FCC PART 15, SUBPART C
ISEDC RSS-247, ISSUE 2, FEBRUARY 2017

TEST REPORT

For

Cisco Systems Inc.

125 West Tasman Drive,

San Jose, CA 95134 USA

FCC ID: LDKHDGWI1903
IC: 2461N-HDGWI1903

Report Type:	**Model:**
Original Report	C9117AXI-B (US), C9117AXI-A (Canada)

Prepared By:	Zhao Zhao Test Engineer
Report Number:	R1811136-247
Report Date:	2018-12-20
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1811136-247	Original Report	2018-12-20

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Cisco Systems Inc.,* and their product model: C9117AXI-B (US), C9117AXI-A (Canada) as referred to in this report. The product is a Dual Band Access Points.

1.2 Mechanical Description of EUT

The GRU product measures approximately 220 mm (L) x 220 mm (W) x 60 mm (H) and weighs approximately 1300 g.

1.3 Objective

This report is prepared on behalf of *Cisco Systems Inc.*, in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commission's rules and ISEDC RSS-247 Issue 2 on February 2017.

The objective is to determine compliance with FCC Part 15.247 and ISEDC RSS-247 rules for Antenna Requirements and Radiated Spurious Emissions.

1.4 Related Submittal(s)/Grant(s)

U-NII FCC Part 15.407 and ISEDC RSS-247 report

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB 558074 D01 DTS Meas Guidance v04: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48dB
Unwanted Emissions, conducted	±1.57dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2 ° C
Humidity	±5 %
DC and low frequency voltages	±1.0 %
Time	±2 %
Duty Cycle	±3 %

1.7 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0027.

1.8 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2005 by A2LA (Test Laboratory Accreditation Certificate Number 3279.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide

range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.03)*** to certify

- For the USA (Federal Communications Commission):
  - 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  - 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  - 3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
  - 1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  - 2 All Scope 2-Licensed Personal Mobile Radio Services;
  - 3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  - 4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  - 5 All Scope 5-Licensed Fixed Microwave Radio Services
  - 6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
  - 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
  - 2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2
- For the Hong Kong Special Administrative Region:
  - 1 All Radio Equipment, per KHCA 10XX-series Specifications;
  - 2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  - 3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  - 1 MIC Telecommunication Business Law (Terminal Equipment):
    - All Scope A1 - Terminal Equipment for the Purpose of Calls;
    - All Scope A2 - Other Terminal Equipment
  - 2 Radio Law (Radio Equipment):
    - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
    - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
    - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)

- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

D- ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISEDC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.10-2013 and FCC KDB 558074 D01 DTS Meas Guidance v04.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

The test firmware used was Tera Term and test commands, provided by *Cisco Systems Inc.*, the software is compliant with the standard requirements being tested against.

Modulation	Frequency (MHz)	Power Setting
802.11b	2412	17
	2437	17
	2462	17
802.11g	2412	17
	2437	17
	2462	17
802.11n	2412	17
	2437	17
	2462	17
BLE	2402	default
	2440	default
	2480	default

Data Rates Tested:
802.11b mode: 1Mbps
802.11g mode: 6Mbps
802.11n mode: m0
BLE: default

2.3 Duty Cycle Correction Factor

According to KDB 558074 D01 DTS Meas Guidance v04 section 6.0:

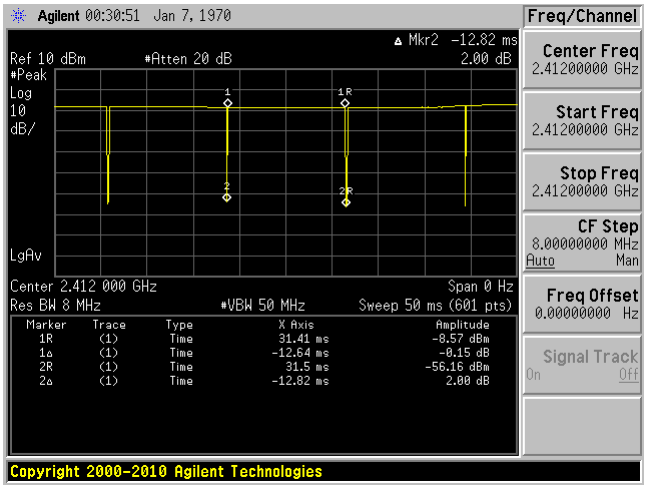
Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be utilized to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data is being acquired (i.e., no transmitter off-time is to be considered).

Radio Mode	Total On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11b	12.64	12.82	98.59	0.0614
802.11g	2.088	2.211	94.37	0.2486
802.11n20	5.388	5.662	95.16	0.2154
BLE	1	1	100	0

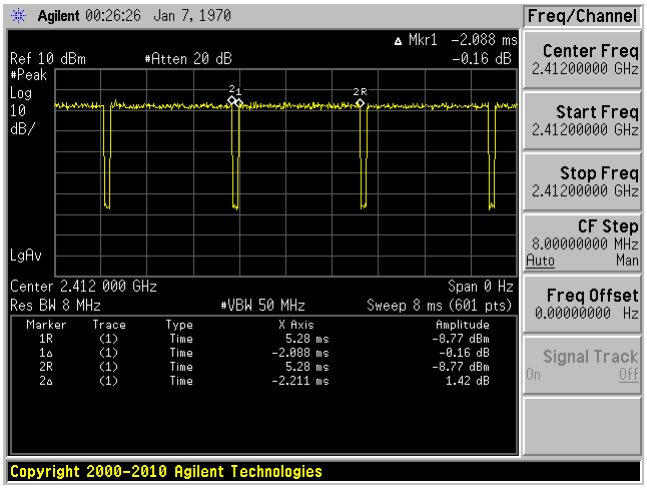
Duty Cycle = On Time (ms)/ Period (ms)
Duty Cycle Correction Factor (dB) = 10*log(1/Duty Cycle)

Please refer to the following plots.

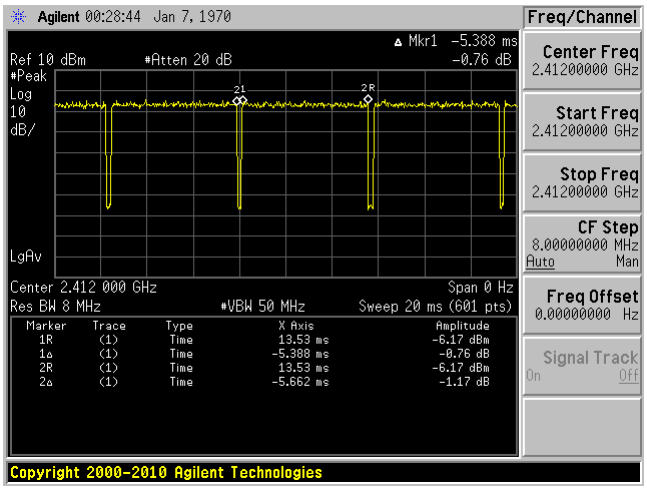
802.11b mode



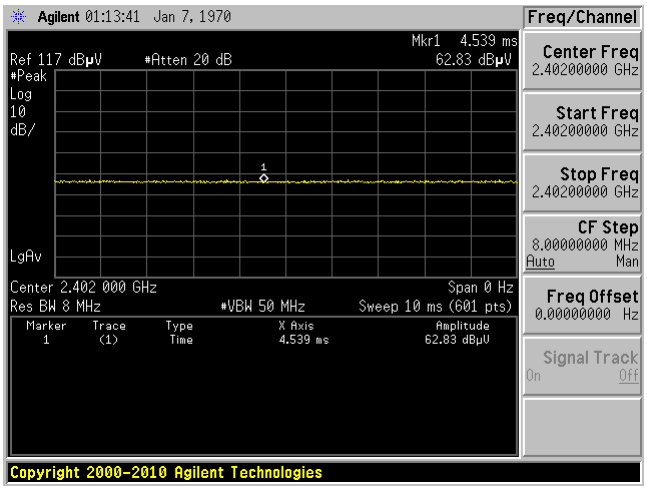
802.11g mode



802.11n20 Mode



BLE



2.4 Equipment Modifications

No equipment modifications are made to the EUT

2.5 Local Support Equipment

Manufacturer	Description	Model	Serial Number
Dell	Laptop	Latitude E6410	3CKRAQ1

2.6 Support Equipment

Manufacturer	Description	Model
Cisco	Power supply	AIR-PWRINJ6 V01

2.7 Interface Ports and Cabling

Cable Description	Length	To	From
Ethernet cable	2 m	PoE	EUT
Ethernet-serial-USB cable	2 m	EUT	Laptop

3 Summary of Test Results

Results reported relate only to the product tested.

FCC and ISEDC Rules	Description of Test	Results
FCC §15.203, §15.247 ISEDC RSS-Gen §6.8	Antenna Requirement	Compliant
FCC §15.207 ISEDC RSS-Gen §8.8	AC Line Conducted Emissions	Compliant
FCC §2.1053, §15.35(b), §15.205, §15.209, §15.247 (d) ISEDC RSS-247 §5.5 ISEDC RSS-Gen §8.9 and §8.10	Radiated Spurious Emissions	Compliant

4 FCC §15.203 & ISEDC RSS-Gen §6.8 - Antenna Requirements

4.1 Applicable Standards

According to FCC §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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to ISEDC RSS-Gen §6.8: Transmitter Antenna

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

4.2 Antenna Description

Antenna usage	Band of Operation (MHz)	Maximum Antenna Gain (dBi)
Wi-Fi	2400-2500	4
BLE	2400-2500	3.5

5 FCC §15.207 & ISEDC RSS-Gen §8.8 - AC Line Conducted Emissions

5.1 Applicable Standards

As per FCC §15.207 and ISEDC RSS-Gen §8.8 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note1	56 to 46 Note2
0.5-5	56	46
5-30	60	50

Note1: Decreases with the logarithm of the frequency.
Note2: A linear average detector is required

5.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.10-2013 measurement procedure. The specification used were FCC §15.207 and ISEDC RSS-Gen §8.8 limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

5.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cords of support equipment were connected to LISN-2.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data were recorded in the peak, quasi-peak, and average detection mode. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

5.4 Corrected Amplitude and Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

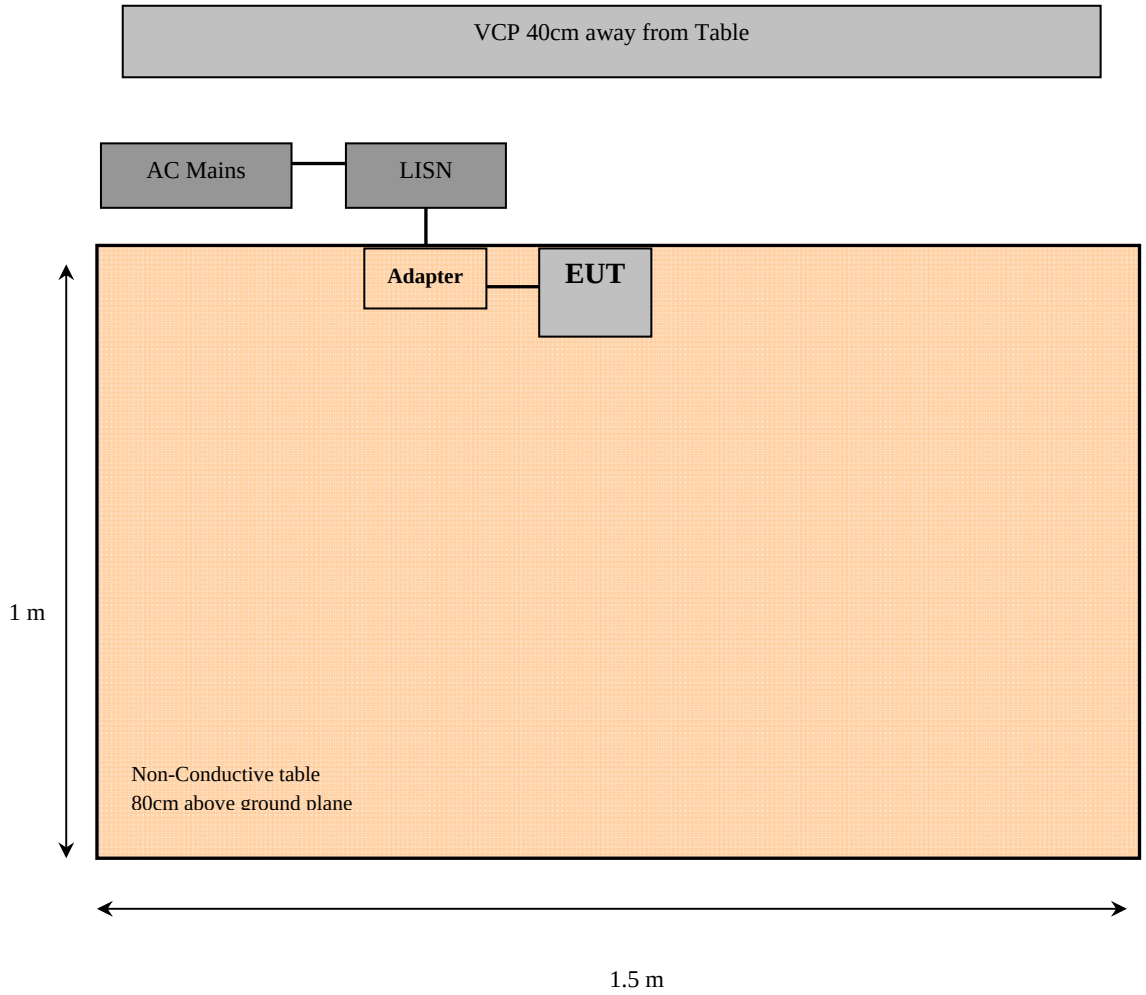
CA = Ai + CL + Atten

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.7 dB) + Attenuator (10 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude – Limit

5.5 Test Setup Block Diagram



5.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950.03	100338	2018-07-05	2 years
Rohde & Schwarz	Impulse Limiter	ESH3-Z2	101964	2018-07-27	1 year
Solar Electronics Company	High Pass Filter	Type 7930-100	7930150203	2018-02-28	1 year
Suirong	30 ft conductive emission cable	LMR 400	-	N/R	N/A
FCC	LISN	FCC-LISN-50-25-2-10-CISPR16	160129	2018-04-04	1 year
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950.03	100338	2018-07-05	2 years

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

5.7 Test Environmental Conditions

Temperature:	24º C
Relative Humidity:	30 %
ATM Pressure:	102.1 kPa

The testing was performed by Zhao Zhao on 2018-12-07 in 5 meter chamber 3.

5.8 Summary of Test Results

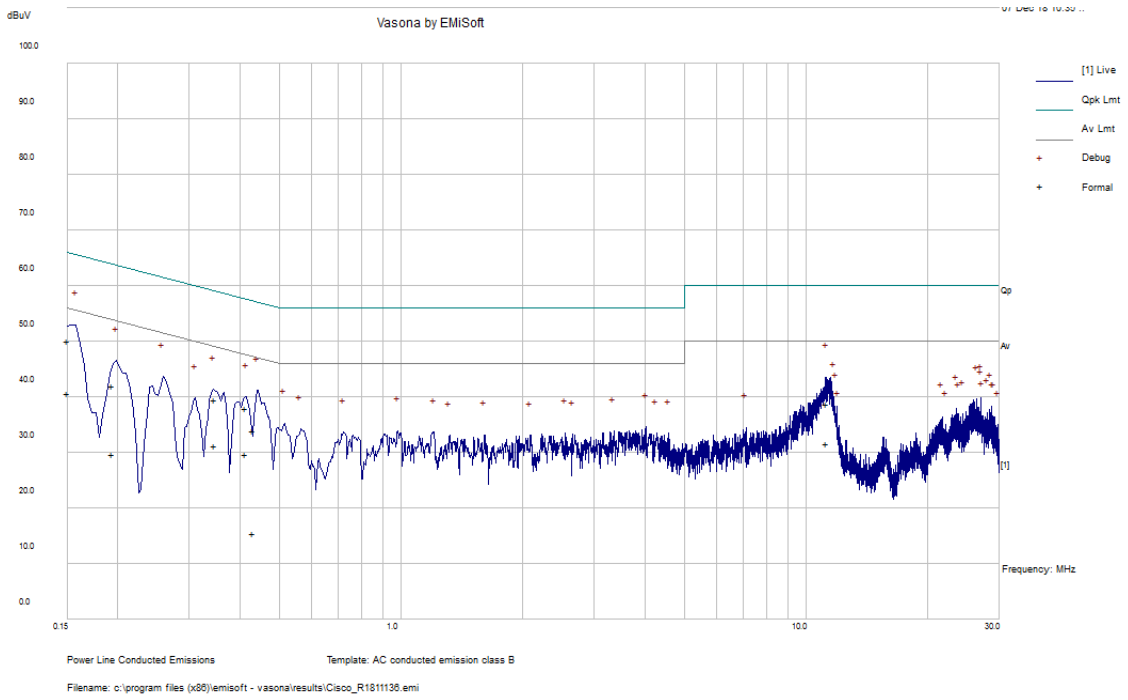
According to the recorded data in following table, the EUT complied with the FCC 15C and ISEDC RSS-Gen standard's conducted emissions limits, with the margin reading of:

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-15.17	0.150731	Line	0.15-30

5.9 Conducted Emissions Test Plots and Data

Worst Case Colocation, 2.4 GHz BLE, 2.4 GHz Wi-Fi CCK mode and 5 GHz Wi-Fi HT/VHT20 mode

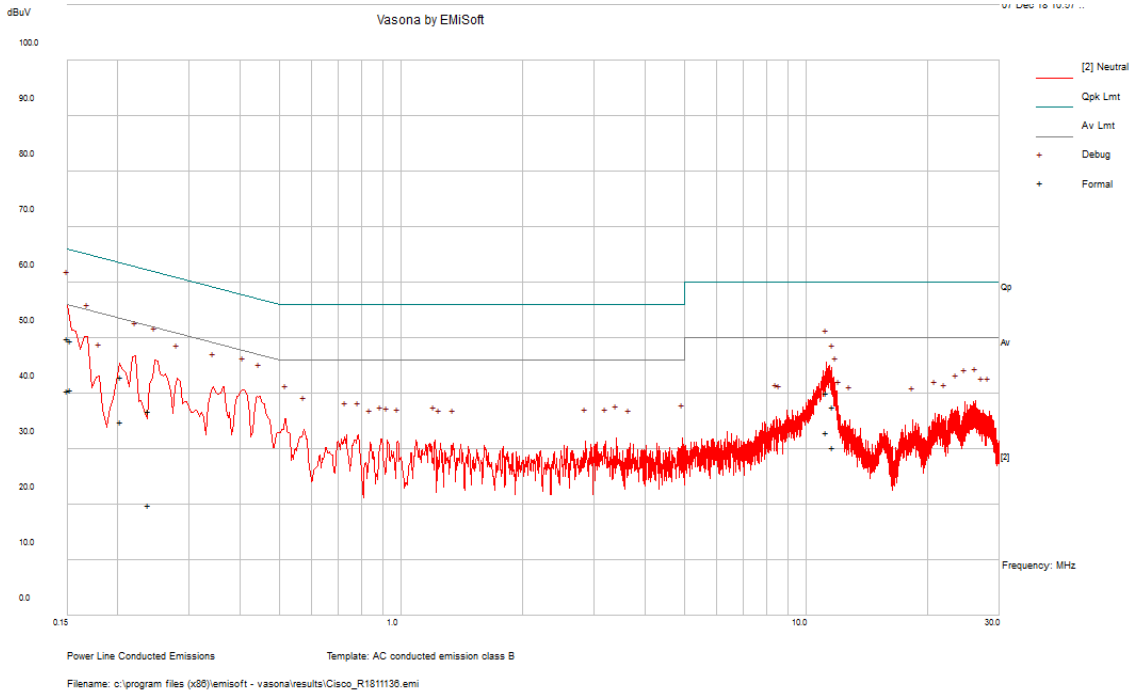
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150731	50.16	Line	65.96	-15.8	QP
0.430779	33.89	Line	57.24	-23.35	QP
11.21	38.73	Line	60	-21.27	QP
0.194118	42.02	Line	63.86	-21.84	QP
0.412561	38.07	Line	57.6	-19.53	QP
0.347224	39.64	Line	59.03	-19.39	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150731	40.79	Line	55.96	-15.17	Ave.
0.430779	15.46	Line	47.24	-31.78	Ave.
11.21	31.73	Line	50	-18.27	Ave.
0.194118	29.7	Line	53.86	-24.16	Ave.
0.412561	29.73	Line	47.6	-17.87	Ave.
0.347224	31.21	Line	49.03	-17.82	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150288	49.98	Neutral	65.98	-16.01	QP
11.211363	40.06	Neutral	60	-19.94	QP
0.153142	49.56	Neutral	65.83	-16.27	QP
0.238721	36.95	Neutral	62.14	-25.19	QP
0.203223	43.07	Neutral	63.48	-20.41	QP
11.666763	37.56	Neutral	60	-22.44	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150288	40.44	Neutral	55.98	-15.54	Ave.
11.211363	33.08	Neutral	50	-16.92	Ave.
0.153142	40.77	Neutral	55.83	-15.06	Ave.
0.238721	19.85	Neutral	52.14	-32.29	Ave.
0.203223	34.91	Neutral	53.48	-18.57	Ave.
11.666763	30.42	Neutral	50	-19.58	Ave.

6 FCC §15.209, §15.247(d) & ISEDC RSS-247 §5.5, RSS-Gen §8.9, §8.10 - Spurious Radiated Emissions

6.1 Applicable Standards

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3.332 – 3.339 3 3458 – 3 358 3.600 – 4.400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz.

However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.
As per FCC §15.247 (d), 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

6.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.10-2013. The specification used was the FCC 15 Subpart C limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

6.3 Test Procedure

The EUT host, and all support equipment power cords were connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

For radiated testing the EUT was set 3 meter away from the testing antenna, which was varied from 1-4 meter, and the EUT was placed on a turntable, which was 0.8 meter and 1.5 meter above the ground plane for below and above 1000 MHz measurements, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna's polarity should be changed between horizontal and vertical.

The spectrum analyzer or receiver was set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 3MHz / Sweep = 100 ms
(2) Average: RBW = 1MHz / VBW = 3MHz / Sweep = Auto

6.4 Corrected Amplitude and Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

6.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde and Schwarz	Receiver, EMI Test	ESCI 1166.5950.03	100338	2018-07-05	2 years
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2018-05-08	1 year
Sunol Sciences	System Controller	SC99V	011003-1	N/R	N/A
Sunol Sciences	Antenna, Biconi-Log	JB1	A013105-3	2018-02-26	2 years
Wisewave	Antenna, Horn	ARH-4223-02	10555-01	2018-02-14	2 years
Wisewave	Antenna, Horn	ARH-4223-02	10555-02	2018-02-14	2 years
Agilent	Amplifier, Pre	8447D	2944A10187	2018-04-02	1 year
Insulated Wire INC	2.92mm (M) X2, 1501 Armor Neoprene, 396	KPS-1501AN-3960-KPS	DC 1807	2018-03-13	1 year
-	SMA cable	-	C00011	Each time[1]	N/A
-	N-Type Cable	-	C00012	Each time[1]	N/A
-	N-Type Cable	-	C00014	Each time[1]	N/A
HP	Pre-Amplifier	8449B	3147A00400	2018-02-02	1 year
Sunol Sciences	Antenna, Horn	DRH-118	A052704	2017-03-27	2 years
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
***Statement of Traceability*:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 9 June 2016) "A2LA Policy on Metrological Traceability".

6.6 Test Environmental Conditions

Temperature:	22-25 ºC
Relative Humidity:	29-30 %
ATM Pressure:	102.1 kPa

The testing was performed by Zhao Zhao from 2018-11-21 in 5m chamber 3.

6.7 Summary of Test Results

According to the data hereinafter, the EUT complied with FCC Title 47, Part 15C standard's radiated emissions limits, and had the worst margin of:

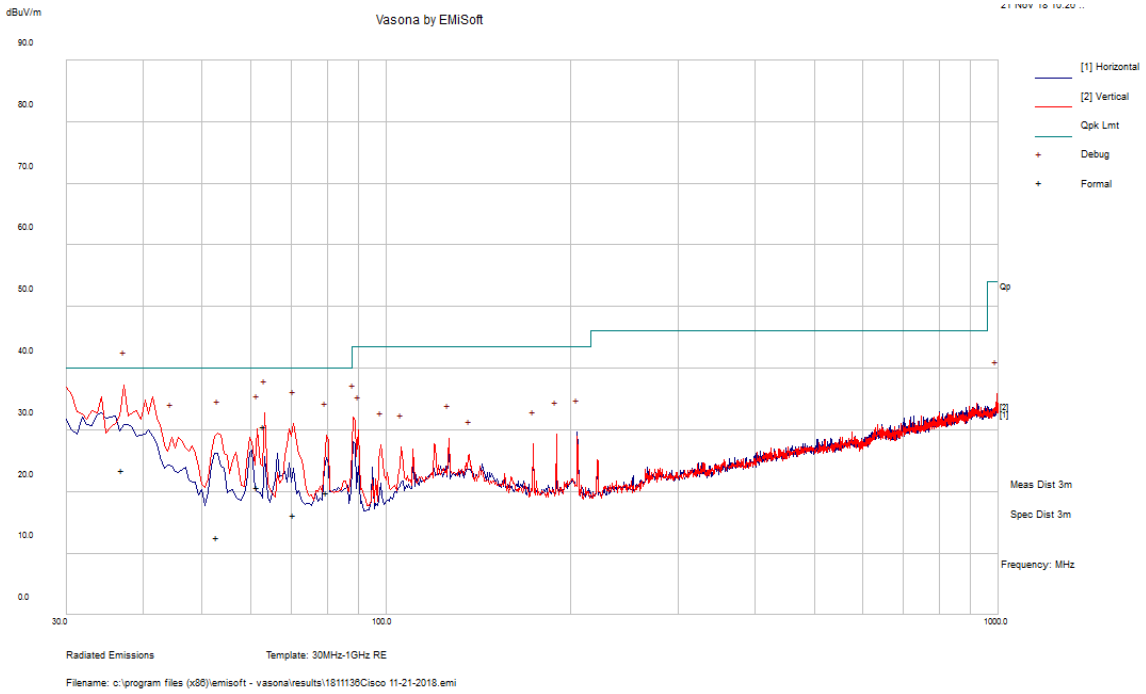
Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, channel**
-3.59	11825.1	Vertical	2412 MHz, n20 Mode

Please refer to the following table and plots for specific test result details

6.8 Spurious Emissions Test Results

1) 30 MHz – 1 GHz Worst Case, Measured at 3 meters

Worst Case Colocation, 2.4 GHz BLE, 2.4 GHz Wi-Fi CCK mode and 5 GHz Wi-Fi HT/VHT20 mode



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
37.0713	23.45	208	V	260	40	-16.55	Pass
63.1977	30.63	125	V	357	40	-9.37	Pass
70.4447	16.29	153	V	314	40	-23.71	Pass
61.5941	20.71	129	V	358	40	-19.29	Pass
52.9417	12.65	200	V	305	40	-27.35	Pass
79.9603	19.81	100	V	302	40	-20.19	Pass

Note: Only chosen the worst 6 Emissions were tested in formal scan because all other emissions were 20 dB below the limit.

2) 1 GHz-10 GHz, measured at 3 meters

Wi-Fi

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISED		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz CCK mode power setting: 17											
1105	47.45	87	266	H	24.36	3.91	37.52	38.20	74	-35.80	PK
1036.3	41.28	87	266	H	24.36	3.91	37.52	32.03	54	-21.97	AV
1051	48.95	102	258	V	24.05	3.91	37.52	39.39	74	-34.61	PK
1031.5	41.07	102	258	V	24.05	3.91	37.52	31.51	54	-22.49	AV
2202	47.71	87	266	H	28.02	5.39	36.26	44.87	74	-29.13	PK
2200.1	40.30	87	266	H	28.02	5.39	36.26	37.46	54	-16.54	AV
2202	48.05	102	258	V	27.90	5.39	36.26	45.08	74	-28.92	PK
2200.1	40.08	102	258	V	27.90	5.39	36.26	37.11	54	-16.89	AV
Middle Channel 2437 MHz CCK mode power setting: 17											
1060	49.14	25	273	H	24.36	3.91	37.52	39.89	74	-34.11	PK
1060	41.59	25	273	H	24.36	3.91	37.52	32.34	54	-21.66	AV
1060	48.88	65	273	V	24.05	3.91	37.52	39.32	74	-34.68	PK
1060	41.47	65	273	V	24.05	3.91	37.52	31.91	54	-22.09	AV
2187	47.90	25	273	H	28.02	5.39	36.26	45.06	74	-28.94	PK
2185.1	41.49	25	273	H	28.02	5.39	36.26	38.65	54	-15.35	AV
2187	47.42	65	273	V	27.90	5.39	36.26	44.45	74	-29.55	PK
2185.1	41.54	65	273	V	27.90	5.39	36.26	38.57	54	-15.43	AV
High Channel 2462 MHz CCK mode power setting: 17											
1060	49.22	17	273	H	24.36	3.91	37.52	39.97	74	-34.03	PK
1059.9	41.02	17	273	H	24.36	3.91	37.52	31.77	54	-22.23	AV
1060	49.24	64	273	V	24.05	3.91	37.52	39.68	74	-34.32	PK
1059.9	41.12	64	273	V	24.05	3.91	37.52	31.56	54	-22.44	AV
2187	49.50	17	273	H	28.02	5.39	36.26	46.66	74	-27.34	PK
2185.1	41.34	17	273	H	28.02	5.39	36.26	38.50	54	-15.50	AV
2187	47.95	64	273	V	27.90	5.39	36.26	44.98	74	-29.02	PK
2185.1	41.58	64	273	V	27.90	5.39	36.26	38.61	54	-15.39	AV

Please refer to the Appendix A to Appendix C for plots

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISED		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz non-HT20 mode power setting: 17											
1000	48.07	87	266	H	24.36	3.91	37.52	38.82	74	-35.18	PK
1000	44.74	87	266	H	24.36	3.91	37.52	35.49	54	-18.51	AV
1000	48.45	102	258	V	24.05	3.91	37.52	38.89	74	-35.11	PK
1000	44.92	102	258	V	24.05	3.91	37.52	35.36	54	-18.64	AV
2202	48.08	87	266	H	28.02	5.39	36.26	45.24	74	-28.76	PK
2185.4	44.22	87	266	H	28.02	5.39	36.26	41.38	54	-12.62	AV
2187	47.97	102	258	V	27.90	5.39	36.26	45.00	74	-29.00	PK
2185.4	44.06	102	258	V	27.90	5.39	36.26	41.09	54	-12.91	AV
Mid Channel 2437 MHz non-HT20 mode power setting: 17											
1000	48.65	25	273	H	24.36	3.91	37.52	39.40	74	-34.60	PK
1000	44.97	25	273	H	24.36	3.91	37.52	35.72	54	-18.28	AV
1000	49.83	65	273	V	24.05	3.91	37.52	40.27	74	-33.73	PK
1000	44.47	65	273	V	24.05	3.91	37.52	34.91	54	-19.09	AV
2170	46.55	25	273	H	28.02	5.39	36.26	43.71	74	-30.29	PK
2192.4	43.58	25	273	H	28.02	5.39	36.26	40.74	54	-13.26	AV
2170.4	48.02	65	273	V	27.90	5.39	36.26	45.05	74	-28.95	PK
2170.4	43.53	65	273	V	27.90	5.39	36.26	40.56	54	-13.44	AV
High Channel 2462 MHz non-HT20 mode power setting: 17											
1000	49.08	17	273	H	24.36	3.91	37.52	39.83	74	-34.17	PK
1000	44.87	17	273	H	24.36	3.91	37.52	35.62	54	-18.38	AV
1000	51.07	64	273	V	24.05	3.91	37.52	41.51	74	-32.49	PK
1000	45.07	64	273	V	24.05	3.91	37.52	35.51	54	-18.49	AV
2170	47.78	17	273	H	28.02	5.39	36.26	44.94	74	-29.06	PK
2183.2	44.06	17	273	H	28.02	5.39	36.26	41.22	54	-12.78	AV
2185	49.92	64	273	V	27.90	5.39	36.26	46.95	74	-27.05	PK
2183.2	44.06	64	273	V	27.90	5.39	36.26	41.09	54	-12.91	AV

