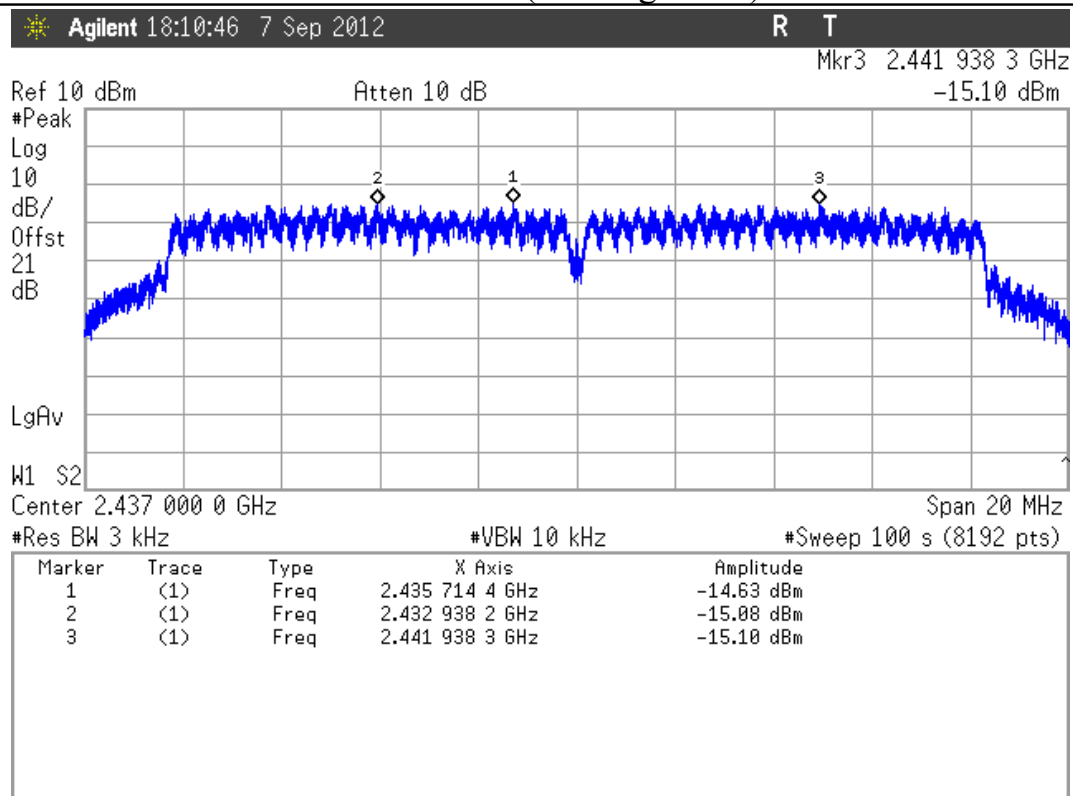
Data Rate = 6 Mb/s

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. 12077-FCC-IC Rev. 02, page 67 / 176

Peak Power Spectral Density Mid Channel (802.11g mode)



Note:

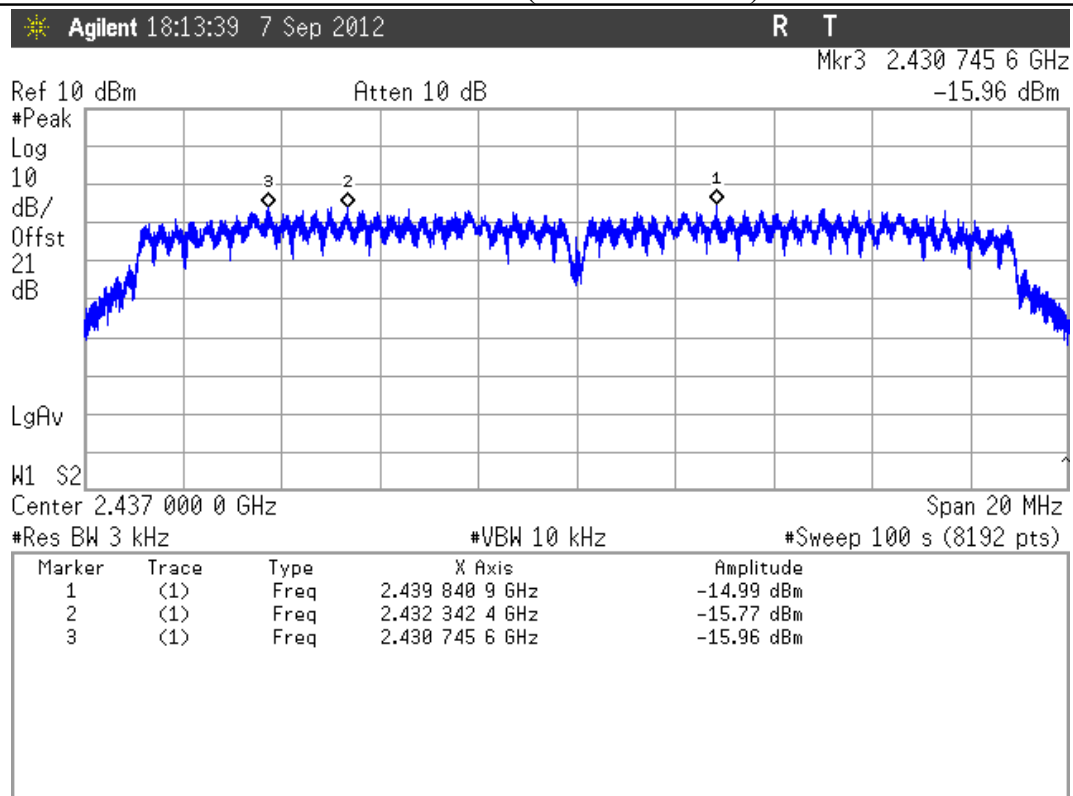
Data Rate = 54 Mb/s

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. 12077-FCC-IC Rev. 02, page 68 / 176

Peak Power Spectral Density Mid Channel (802.11n mode)



Note:

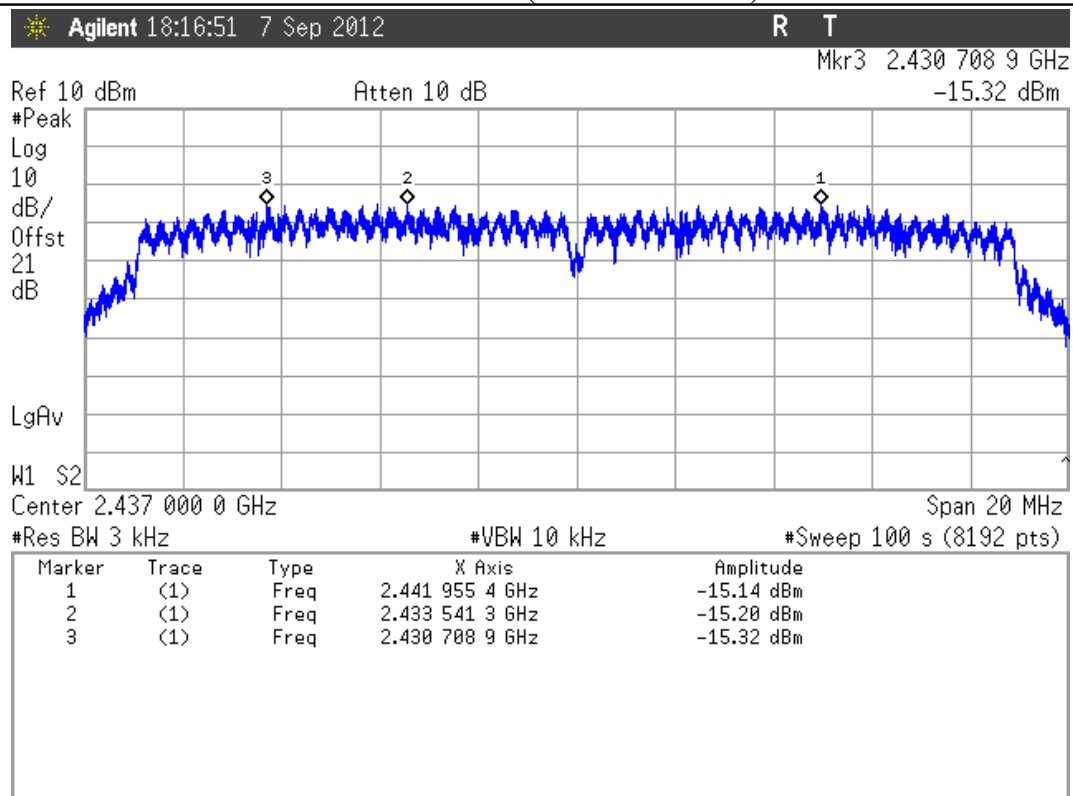
Data Rate = 6.5 Mb/s

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. 12077-FCC-IC Rev. 02, page 69 / 176

Peak Power Spectral Density Mid Channel (802.11n mode)



Note:

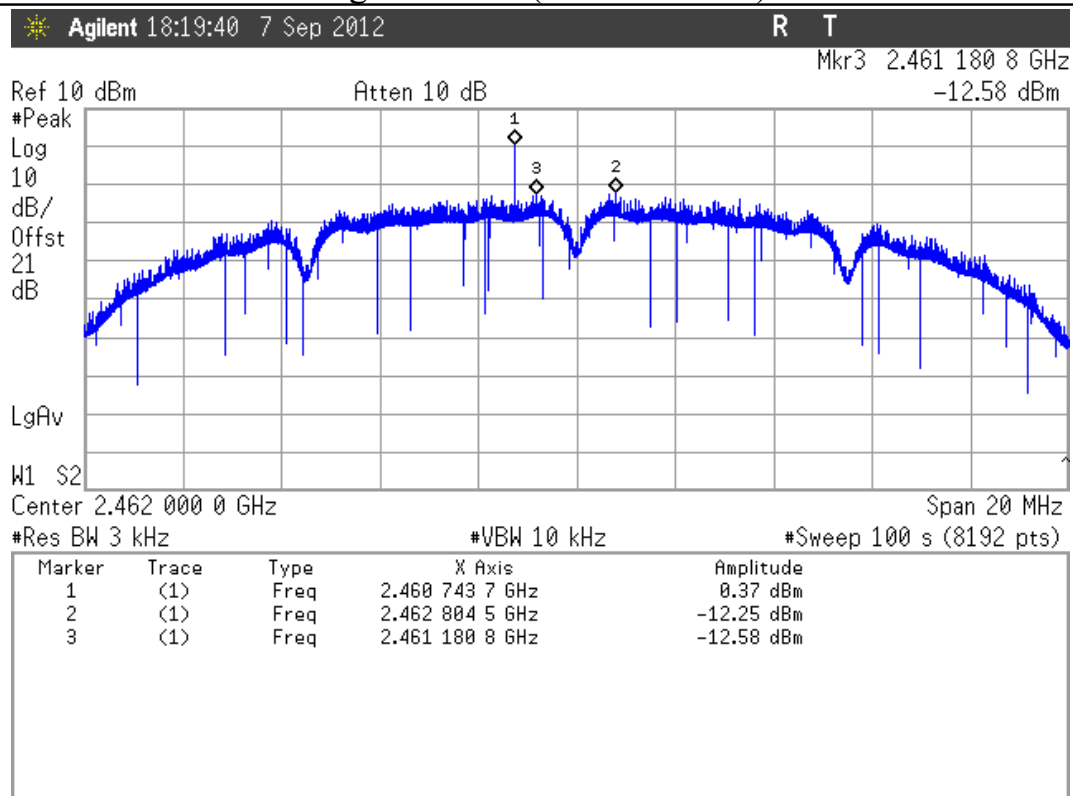
Data Rate = 65 Mb/s

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. 12077-FCC-IC Rev. 02, page 70 / 176

Peak Power Spectral Density High Channel (802.11b mode)



Note:

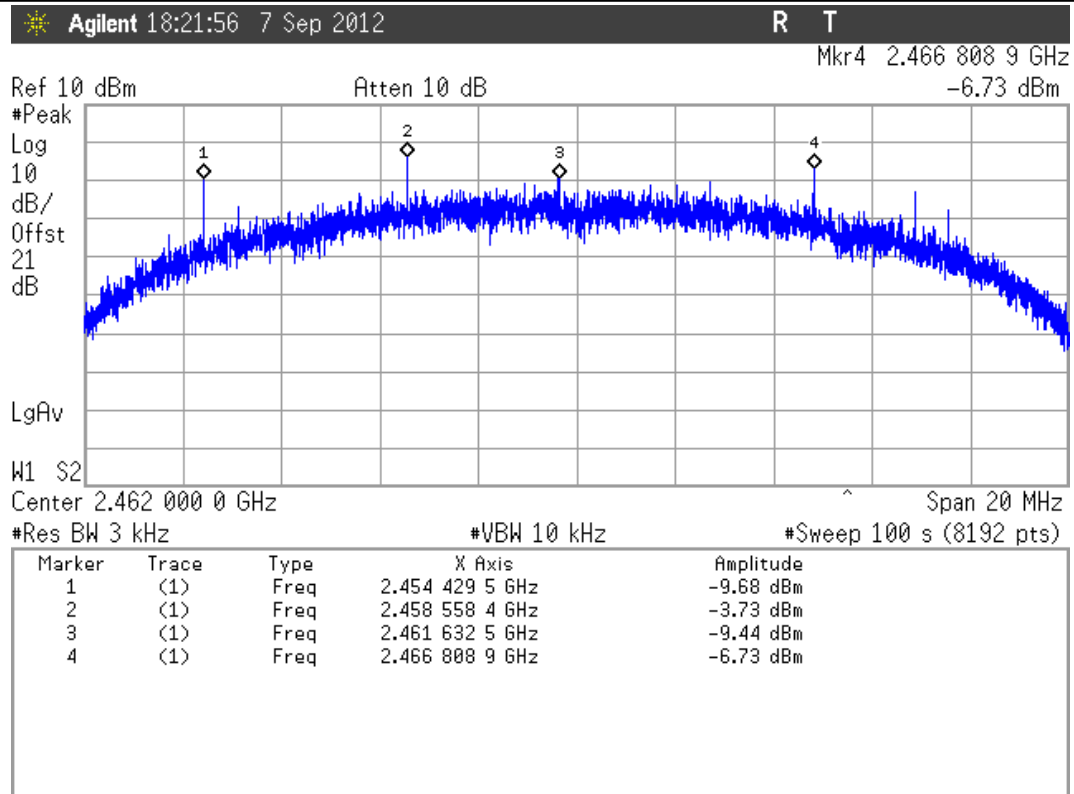
Data Rate = 1 Mb/s

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. 12077-FCC-IC Rev. 02, page 71 / 176

Peak Power Spectral Density High Channel (802.11b mode)



Note:

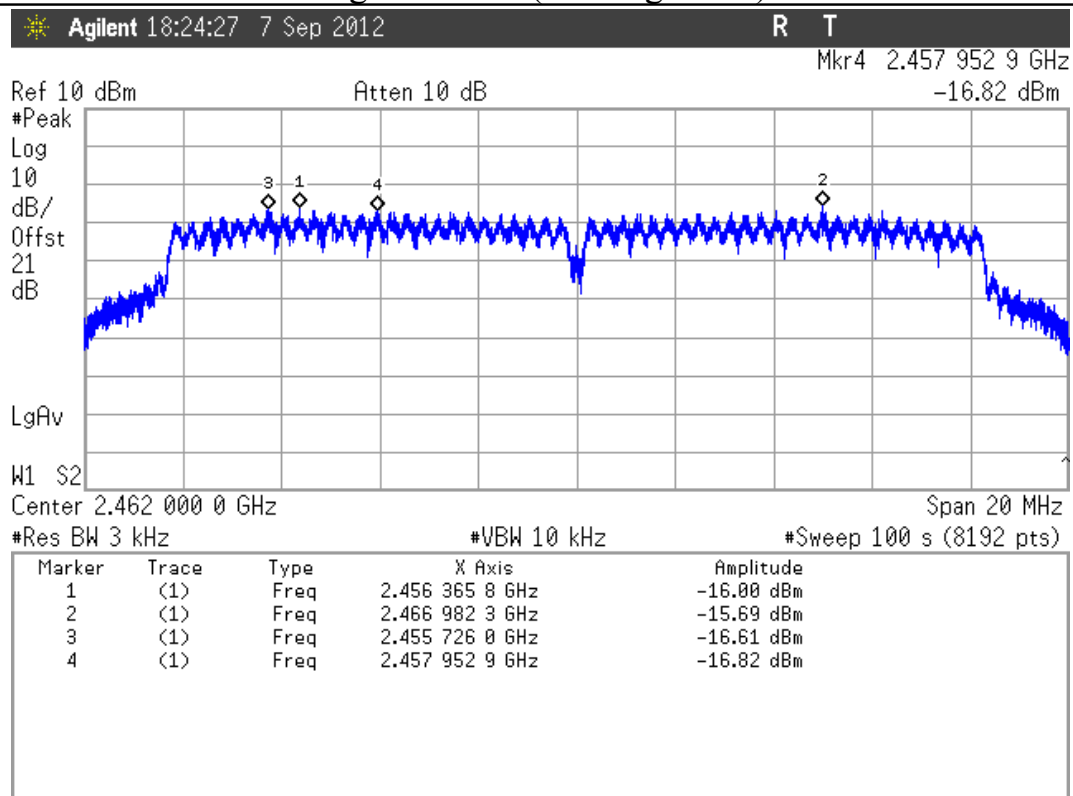
Data Rate = 11 Mb/s

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. 12077-FCC-IC Rev. 02, page 72 / 176

Peak Power Spectral Density High Channel (802.11g mode)



Note:

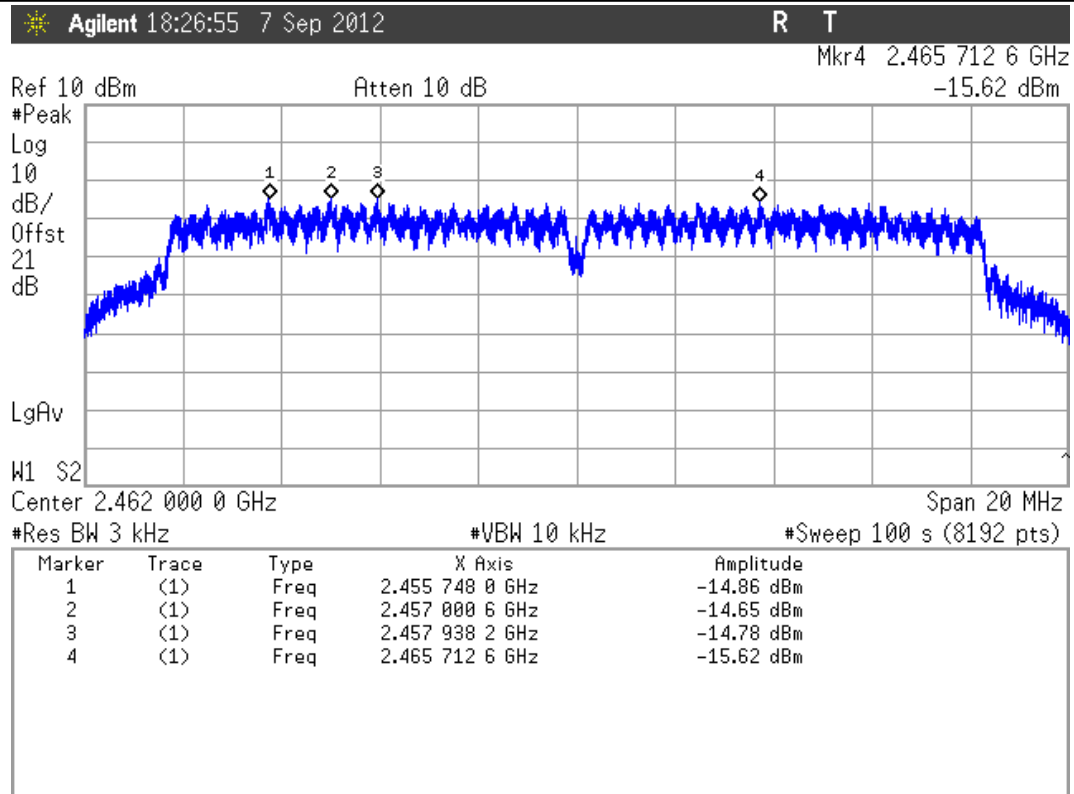
Data Rate = 6 Mb/s

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. 12077-FCC-IC Rev. 02, page 73 / 176

Peak Power Spectral Density High Channel (802.11g mode)



Note:

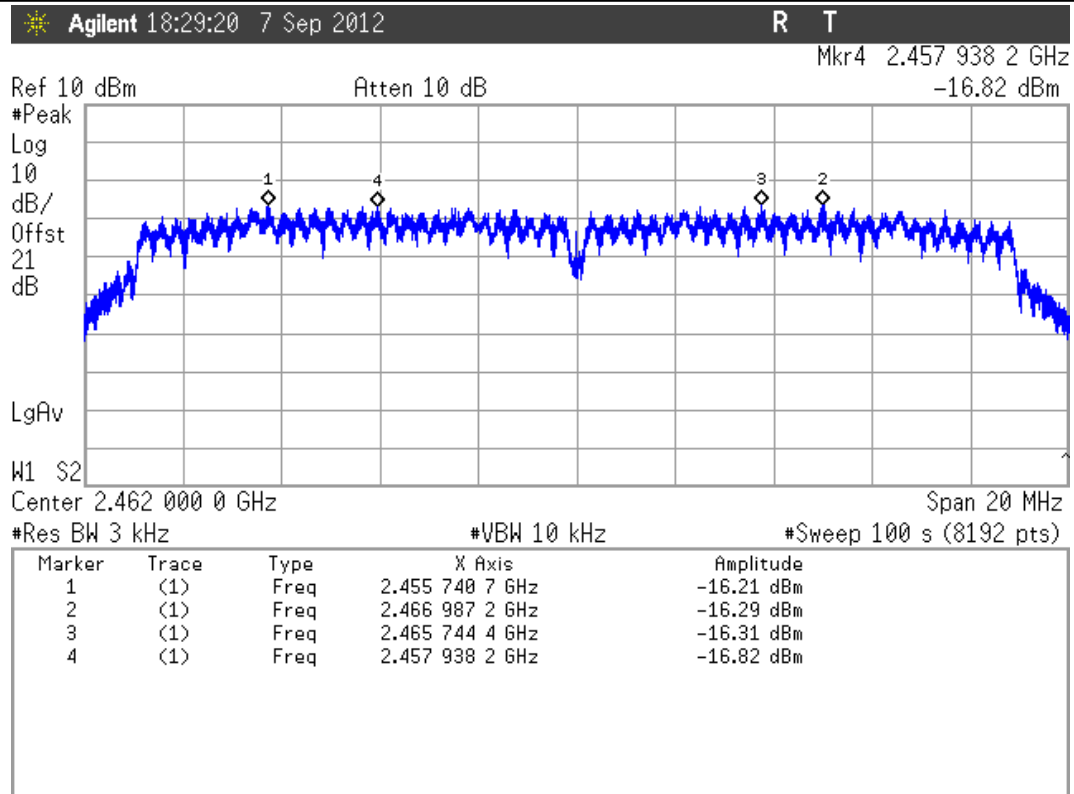
Data Rate = 54 Mb/s

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. 12077-FCC-IC Rev. 02, page 74 / 176

Peak Power Spectral Density High Channel (802.11n mode)



Note:

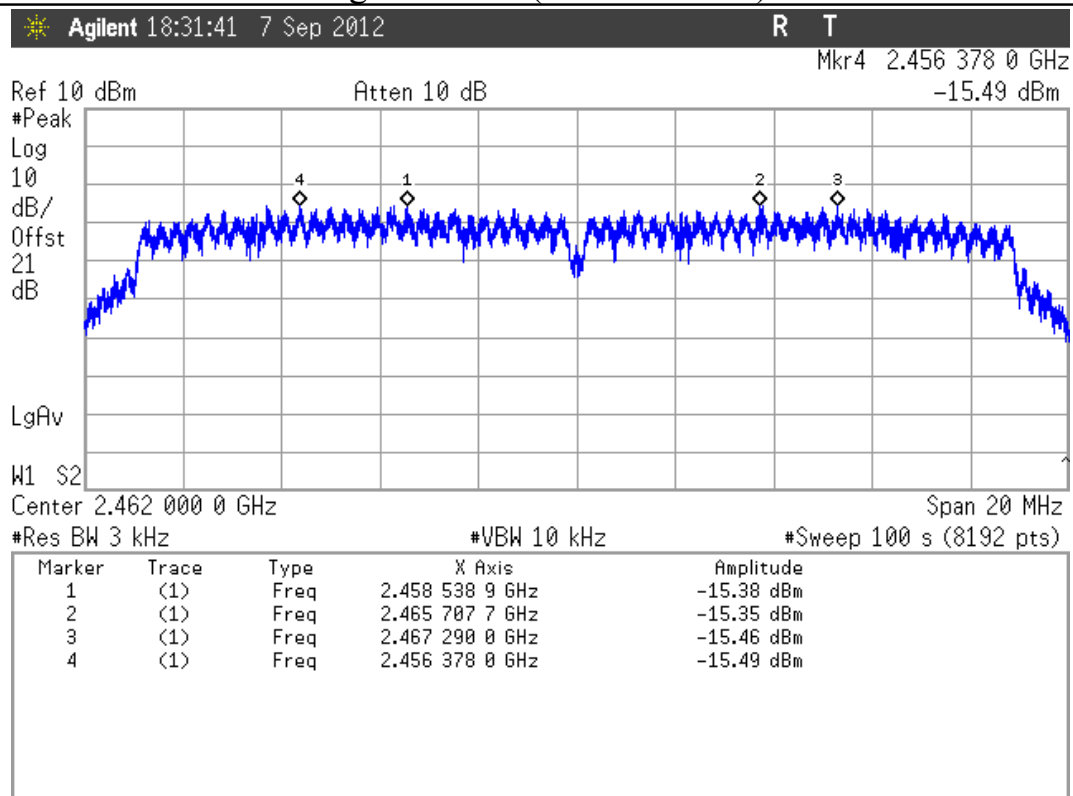
Data Rate = 6.5 Mb/s

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. 12077-FCC-IC Rev. 02, page 75 / 176

Peak Power Spectral Density High Channel (802.11n mode)



Note:

Data Rate = 65 Mb/s

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. 12077-FCC-IC Rev. 02, page 76 / 176

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 ^(*)	59 – 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	01/2013
EMI Receiver Filter Section	HP	HP85460A	01/2013
LISN	GSD	NTW01	01/2013
Screened Room	GSD	CSC01	01/2013

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.



FREQ 491.6 kHz
PEAK 44.5 dBμV
QP 44.0 dBμV
AVG 43.9 dBμV

LOG REF 85.0 dBμV

10
dB/
#ATN
20 dB

WA SB
SC FS
ACORR

START 150 kHz

RL 1F BW 9.0 kHz

AVG BW 30 kHz

STOP 30.00 MHz

#SWP 10.0 sec

B Band (0.15 – 30 MHz): phase 1

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. 12077-FCC-IC Rev. 02, page 78 / 176



FREQ 491.7 kHz
 PEAK 44.6 dBμV
 QP 44.0 dBμV
 AVG 43.9 dBμV

LOG REF 85.0 dBμV

10
 dB/
 #ATN
 20 dB

WA SB
 SC FS
 ACORR

START 150 kHz

RL 1F BW 9.0 kHz

AVG BW 30 kHz

STOP 30.00 MHz

#SWP 10.0 sec

B Band (0.15 – 30 MHz): phase 2

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. 12077-FCC-IC Rev. 02, page 79 / 176

9. RADIATED EMISSIONS

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

FCC

<i>DISTANCE</i> (m)	<i>FREQUENCY RANGE</i> (MHz)	<i>QUASI-PEAK LIMITS</i> [dB (μV/m)]	<i>AVERAGE LIMITS</i> [dB (μV/m)]
300	0,009 – 0,49	48,52 – 13,8	
30	0,049 – 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. DUE
EMI Receiver	HP	HP8546A	01/2013
EMI Receiver Filter Section	HP	HP85460A	01/2013
EMI Receiver	Agilent	E4440A	01/2013
EMI Receiver Filter Section	Agilent	N9039A	01/2013
Anechoic Chamber	Comtest	CSA01	01/2013
Horn Antenna (1-18 GHz)	EMCO	3115	01/2013
Loop Antenna	EMCO	6512	01/2013
Horn Antenna (18-26.5 GHz)	Alpha Ind. Inc.	100655A	01/2013
Bilog Antenna	Schaffner	CBL6112B	01/2013
Controller	Deisel	HD100	01/2013
Turn Table	Deisel	MA240	01/2013

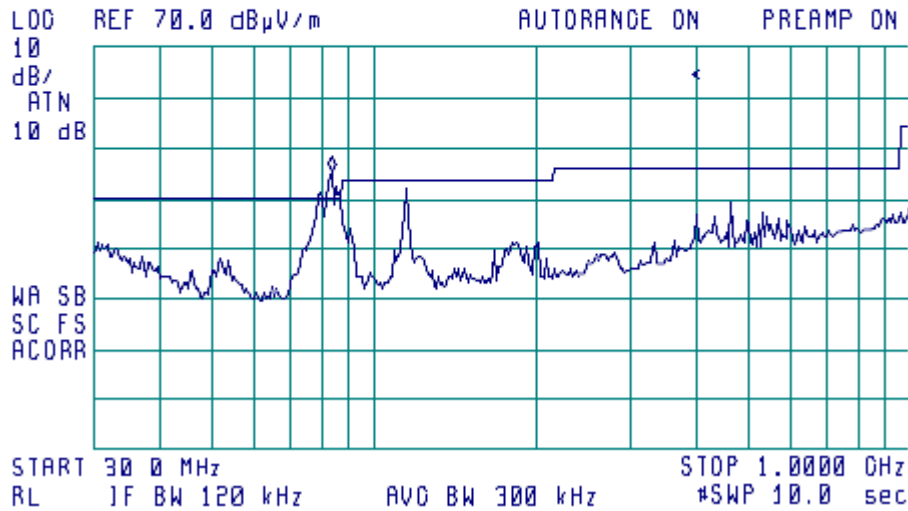
Test procedure: RE22R02**Notes**

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.
<u>Results and conclusions</u>
In all the operative conditions, equipment complied with the standard limits. Graphics in following figures show the most significant registrations of the performed measurements.



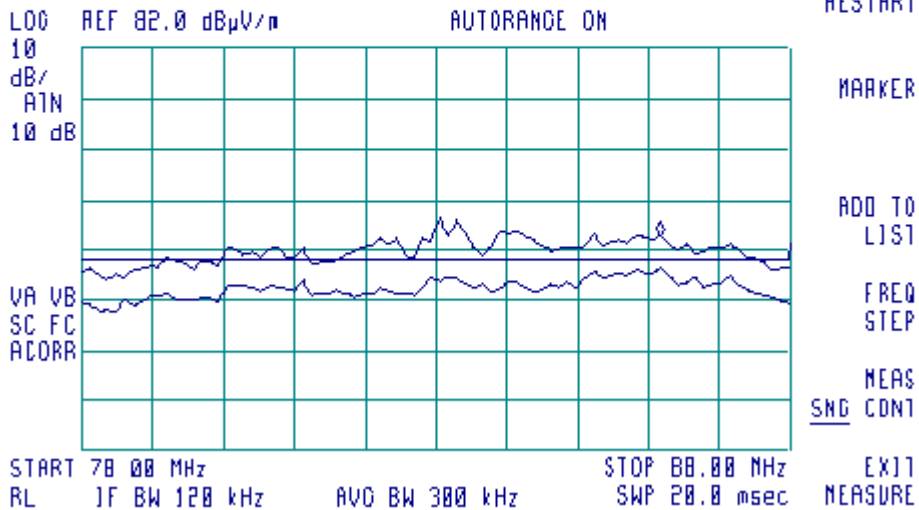
FREQ 83.09 MHz
PEAK 48.8 dBμV/m
QP 36.2 dBμV/m
AVC 21.9 dBμV/m



MARKER

FREQ 86.16 MHz
PEAK 44.8 dBμV/m
QP 38.3 dBμV/m
AVC NOT SELECTED

MEASURE
AT MKR
HOLD



Notes: POL V

Record of the measurement of radiated emissions.

One of the maximum disturbance determined in the frequency range 30MHz – 1 GHz.

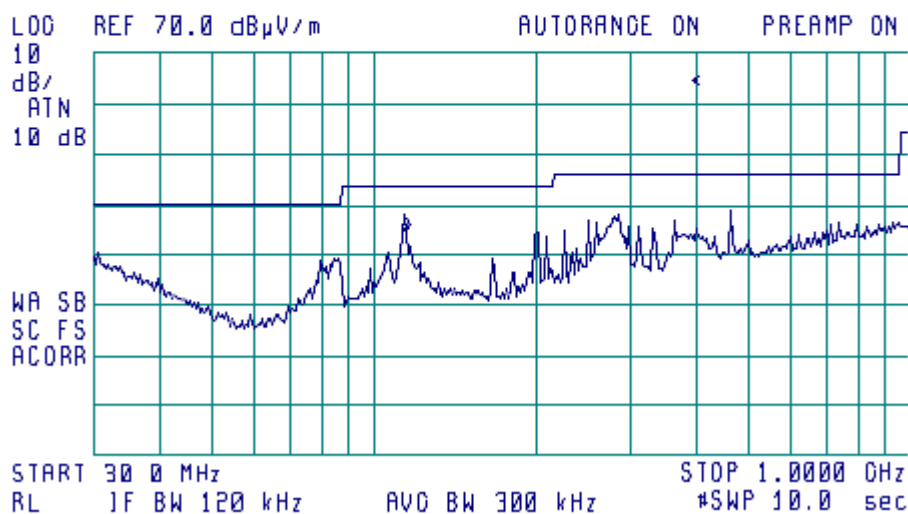
This document may be only fully reproduced.

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

Report n. 12077-FCC-IC Rev. 02, page 82 / 176



FREQ 115.7 MHz
 PEAK 38.9 dB μ V/m
 QP 27.9 dB μ V/m
 AVO 16.7 dB μ V/m



Notes:
 POL H

Record of the measurement of radiated emissions.

One of the maximum disturbance determined in the frequency range 30MHz – 1 GHz.

This document may be only fully reproduced.

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

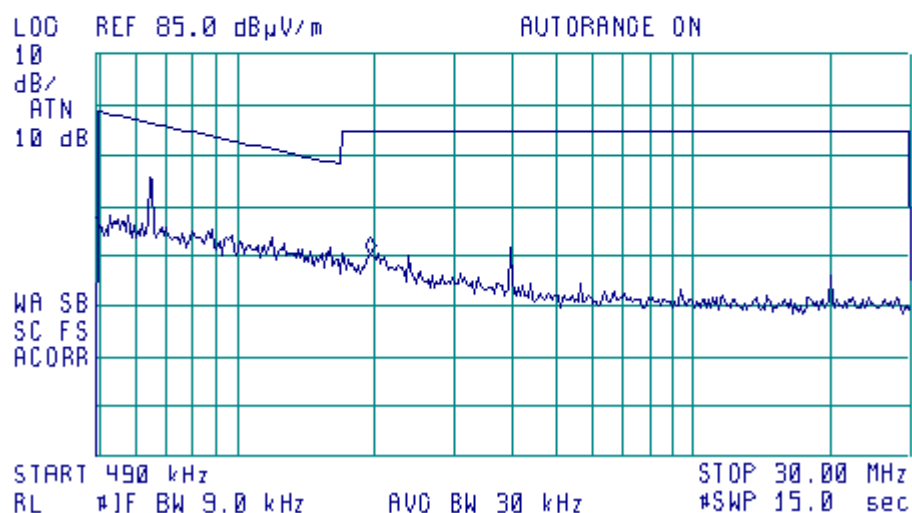
Report n. 12077-FCC-IC Rev. 02, page 83 / 176

MAGNETIC FIELD EMISSIONS:

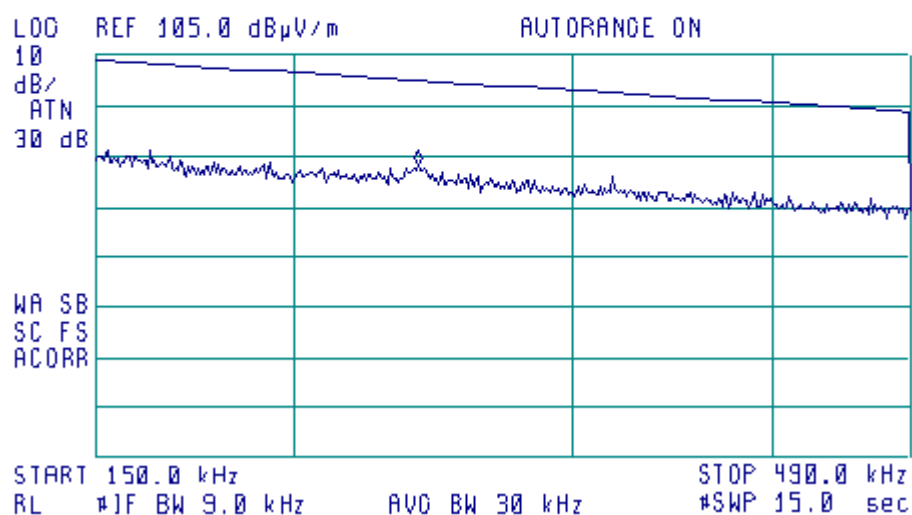
EUT FRONT SIDE, LOOP ANTENNA PARALLEL



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.99 MHz
45.45 dB μ V/m



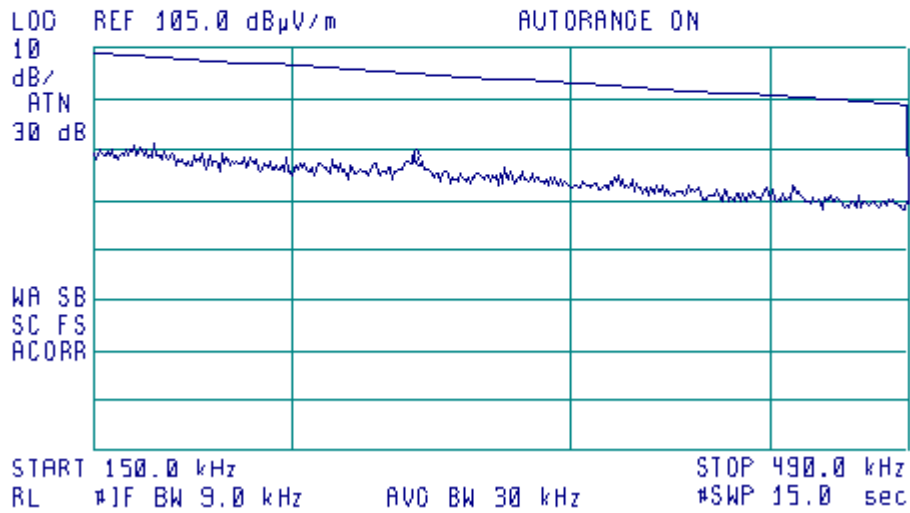
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 240.0 kHz
83.23 dB μ V/m



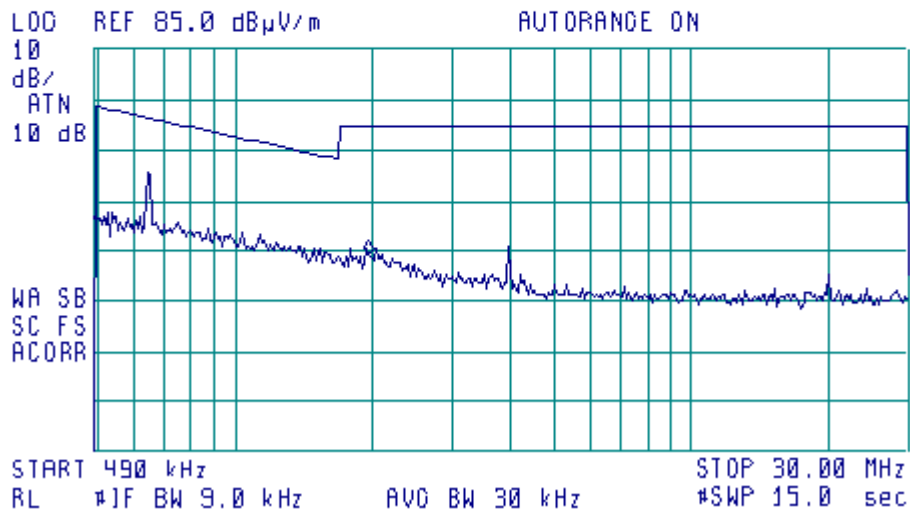
EUT FRONT SIDE, LOOP ANTENNA ORTHOGONAL



ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 240.0 kHz
82.26 dB μ V/m



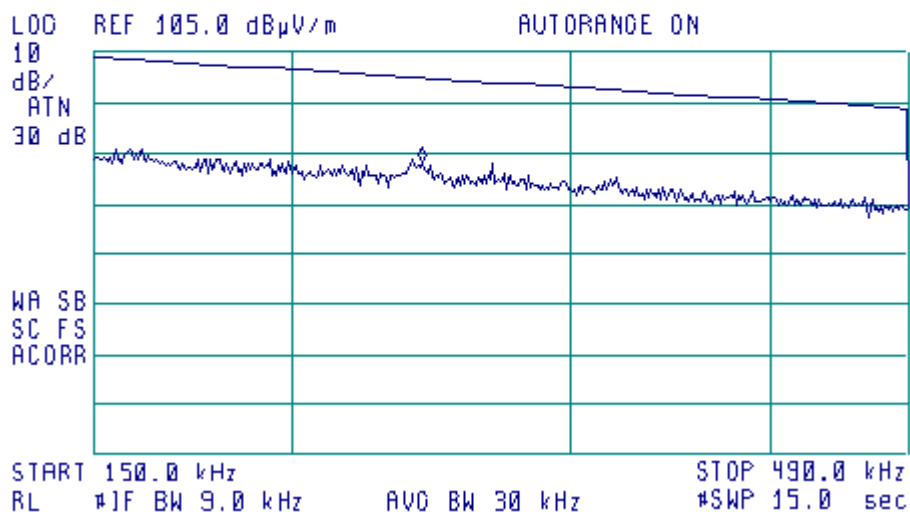
ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 1.99 MHz
44.00 dB μ V/m



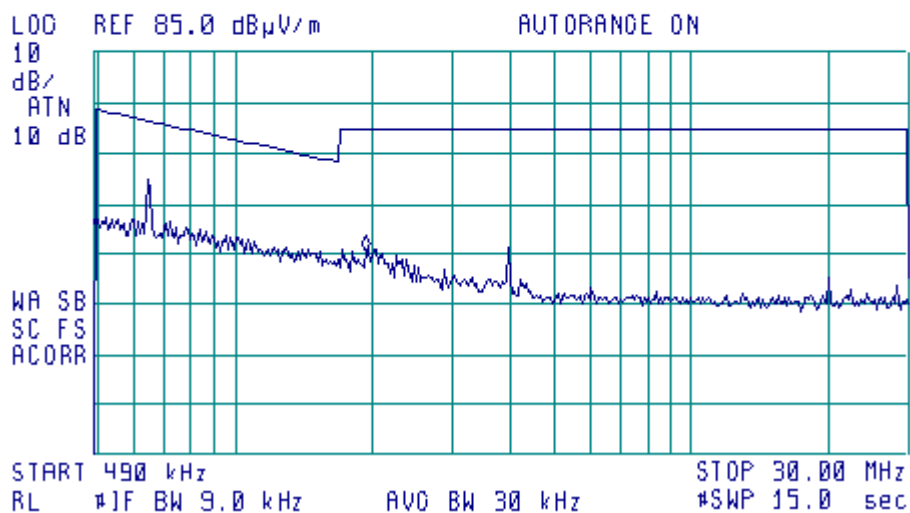
EUT LATERAL SIDE, LOOP ANTENNA ORTHOGONAL



