MOTOROLA

MOBILE DEVICES BUSINESS

PRODUCT SAFETY AND COMPLIANCE EMC LABORATORY

EMC TEST REPORT - Addendum

Test Report Number – 18002-1BT

Report Date – April 13, 2006

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Engineer, I hereby declare that the equipment tested as specified in this report conforms to the requirements indicated.

Signature: Name: Thanigaiselvan Palaniswami

Title: EMC Engineer Date: April 13, 2006

A2LA Certificate Number: 1651-01

A2LA ACCREDITED

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Test Report Details

Tests Performed By:	Motorola Mobile Devices Business Product Safety and Compliance Group 600 North US Hwy 45 Libertyville, IL 60048 PH (847) 523-6167 Fax (847) 523-4538 Motorola MDB FRN: 0004321311 FCC Registration Number: 316588 Industry Canada Number: IC3908
Tests Requested By:	Motorola Inc. Mobile Devices Business 600 North US Hwy 45 Libertyville, IL 60048
Product Type:	Cellular Phone
Signaling Capability:	GSM 1900 and Bluetooth
Model Number:	L6- iMode
Serial Numbers:	FB15V2227S, FB15V2227P, FB15V2226Q FB15V2228P & FB15V2228F
Testing Complete Date:	April 13, 2006

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

__X__Part 15 Subpart C – Intentional Radiators
_____Part 22 Subpart H - Public Mobile Services
_____Part 24 - Personal Communications Services
_____ Part 90 - Private Land Mobile Radio Service

Applicable Standards: TIA EIA 137-A, TIA EIA 98-C, ANSI 63.4 2001, RSS-118 (AMPS), RSS-128 (TDMA), RSS-129 (CDMA), RSS-133 (PCS)

DA 00-705, “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems” published by the Federal Communications Commission was also used in the testing of this product.

Summary of Testing

Test	Test Name	Pass/Fail
1	Carrier Frequency Separation	Pass
2	Number of Hopping Frequencies	Pass
3	Time of Occupancy (Dwell Time)	Pass
4	20 dB Bandwidth	Pass
5	Spurious RF Conducted Emissions	Pass
6	Field Strength of Spurious Emissions	Pass
7	Max Power	N/A
8	Band Edges	Pass
9	Conducted Spurious Emissions	Pass

Test	Test Name	Results
1	Carrier Frequency Separation	1 MHz
2	Number of Hopping	79
3	Time of Occupancy (Dwell Time)	2.917 ms
4	20 dB Bandwidth	826 kHz
5	Spurious RF Conducted Emissions	See plots
6	Field Strength of Spurious Emissions	See plots
7	Max Power	3.60 dBm
8	Band Edges	See plots
9	Conducted Spurious Emissions	See plots

General and Special Conditions

The EUT was tested using a fully charged battery when applicable. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

All testing was done in an indoor controlled environment with an average temperature of 22º C and relative humidity of 50%.

Equipment and Cable Configurations

The EUT was tested in a stand-alone configuration that is representative of typical use.

Measuring Equipment and Calibration Information

Manufacturer	Equipment Type	Model No.	Serial Number	Cal. Due Date
Rohde & Schwarz	Receiver	ESI26	838786/010	6/17/2006
Hewlett-Packard	EMC Analyzer	E7405A	US40240219	6/8/2006
AH Systems Inc	DRG Horn Antenna	SAS-200/571	265	5/25/2006
ETS	Log-Periodic Antenna	3148	1188	6/14/2006
ETS	Biconical Antenna	3110B	3369	8/18/2006
Attenuator	Weinschel	AS-6	6677	11/10/2006
Attenuator	Weinschel	AS-3	6677	11/10/2006
Attenuator	Agilent	8491A	36904	9/19/2006
Rohde & Schwarz	Mobile Test Set	CMD 80	DE29008	N/A
Hewlett-Packard	Signal Generator	83623B	3844A01195	6/20/2006

All equipment is on a one-year calibration cycle.

Description of Bluetooth Transmitter

The L6 i-mode cellular phone offers Bluetooth as a feature. The Bluetooth spread-spectrum, frequency hopping transceiver is designed to operate between 2400 and 2483.5 MHz. The Bluetooth antenna is mounted on the PCB inside of the EUT. The antenna installation is permanent. For a more thorough description of the functionality please refer to Exhibit 12 of this package.

As a Bluetooth transmitter, it is designed operate with other Bluetooth devices as defined by industrial standard. In this application, the device is battery-operated.

The maximum Bluetooth antenna gain is 3.4 dB.

Measurement Procedures and Data

CARRIER FREQUENCY SEPARATION

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

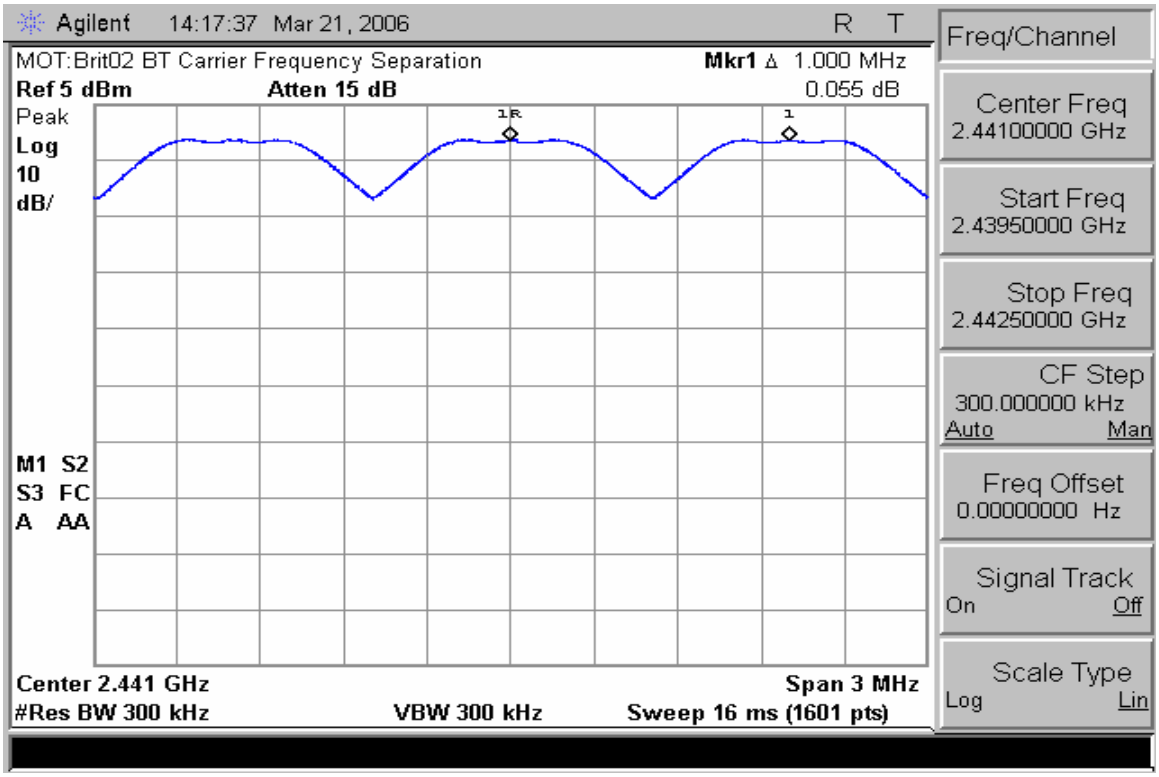
The Bluetooth transmitter of the L6 had its hopping function enabled. The following spectrum analyzer settings were used:

1. Span = wide enough to capture the peaks of two adjacent channels
2. Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
3. Video (or Average) Bandwidth (VBW) ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

Measurement Results

See attached.



Carrier Frequency Separation

NUMBER OF HOPPING FREQUENCIES

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

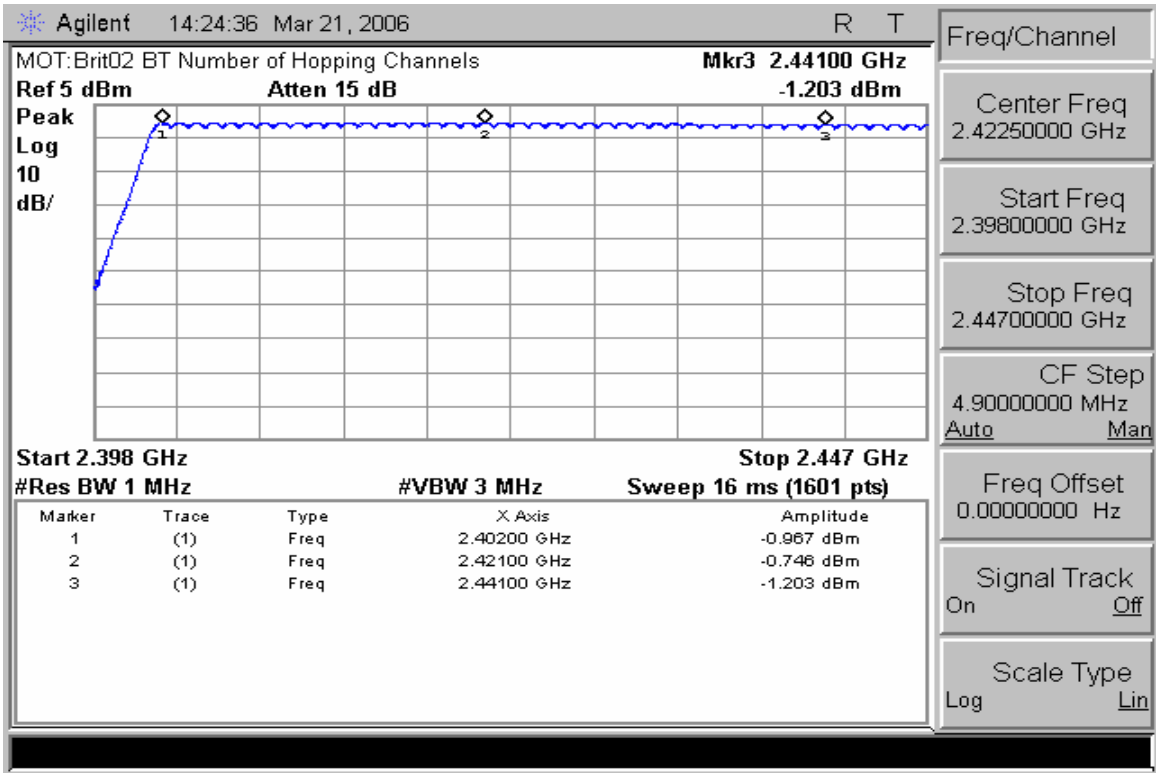
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = the frequency band of operation
2. RBW ≥ 1% of the span
3. VBW ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

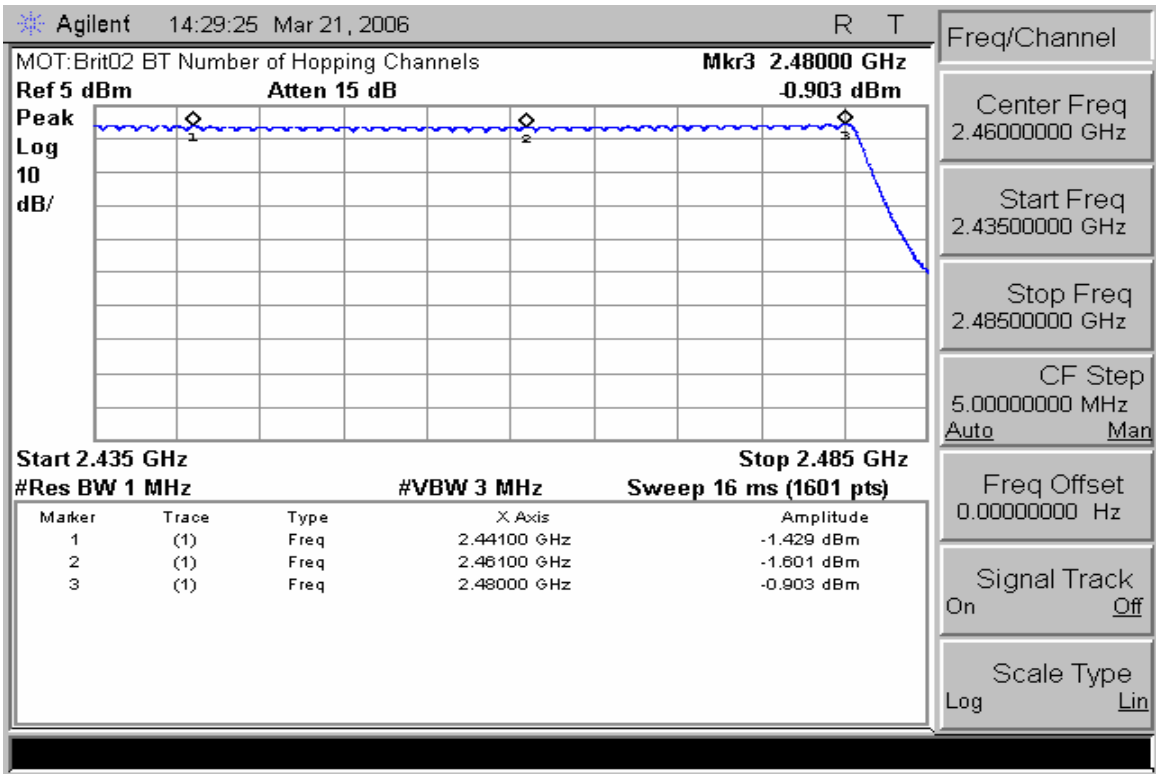
The trace was allowed to stabilize.

Measurement Results

See attached.



Number of Hopping Frequencies (Channels 0 – 39)



Number of Hopping Frequencies (Channels 39 – 78)

TIME OF OCCUPANCY (DWELL TIME)

CFR47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

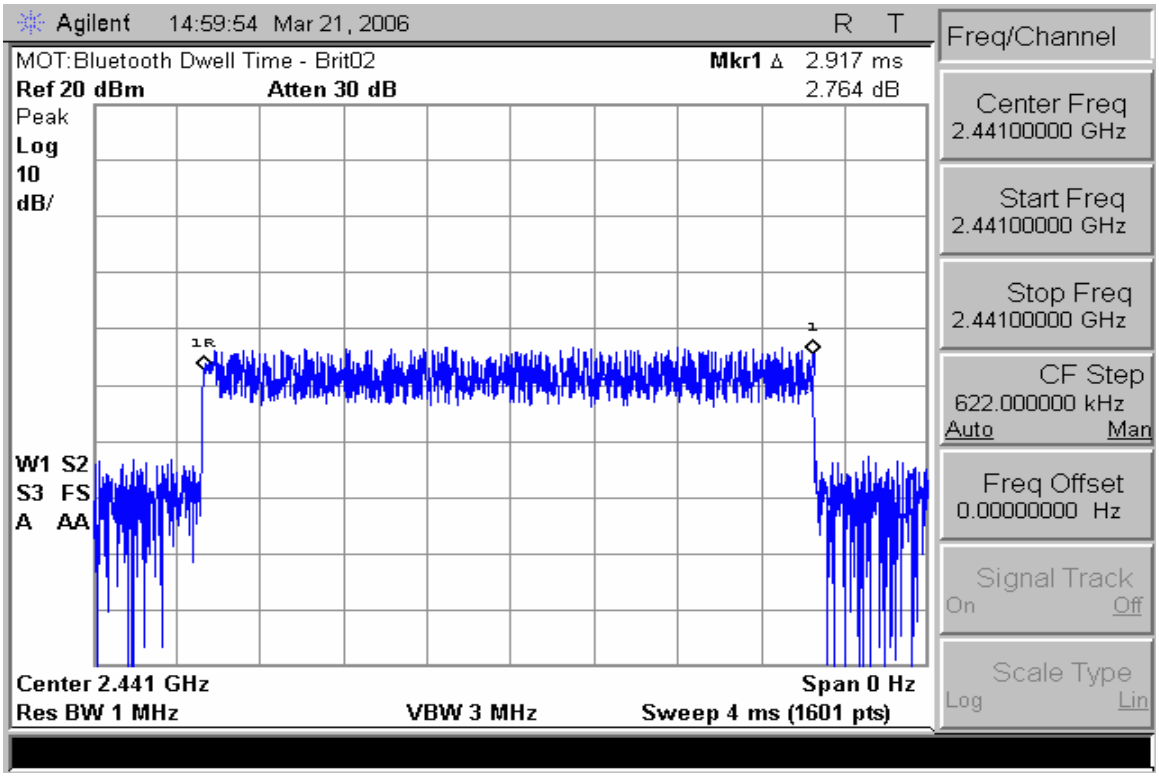
The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

1. Span = zero span, centered on a hopping channel
2. RBW = 1 MHz
3. VBW ≥ RBW
4. Sweep = as necessary to capture the entire dwell time per hopping channel
5. Detector function = peak
6. Trace = max hold

The marker-delta function was used to determine the dwell time.

Measurement Results

Attached


Agilent 14:59:54 Mar 21, 2006
R T
MOT:Bluetooth Dwell Time - Brit02
Mkr1 Δ 2.917 ms
2.764 dB
Ref 20 dBm
Atten 30 dB
Peak
Log
10
dB/
1R
1
W1 S2
S3 FS
A AA
Center 2.441 GHz
Span 0 Hz
Res BW 1 MHz
VBW 3 MHz
Sweep 4 ms (1601 pts)
Freq/Channel
Center Freq
2.44100000 GHz
Start Freq
2.44100000 GHz
Stop Freq
2.44100000 GHz
CF Step
622.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Scale Type
Log Lin

Dwell Time

20dB Bandwidth

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

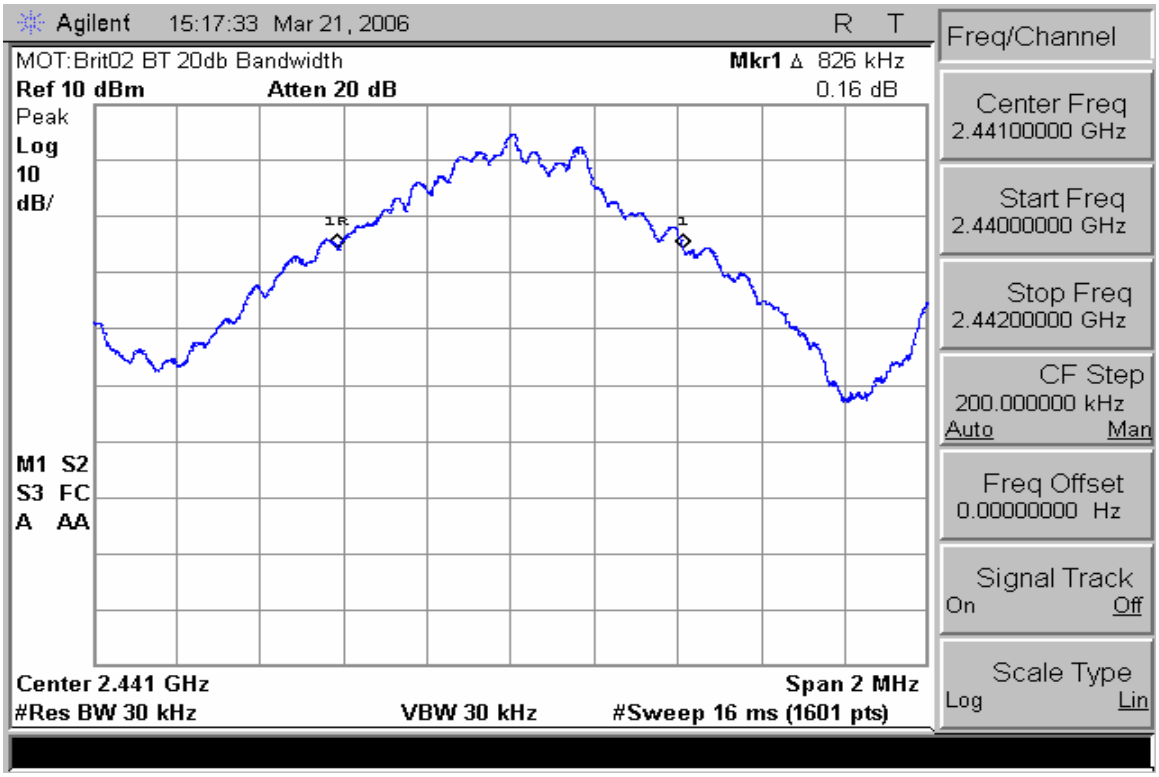
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = approx. 2 to 3 times the 20dB bandwidth, centered on a hopping frequency
2. RBW ≥ 1% of the 20dB span
3. VBW ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 20dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 20dB bandwidth of the emission.