Please refer to the Appendix A to Appendix C for plots

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISED		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz HT20 mode power setting: 17											
1000	48.60	87	266	H	24.36	3.91	37.52	39.35	74	-34.65	PK
1000	44.71	87	266	H	24.36	3.91	37.52	35.46	54	-18.54	AV
1000	49.00	102	258	V	24.05	3.91	37.52	39.44	74	-34.56	PK
1000	44.62	102	258	V	24.05	3.91	37.52	35.06	54	-18.94	AV
2202	46.42	87	266	H	28.02	5.39	36.26	43.58	74	-30.42	PK
2185.4	43.72	87	266	H	28.02	5.39	36.26	40.88	54	-13.12	AV
2202	47.64	102	258	V	27.90	5.39	36.26	44.67	74	-29.33	PK
2185.4	43.69	102	258	V	27.90	5.39	36.26	40.72	54	-13.28	AV
Mid Channel 2437 MHz HT20 mode power setting: 17											
1000	49.00	25	273	H	24.36	3.91	37.52	39.75	74	-34.25	PK
1000	45.02	25	273	H	24.36	3.91	37.52	35.77	54	-18.23	AV
1000	50.13	65	273	V	24.05	3.91	37.52	40.57	74	-33.43	PK
1000	44.36	65	273	V	24.05	3.91	37.52	34.80	54	-19.20	AV
2170	48.39	25	273	H	28.02	5.39	36.26	45.55	74	-28.45	PK
2192.4	43.90	25	273	H	28.02	5.39	36.26	41.06	54	-12.94	AV
2187	47.49	65	273	V	27.90	5.39	36.26	44.52	74	-29.48	PK
2195.7	42.84	65	273	V	27.90	5.39	36.26	39.87	54	-14.13	AV
High Channel 2462 MHz HT20 mode power setting: 17											
1000	48.81	17	273	H	24.36	3.91	37.52	39.56	74	-34.44	PK
1000	44.90	17	273	H	24.36	3.91	37.52	35.65	54	-18.35	AV
1000	48.89	64	273	V	24.05	3.91	37.52	39.33	74	-34.67	PK
1000	45.09	64	273	V	24.05	3.91	37.52	35.53	54	-18.47	AV
2170	47.67	17	273	H	28.02	5.39	36.26	44.83	74	-29.17	PK
2183.2	44.00	17	273	H	28.02	5.39	36.26	41.16	54	-12.84	AV
2202	48.39	64	273	V	27.90	5.39	36.26	45.42	74	-28.58	PK
2183.2	44.08	64	273	V	27.90	5.39	36.26	41.11	54	-12.89	AV

Please refer to the Appendix A to Appendix C for plots

BLE

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISED		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz power setting: default											
1030	49.56	148	113	H	24.36	3.91	37.52	40.31	74	-33.69	PK
1044	44.65	148	113	H	24.36	3.91	37.52	35.40	54	-18.60	AV
1030	49.44	143	235	V	24.05	3.91	37.52	39.88	74	-34.12	PK
1033	44.56	143	235	V	24.05	3.91	37.52	35.00	54	-19.00	AV
2185	48.73	148	113	H	28.02	5.39	36.26	45.89	74	-28.11	PK
2176.6	43.32	148	113	H	28.02	5.39	36.26	40.48	54	-13.52	AV
2182	48.61	143	235	V	27.90	5.39	36.26	45.64	74	-28.36	PK
2180.1	43.49	143	235	V	27.90	5.39	36.26	40.52	54	-13.48	AV
Middle Channel 2440 MHz power setting: default											
1000	49.73	123	274	H	24.36	3.91	37.52	40.48	74	-33.52	PK
10440	44.60	123	274	H	24.36	3.91	37.52	35.35	54	-18.65	AV
1030	48.08	155	225	V	24.05	3.91	37.52	38.52	74	-35.48	PK
1033	44.63	155	225	V	24.05	3.91	37.52	35.07	54	-18.93	AV
2080	47.50	123	274	H	28.02	5.39	36.26	44.66	74	-29.34	PK
2181.6	43.78	123	274	H	28.02	5.39	36.26	40.94	54	-13.06	AV
2172	48.54	155	225	V	27.90	5.39	36.26	45.57	74	-28.43	PK
2184.9	43.43	155	225	V	27.90	5.39	36.26	40.46	54	-13.54	AV
High Channel 2480 MHz power setting: default											
1030	49.61	146	283	H	24.36	3.91	37.52	40.36	74	-33.64	PK
1034.1	44.69	146	283	H	24.36	3.91	37.52	35.44	54	-18.56	AV
1045	49.30	153	236	V	24.05	3.91	37.52	39.74	74	-34.26	PK
10330	44.61	153	236	V	24.05	3.91	37.52	35.05	54	-18.95	AV
2172	48.01	146	283	H	28.02	5.39	36.26	45.17	74	-28.83	PK
2177.6	43.29	146	283	H	28.02	5.39	36.26	40.45	54	-13.55	AV
2167	48.38	153	236	V	27.90	5.39	36.26	45.41	74	-28.59	PK
2179.8	43.39	153	236	V	27.90	5.39	36.26	40.42	54	-13.58	AV

Please refer to the Appendix D to Appendix F for plots

3) 10 GHz-18 GHz, measured at 1 meter

Wi-Fi

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISED		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz CCK mode power setting: 17											
10220	44.57	90	162	H	38.60	14.18	35.36	61.99	84	-22.01	PK
10440.5	39.03	90	162	H	38.60	14.18	35.36	56.45	64	-7.55	AV
10107	43.80	106	213	V	38.56	14.18	35.36	61.18	84	-22.82	PK
10439.5	37.53	106	213	V	38.56	14.18	35.36	54.91	64	-9.09	AV
11880	43.91	90	162	H	38.80	14.94	34.65	63.00	84	-21.00	PK
11079.2	36.85	90	162	H	38.80	14.94	34.65	55.94	64	-8.06	AV
10867	44.19	106	213	V	38.79	14.94	34.65	63.27	84	-20.73	PK
11076.3	37.05	106	213	V	38.79	14.94	34.65	56.13	64	-7.87	AV
Middle Channel 2437 MHz CCK mode power setting: 17											
10120	44.17	23	273	H	38.60	14.18	35.36	61.59	84	-22.41	PK
10316.4	37.44	23	273	H	38.60	14.18	35.36	54.86	64	-9.14	AV
10093	44.64	8	194	V	38.56	14.18	35.36	62.02	84	-21.98	PK
10105.5	38.40	8	194	V	38.56	14.18	35.36	55.78	64	-8.22	AV
11060	42.82	23	273	H	38.80	14.94	34.65	61.91	84	-22.09	PK
11139.6	36.64	23	273	H	38.80	14.94	34.65	55.73	64	-8.27	AV
11025	43.40	8	194	V	38.79	14.94	34.65	62.48	84	-21.52	PK
11355.6	36.09	8	194	V	38.79	14.94	34.65	55.17	64	-8.83	AV
High Channel 2462 MHz CCK mode power setting: 17											
10240	43.99	60	166	H	38.60	14.18	35.36	61.41	84	-22.59	PK
10094.7	38.38	60	166	H	38.60	14.18	35.36	55.80	64	-8.20	AV
10240	43.25	8	181	V	38.56	14.18	35.36	60.63	84	-23.37	PK
10354.5	37.58	8	181	V	38.56	14.18	35.36	54.96	64	-9.04	AV
10987	43.52	60	166	H	38.80	14.94	34.65	62.61	84	-21.39	PK
11098.8	36.92	60	166	H	38.80	14.94	34.65	56.01	64	-7.99	AV
11052	42.86	8	181	V	38.79	14.94	34.65	61.94	84	-22.06	PK
11050.7	37.23	8	181	V	38.79	14.94	34.65	56.31	64	-7.69	AV

Please refer to the Appendix A to Appendix C for plots

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISED		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz non-HT20 mode power setting: 17											
10427	43.67	90	162	H	38.60	14.18	35.36	61.09	84	-22.91	PK
10187.5	38.87	90	162	H	38.60	14.18	35.36	56.29	64	-7.71	AV
10227	43.46	106	213	V	38.56	14.18	35.36	60.84	84	-23.16	PK
10178.7	39.14	106	213	V	38.56	14.18	35.36	56.52	64	-7.48	AV
11027	42.57	90	162	H	39.67	16.74	33.67	65.31	84	-18.69	PK
11842.6	37.79	90	162	H	39.67	16.74	33.67	60.53	64	-3.47	AV
11853	42.54	106	213	V	39.71	16.74	33.67	65.32	84	-18.69	PK
10998.8	37.35	106	213	V	39.71	16.74	33.67	60.13	64	-3.87	AV
Mid Channel 2437 MHz non-HT20 mode power setting: 17											
10133	43.21	23	273	H	38.60	14.18	35.36	60.63	84	-23.37	PK
10188.5	38.95	23	273	H	38.60	14.18	35.36	56.37	64	-7.63	AV
10080	43.14	8	194	V	38.56	14.18	35.36	60.52	84	-23.48	PK
10193.4	38.94	8	194	V	38.56	14.18	35.36	56.32	64	-7.68	AV
11869	41.96	23	273	H	39.67	16.74	33.67	64.70	84	-19.30	PK
11851.4	37.80	23	273	H	39.67	16.74	33.67	60.54	64	-3.46	AV
11575	41.61	8	194	V	39.71	16.74	33.67	64.39	84	-19.62	PK
11864.1	37.60	8	194	V	39.71	16.74	33.67	60.38	64	-3.62	AV
High Channel 2462 MHz non-HT20 mode power setting: 17											
10080	43.63	60	166	H	38.60	14.18	35.36	61.05	84	-22.95	PK
10184.6	38.76	60	166	H	38.60	14.18	35.36	56.18	64	-7.82	AV
10133	44.11	8	181	V	38.56	14.18	35.36	61.49	84	-22.51	PK
10121.1	38.70	8	181	V	38.56	14.18	35.36	56.08	64	-7.92	AV
11829	42.47	60	166	H	39.67	16.74	33.67	65.21	84	-18.79	PK
1185.2.4	37.54	60	166	H	39.67	16.74	33.67	60.28	64	-3.72	AV
10840	42.04	8	181	V	39.71	16.74	33.67	64.82	84	-19.19	PK
11849.5	37.64	8	181	V	39.71	16.74	33.67	60.42	64	-3.59	AV

Please refer to the Appendix A to Appendix C for plots

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISED		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz HT20 mode power setting: 17											
10307	43.94	90	162	H	38.60	14.18	35.36	61.36	84	-22.64	PK
10119.2	39.02	90	162	H	38.60	14.18	35.36	56.44	64	-7.56	AV
10080	43.62	106	213	V	38.56	14.18	35.36	61.00	84	-23.00	PK
10228.5	38.97	106	213	V	38.56	14.18	35.36	56.35	64	-7.65	AV
11840	42.65	90	162	H	39.67	16.74	33.67	65.39	84	-18.61	PK
12628.9	37.13	90	162	H	39.67	16.74	33.67	59.87	64	-4.13	AV
12320	41.59	106	213	V	39.71	16.74	33.67	64.37	84	-19.64	PK
11825.1	37.64	106	213	V	39.71	16.74	33.67	60.42	64	-3.59	AV
Mid Channel 2437 MHz HT20 mode power setting: 17											
10240	42.90	23	273	H	38.60	14.18	35.36	60.32	84	-23.68	PK
10188.5	38.78	23	273	H	38.60	14.18	35.36	56.20	64	-7.80	AV
10080	43.53	8	194	V	38.56	14.18	35.36	60.91	84	-23.09	PK
10193.4	39.11	8	194	V	38.56	14.18	35.36	56.49	64	-7.51	AV
12389	41.05	23	273	H	39.67	16.74	33.67	63.79	84	-20.21	PK
12523.4	36.69	23	273	H	39.67	16.74	33.67	59.43	64	-4.57	AV
12322	41.77	8	194	V	39.71	16.74	33.67	64.55	84	-19.46	PK
12535.1	37.13	8	194	V	39.71	16.74	33.67	59.91	64	-4.09	AV
High Channel 2462 MHz HT20 mode power setting: 17											
10107	43.03	60	166	H	38.60	14.18	35.36	60.45	84	-23.55	PK
10226.6	38.81	60	166	H	38.60	14.18	35.36	56.23	64	-7.77	AV
10133	43.20	8	181	V	38.56	14.18	35.36	60.58	84	-23.42	PK
10185.6	38.67	8	181	V	38.56	14.18	35.36	56.05	64	-7.95	AV
12469	41.34	60	166	H	39.67	16.74	33.67	64.08	84	-19.92	PK
12535.1	36.65	60	166	H	39.67	16.74	33.67	59.39	64	-4.61	AV
11867	42.44	8	181	V	39.71	16.74	33.67	65.22	84	-18.79	PK
12643.5	37.02	8	181	V	39.71	16.74	33.67	59.80	64	-4.21	AV

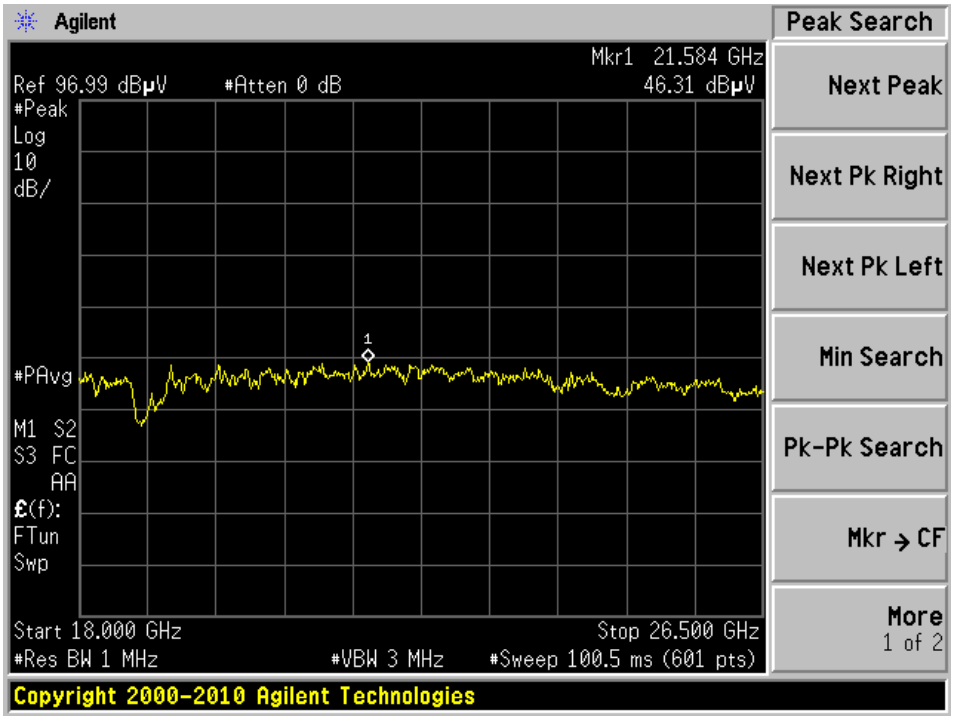
Please refer to the Annex A to Annex C for plots

BLE

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISED		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz power setting: default											
10093	43.67	151	182	H	38.60	14.18	35.36	61.09	84	-22.91	PK
10117.2	38.23	151	182	H	38.60	14.18	35.36	55.65	64	-8.35	AV
10133	43.10	175	204	V	38.56	14.18	35.36	60.48	84	-23.52	PK
10440.5	39.11	175	204	V	38.56	14.18	35.36	56.49	64	-7.51	AV
11104	42.81	151	182	H	38.80	14.94	34.65	61.90	84	-22.10	PK
11106.9	36.94	151	182	H	38.80	14.94	34.65	56.03	64	-7.97	AV
11118	41.27	175	204	V	38.79	14.94	34.65	60.35	84	-23.65	PK
11103	36.74	175	204	V	38.79	14.94	34.65	55.82	64	-8.18	AV
Middle Channel 2440 MHz power setting: default											
10133	43.42	270	232	H	38.60	14.18	35.36	60.84	84	-23.16	PK
10134.8	38.40	270	232	H	38.60	14.18	35.36	55.82	64	-8.18	AV
10440	43.42	190	204	V	38.56	14.18	35.36	60.80	84	-23.20	PK
10439.5	39.83	190	204	V	38.56	14.18	35.36	57.21	64	-6.79	AV
11096	41.69	270	232	H	38.80	14.94	34.65	60.78	84	-23.22	PK
11094.7	36.73	270	232	H	38.80	14.94	34.65	55.82	64	-8.18	AV
10905	42.30	190	204	V	38.79	14.94	34.65	61.38	84	-22.62	PK
11077.1	36.66	190	204	V	38.79	14.94	34.65	55.74	64	-8.26	AV
High Channel 2480 MHz power setting: default											
10173	43.21	96	226	H	38.60	14.18	35.36	60.63	84	-23.37	PK
10180.7	38.38	96	226	H	38.60	14.18	35.36	55.80	64	-8.20	AV
10120	43.94	341	206	V	38.56	14.18	35.36	61.32	84	-22.68	PK
10118.2	38.31	341	206	V	38.56	14.18	35.36	55.69	64	-8.31	AV
11043	41.52	96	226	H	38.80	14.94	34.65	60.61	84	-23.39	PK
11094.2	36.47	96	226	H	38.80	14.94	34.65	55.56	64	-8.44	AV
10969	41.71	341	206	V	38.79	14.94	34.65	60.79	84	-23.21	PK
11101	36.95	341	206	V	38.79	14.94	34.65	56.03	64	-7.97	AV

Please refer to the Annex D to Annex F for plots

4) 18 GHz-26.5 GHz, measured at 1 meter



No emission seen above 18GHz, the plot above represents worst case for all modes tested.

Test Plots

Please refer to attachments from Appendix A to Appendix F

Appendix G – Test Setup Photographs

Please refer to the attachment

Appendix H – EUT External Photographs

Please refer to the attachment

Appendix I – EUT Internal Photographs

Please refer to the attachment

Appendix J (Normative) - ISO/IEC 17025 Certificate and Scope of Accreditation

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets A2LA R222 - *Specific Requirements EPA ENERGY STAR Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 2nd day of October 2018.

President and CEO
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2020

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

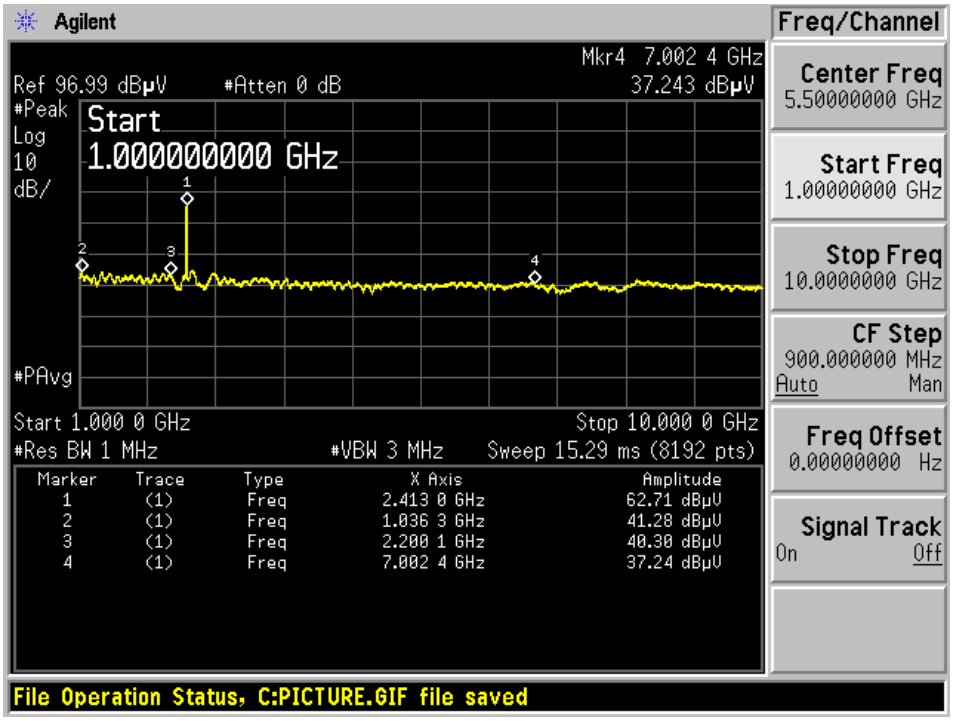
Please follow the web link below for a full ISO 17025 scope

https://www.a2la.org/scopepdf/3297-02.pdf

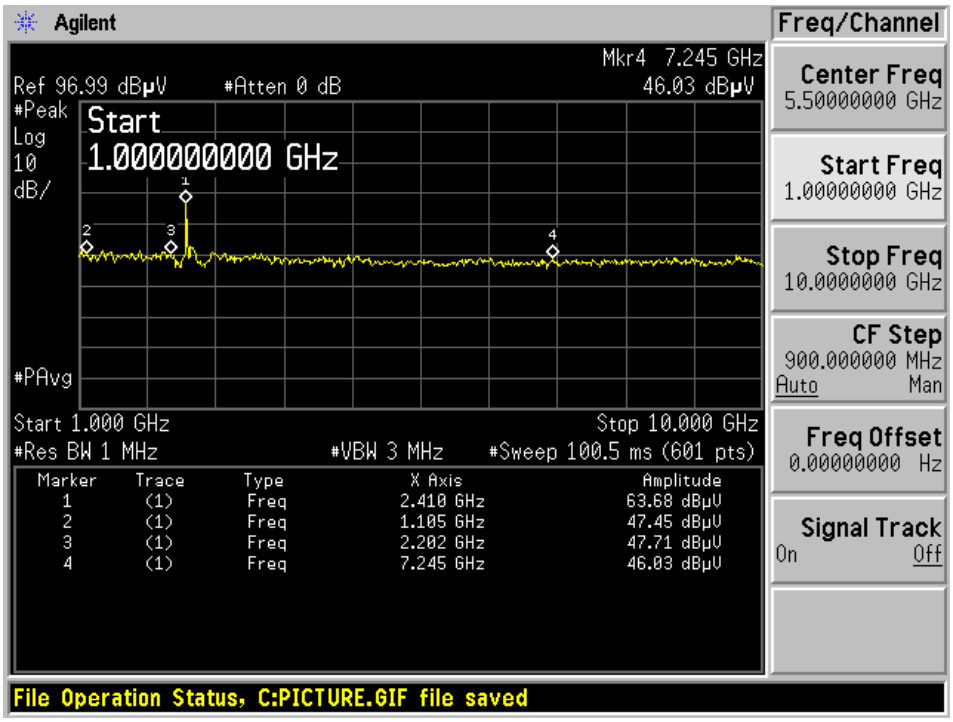
--- END OF REPORT ---

Appendix A Wi-Fi 2412 MHz

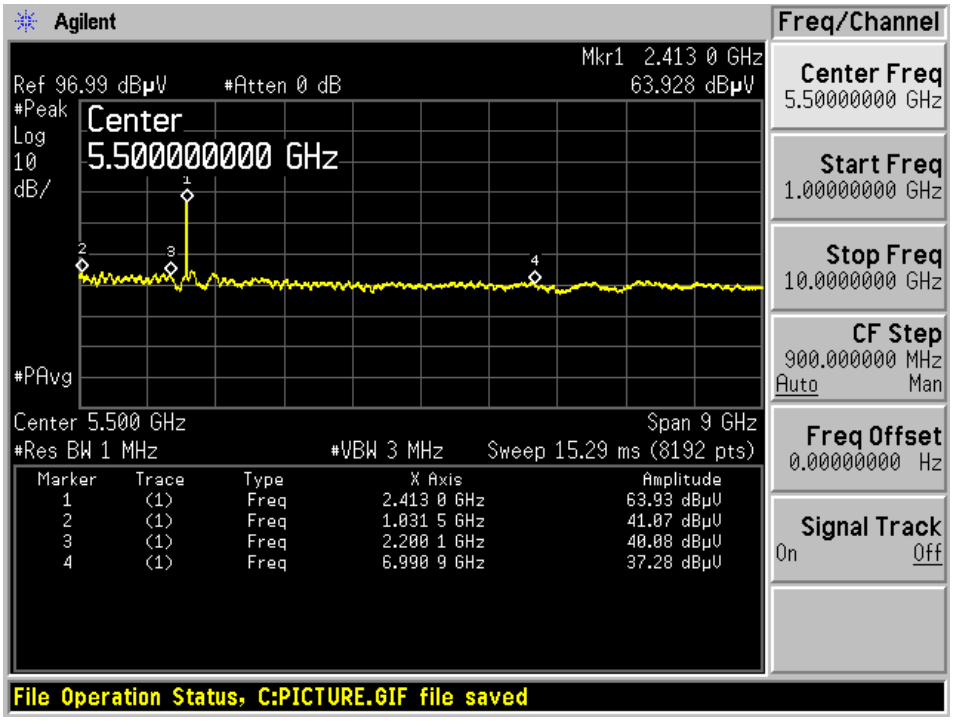
CCK 1-10GHz-H-AV



CCK 1-10GHz-H-PK



CCK 1-10GHz-V-AV



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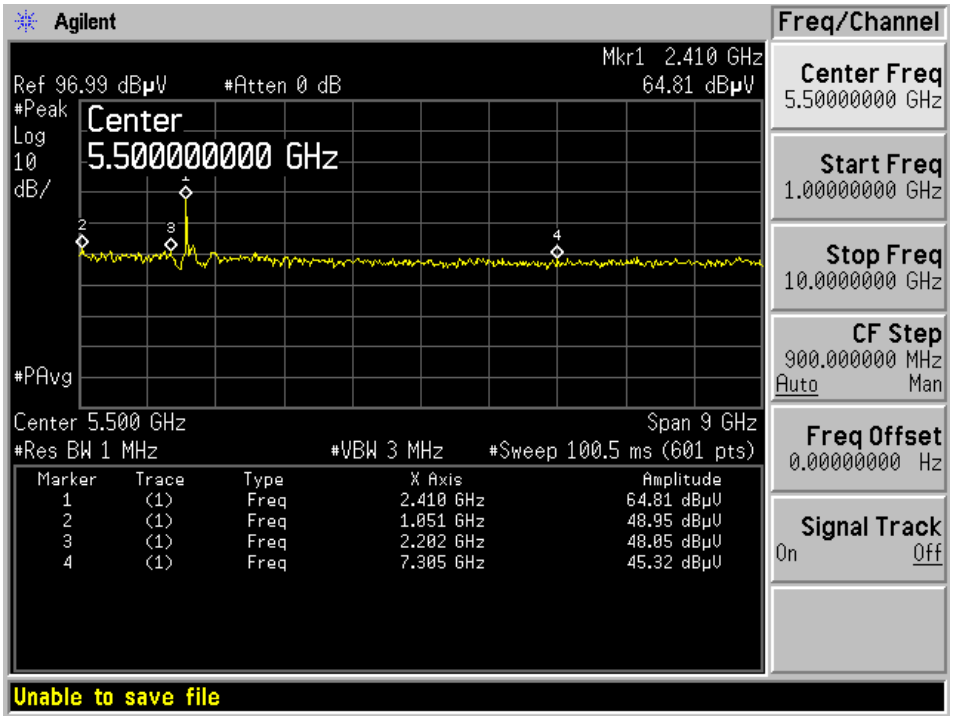
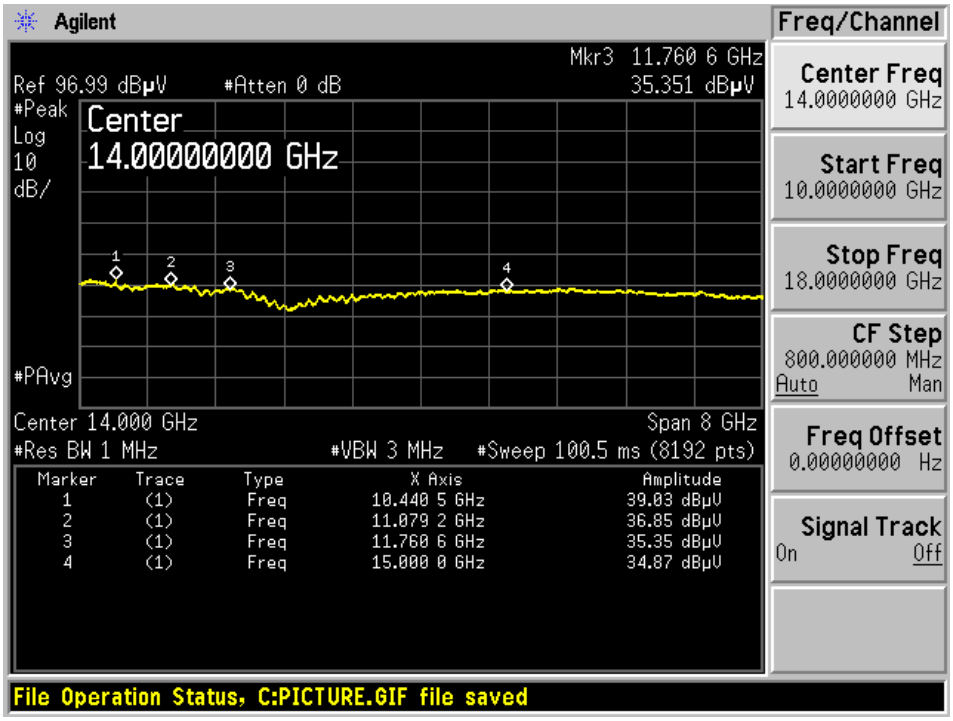


CCK 10-18GHz-H-AV



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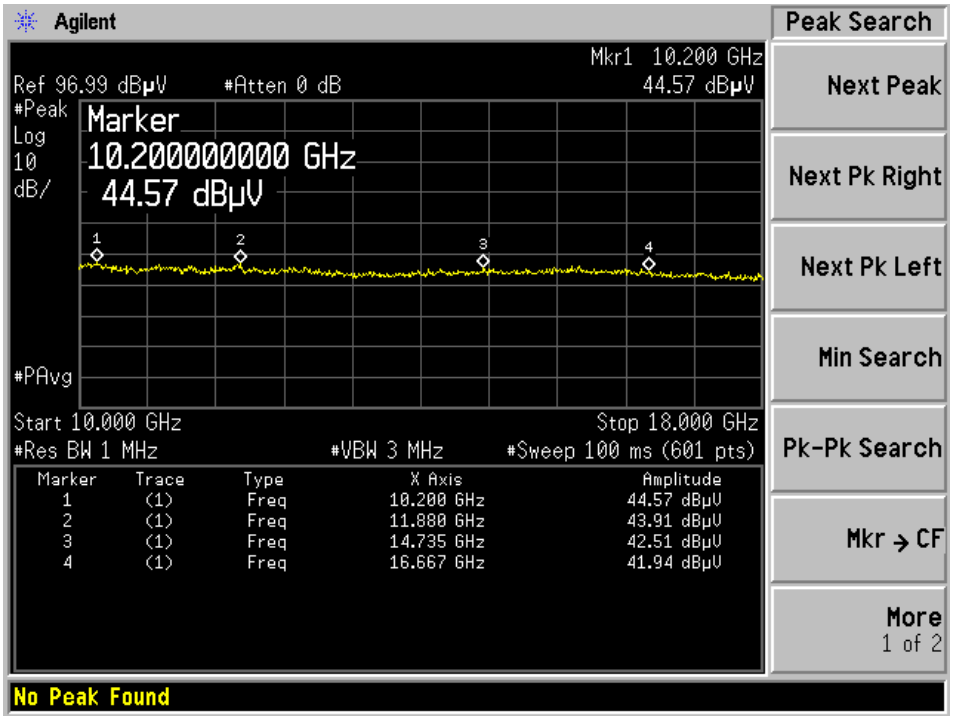

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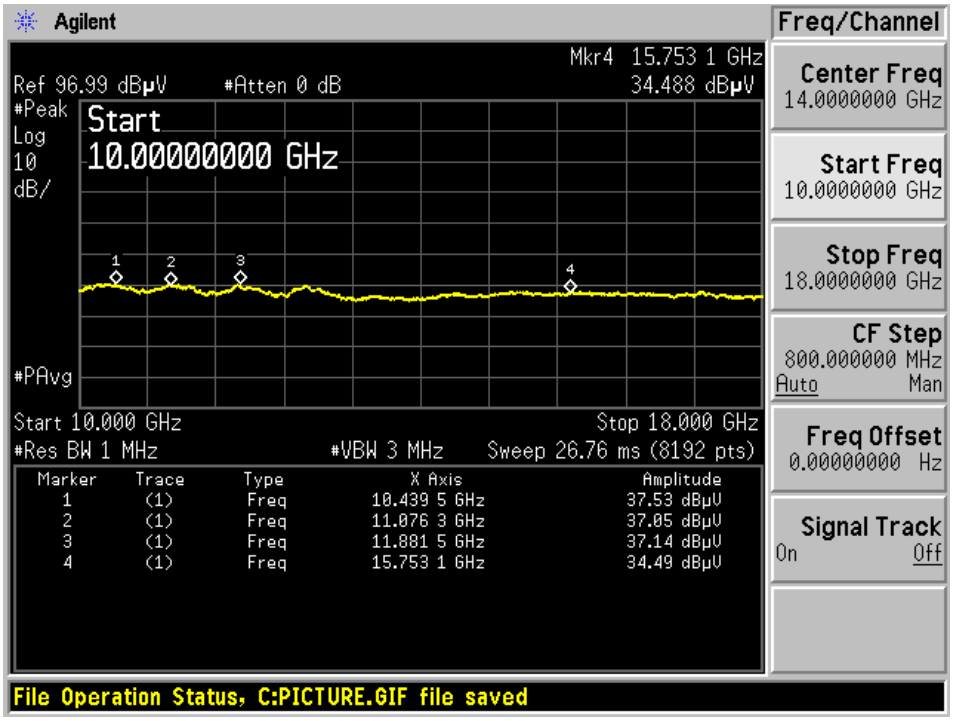