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 241.6 kHz
83.02 dB μ V/m



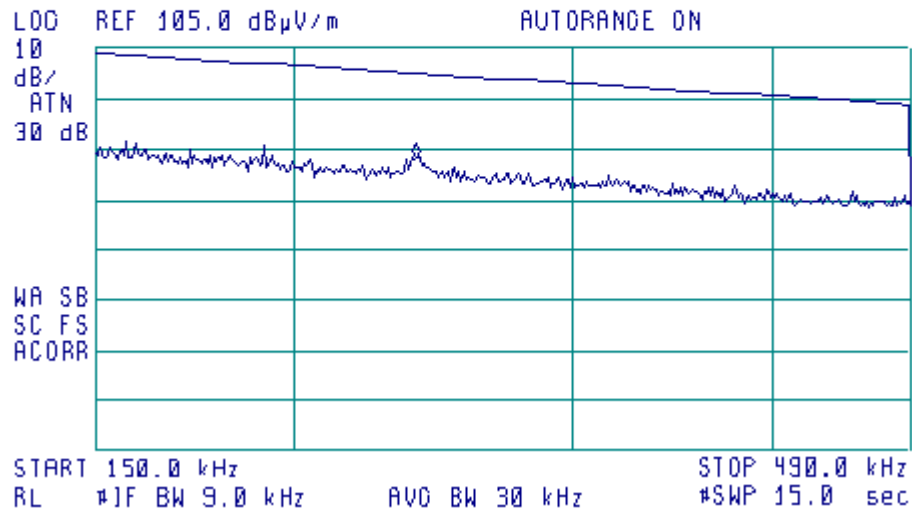
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.96 MHz
45.56 dB μ V/m



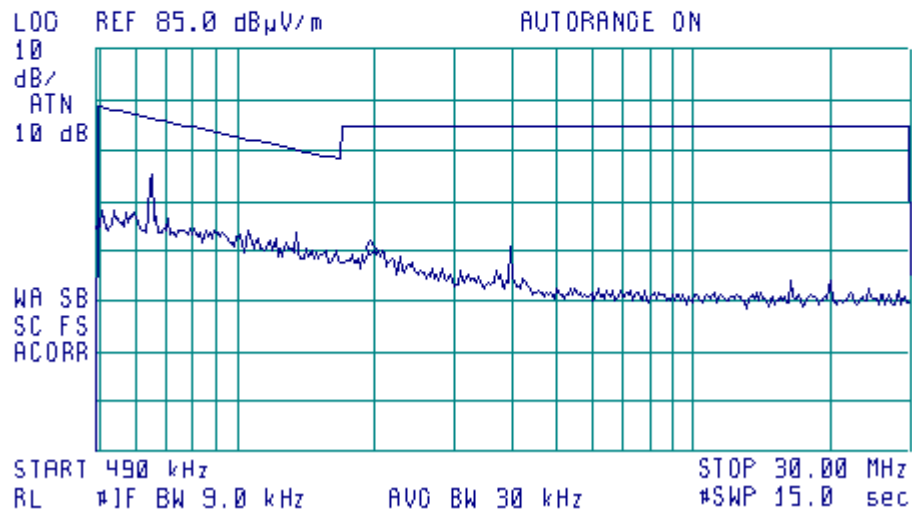
EUT LATERAL SIDE, LOOP ANTENNA PARALLEL



ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 239.2 kHz
83.04 dBμV/m

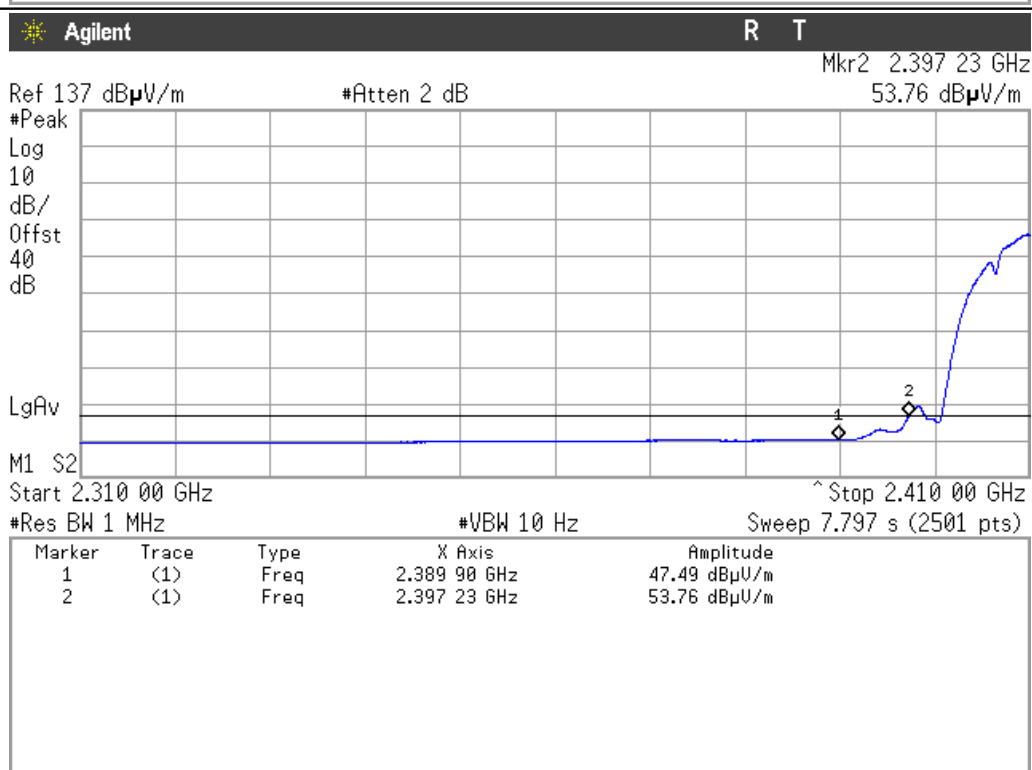
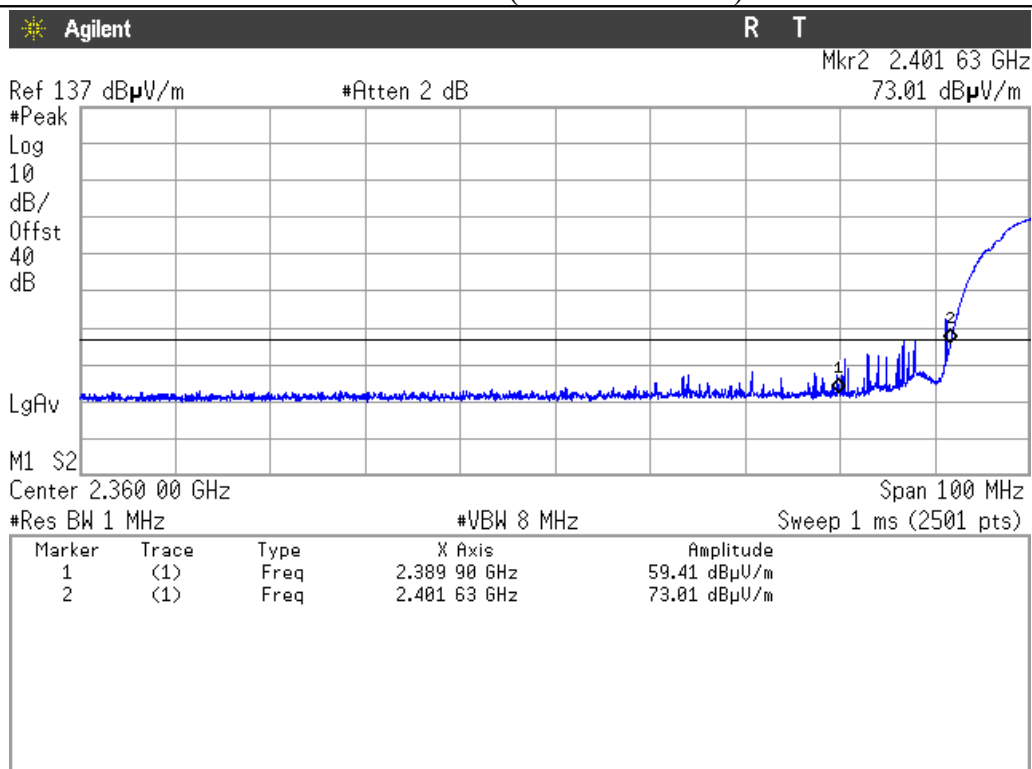


ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 1.99 MHz
43.96 dBμV/m



FOLLOWING FIGURES FOR
RESTRICTED BAND EDGE MEASUREMENT:
EXTERNAL AND INTERNAL ANTENNA – WITH MODULATION

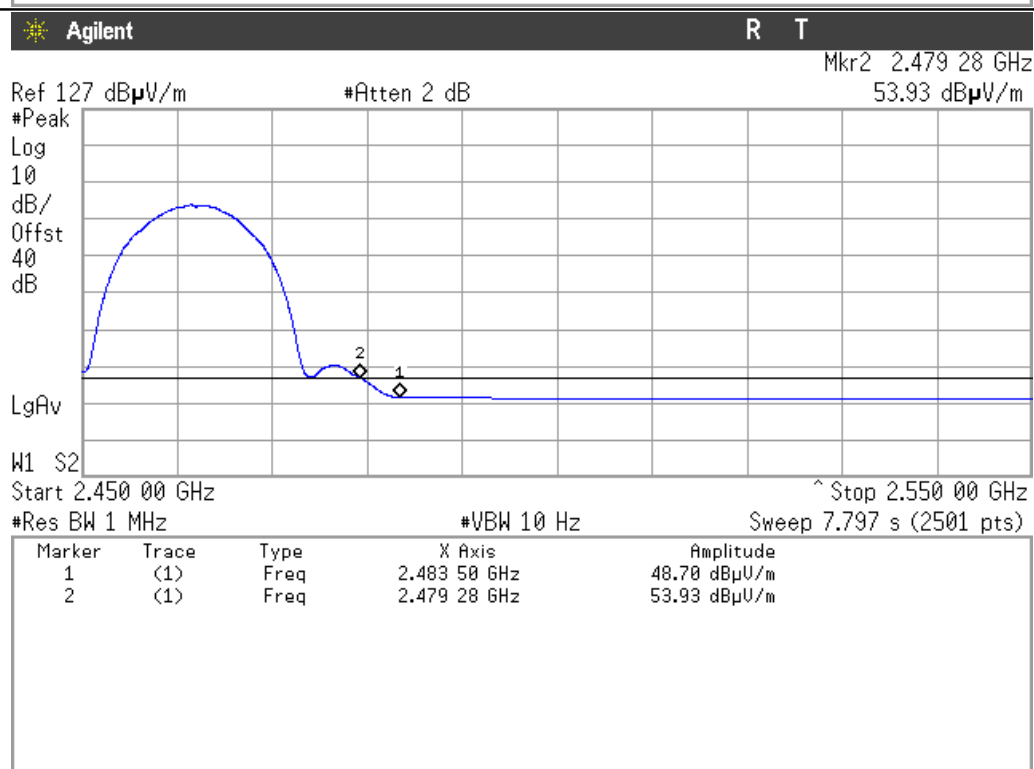
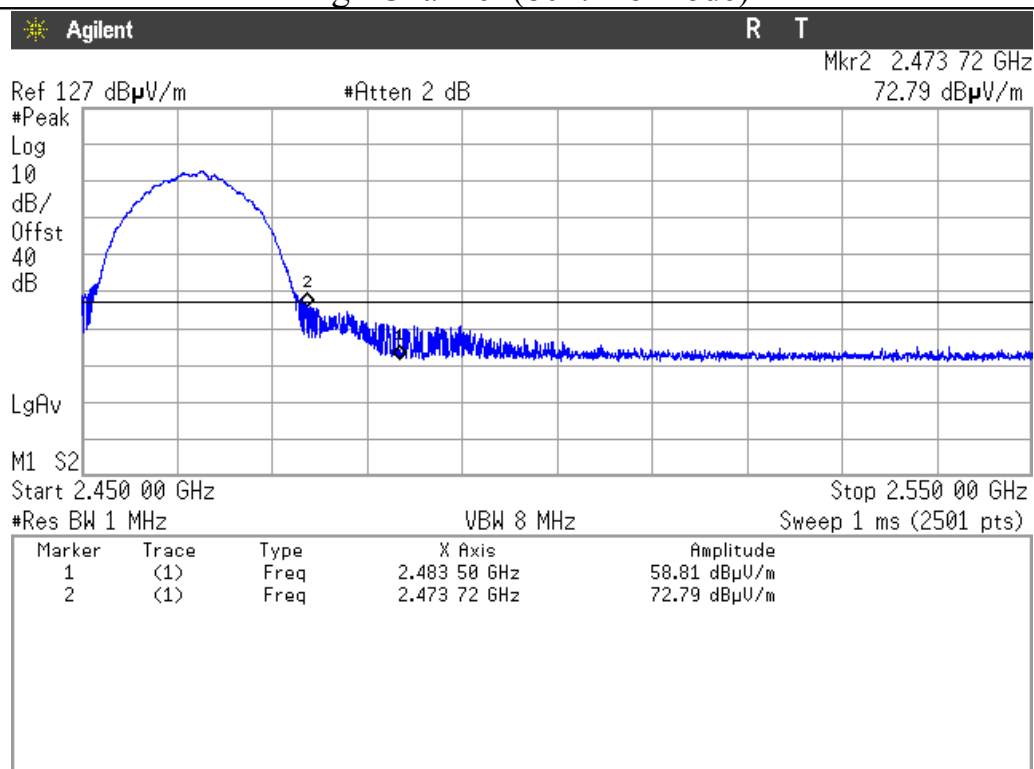
Restricted Band Edge Radiated Measurement Low Channel (802.11b mode)



Note:

Data Rate = 1 Mb/s
External Antenna
Pol. V

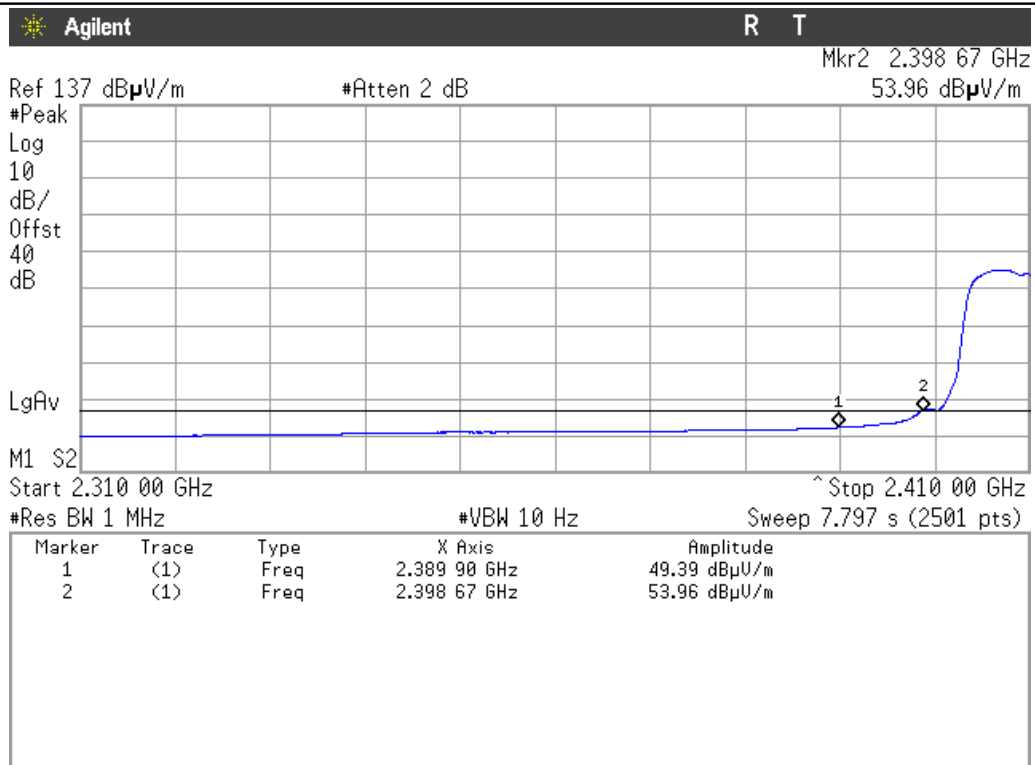
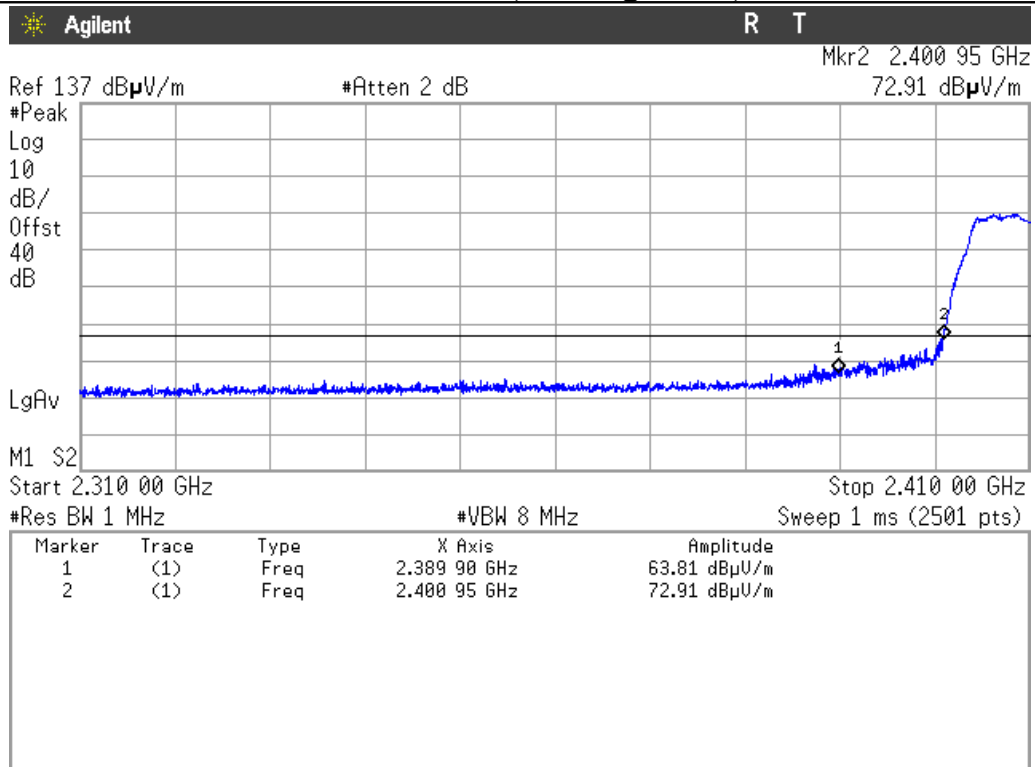
Restricted Band Edge Radiated Measurement High Channel (802.11b mode)



Note:

Data Rate = 11 Mb/s
External Antenna
Pol. V

Restricted Band Edge Radiated Measurement Low Channel (802.11g mode)



Note:

Data Rate = 54 Mb/s

External Antenna

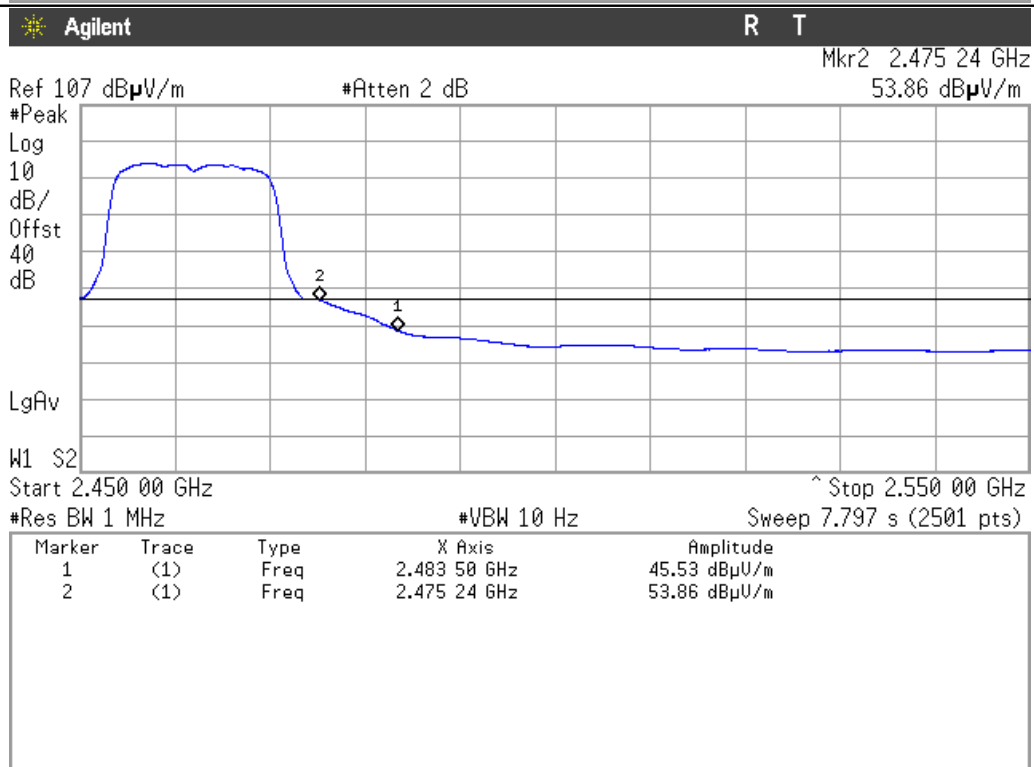
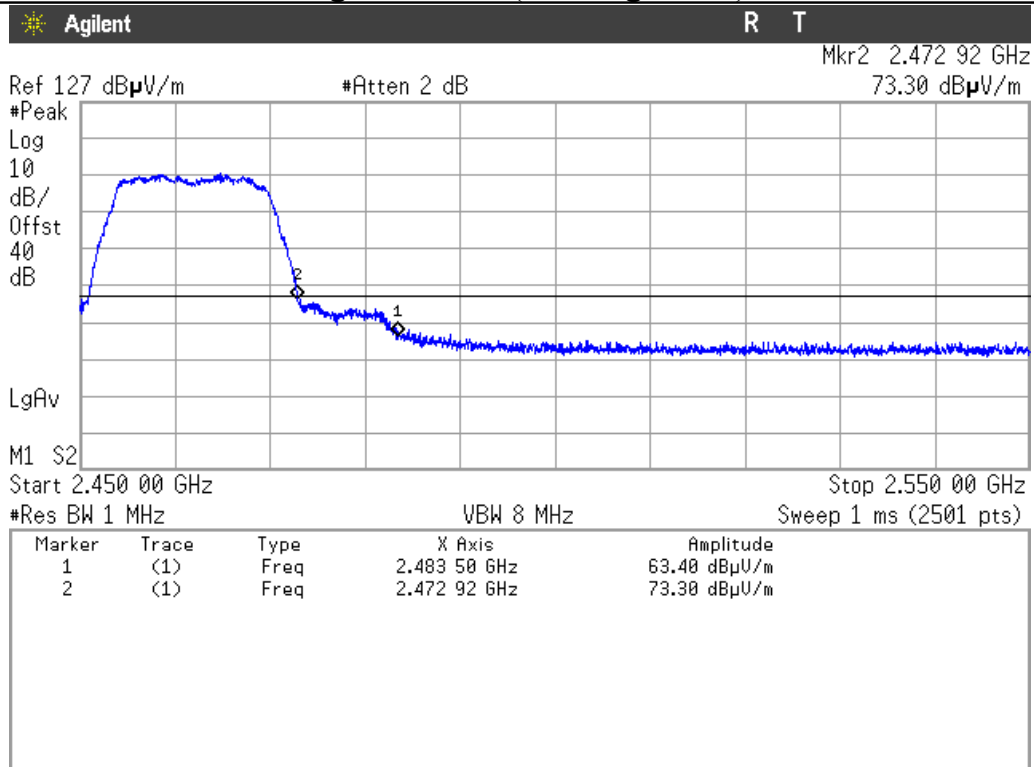
Pol. V

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. 12077-FCC-IC Rev. 02, page 91 / 176

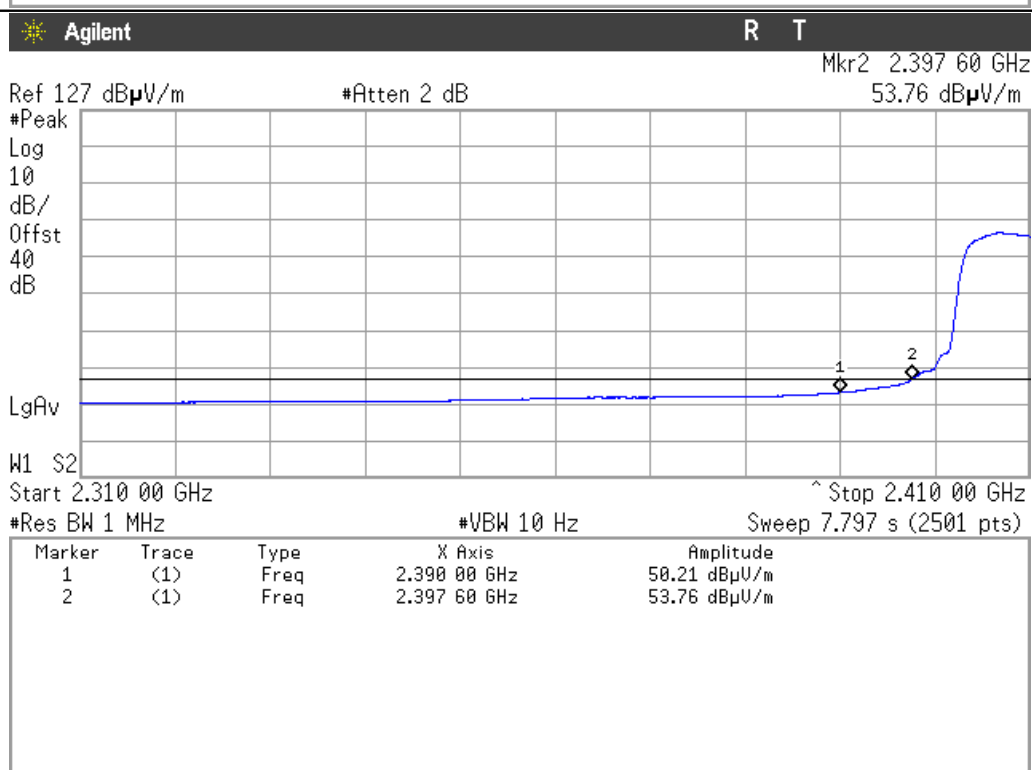
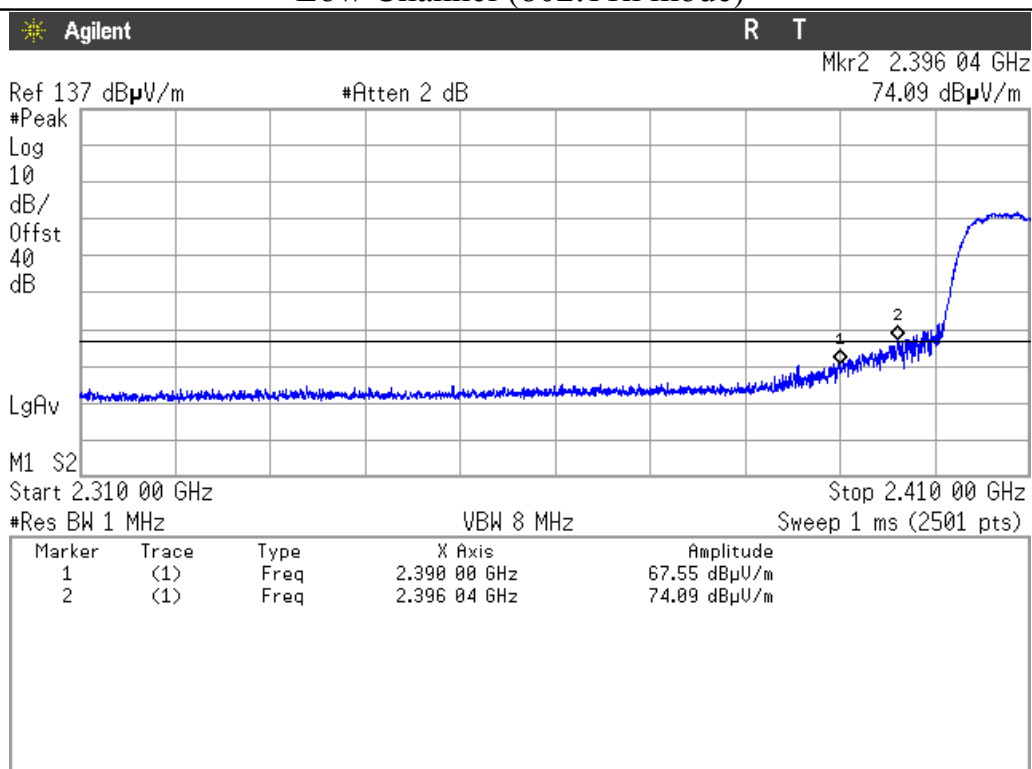
Restricted Band Edge Radiated Measurement High Channel (802.11g mode)



Note:

Data Rate = 54 Mb/s
External Antenna
Pol. V

Restricted Band Edge Radiated Measurement Low Channel (802.11n mode)



Note:

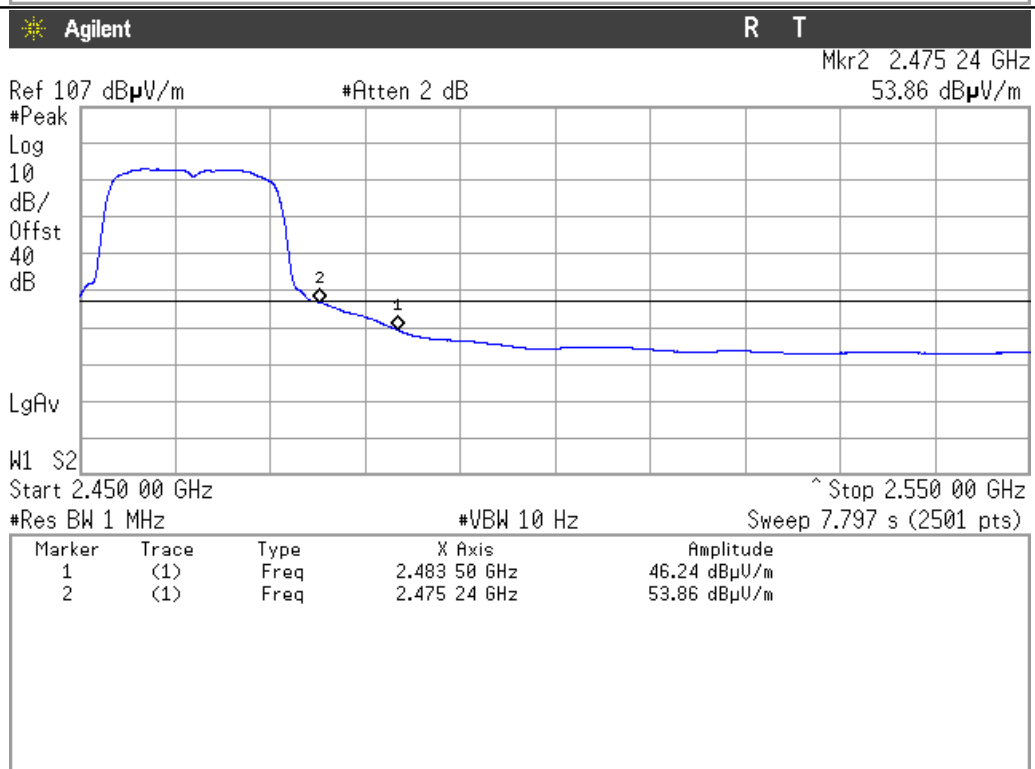
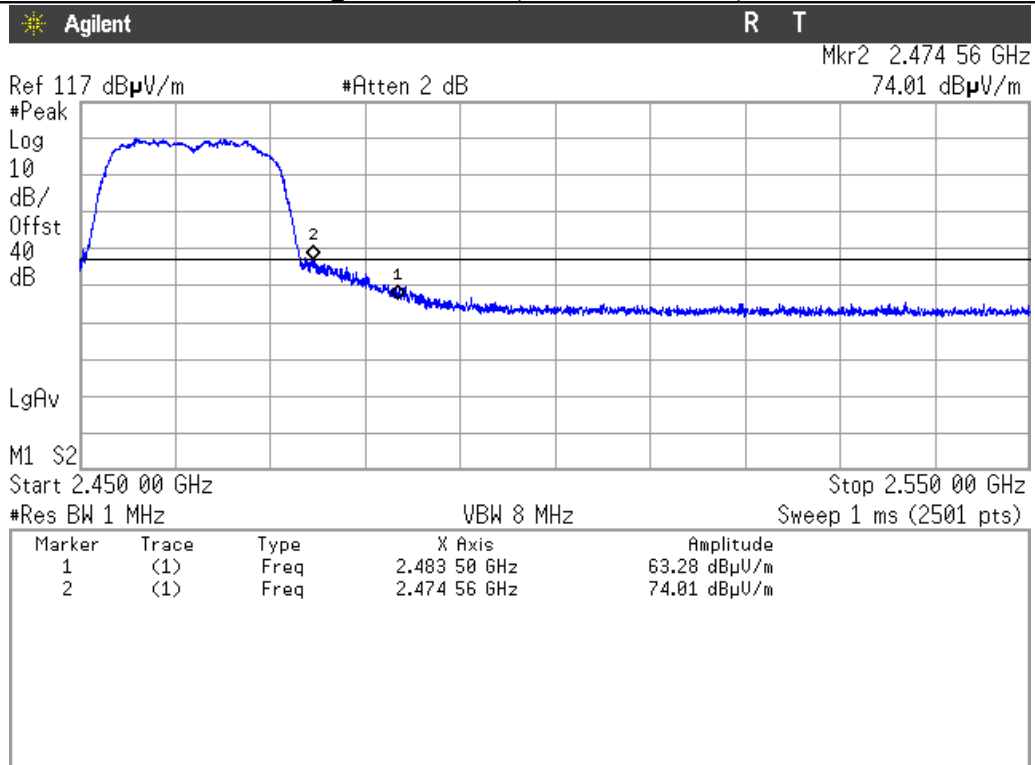
Data Rate = 65 Mb/s
External Antenna
Pol. V

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. 12077-FCC-IC Rev. 02, page 93 / 176

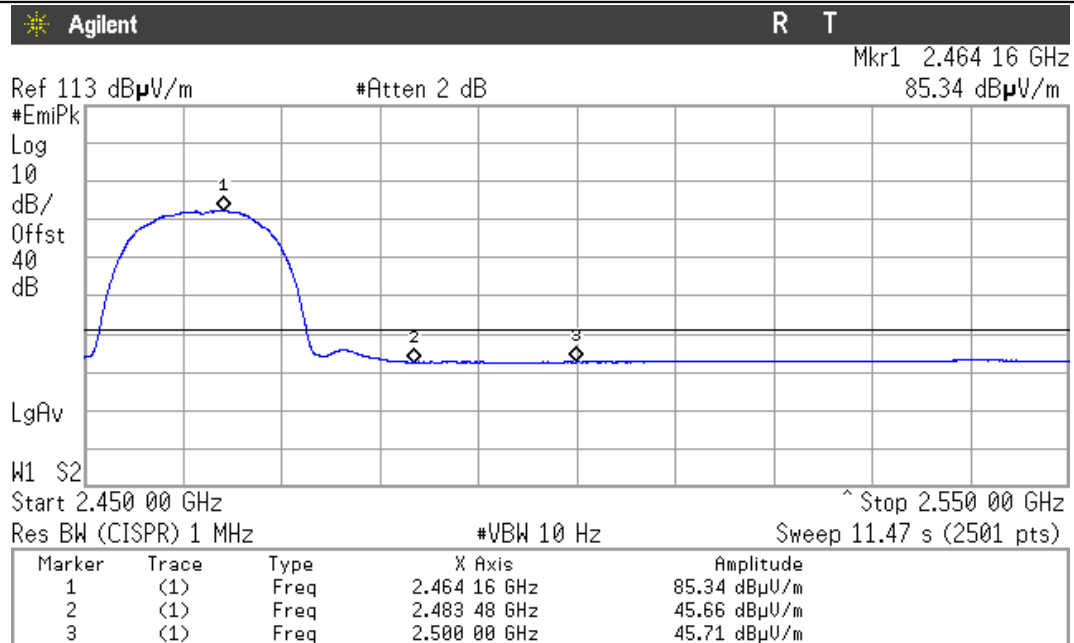
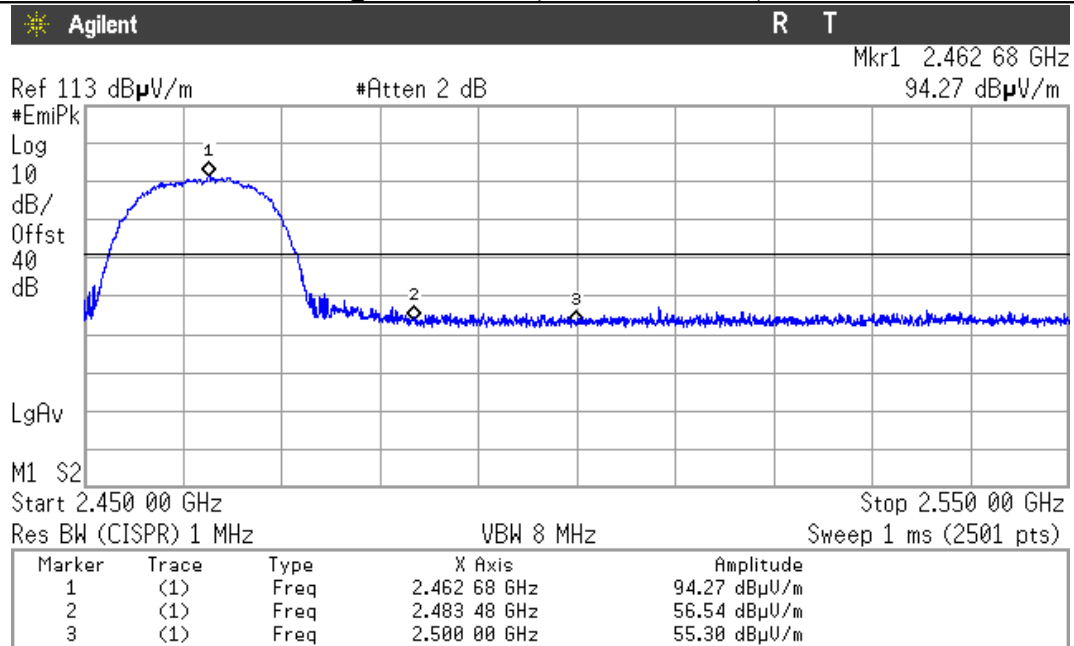
Restricted Band Edge Radiated Measurement High Channel (802.11n mode)



Note:

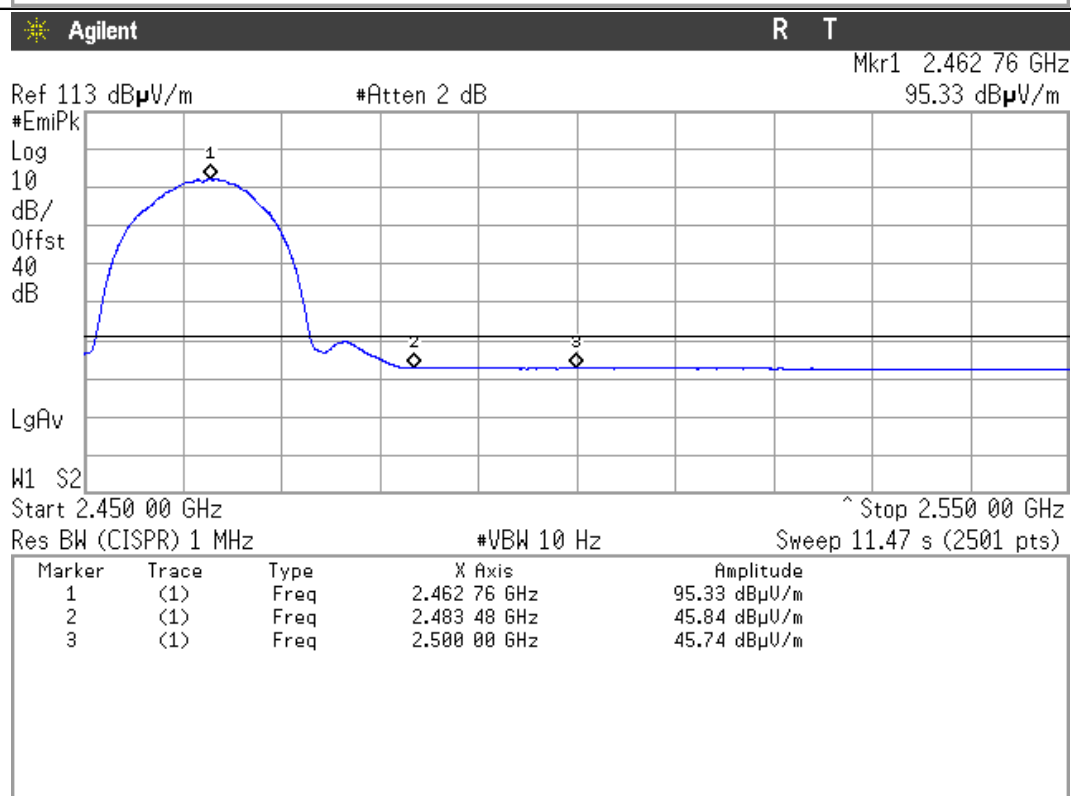
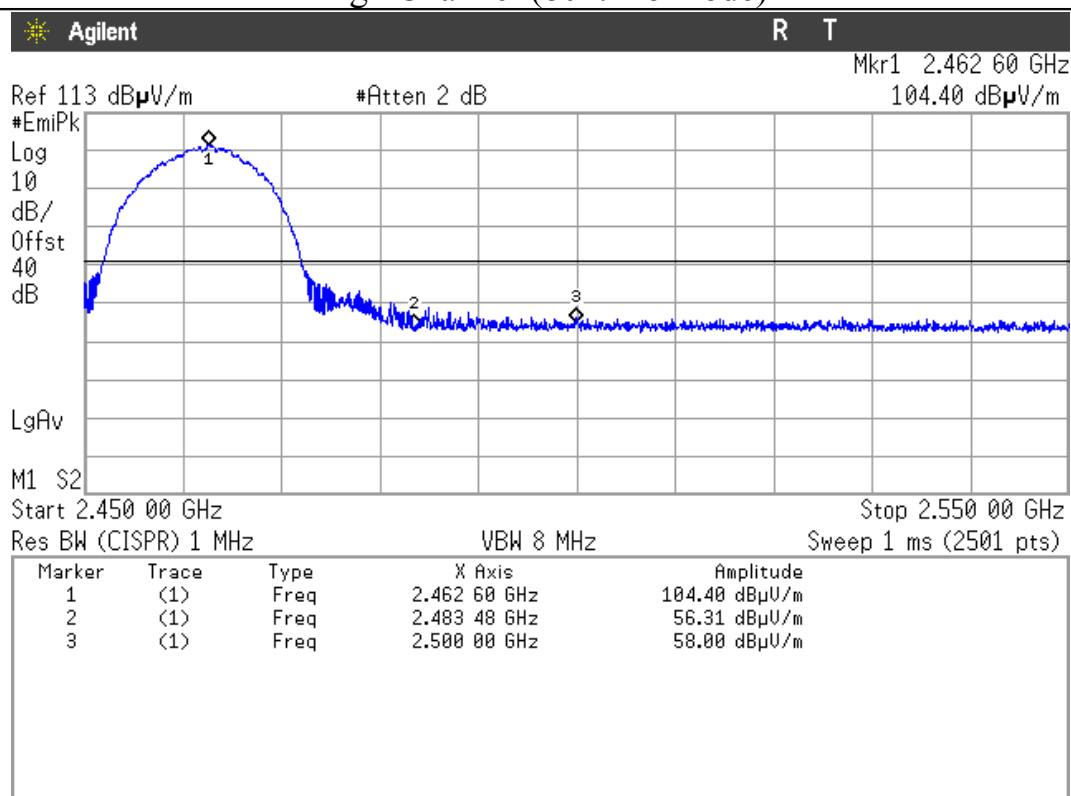
Data Rate = 65 Mb/s
External Antenna
Pol. V

Restricted Band Edge Radiated Measurement High Channel (802.11b mode)