Measurement Results

Attached



20dB Bandwidth

FIELD STRENGTH OF SPURIOUS EMISSIONS

CFR Part 2.1053, 15.247

Measurement Procedure

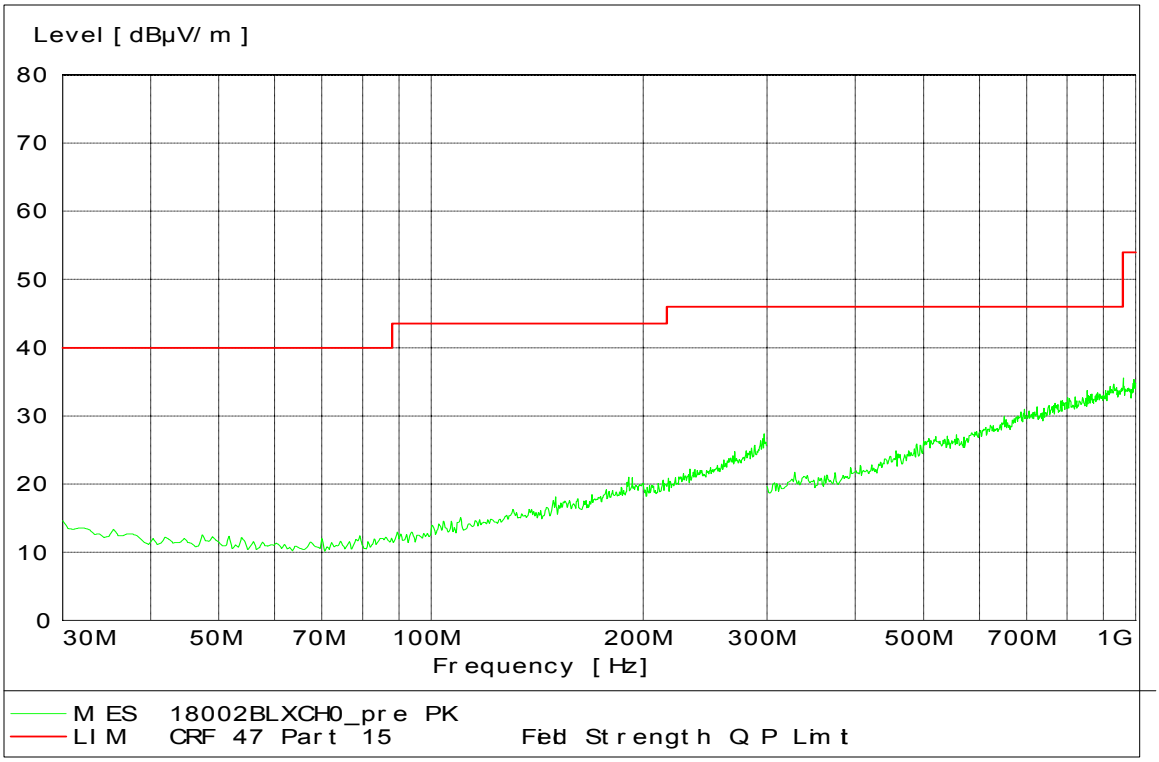
The Equipment-Under-Test is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

Field Strength (dBuV/m) = EMI Receiver Level (dBuV) + Cable Loss (dB) - Amplifier Gain (dB) + Antenna Correction Factor (1/m)

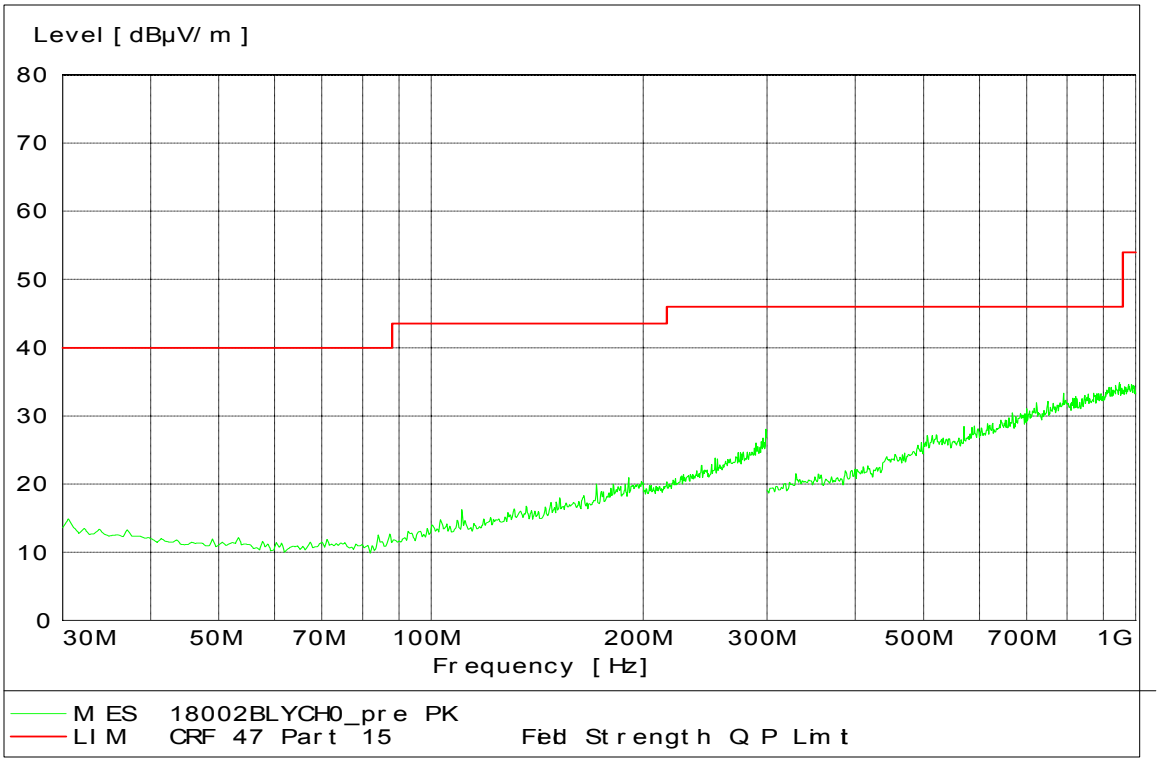
A fully charged battery was used for the supply voltage.

Measurement Results

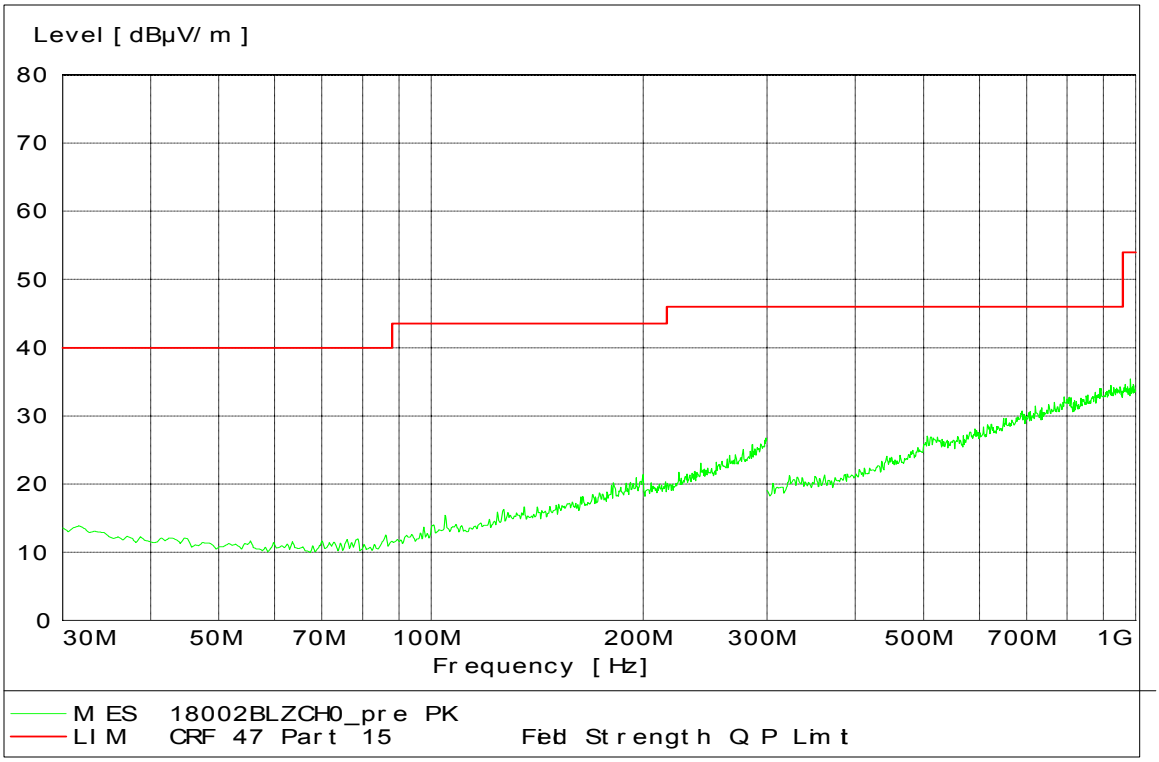
Attached



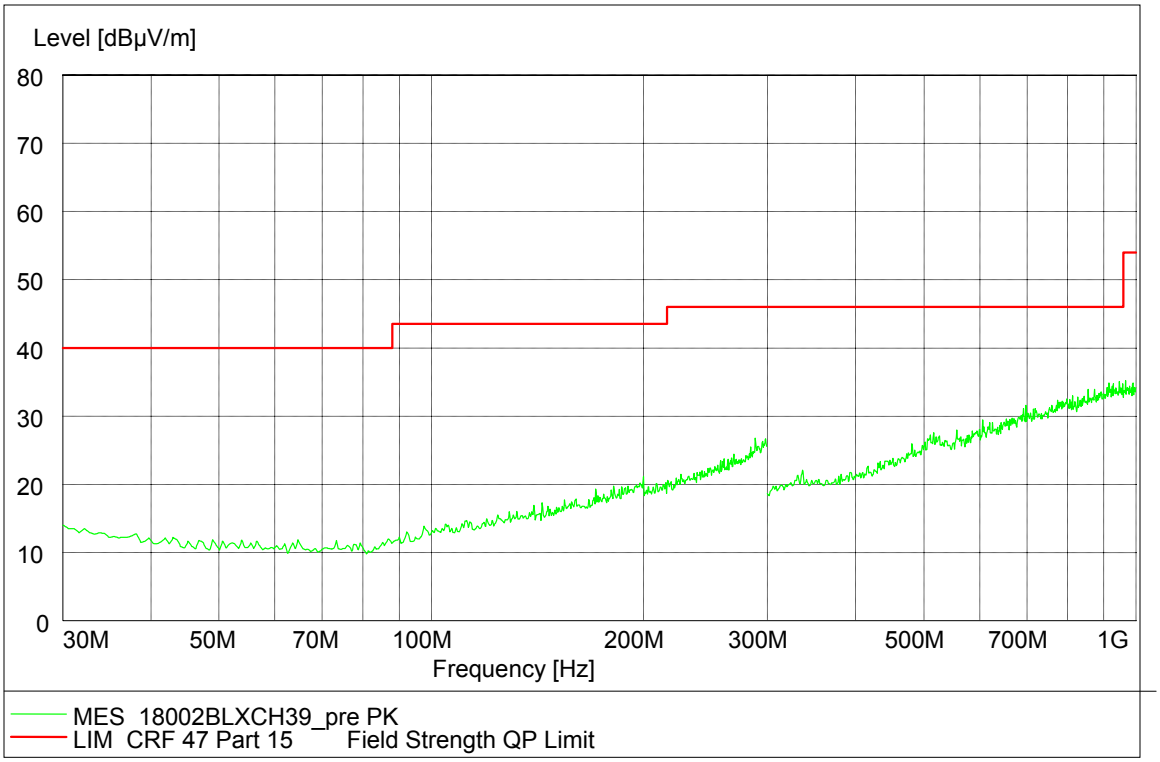
30-1000 MHz Low Channel Dual Polarization X



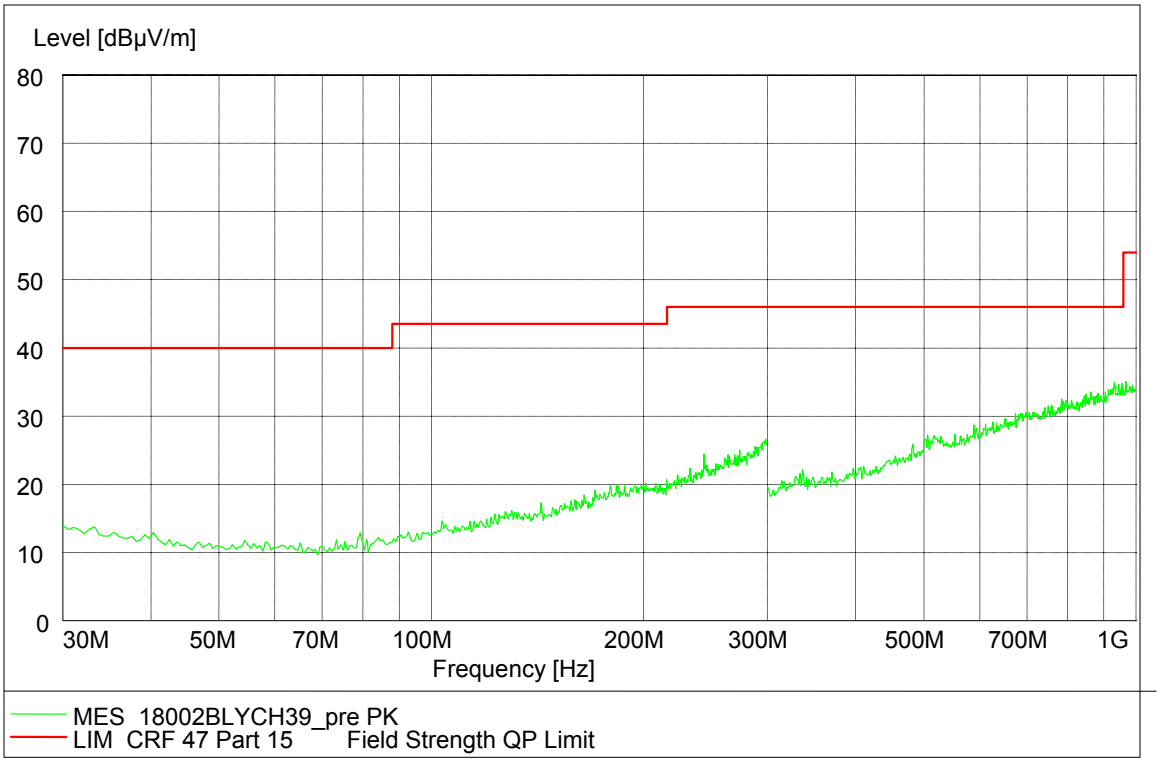
30-1000 MHz Low Channel Dual Polarization Y



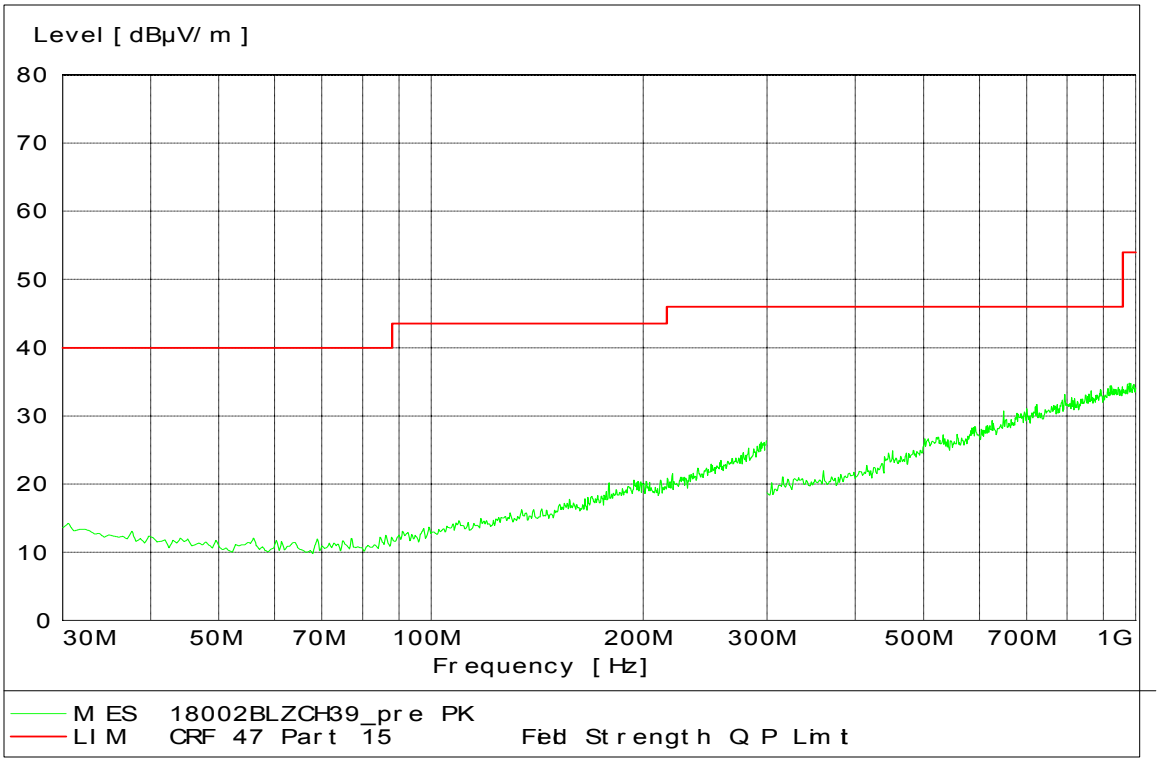
30-1000 MHz Low Channel Dual Polarization Z



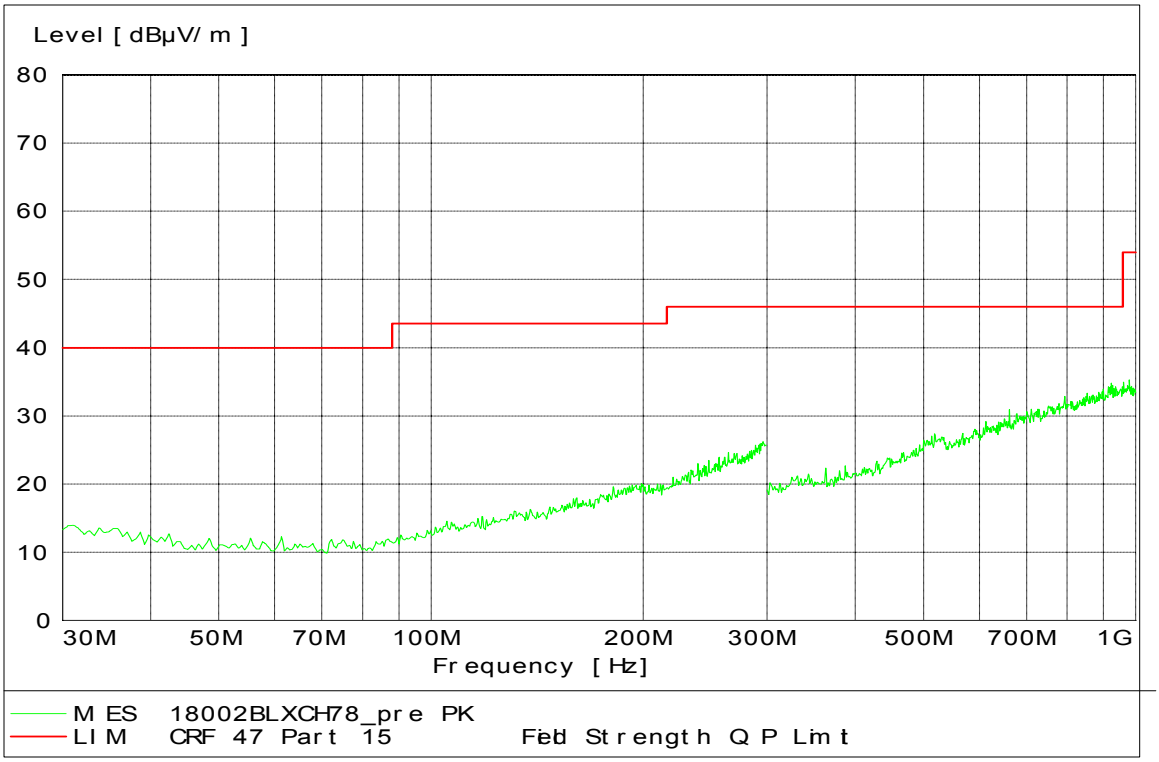
30-1000 MHz Mid Channel Dual Polarization X



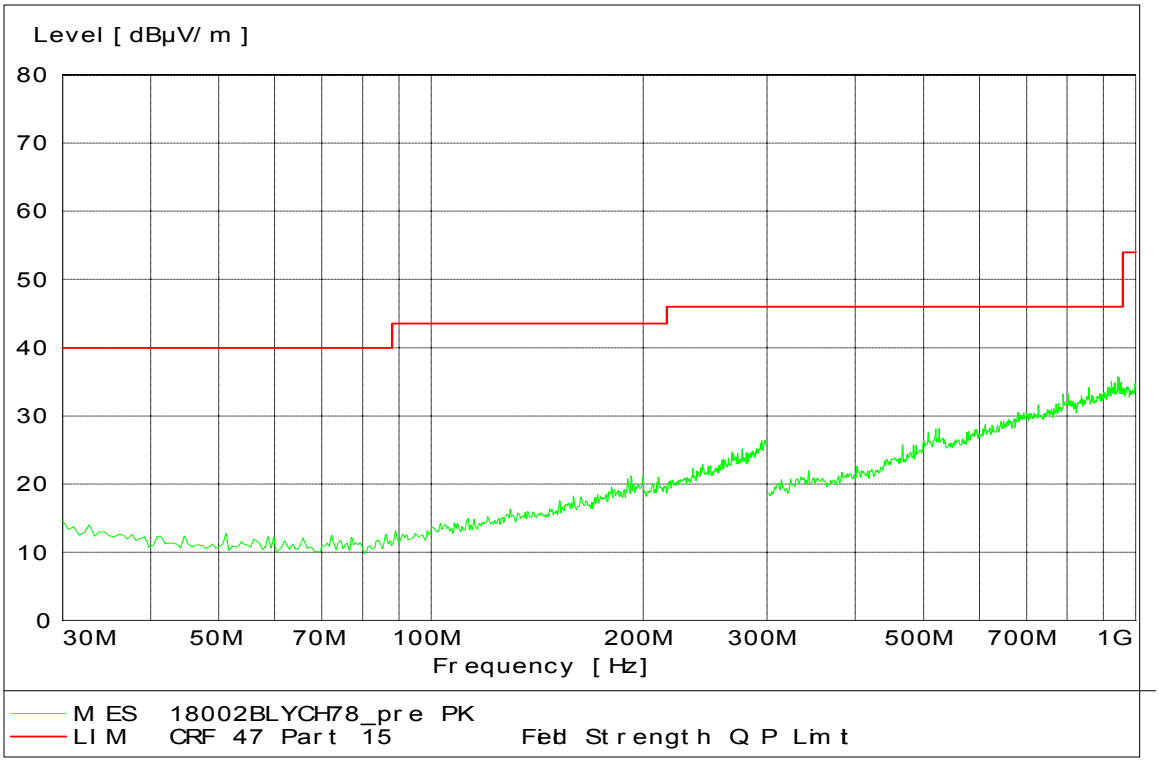
30 -1000 MHz Mid Channel Dual Polarization Y