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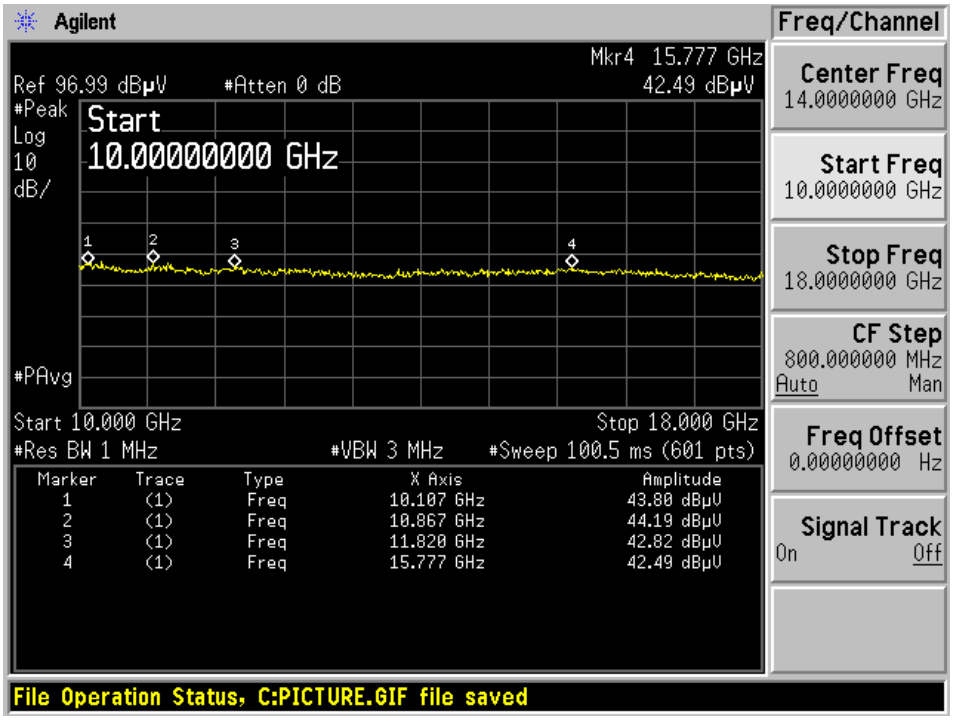
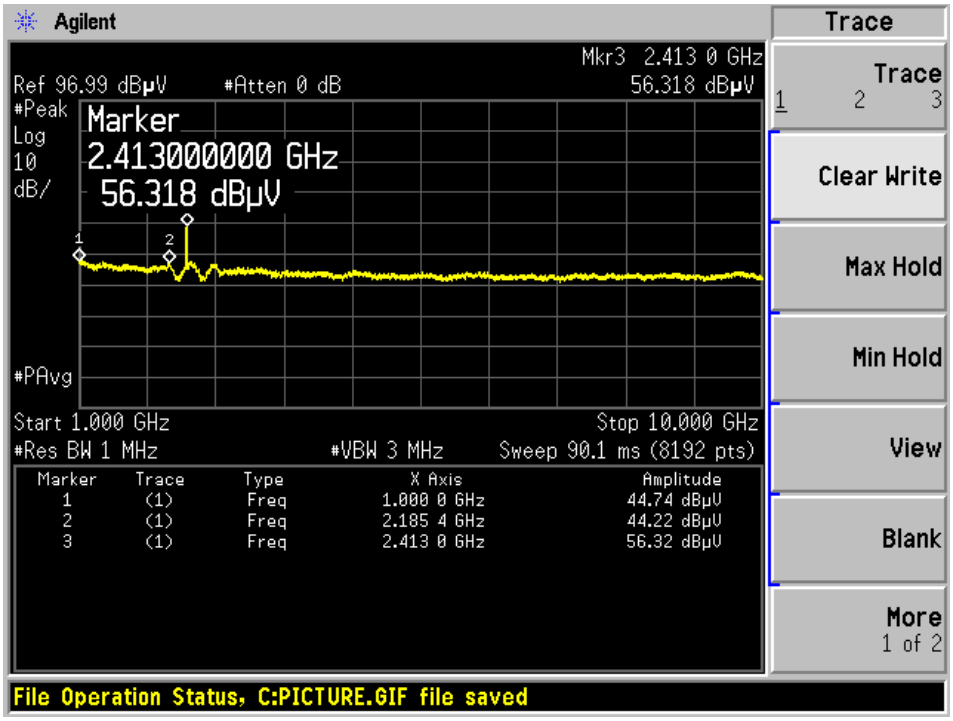


Non HT20 1-10G-H-AV



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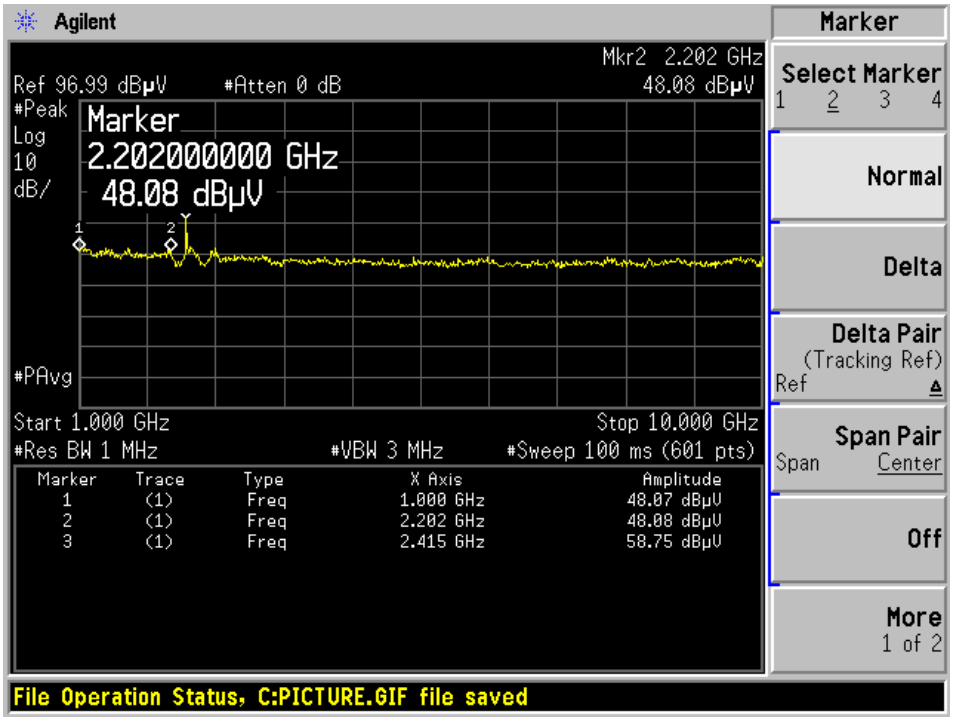

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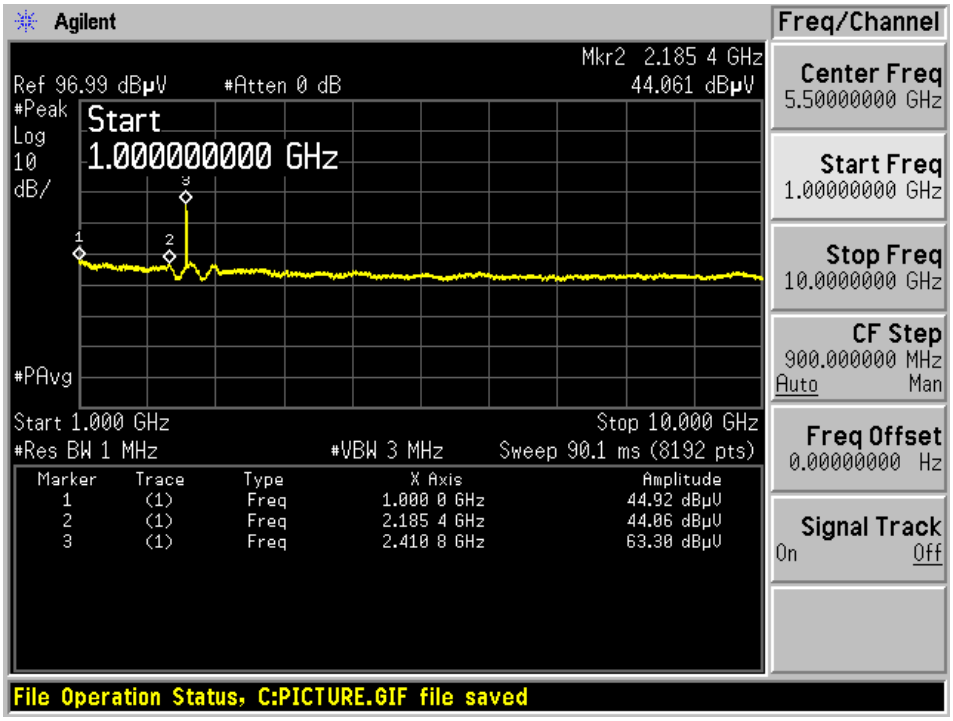

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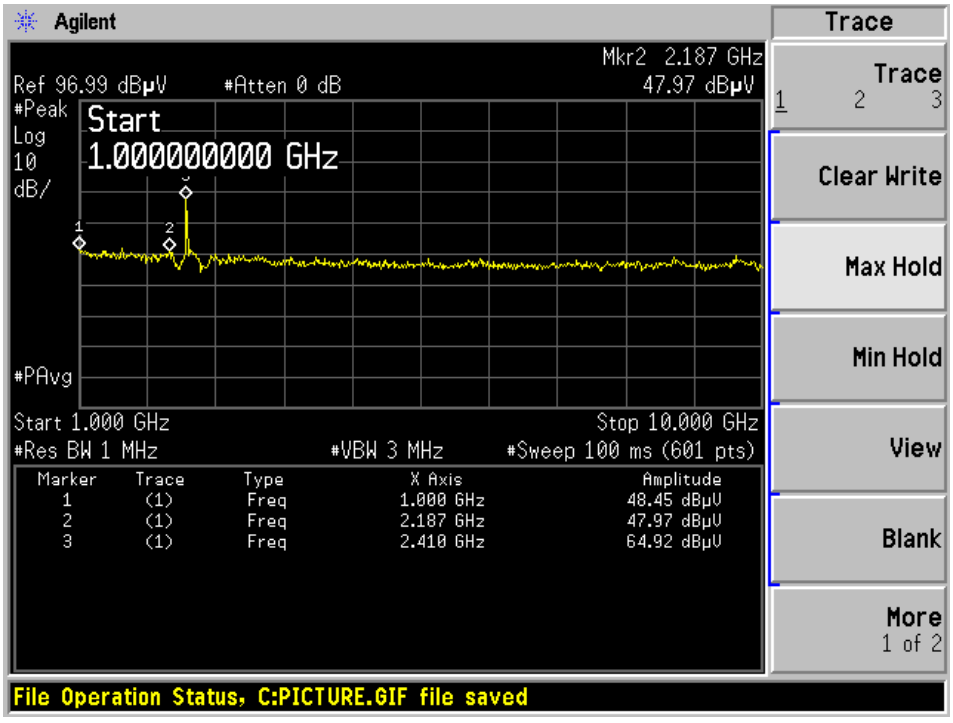

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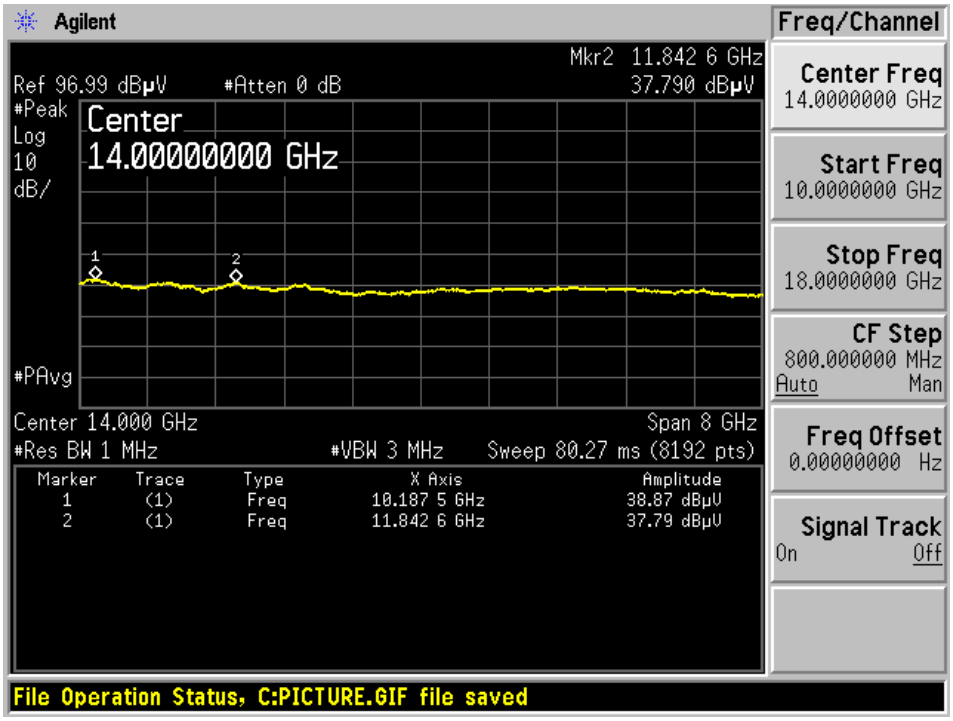

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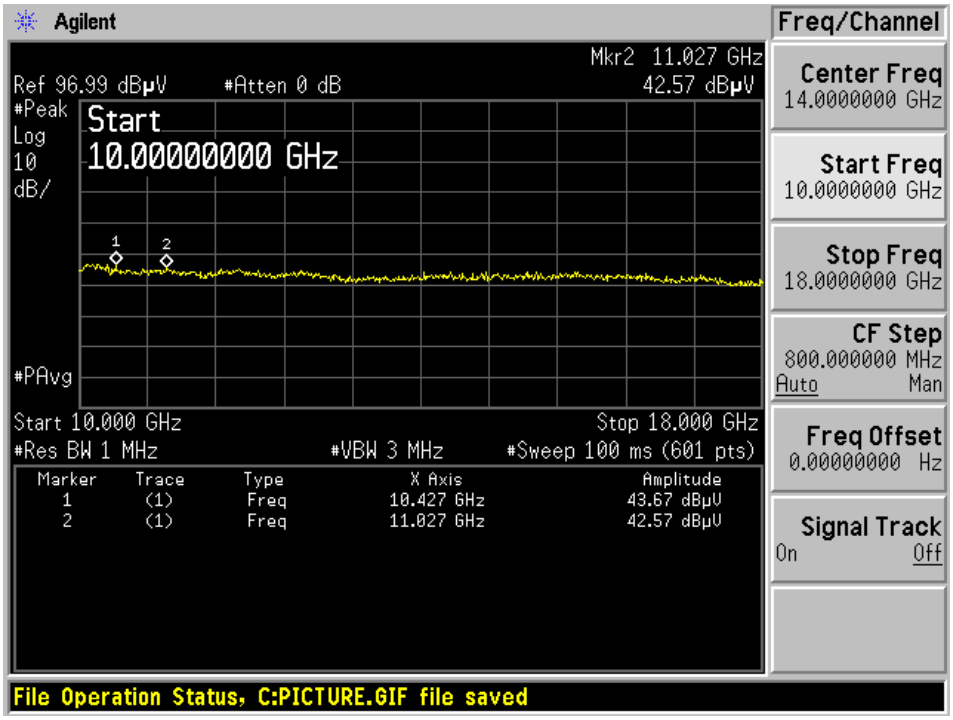

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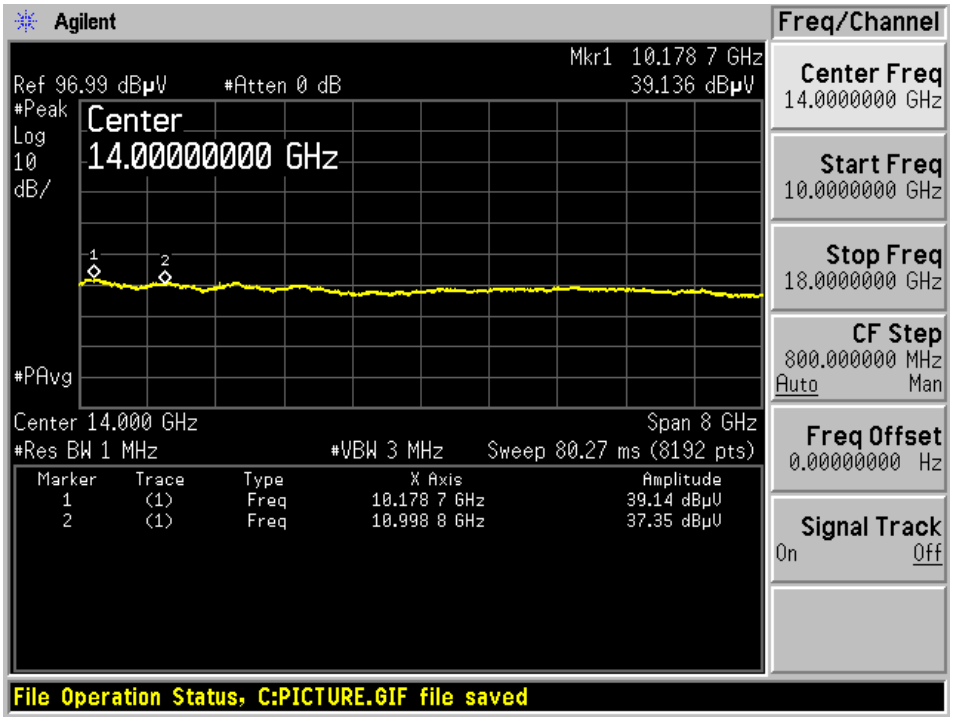

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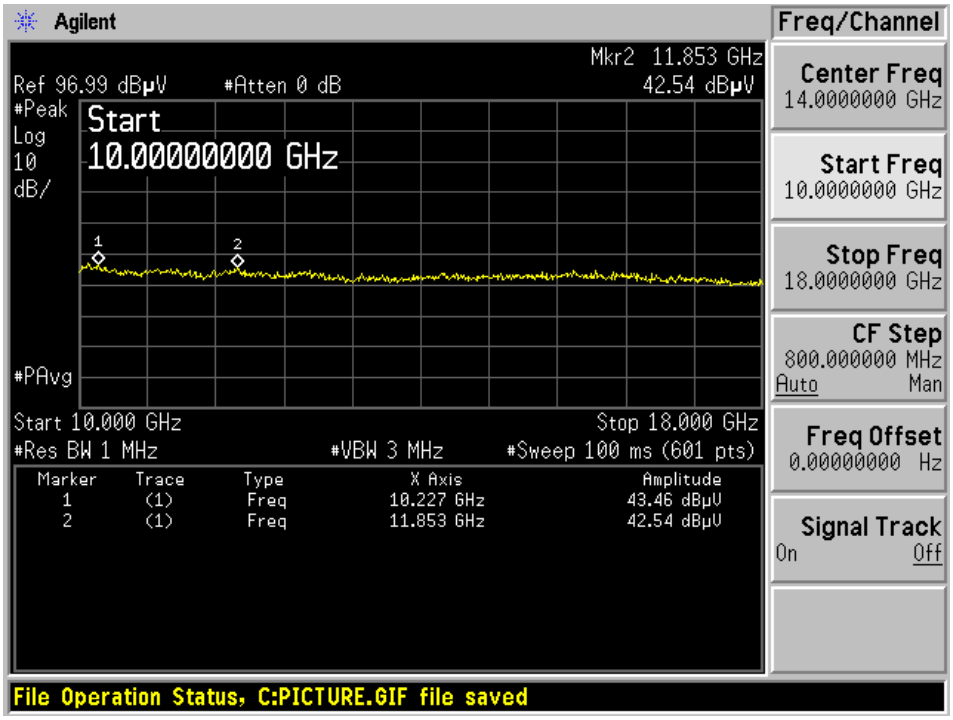
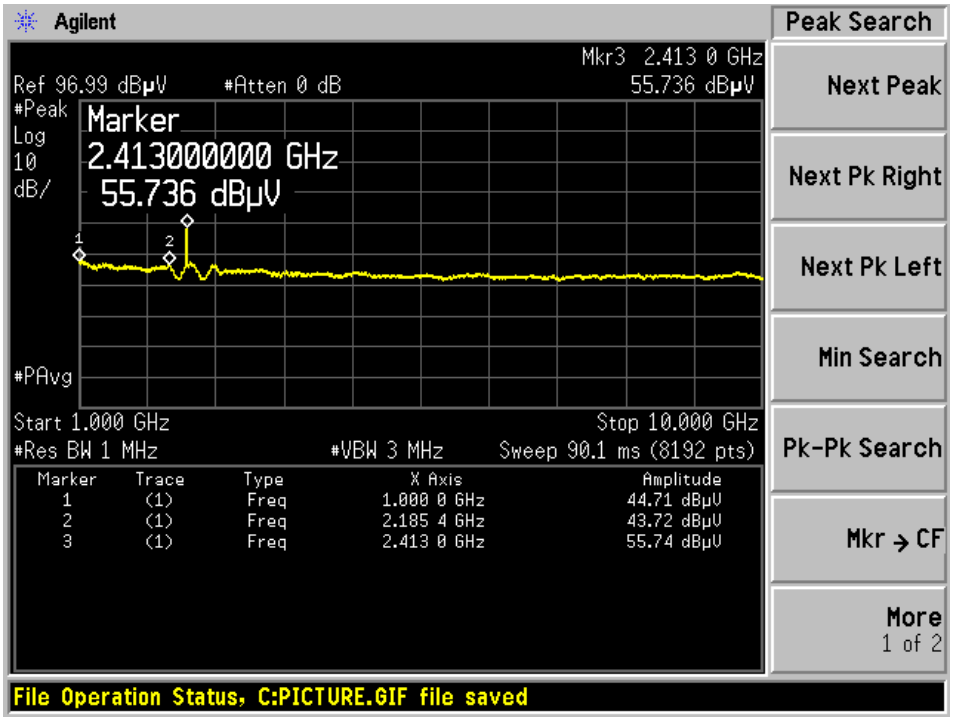
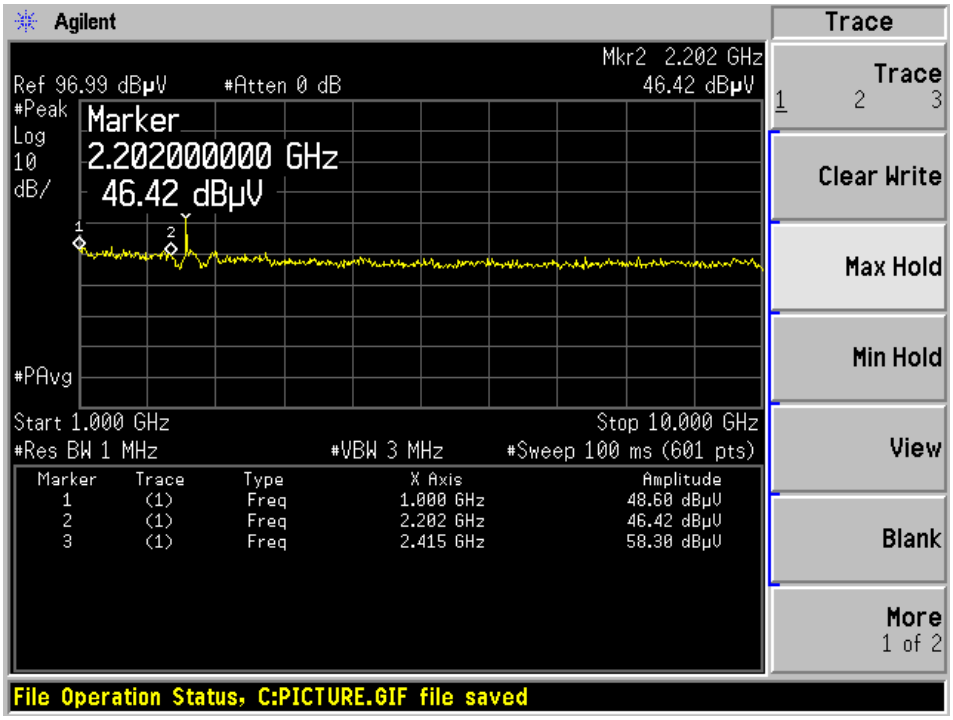