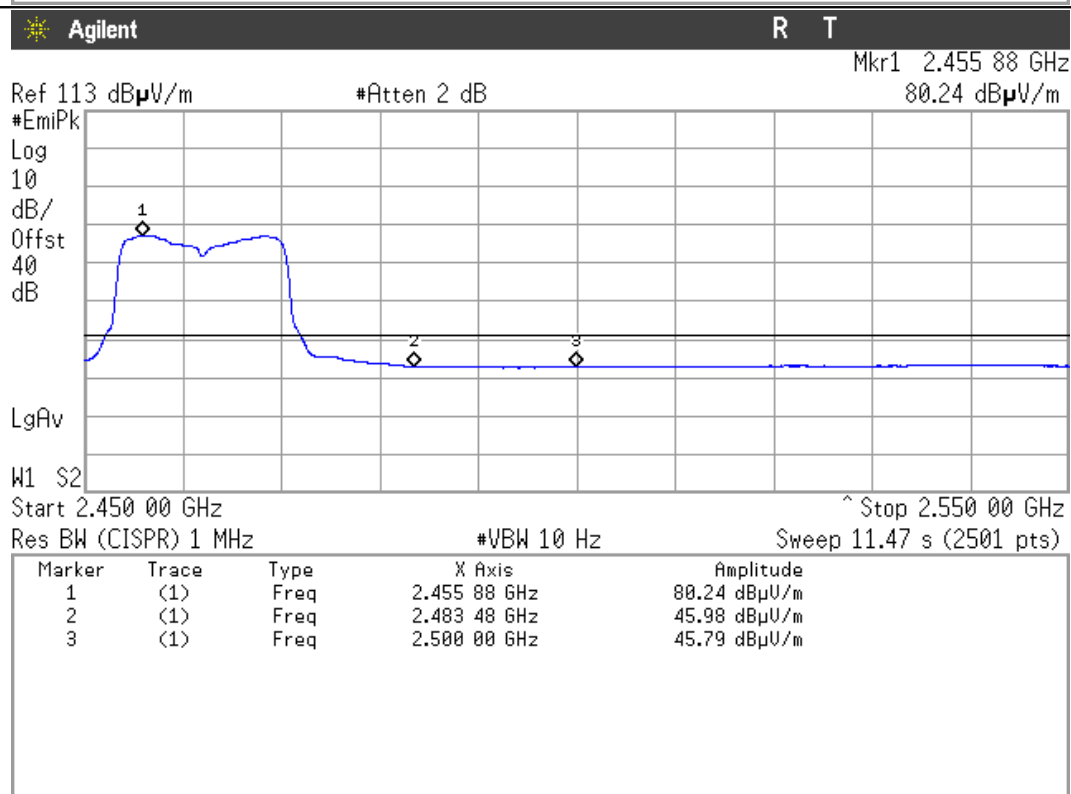
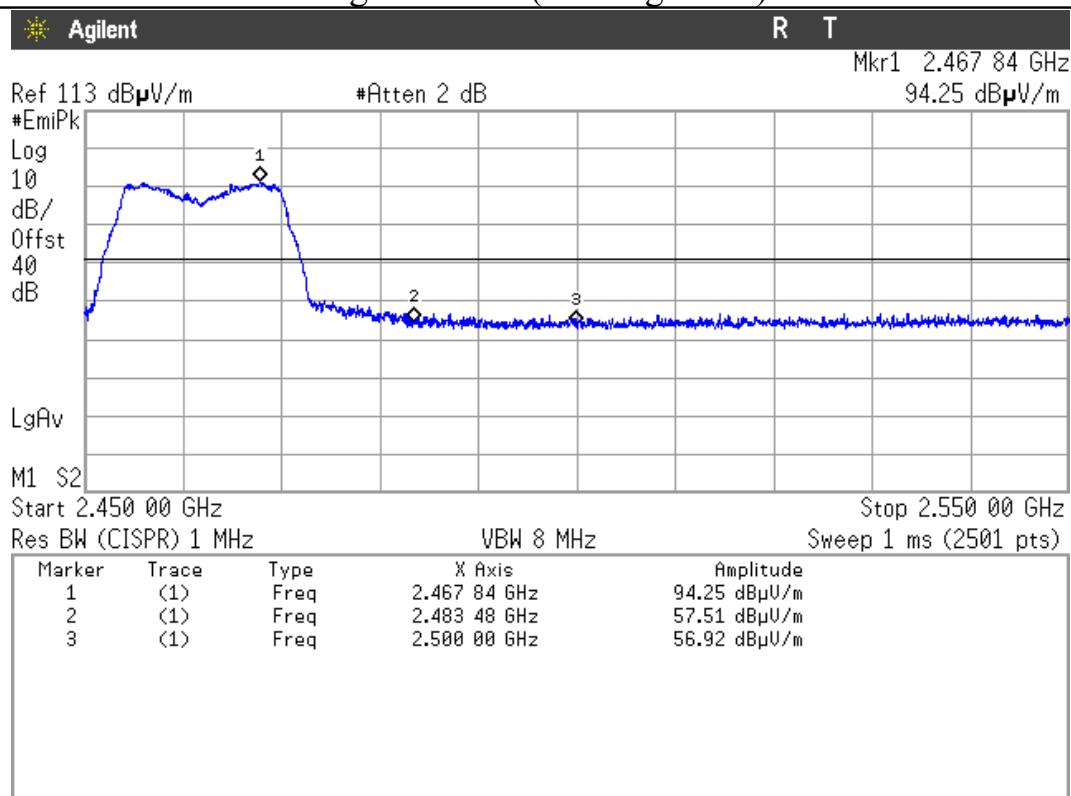
Note: Data Rate = 11 Mb/s
Internal Antenna
Pol. V

Restricted Band Edge Radiated Measurement High Channel (802.11b mode)



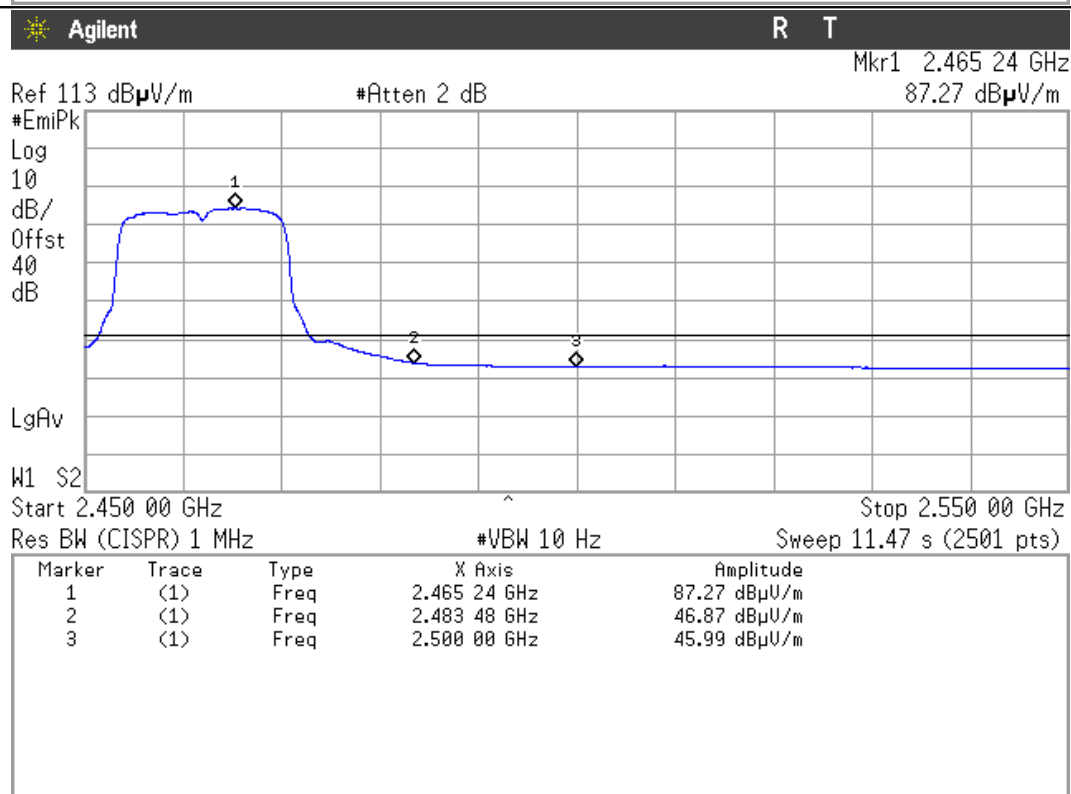
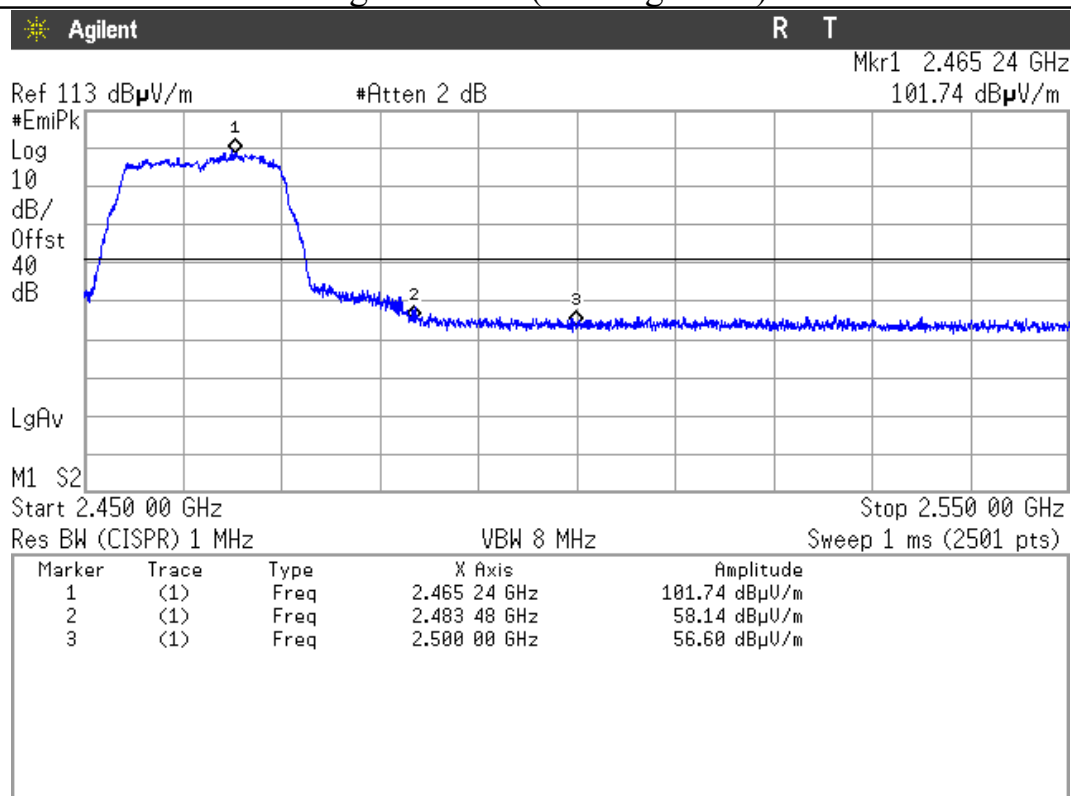
Note: Data Rate = 11 Mb/s
Internal Antenna
Pol. H

Restricted Band Edge Radiated Measurement High Channel (802.11g mode)



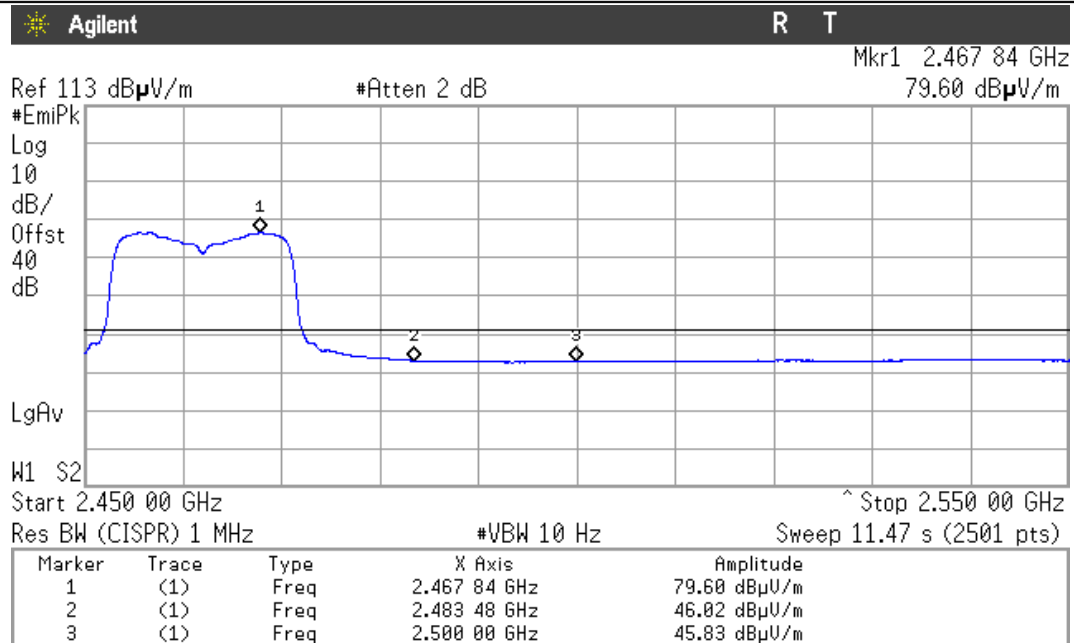
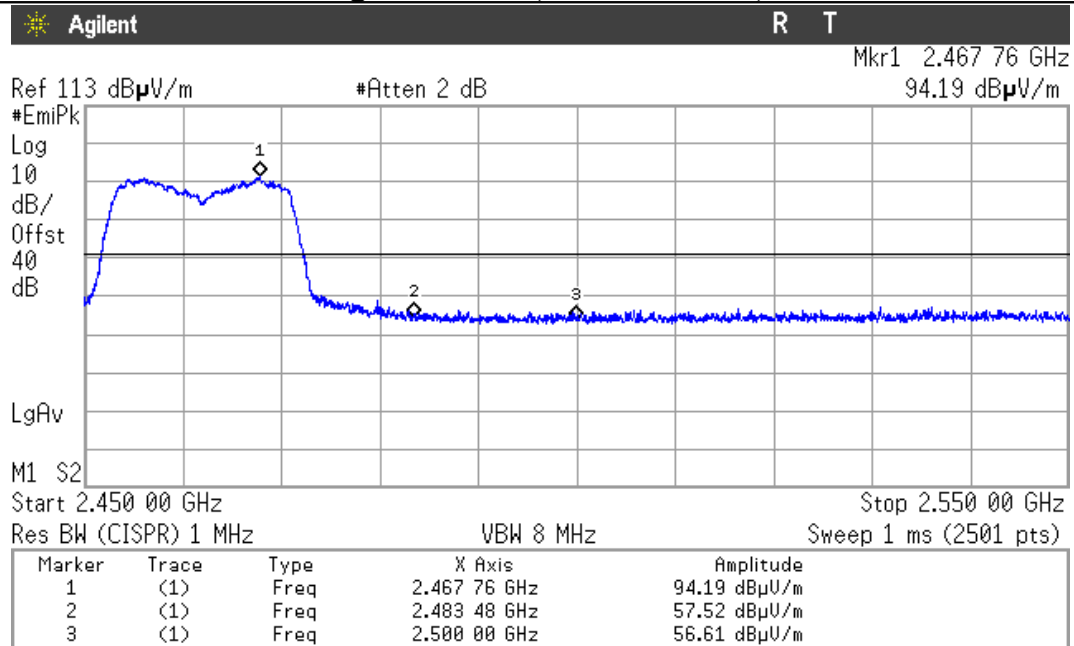
Note: Data Rate = 54 Mb/s
Internal Antenna
Pol. V

Restricted Band Edge Radiated Measurement High Channel (802.11g mode)



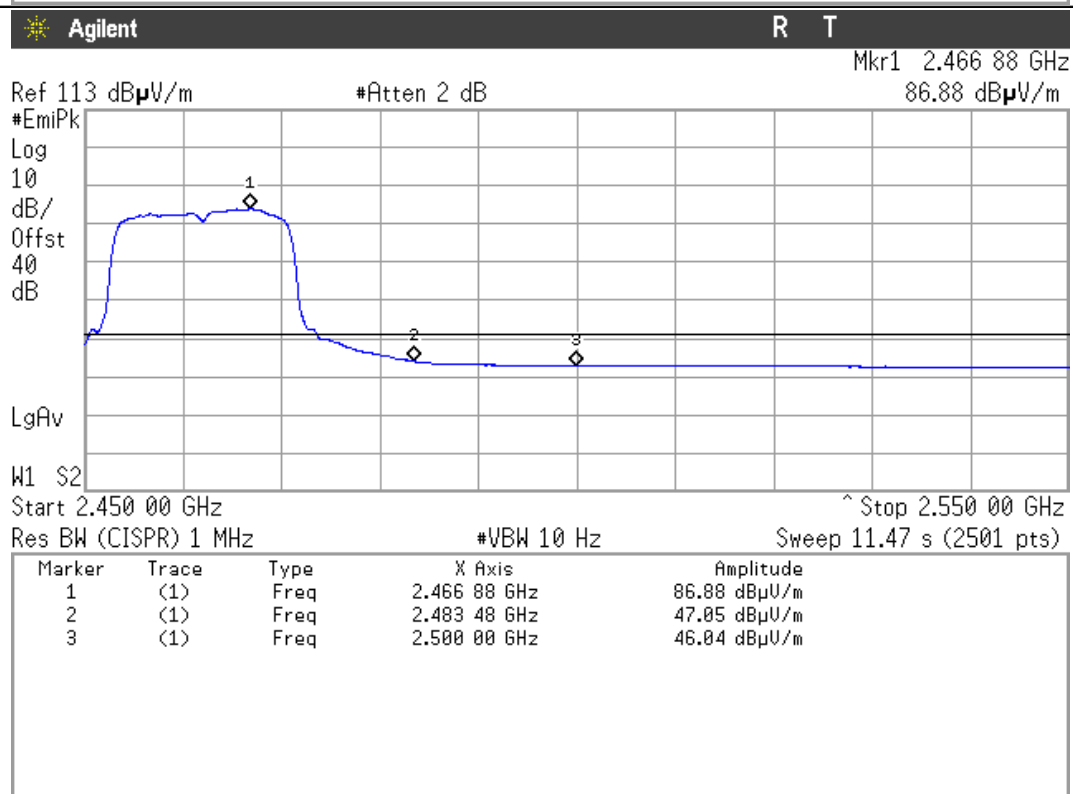
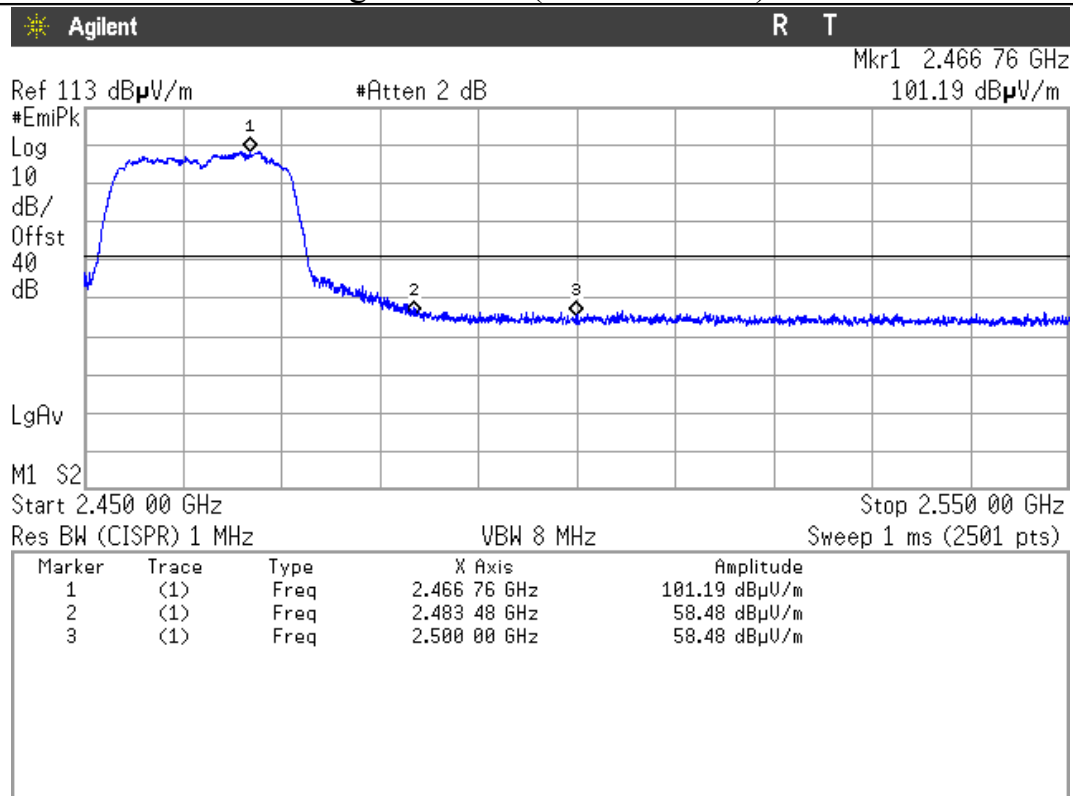
Note: Data Rate = 54 Mb/s
Internal Antenna
Pol. H

Restricted Band Edge Radiated Measurement High Channel (802.11n mode)



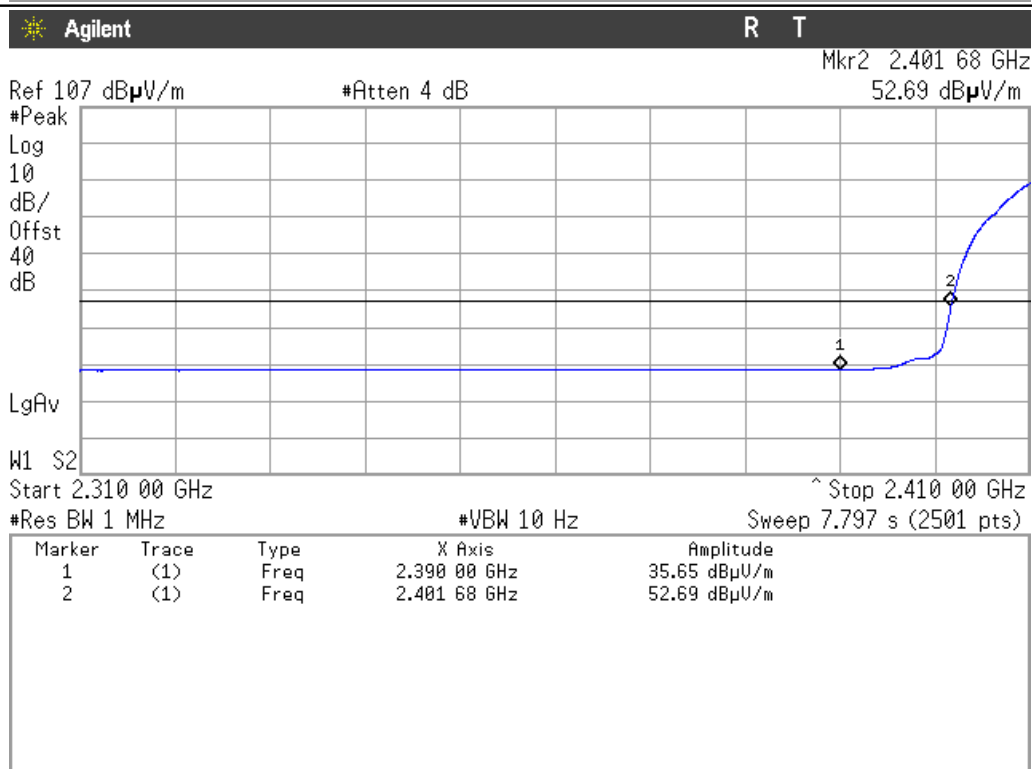
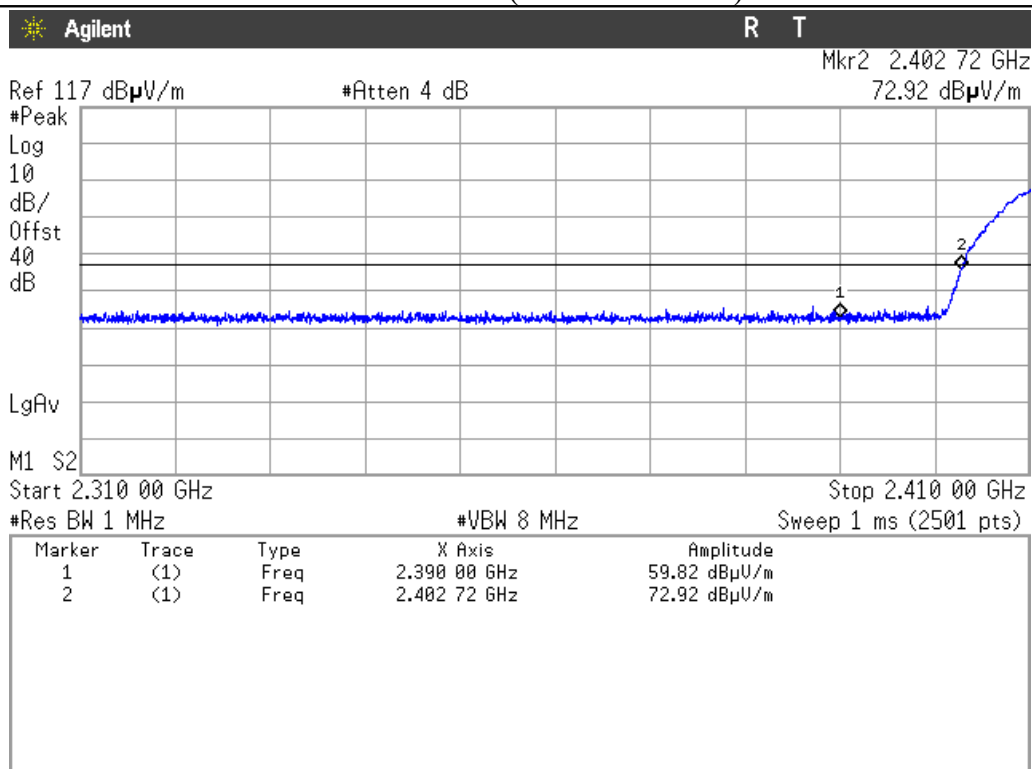
Note: Data Rate = 65 Mb/s
Internal Antenna
Pol. V

Restricted Band Edge Radiated Measurement High Channel (802.11n mode)



Note: Data Rate = 65 Mb/s
Internal Antenna
Pol. H

Restricted Band Edge Radiated Measurement Low Channel (802.11b mode)



Note:

Data Rate = 11 Mb/s

Internal Antenna

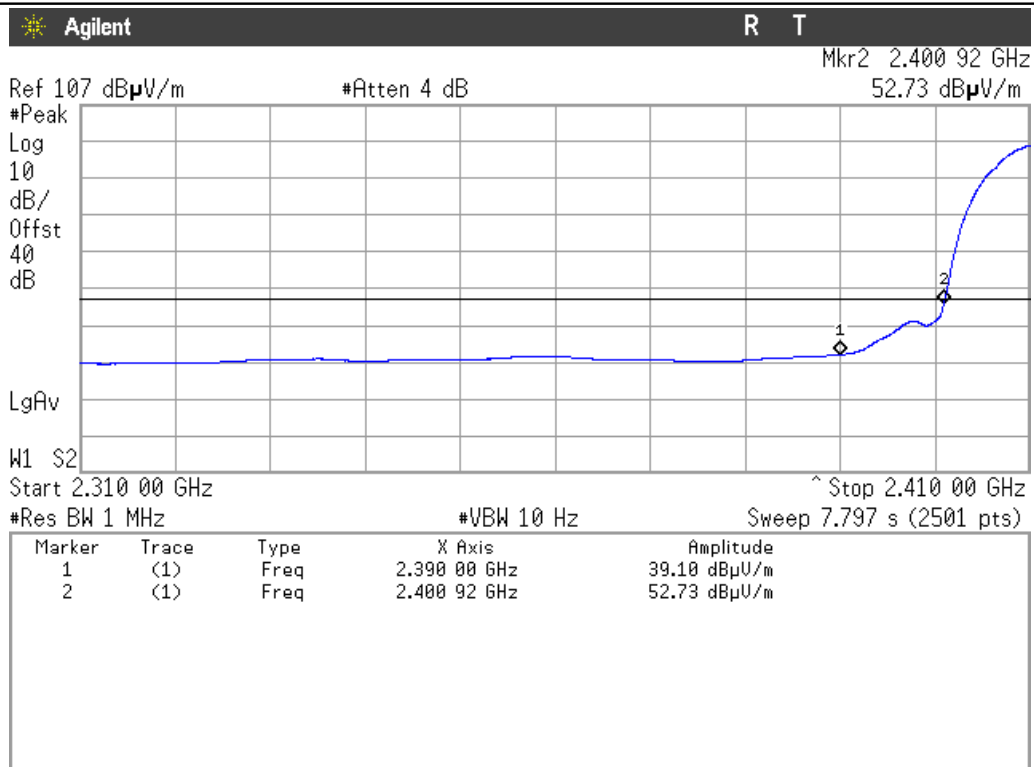
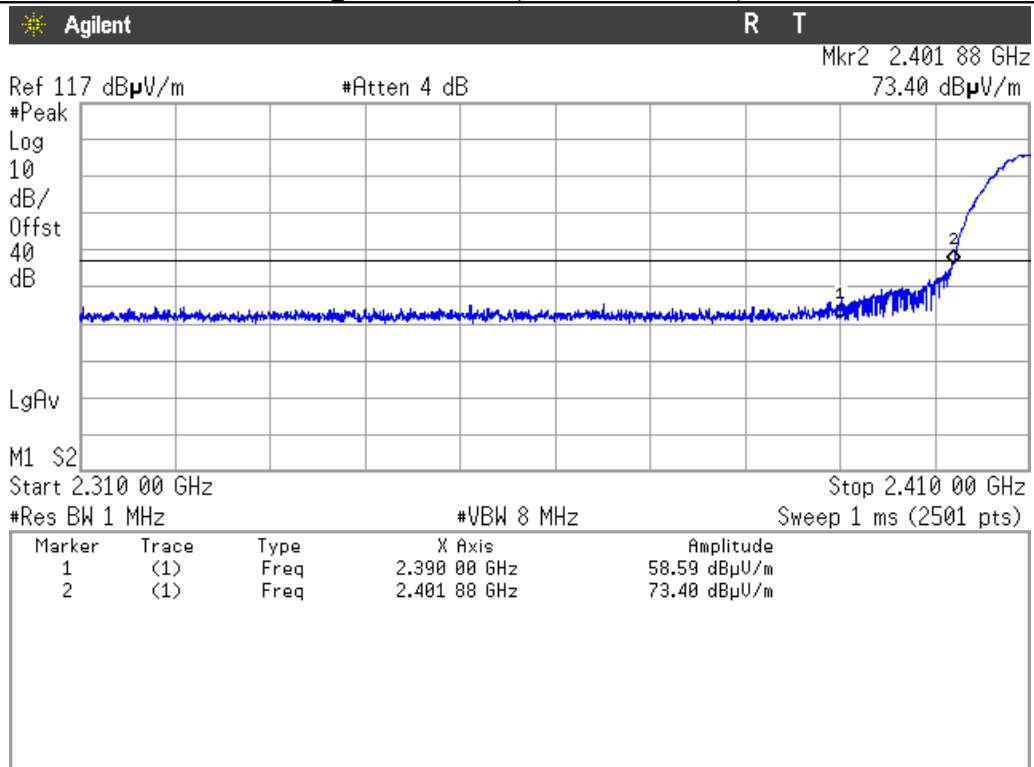
Pol. H

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. 12077-FCC-IC Rev. 02, page 101 / 176

Restricted Band Edge Radiated Measurement High Channel (802.11b mode)



Note:

Data Rate = 11 Mb/s

Internal Antenna

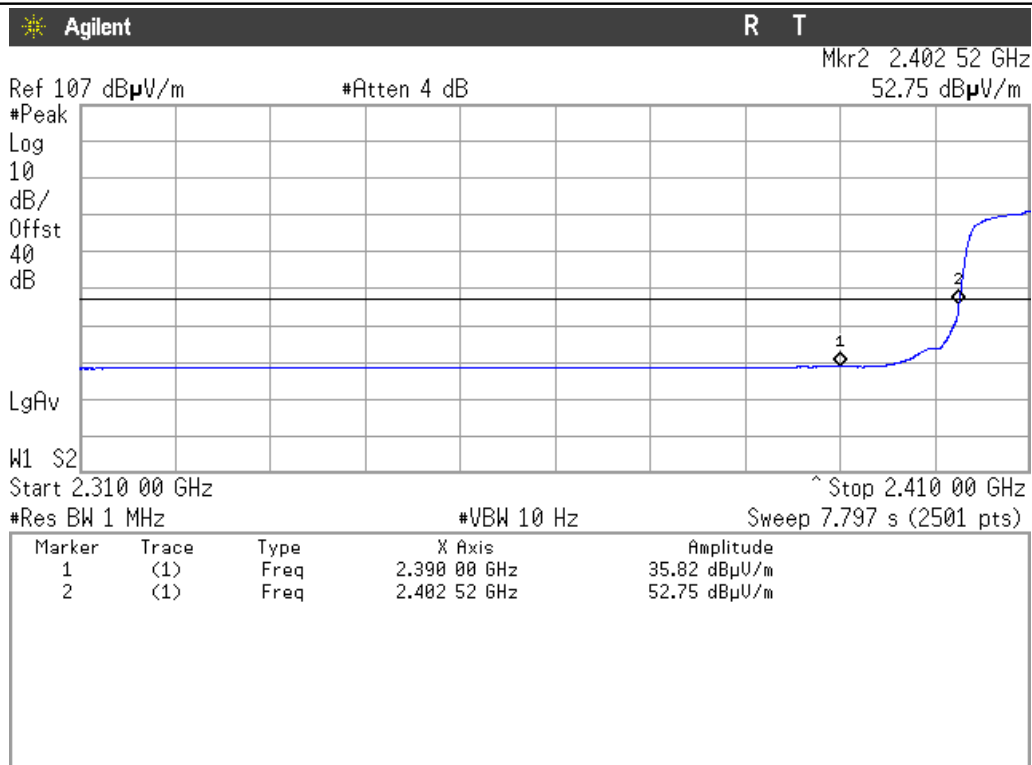
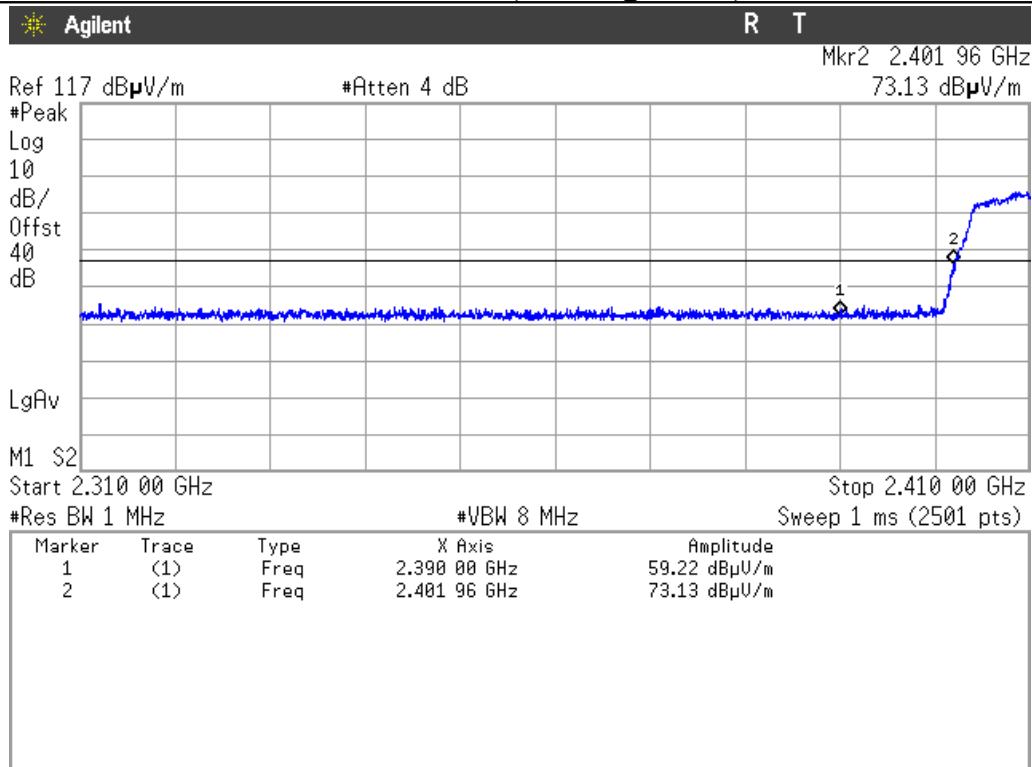
Pol. V

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. 12077-FCC-IC Rev. 02, page 102 / 176

Restricted Band Edge Radiated Measurement Low Channel (802.11g mode)



Note:

Data Rate = 54 Mb/s

Internal Antenna

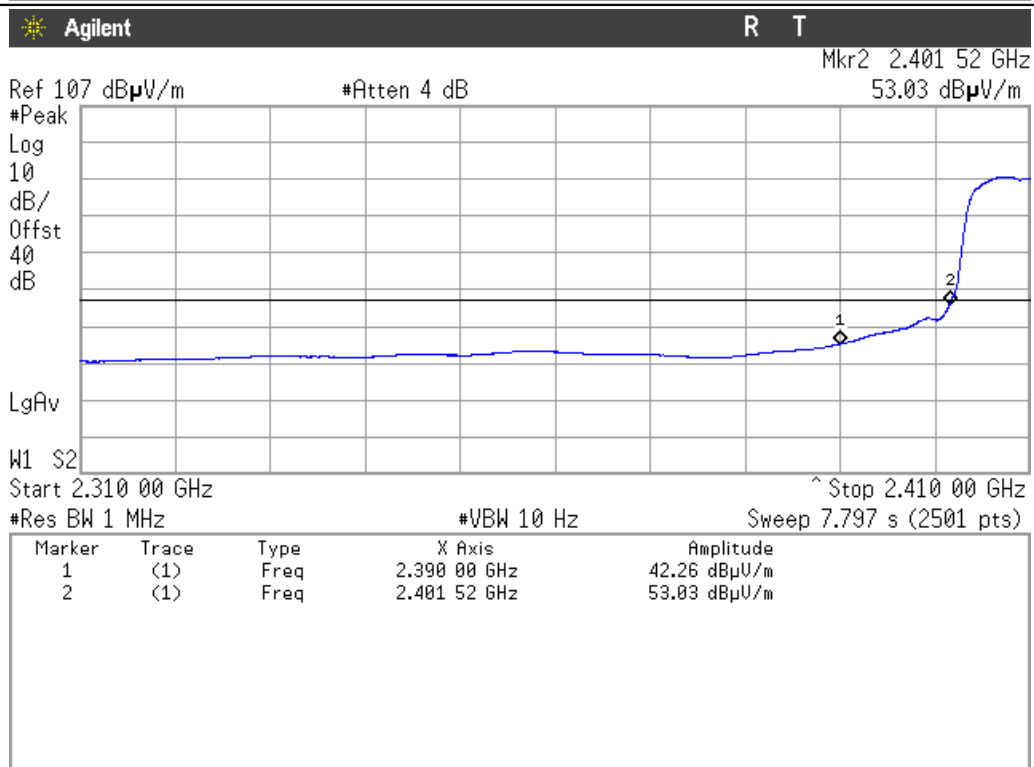
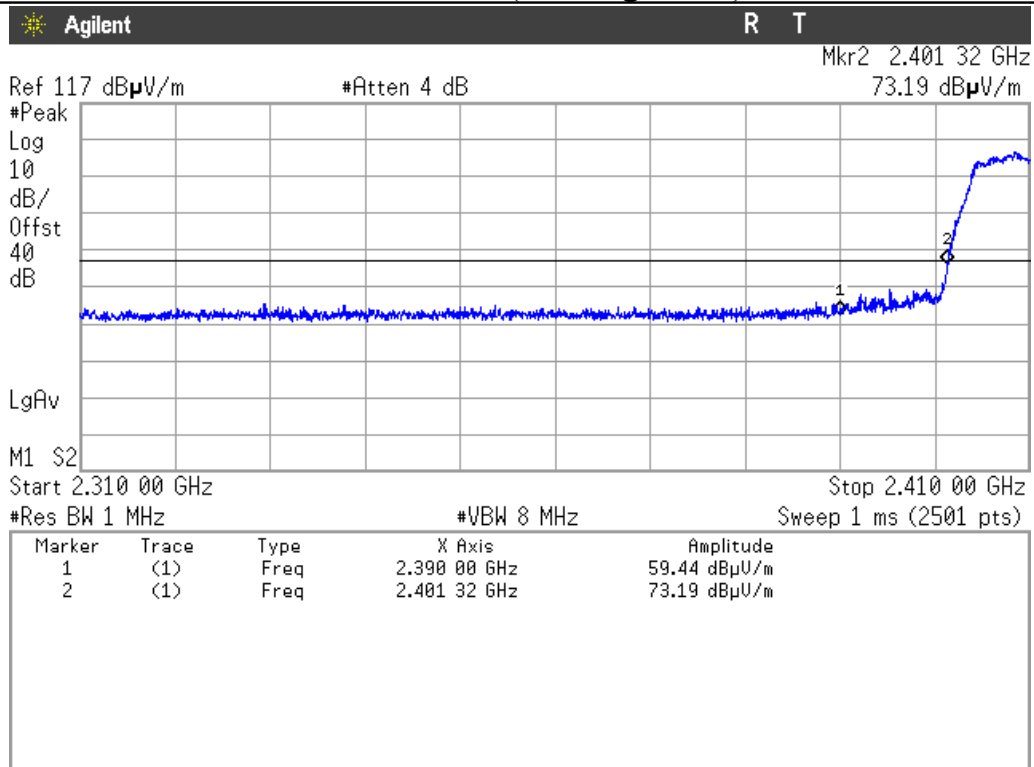
Pol. H

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. 12077-FCC-IC Rev. 02, page 103 / 176

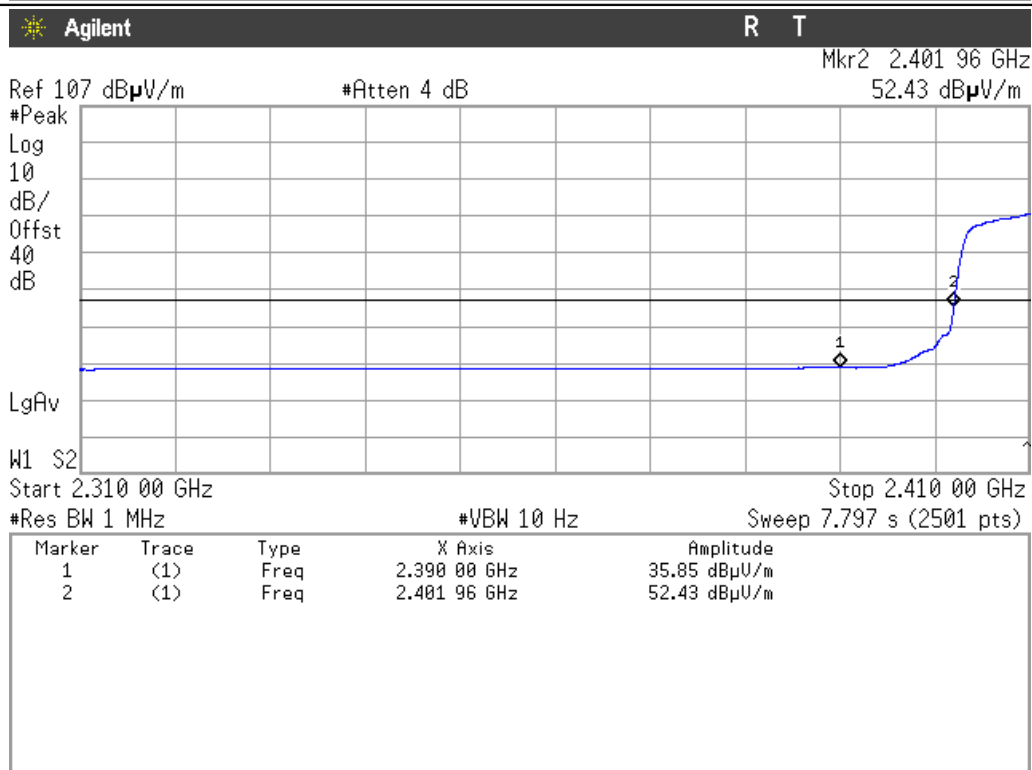
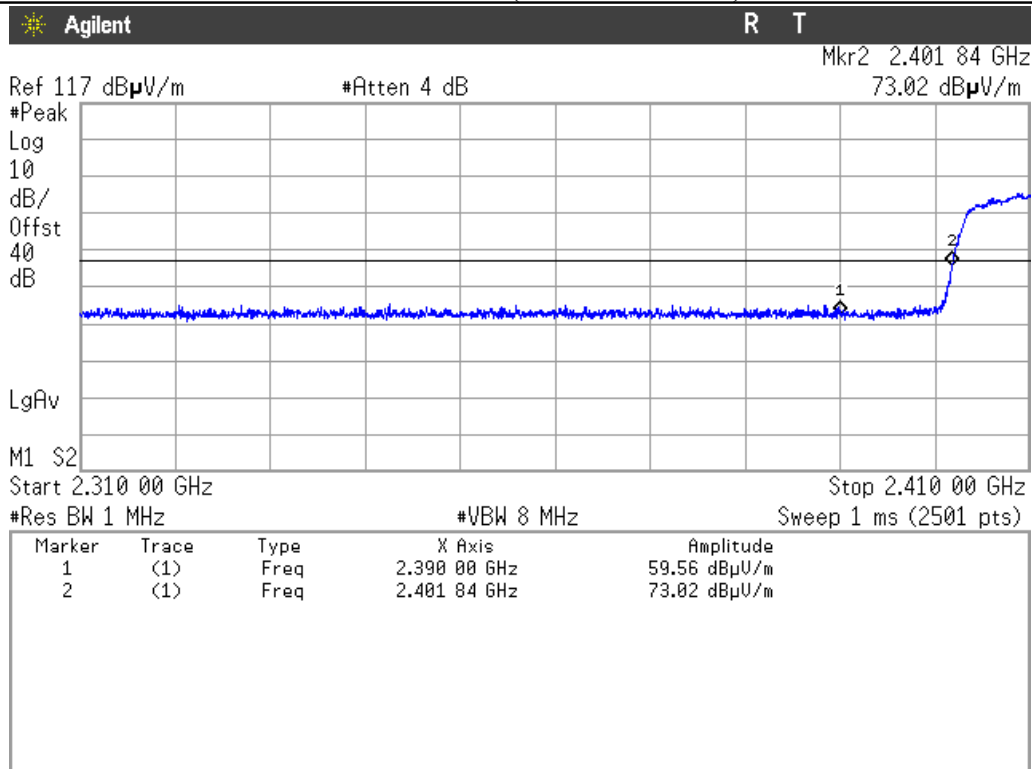
Restricted Band Edge Radiated Measurement Low Channel (802.11g mode)