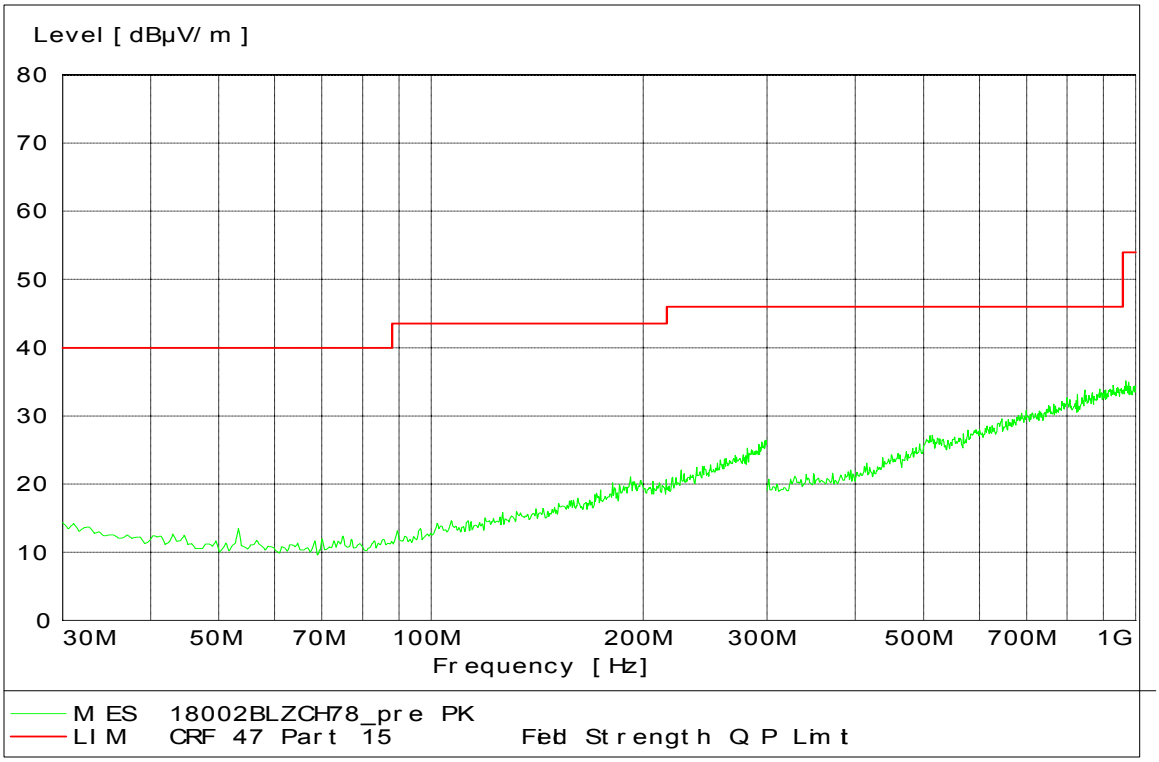
30 -1000 MHz Mid Channel Dual Polarization Z



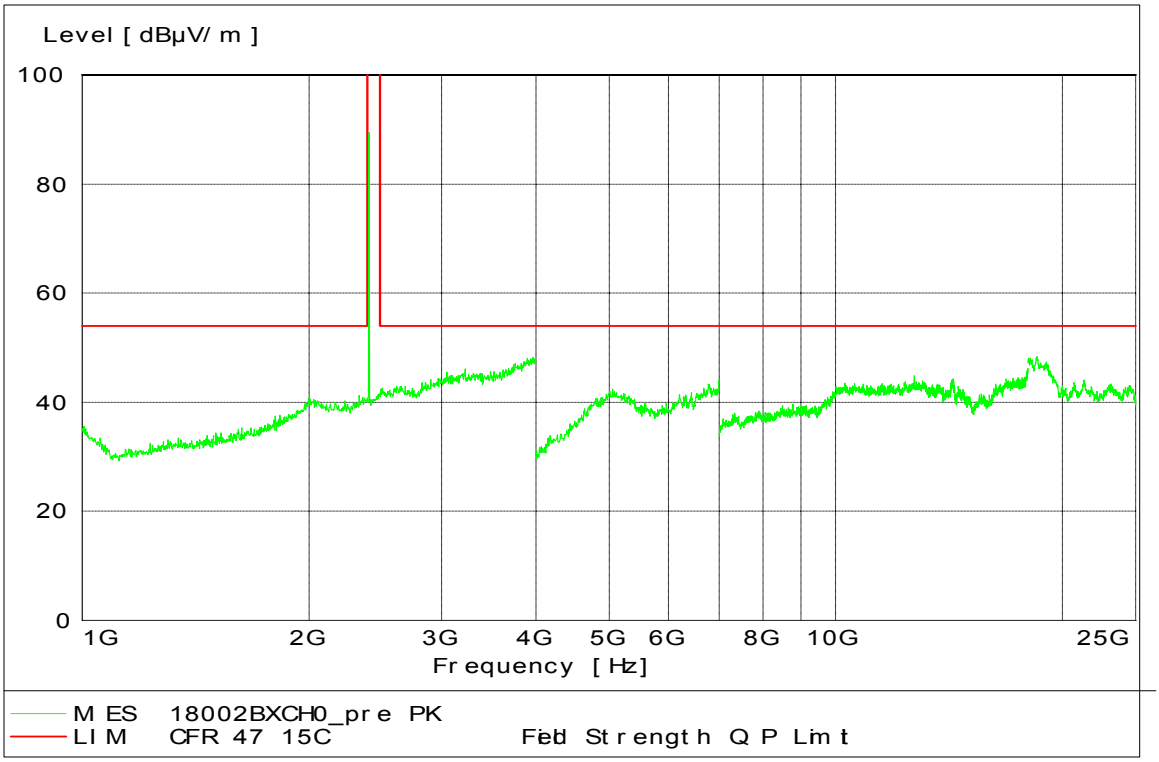
30 -1000 MHz High Channel Dual Polarization X



30 -1000 MHz High Channel Dual Polarization Y

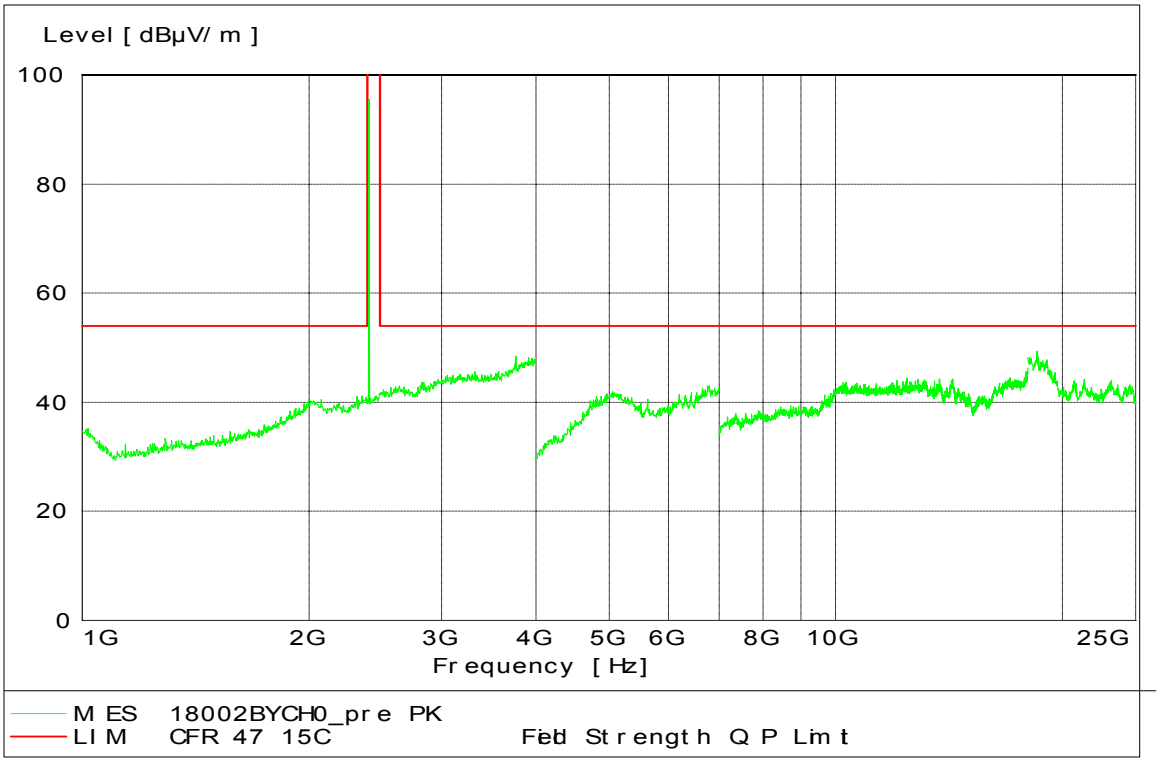


30 -1000 MHz High Channel Dual Polarization Z



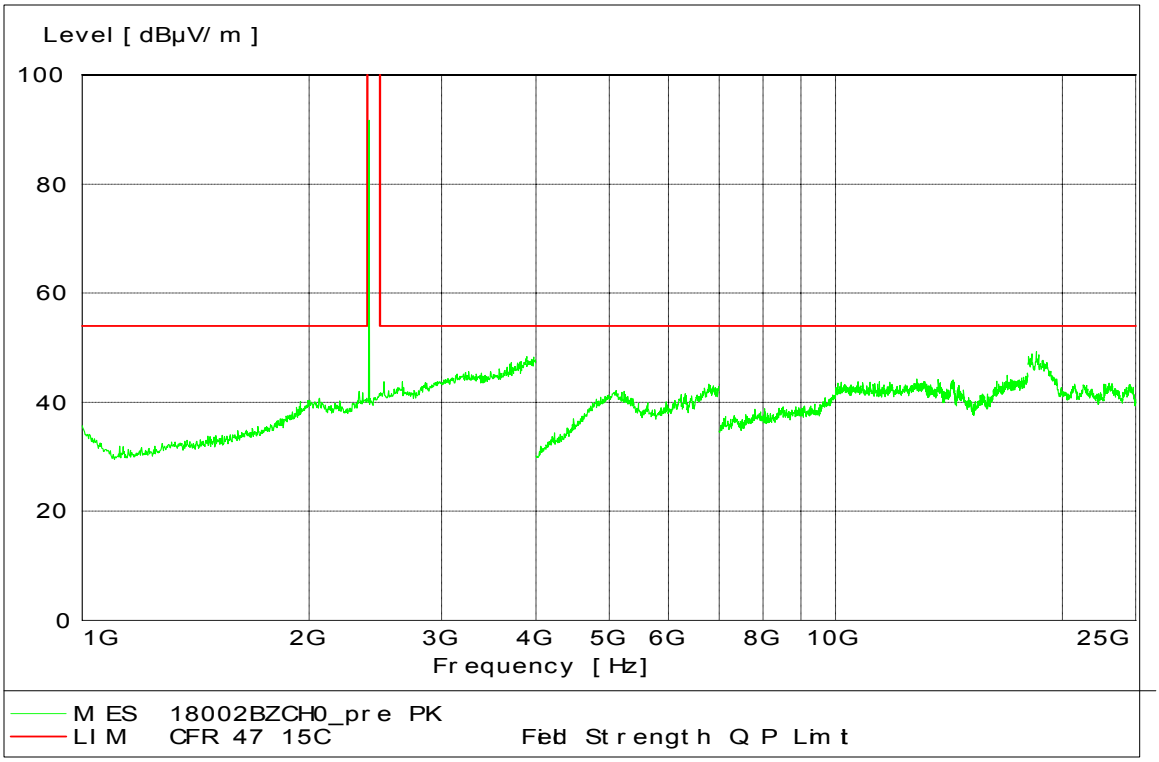
1-25 GHz Low Channel Dual Polarization X

Frequency	Measured	Detector	Limit
MHz	dBµV/m	Type	dBµV/m
2400	89.42	Peak	999



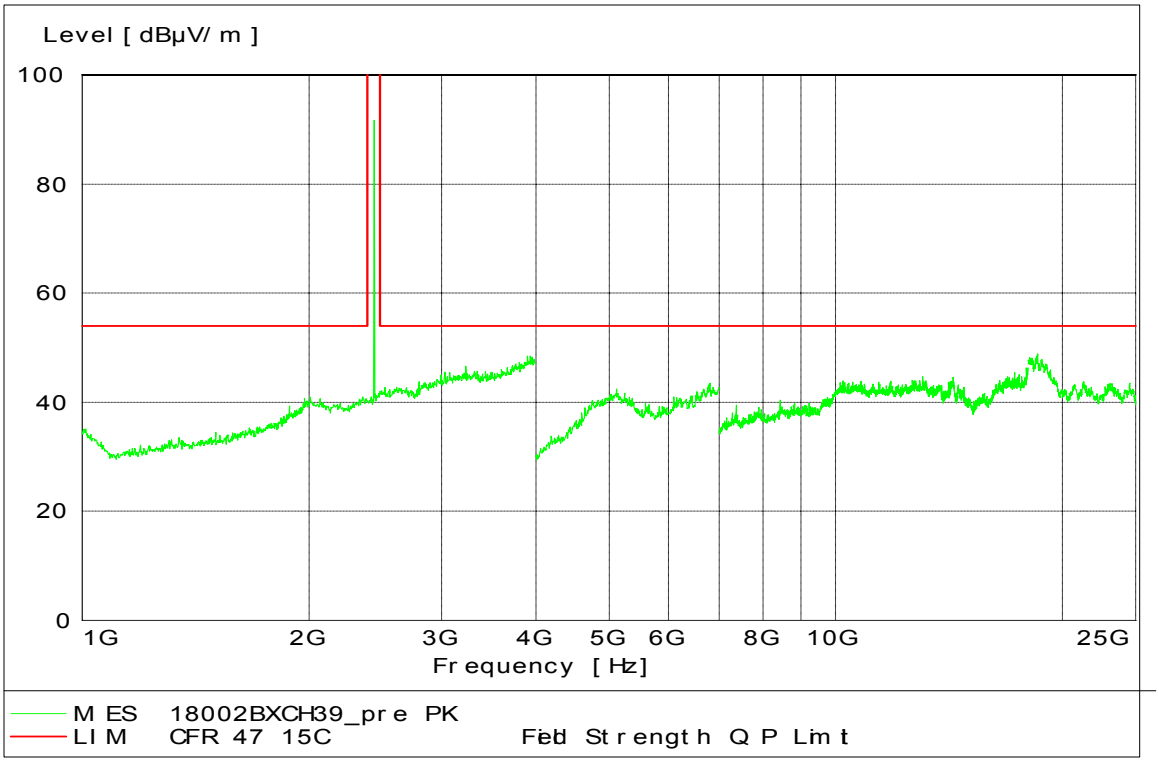
1-25 GHz Low Channel Dual Polarization Y

Frequency	Measured	Detector	Limit
MHz	dBµV/m	Type	dBµV/m
2400	95.56	Peak	999



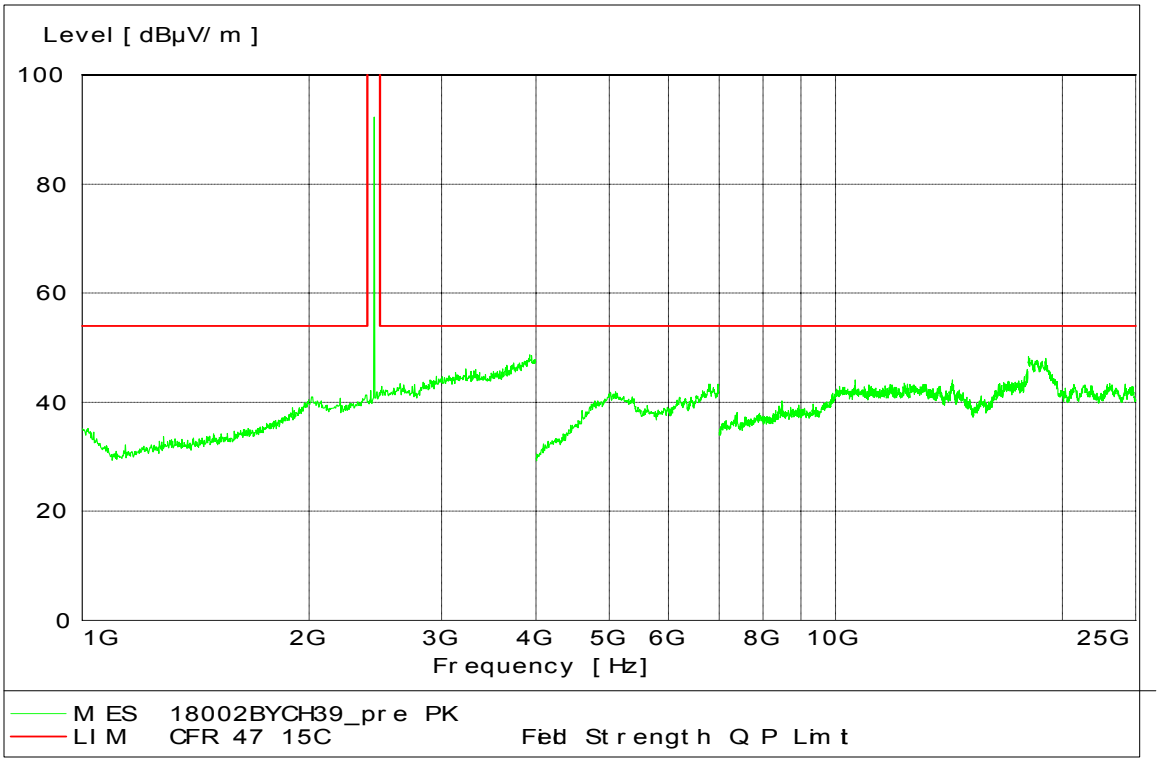
1-25 GHz Low Channel Dual Polarization Z

Frequency	Measured	Detector	Limit
MHz	dBµV/m	Type	dBµV/m
2400	91.73	Peak	999



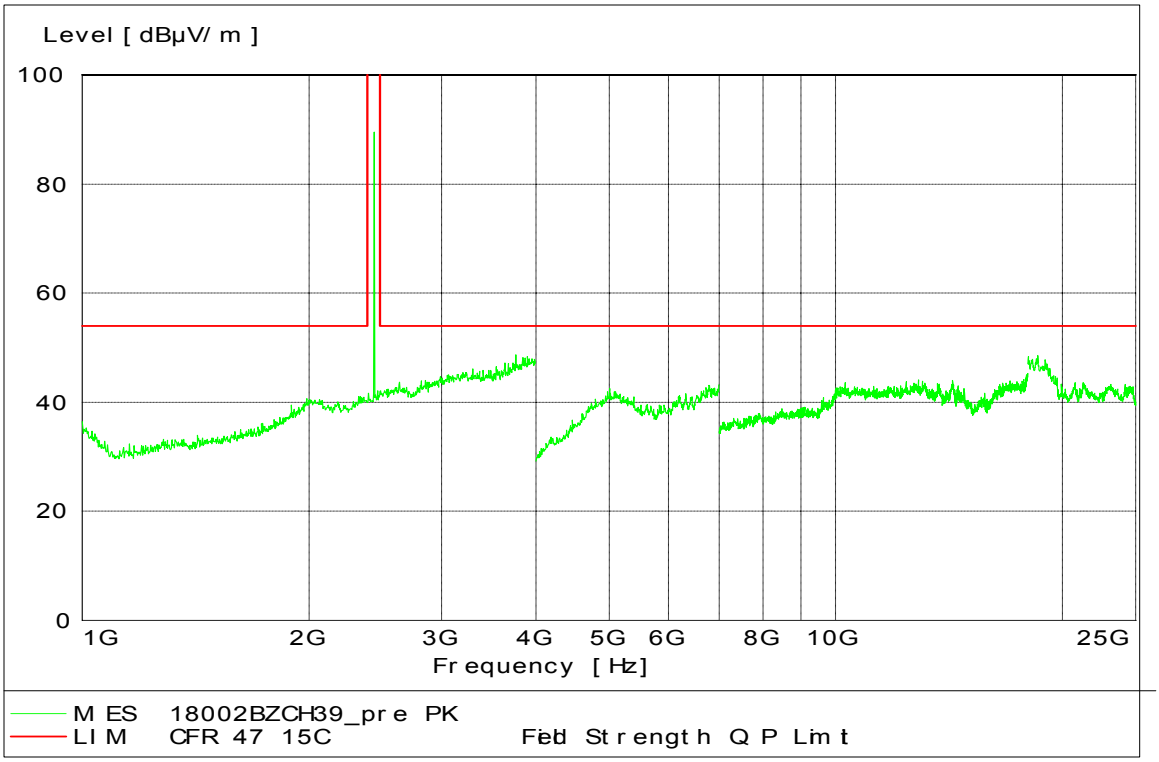
1-25 GHz Mid Channel Dual Polarization X