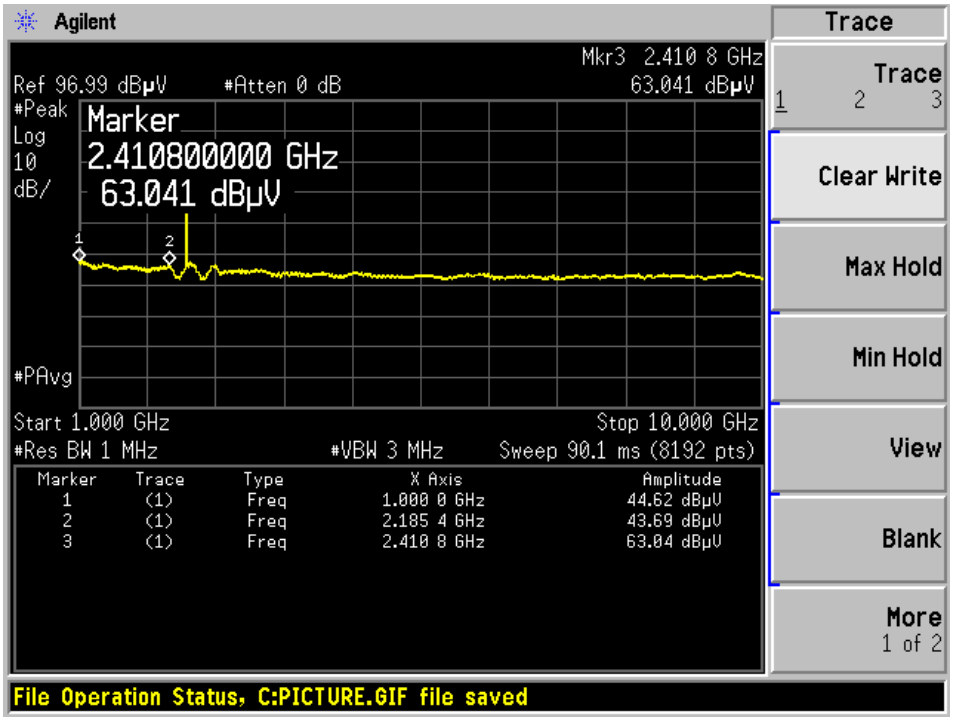
HT20 1-10G-H-AV



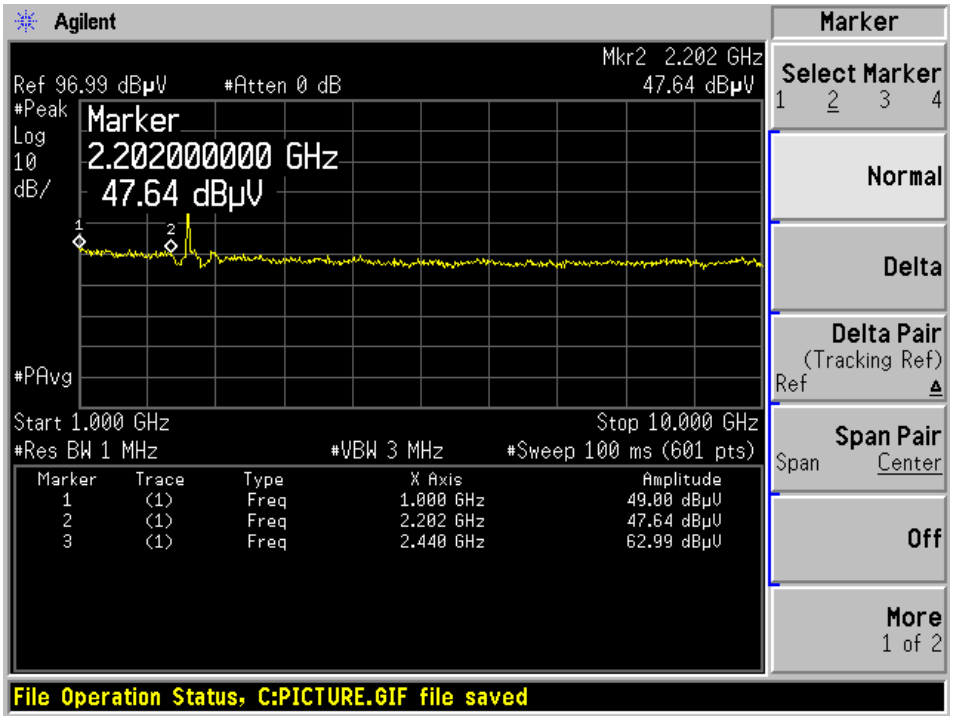
HT20 1-10G-H-PK



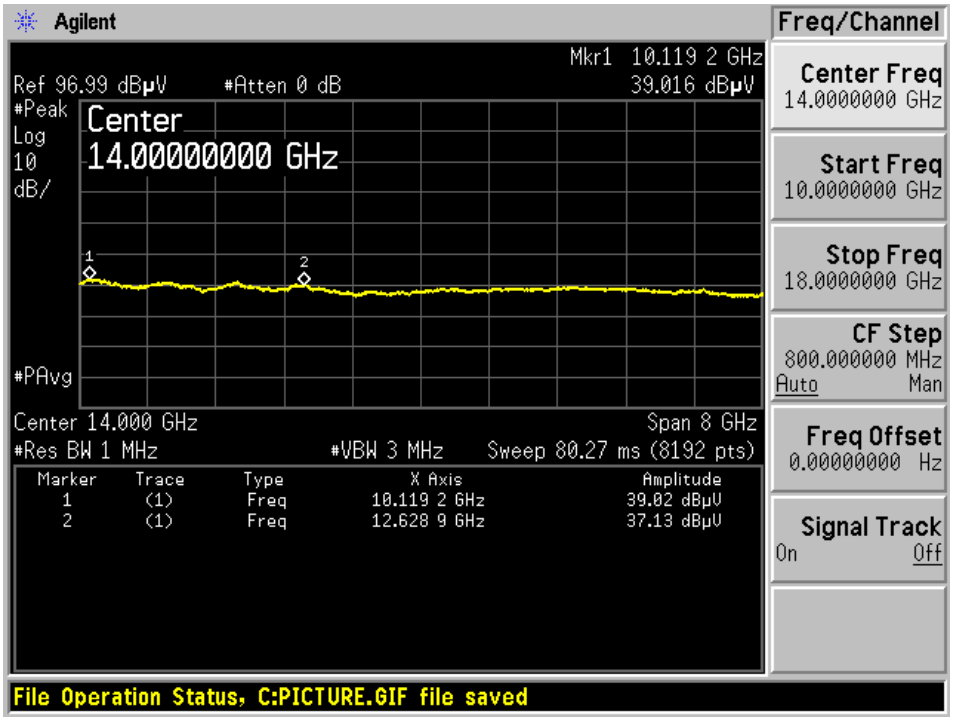
HT20 1-10G-V-AV



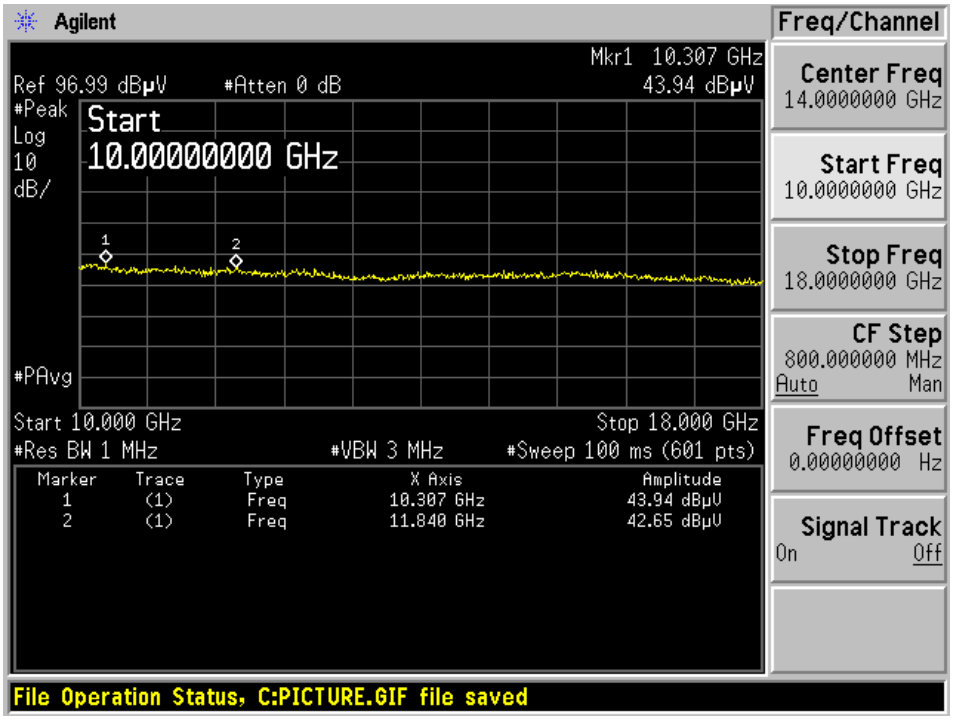
HT20 1-10G-V-PK



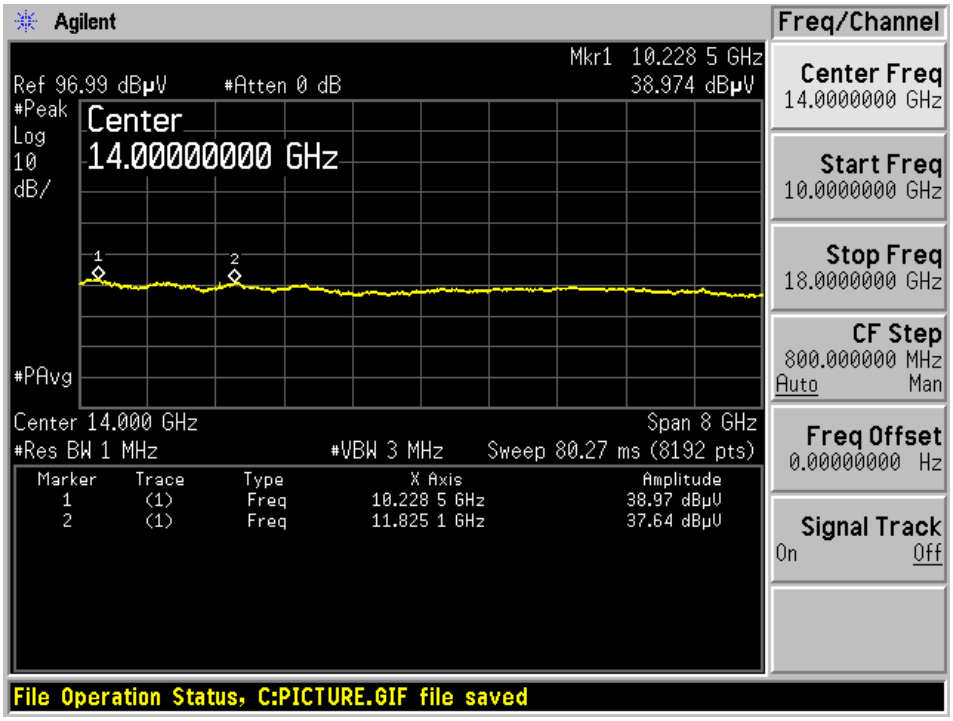
HT20 10-18G-H-AV



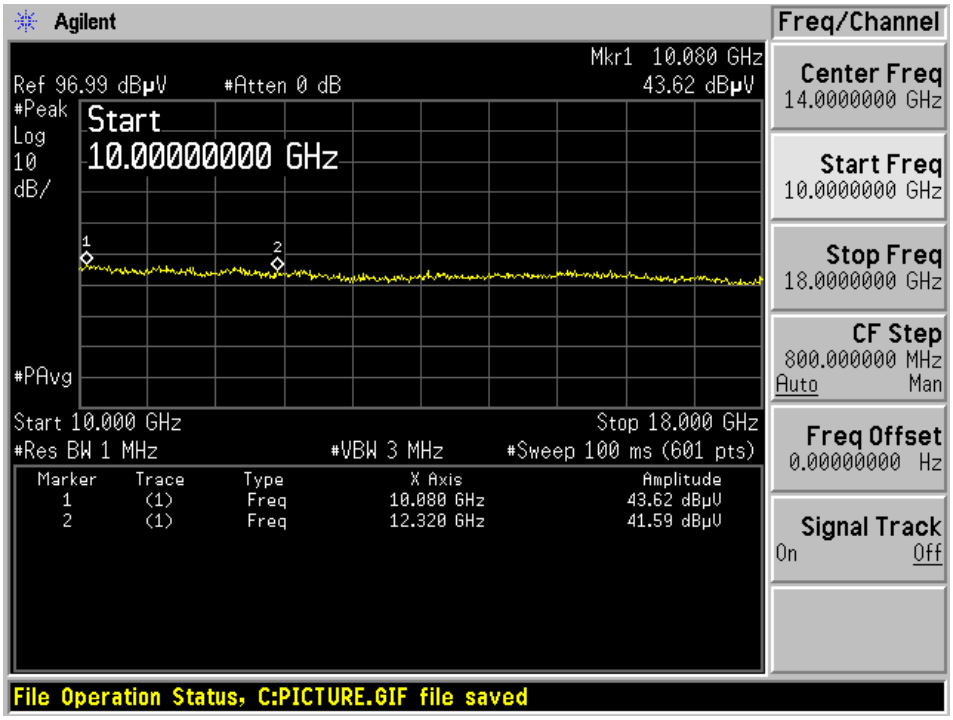
HT20 10-18G-H-PK



HT20 10-18G-V-AV

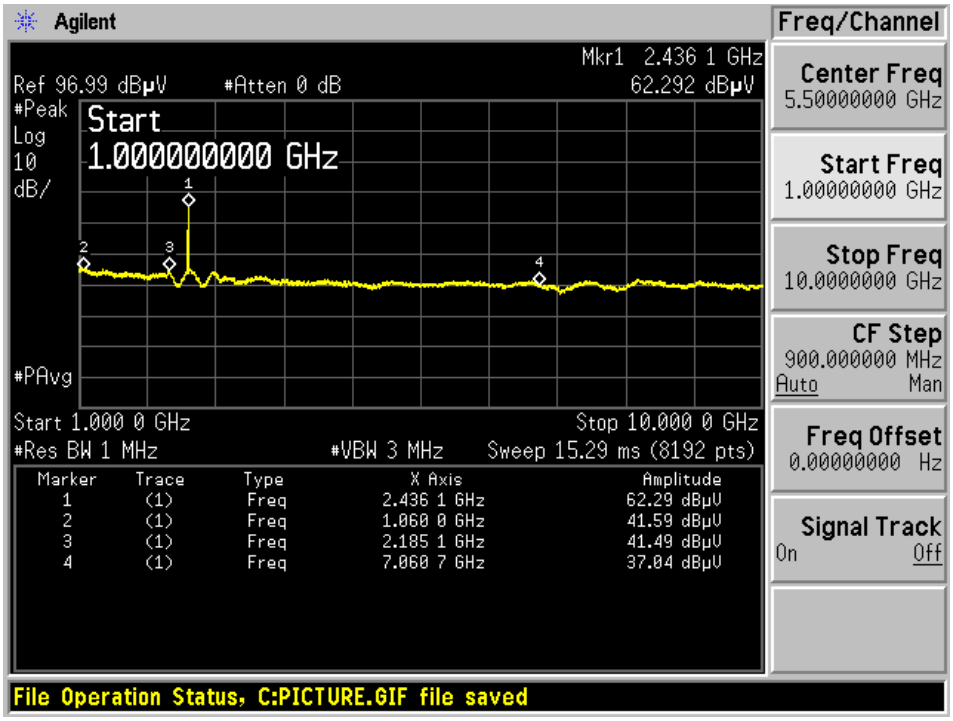


HT20 10-18G-V-PK

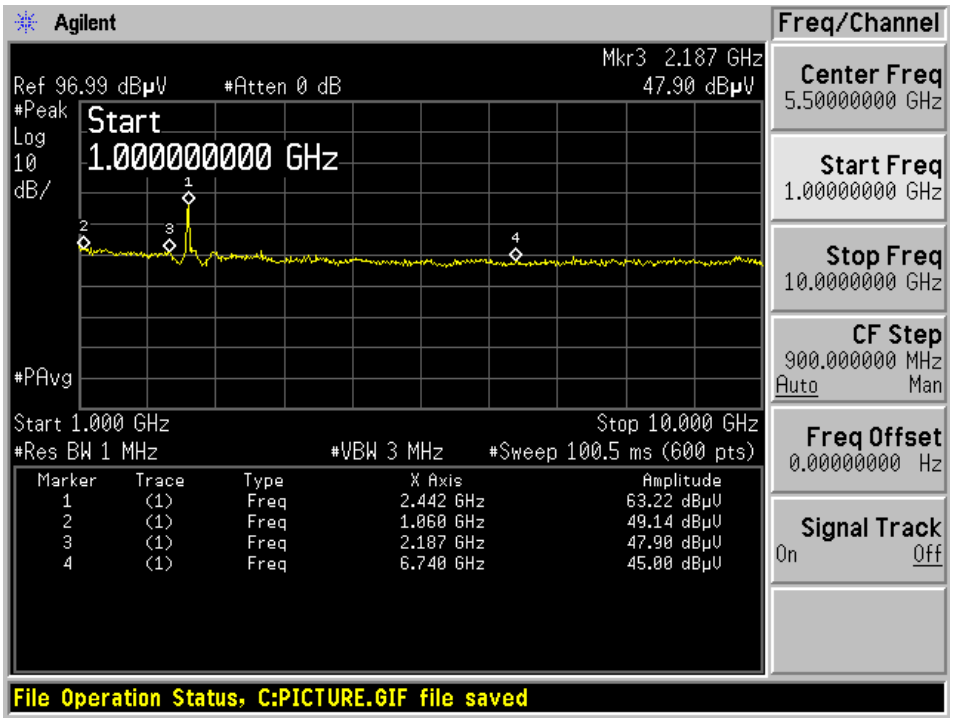


Appendix B Wi-Fi 2437 MHz

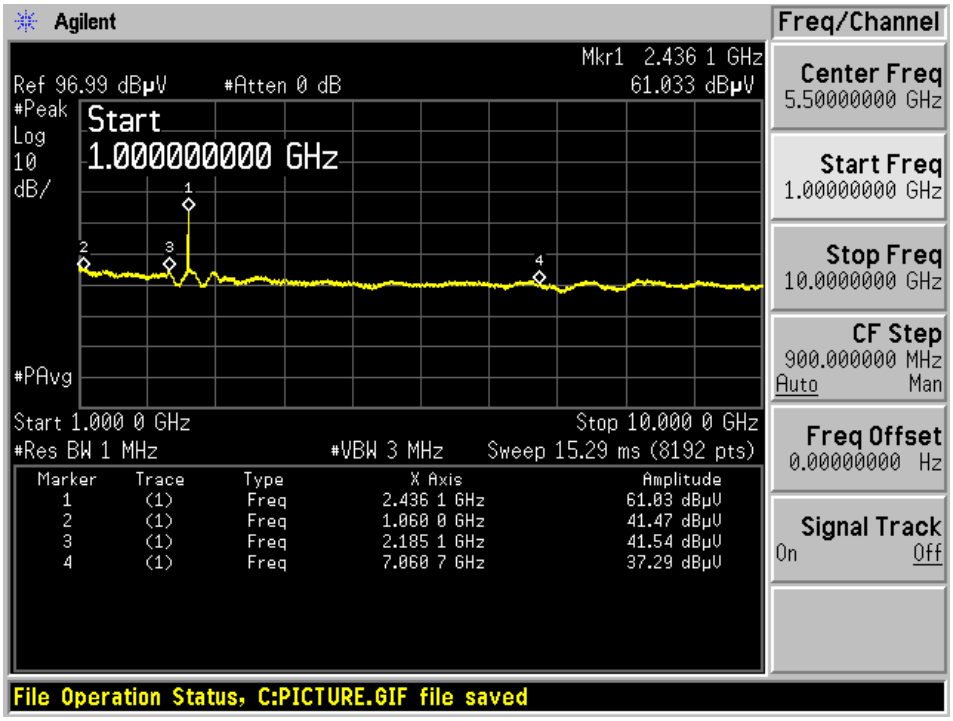
CCK 1-10GHz-H-AV



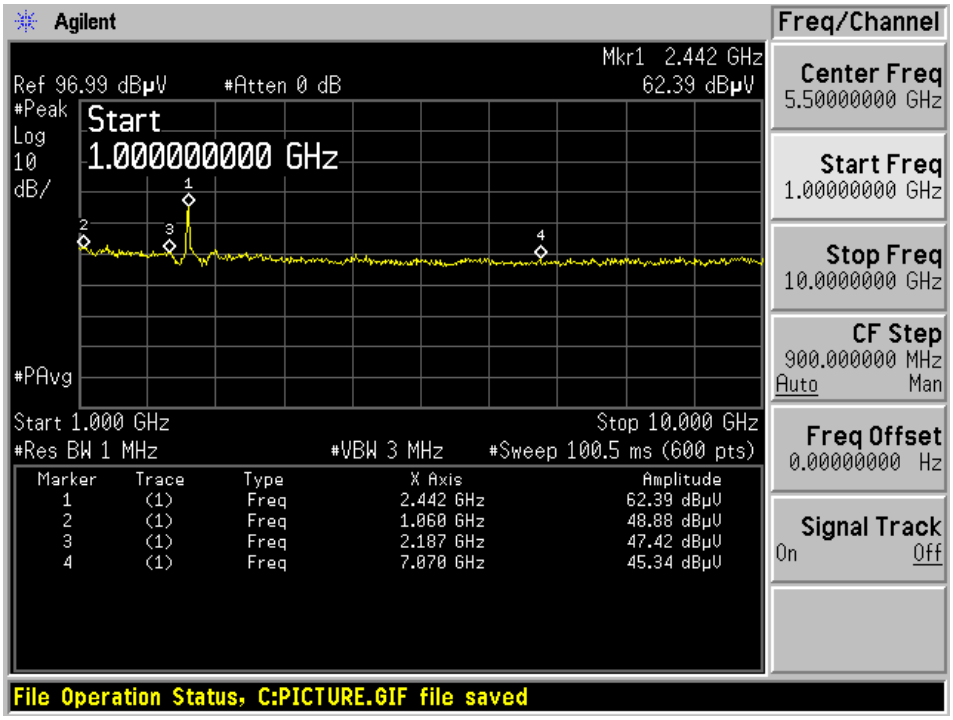
CCK 1-10GHz-H-PK



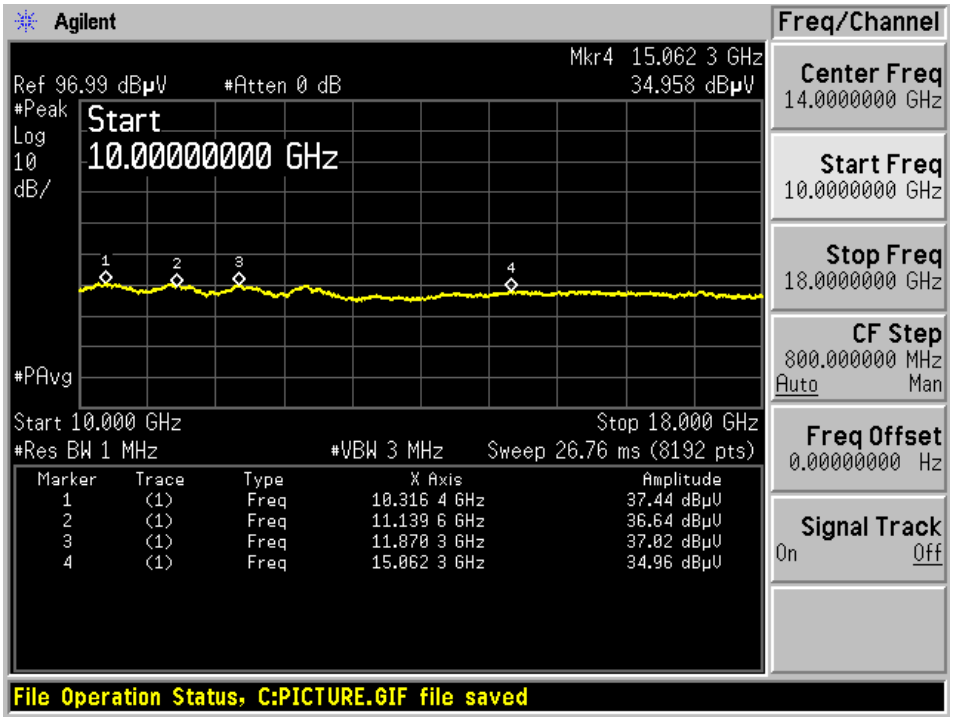
CCK 1-10GHz-V-AV



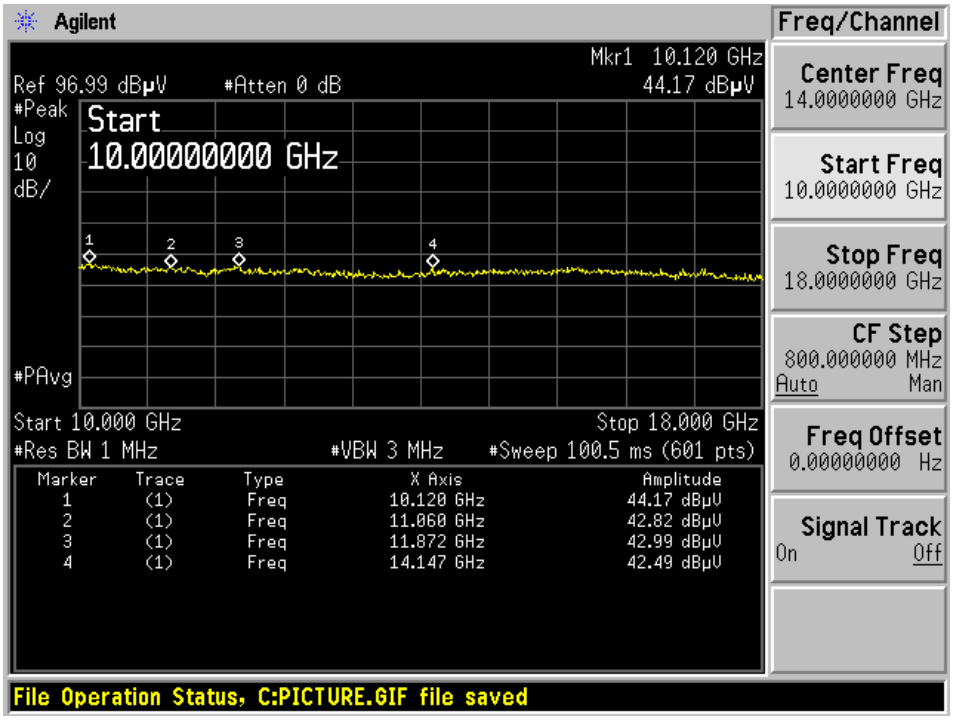
CCK 1-10GHz-V-PK



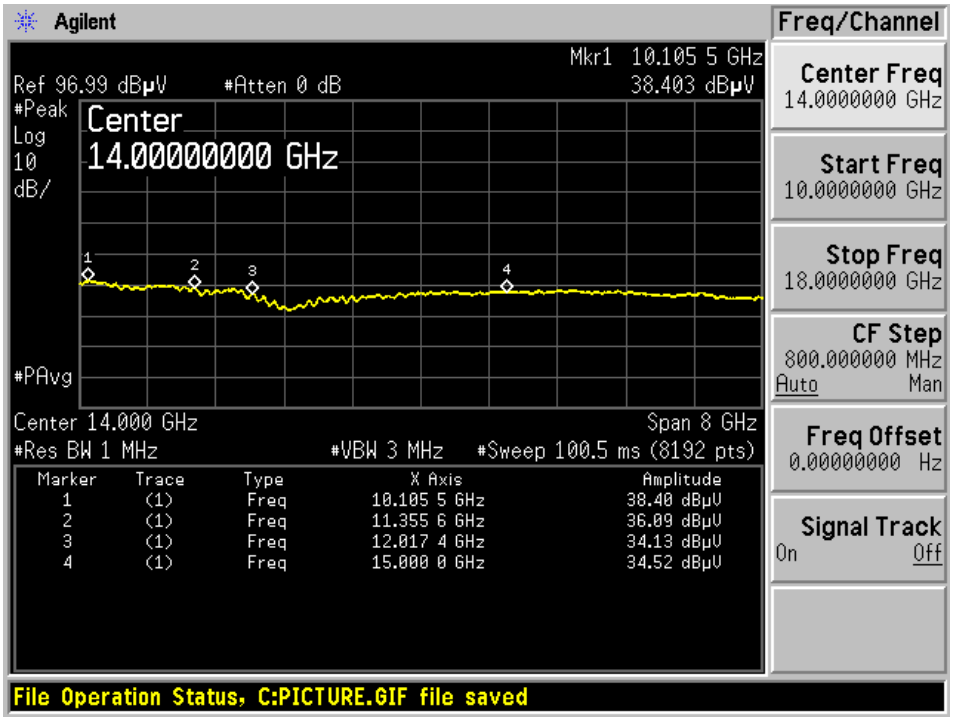
CCK 10-18GHz-H-AV



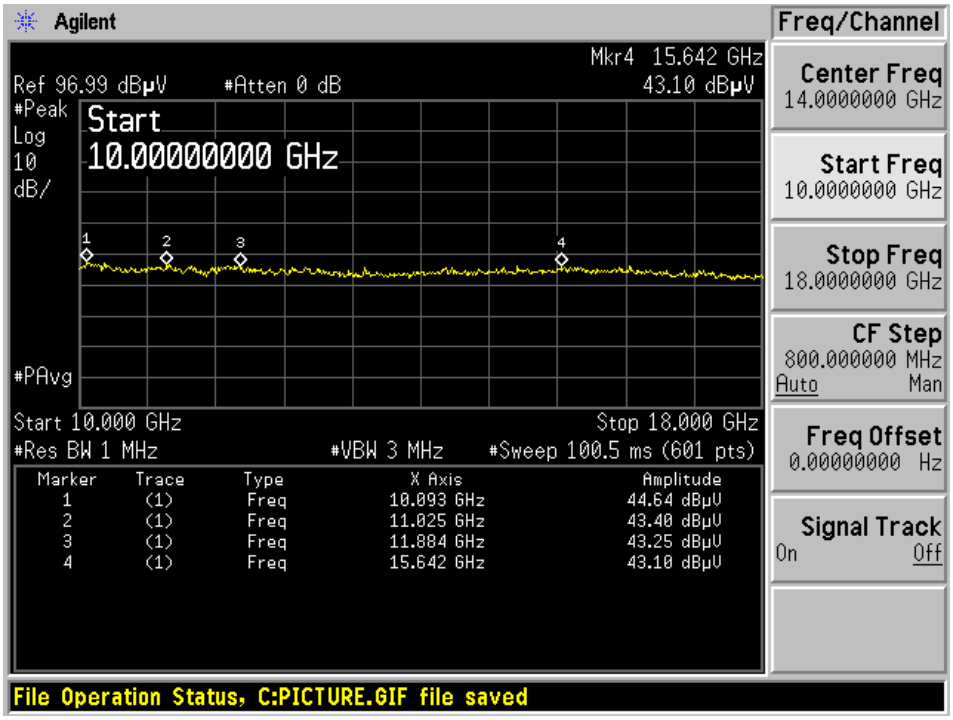
CCK 10-18GHz-H-PK



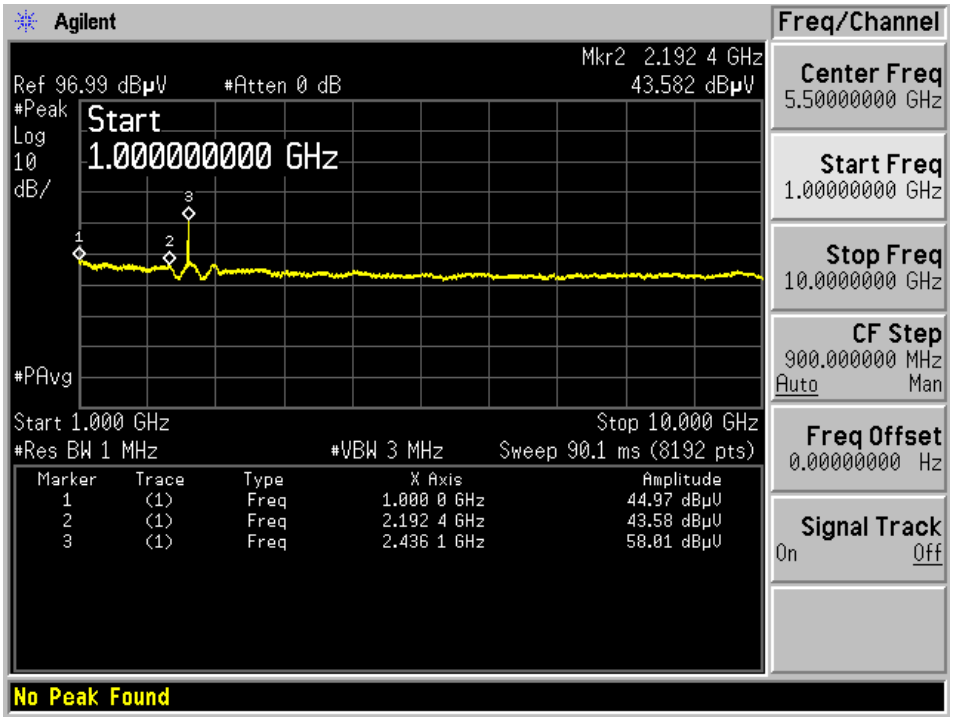
CCK 10-18GHz-V-AV



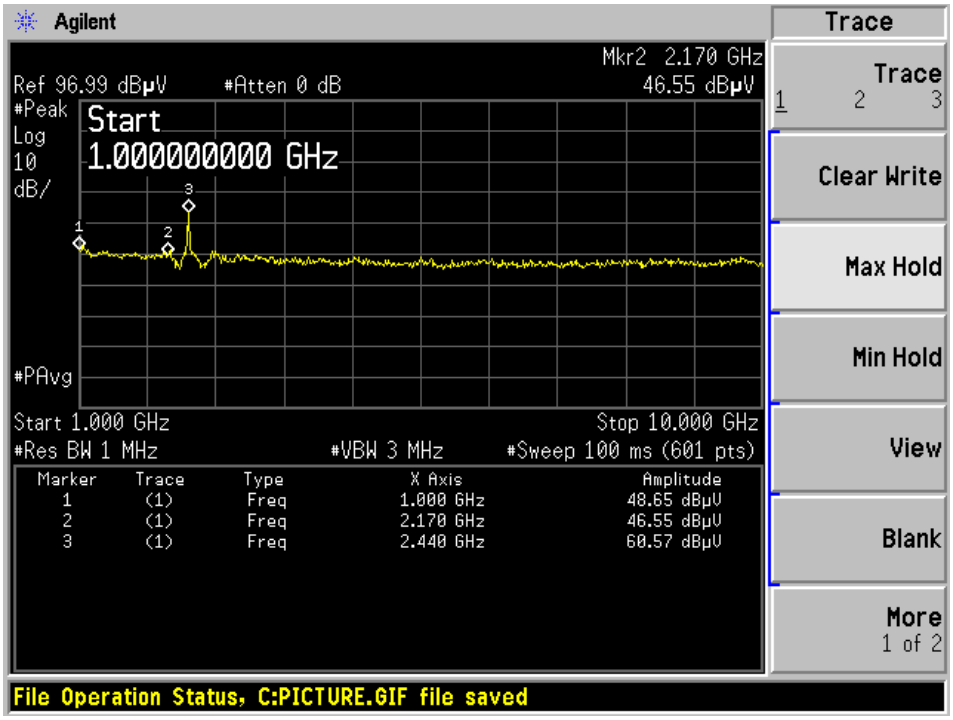
CCK 10-18GHz-V-PK



Non HT20 1-10G-H-AV



Non HT20 1-10G-H-PK



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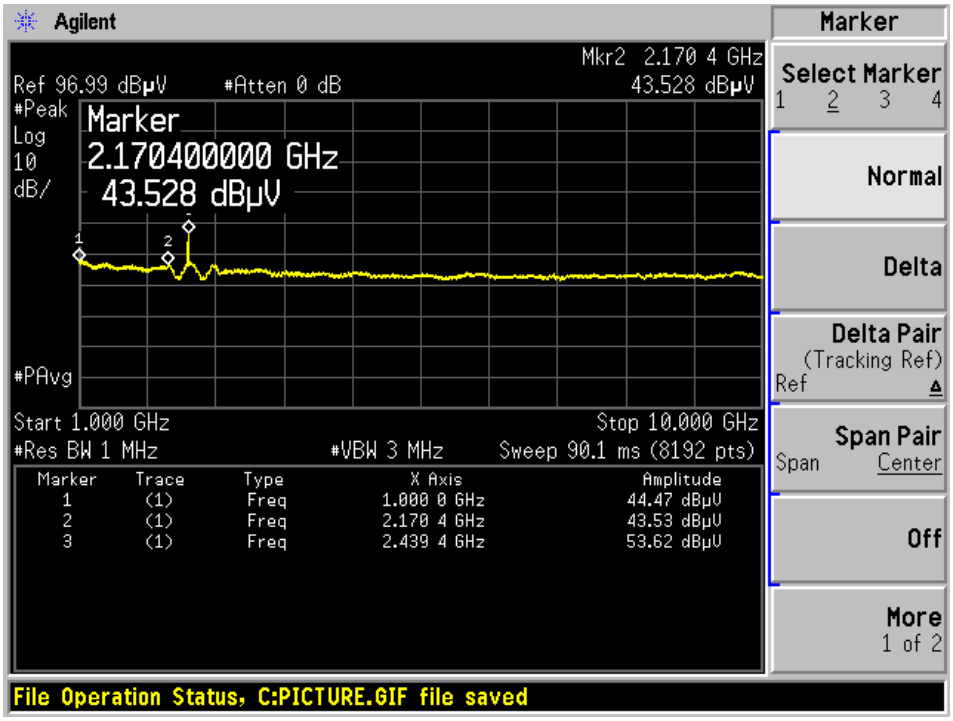

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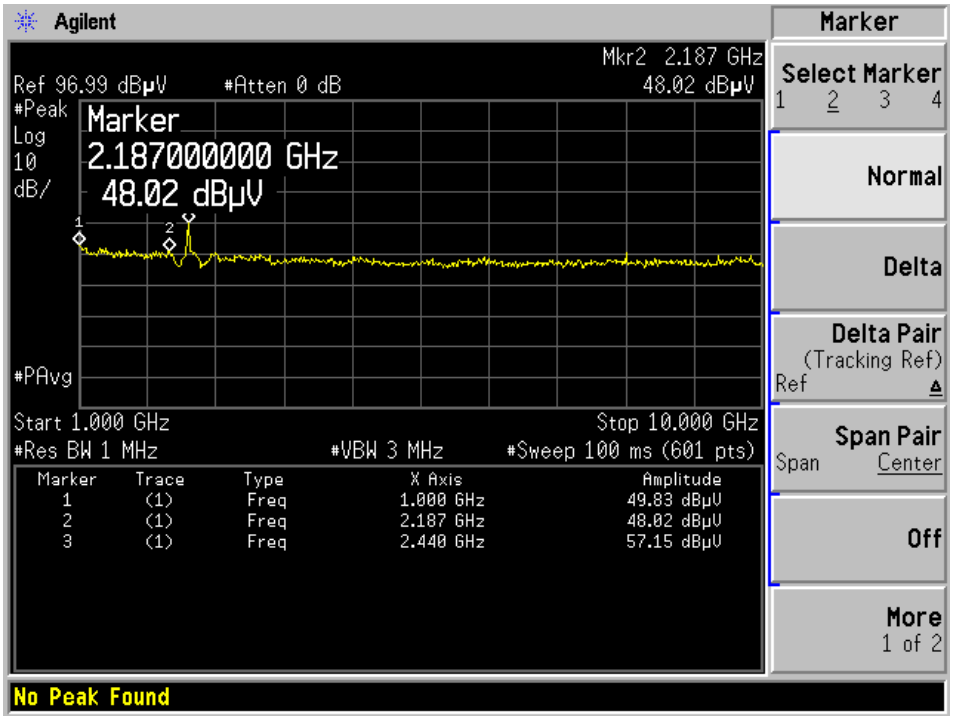