Note:

Data Rate = 54 Mb/s
Internal Antenna
Pol. V

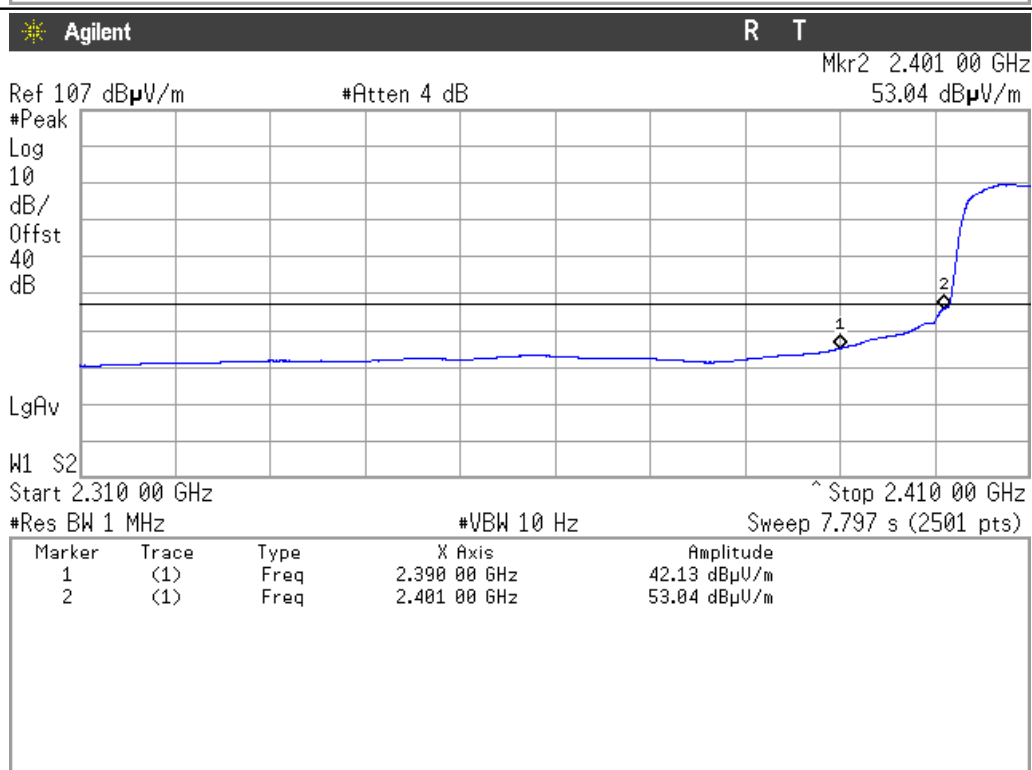
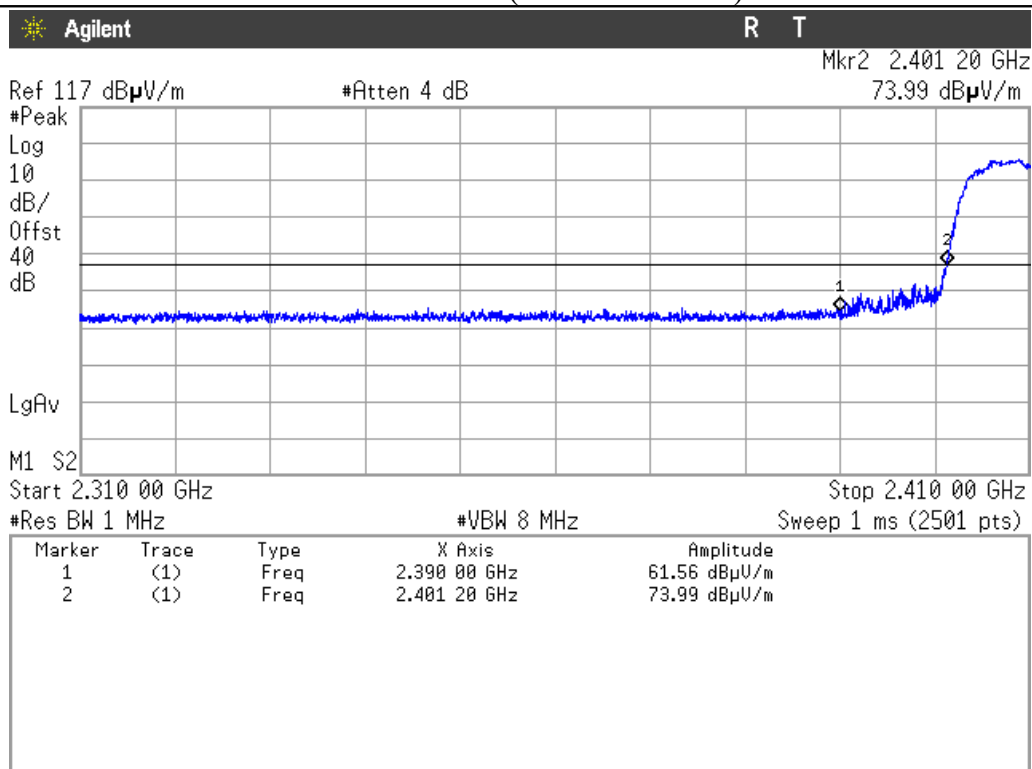
Restricted Band Edge Radiated Measurement Low Channel (802.11n mode)



Note:

Data Rate = 65 Mb/s
Internal Antenna
Pol. H

Restricted Band Edge Radiated Measurement Low Channel (802.11n mode)



Note:

Data Rate = 65 Mb/s
Internal Antenna
Pol. V

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	55,3	46,3	74,0	54,0
4,824	V	54,7	45,9	74,0	54,0
7,236	H	57,1	44,6	74,0	54,0
7,236	V	56,3	43,8	74,0	54,0
9,648	H	59,5	47,6	74,0	54,0
9,648	V	61,7	45,3	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	54,2	46,1	74,0	54,0
4,824	V	53,7	44,5	74,0	54,0
7,236	H	56,1	45,1	74,0	54,0
7,236	V	56,8	44,8	74,0	54,0
9,648	H	58,7	46,7	74,0	54,0
9,648	V	60,2	46,8	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	54,9	47,1	74,0	54,0
4,824	V	53,9	43,9	74,0	54,0
7,236	H	55,2	45,4	74,0	54,0
7,236	V	55,6	44,5	74,0	54,0
9,648	H	57,7	46,1	74,0	54,0
9,648	V	61,0	47,1	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	54,7	46,2	74,0	54,0
4,824	V	53,5	44,8	74,0	54,0
7,311	H	55,1	47,9	74,0	54,0
7,311	V	55,1	44,3	74,0	54,0
9,748	H	56,7	46,7	74,0	54,0
9,748	V	61,5	47,0	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	55,3	46,1	74,0	54,0
4,824	V	54,2	44,9	74,0	54,0
7,311	H	55,0	47,8	74,0	54,0
7,311	V	55,8	44,8	74,0	54,0
9,748	H	56,4	47,6	74,0	54,0
9,748	V	61,0	47,1	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	55,9	45,9	74,0	54,0
4,824	V	54,9	44,3	74,0	54,0
7,311	H	56,3	47,9	74,0	54,0
7,311	V	54,2	44,4	74,0	54,0
9,748	H	56,1	47,5	74,0	54,0
9,748	V	61,1	47,9	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	56,9	46,2	74,0	54,0
4,924	V	55,3	45,6	74,0	54,0
7,386	H	57,2	48,6	74,0	54,0
7,386	V	53,1	43,4	74,0	54,0
9,848	H	57,1	46,5	74,0	54,0
9,848	V	63,2	47,1	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	58,3	47,3	74,0	54,0
4,924	V	54,1	46,2	74,0	54,0
7,386	H	59,2	47,3	74,0	54,0
7,386	V	52,5	44,4	74,0	54,0
9,848	H	55,8	45,1	74,0	54,0
9,748	V	61,9	46,7	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	58,1	47,9	74,0	54,0
4,924	V	55,4	46,1	74,0	54,0
7,386	H	59,5	47,4	74,0	54,0
7,386	V	52,1	45,7	74,0	54,0
9,848	H	54,3	46,2	74,0	54,0
9,748	V	61,1	46,4	74,0	54,0
NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR					

RADIATED SPURIOUS EMISSIONS INTERNAL ANTENNA					
Low Channel 802.11b mode, 11 Mbs					
F GHz	Polarization	Peak dBuV/m	Avg dBuV/m	Limit Peak	Limit Avg
4,824	H	58,9	45,7	74,0	54,0
4,824	V	55,3	46,5	74,0	54,0
7,236	H	59,1	46,3	74,0	54,0
7,236	V	53,2	44,9	74,0	54,0
9,648	H	54,7	45,9	74,0	54,0
9,648	V	61,9	46,9	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	57,1	46,9	74,0	54,0
4,824	V	53,1	47,9	74,0	54,0
7,236	H	58,2	45,9	74,0	54,0
7,236	V	55,7	46,2	74,0	54,0
9,648	H	55,6	44,9	74,0	54,0
9,648	V	61,2	47,9	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	59,2	47,9	74,0	54,0
4,824	V	55,2	47,5	74,0	54,0
7,236	H	57,1	45,1	74,0	54,0
7,236	V	54,3	47,3	74,0	54,0
9,648	H	56,7	44,1	74,0	54,0
9,648	V	61,1	47,2	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	62,2	48,1	74,0	54,0
4,824	V	58,2	46,5	74,0	54,0
7,311	H	54,3	46,2	74,0	54,0
7,311	V	54,8	48,2	74,0	54,0
9,748	H	54,2	45,2	74,0	54,0
9,748	V	60,1	48,4	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	60,1	48,2	74,0	54,0
4,824	V	57,2	44,1	74,0	54,0
7,311	H	55,8	44,5	74,0	54,0
7,311	V	53,1	45,7	74,0	54,0
9,748	H	54,8	48,9	74,0	54,0
9,748	V	59,7	46,7	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	59,9	48,1	74,0	54,0
4,824	V	58,2	45,2	74,0	54,0
7,311	H	56,2	44,7	74,0	54,0
7,311	V	55,4	44,6	74,0	54,0
9,748	H	53,7	47,2	74,0	54,0
9,748	V	58,6	47,7	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	61,8	47,2	74,0	54,0
4,924	V	57,6	46,5	74,0	54,0
7,386	H	55,2	45,6	74,0	54,0
7,386	V	56,8	45,9	74,0	54,0
9,848	H	54,9	46,1	74,0	54,0
9,848	V	56,6	43,2	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	60,5	48,1	74,0	54,0
4,924	V	58,6	45,9	74,0	54,0
7,386	H	54,1	45,2	74,0	54,0
7,386	V	55,7	44,8	74,0	54,0
9,848	H	55,6	46,9	74,0	54,0
9,748	V	58,9	45,2	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	58,5	46,4	74,0	54,0
4,924	V	59,5	45,1	74,0	54,0
7,386	H	54,1	44,6	74,0	54,0
7,386	V	56,3	44,0	74,0	54,0
9,848	H	57,6	44,2	74,0	54,0
9,748	V	58,1	46,9	74,0	54,0
NO OTHER EMISSIONS WERE DETECTED ABOVE SYSTEM NOISE FLOOR					

10. BLUETOOTH: LIMIT OF HOPPING FREQUENCY – AVERAGE TIME OF OCCUPANCY – CHANNEL BANDWIDTH – CHANNEL SEPARATION - PEAK OUTPUT POWER – SPURIOUS RF EMISSION – BAND EDGE

Peak Output Power

Equipment shall meet the limits below .

<i>FREQUENCY RANGE</i> (MHz)	RF power output Limit dBm
2400-2483.5	30

Spurious Emissions

Nr Harmonics	AV Level (dBµV/m)						AV Limits (dBµV/m)	Remark
	Ch Low		Ch Mid		Ch High			
	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)		
2		--		--		--	54.0	
3		--		--		--	54.0	
4		--		--		--	54.0	
5		--		--		--	54.0	
6		--		--		--	54.0	
7		--		--		--	54.0	
8		--		--		--	54.0	
9		--		--		--	54.0	
10		--		--		--	54.0	

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

Nr Harmonics	Peak Level (dBµV/m)						AV Limits (dBµV/m)	Remark
	Ch Low		Ch Mid		Ch High			
	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)	F (MHz)	(dBµV/m)		
2		--		--		--	74.0	
3		--		--		--	74.0	
4		--		--		--	74.0	
5		--		--		--	74.0	
6		--		--		--	74.0	
7		--		--		--	74.0	
8		--		--		--	74.0	
9		--		--		--	74.0	
10		--		--		--	74.0	

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

Band Edge

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.

Channel Separation – Number of hopping frequencies

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

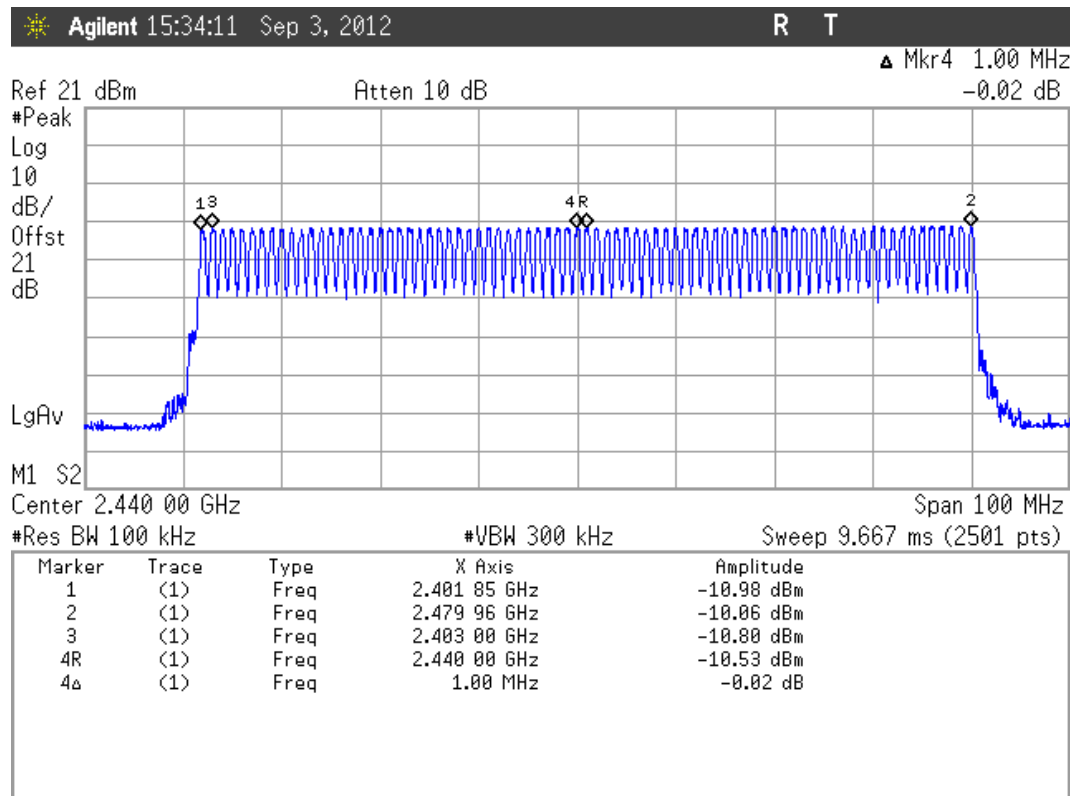
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
EMI Receiver	HP	HP8546A	01/2013
EMI Receiver Filter Section	HP	HP85460A	01/2013
Anechoic Chamber	Comtest	CSA01	01/2013
Bilog Antenna	Schaffner	CBL6112B	01/2013
Horn Antenna	EMCO	3115	01/2013
Controller	Deisel	HD100	01/2013
Turn Table	Deisel	MA240	01/2013
LISN	GSD	NTW06	01/2013

Test procedure: CE22R01

Limit of Hopping Frequency Used



Note:

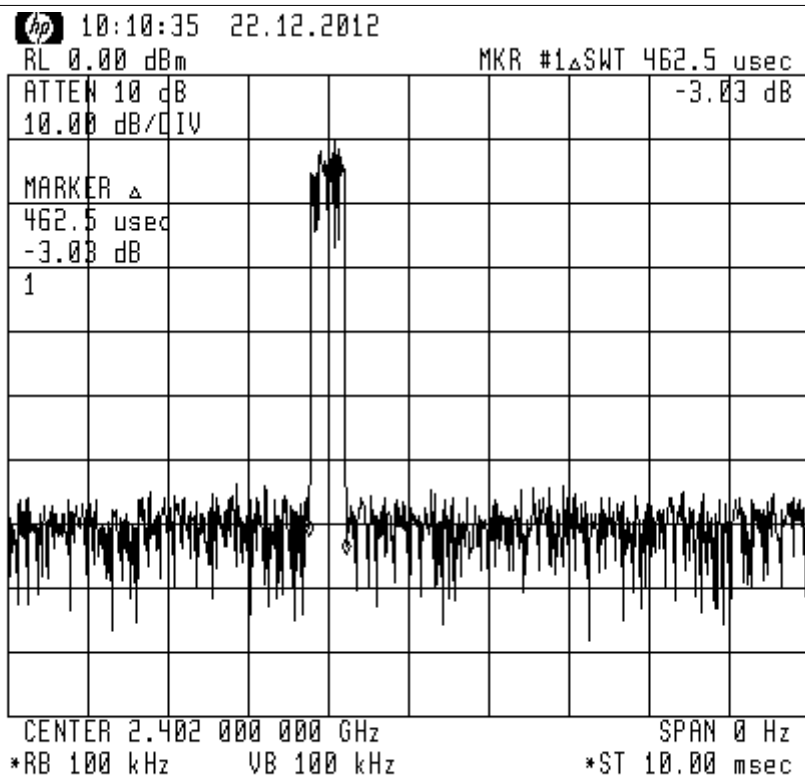
79 channels frequencies, 1 MHz spaced.

This document may be only fully reproduced.

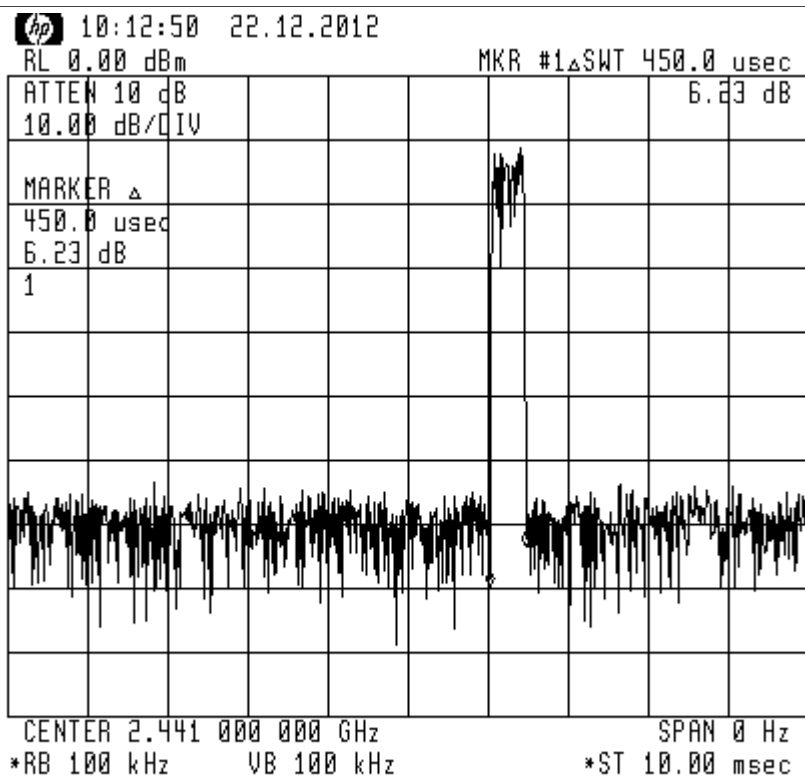
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Report n. 12077-FCC-IC Rev. 02, page 119 / 176