Frequency	Measured	Detector	Limit
MHz	dBµV/m	Type	dBµV/m
2440	91.68	Peak	999



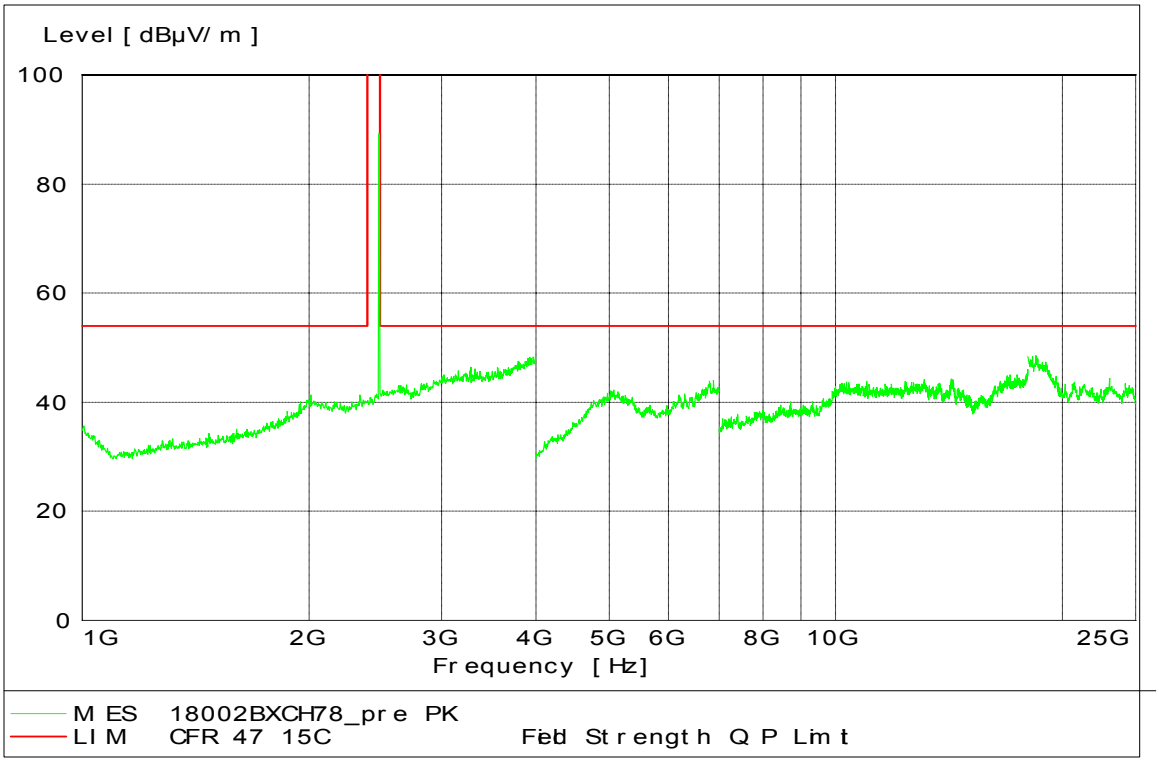
1-25 GHz Mid Channel Dual Polarization Y

Frequency	Measured	Detector	Limit
MHz	dBµV/m	Type	dBµV/m
2440	92.29	Peak	999



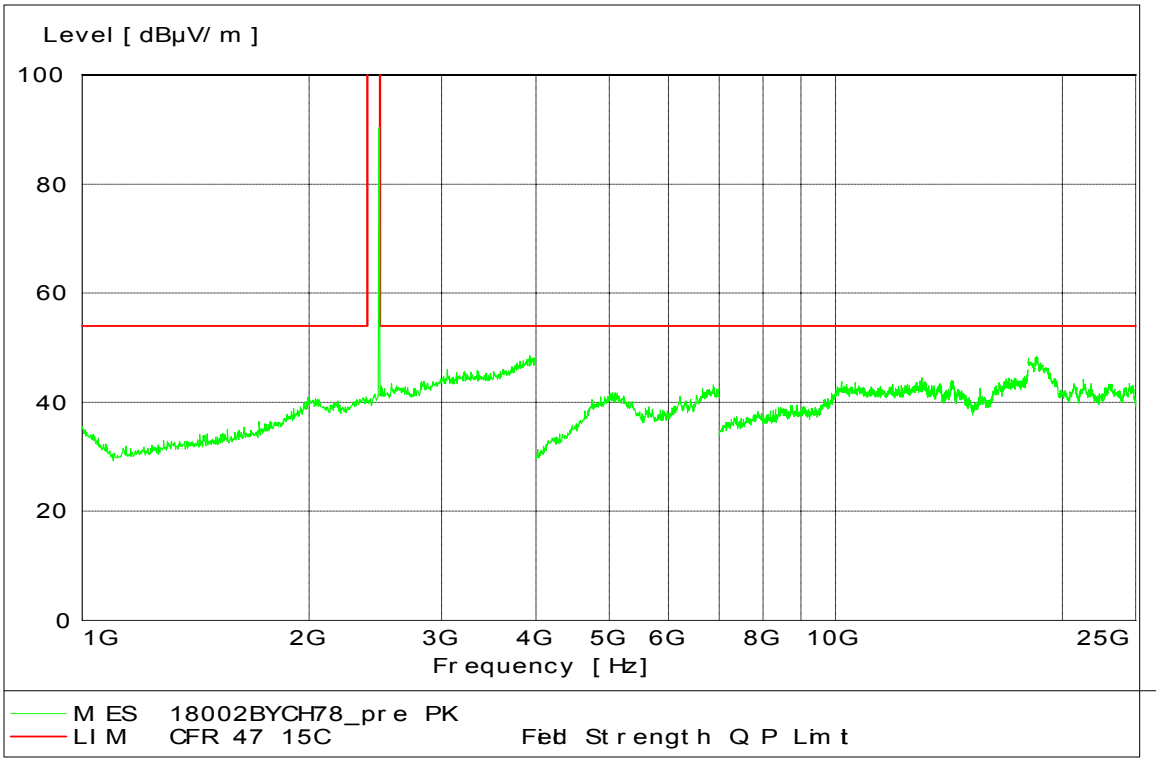
1-25 GHz Mid Channel Dual Polarization Z

Frequency	Measured	Detector	Limit
MHz	dBµV/m	Type	dBµV/m
2440	89.53	Peak	999



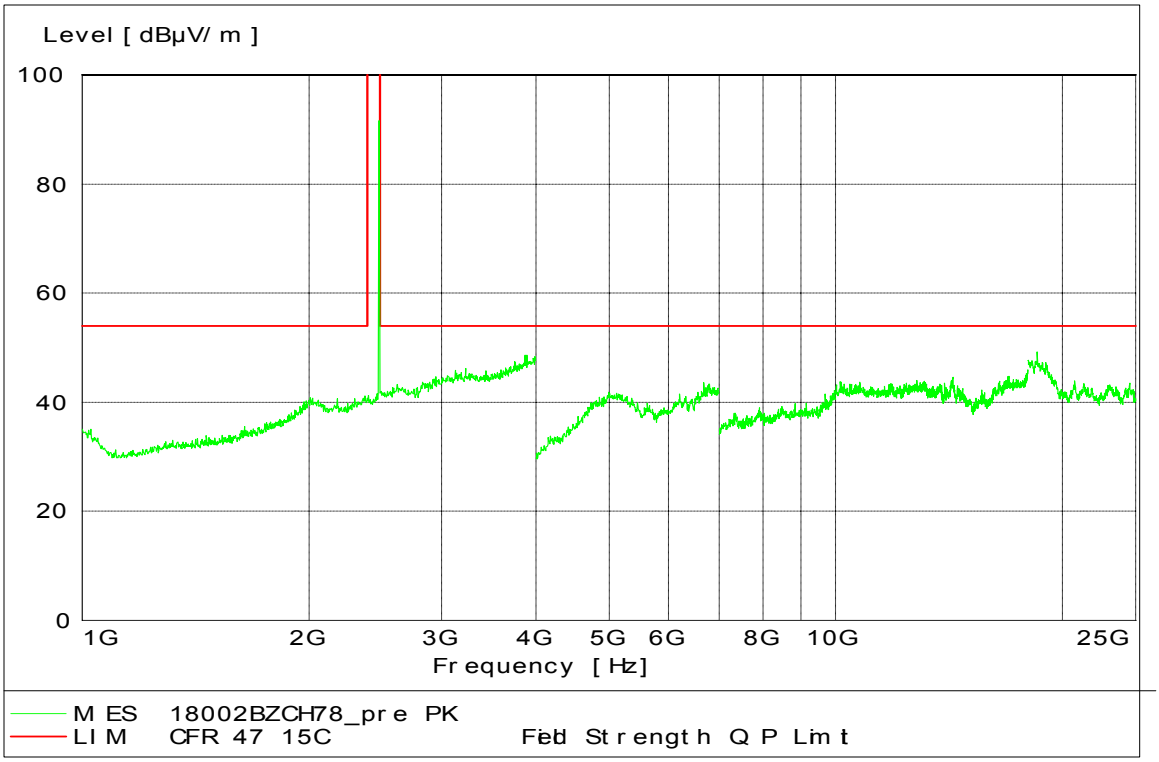
1-25 GHz High Channel Dual Polarization X

Frequency	Measured	Detector	Limit
MHz	dBµV/m	Type	dBµV/m
2477	89.16	Peak	999



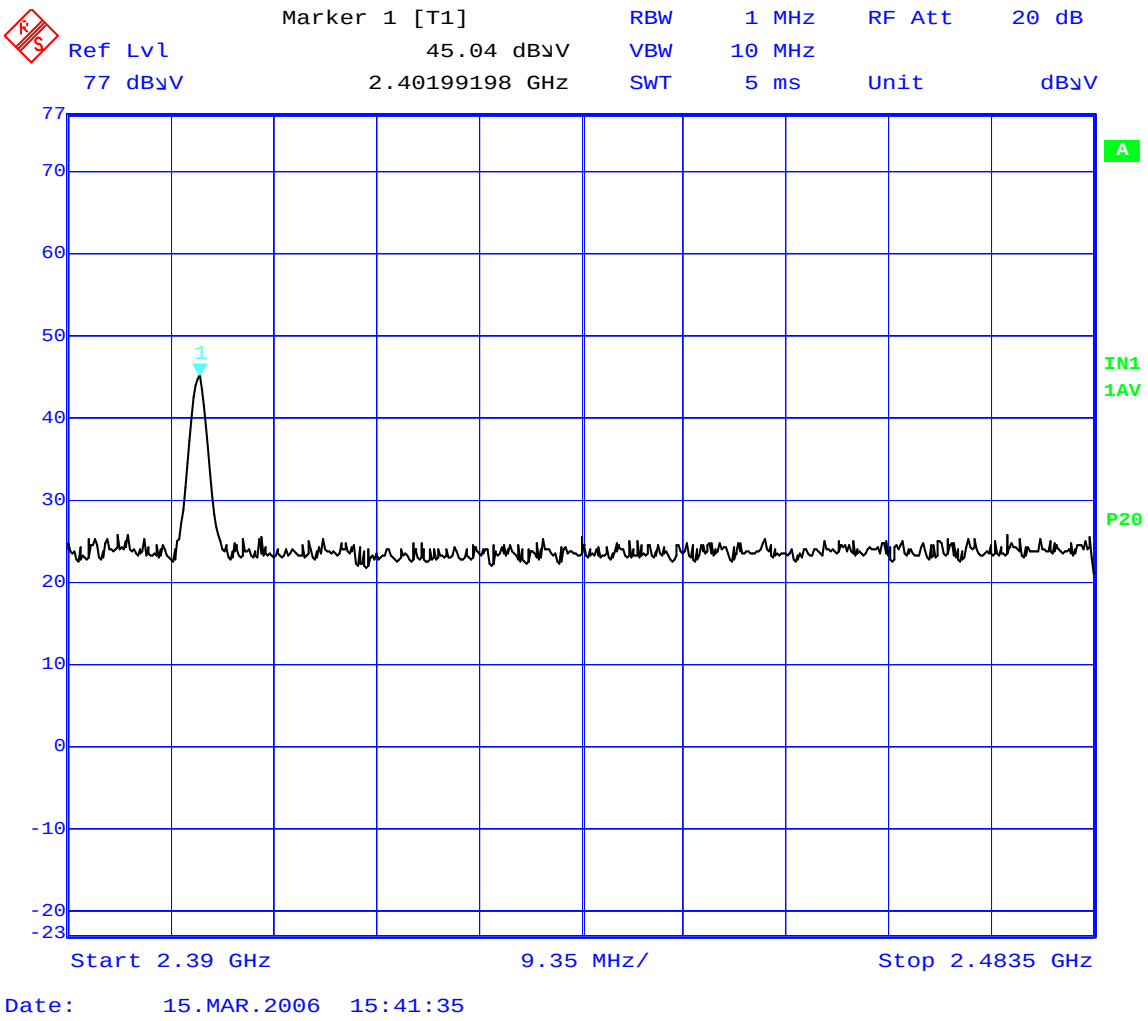
1-25 GHz High Channel Dual Polarization Y

Frequency	Measured	Detector	Limit
MHz	dBµV/m	Type	dBµV/m
2479	90.31	Peak	999

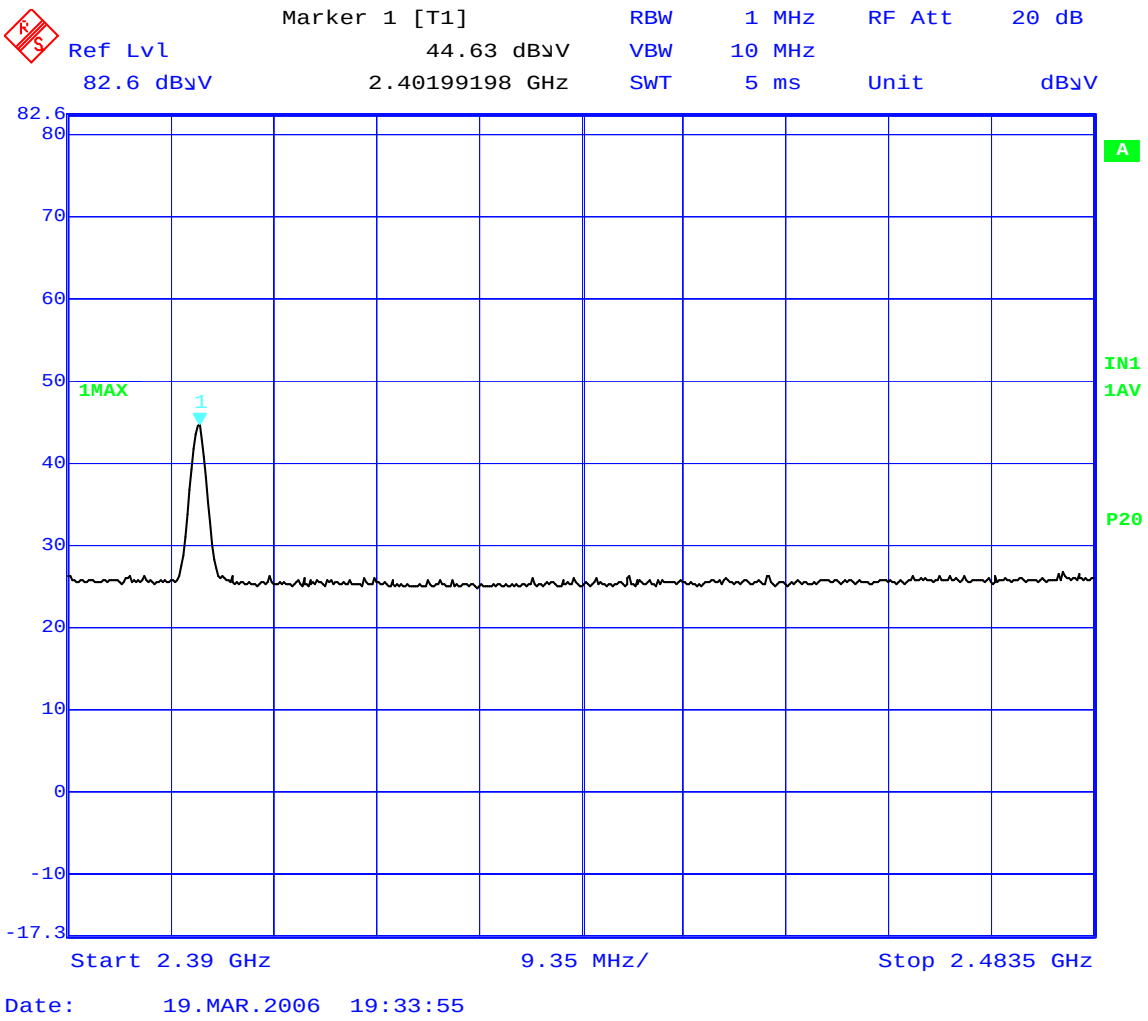


1-25 GHz High Channel Dual Polarization Z

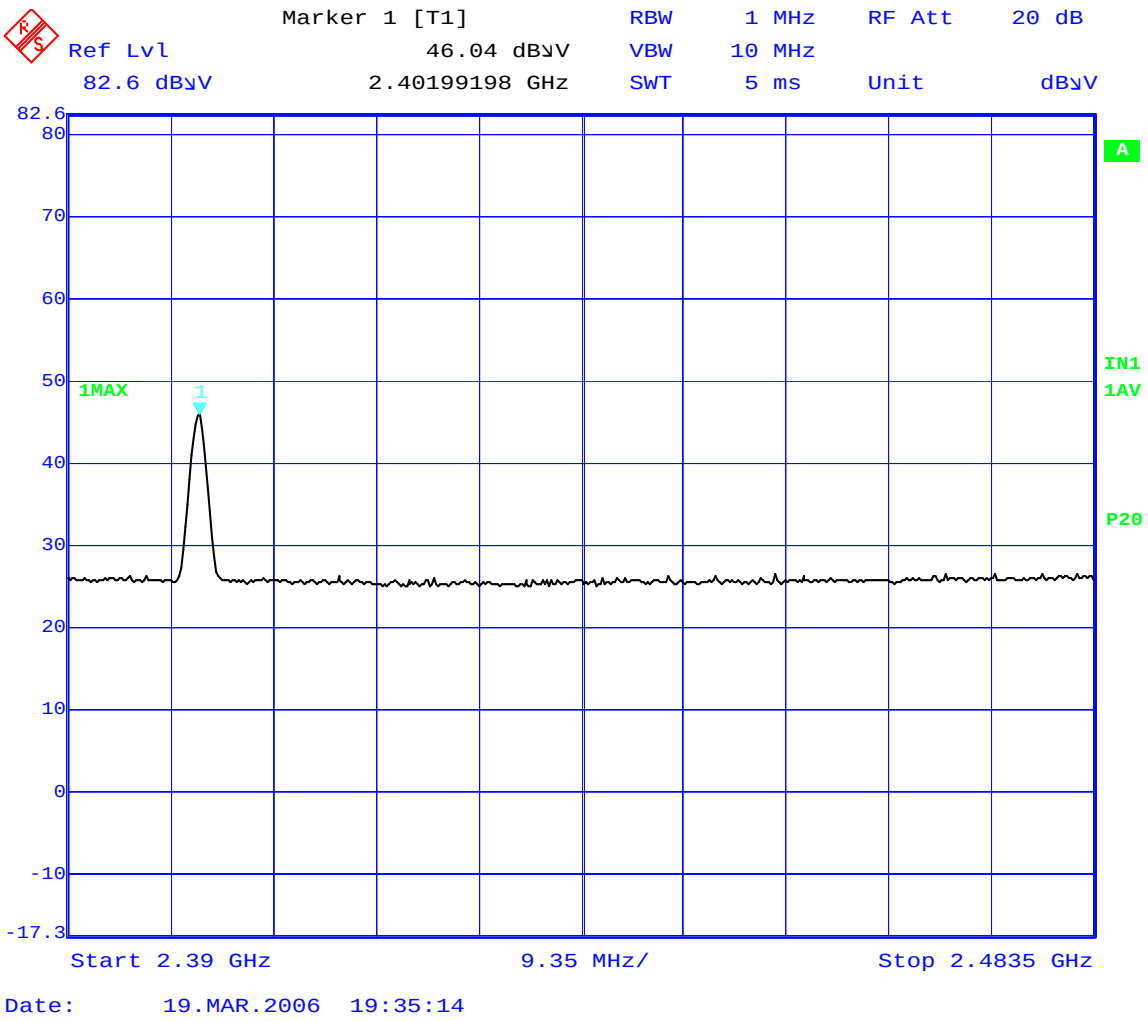
Frequency	Measured	Detector	Limit
MHz	dBµV/m	Type	dBµV/m
2477	91.59	Peak	999



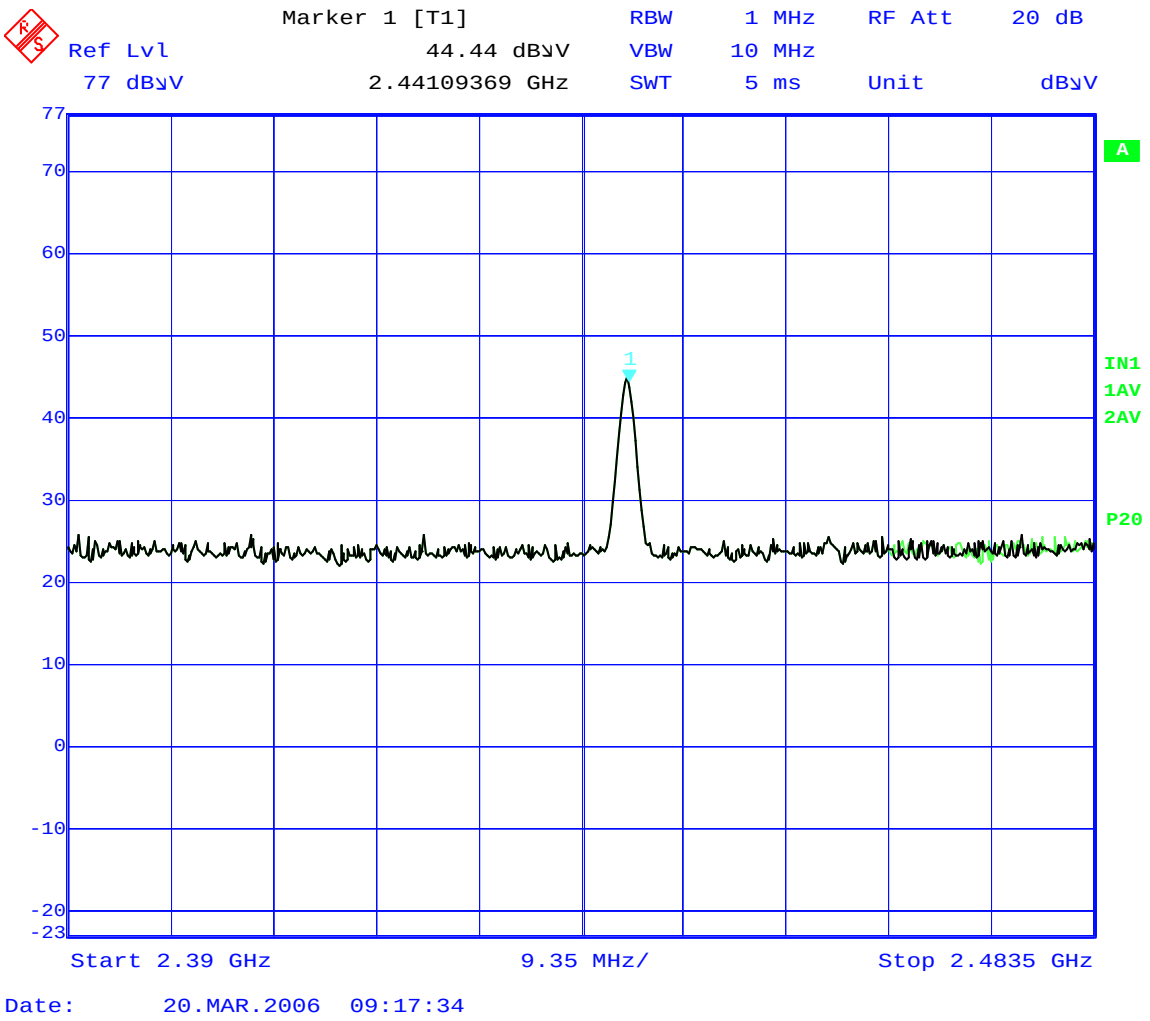
Authorized Band Emissions Low Channel Dual Polarization X