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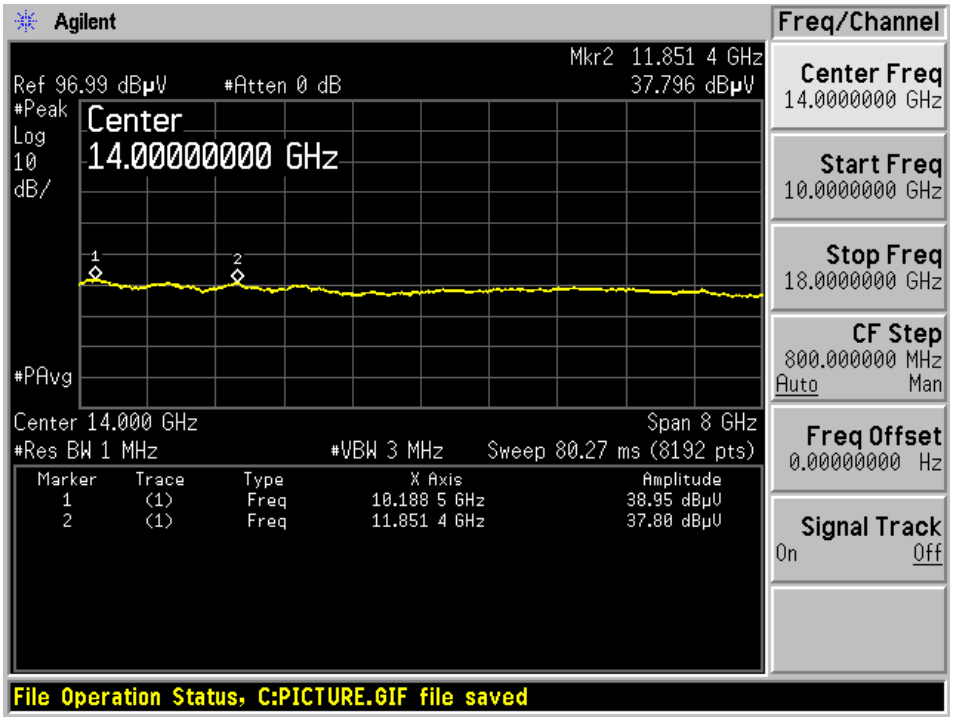

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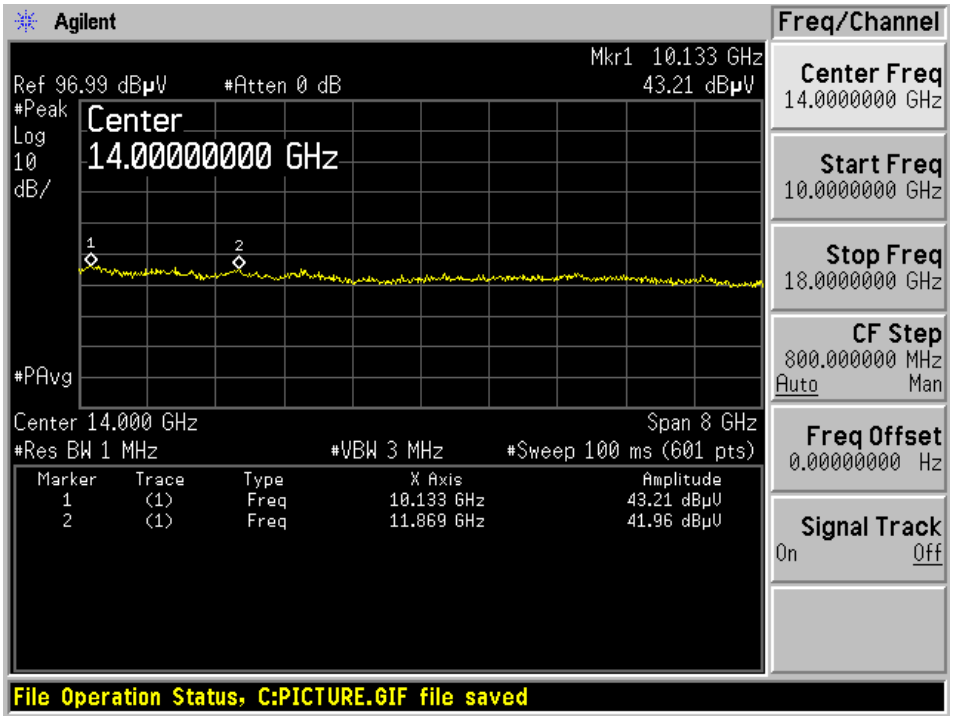

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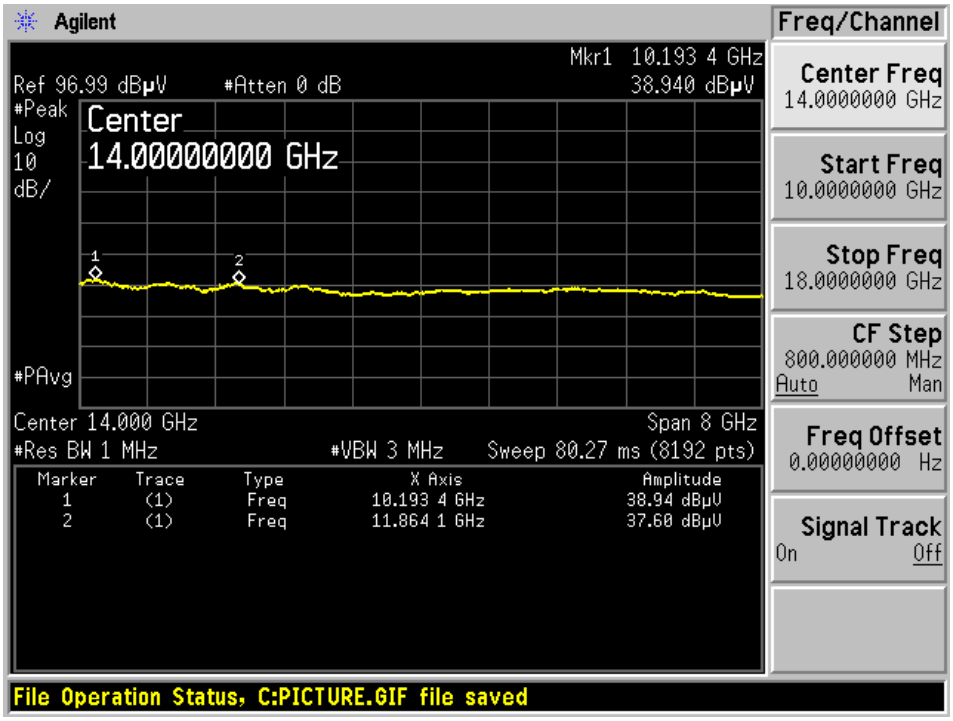

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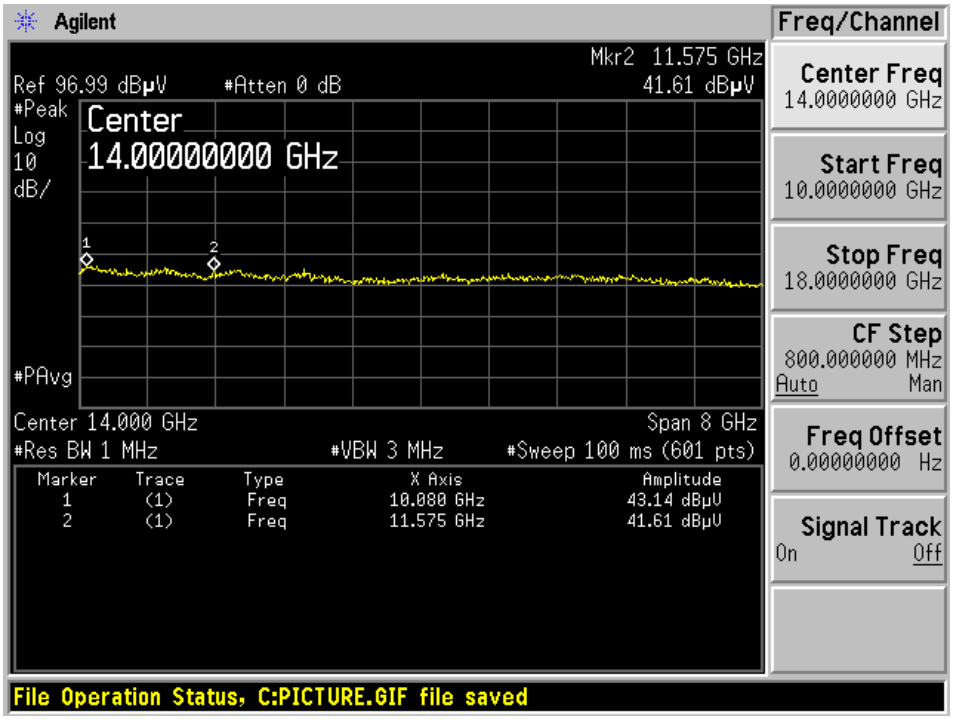

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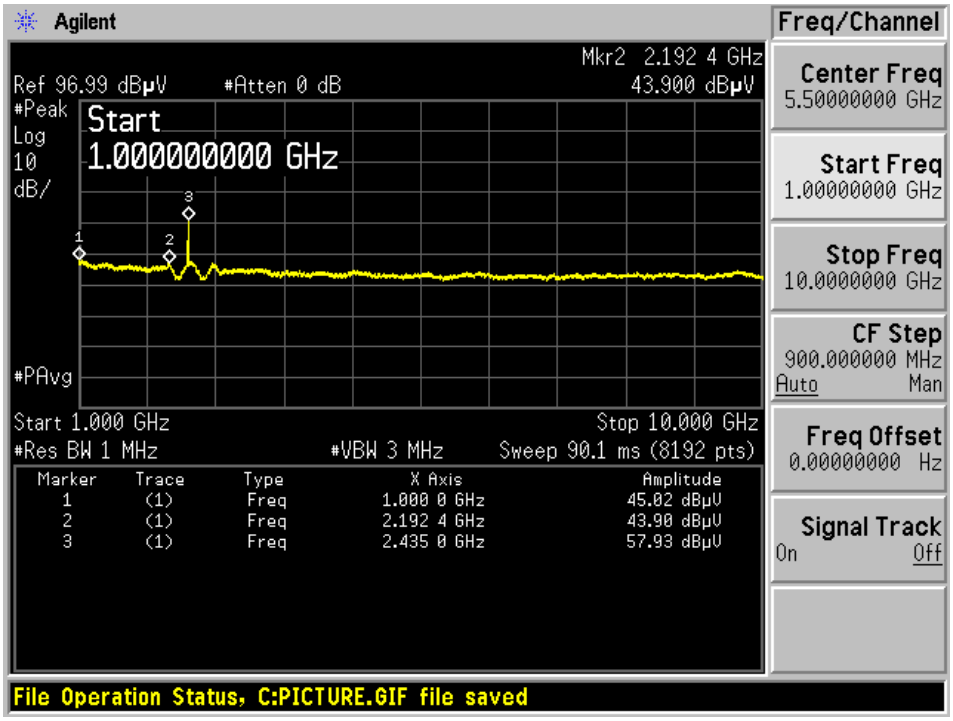

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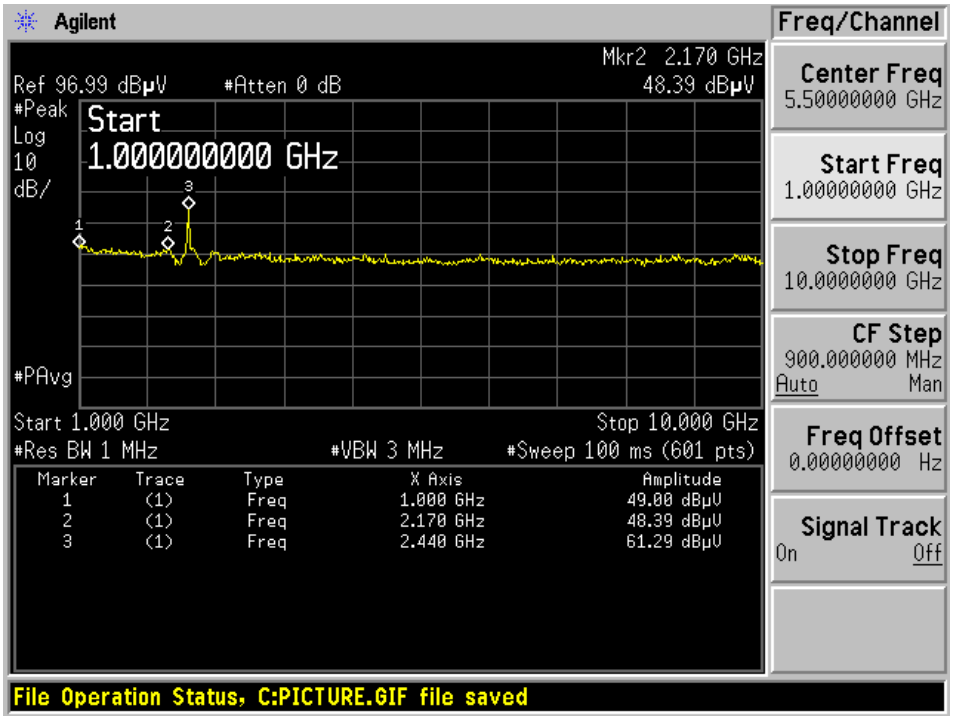

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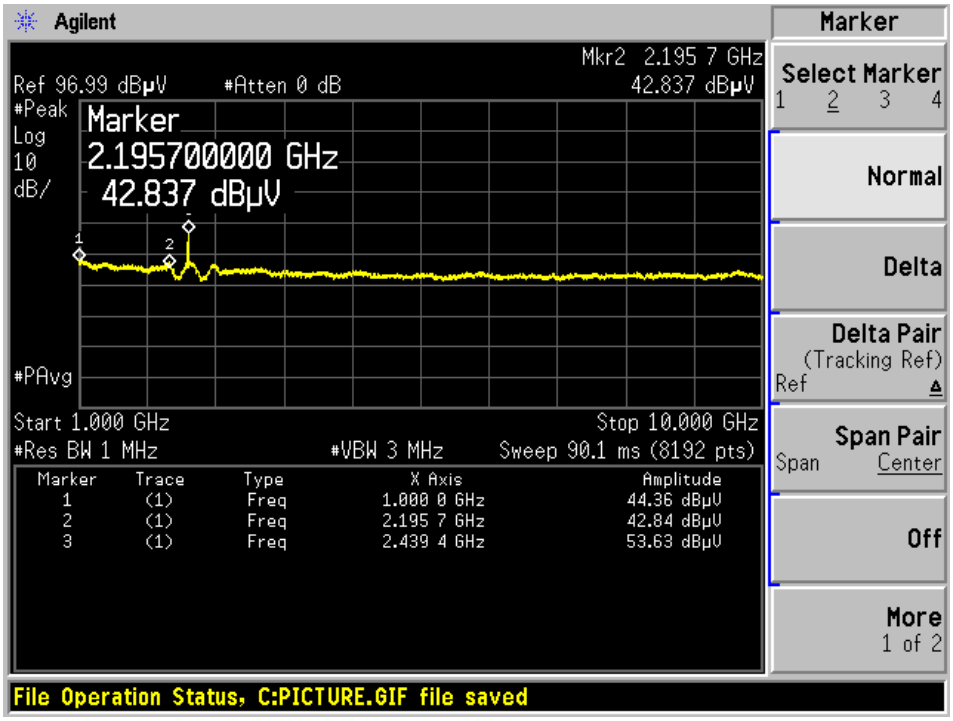
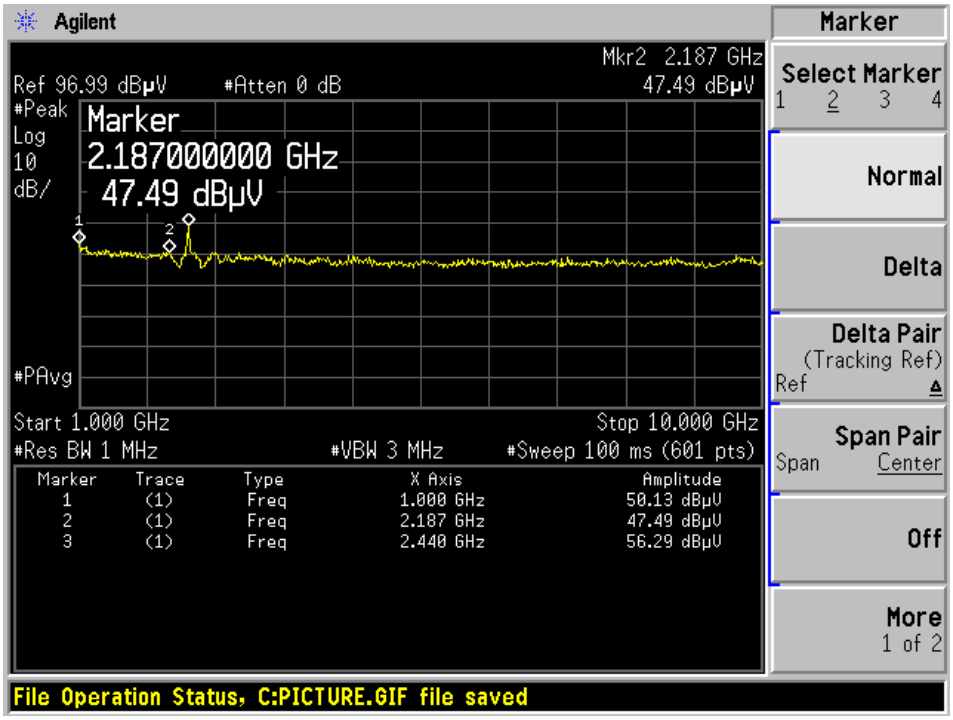
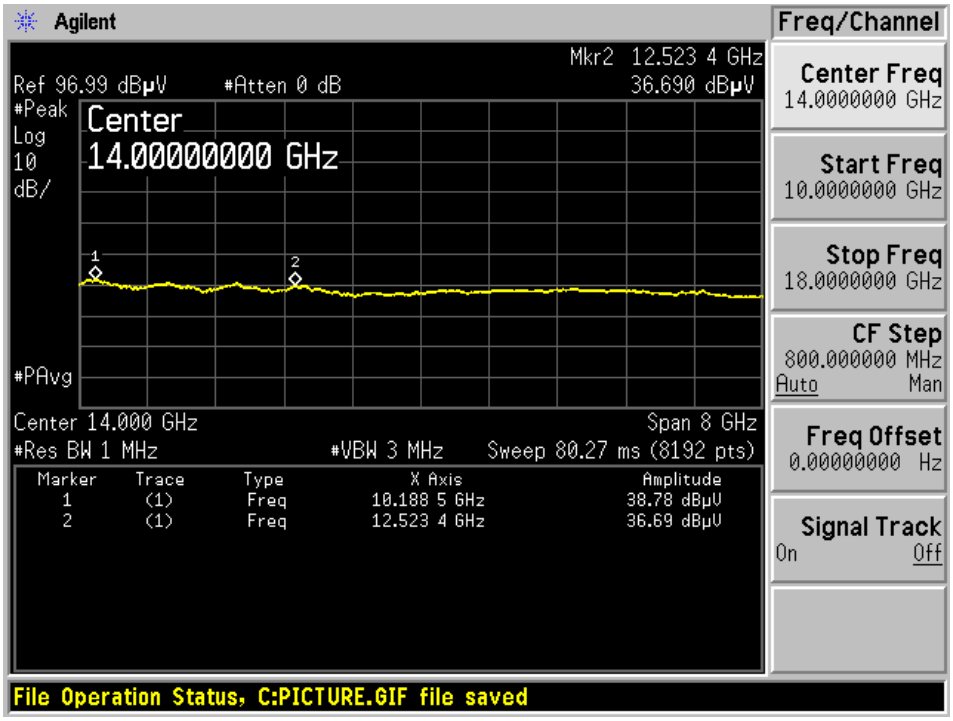


HT20 1-10G-V-PK



HT20 10-18G-H-AV



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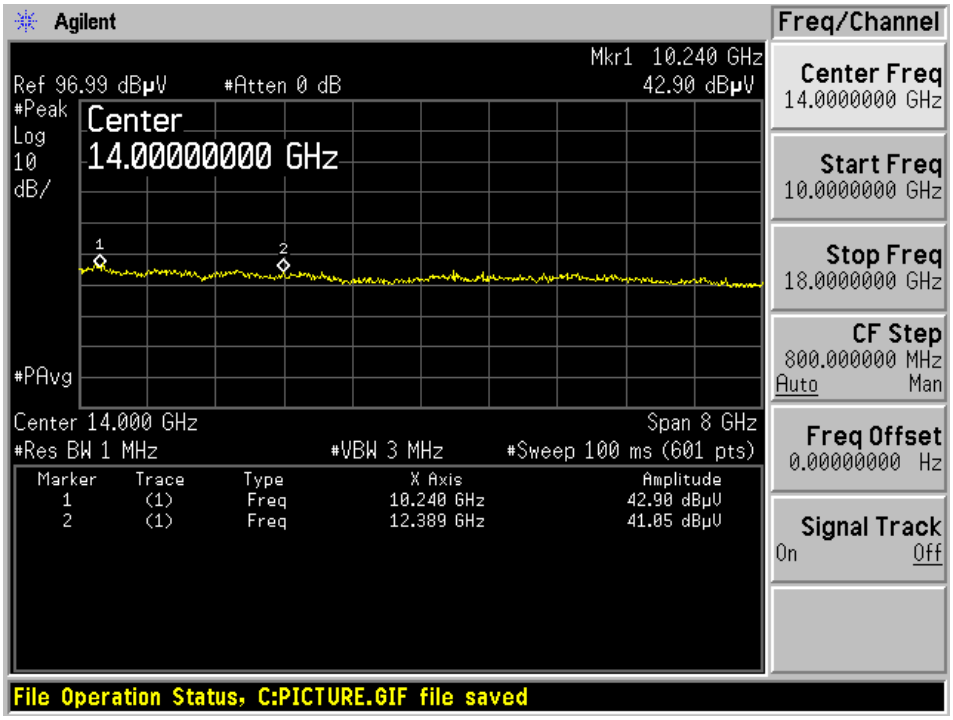

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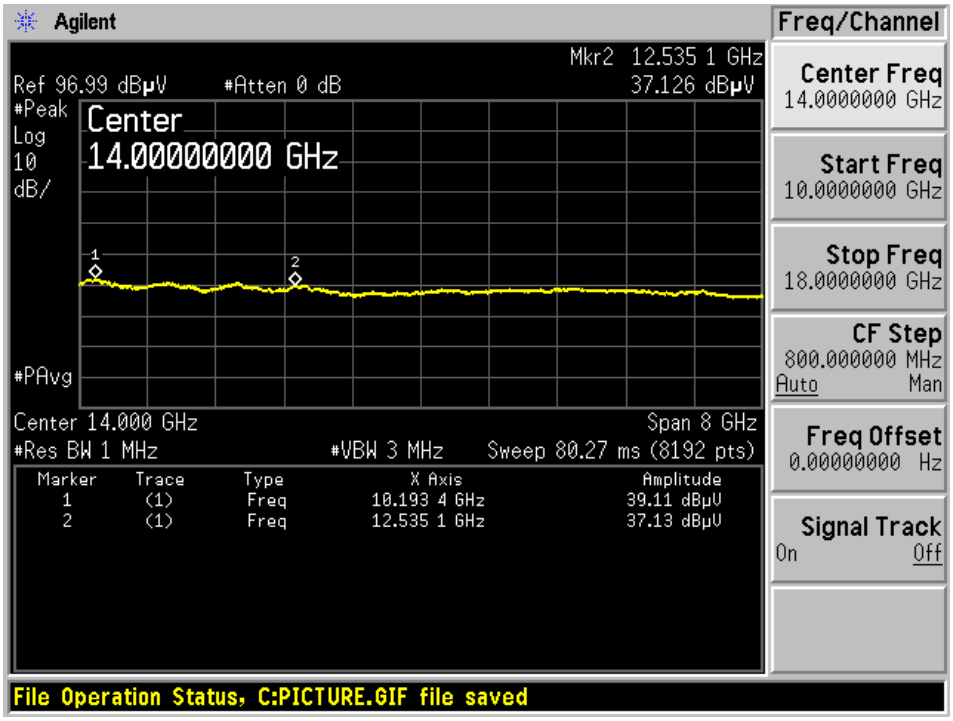
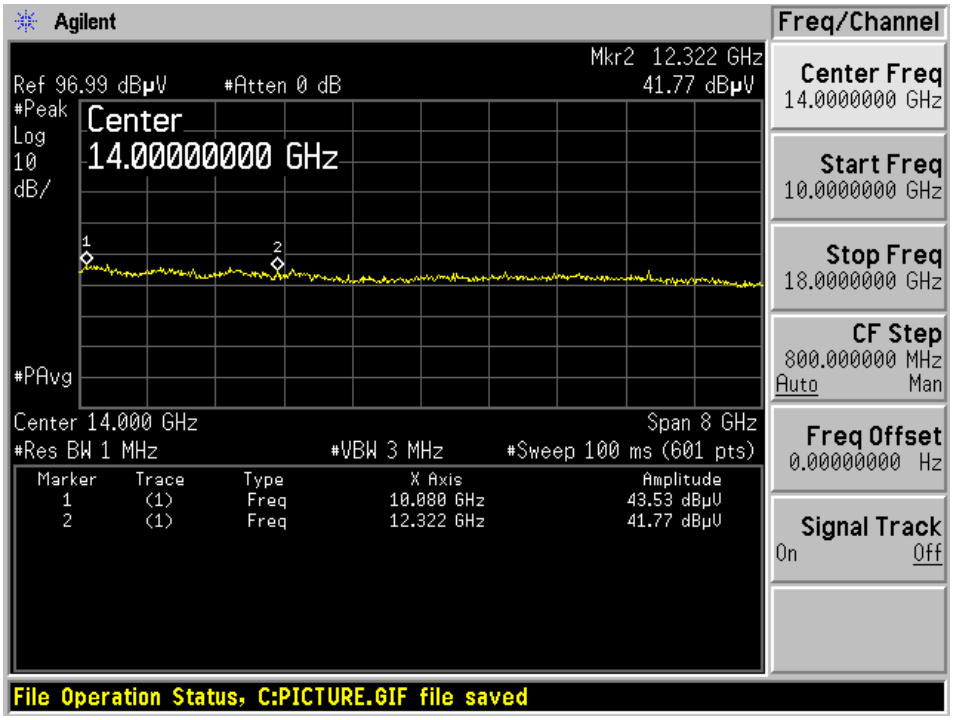
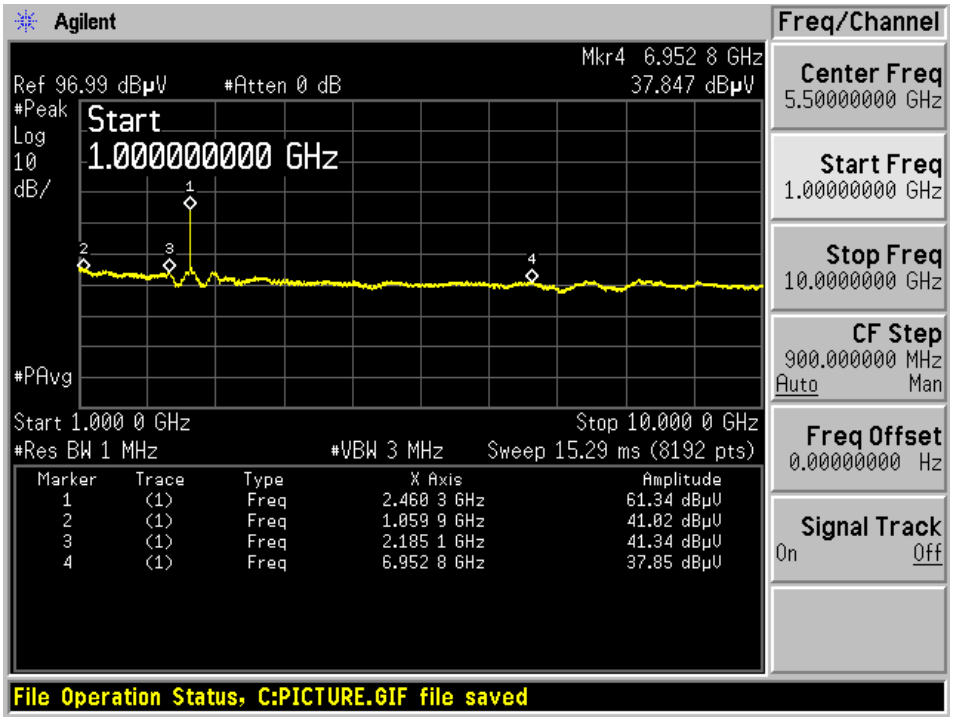