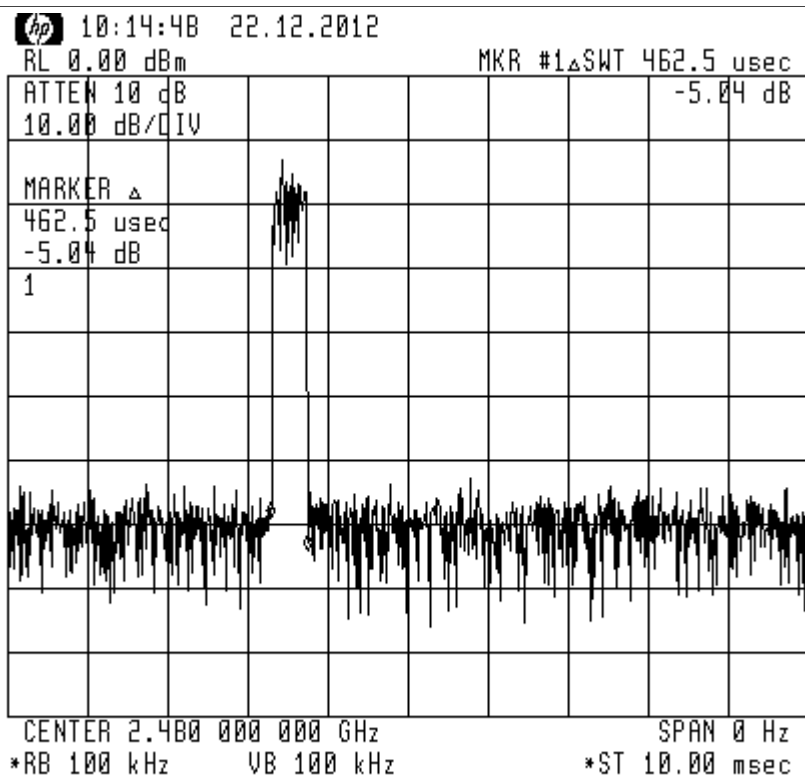
Dwell Times



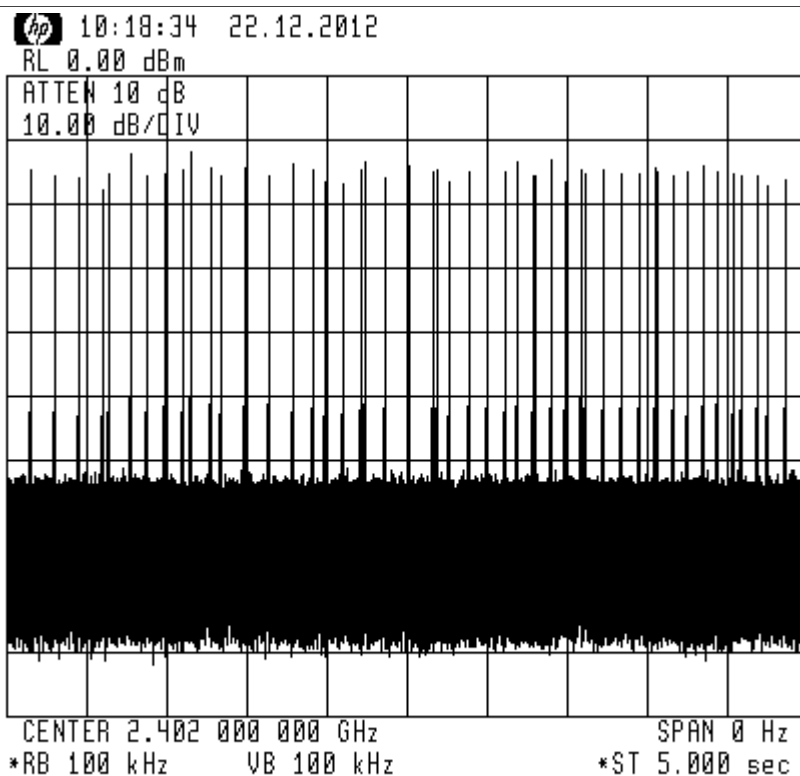
DH1 2402 MHz



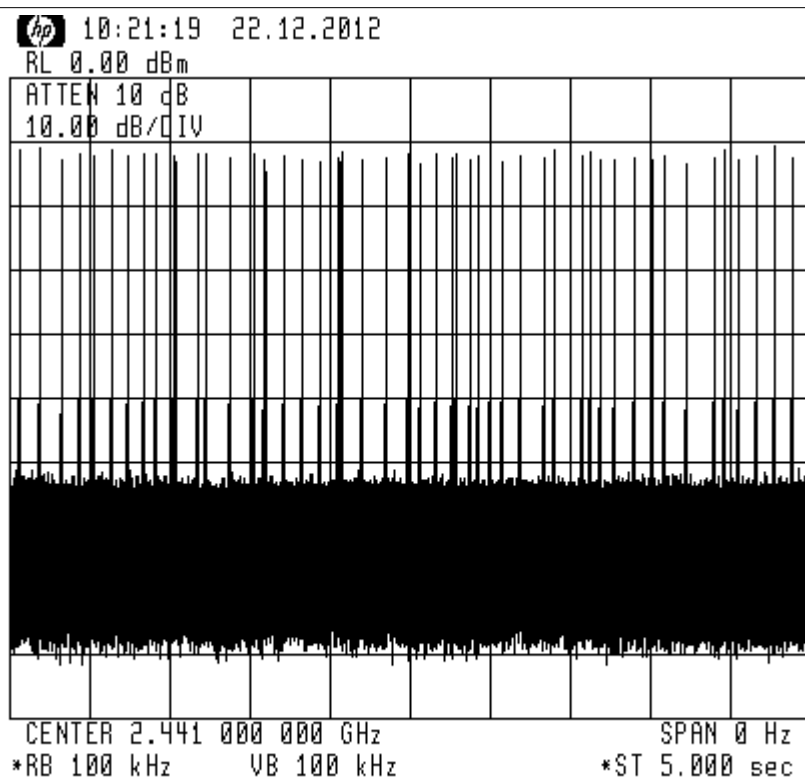
DH1 2441 MHz



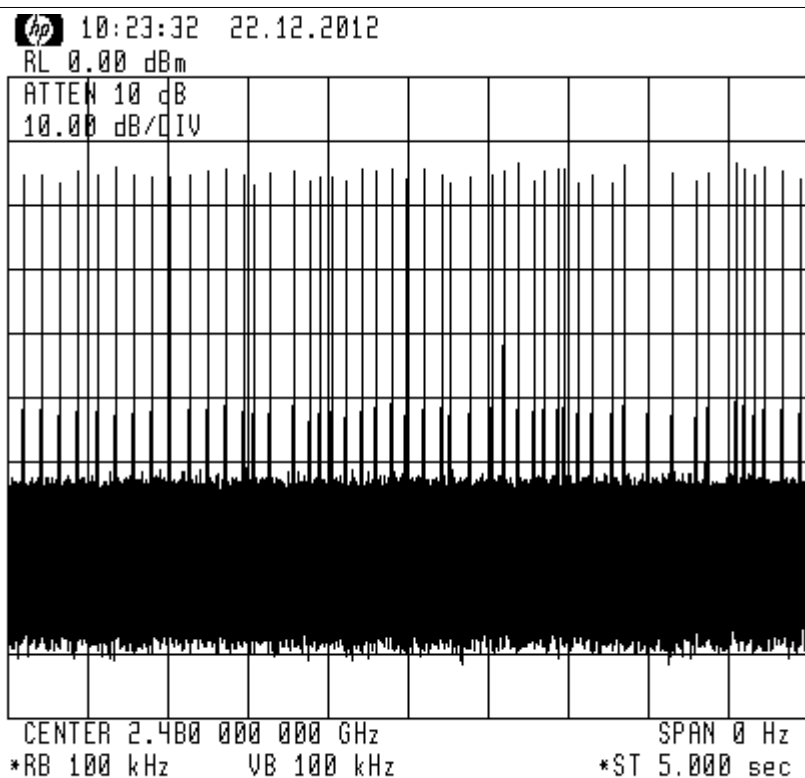
DH1 2480 MHz



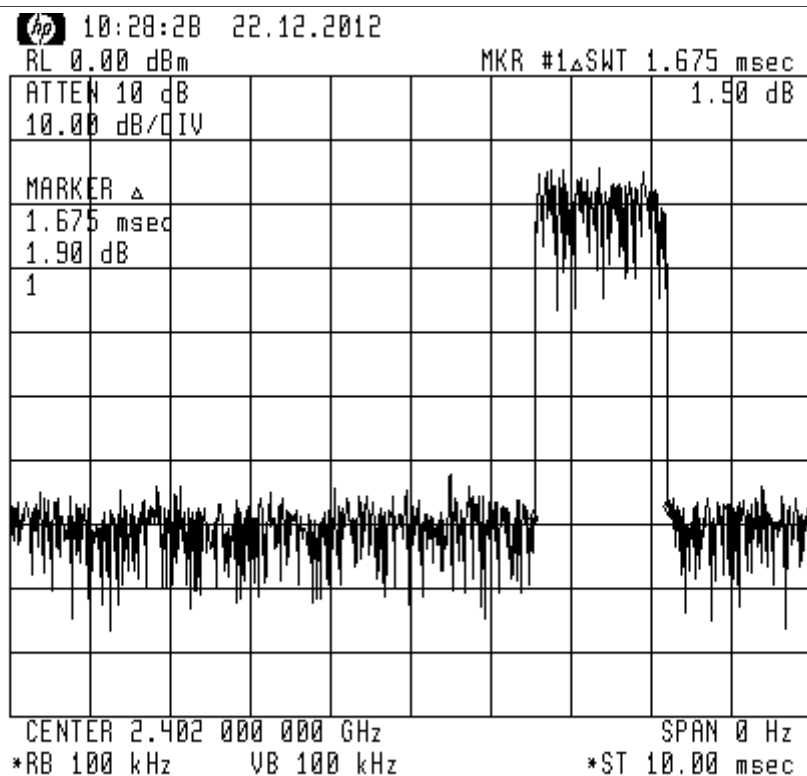
DH1 2402 MHz



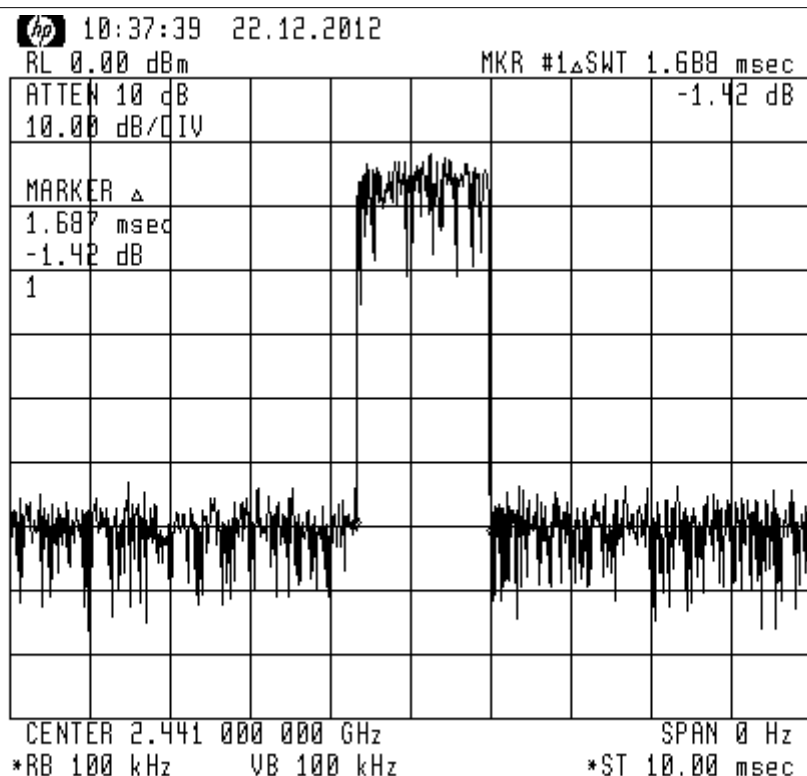
DH1 2441 MHz



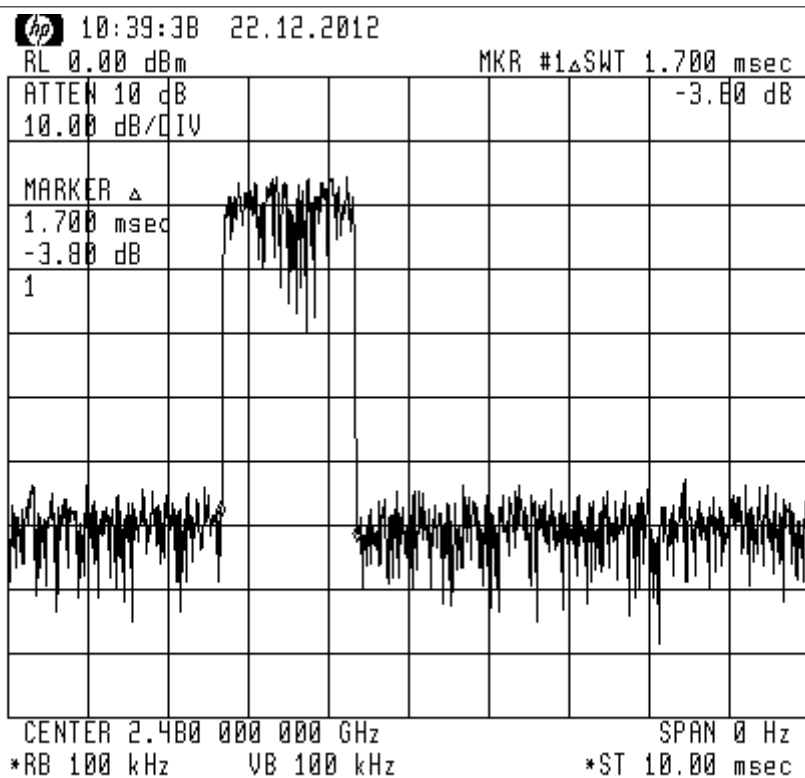
DH1 2480 MHz



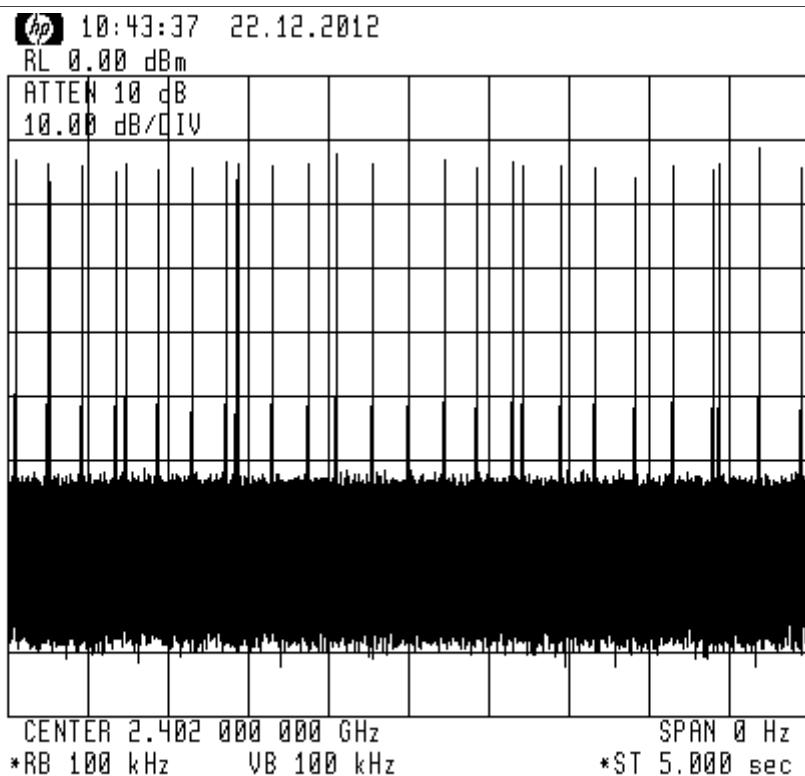
DH3 2402 MHz



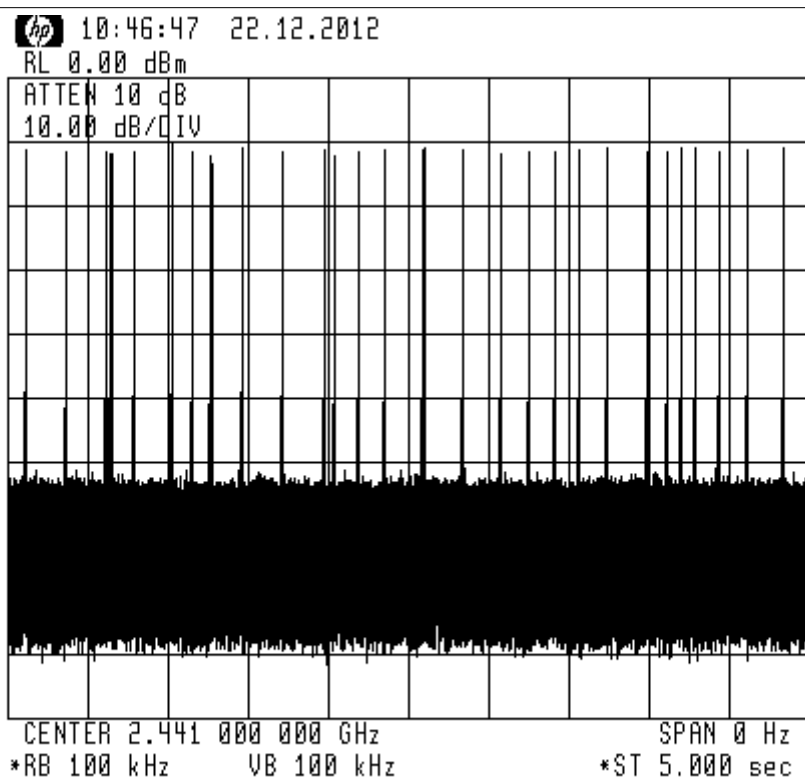
DH3 2441 MHz



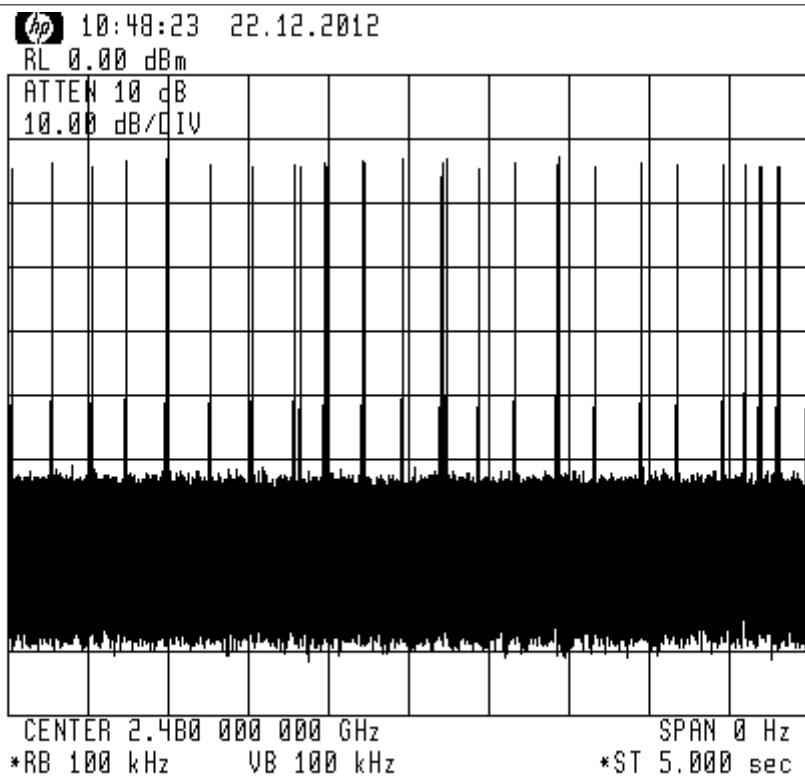
DH3 2480 MHz



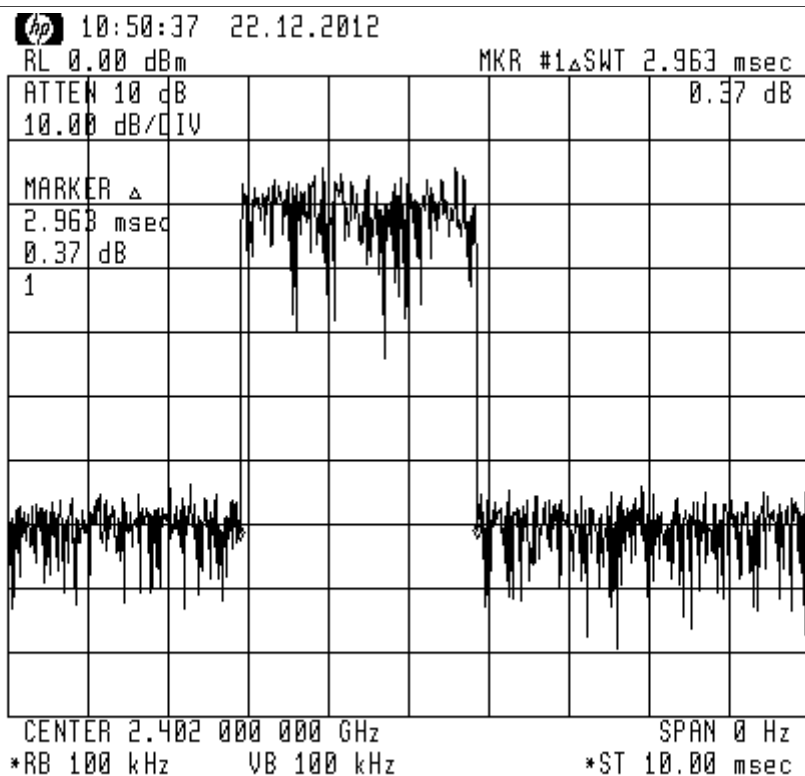
DH3 2402 MHz



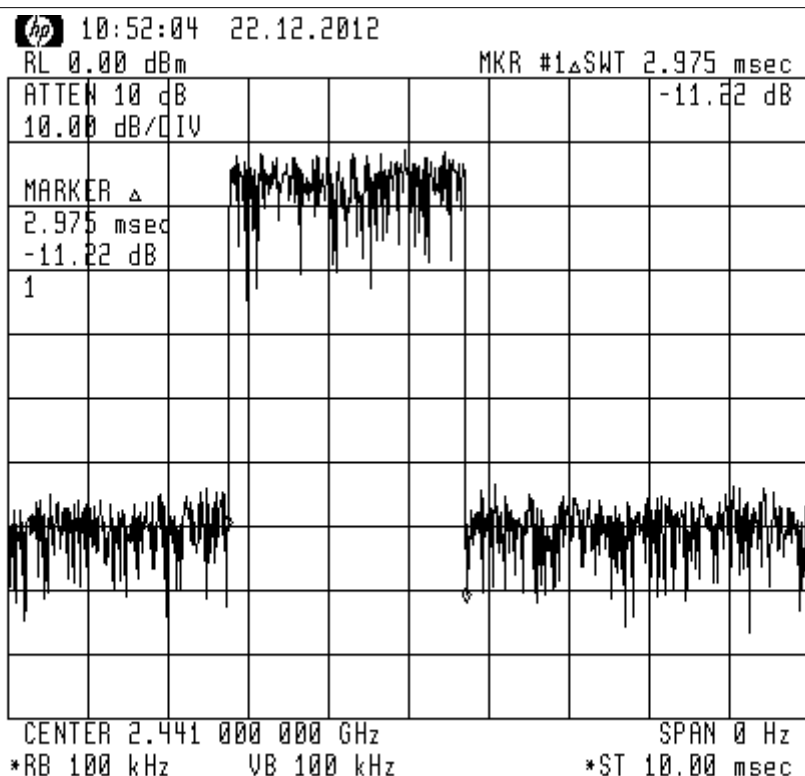
DH3 2441 MHz



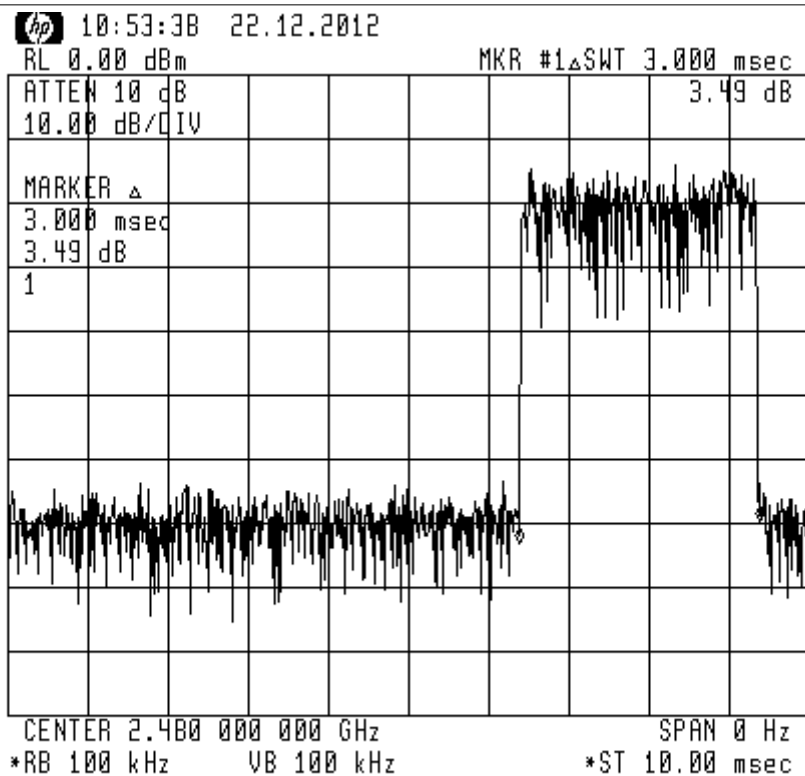
DH3 2480 MHz



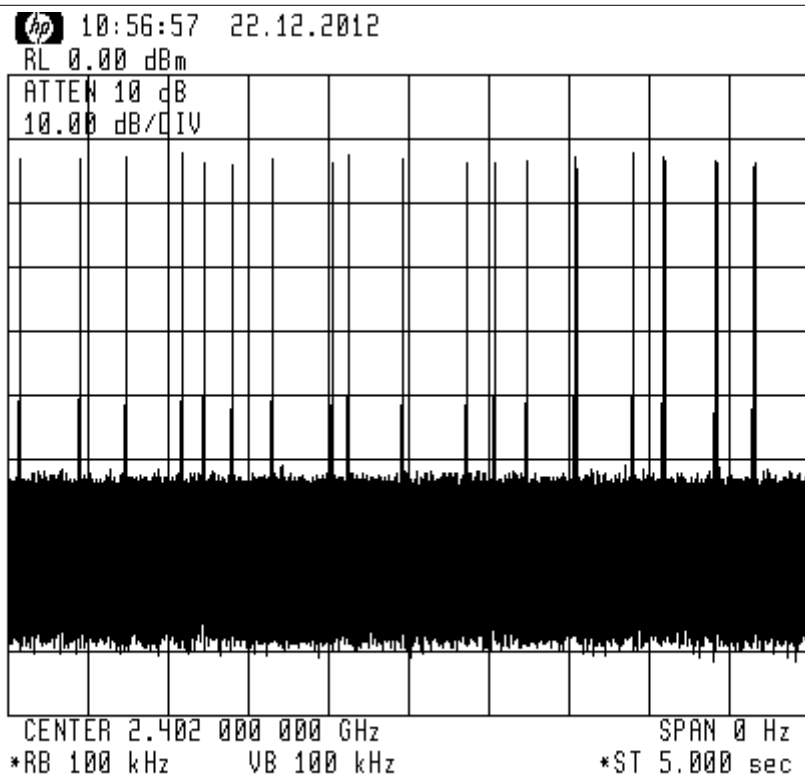
DH5 2402 MHz



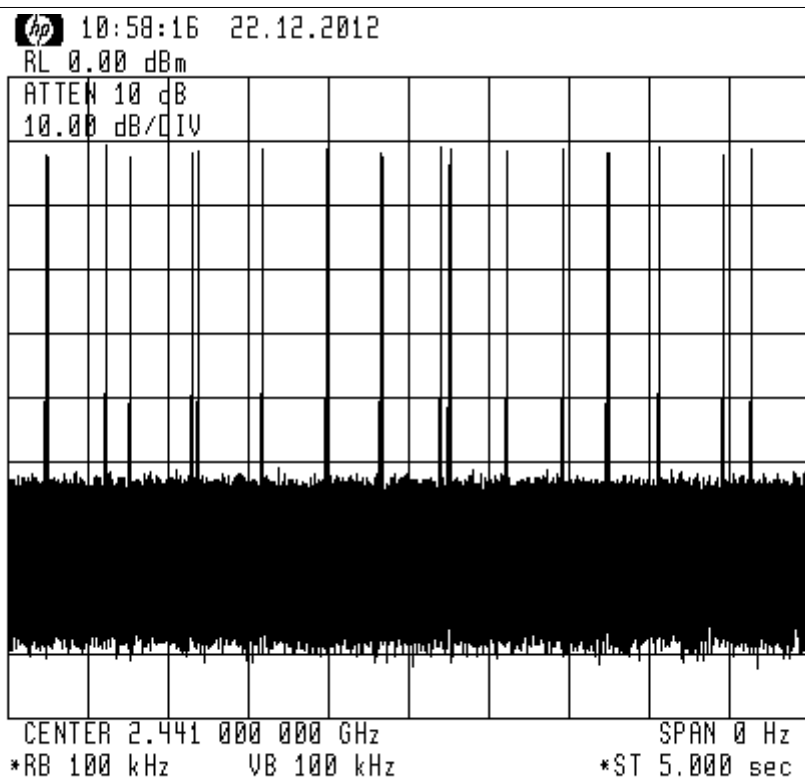
DH5 2441 MHz



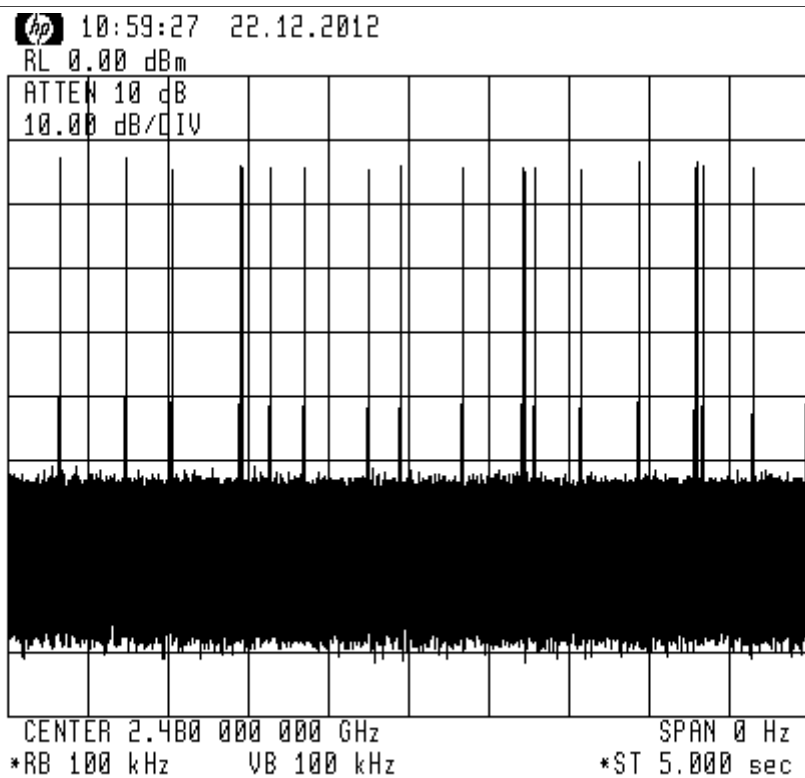
DH5 2480 MHz



DH5 2402 MHz



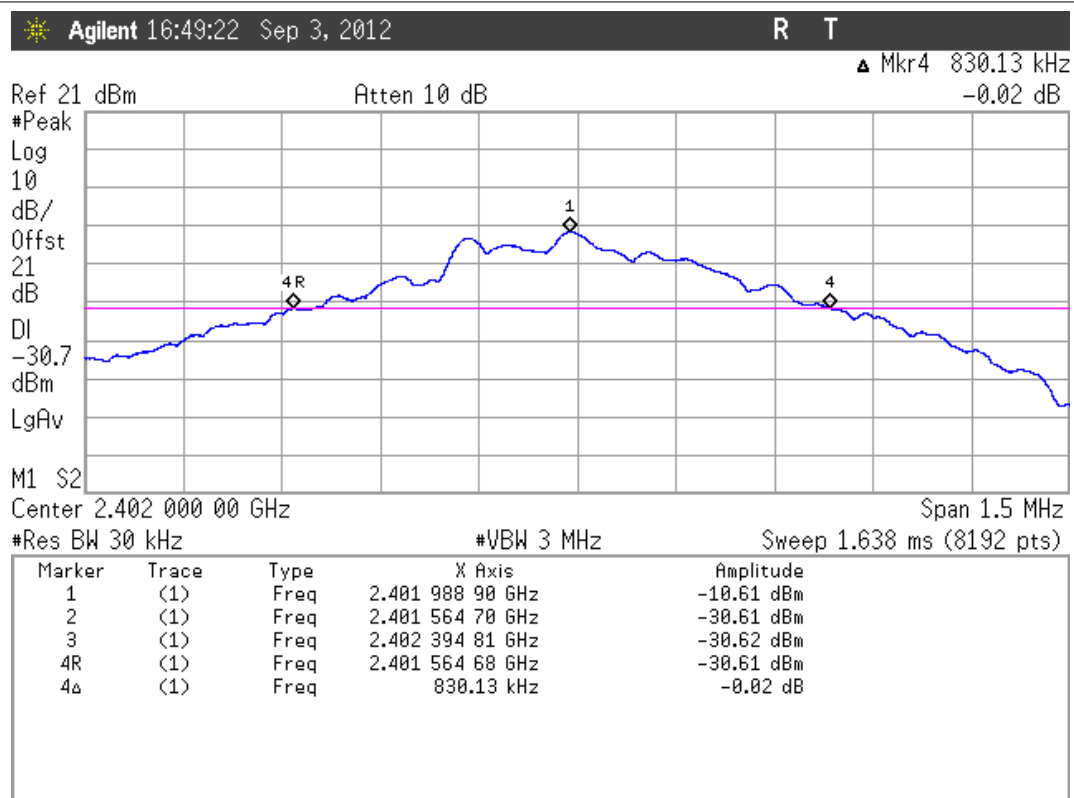
DH5 2441 MHz



DH5 2480 MHz

Resume table of dwell times				
Mode	Number of transmissions in 31.6 sec (79 hopping * 0.4 sec)	Lenght of Transmission Time (msec)	Result (msec)	Limit (msec)
DH1 2402 MHz	49*79*0,4/5=309,68 times	0,463	143,4	400
DH1 2441 MHz	48*79*0,4/5=303,36 times	0,450	136,5	400
DH1 2480 MHz	50*79*0,4/5=316 times	0,463	146,3	400
DH3 2402 MHz	26*79*0,4/5=164,32 times	1,675	275,2	400
DH3 2441 MHz	28*79*0,4/5=176,96 times	1,687	298,5	400
DH3 2480 MHz	26*79*0,4/5=164,32 times	1,700	279,3	400
DH5 2402 MHz	18*79*0,4/5=113,76 times	2,963	337,1	400
DH5 2441 MHz	16*79*0,4/5=101,12 times	2,975	300,8	400
DH5 2480 MHz	17*79*0,4/5=107,44 times	3,000	322,3	400

Channel Bandwidth



DH packet type

Note:

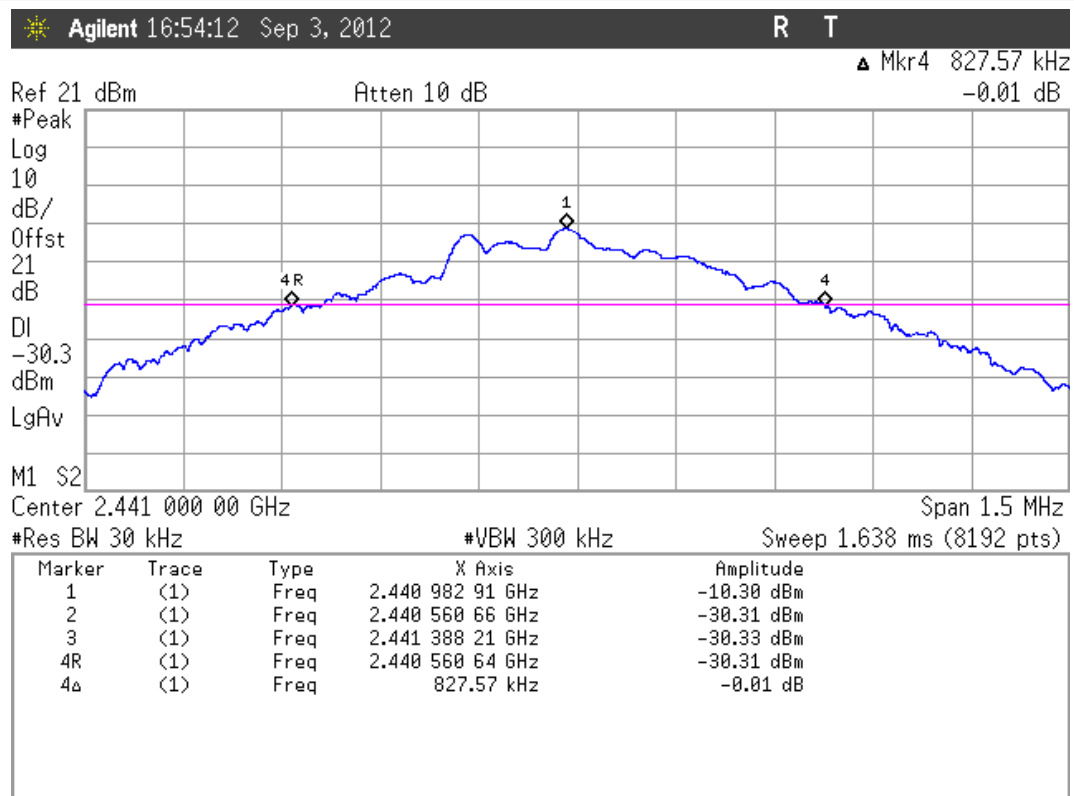
2402 MHz; Ch BW: 830.2 kHz

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. 12077-FCC-IC Rev. 02, page 134 / 176

Channel Bandwidth



DH packet type

Note:

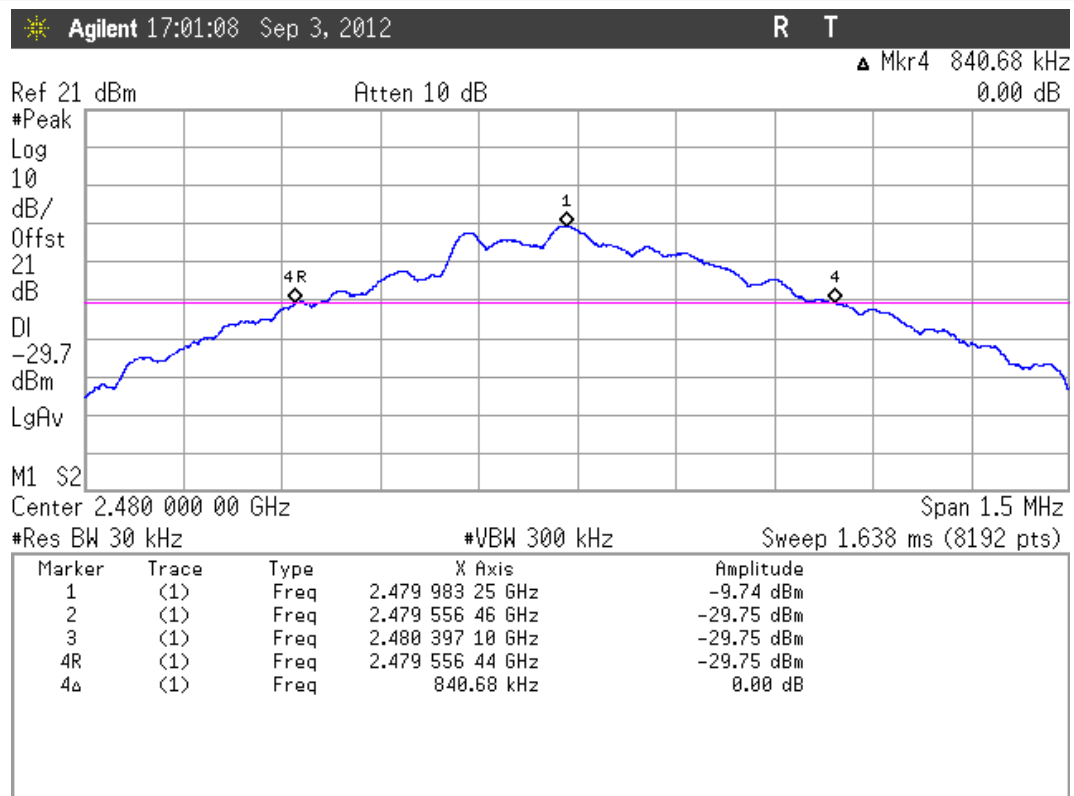
2441 MHz; Ch BW: 827.6 kHz

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. 12077-FCC-IC Rev. 02, page 135 / 176

Channel Bandwidth



DH packet type

Note:

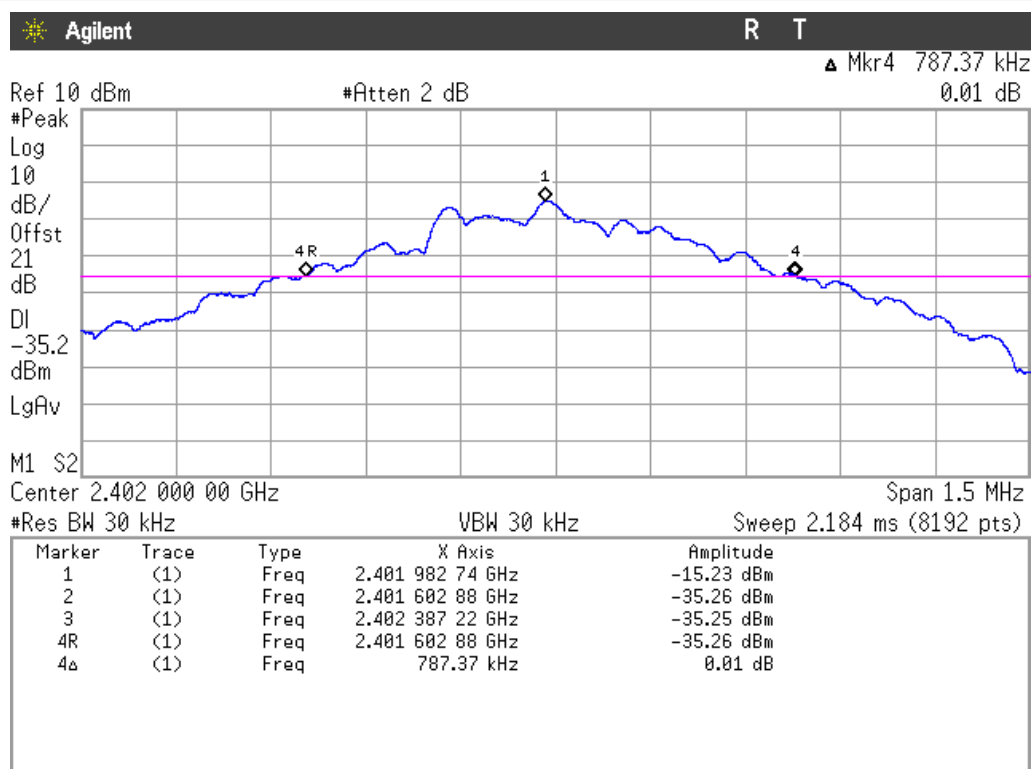
2480 MHz; Ch BW: 840.7 kHz

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. 12077-FCC-IC Rev. 02, page 136 / 176

Channel Bandwidth



2-DH packet type

Note:

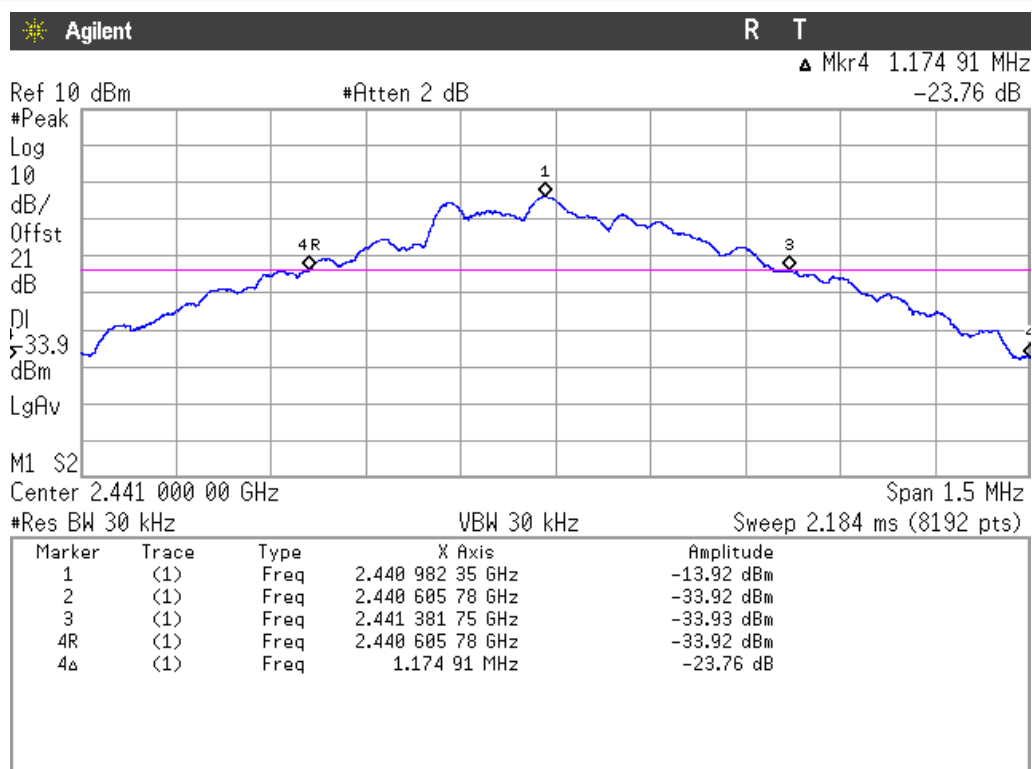
2402 MHz; Ch BW: 787.4 kHz

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. 12077-FCC-IC Rev. 02, page 137 / 176

Channel Bandwidth



2-DH packet type

Note:

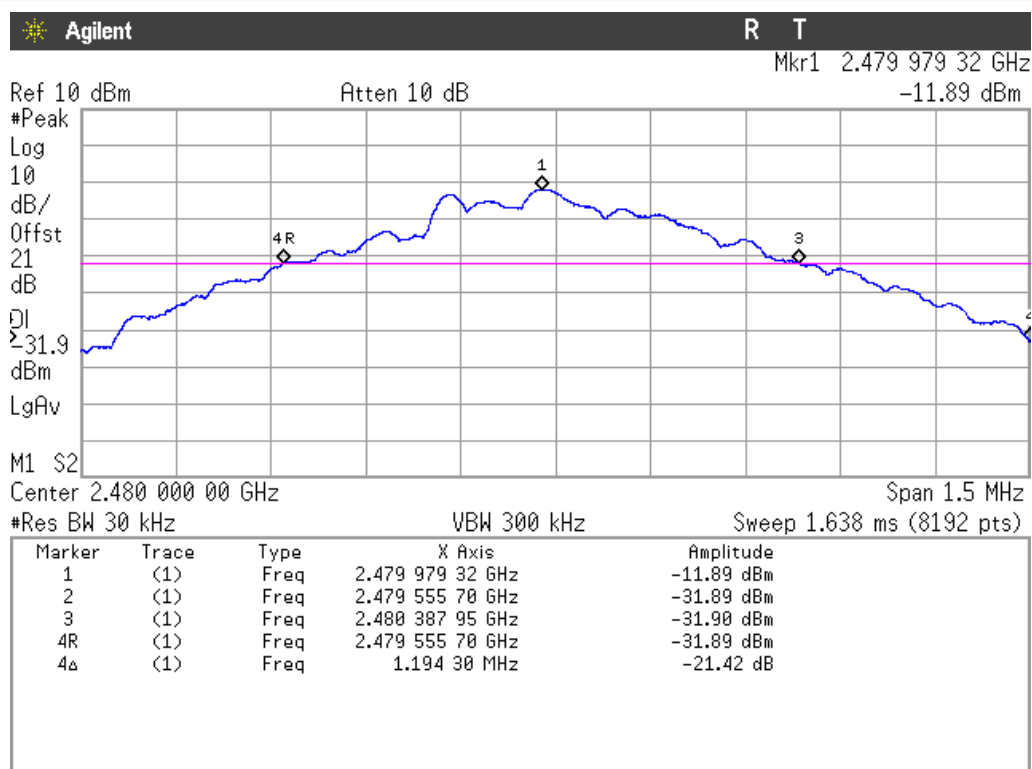
2441 MHz; Ch BW: 776 kHz

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. 12077-FCC-IC Rev. 02, page 138 / 176

Channel Bandwidth



2-DH packet type

Note:

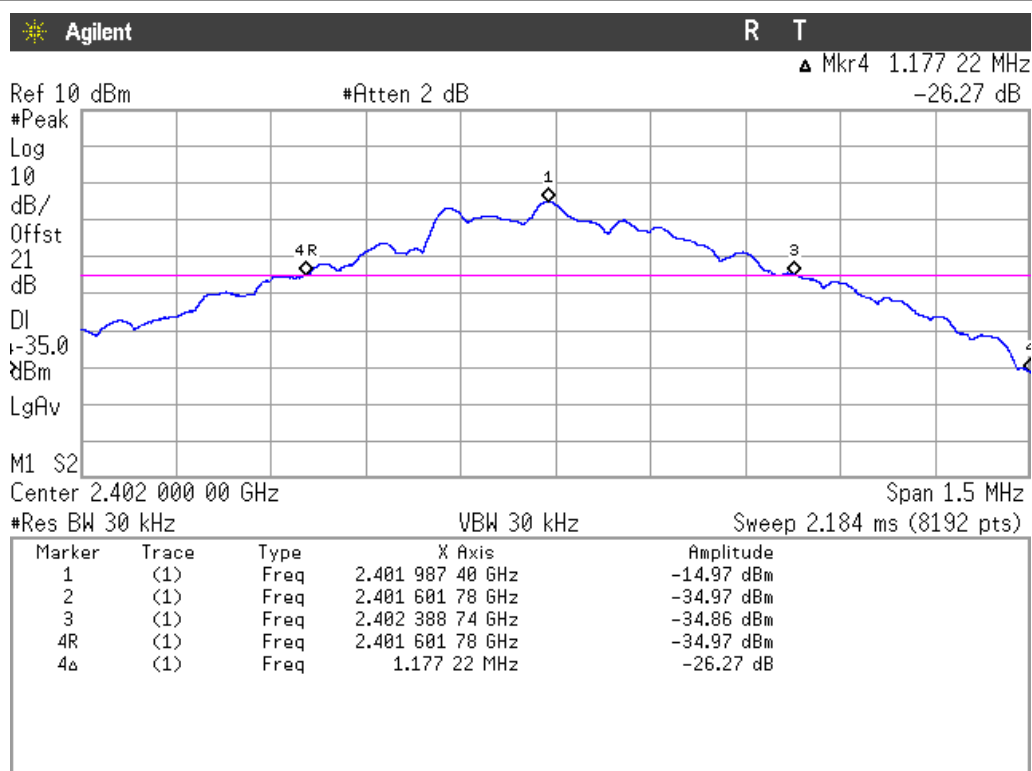
2480 MHz; Ch BW: 840 kHz

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. 12077-FCC-IC Rev. 02, page 139 / 176

Channel Bandwidth



3-DH packet type

Note:

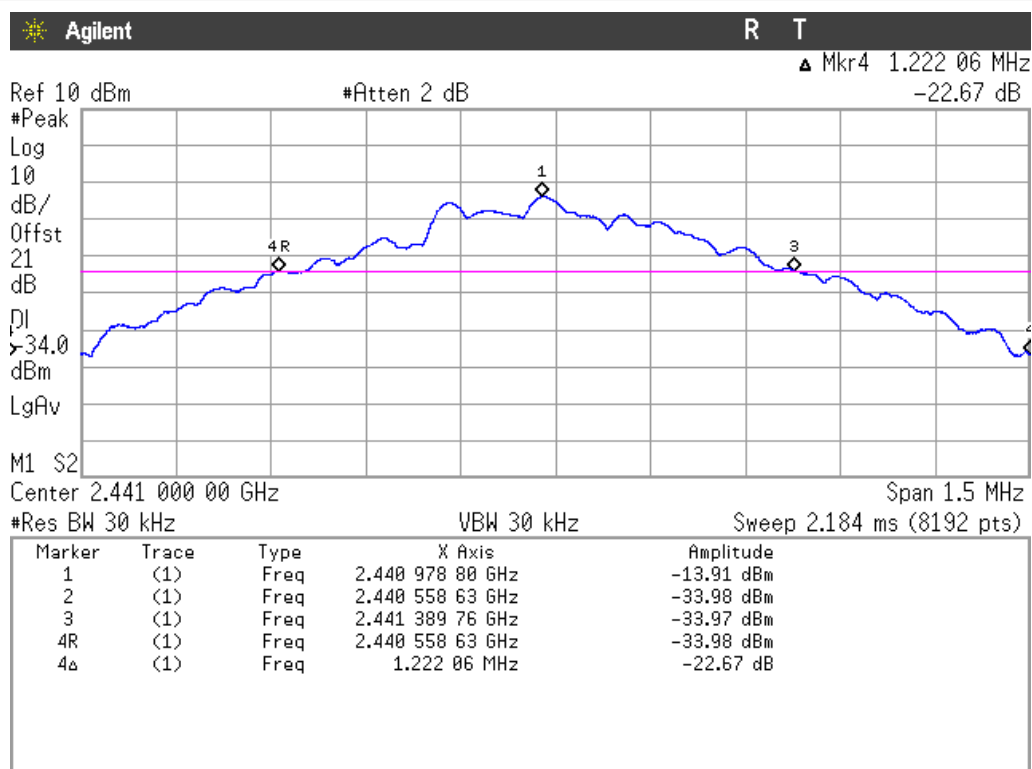
2402 MHz; Ch BW: 835 kHz

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. 12077-FCC-IC Rev. 02, page 140 / 176

Channel Bandwidth



3-DH packet type

Note:

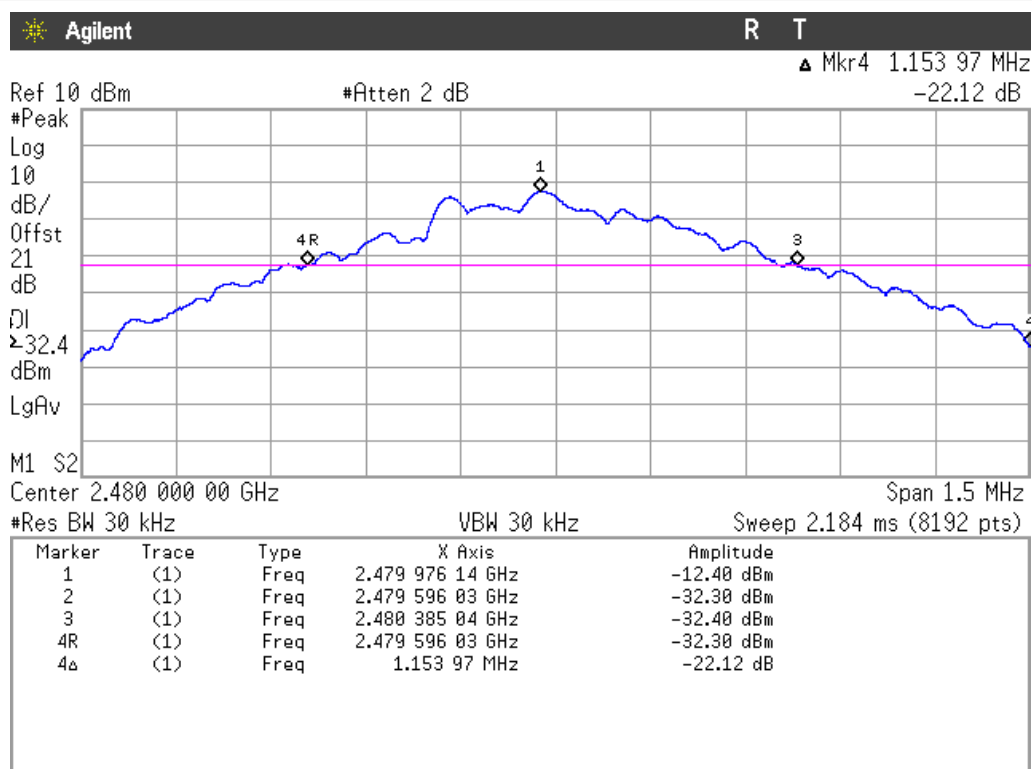
2441 MHz; Ch BW: 835.7 kHz

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. 12077-FCC-IC Rev. 02, page 141 / 176

Channel Bandwidth



3-DH packet type

Note:

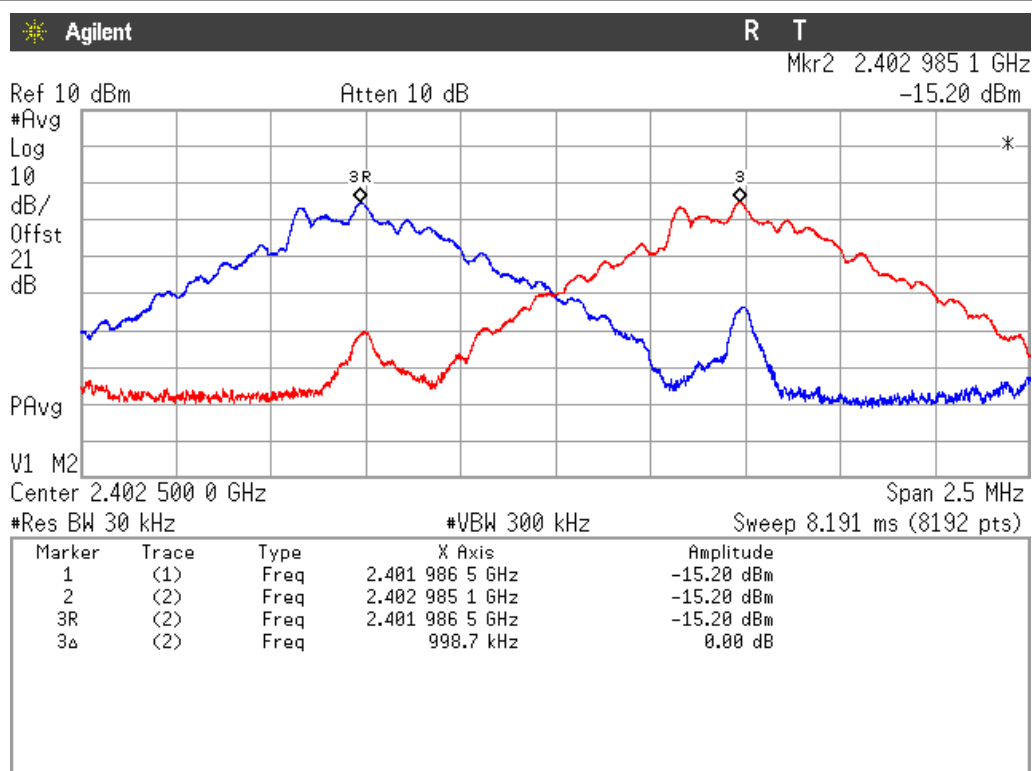
2480 MHz; Ch BW: 836 kHz

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. 12077-FCC-IC Rev. 02, page 142 / 176

Hopping Channel Separation



Note:

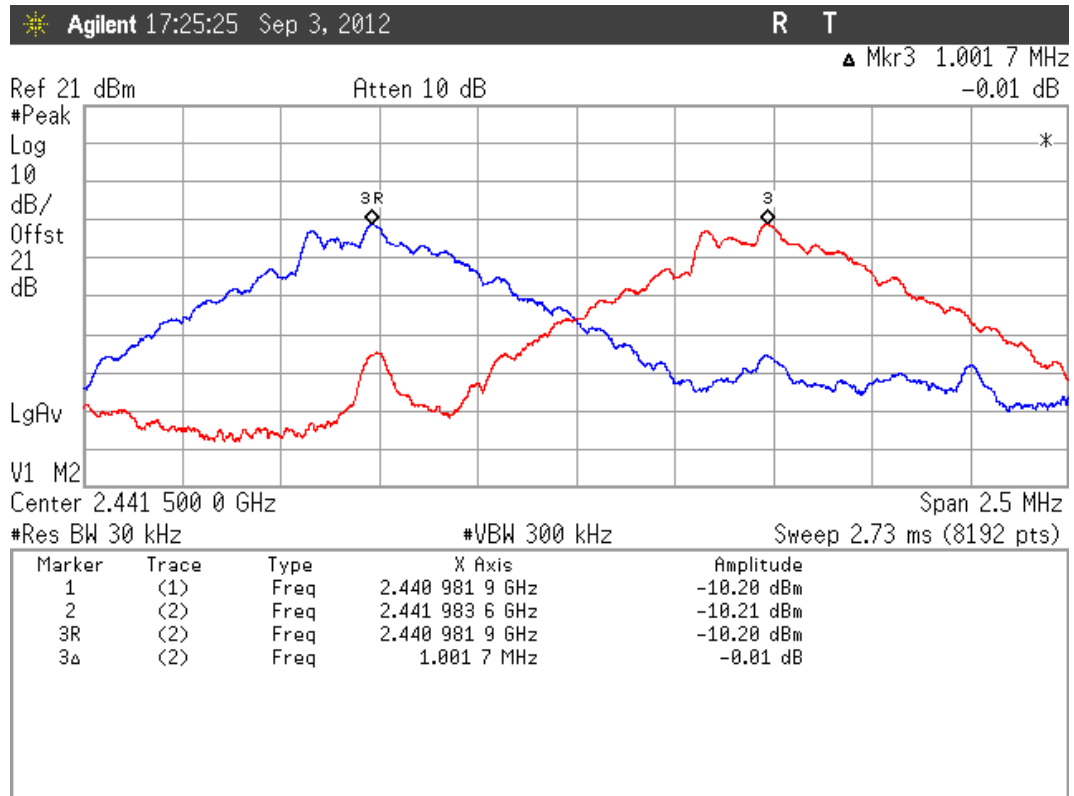
2402-2403 MHz; Ch Separation: 998.7 kHz

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. 12077-FCC-IC Rev. 02, page 143 / 176

Hopping Channel Separation



Note:

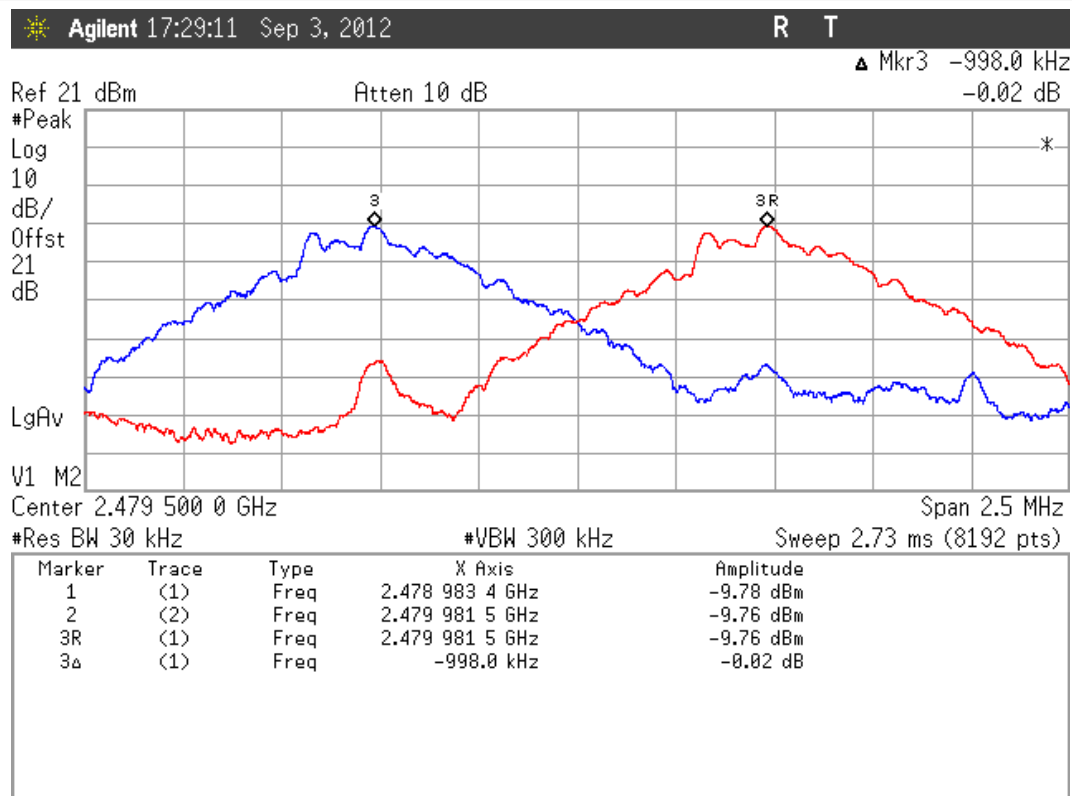
2441-2442 MHz; Ch Separation: 1001.7 kHz

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. 12077-FCC-IC Rev. 02, page 144 / 176

Hopping Channel Separation



Note:

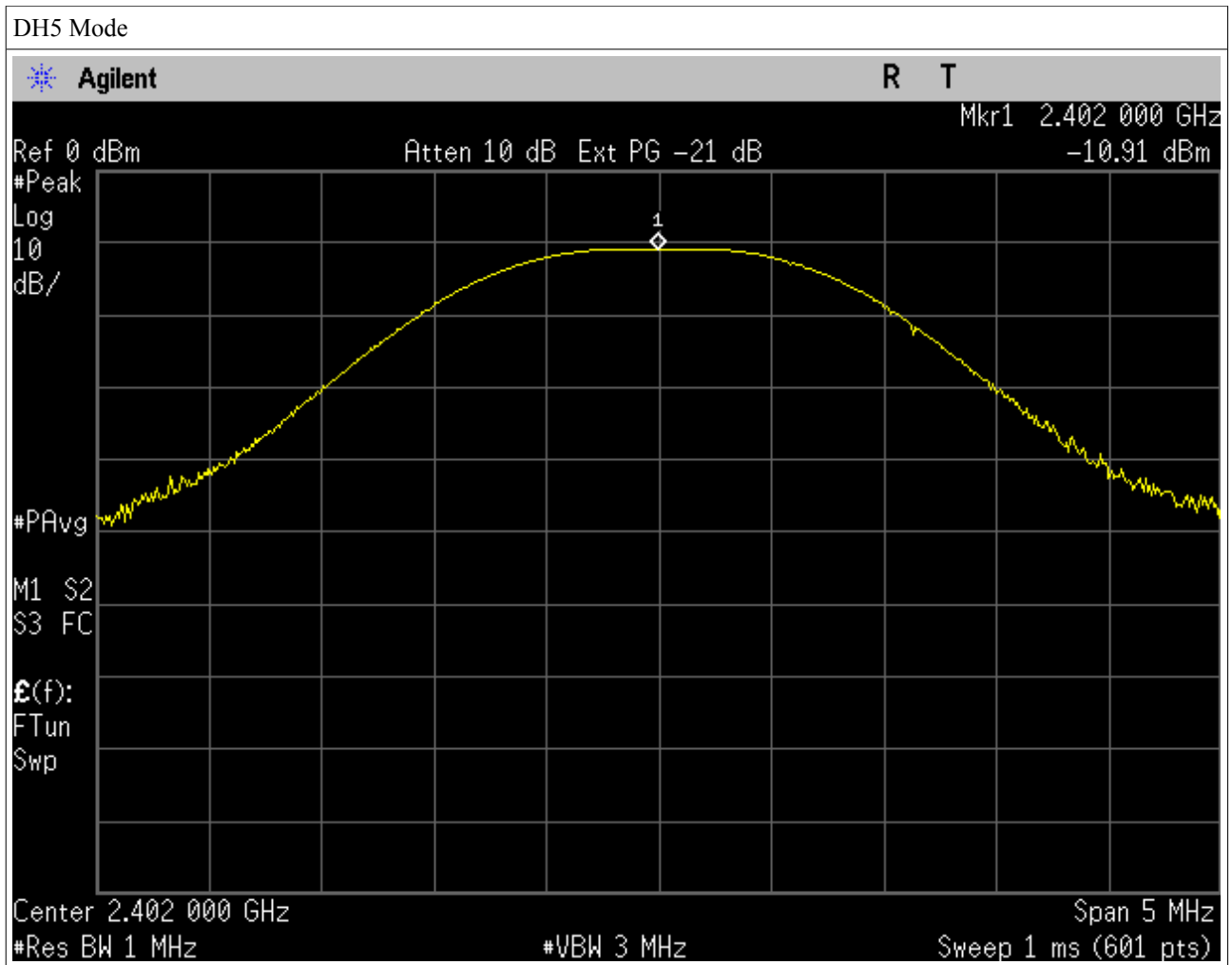
2479-2480 MHz; Ch Separation: 998.0 kHz

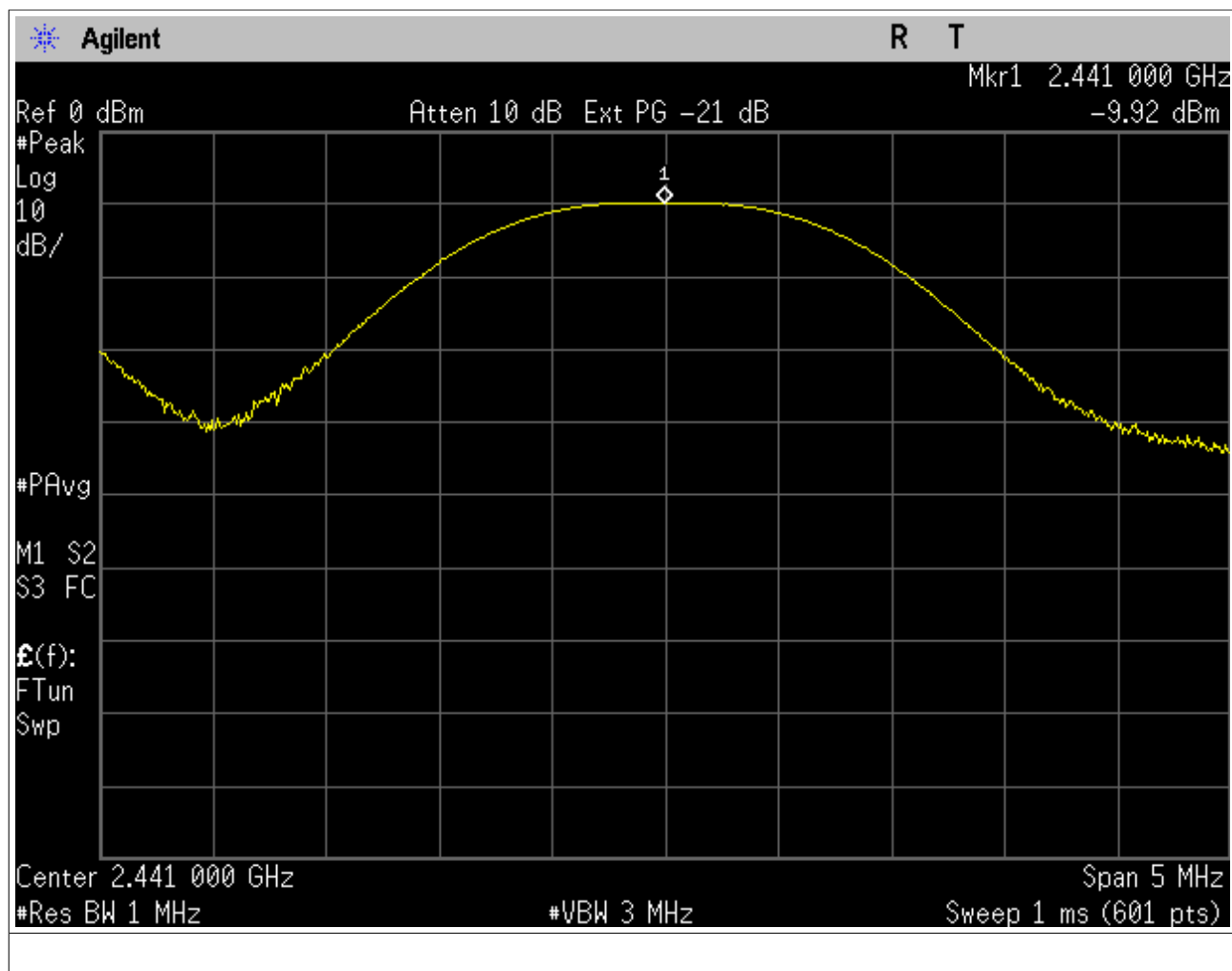
This document may be only fully reproduced.