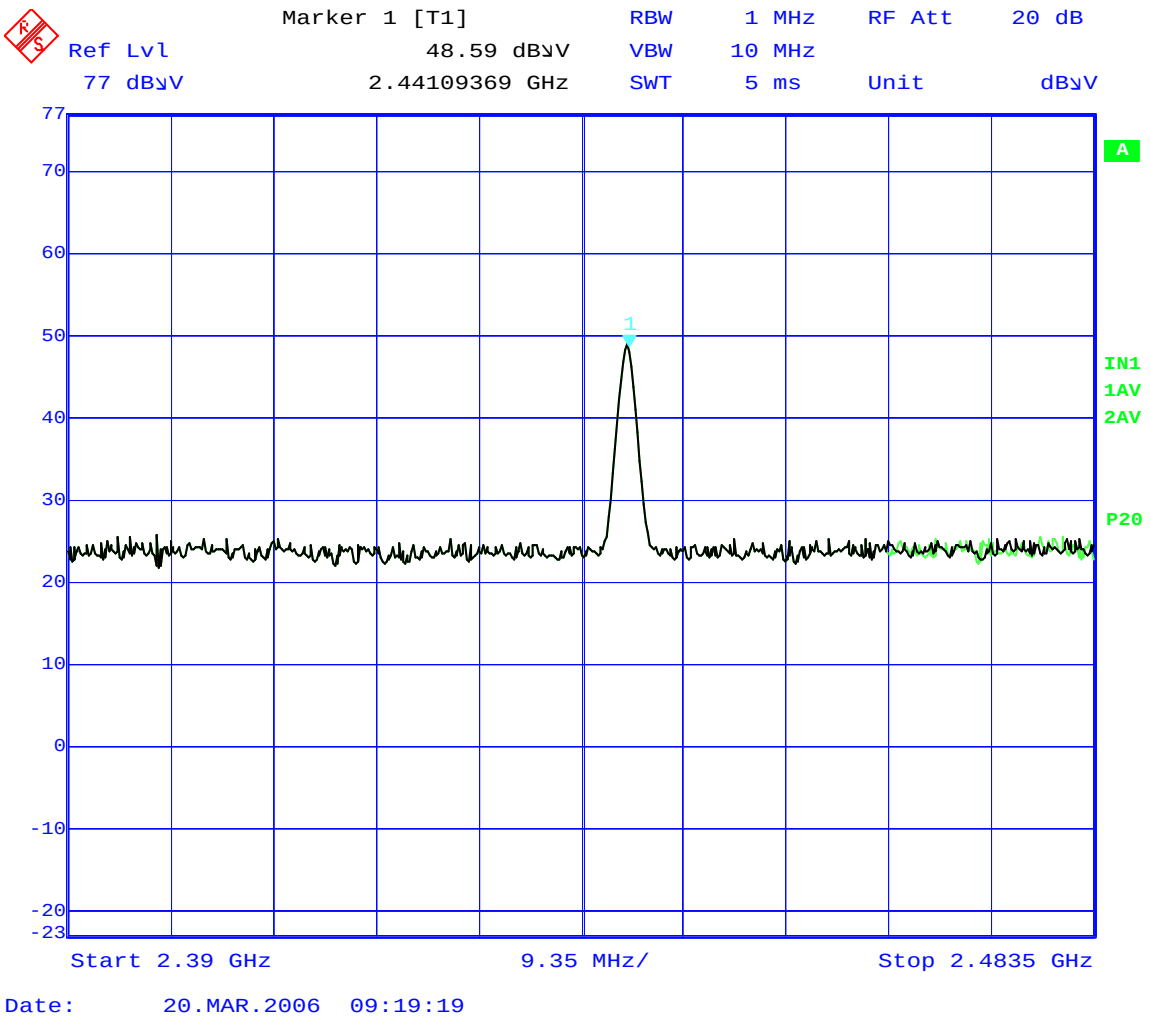
Authorized Band Emissions Low Channel Dual Polarization Y



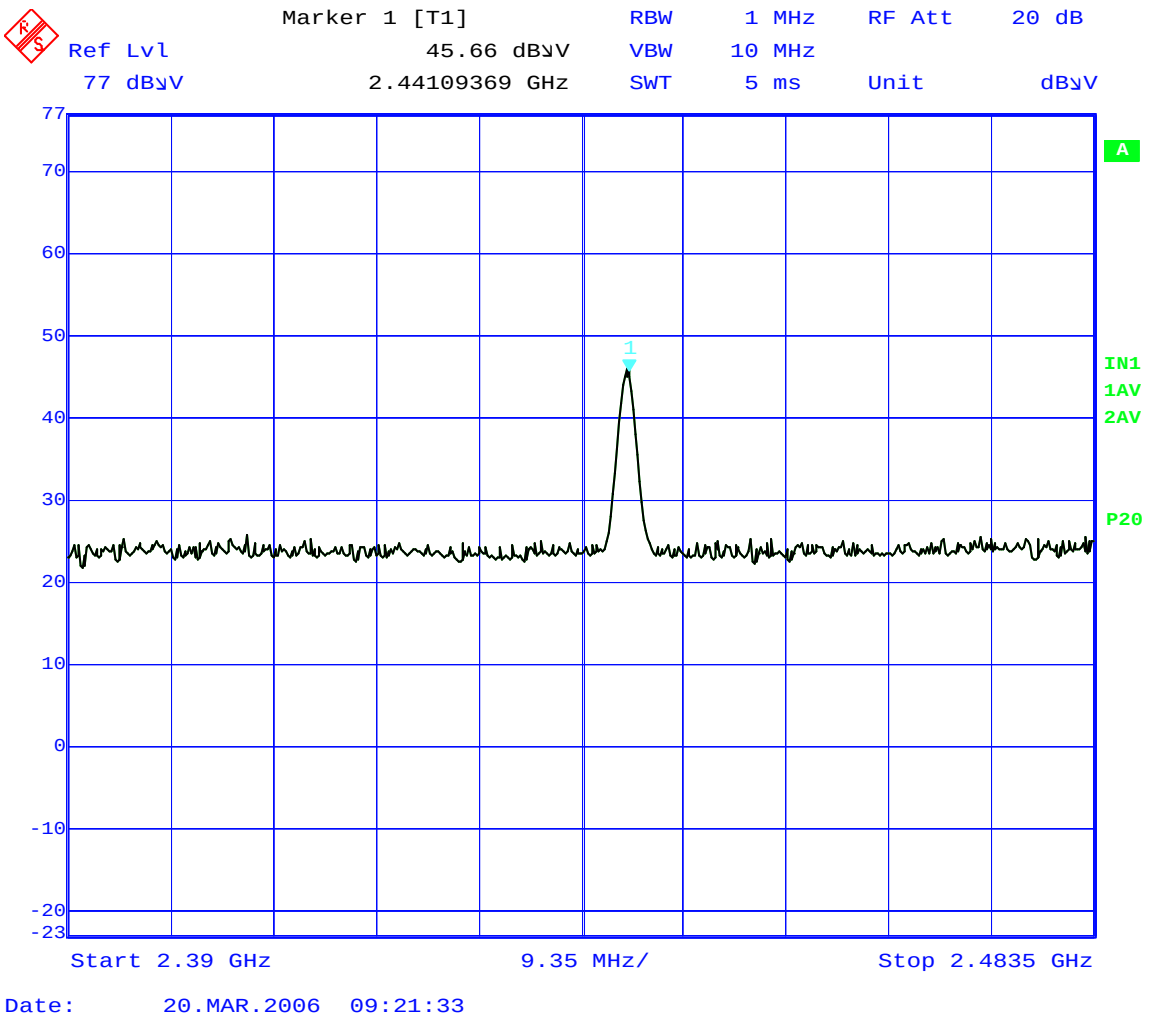
Authorized Band Emissions Low Channel Dual Polarization Z



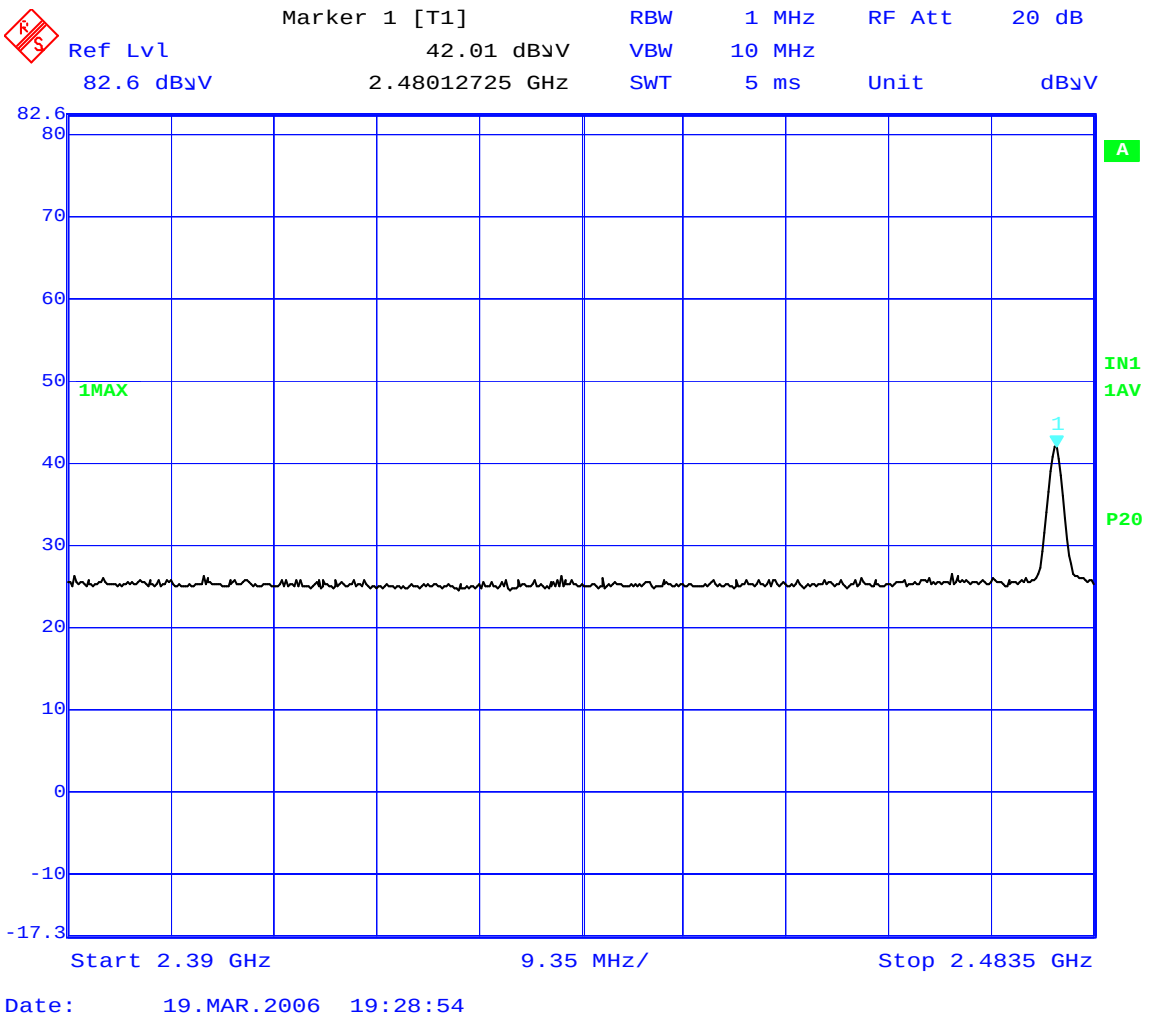
Authorized Band Emissions Mid Channel Dual Polarization X



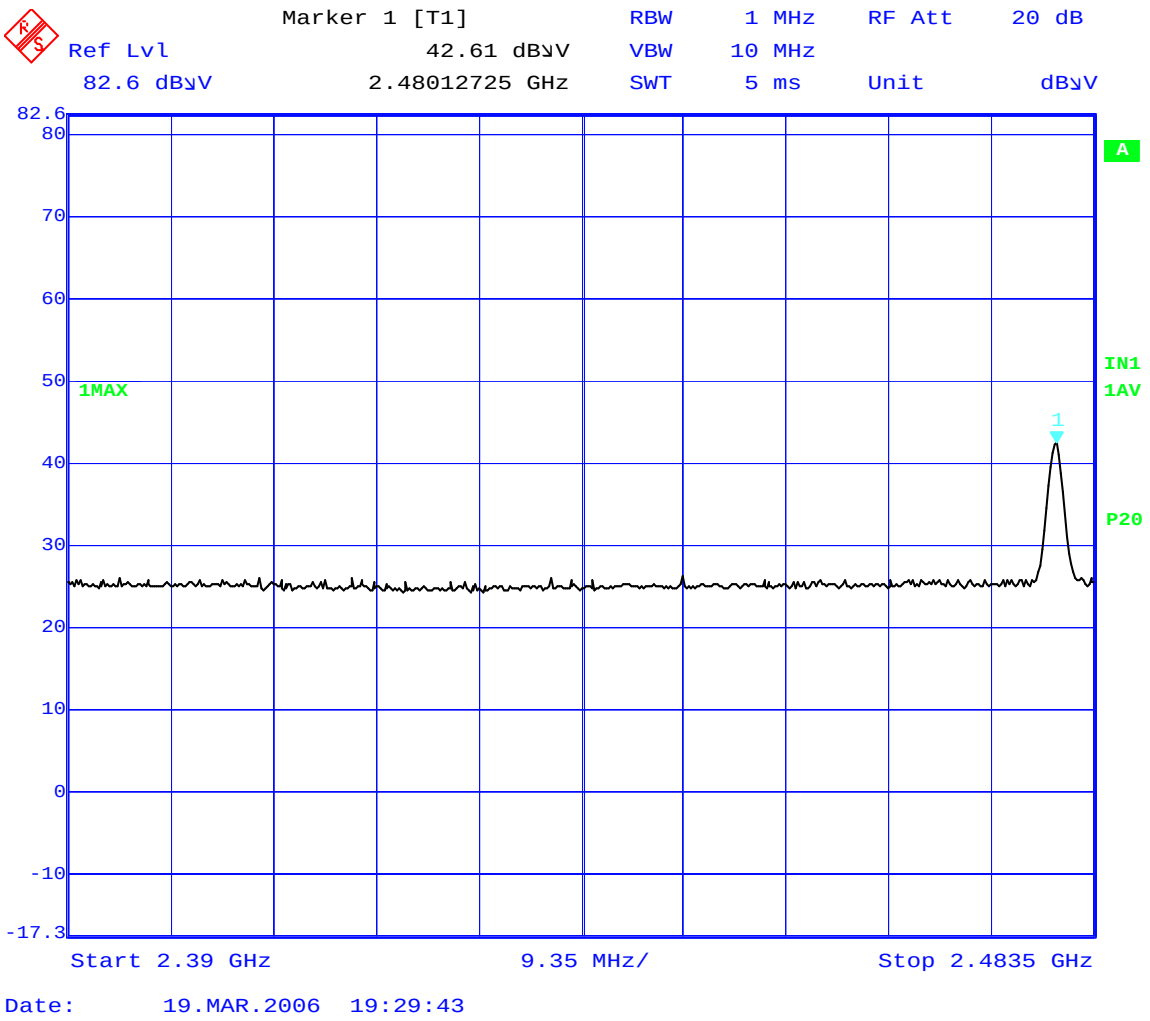
Authorized Band Emissions Mid Channel Dual Polarization Y



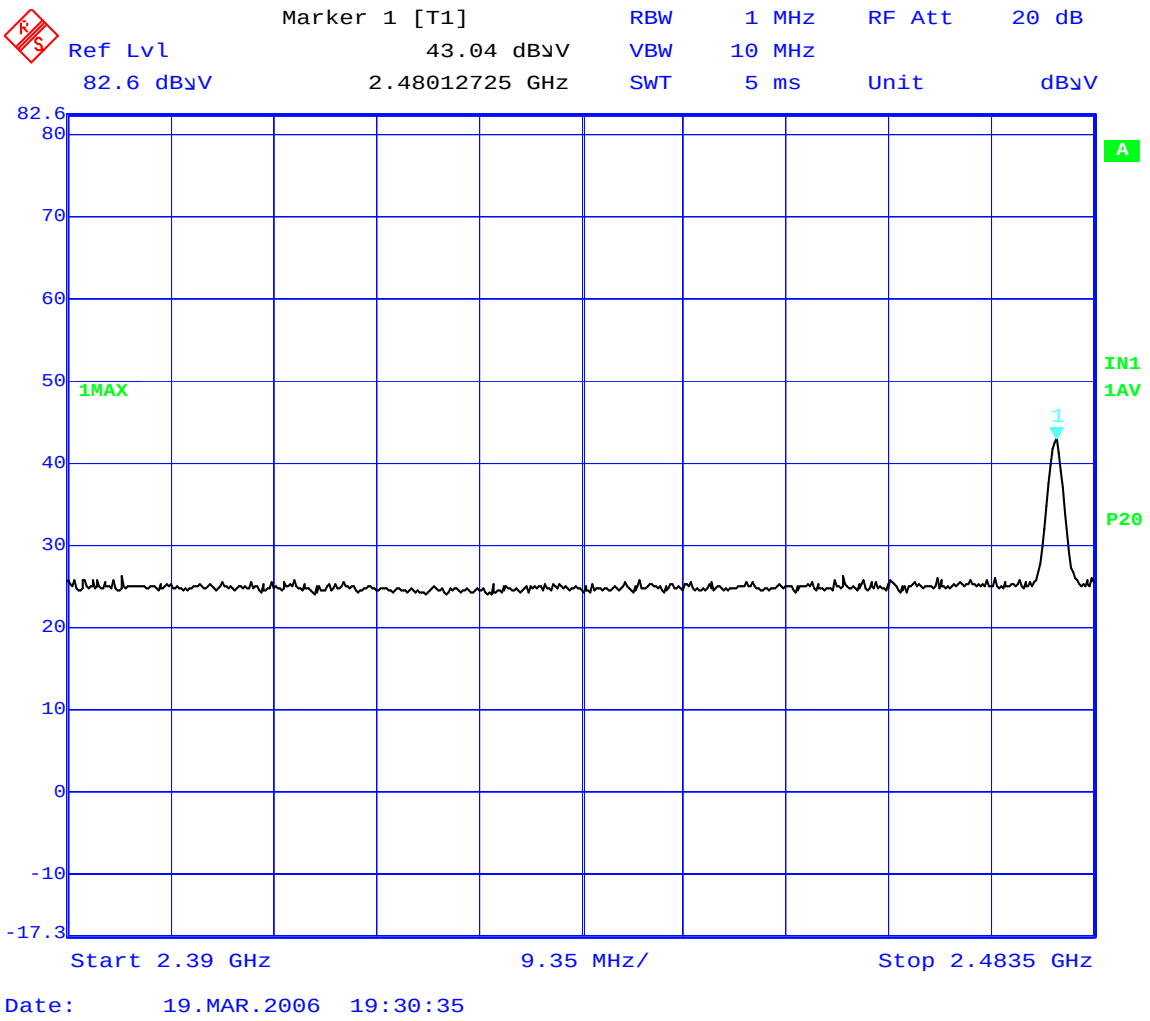
Authorized Band Emissions Mid Channel Dual Polarization Z