HT20 10-18G-V-PK

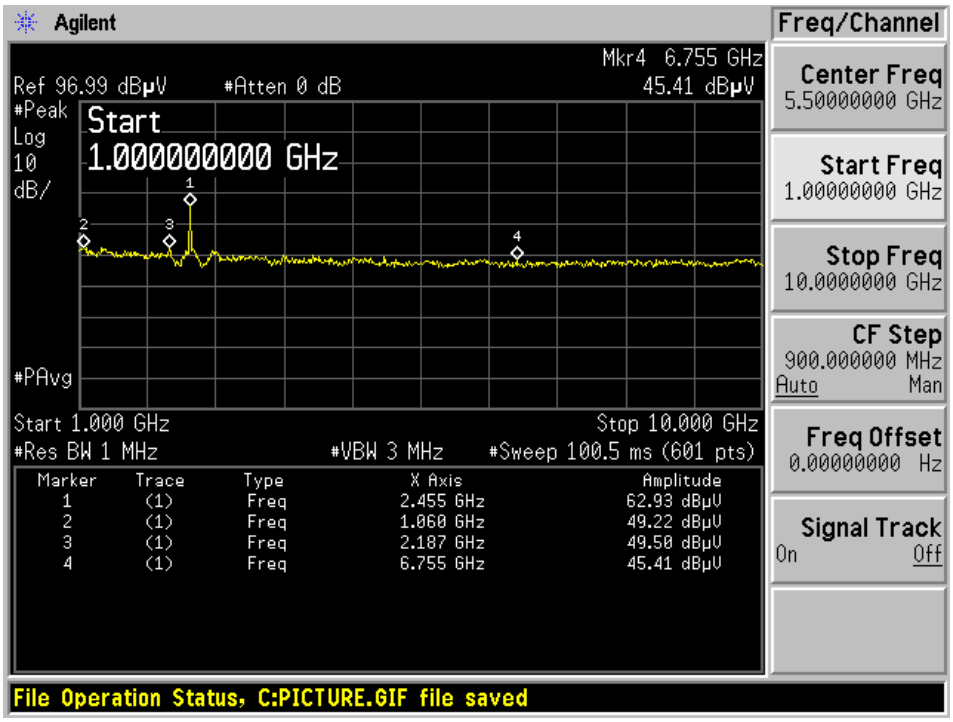


Appendix C Wi-Fi 2462 MHz

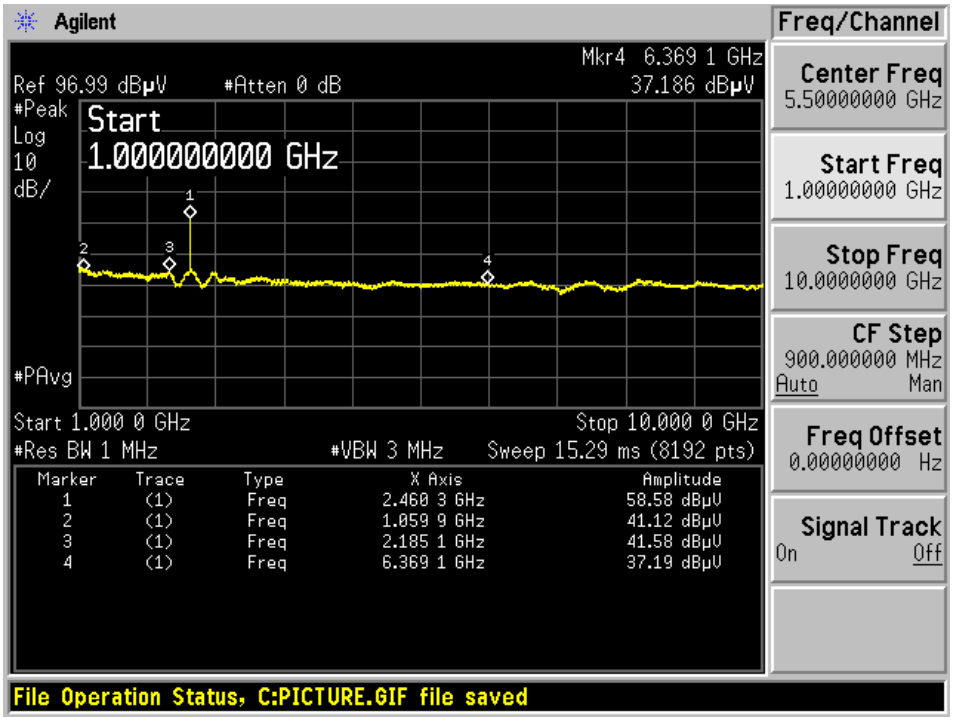
CCK 1-10GHz-H-AV



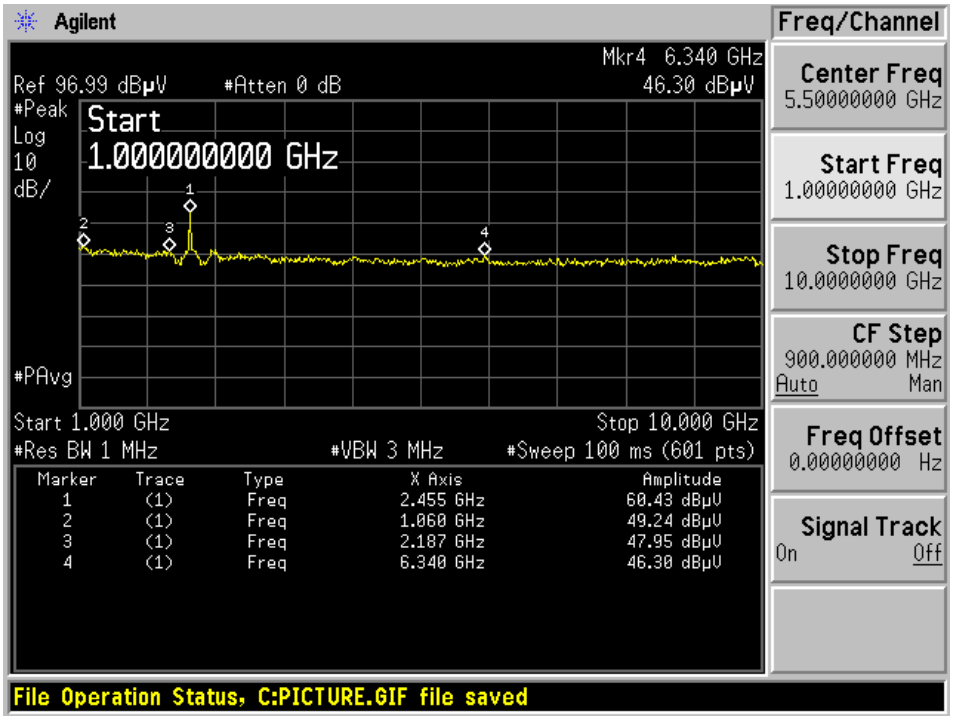
CCK 1-10GHz-H-PK



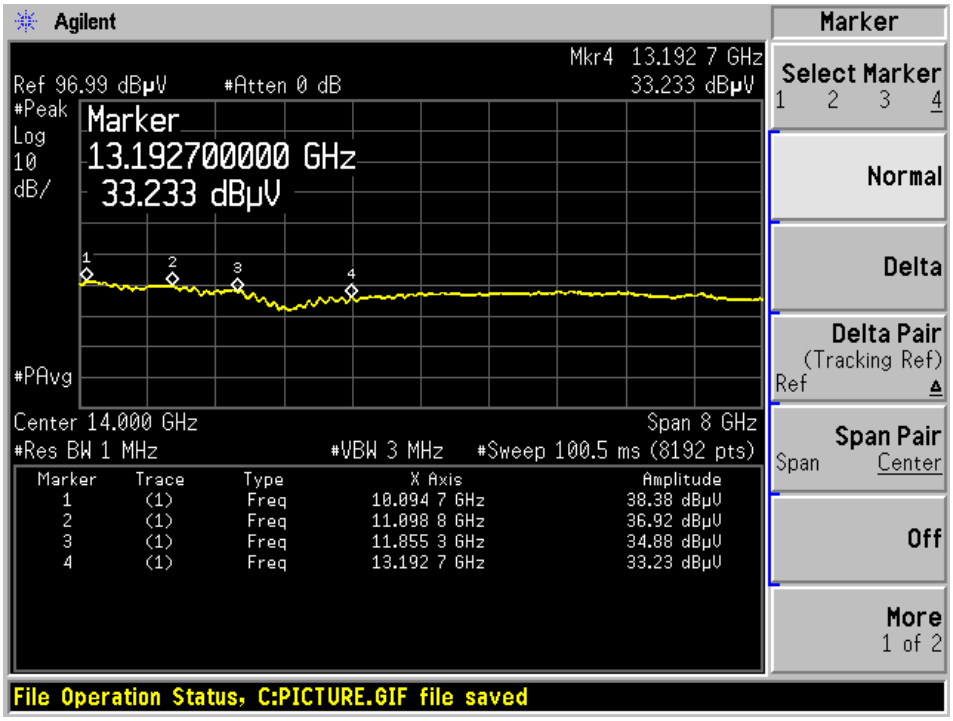
CCK 1-10GHz-V-AV



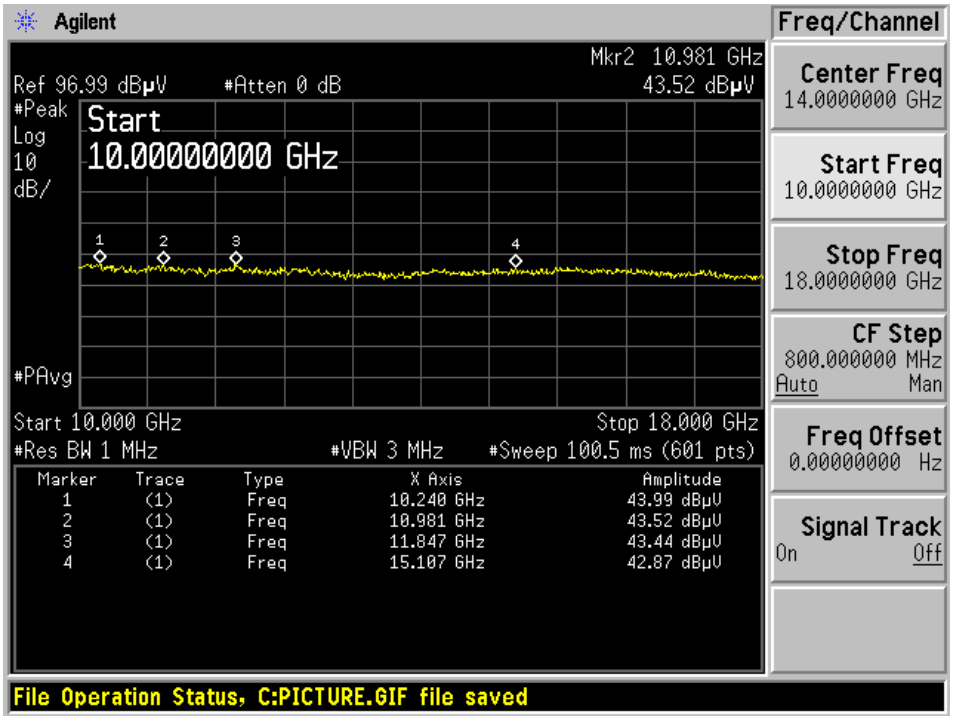
CCK 1-10GHz-V-PK



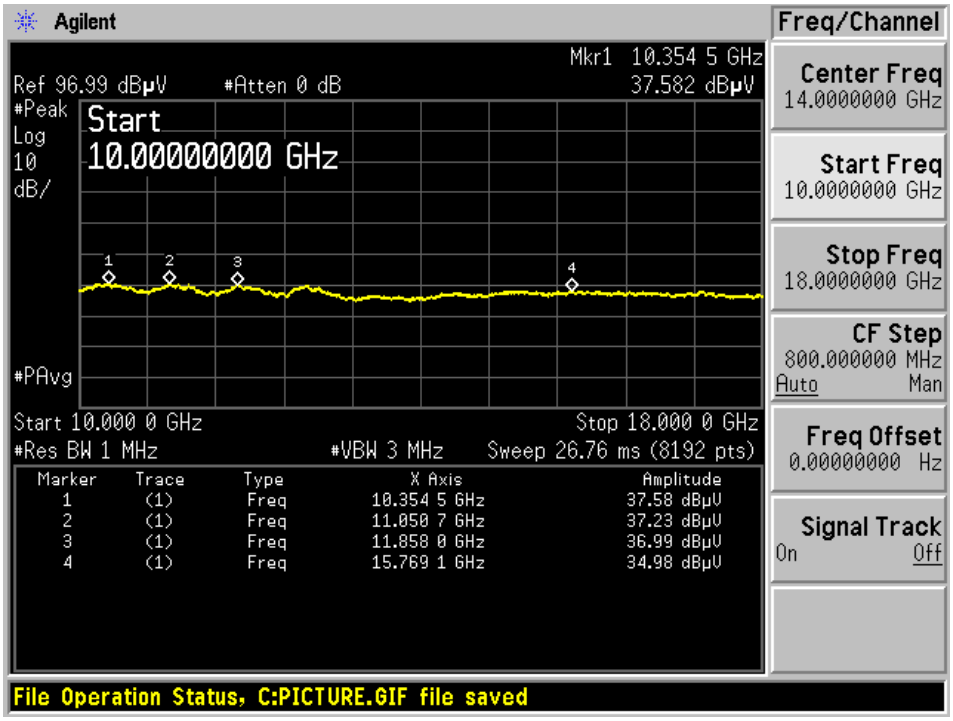
CCK 10-18GHz-H-AV



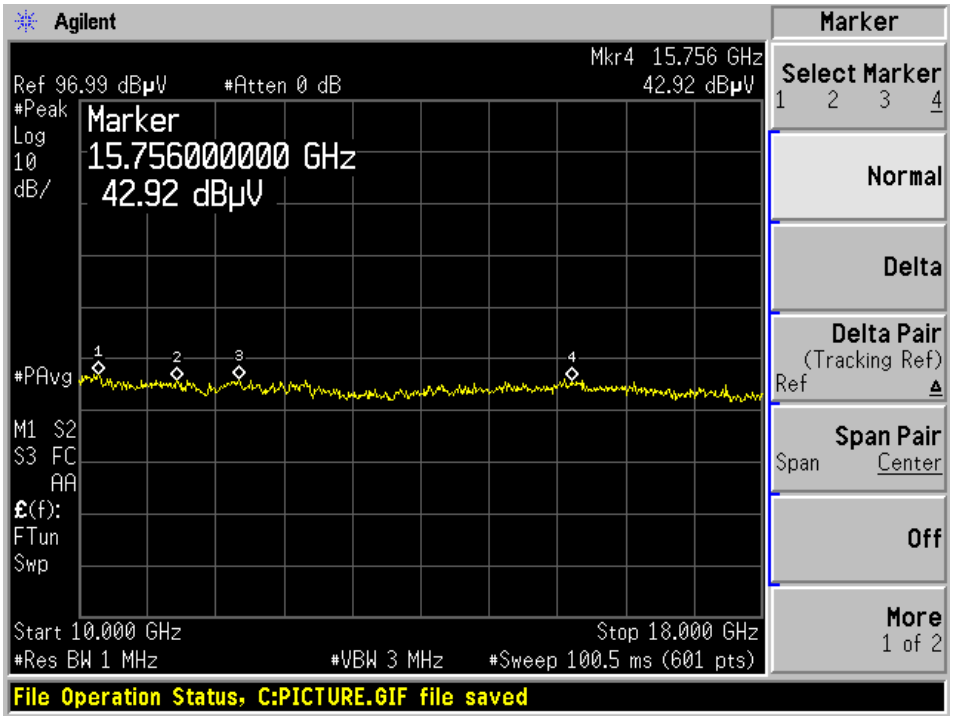
CCK 10-18GHz-H-PK



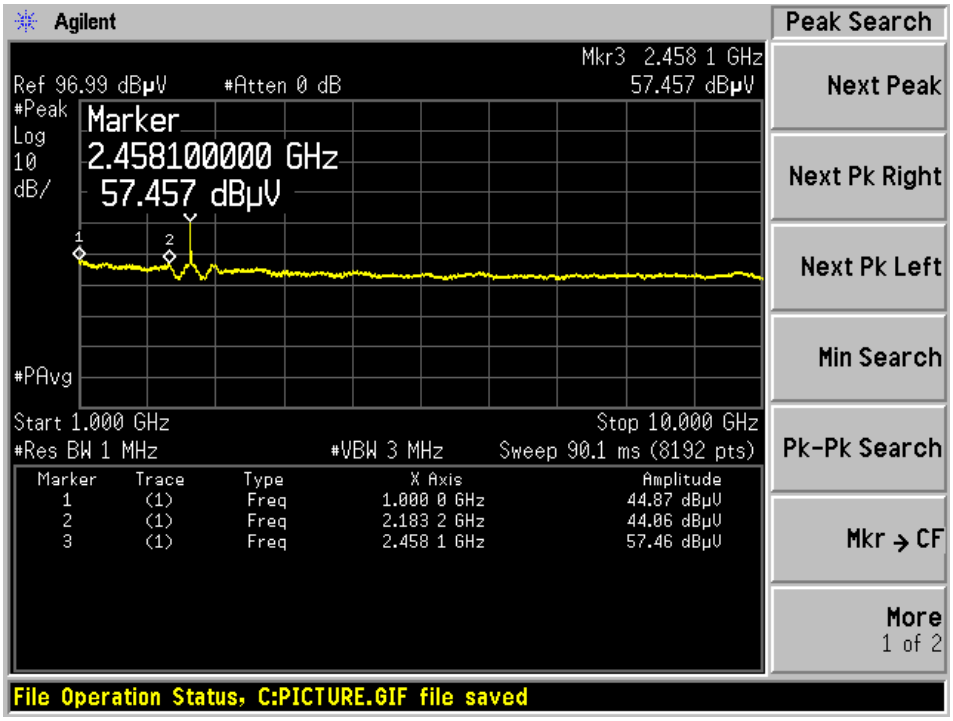
CCK 10-18GHz-V-AV



CCK 10-18GHz-V-PK



Non HT20 1-10G-H-AV



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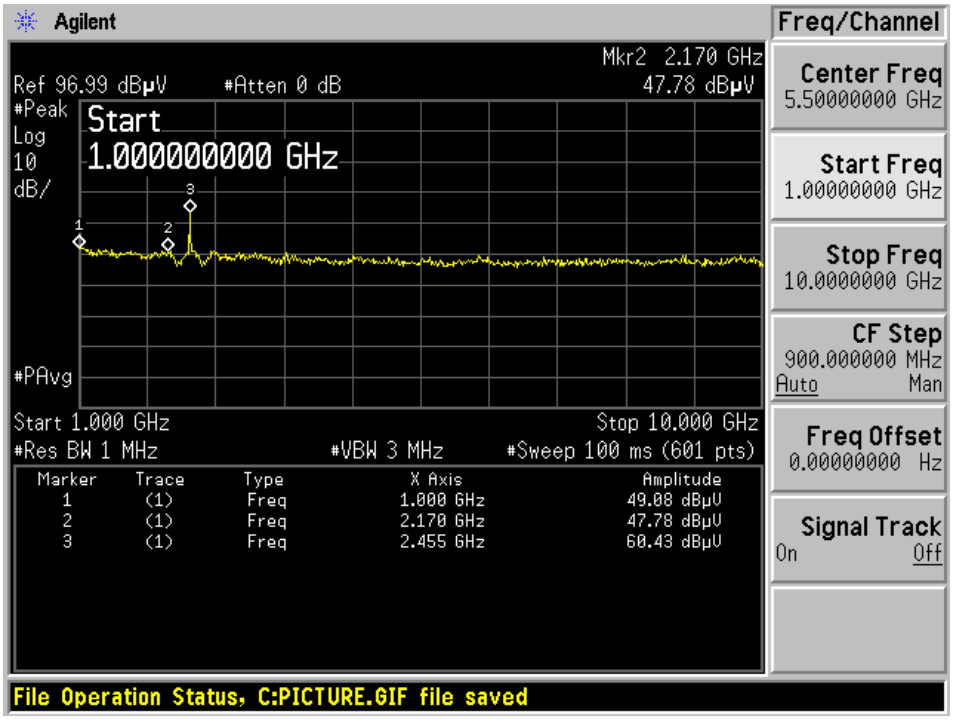

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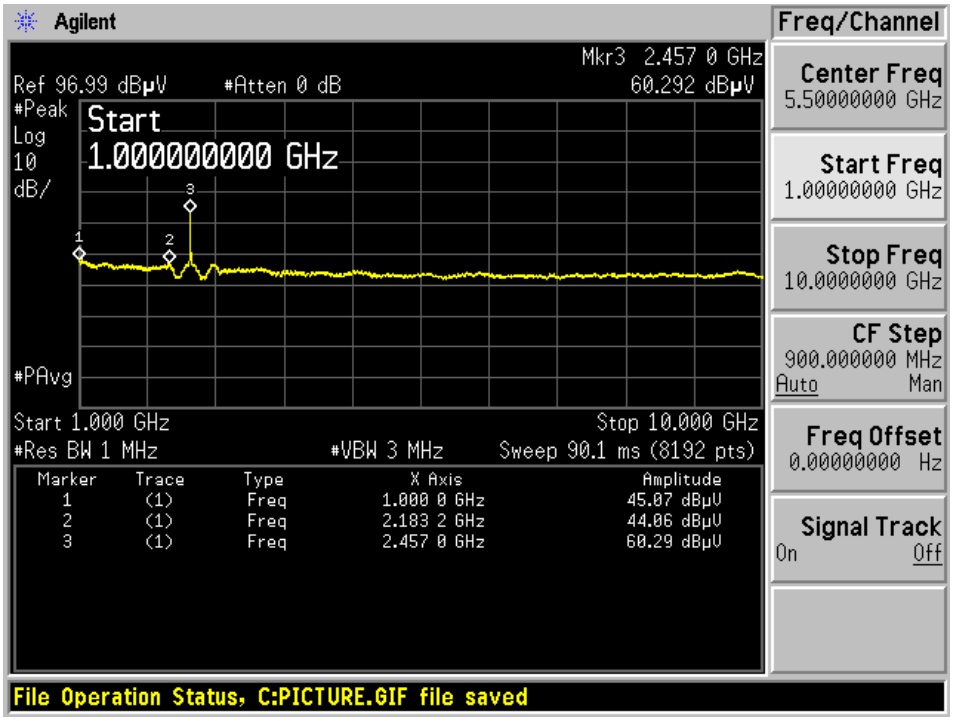

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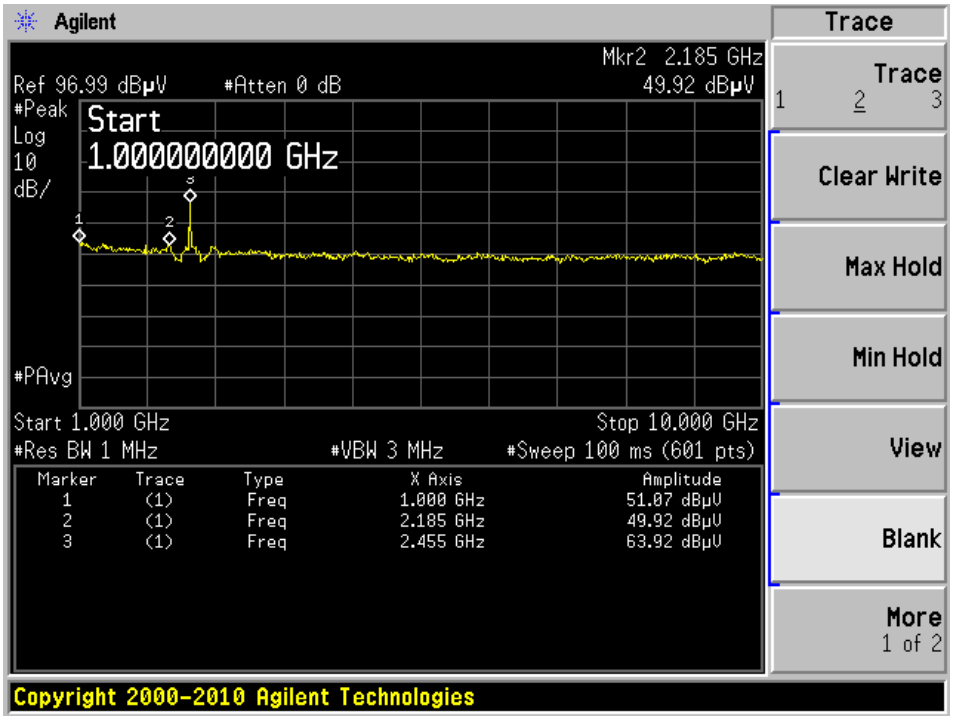

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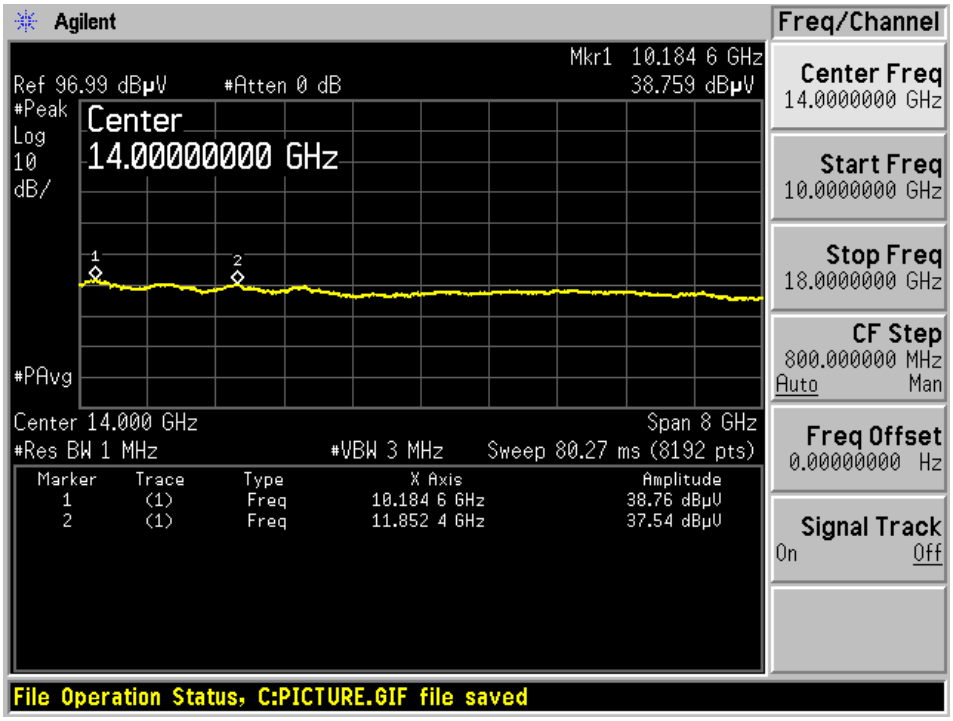

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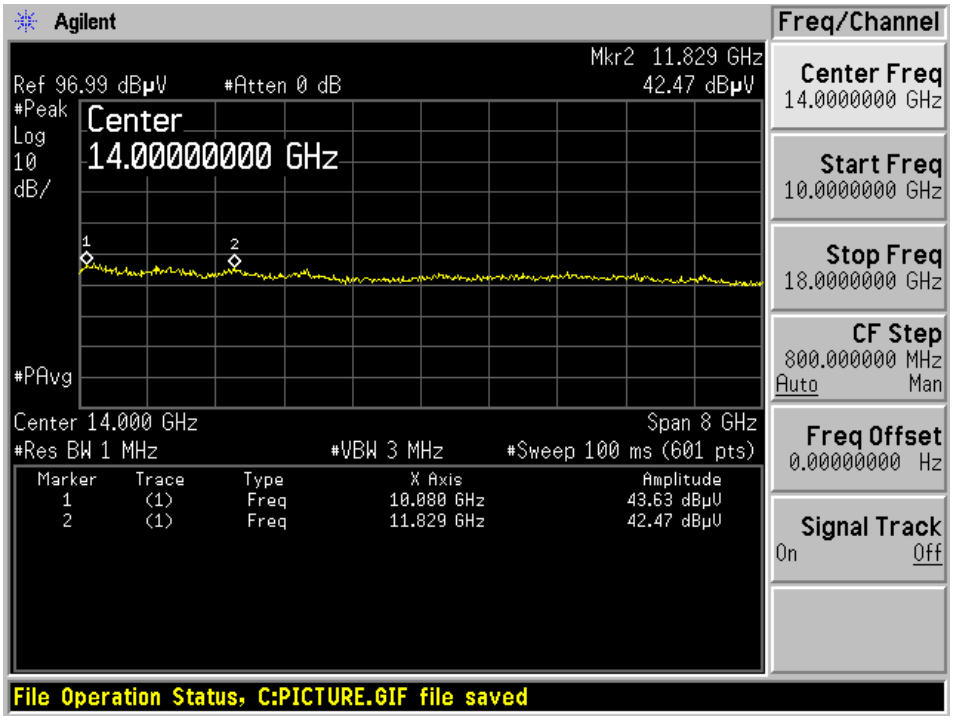

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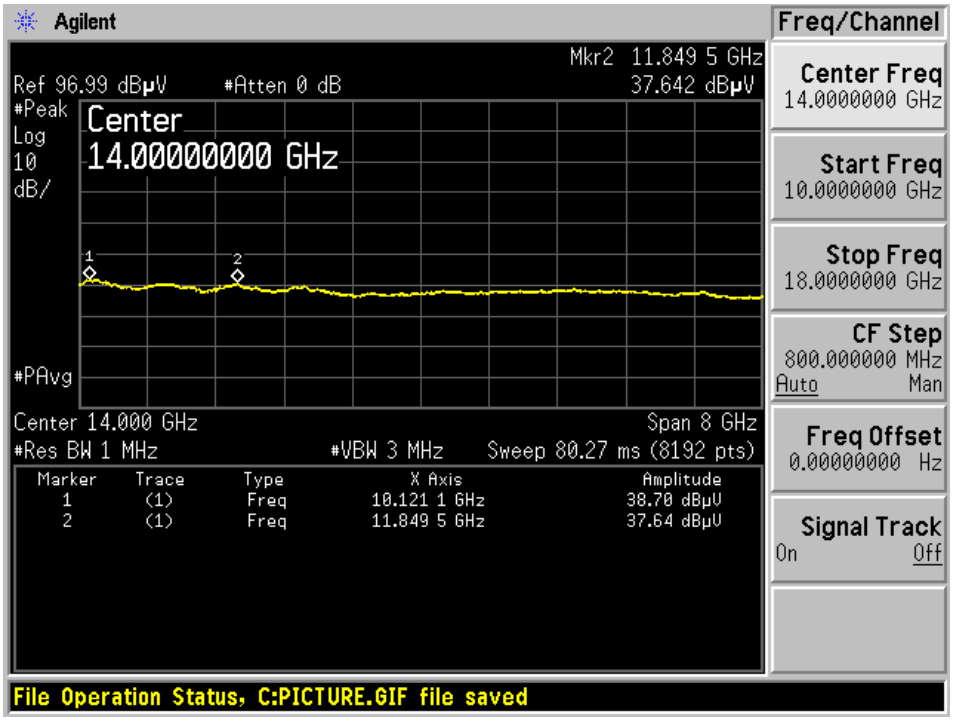

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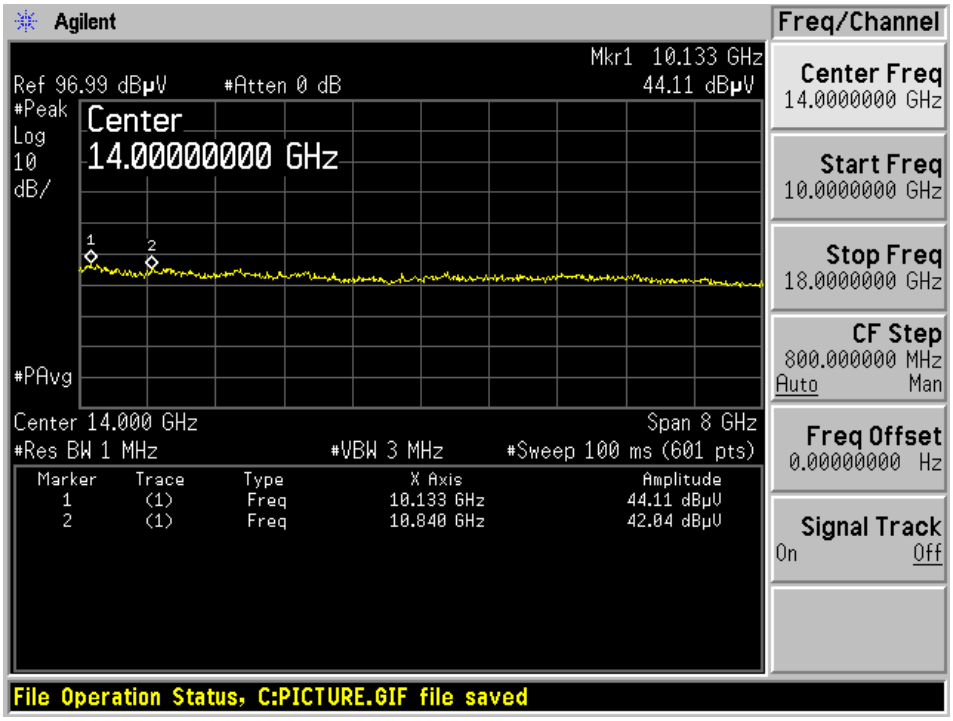
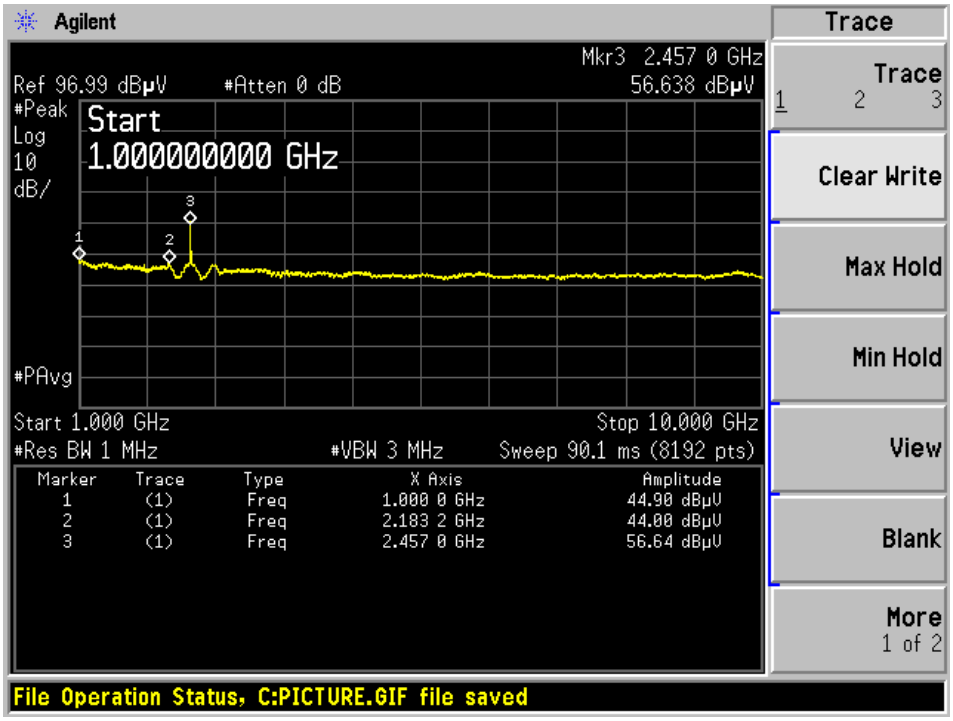