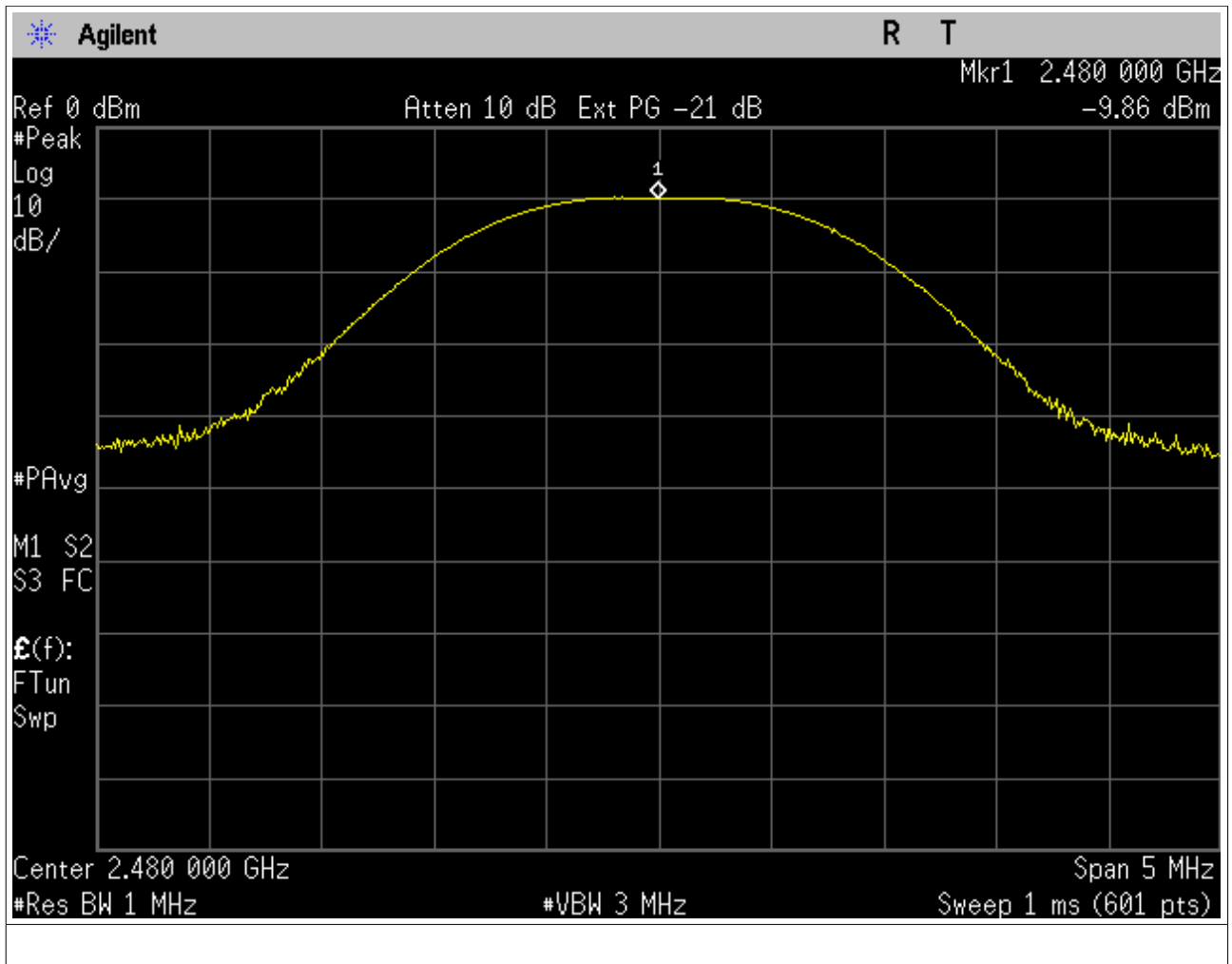
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

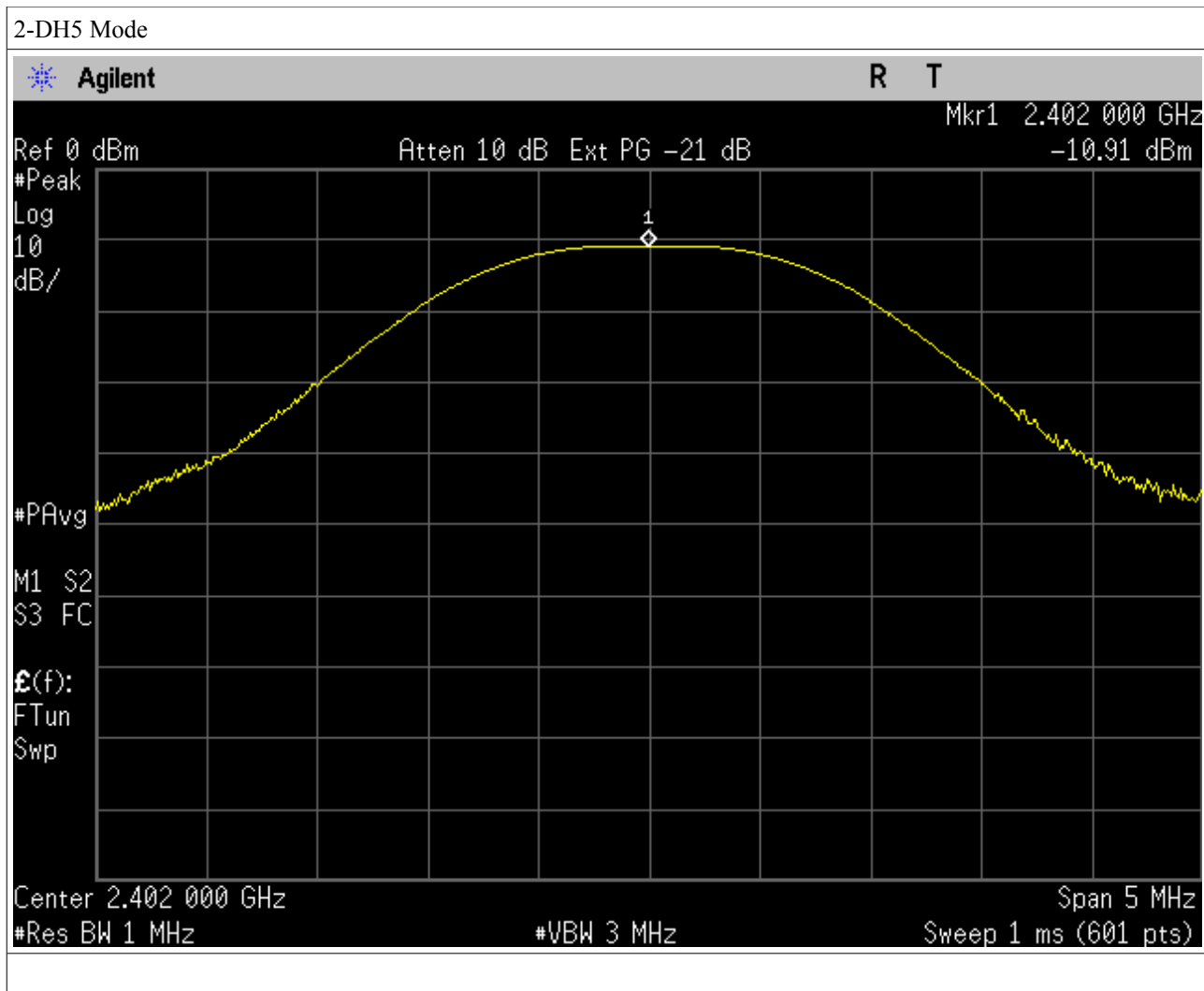
Report n. 12077-FCC-IC Rev. 02, page 145 / 176

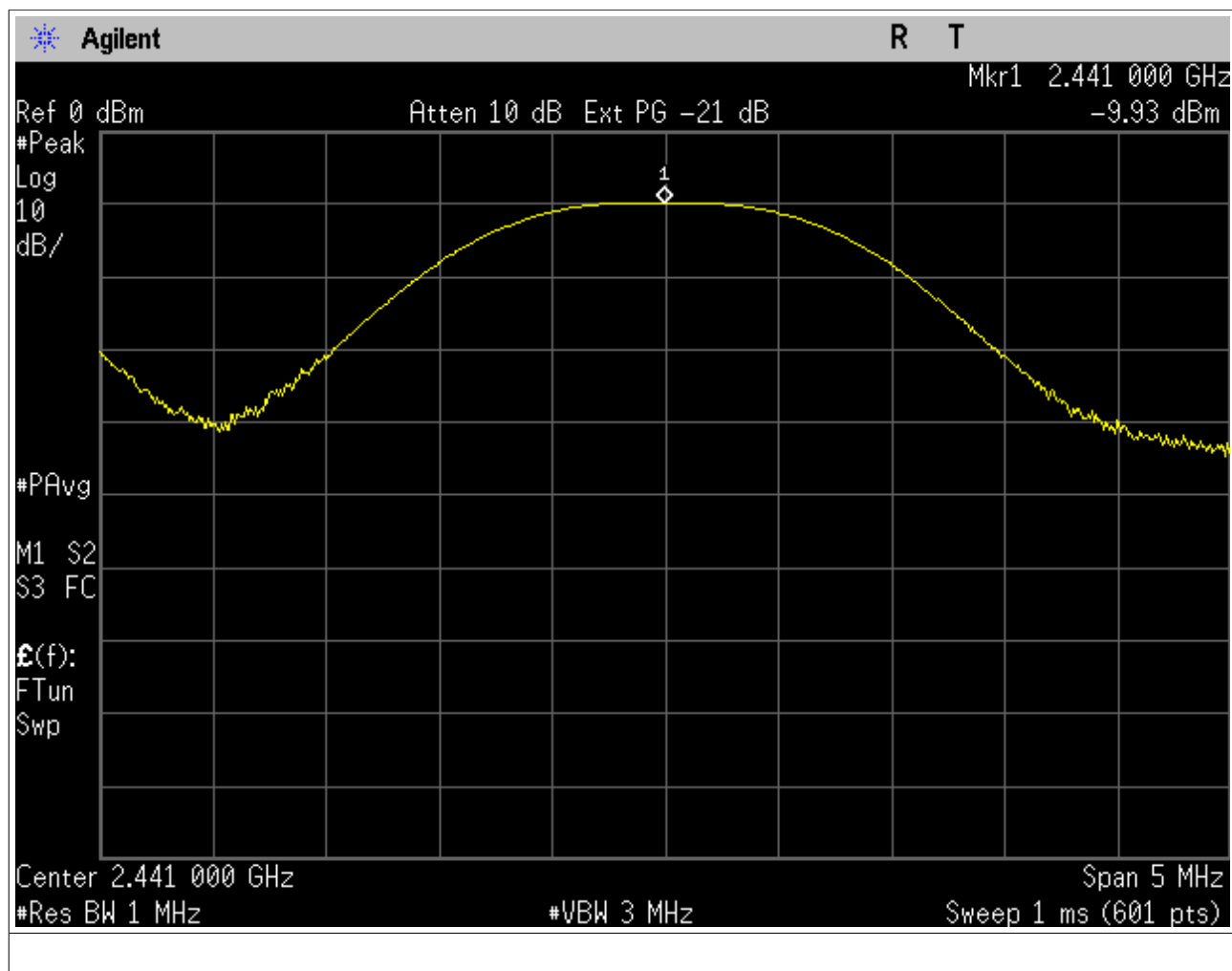
Peak Output Power			
Modulation Type	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)
DH5	2402	-10,9	30
DH5	2441	-9,9	30
DH5	2480	-9,9	30
2-DH5	2402	-10,9	30
2-DH5	2441	-9,9	30
2-DH5	2480	-9,8	30
3-DH5	2402	-10,9	30
3-DH5	2441	-10,0	30
3-DH5	2480	-9,8	30

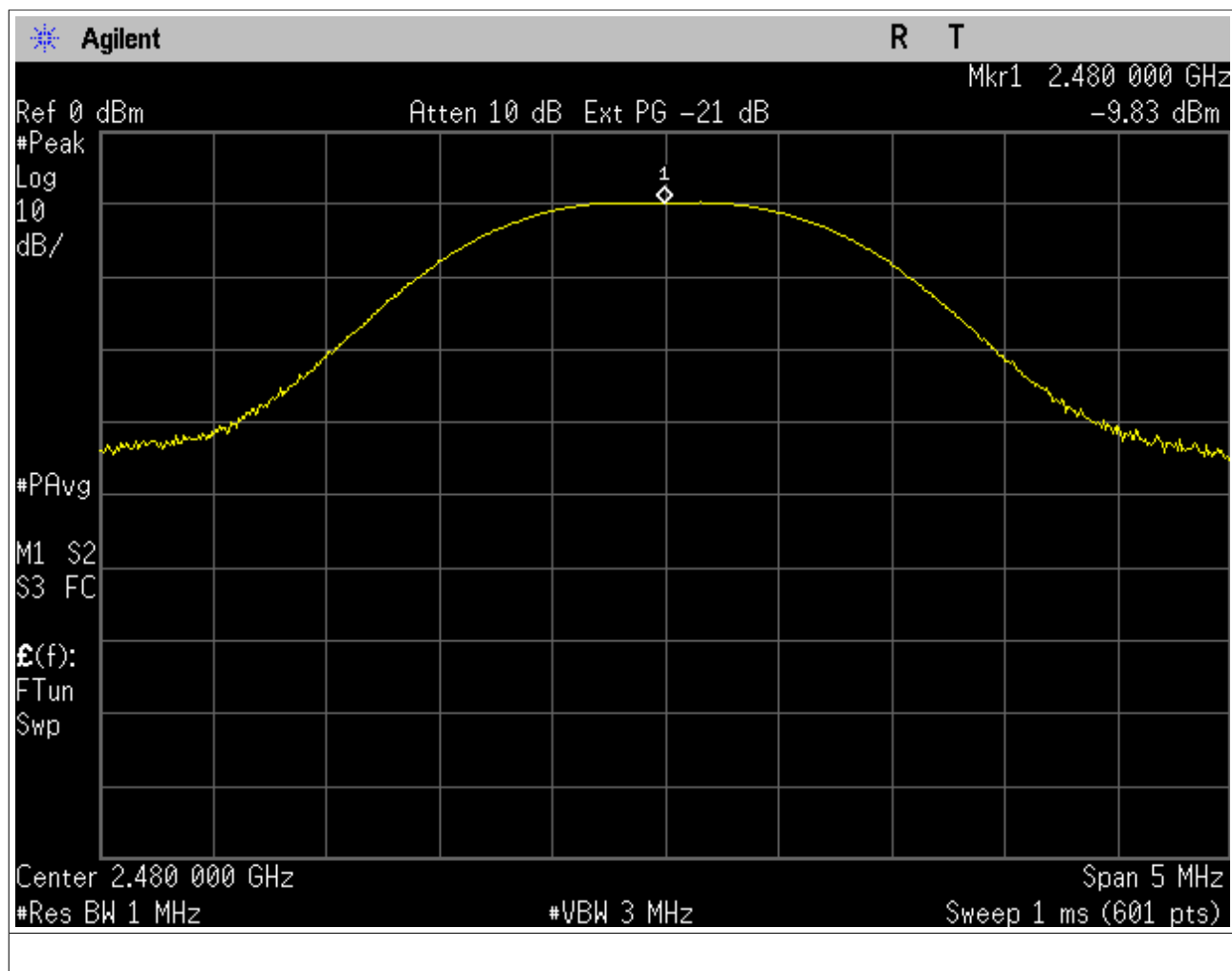


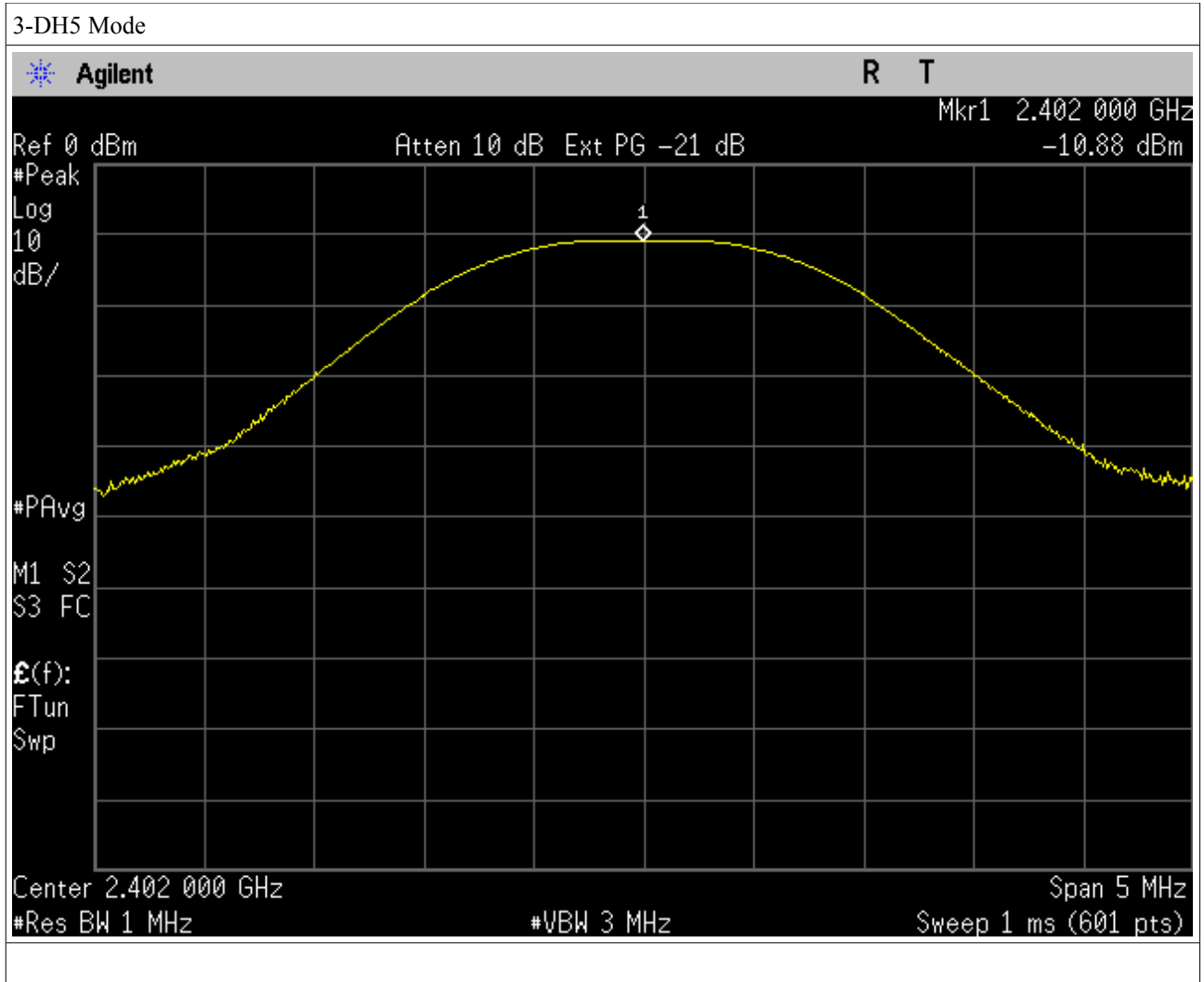


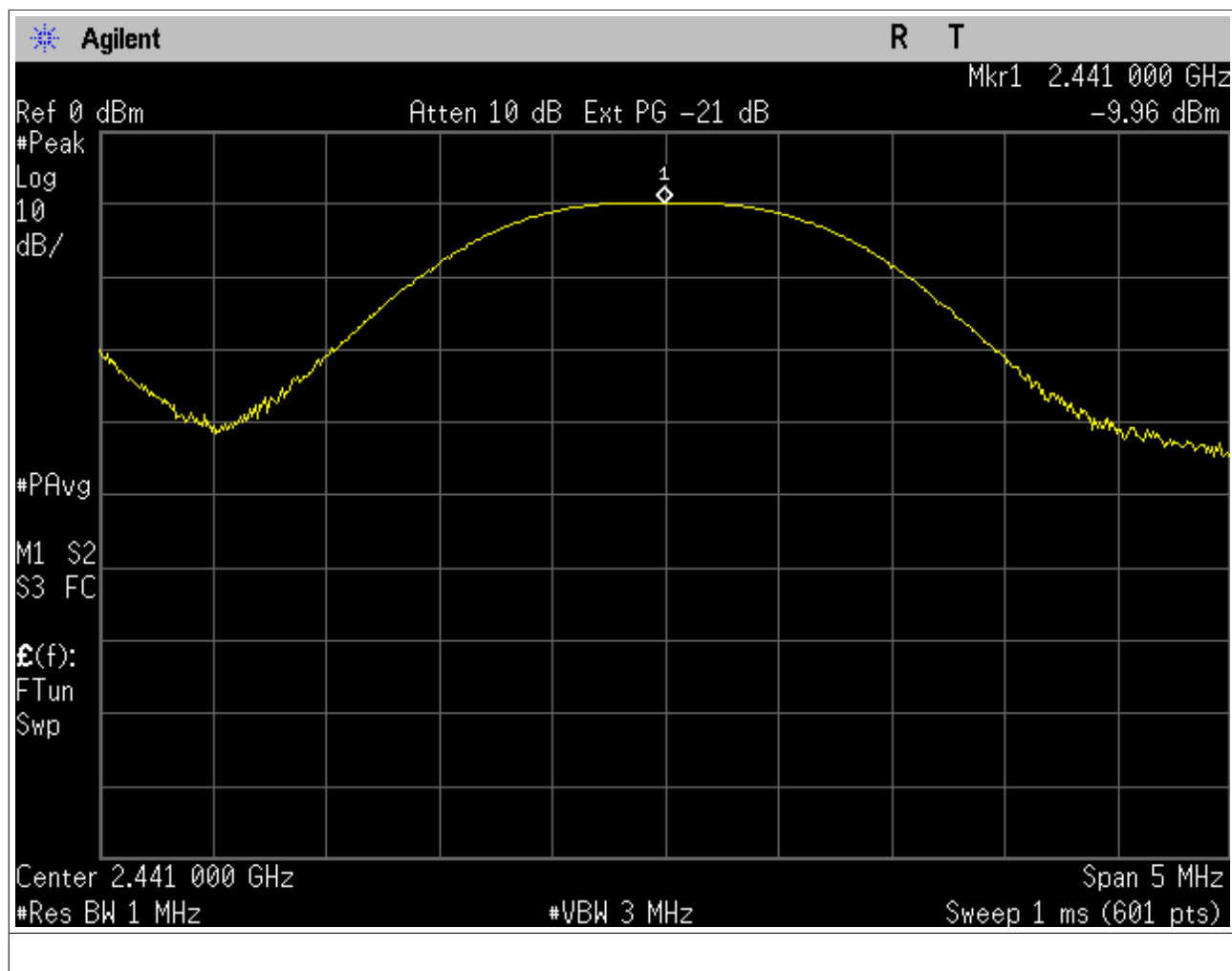


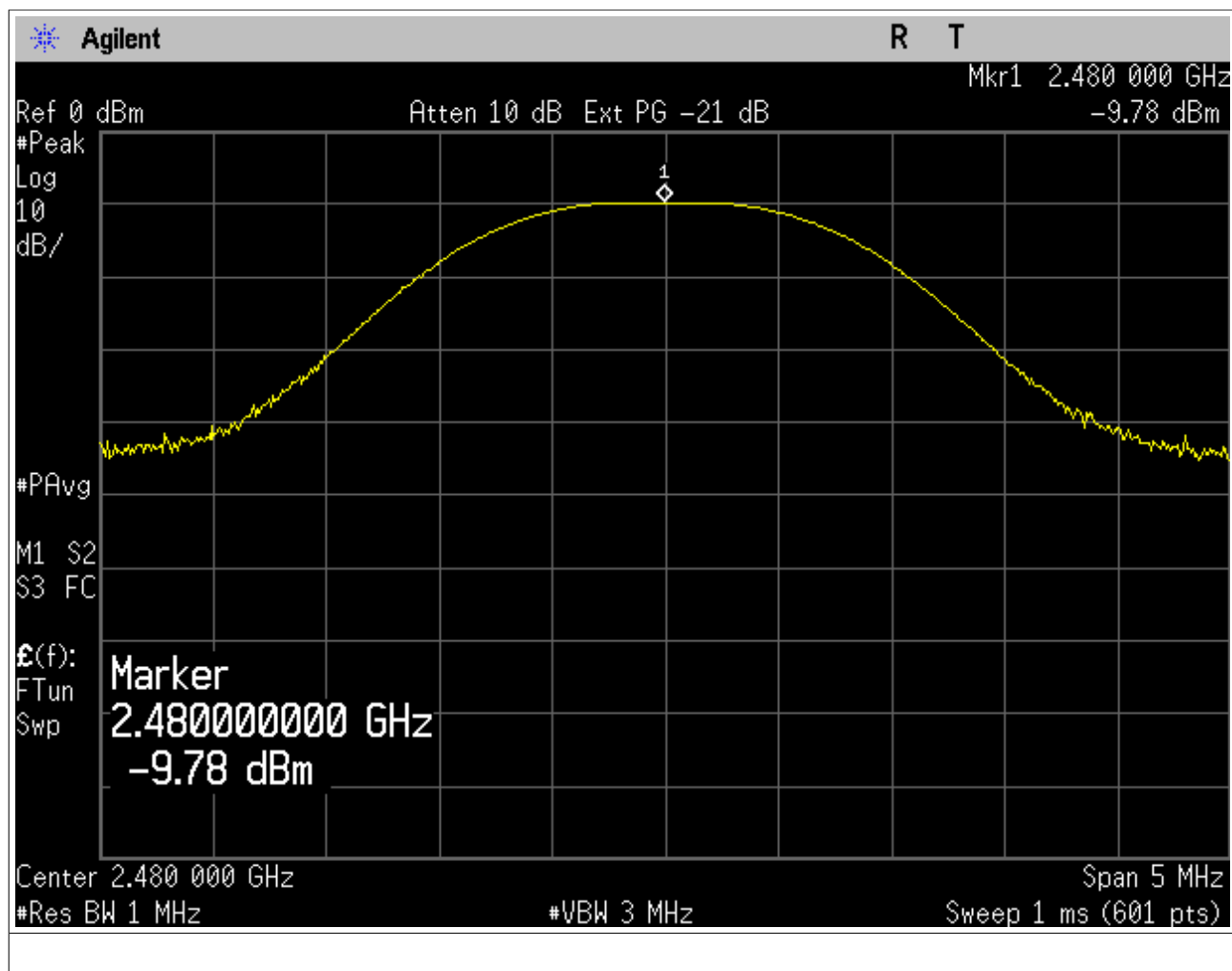




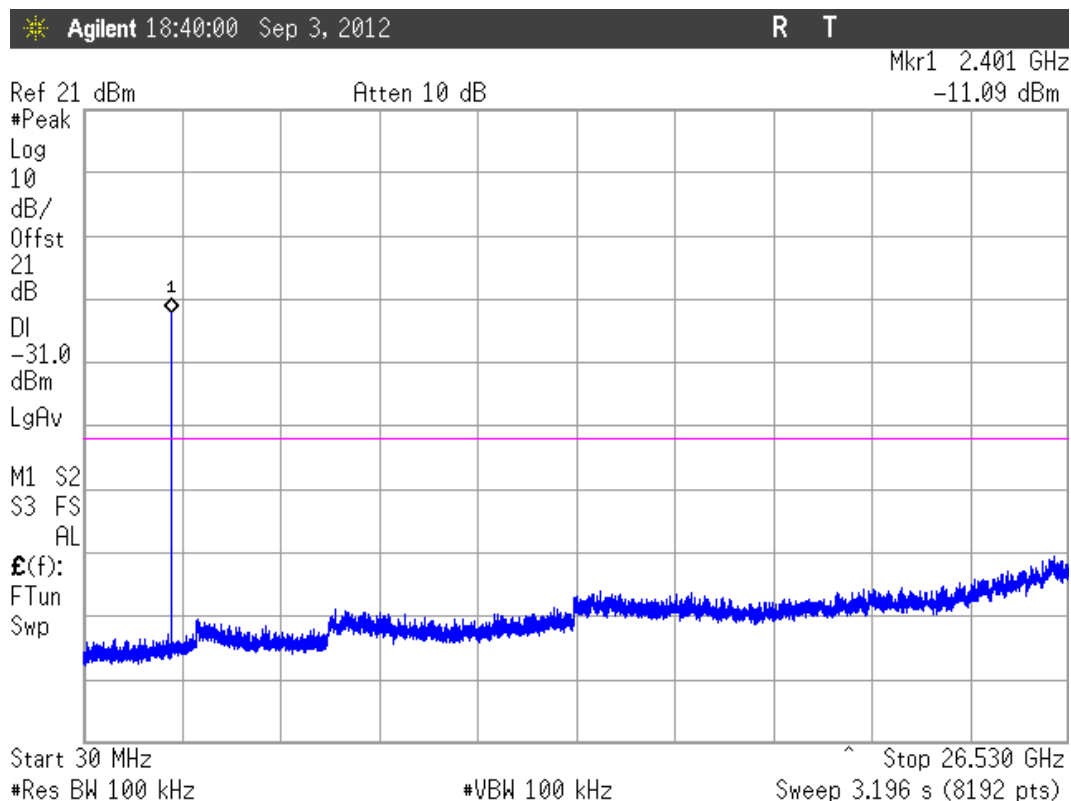
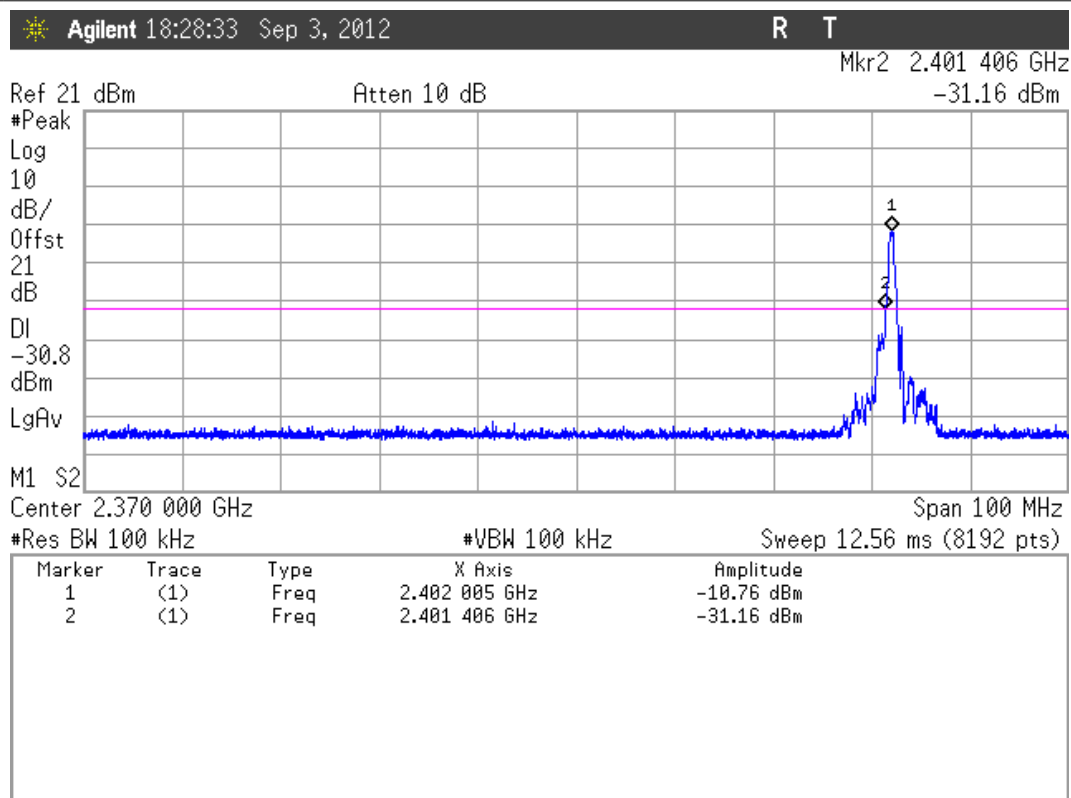




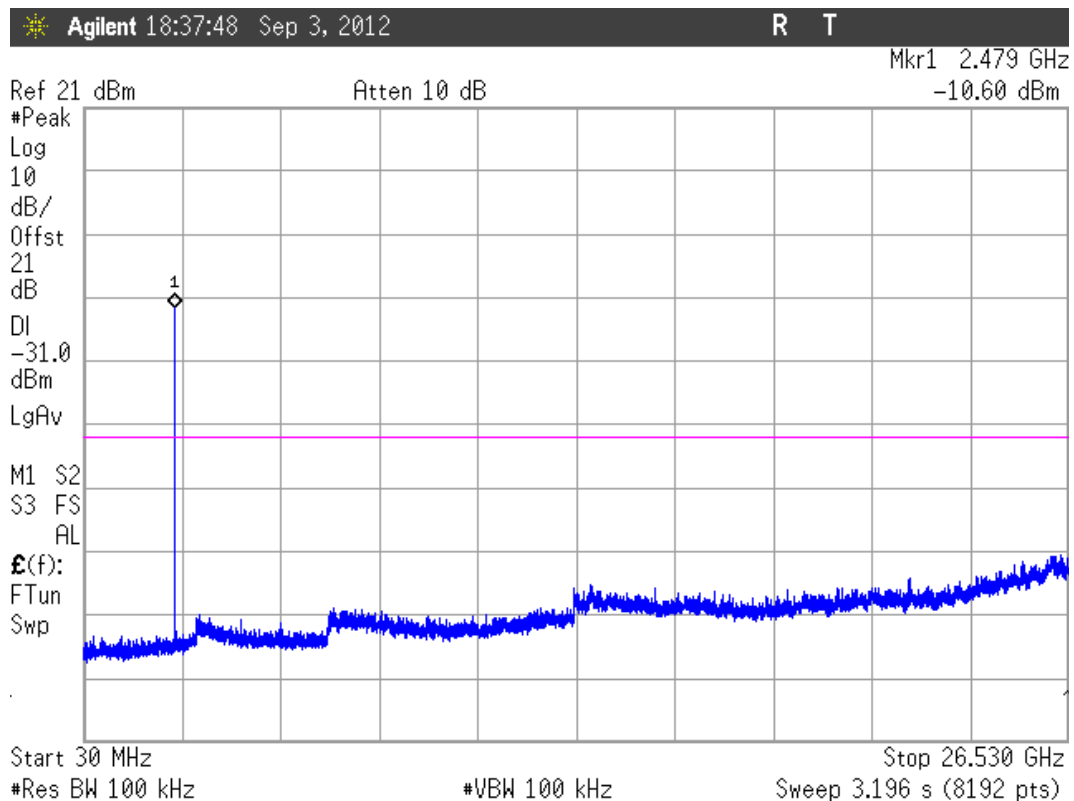
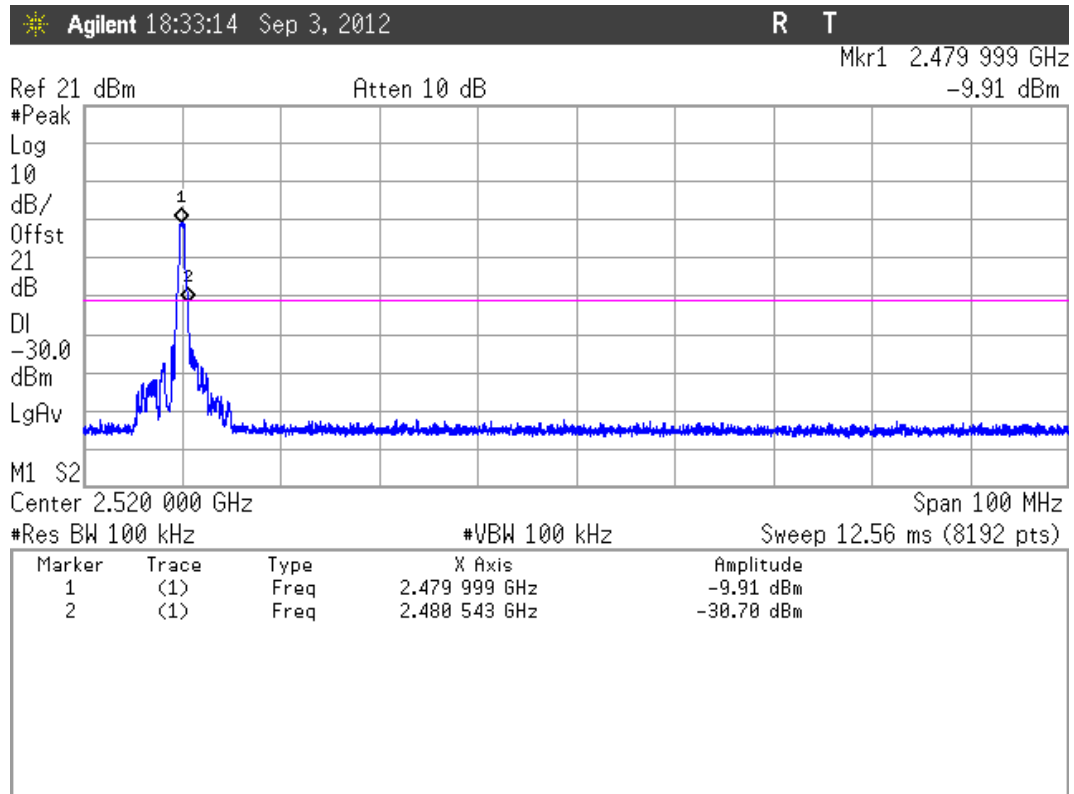