Authorized Band Emissions High Channel Dual Polarization X



Authorized Band Emissions High Channel Dual Polarization Y



Authorized Band Emissions High Channel Dual Polarization Z

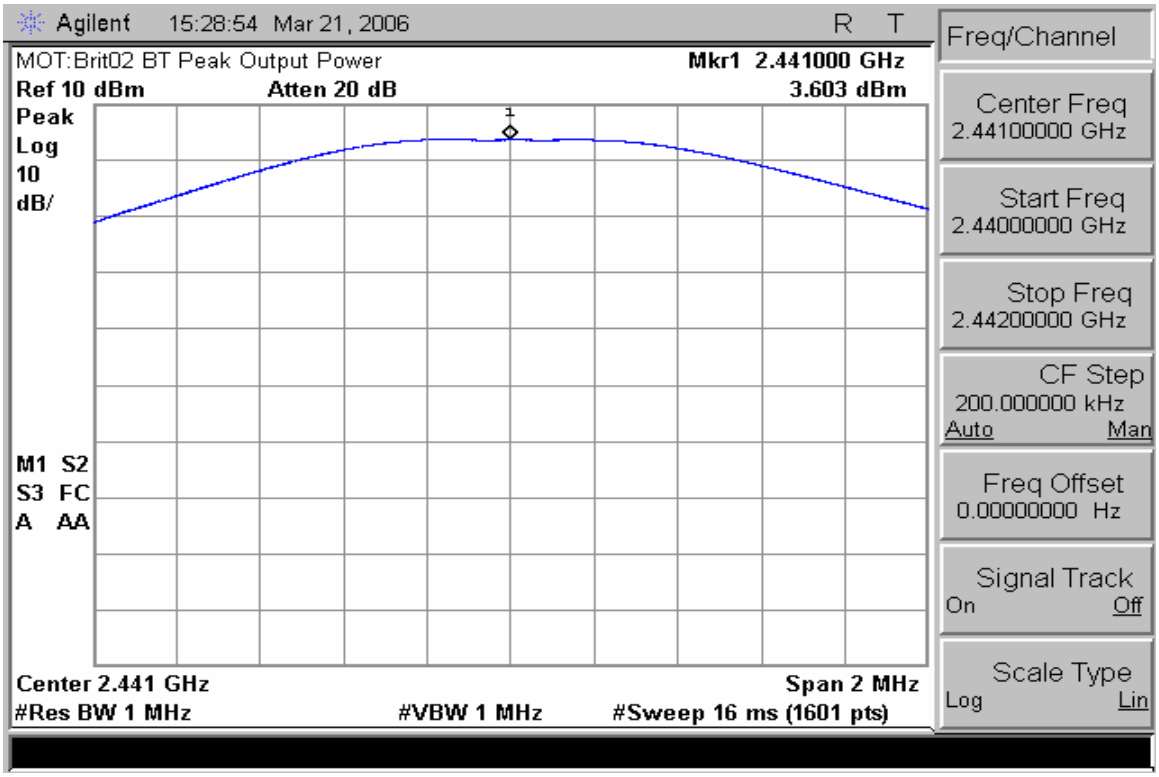
PEAK OUTPUT POWER

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results



Peak Output Power

BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS

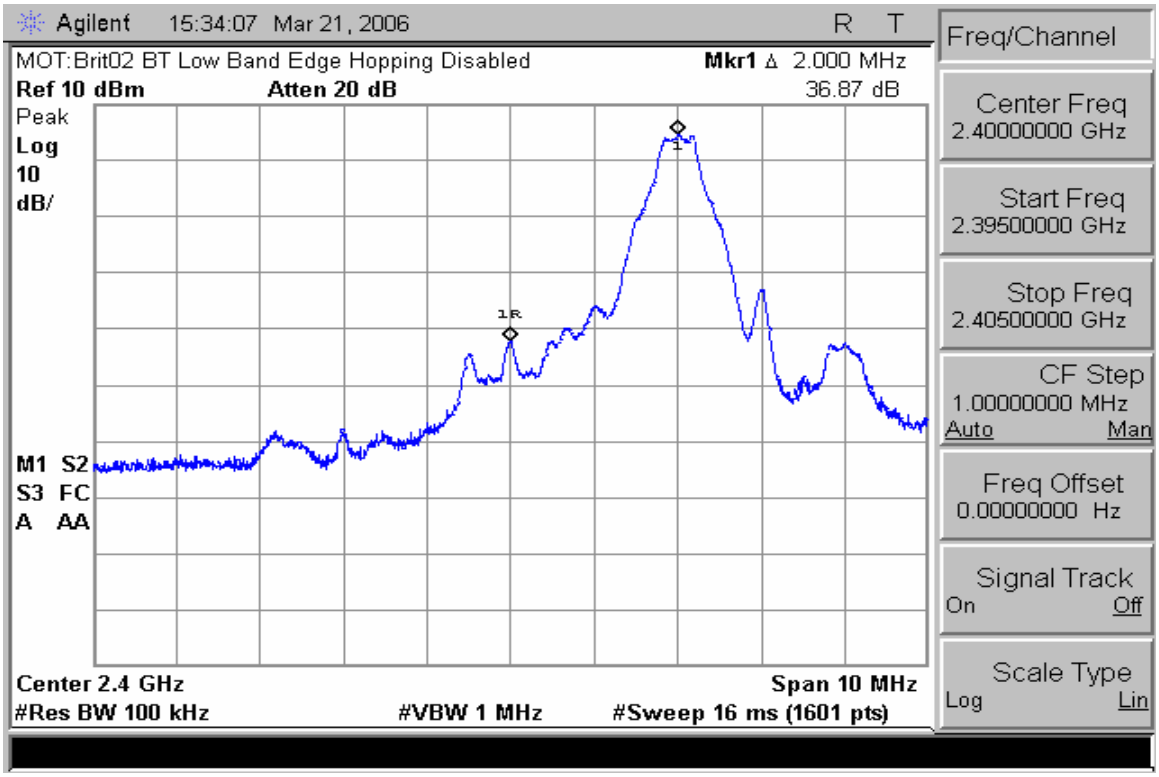
CFR 47 Part 15.247

Measurement Procedure

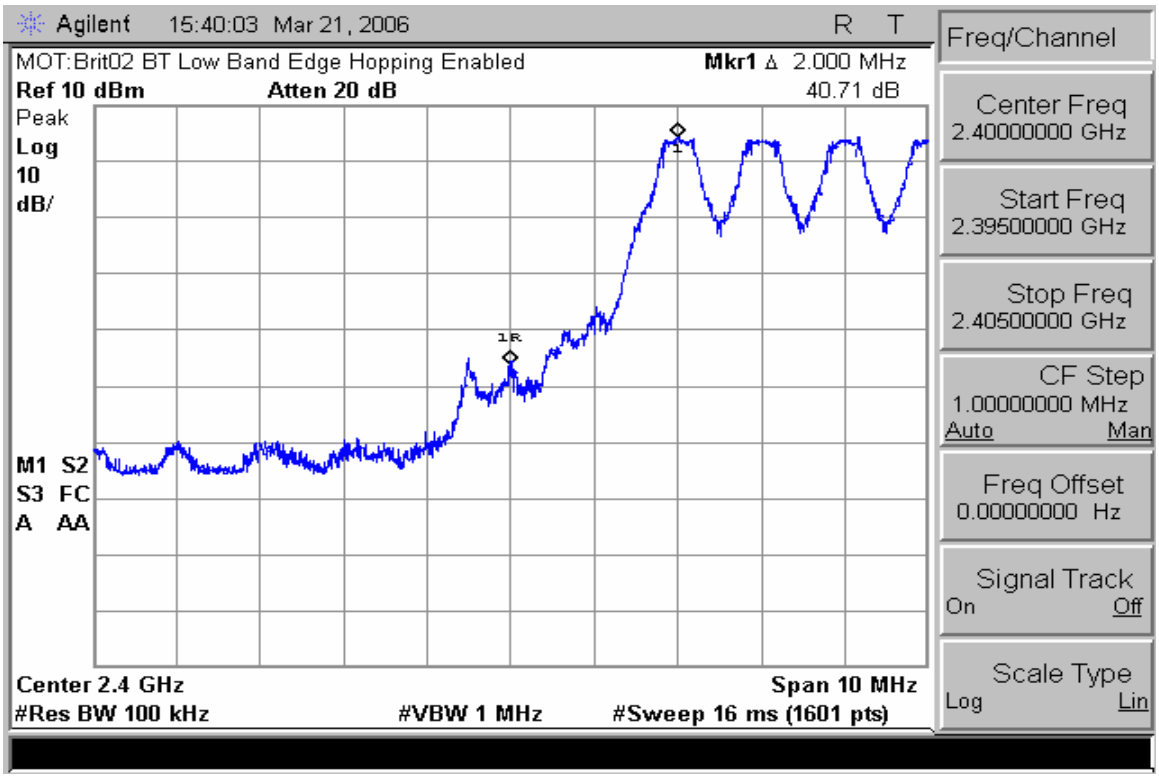
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results

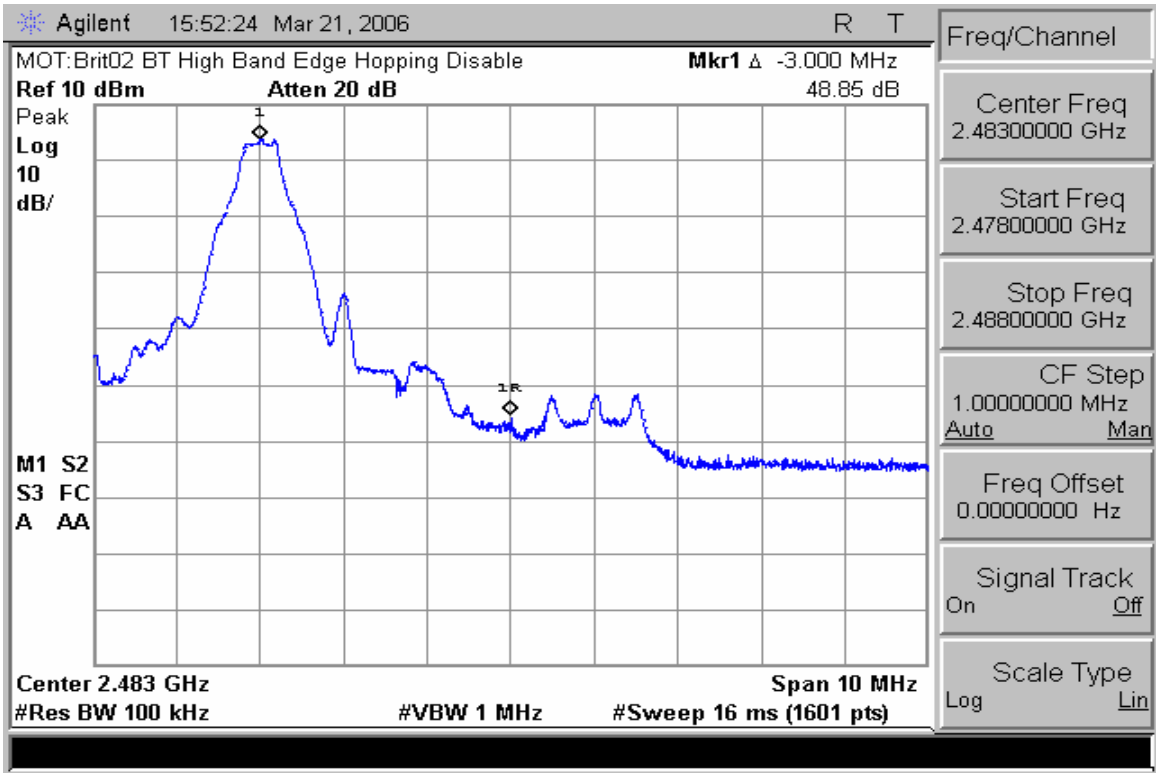
See Attached:



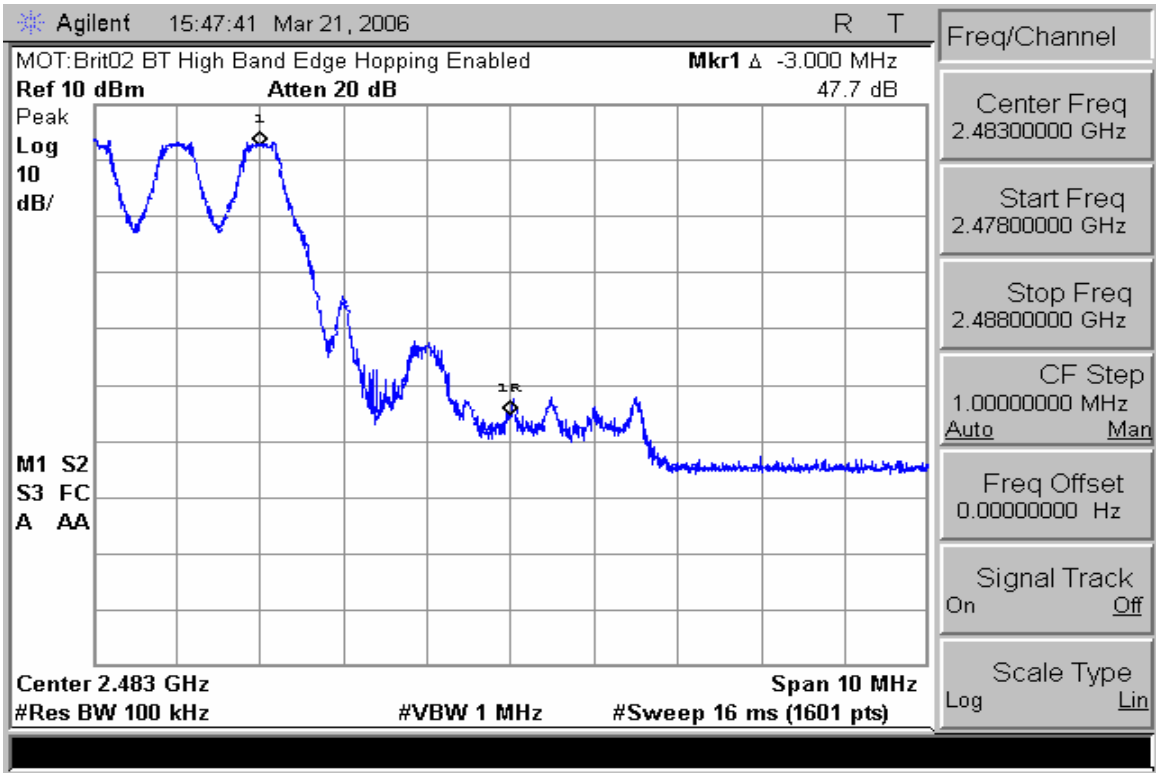
Low Band Edge with Hopping Disabled



Low Band Edge with Hopping Enabled



High Band Edge with Hopping Disabled



High Band Edge with Hopping Enabled

SPURIOUS RF CONDUCTED EMISSIONS

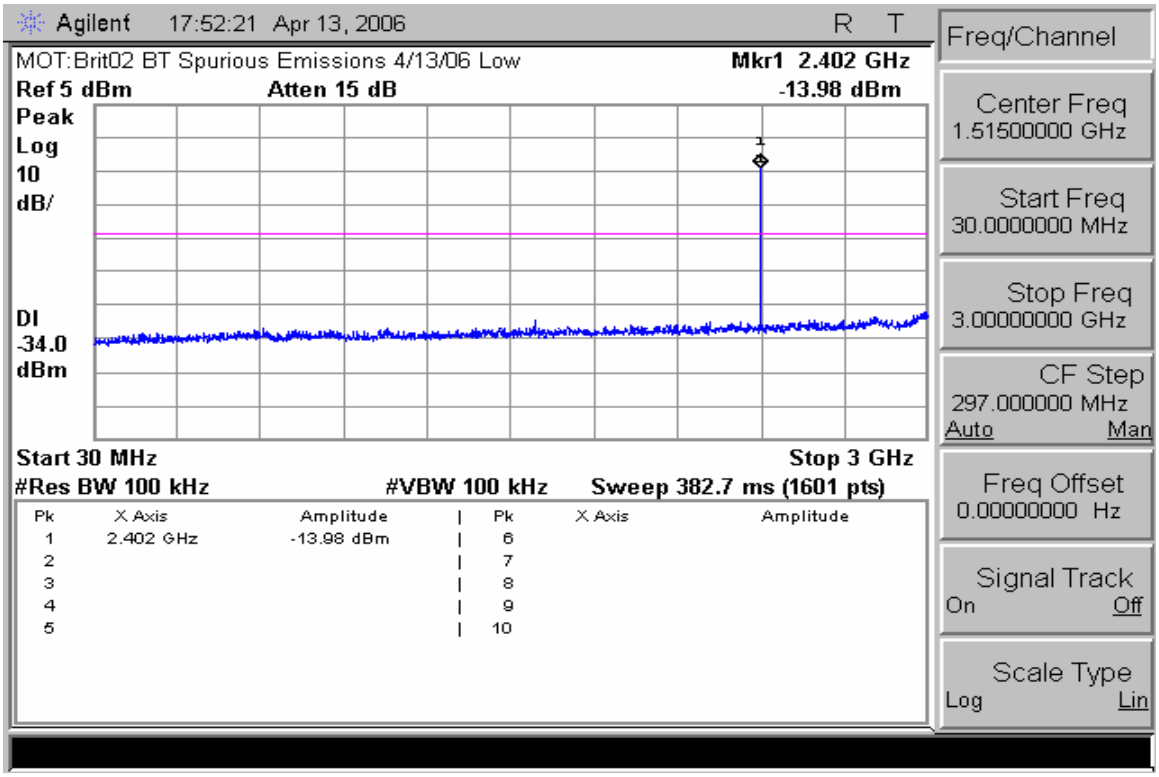
CFR 47 Part 15.247

Measurement Procedure

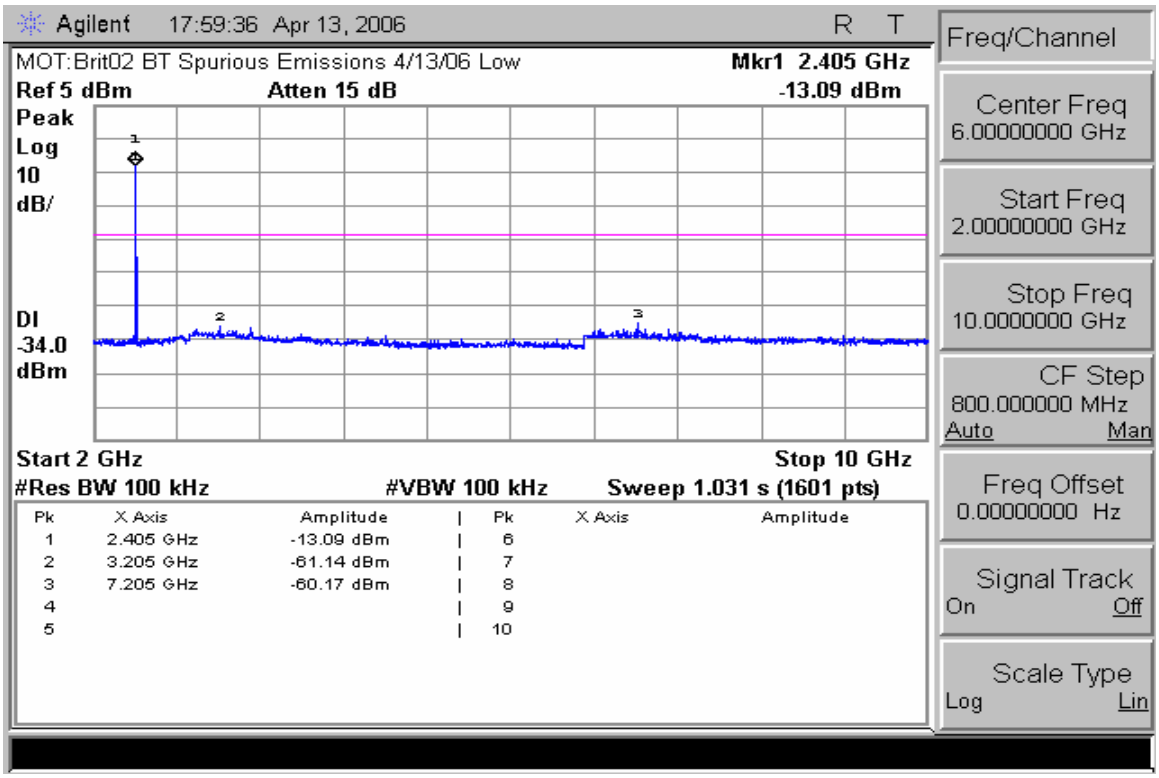
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results

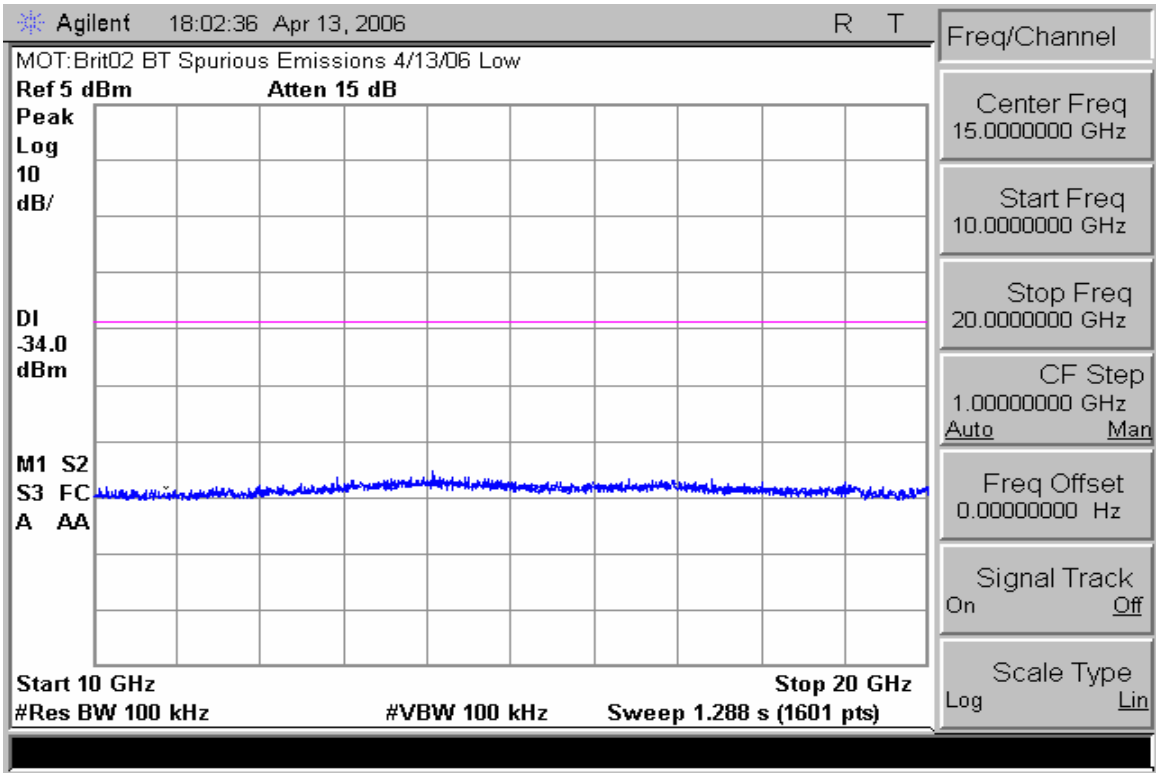
See attached:



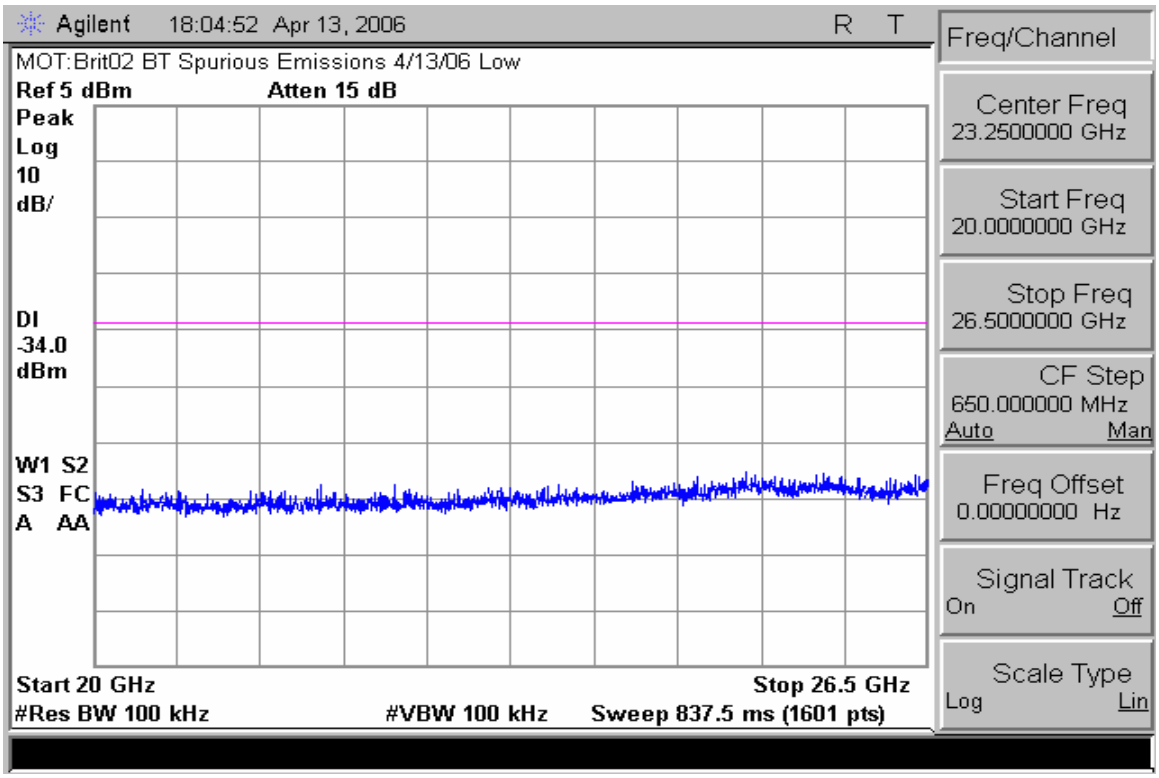
Conducted Spurious Emissions 30-3000MHz (Low Channel)



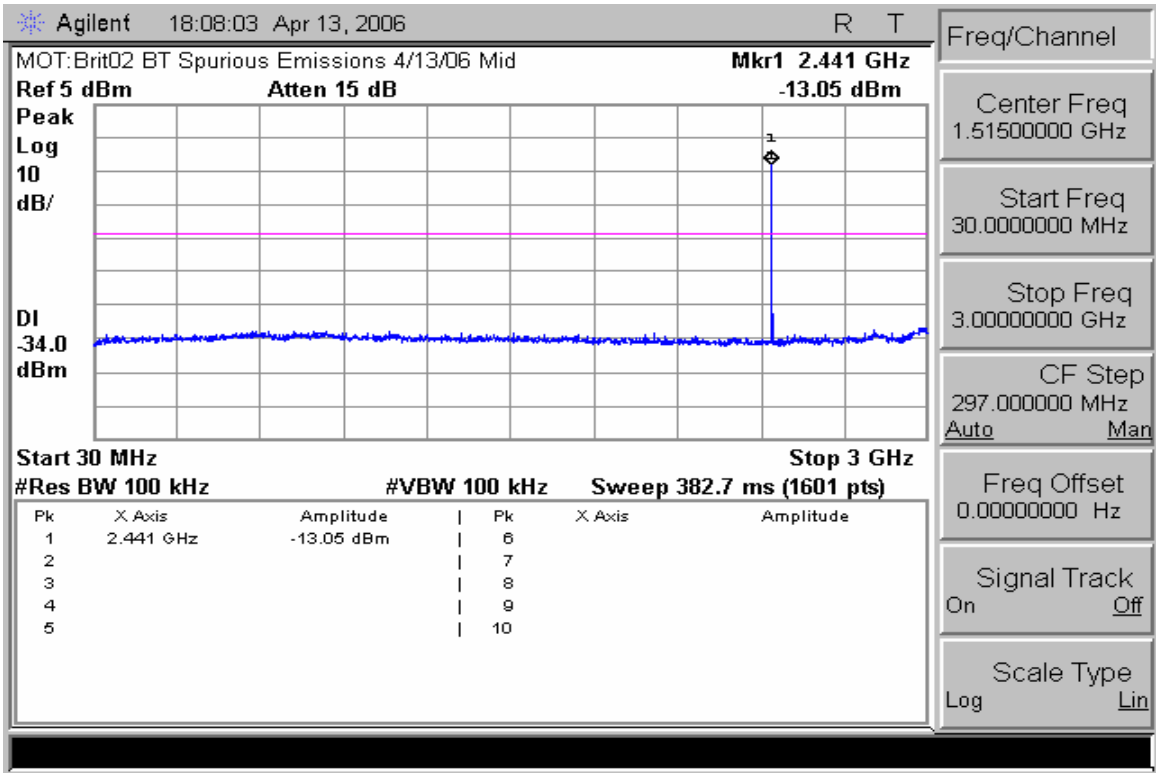
Conducted Spurious Emissions 2-10GHz (Low Channel)



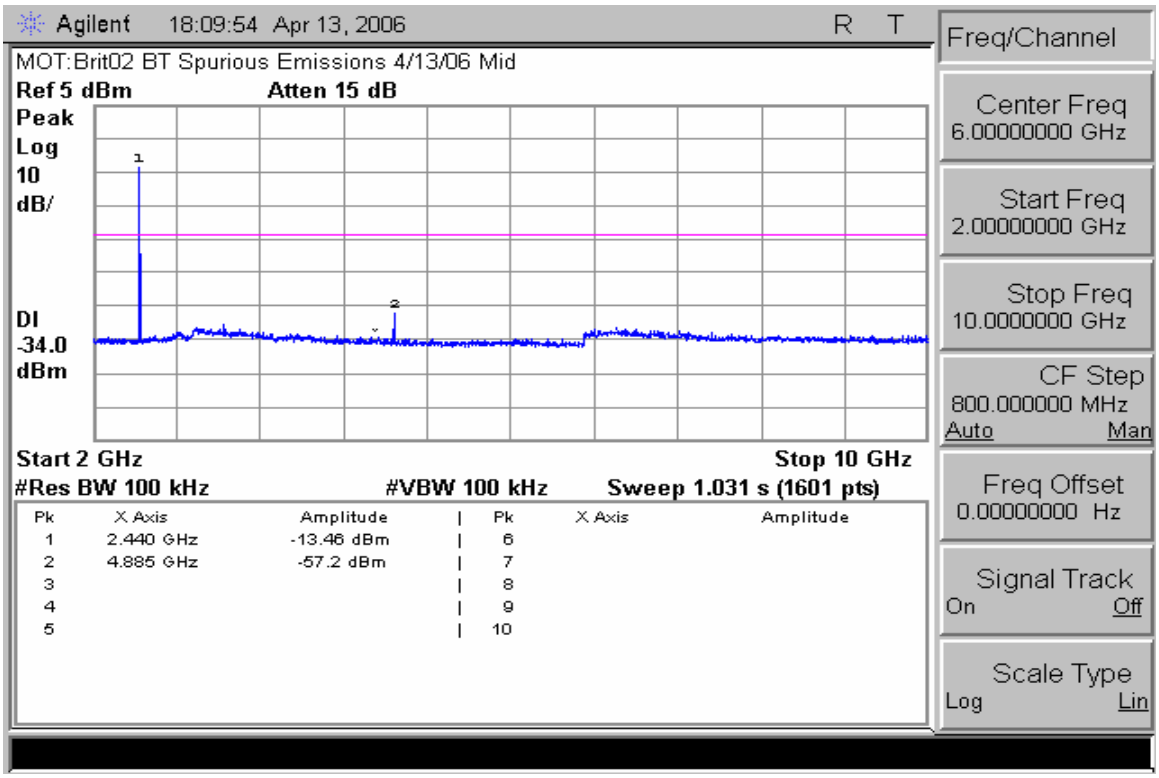
Conducted Spurious Emissions 10-20GHz (Low Channel)



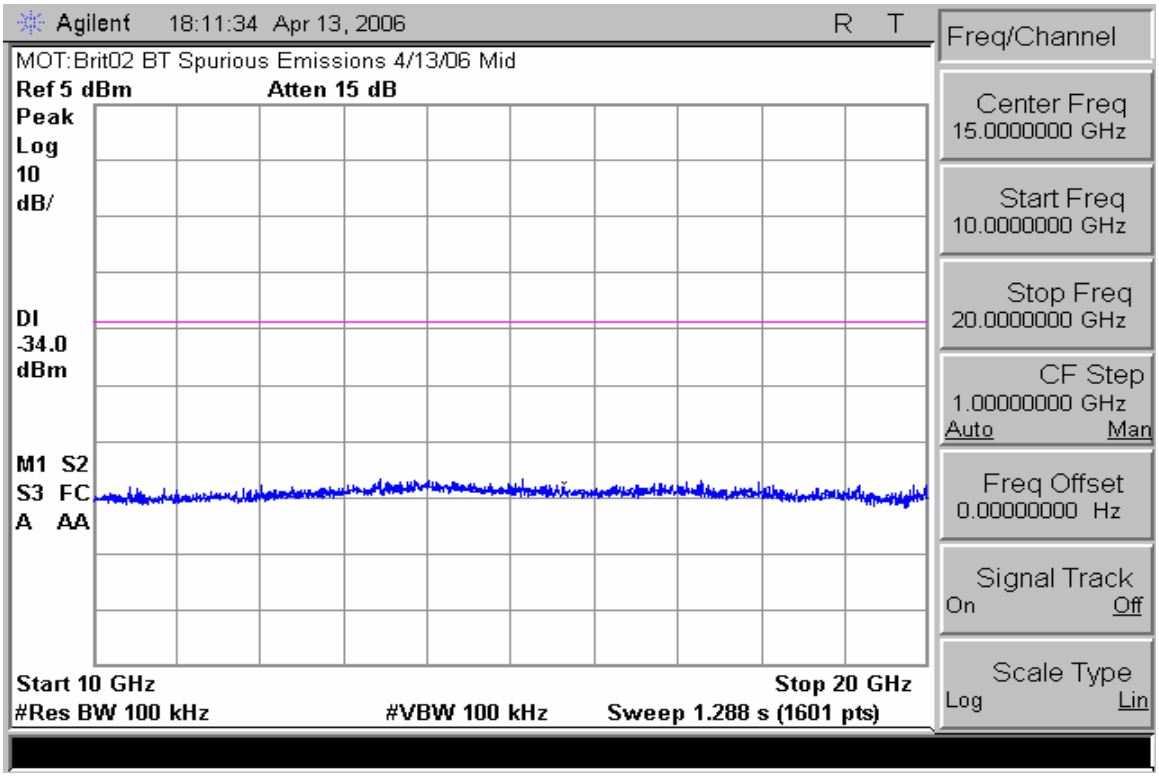
Conducted Spurious Emissions 20-26.5GHz (Low Channel)



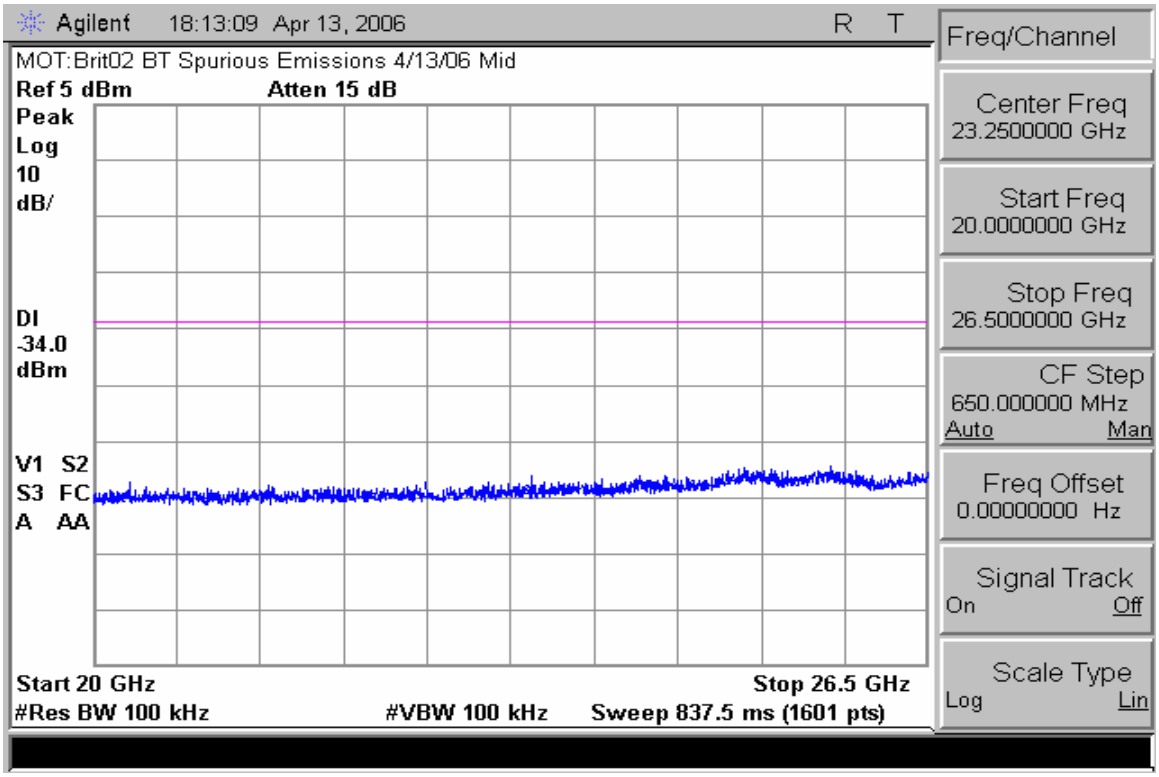
Conducted Spurious Emissions 30-3000MHz (Mid Channel)



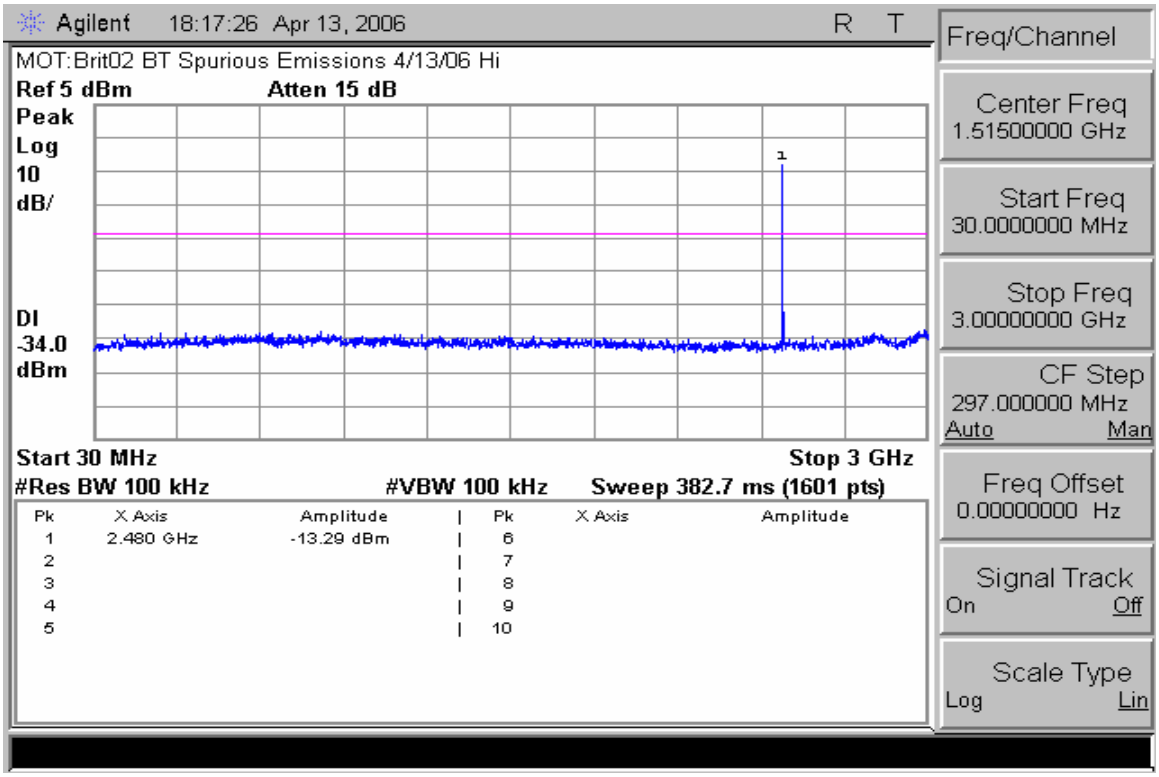
Conducted Spurious Emissions 2-10GHz (Mid Channel)



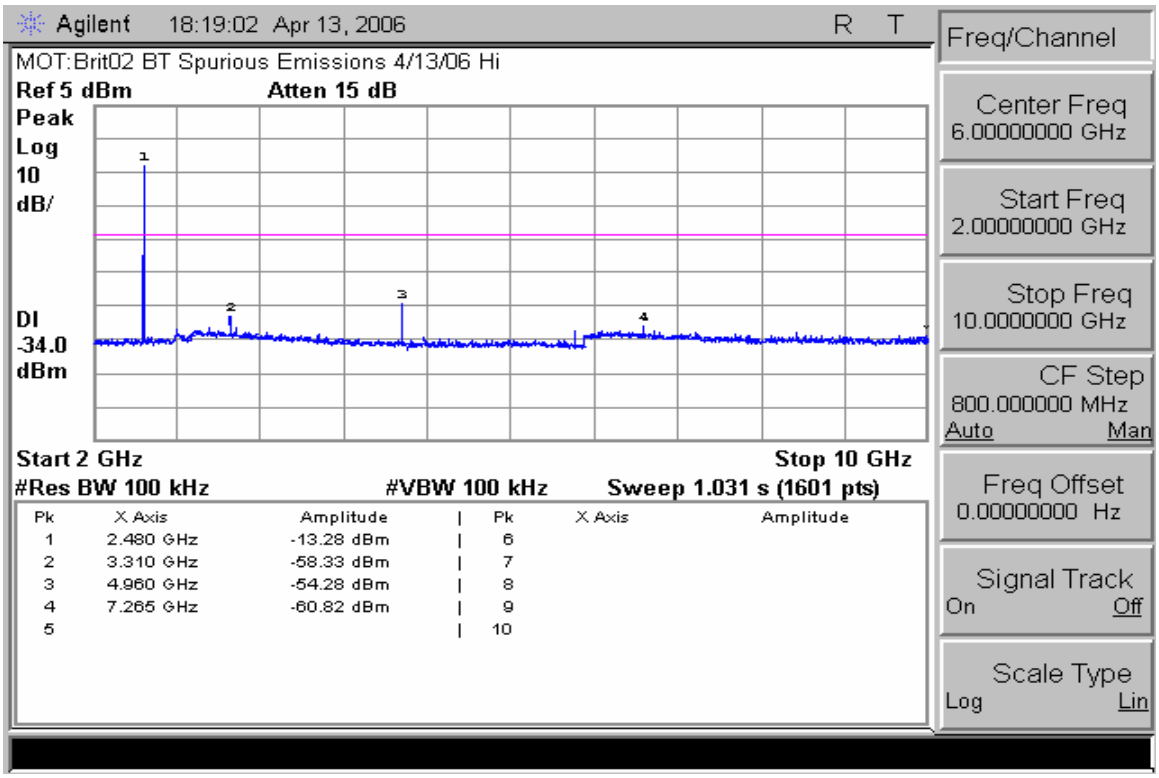
Conducted Spurious Emissions 10-20GHz (Mid Channel)