HT20 1-10G-H-AV



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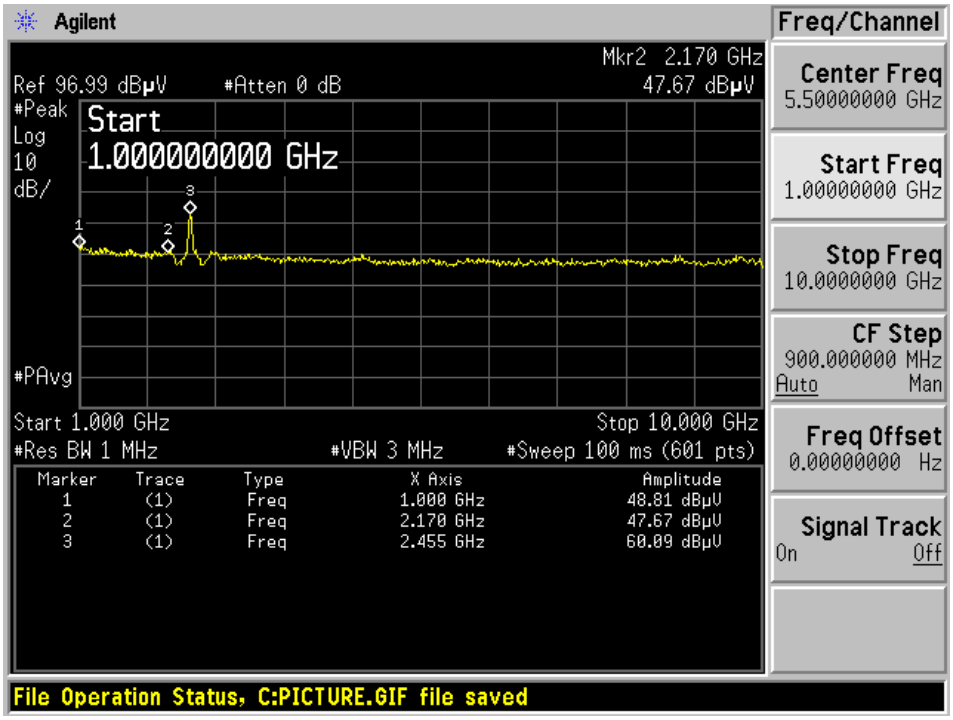
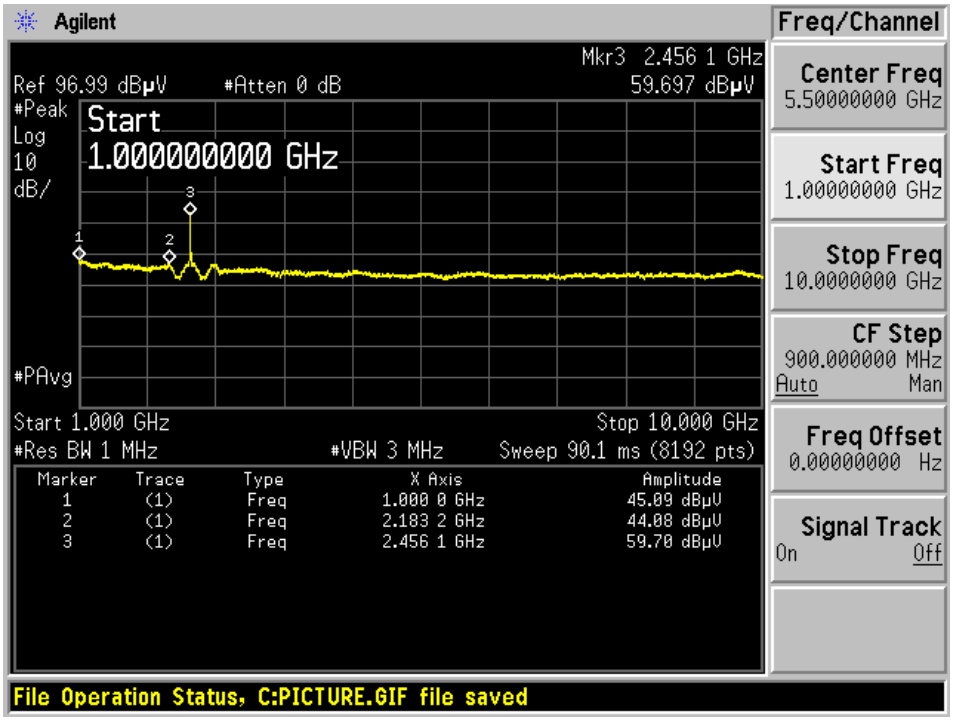
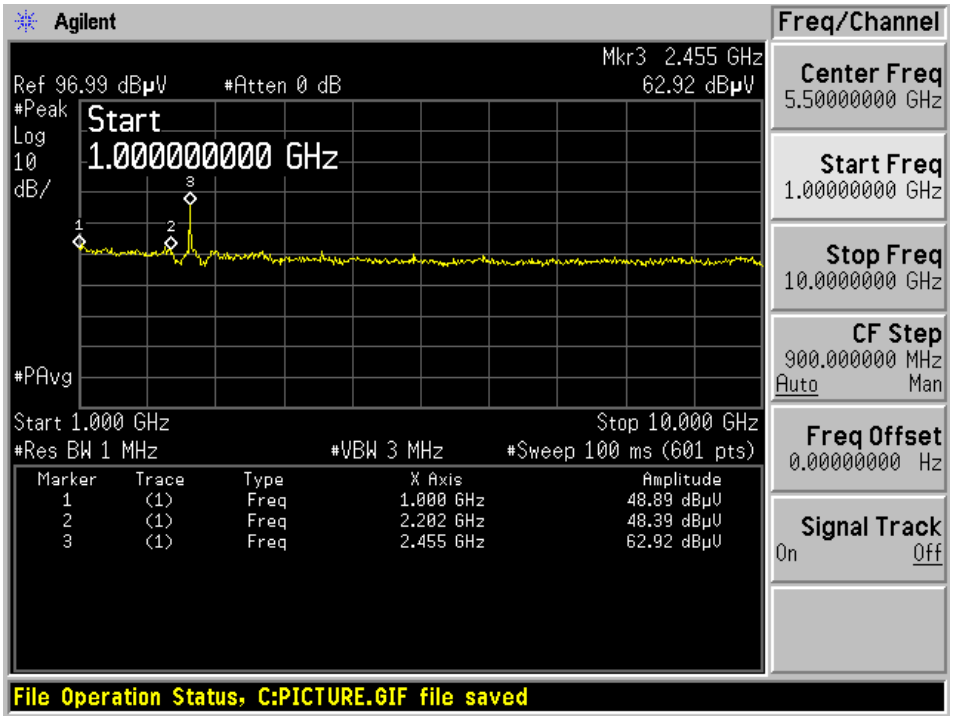


HT20 1-10G-V-AV



HT20 1-10G-V-PK



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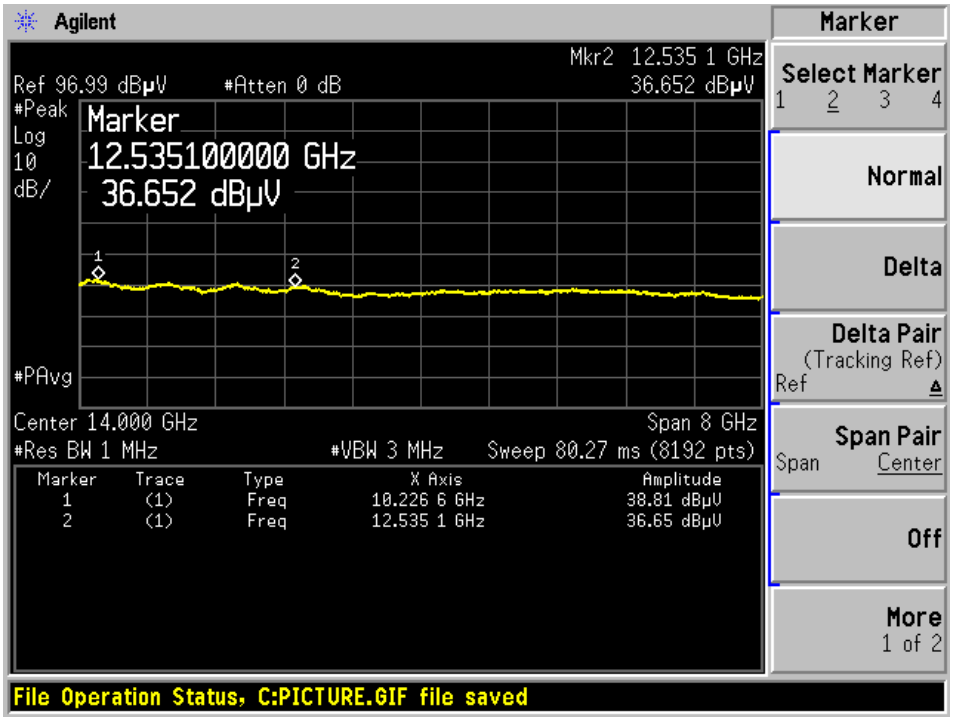

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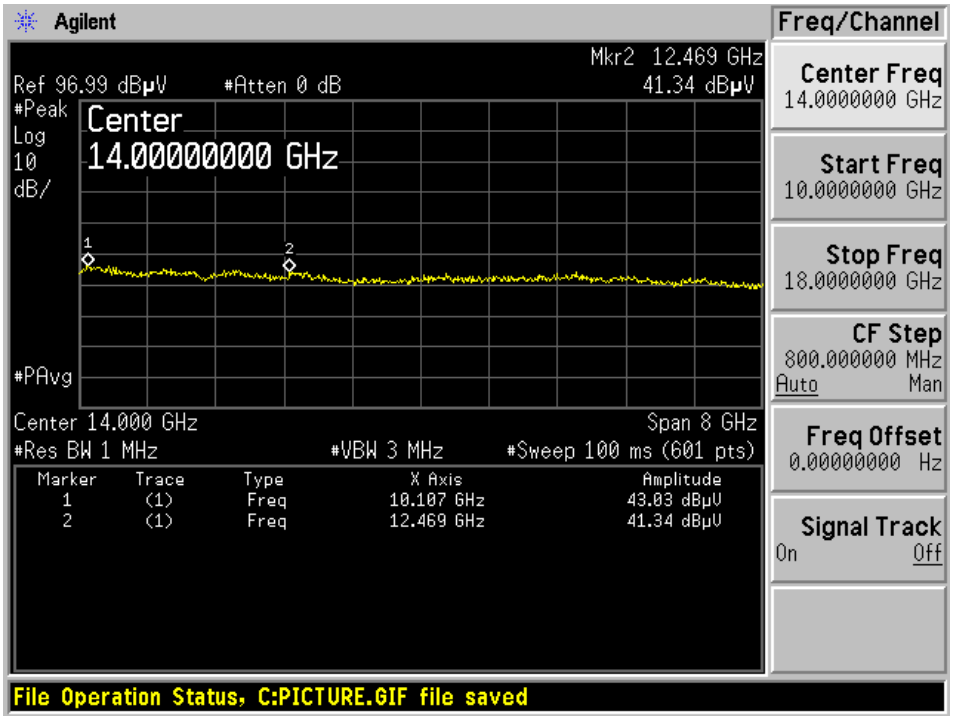

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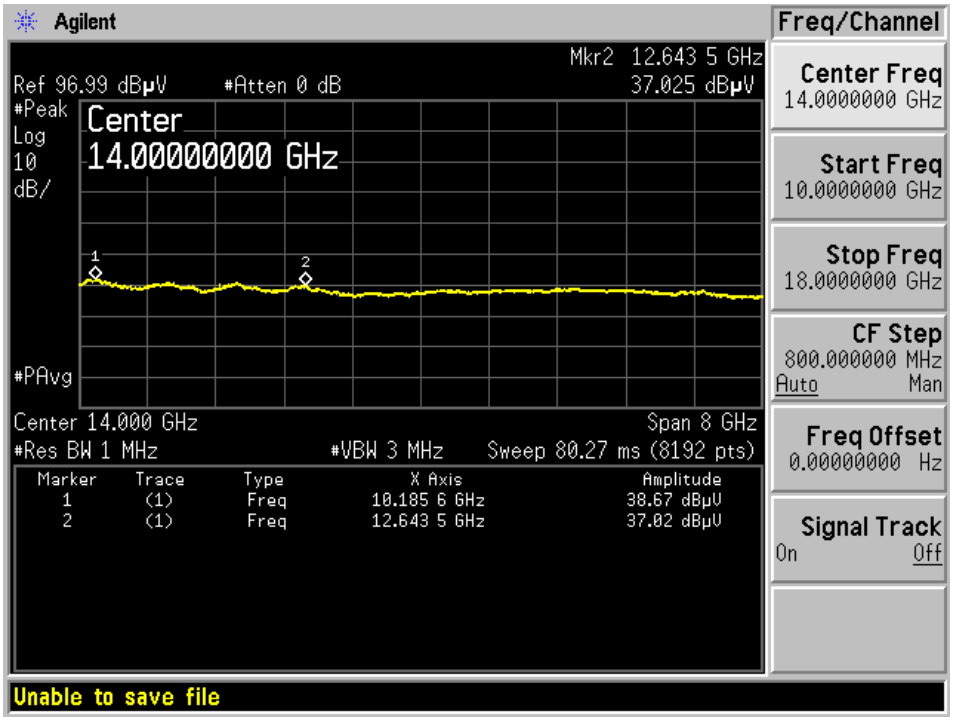
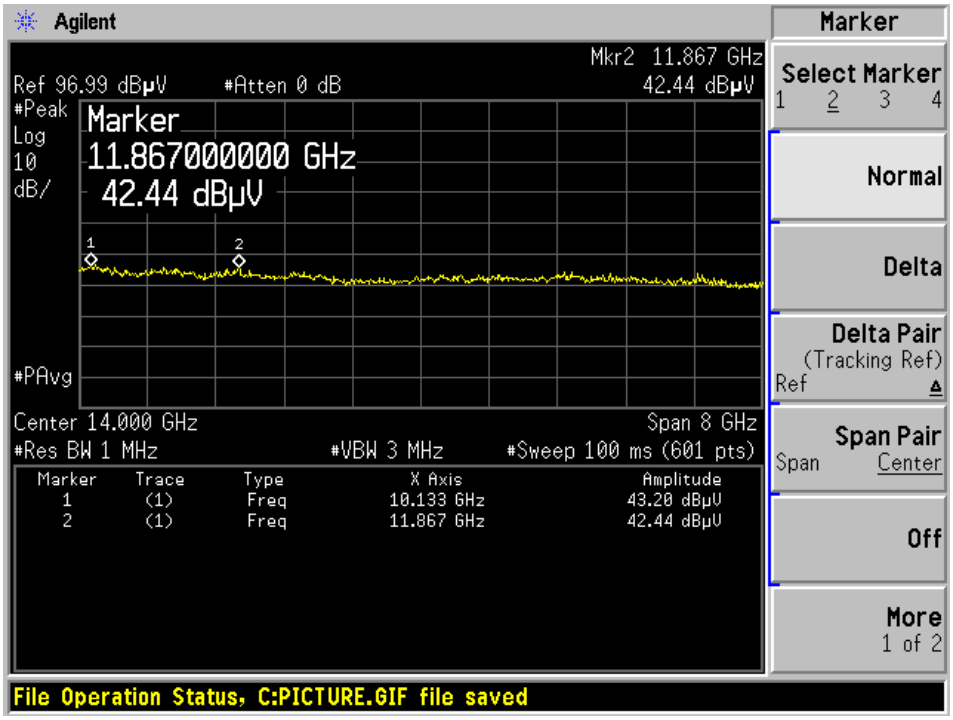
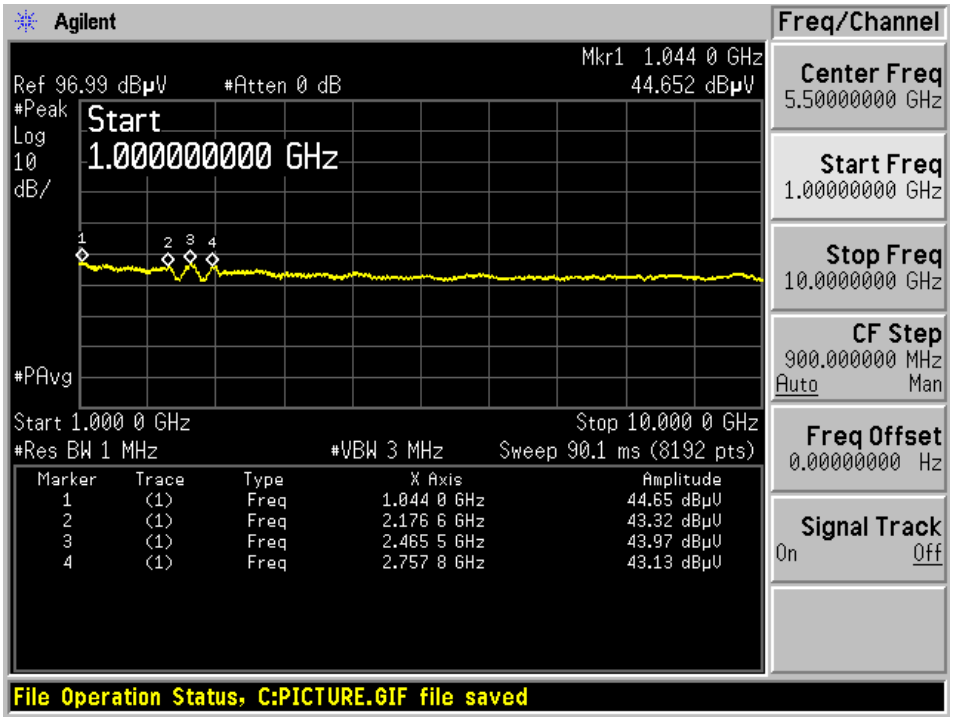