Band Edges Measurement



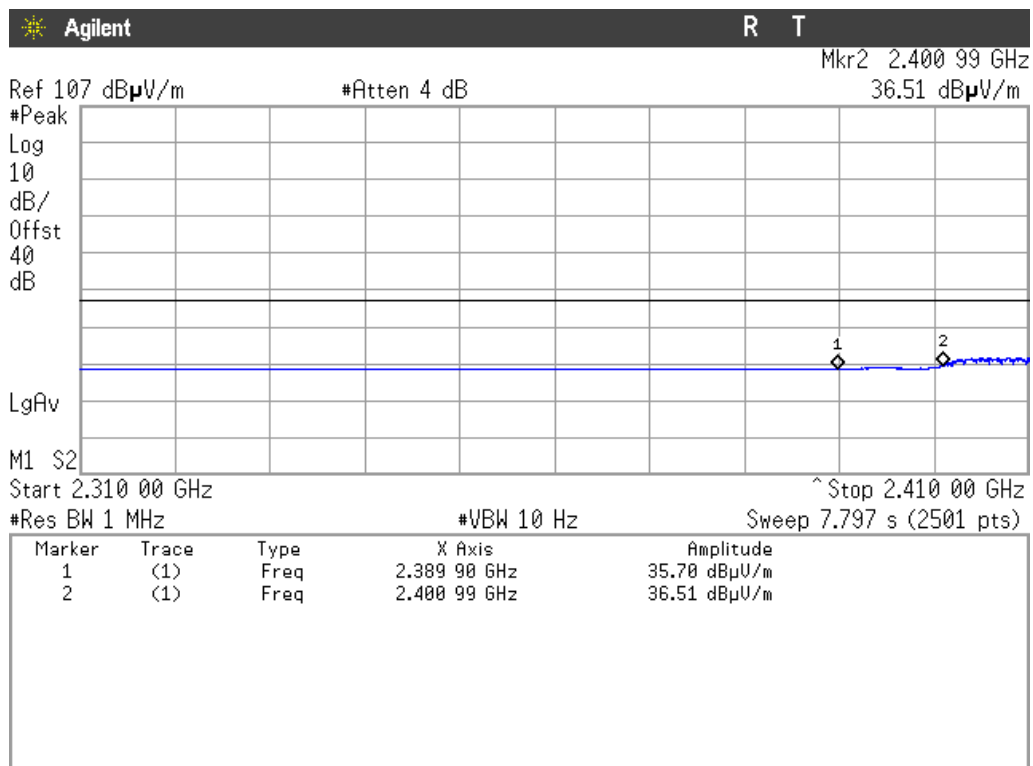
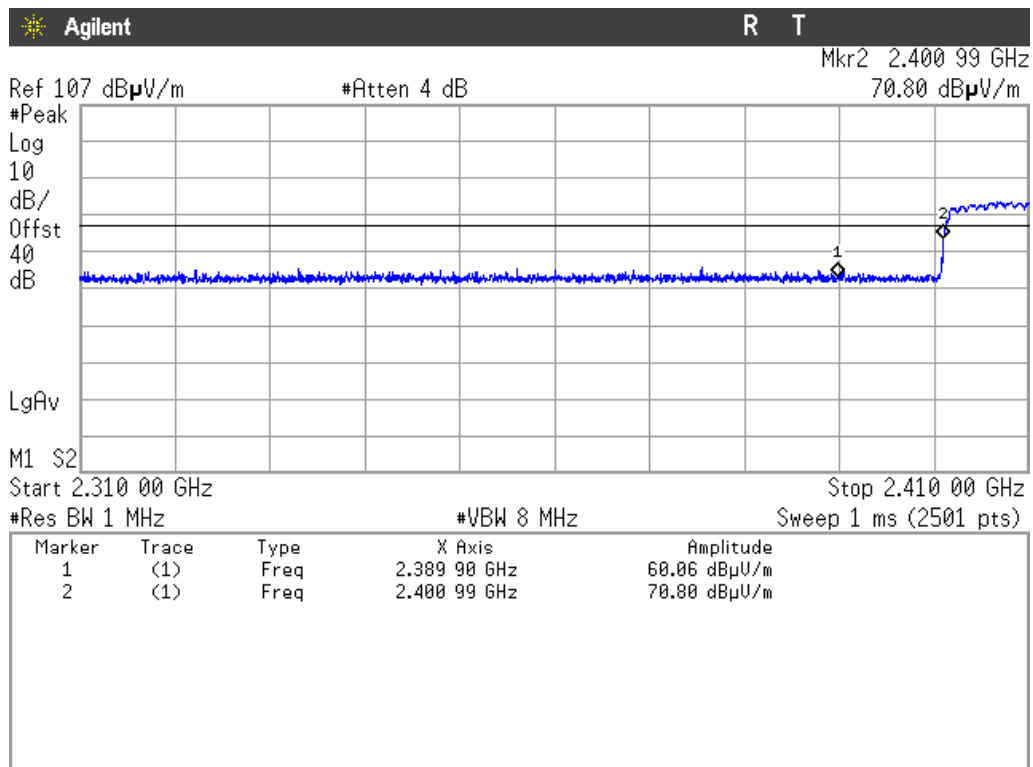
Band Edges Measurement



Note:

2401 MHz; f_H : 2480.6 MHz

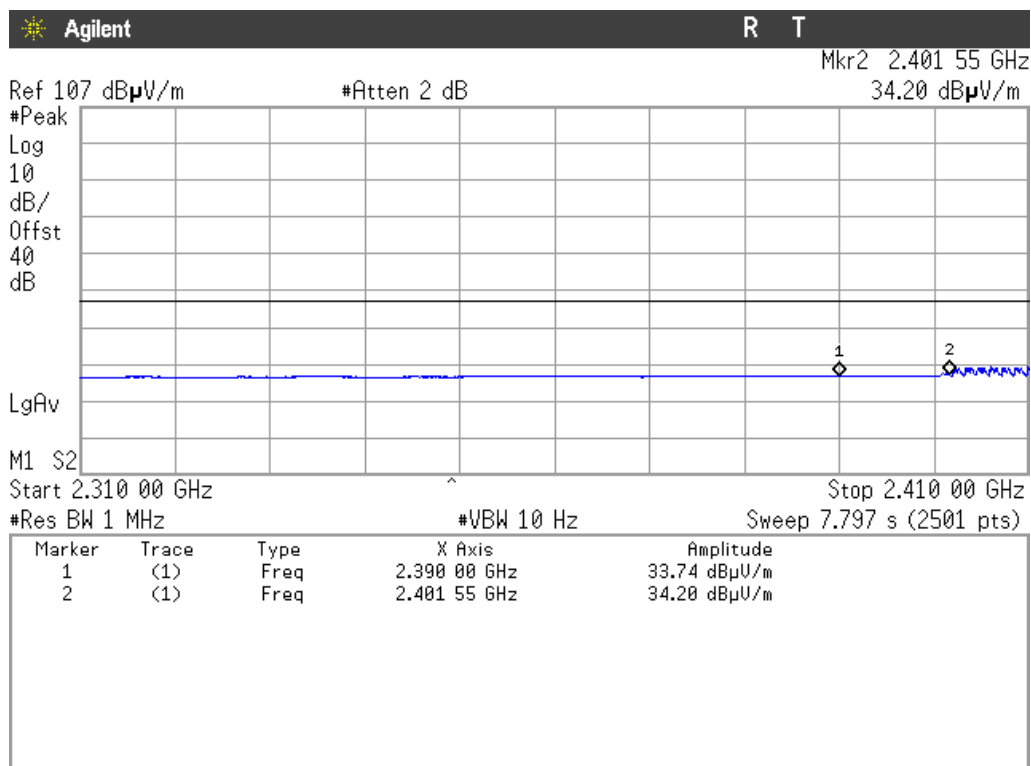
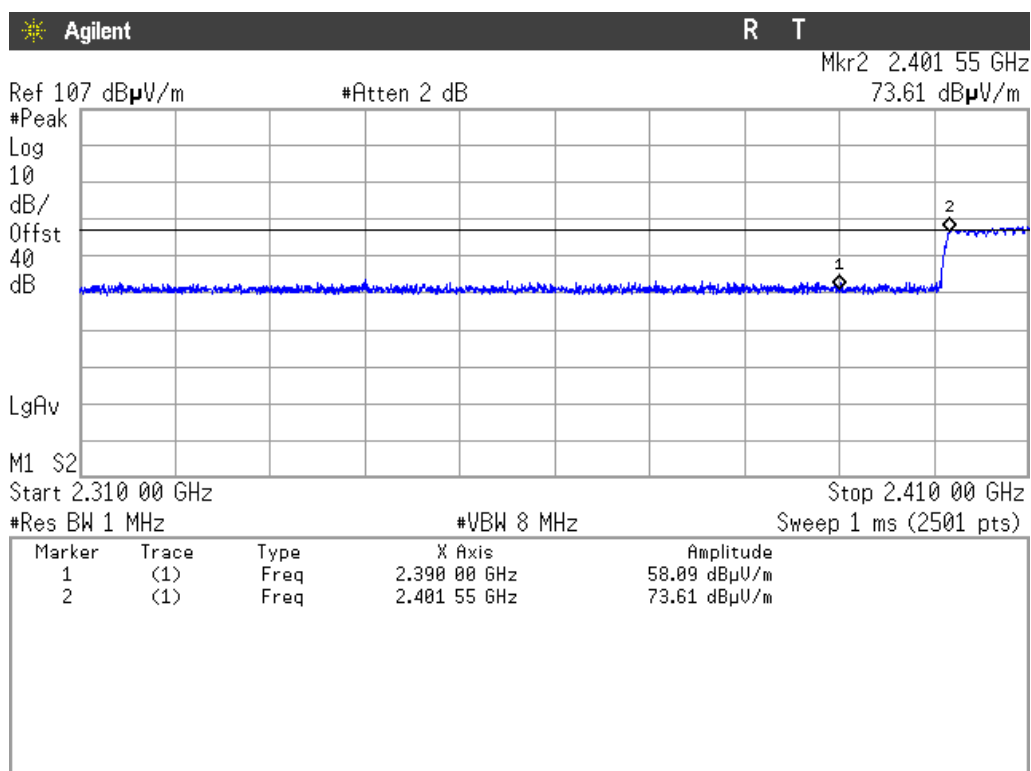
Restricted Band Edge Radiated Measurement Low Range (2310 – 2390 MHz)



Note:

Packet type: DH
Internal Antenna Pol. V

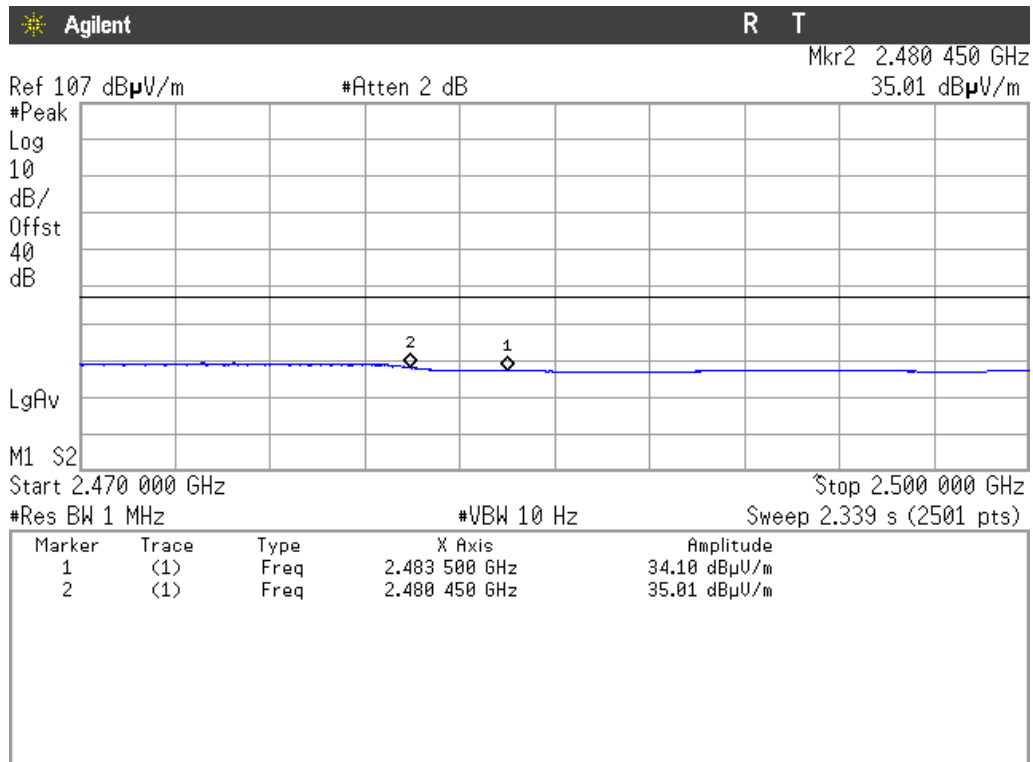
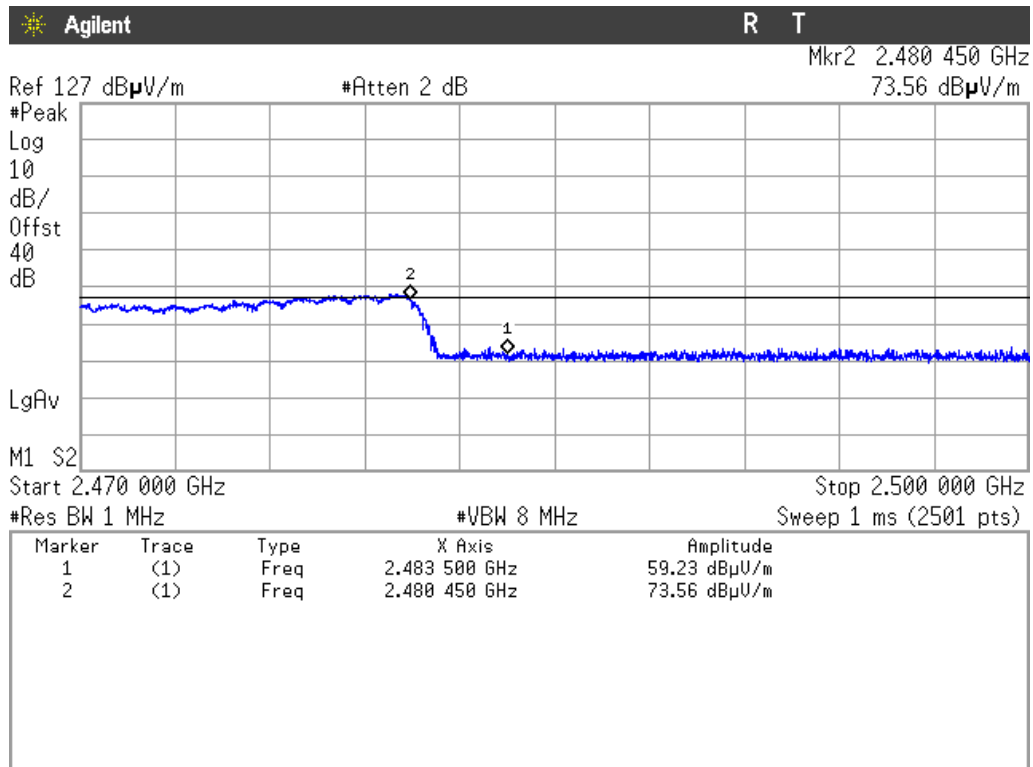
Restricted Band Edge Radiated Measurement Low Range (2310 – 2390 MHz)



Note:

Packet type: DH
Internal Antenna Pol. H

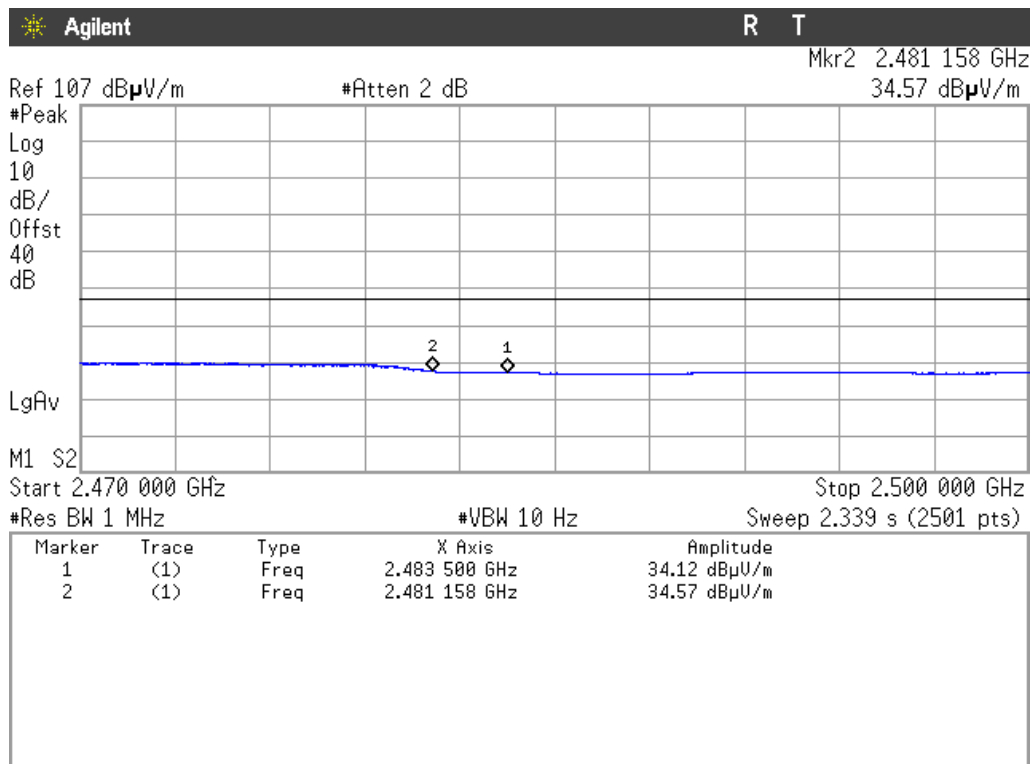
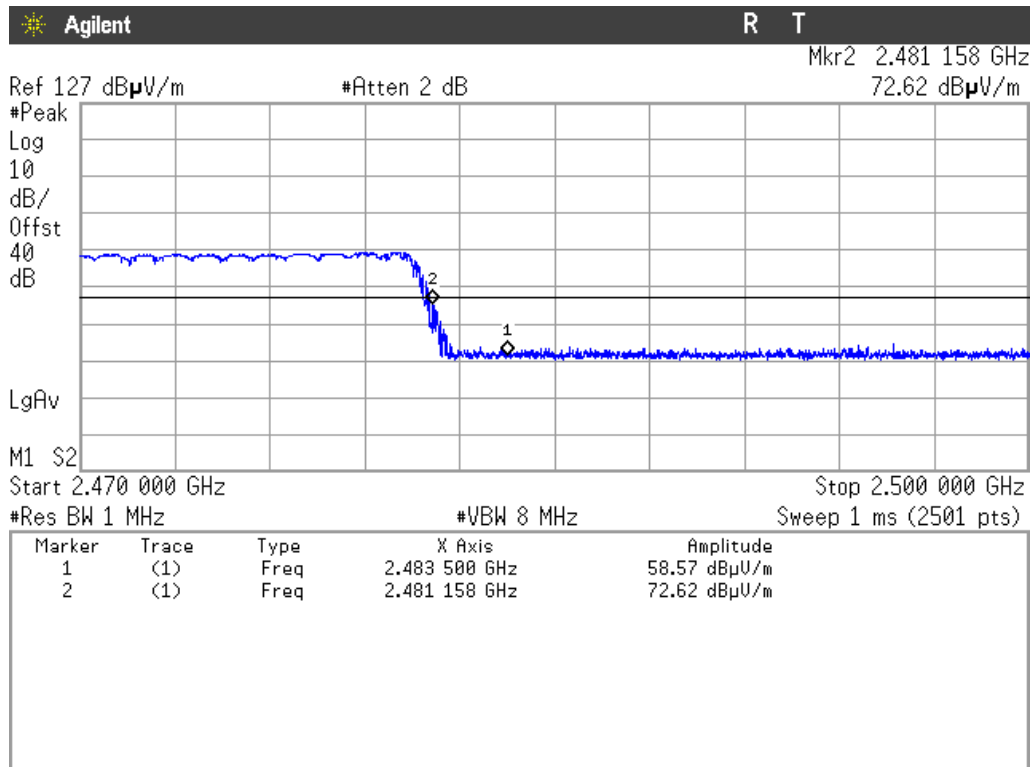
Restricted Band Edge Radiated Measurement High Range (2483.5 – 2500 MHz)



Note:

Packet type: DH
 Internal Antenna Pol. V

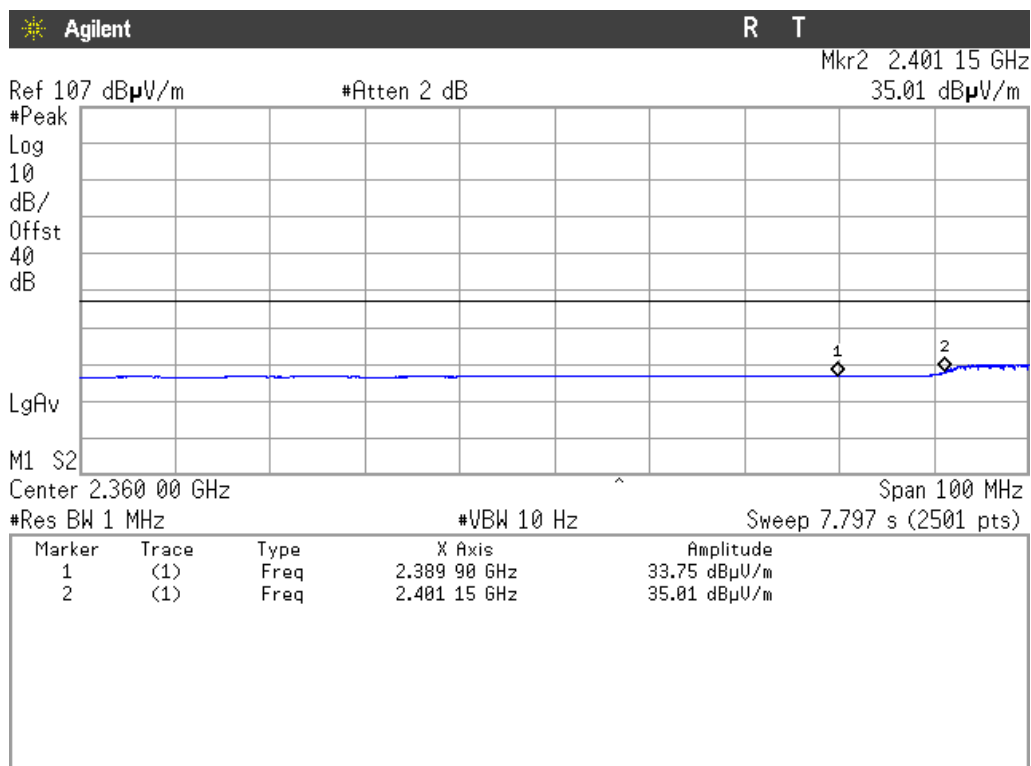
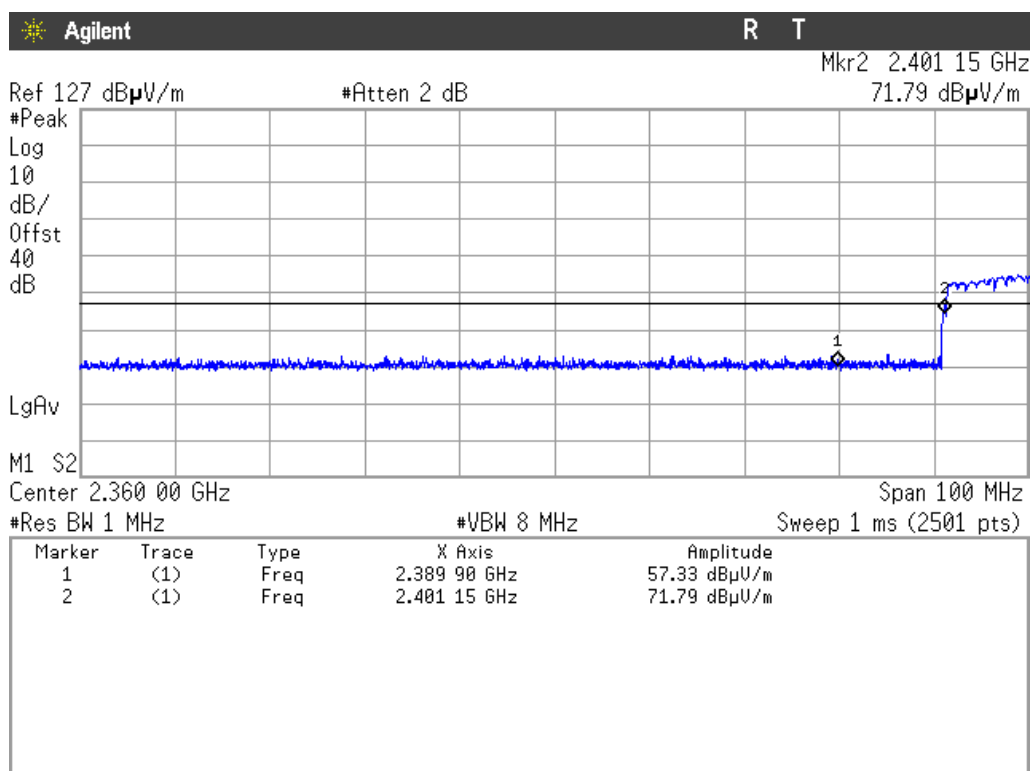
Restricted Band Edge Radiated Measurement High Range (2483.5 – 2500 MHz)



Note:

Packet type: DH
Internal Antenna Pol. H

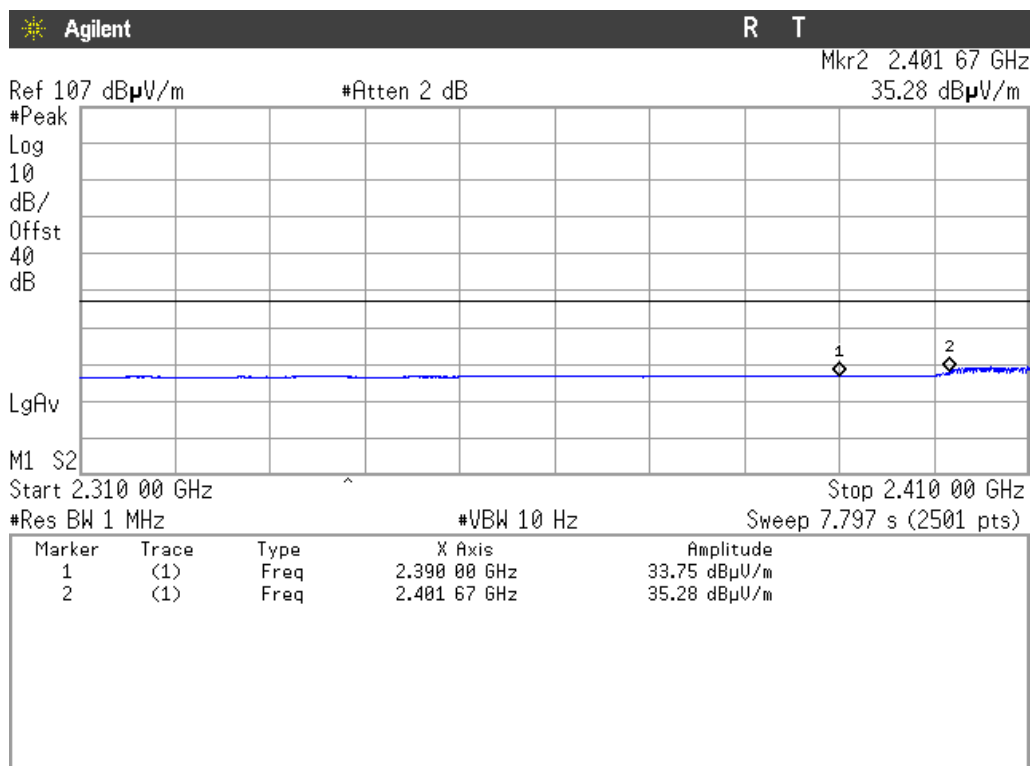
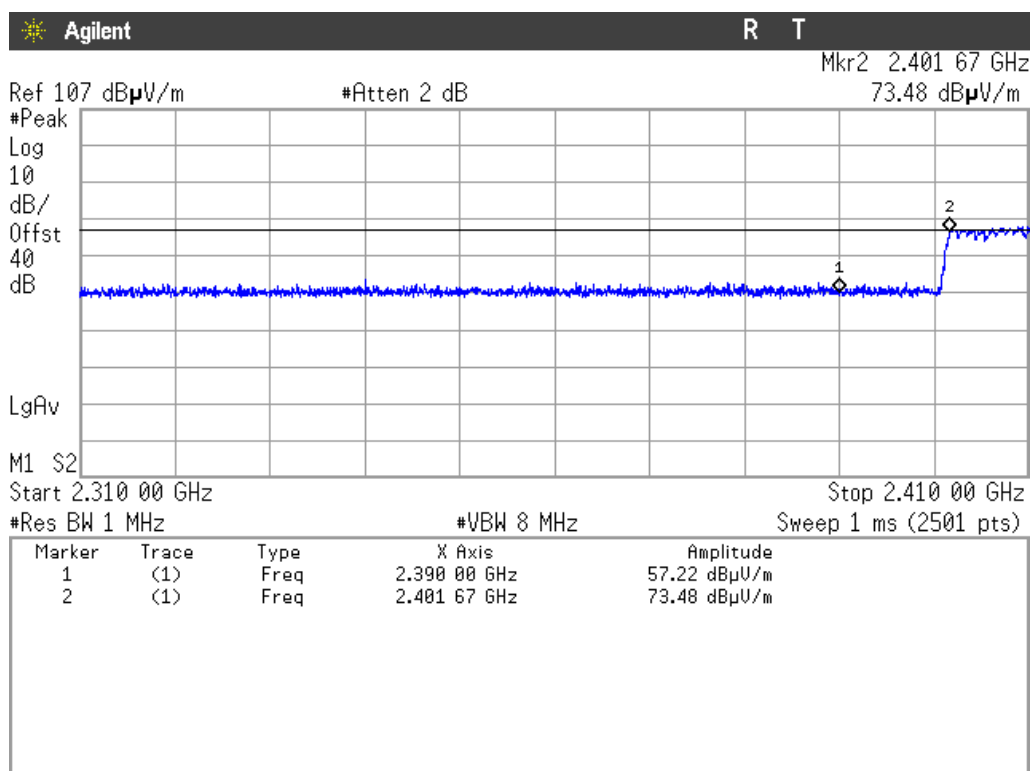
Restricted Band Edge Radiated Measurement Low Range (2310 – 2390 MHz)



Note:

Packet type: 2-DH
Internal Antenna Pol. V

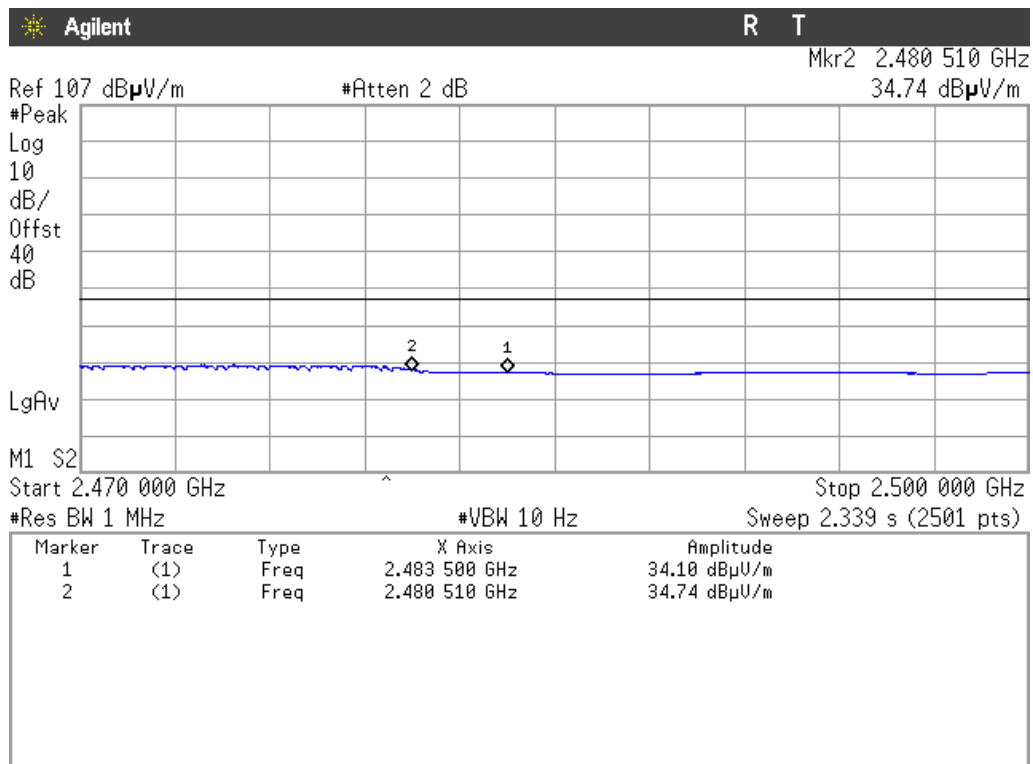
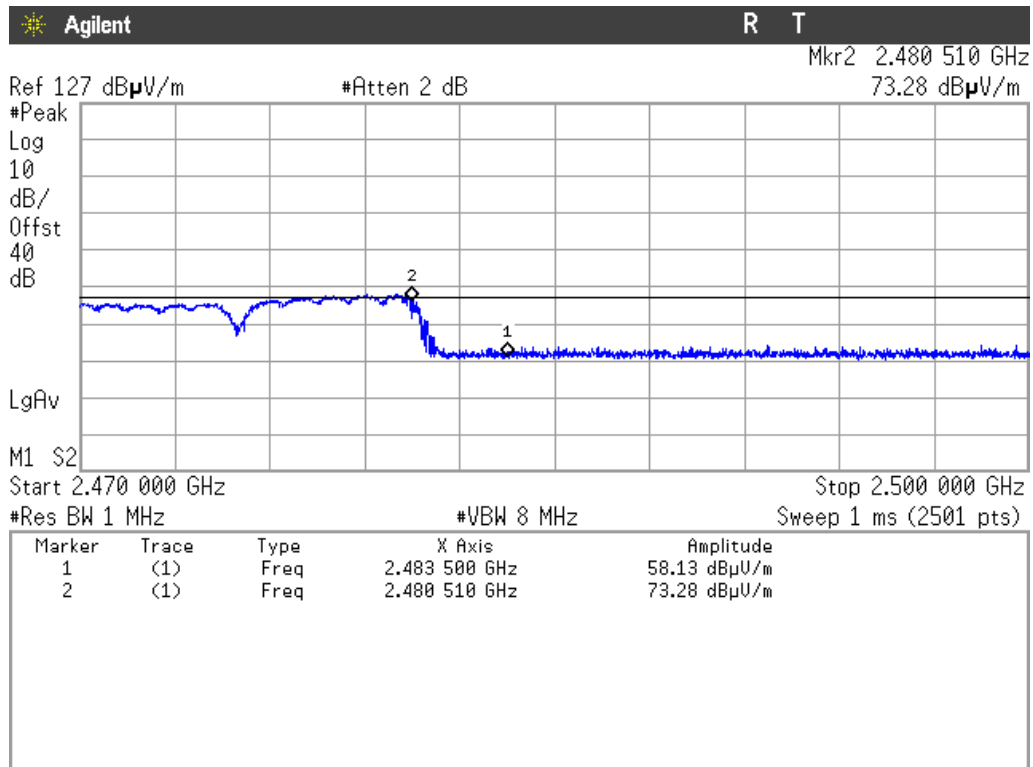
Restricted Band Edge Radiated Measurement Low Range (2310 – 2390 MHz)



Note:

Packet type: 2-DH
Internal Antenna Pol. H

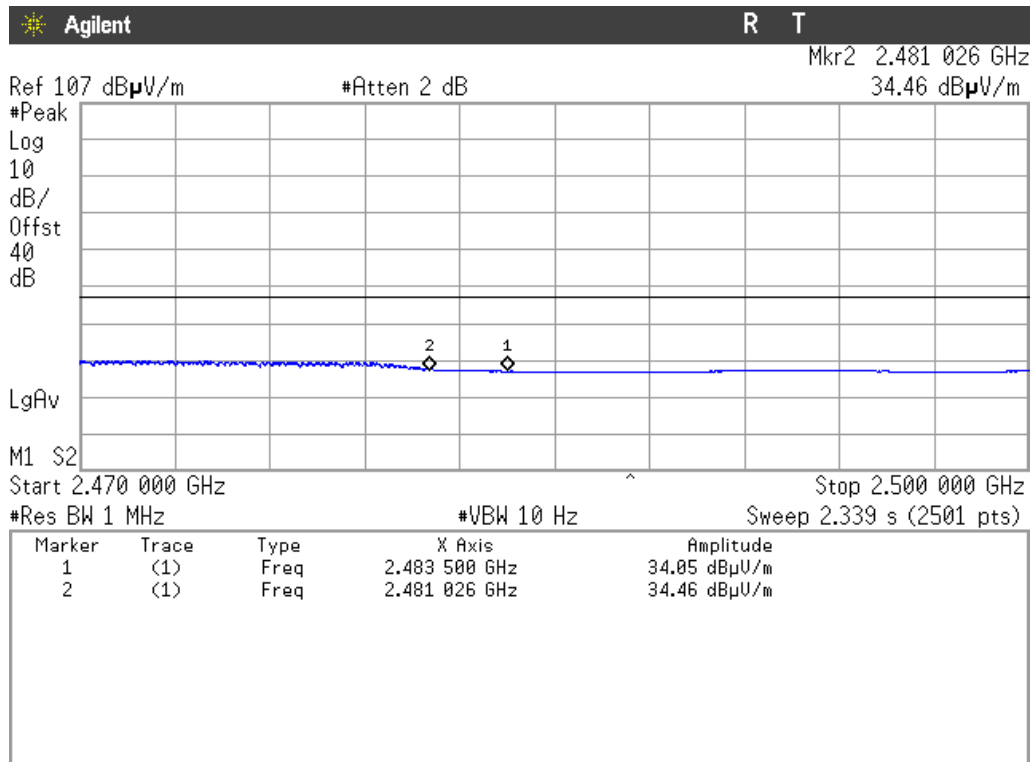
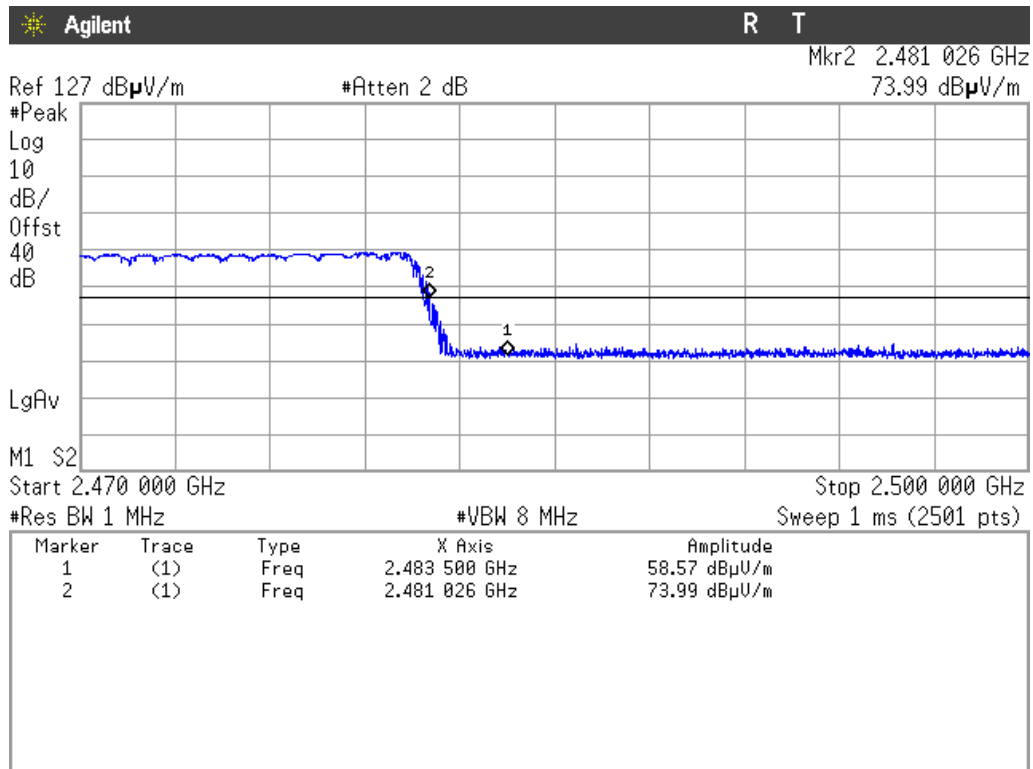
Restricted Band Edge Radiated Measurement High Range (2483.5 – 2500 MHz)



Note:

Packet type: 2-DH
Internal Antenna Pol. V

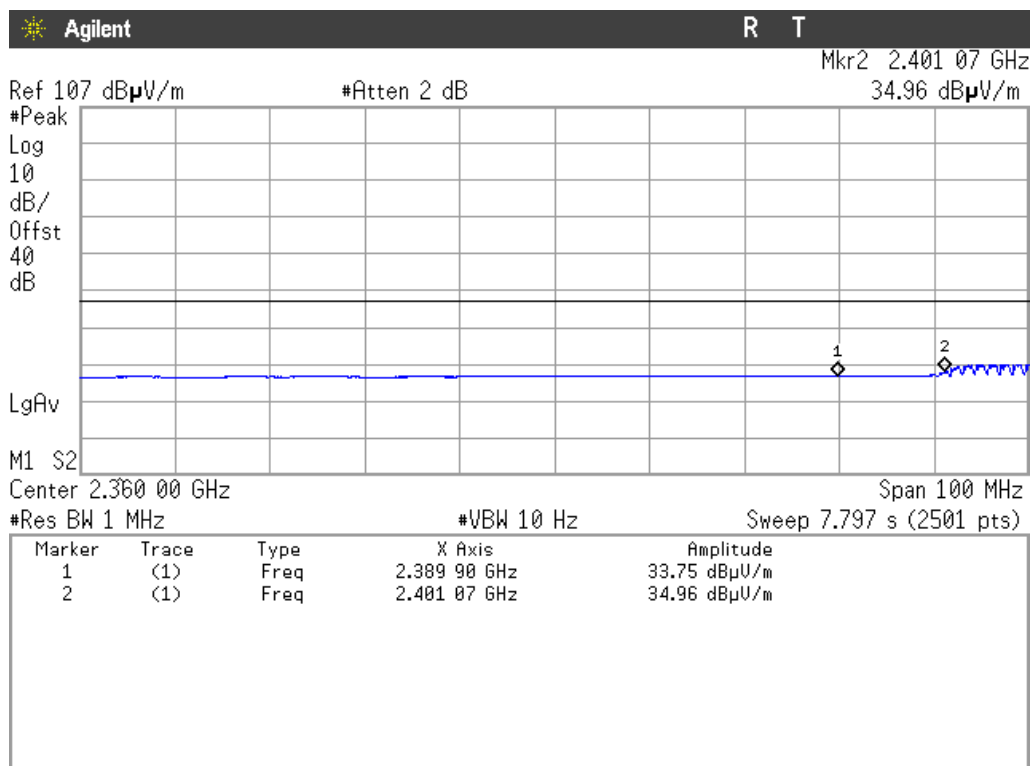
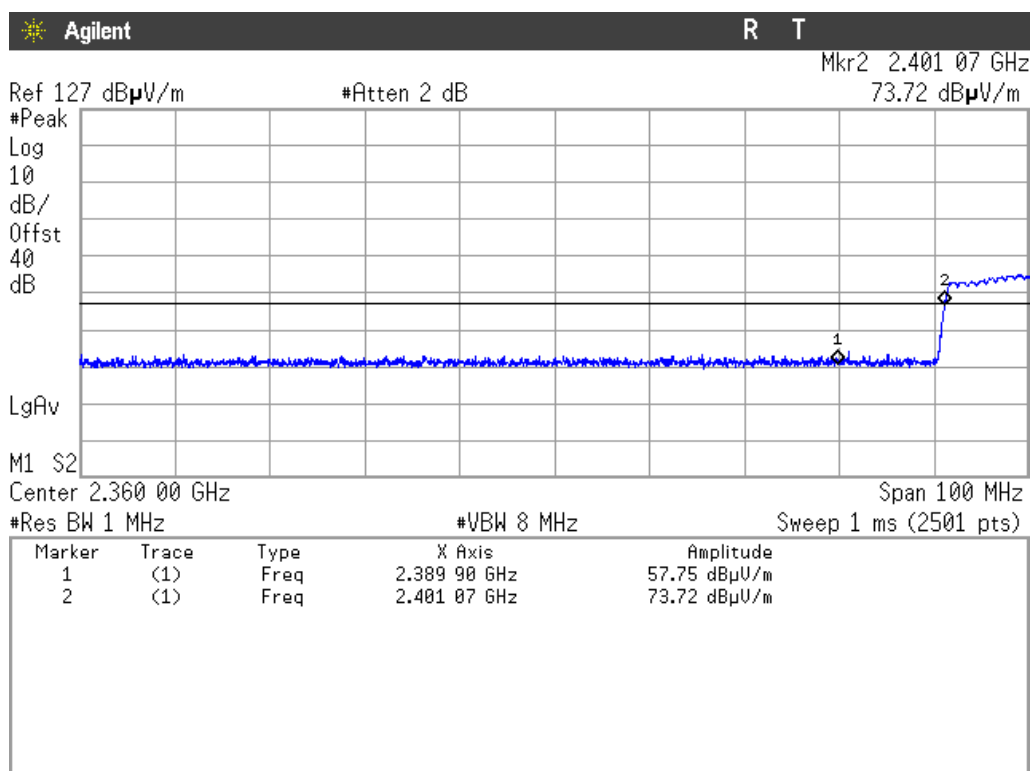
Restricted Band Edge Radiated Measurement High Range (2483.5 – 2500 MHz)



Note:

Packet type: 2-DH
Internal Antenna Pol. H

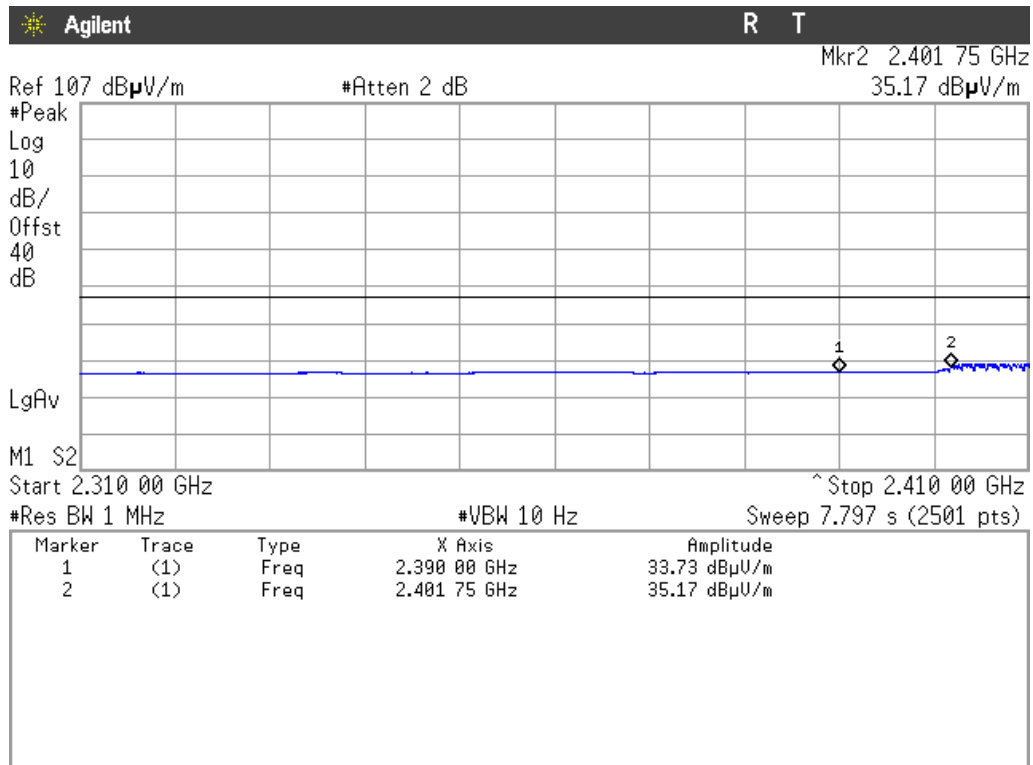
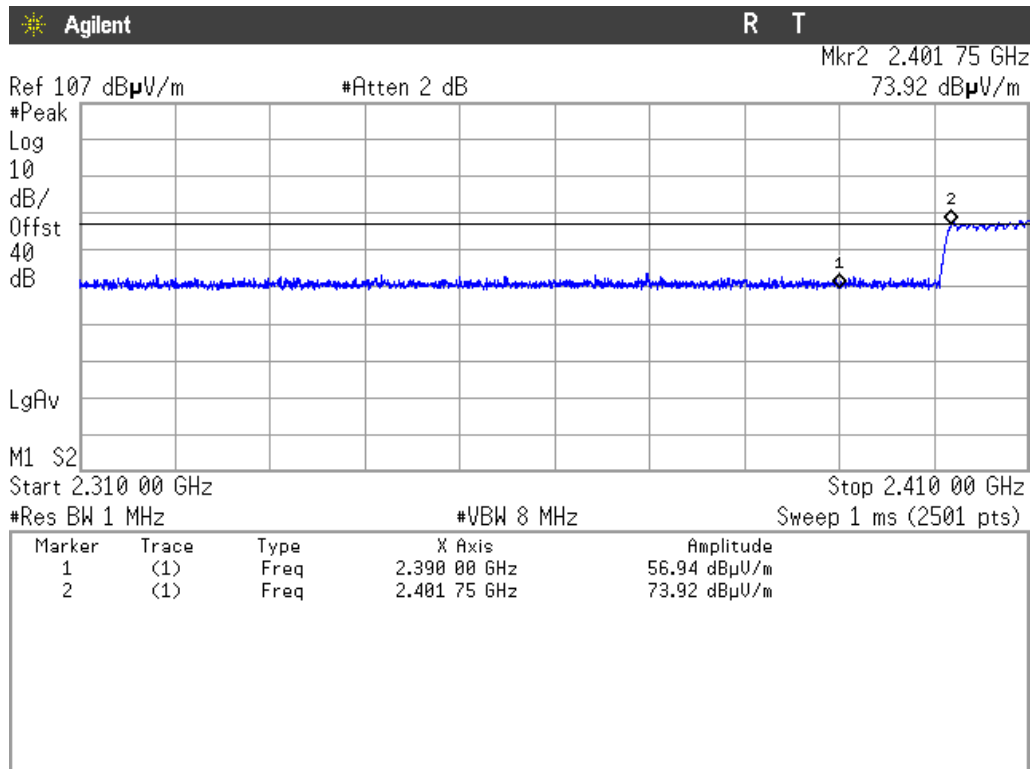
Restricted Band Edge Radiated Measurement Low Range (2310 – 2390 MHz)



Note:

Packet type: 3-DH
Internal Antenna Pol. V

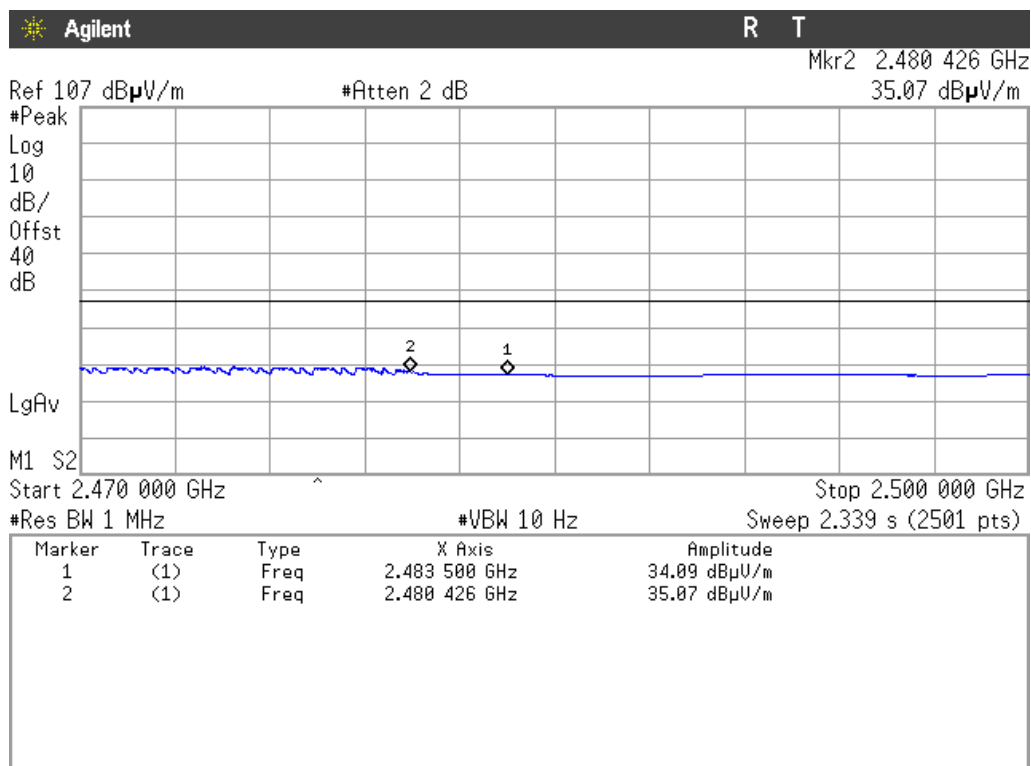
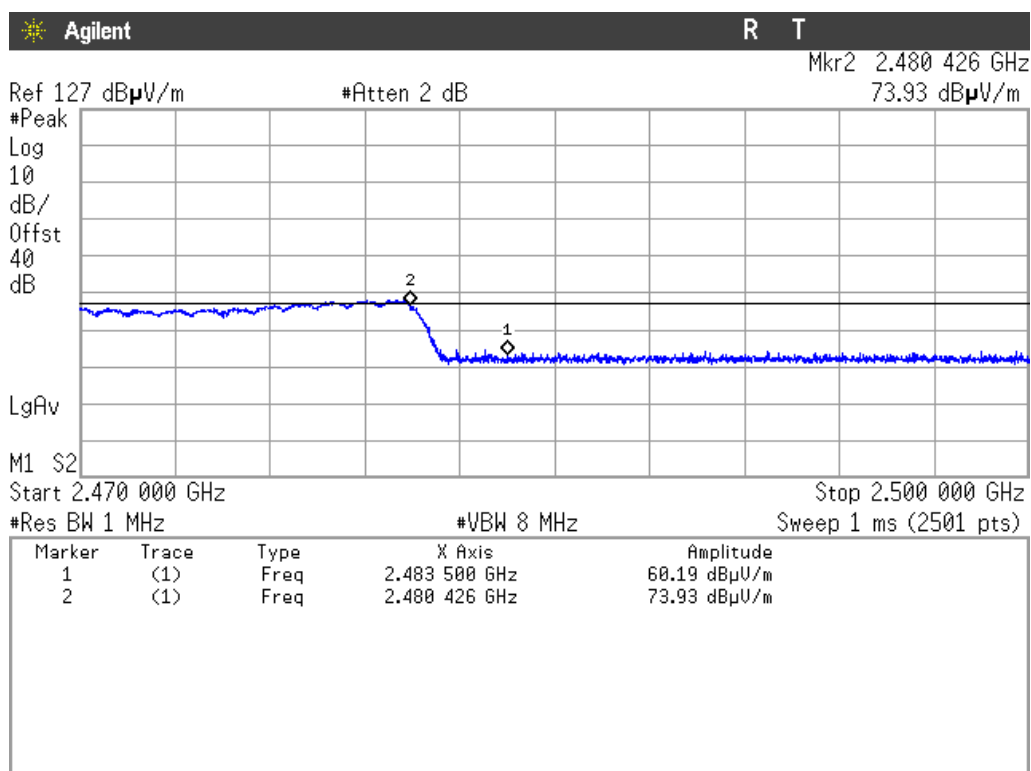
Restricted Band Edge Radiated Measurement Low Range (2310 – 2390 MHz)



Note:

Packet type: 3-DH
Internal Antenna Pol. H

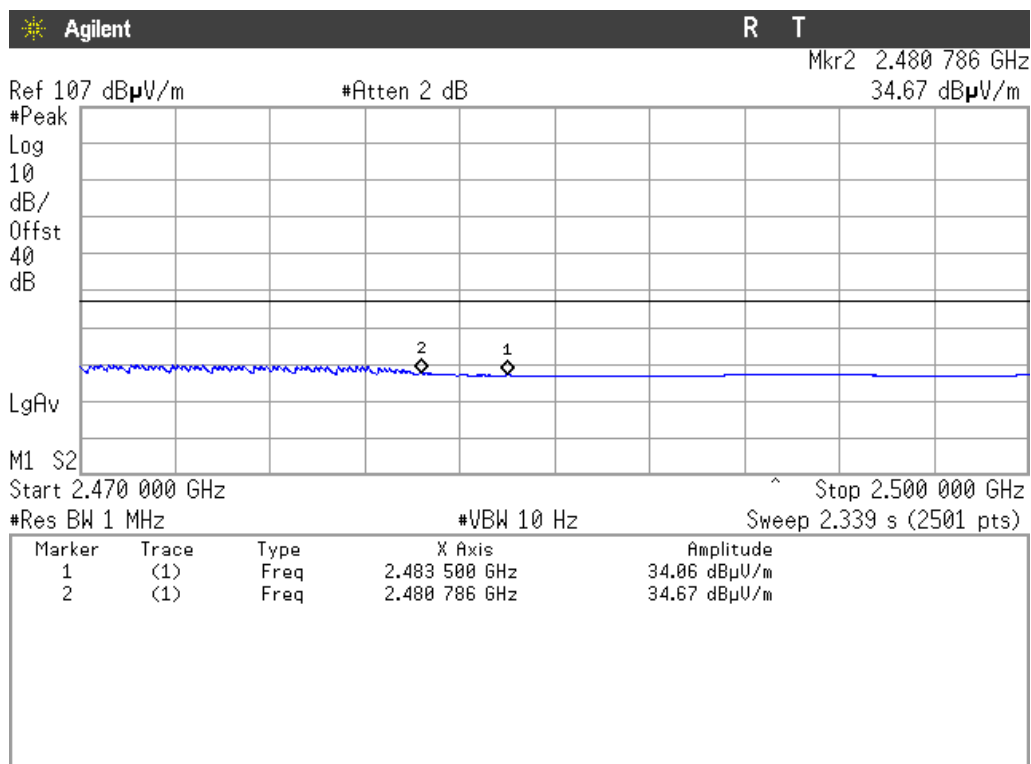
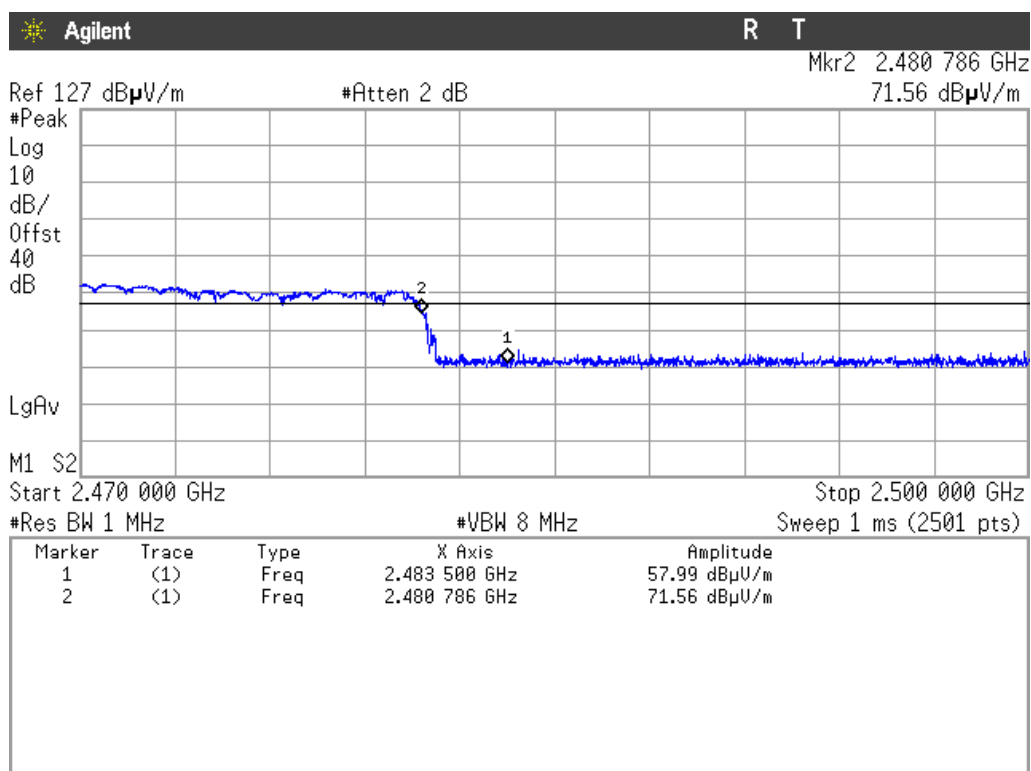
Restricted Band Edge Radiated Measurement High Range (2483.5 – 2500 MHz)



Note:

Packet type: 3-DH
Internal Antenna Pol. V

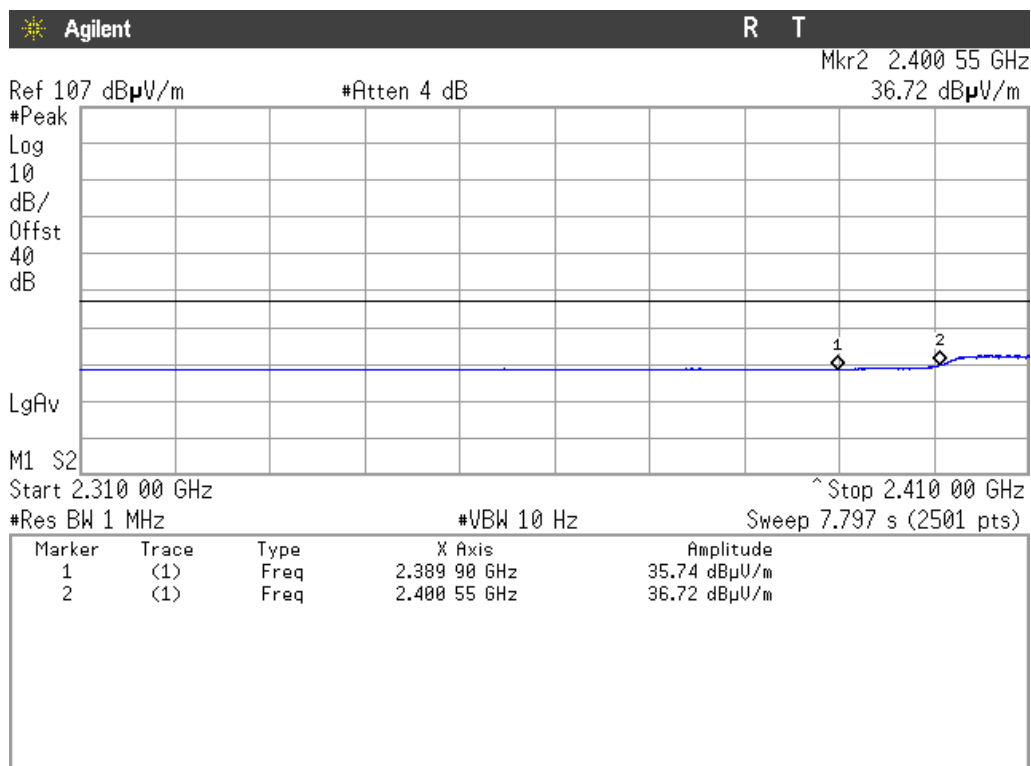
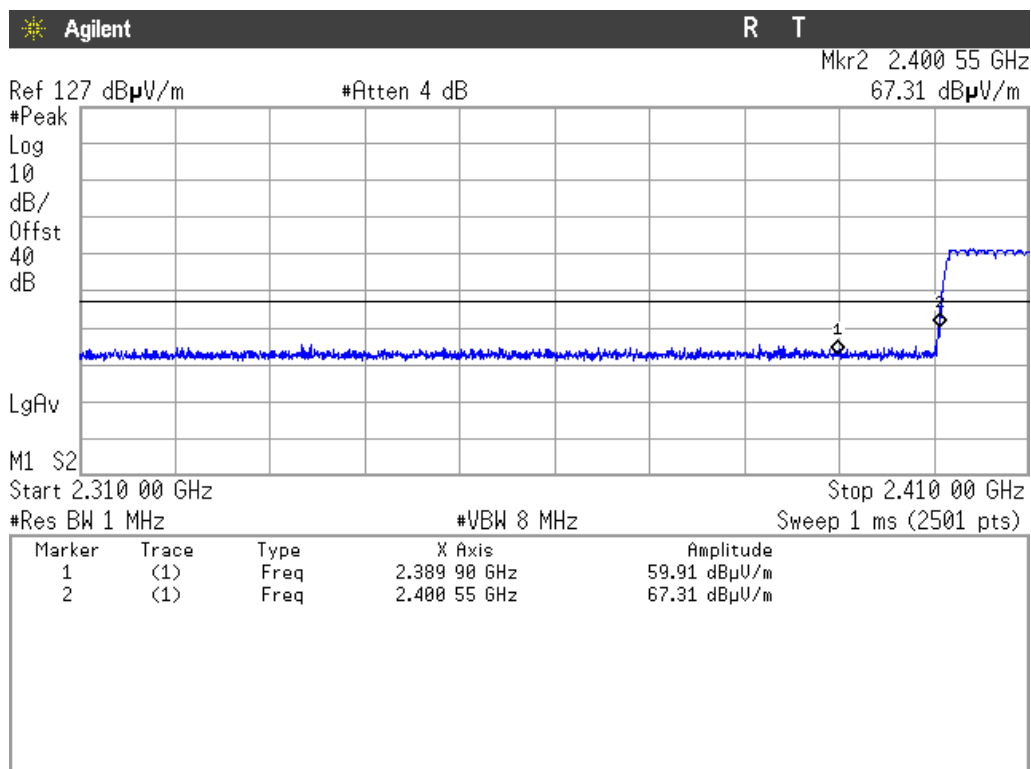
Restricted Band Edge Radiated Measurement High Range (2483.5 – 2500 MHz)



Note:

Packet type: 3-DH
Internal Antenna Pol. H

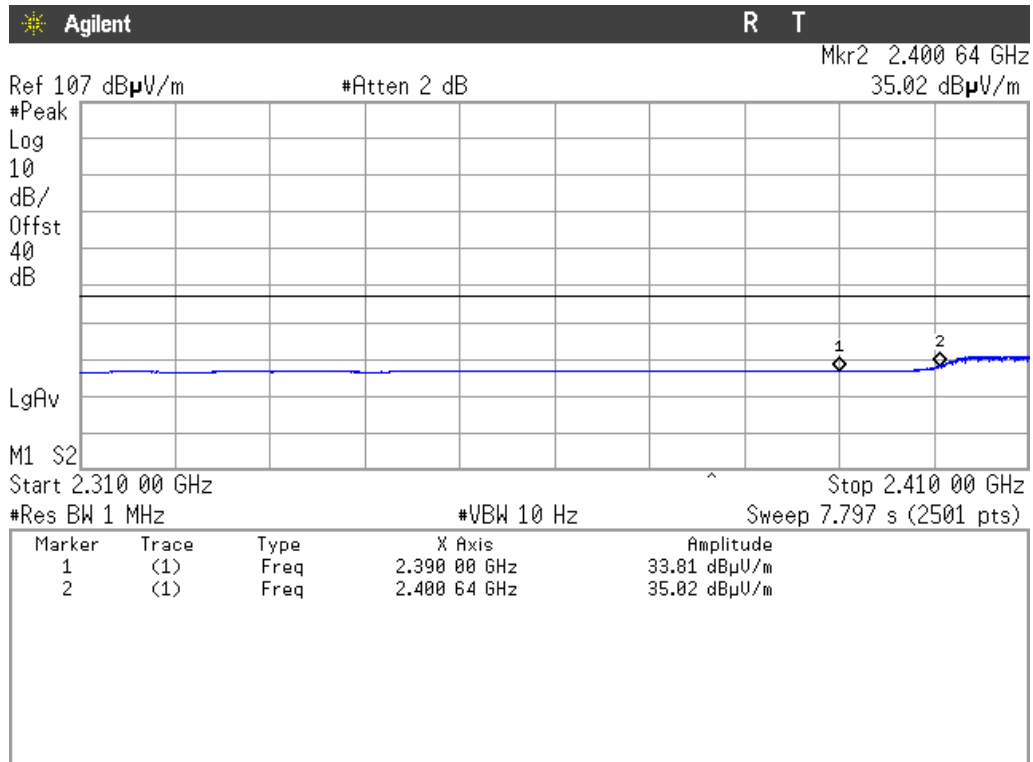
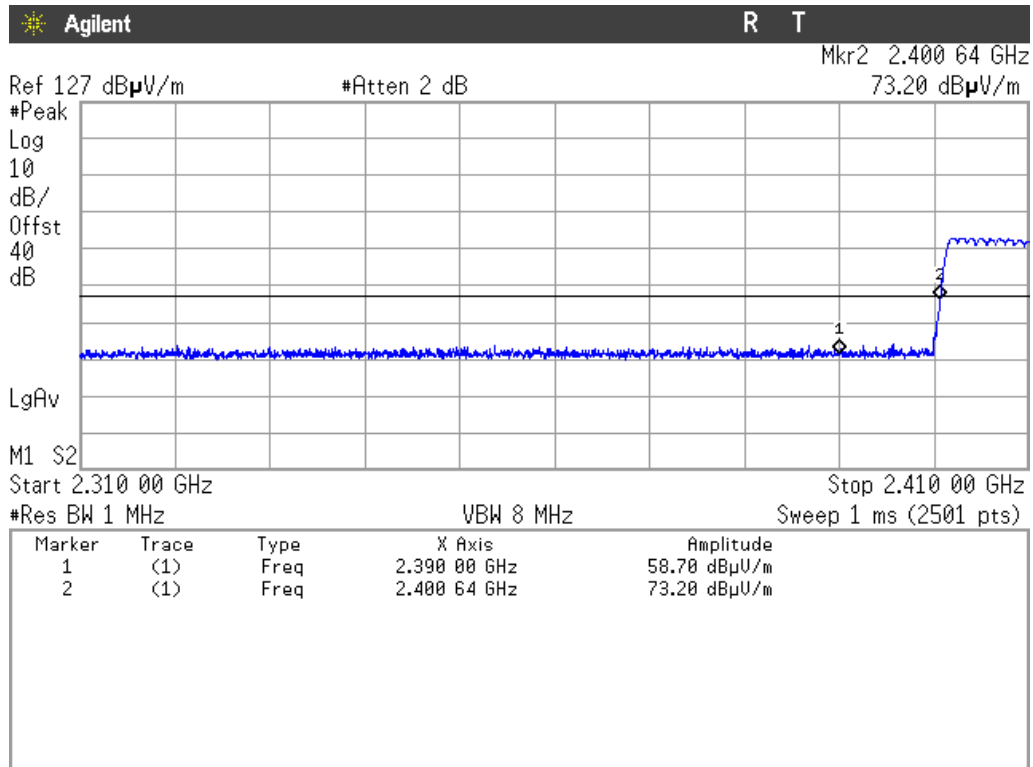
Restricted Band Edge Radiated Measurement Low Range (2310 – 2390 MHz)



Note:

Packet type: DH
External Antenna Pol. V

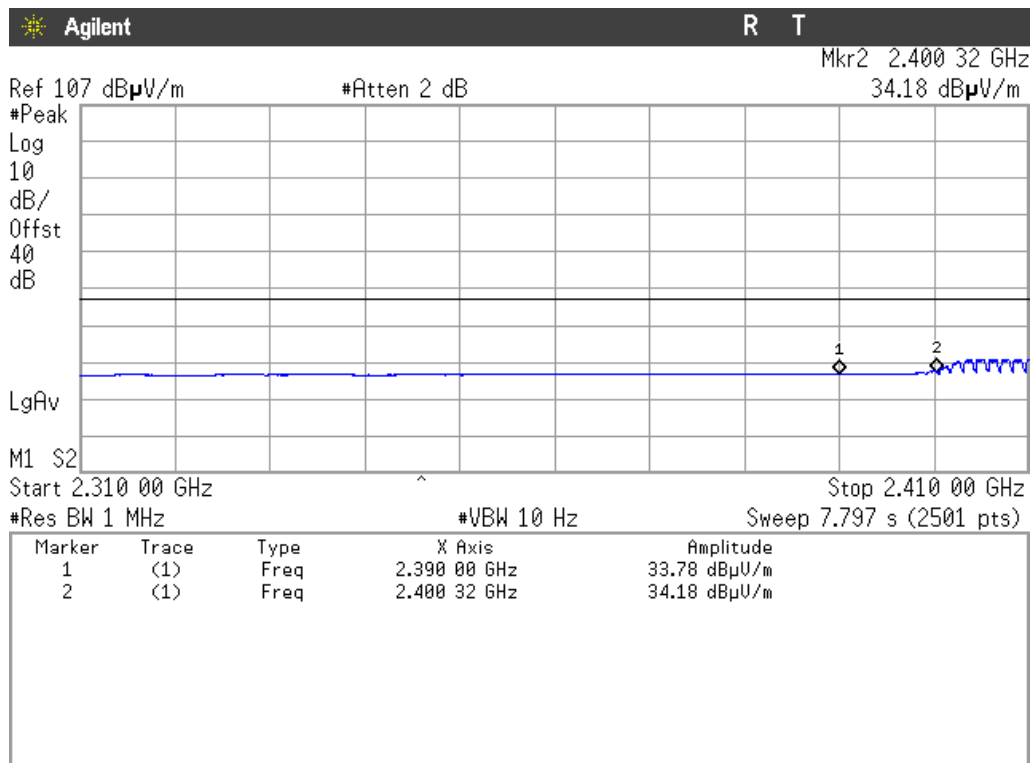
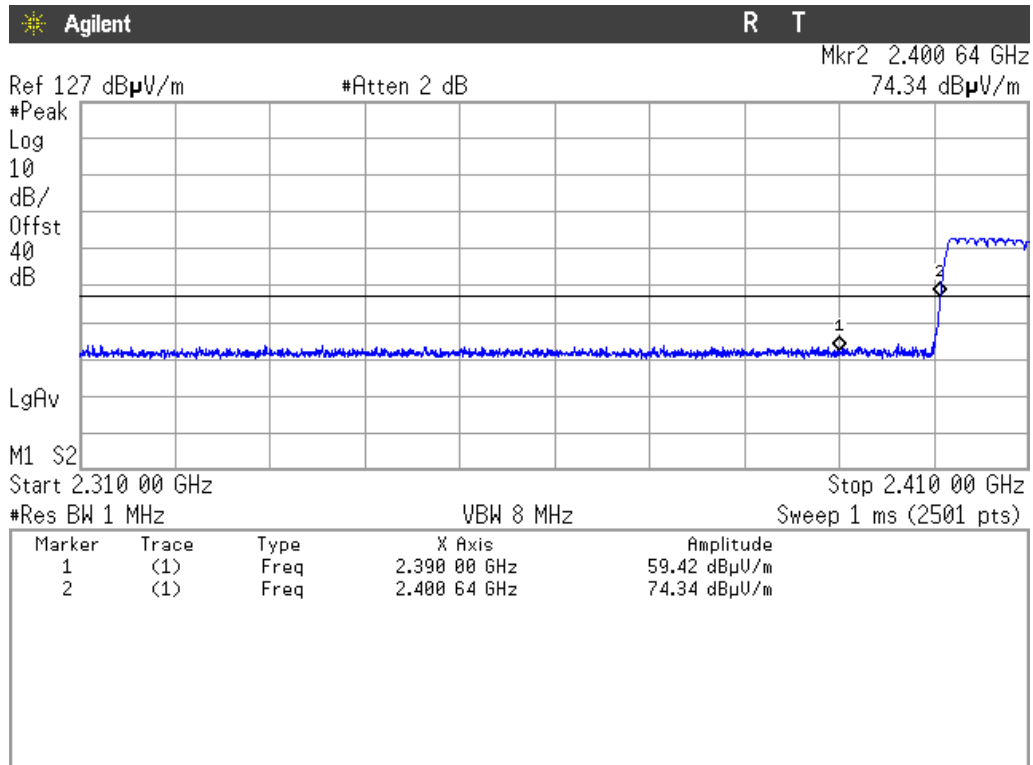
Restricted Band Edge Radiated Measurement Low Range (2310 – 2390 MHz)



Note:

Packet type: 2-DH
External Antenna Pol. V

Restricted Band Edge Radiated Measurement Low Range (2310 – 2390 MHz)



Note:

Packet type: 3-DH
External Antenna Pol. V

11. MAXIMUM PERMISSIBLE EXPOSURE

Equipment shall meet the limits below .

1mW/cm² max at 20 cm of distance

Calculation:

$$E = \frac{\sqrt{30PG}}{d}$$

$$S = \frac{(E)^2}{3770}$$

E= Field Strenght in Volts/meter

P=Power in watt

G= Numeric Antenna Gain

d= Distance in meter

S= power Density in milliwatts/square centimeter

Arranging terms to calculate the power density at a specifica distance yields:

$$S= 0.0795 \cdot 10^{((P+G)/10)/(d^2)}$$

The power density in units of mW/cm² is converted to units of W/m² multiplying by a factor of 10.

Result

Power Density Limit mW/cm ²	Output Power (erp) mW	Power Density at 20cm mW/cm ²	Remark
1	21,3	0,013	-

(*) OET Bulletin 65

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. 12077-FCC-IC Rev. 02, page 173 / 176

12. PHOTO

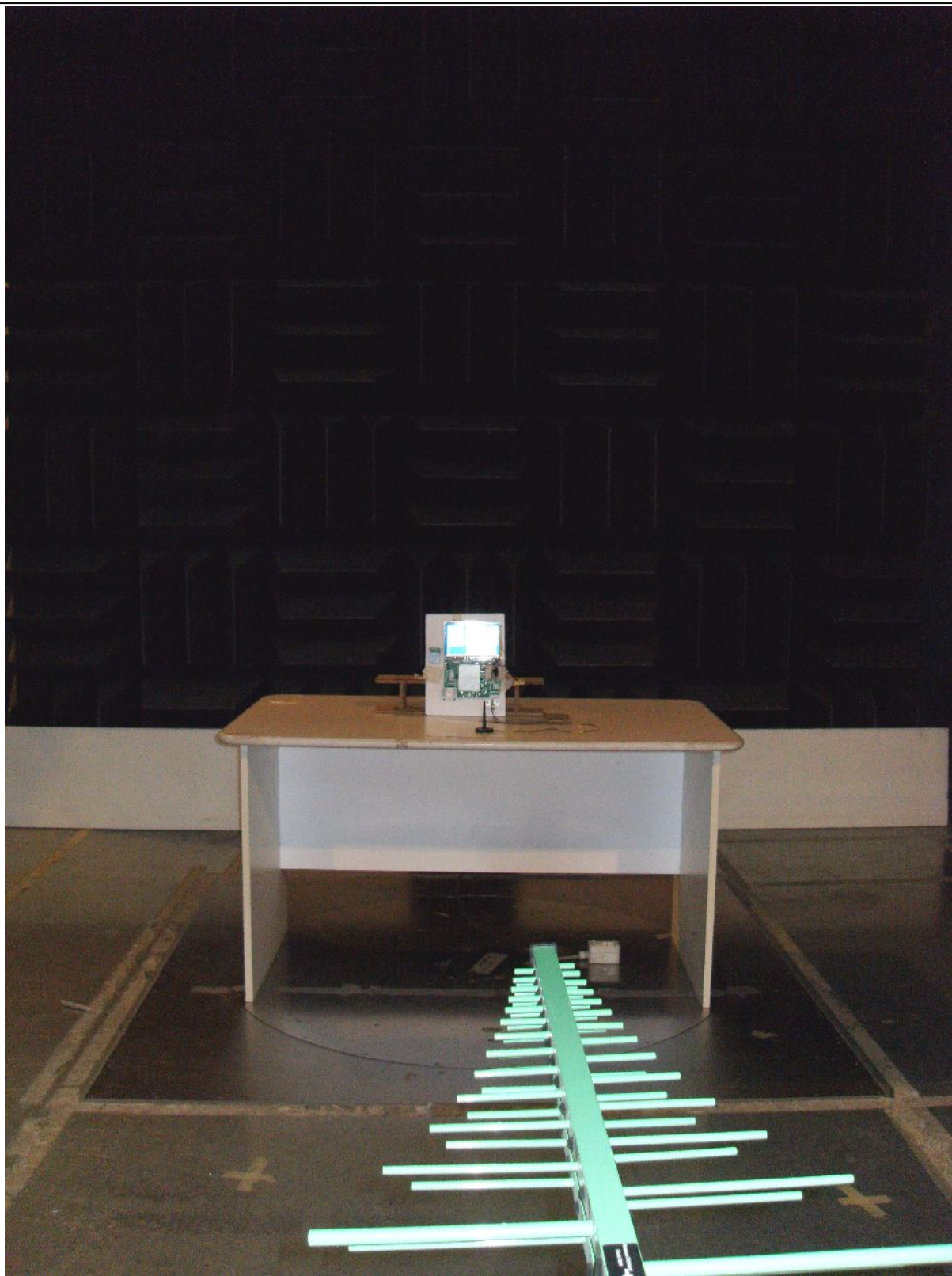


Fig. 12.1

Radiated Emissions Test Set-up

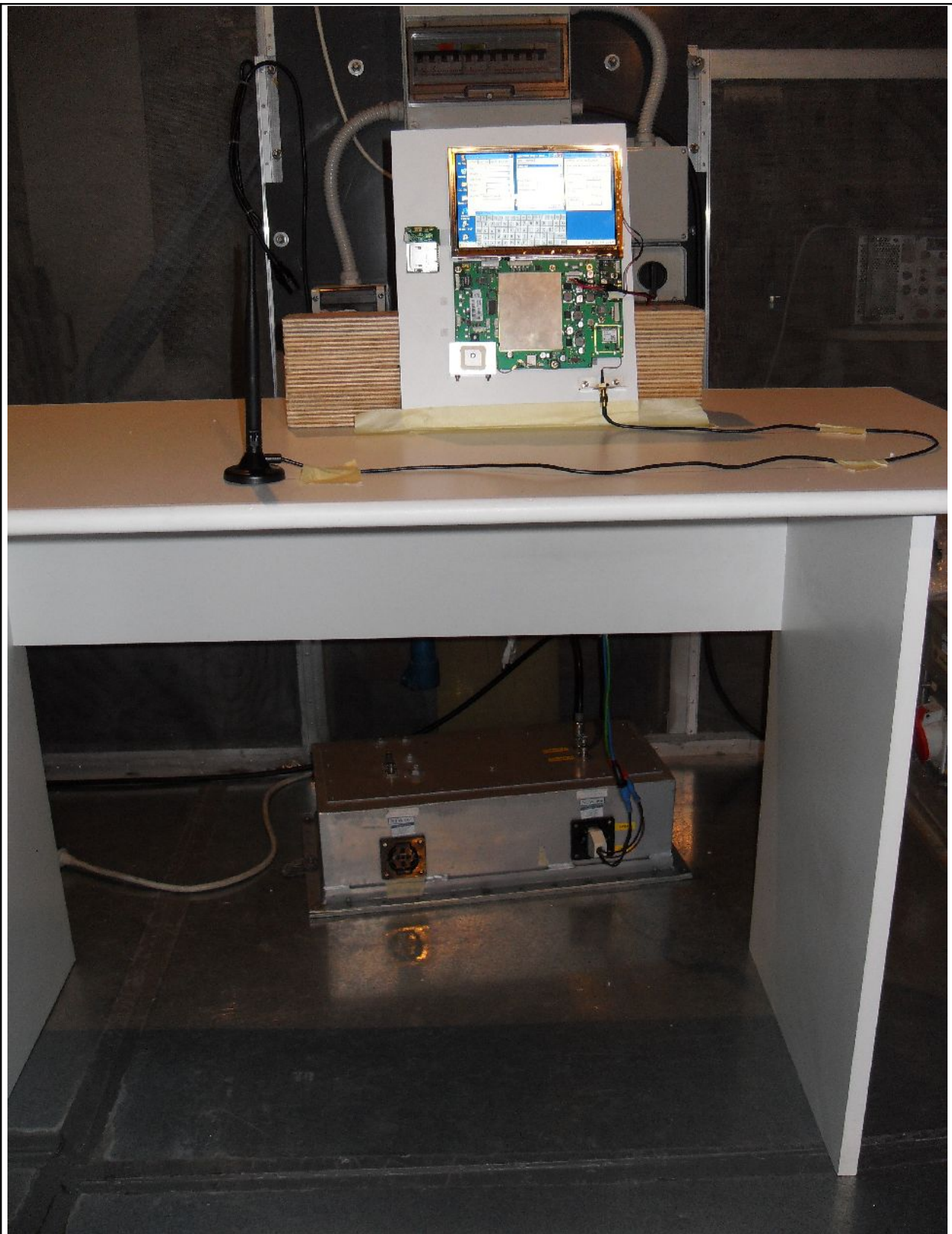


Fig. 12.2

Power Line Conducted Emissions Test Set-up

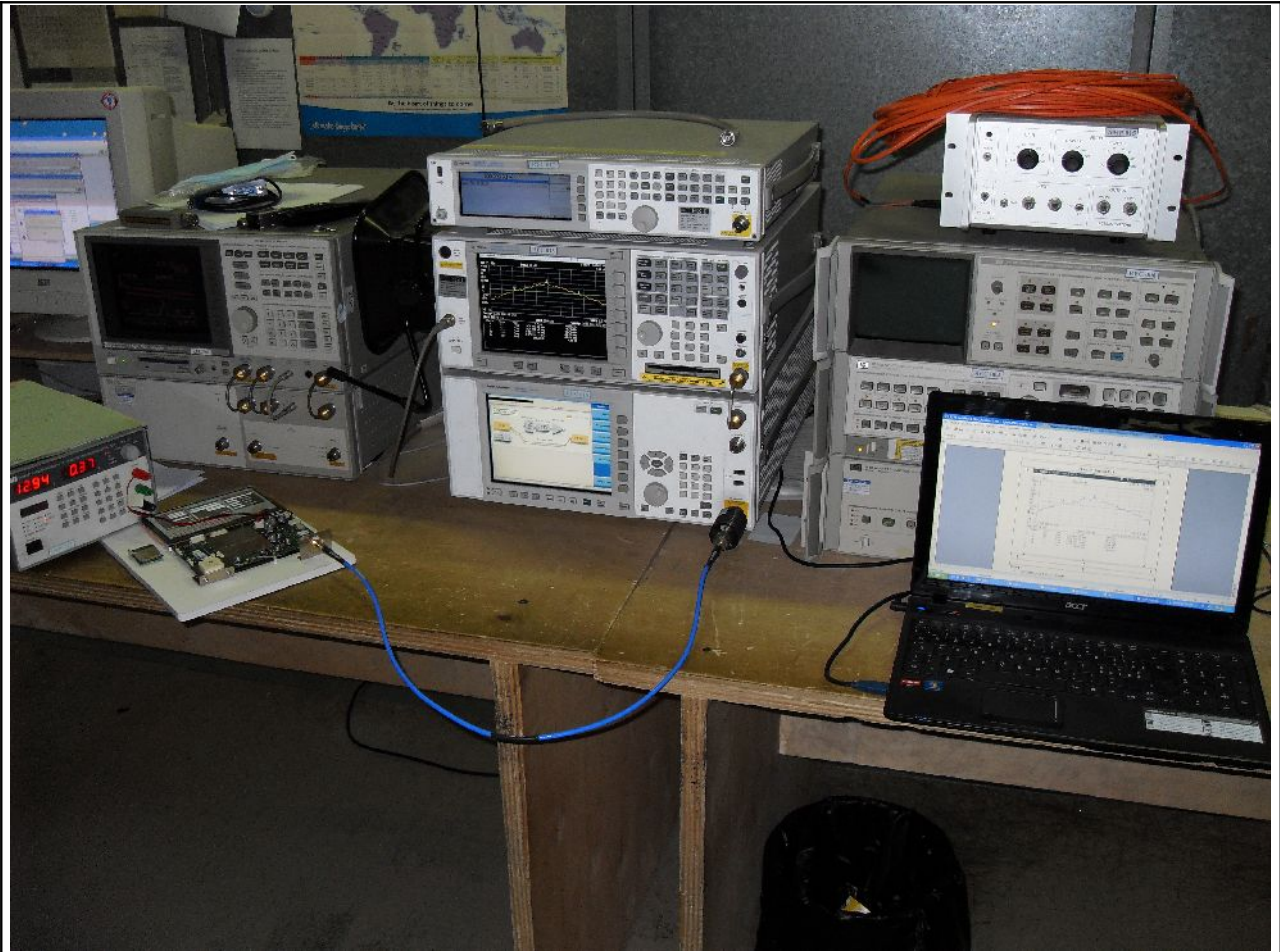


Fig. 12.3

Antenna Port Conducted Emissions Test Set-up