HT20 10-18G-V-PK

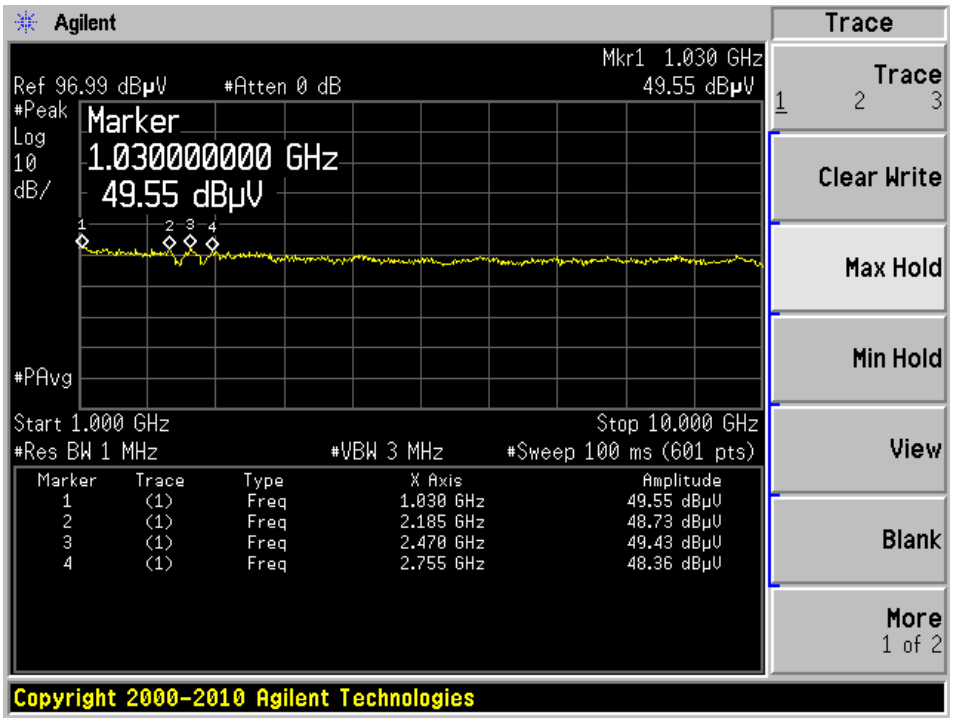


Appendix D BLE 2402 MHz

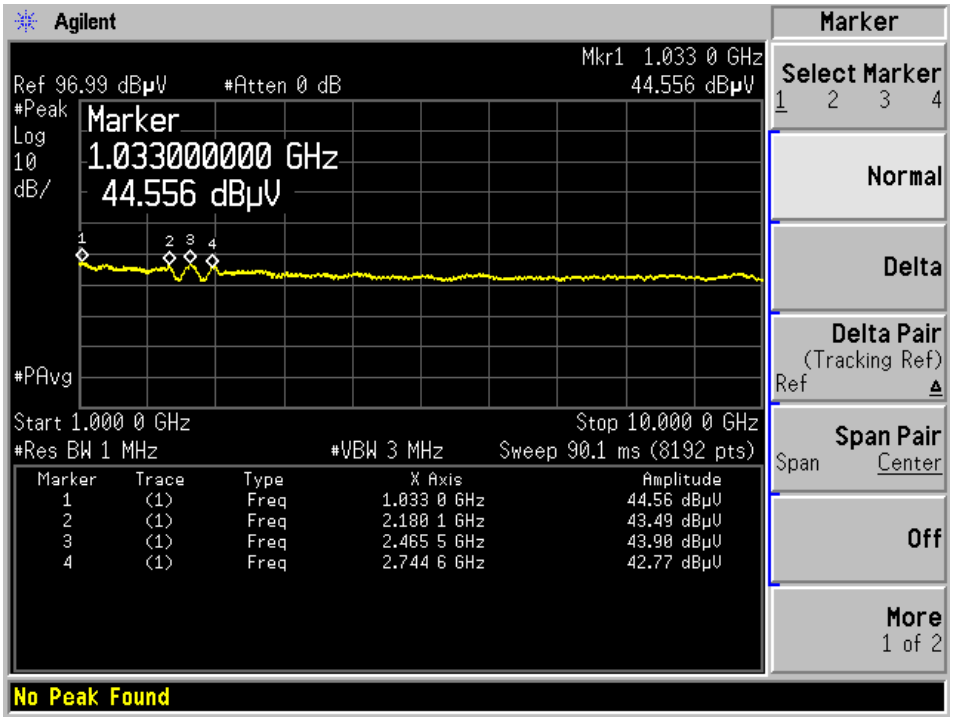
BLE 2402 1-10G-H-AV



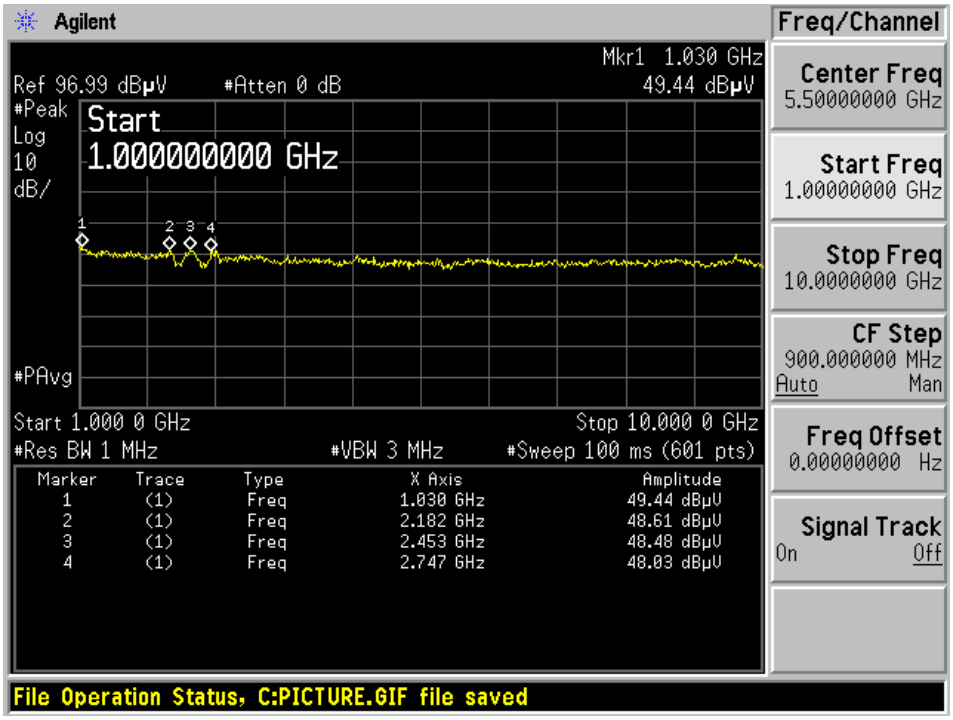
BLE 2402 1-10G-H-PK



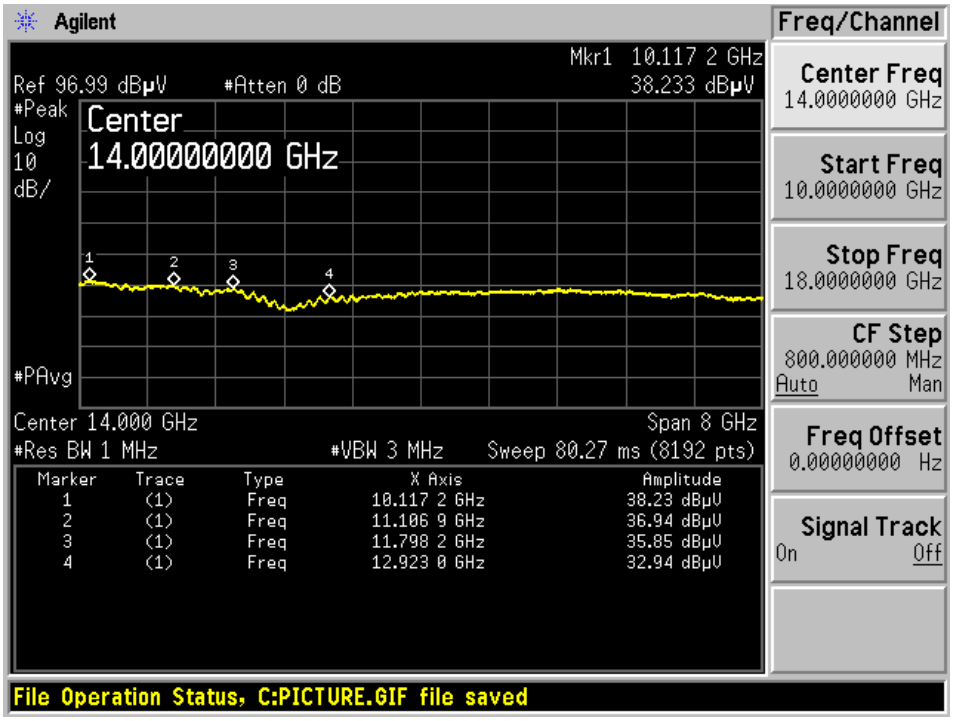
BLE 2402 1-10G-V-AV



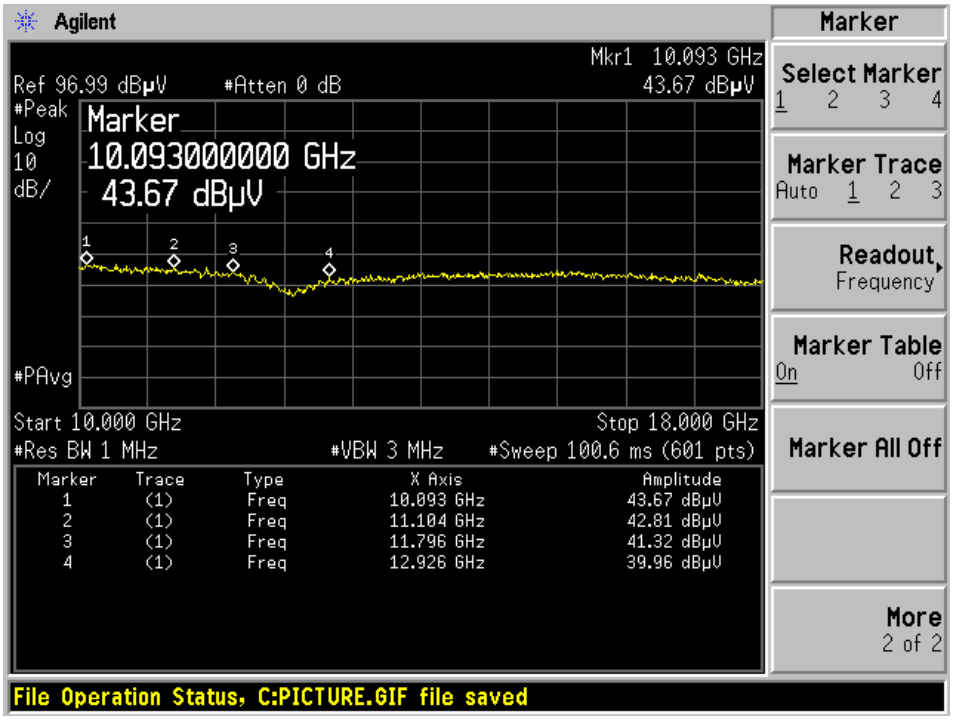
BLE 2402 1-10G-V-PK



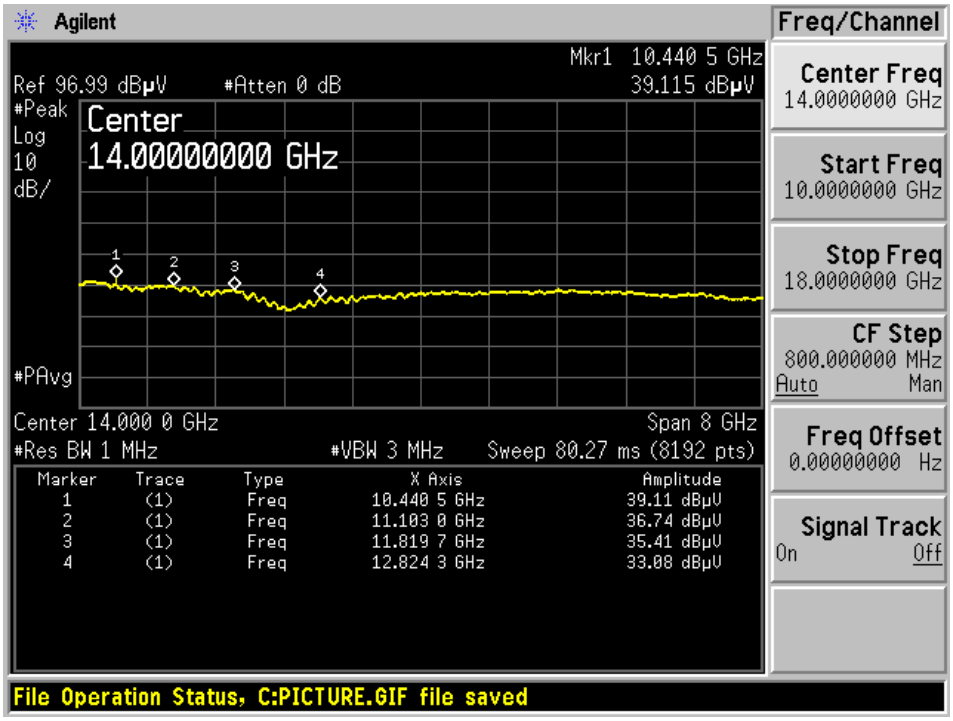
BLE 2402 10-18G-H-AV



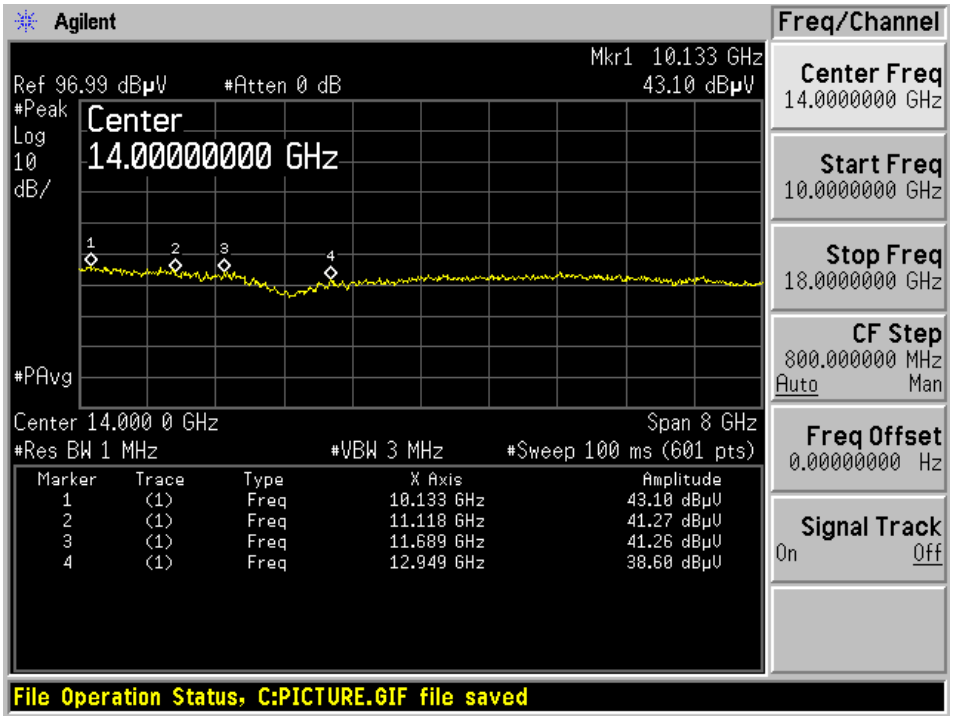
BLE 2402 10-18G-H-PK



BLE 2402 10-18G-V-AV

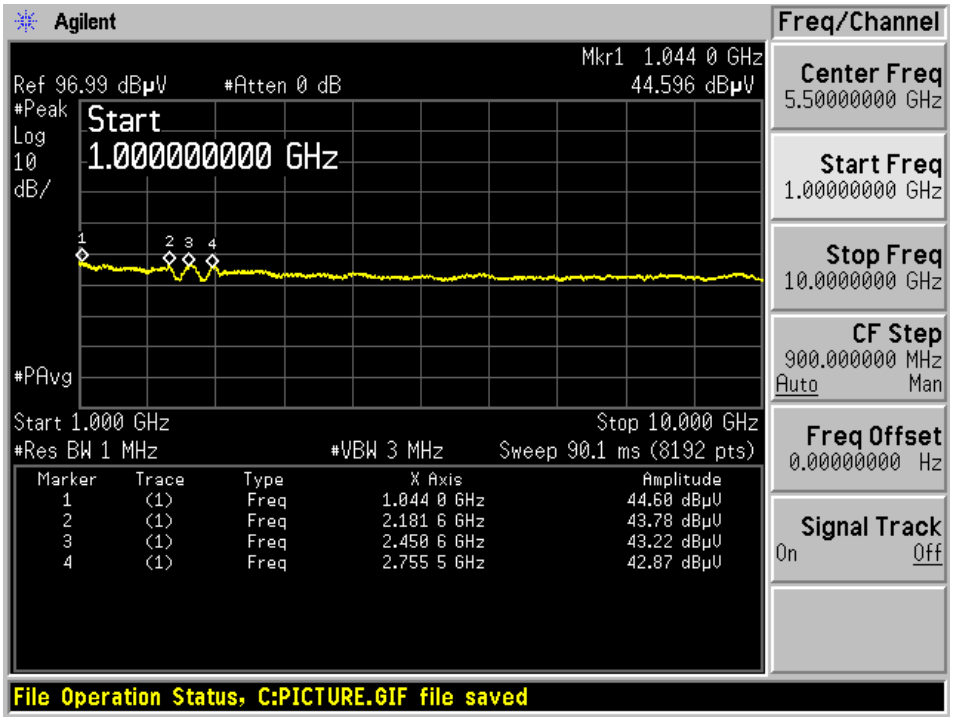


BLE 2402 10-18G-V-PK



Appendix E BLE 2440 MHz

BLE 2440 1-10G-H-AV



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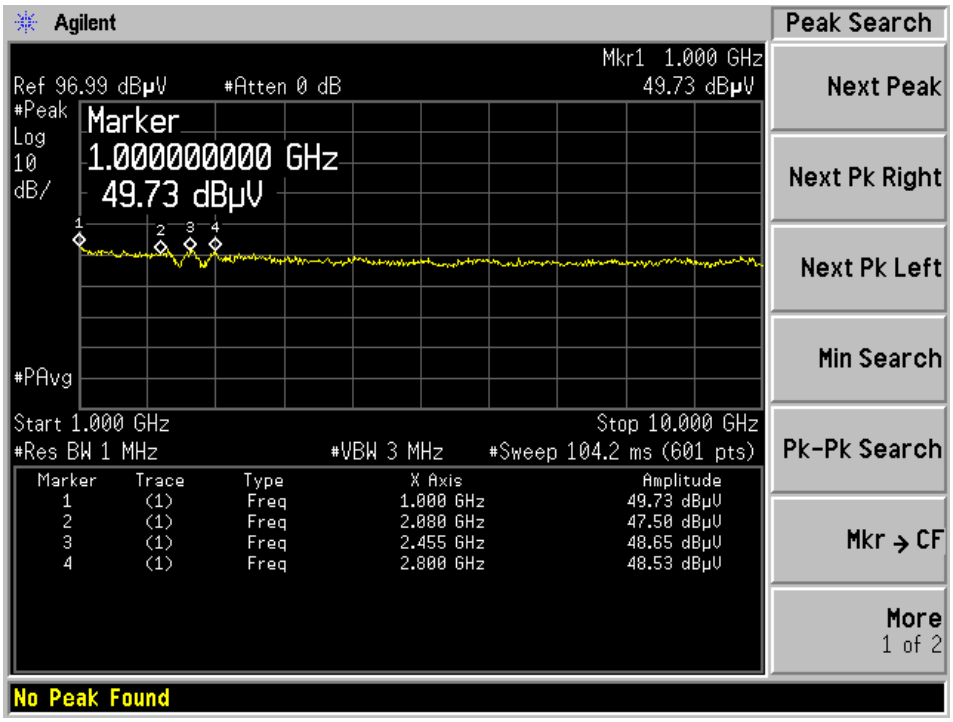
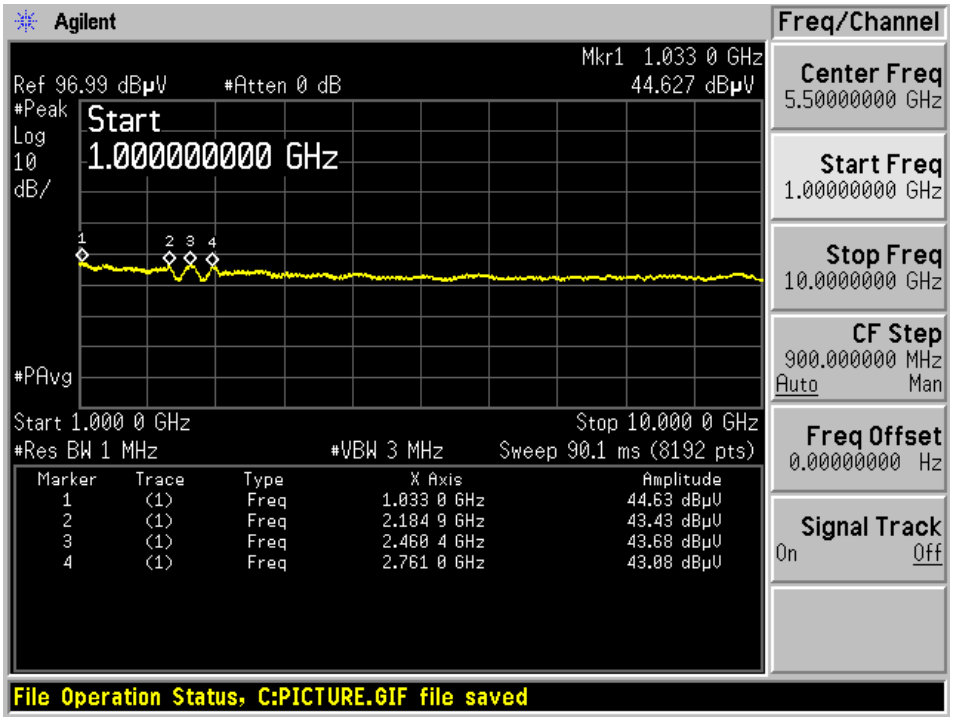


BLE 2440 1-10G-V-AV



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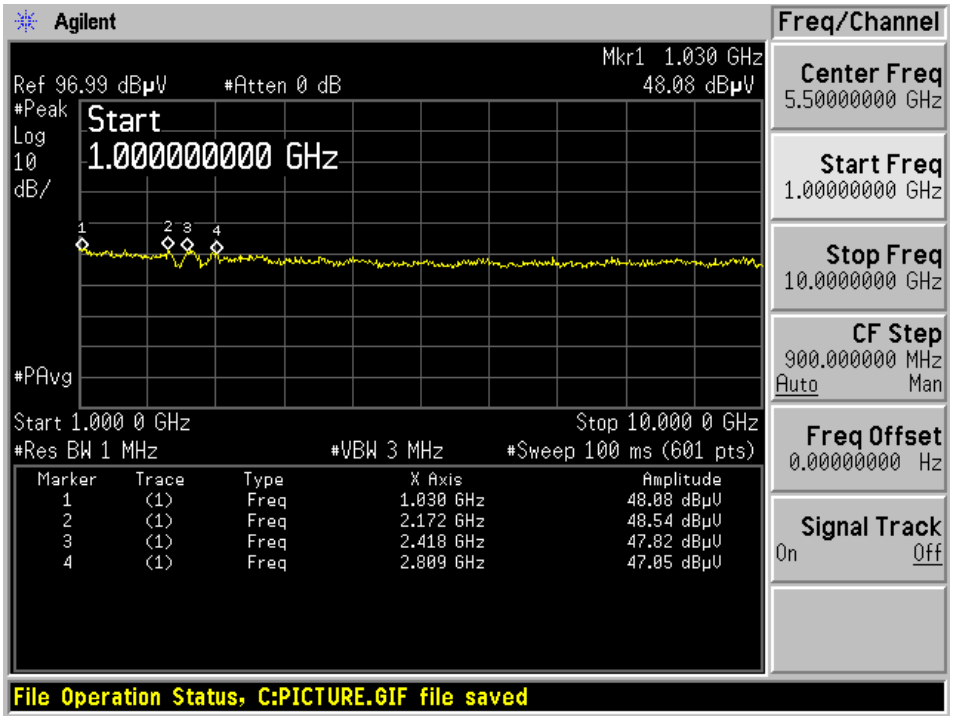
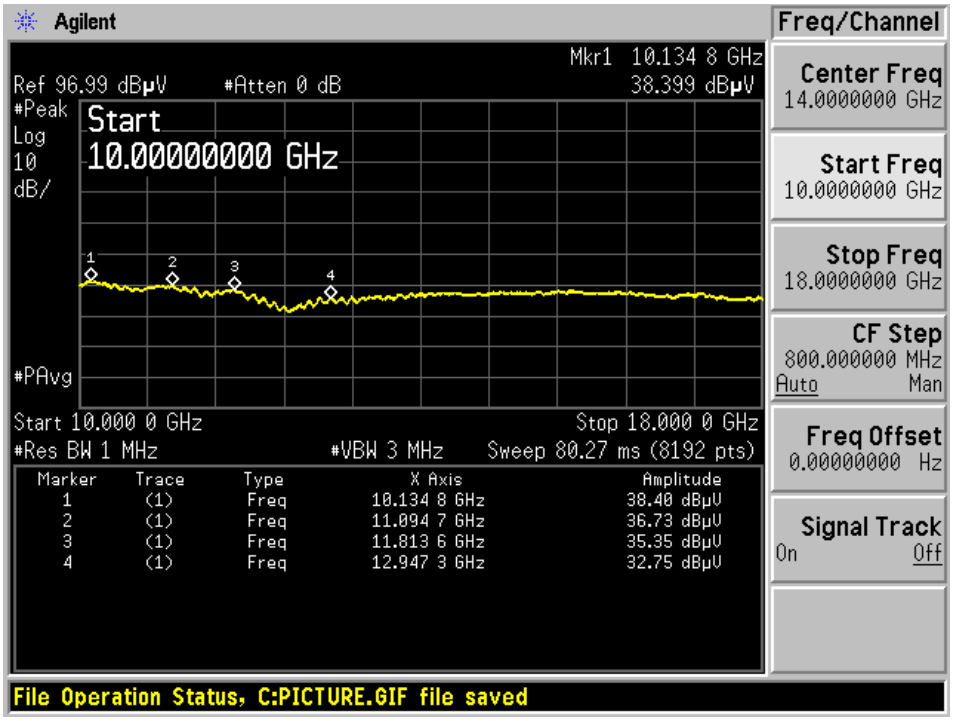
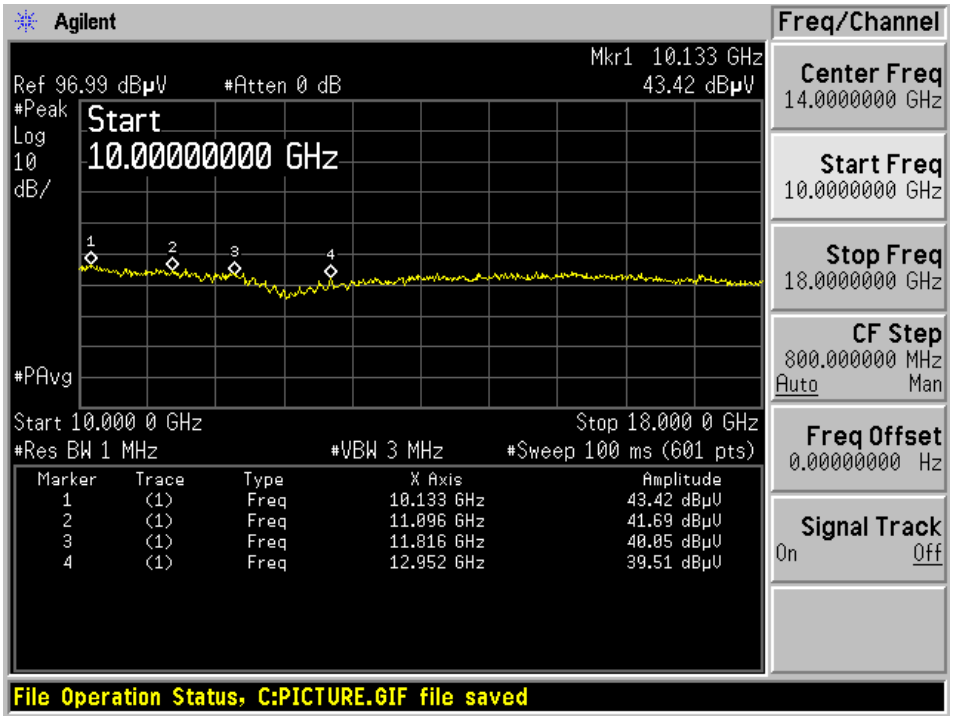


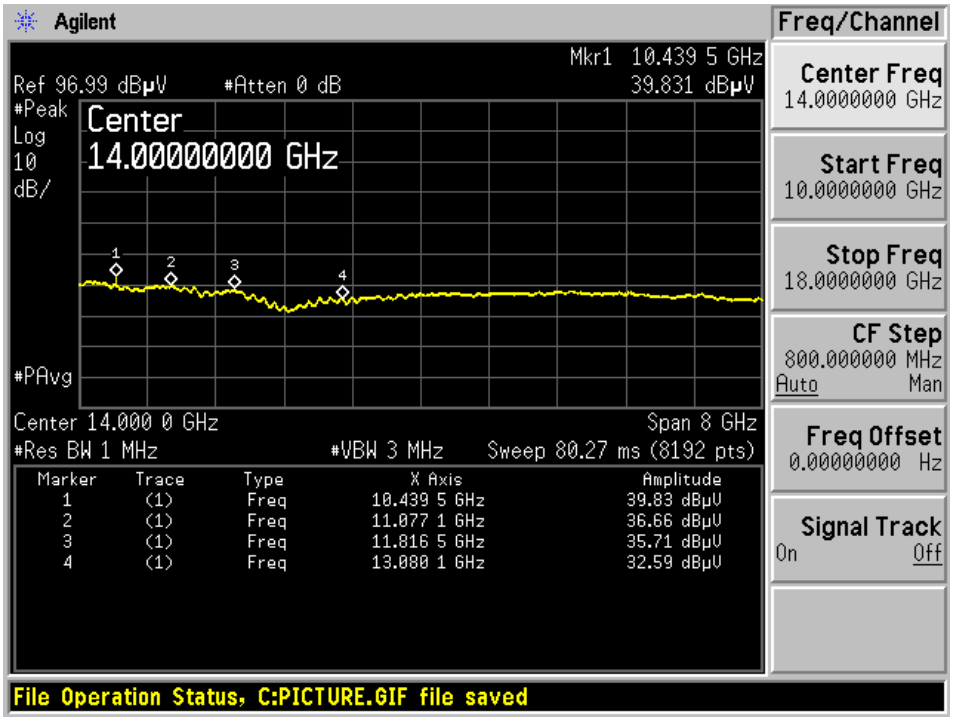
BLE 2440 10-18G-H-AV



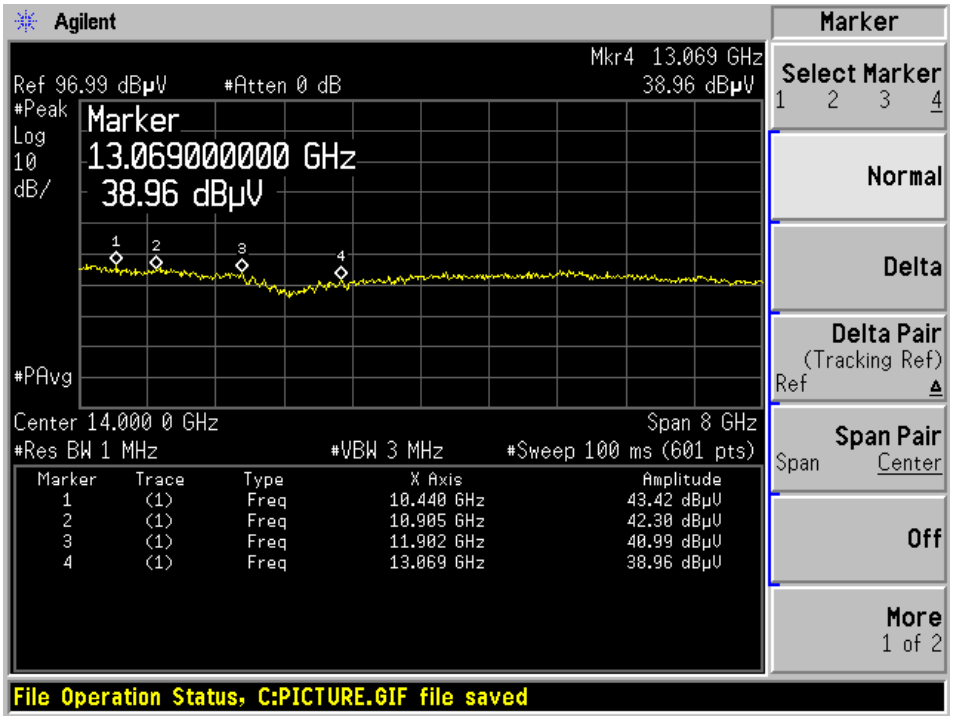
BLE 2440 10-18G-H-PK



BLE 2440 10-18G-V-AV

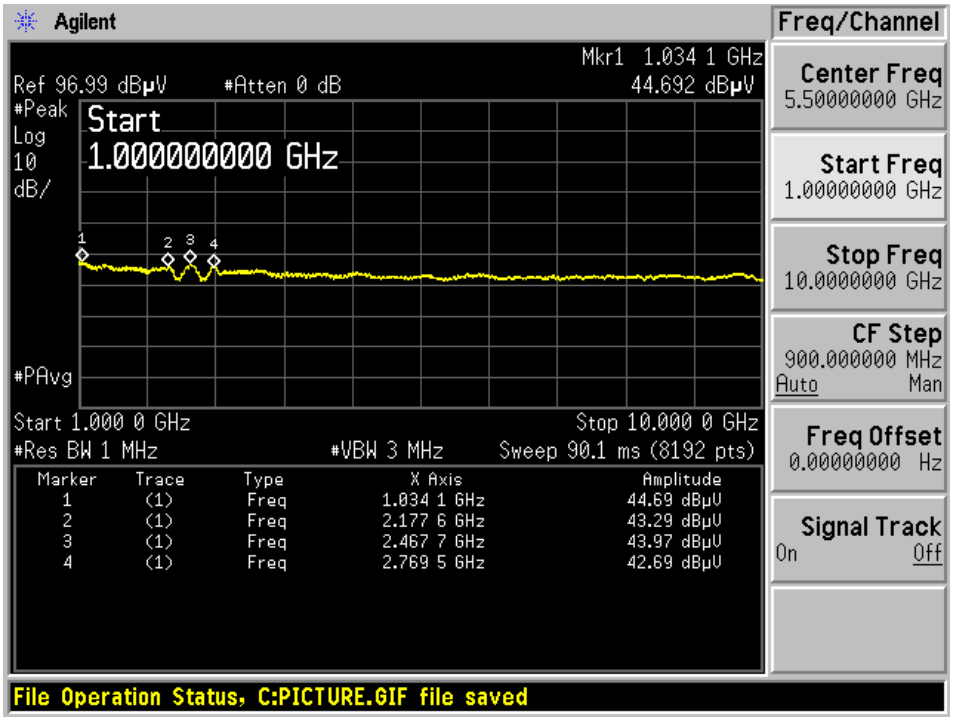


BLE 2440 10-18G-V-PK

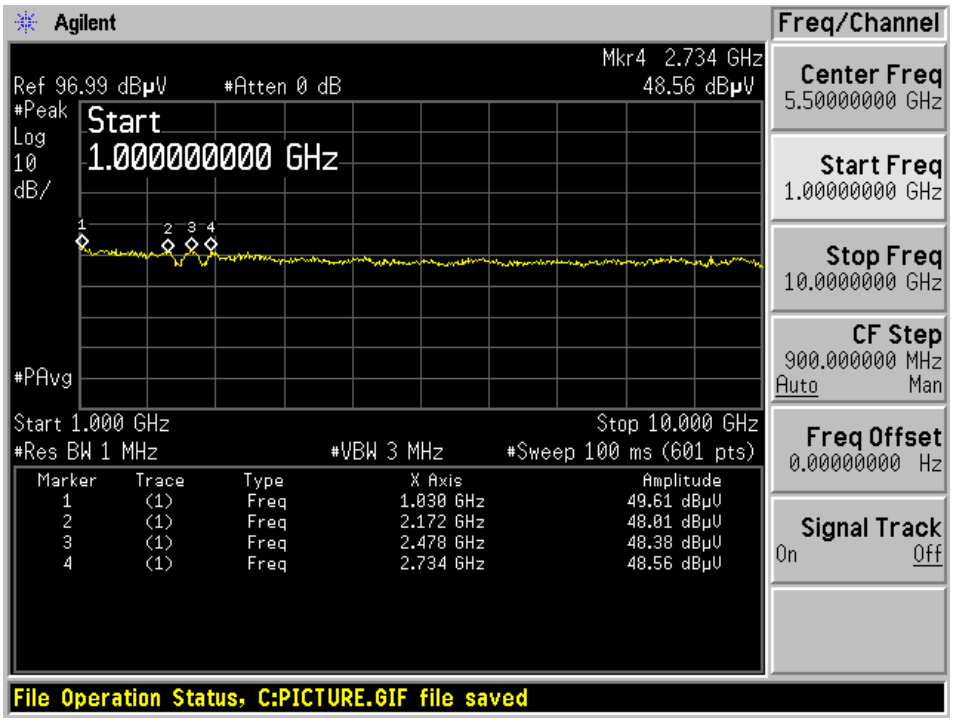


Appendix F BLE 2480 MHz

BLE 2480 1-10G-H-AV



BLE 2480 1-10G-H-PK



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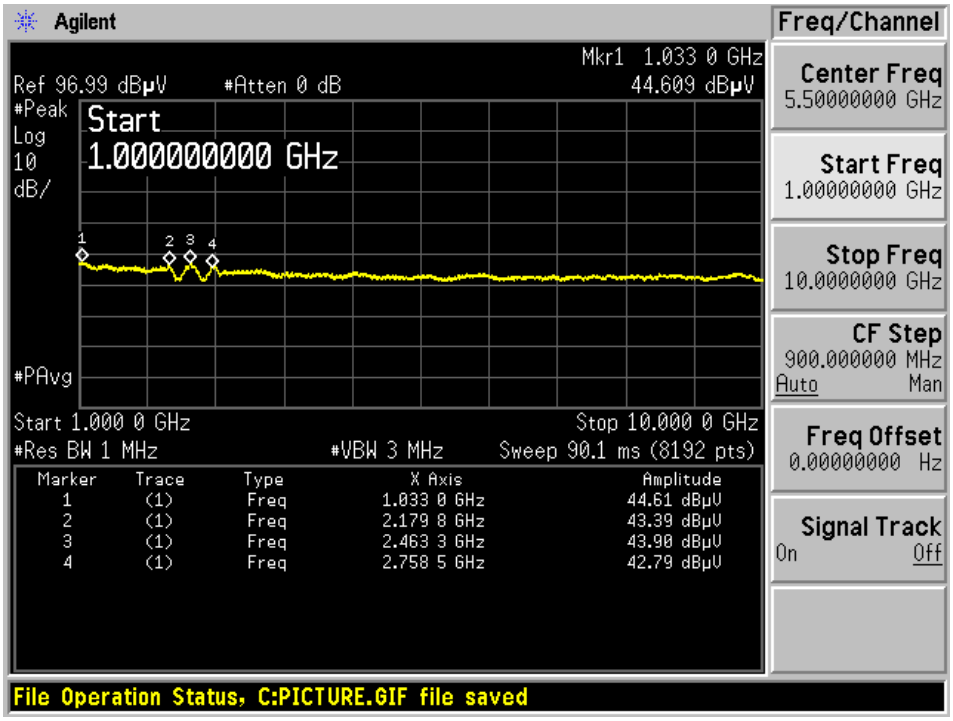

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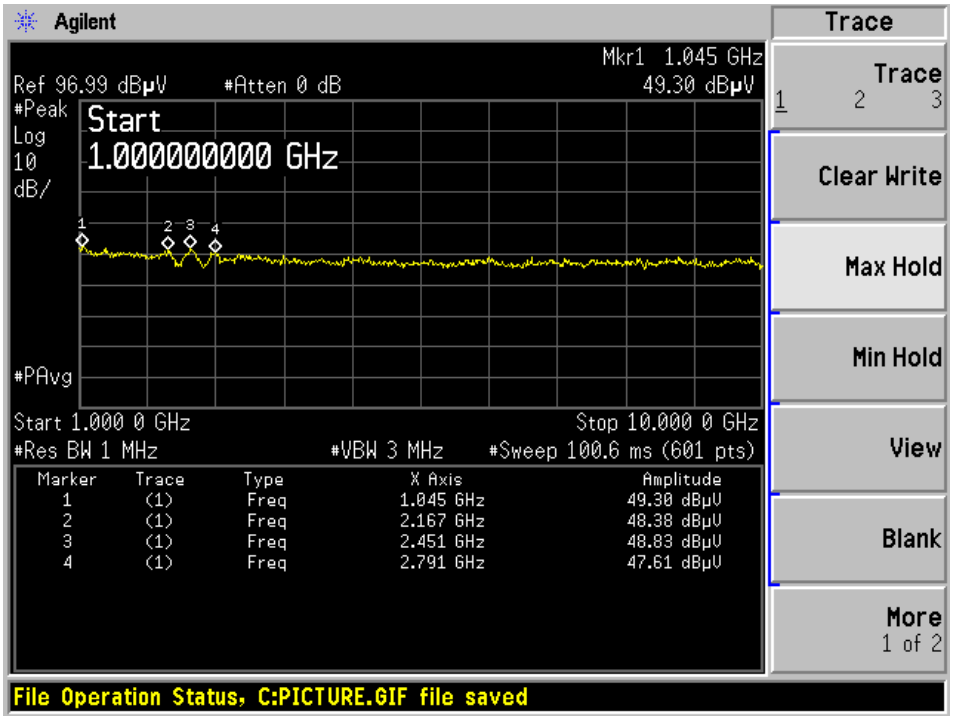

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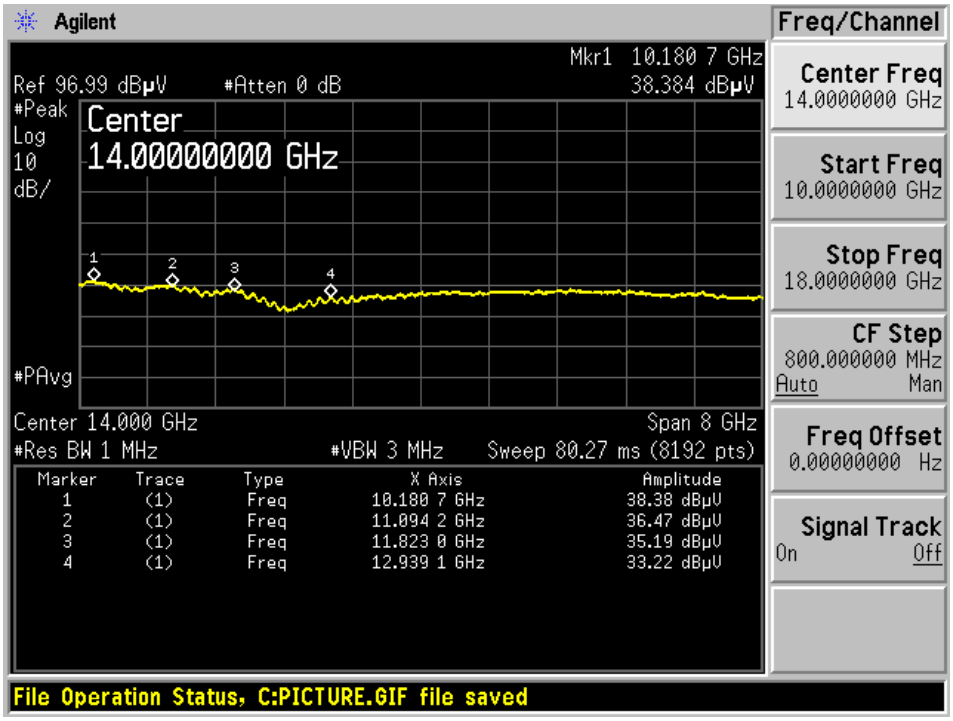

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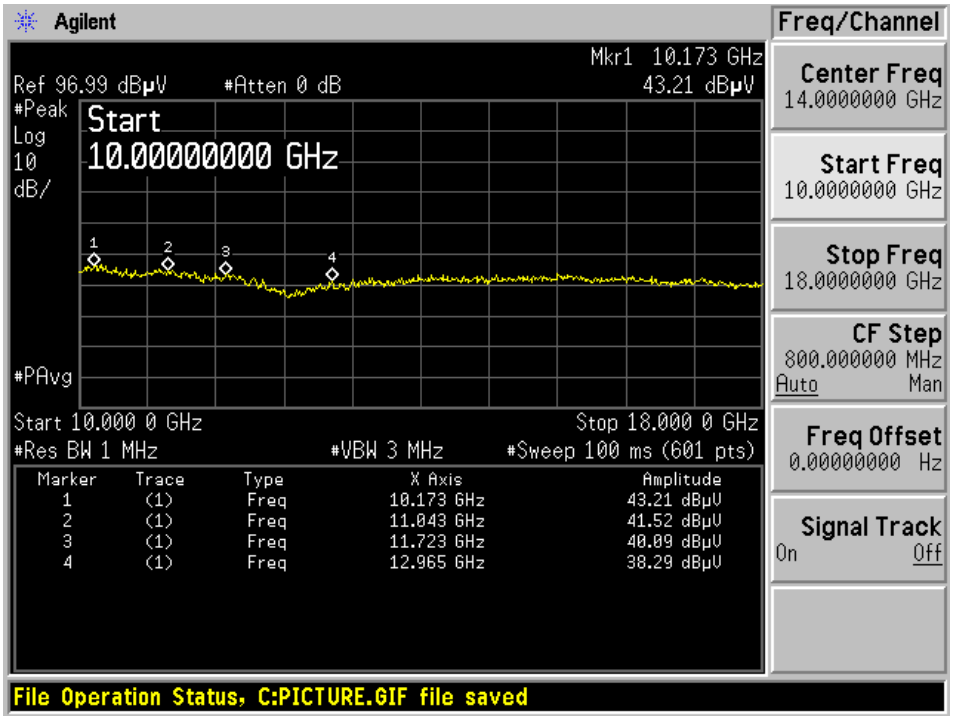

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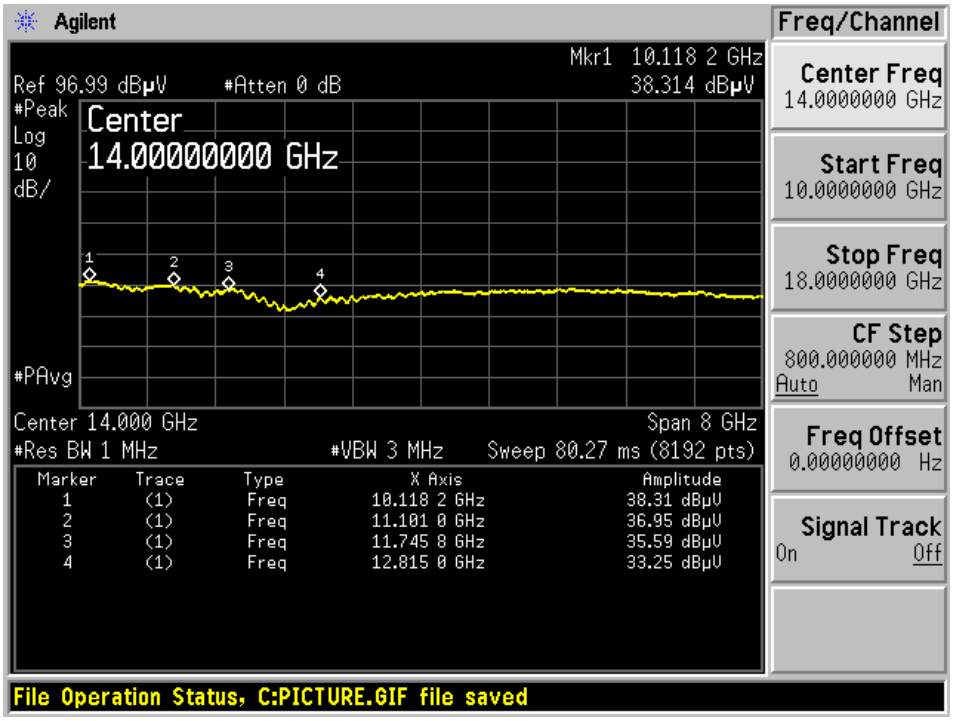

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