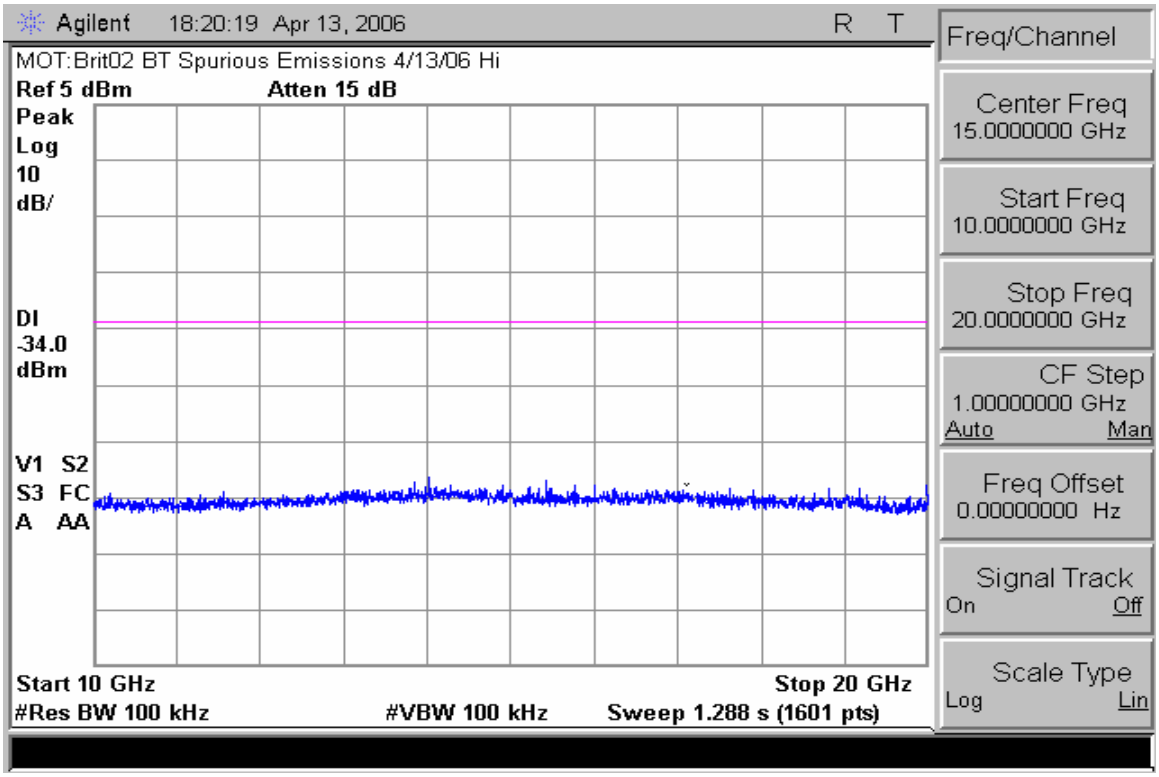
Conducted Spurious Emissions 20-26.5GHz (Mid Channel)



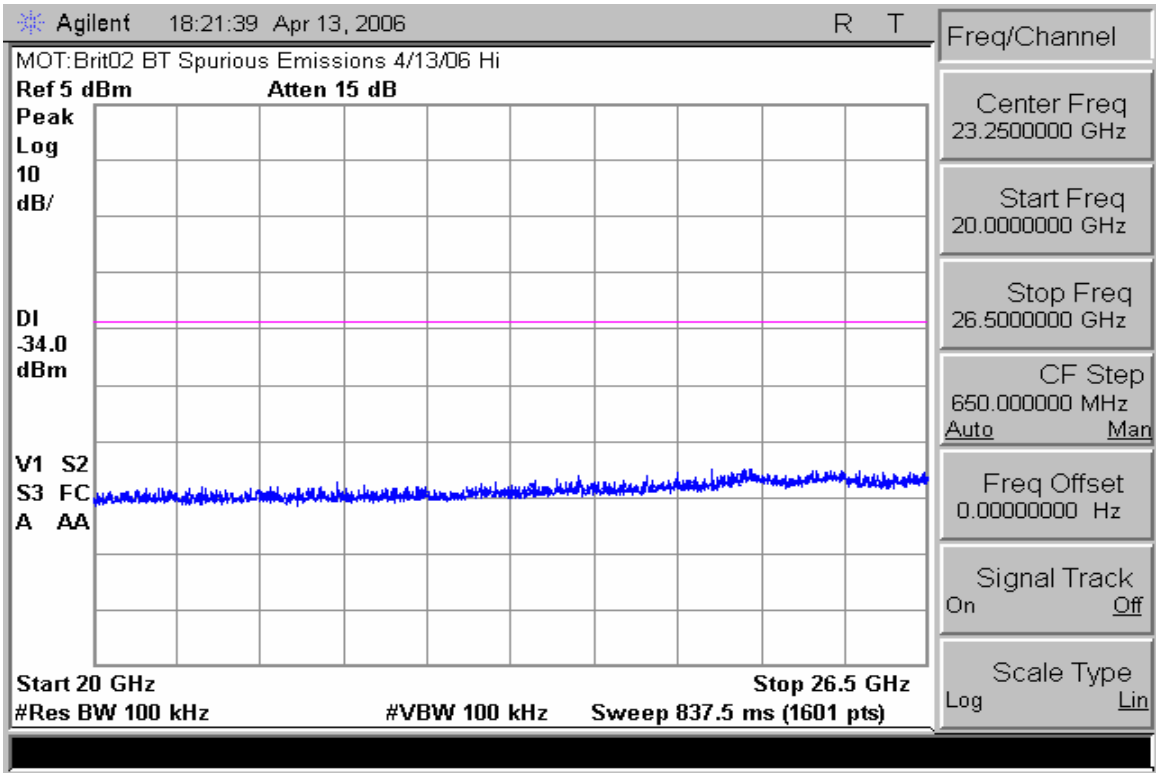
Conducted Spurious Emissions 30-3000MHz (High Channel)



Conducted Spurious Emissions 2-10GHz (High Channel)



Conducted Spurious Emissions 10-20GHz (High Channel)



Conducted Spurious Emissions 20-26.5GHz (High Channel)

AC LINE CONDUCTED

CFR 47 Part 15.207

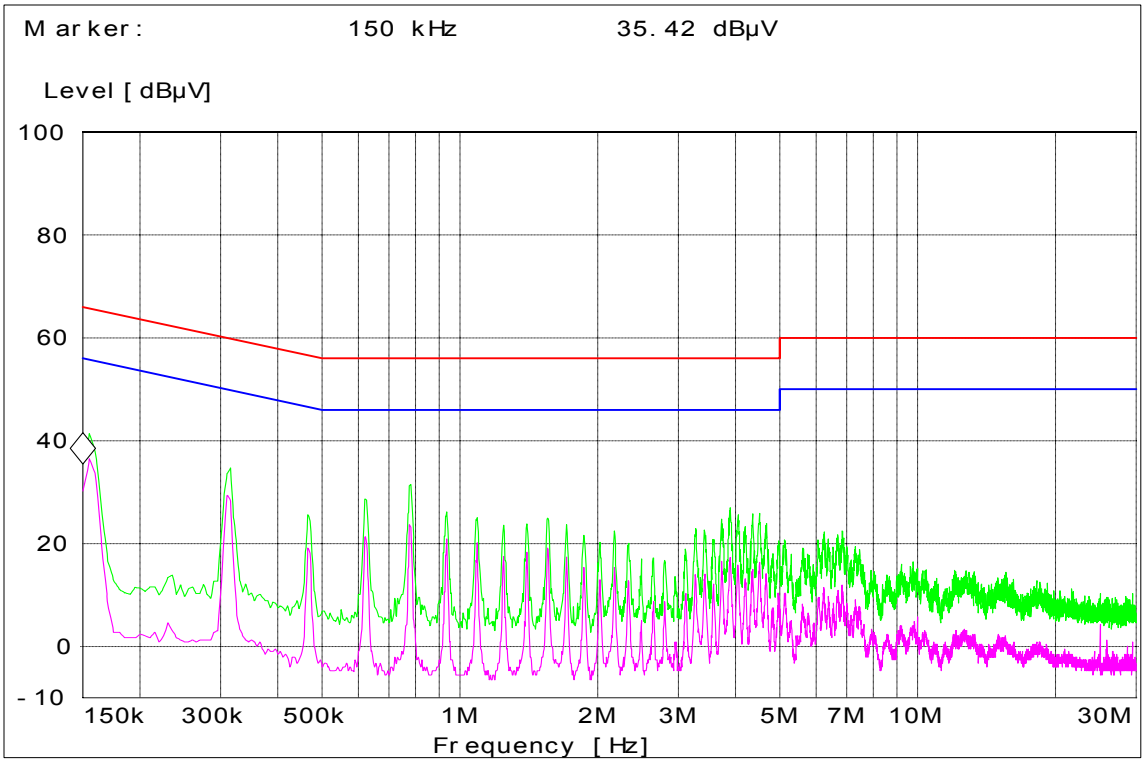
Measurement Procedure

Measured levels of ac power line conducted emission shall be the radio-noise voltage from the line probe or across the 50 Ω LISN port, where permitted, terminated into a 50 Ω noise meter, or where permitted or required, the radio-noise current on the power line sensed by a current probe.

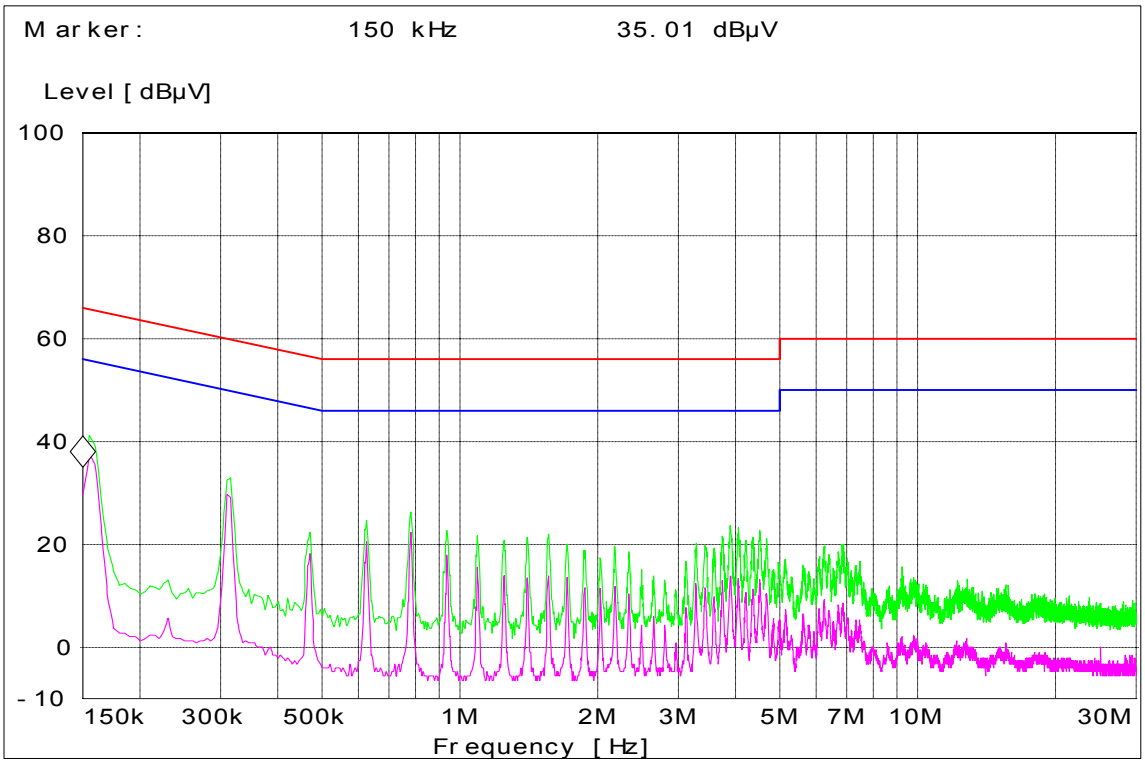
All radio-noise voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord or calibrated extension cord by the use of mating plugs and receptacles on the EUT and LISN. Equipment shall be tested with power cords that are normally supplied using an LISN, the 50 Ω measuring port is terminated by a 50 Ω radio-noise meter or a 50 Ω resistive load. All other ports are terminated in 50 Ω.

Measurement Results

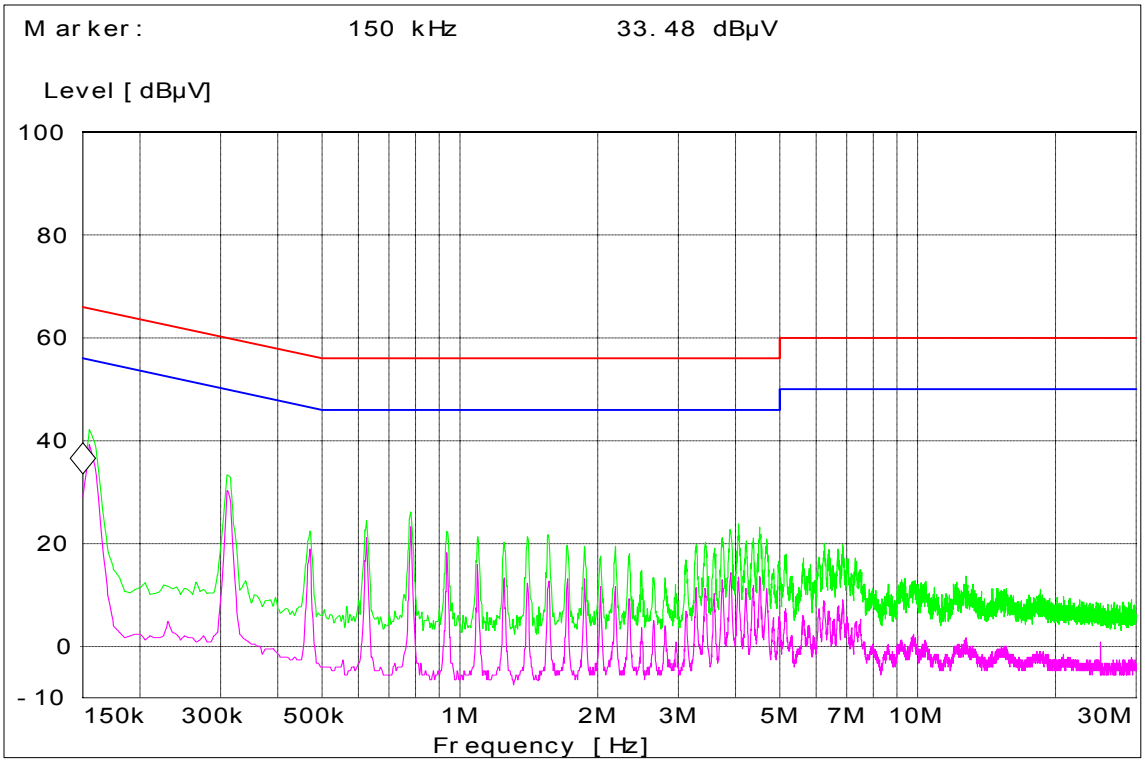
See attached:



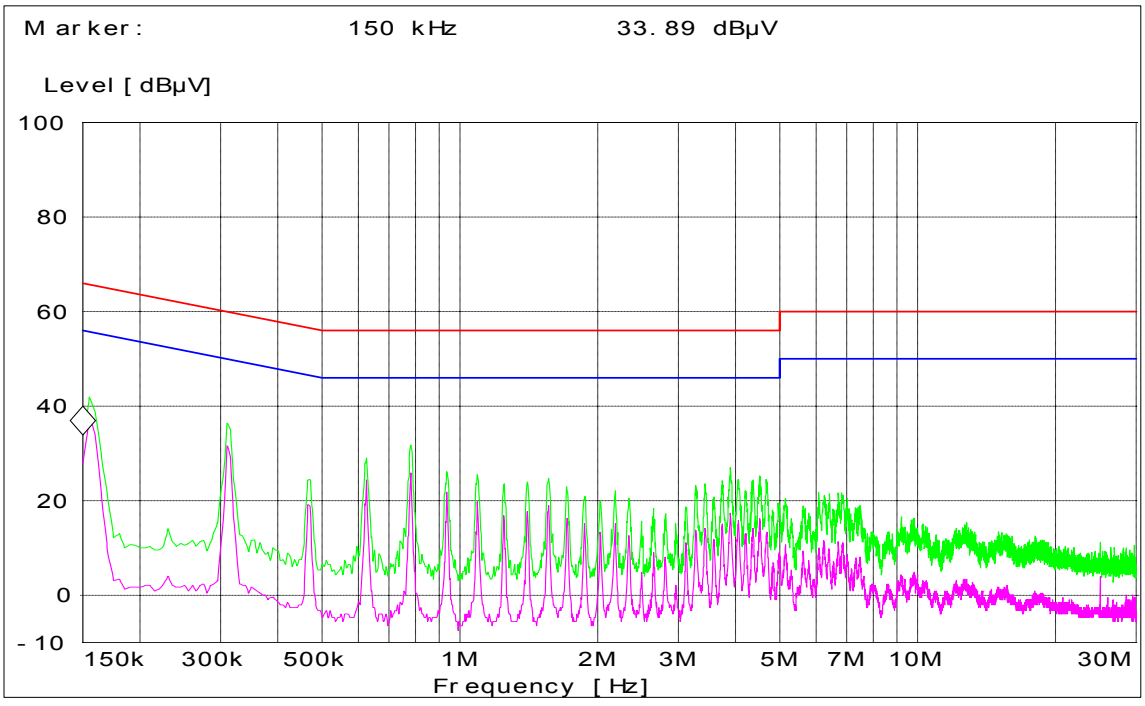
Channel 0 2402MHz - Tx Mode - Neutral Coupling Hopping



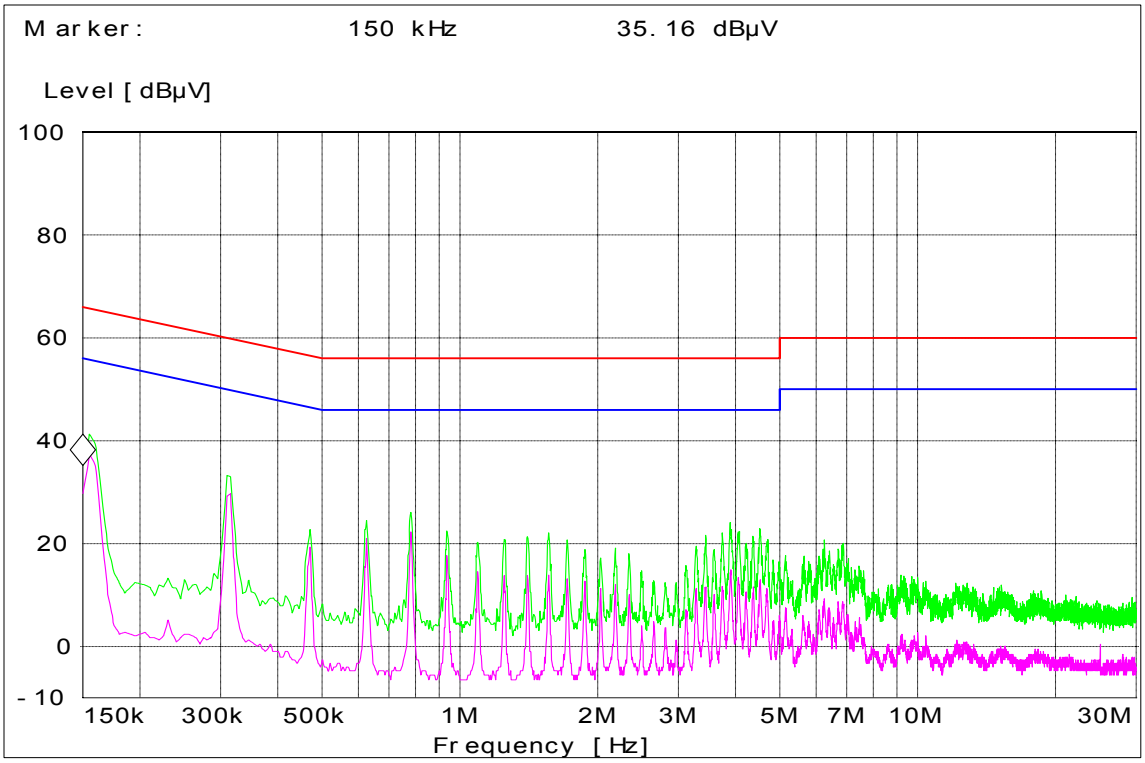
Channel 0 2402MHz - Tx Mode - Line Coupling Nonhopping



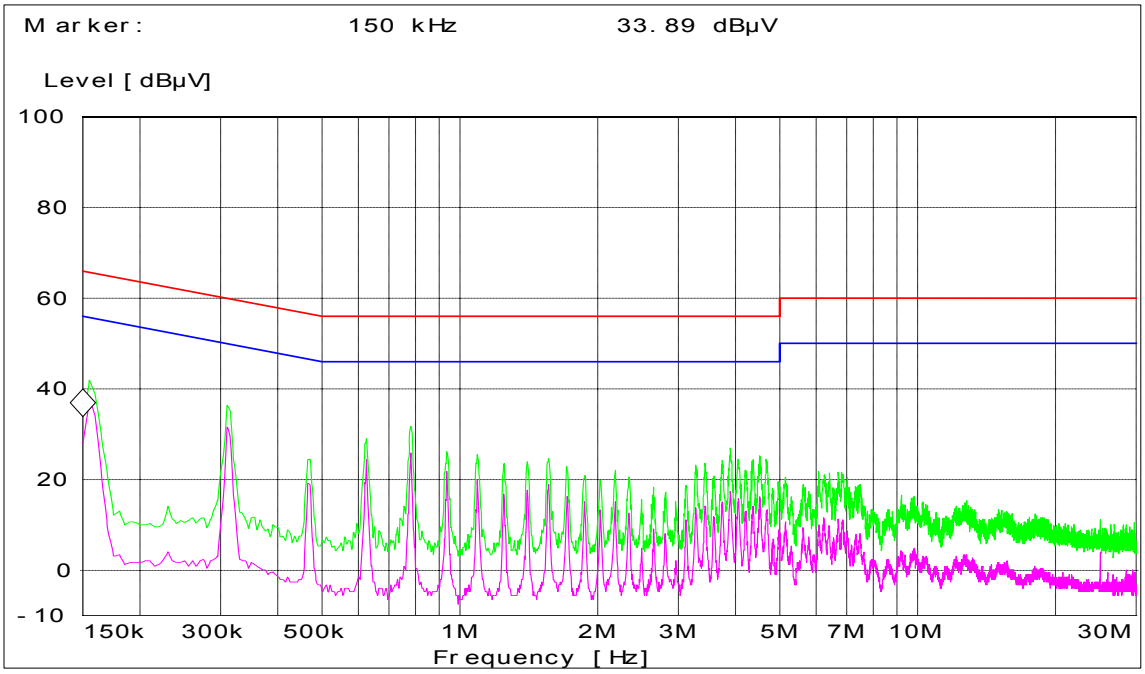
Channel 39 2441MHz - Tx Mode - Line Coupling Nonhopping



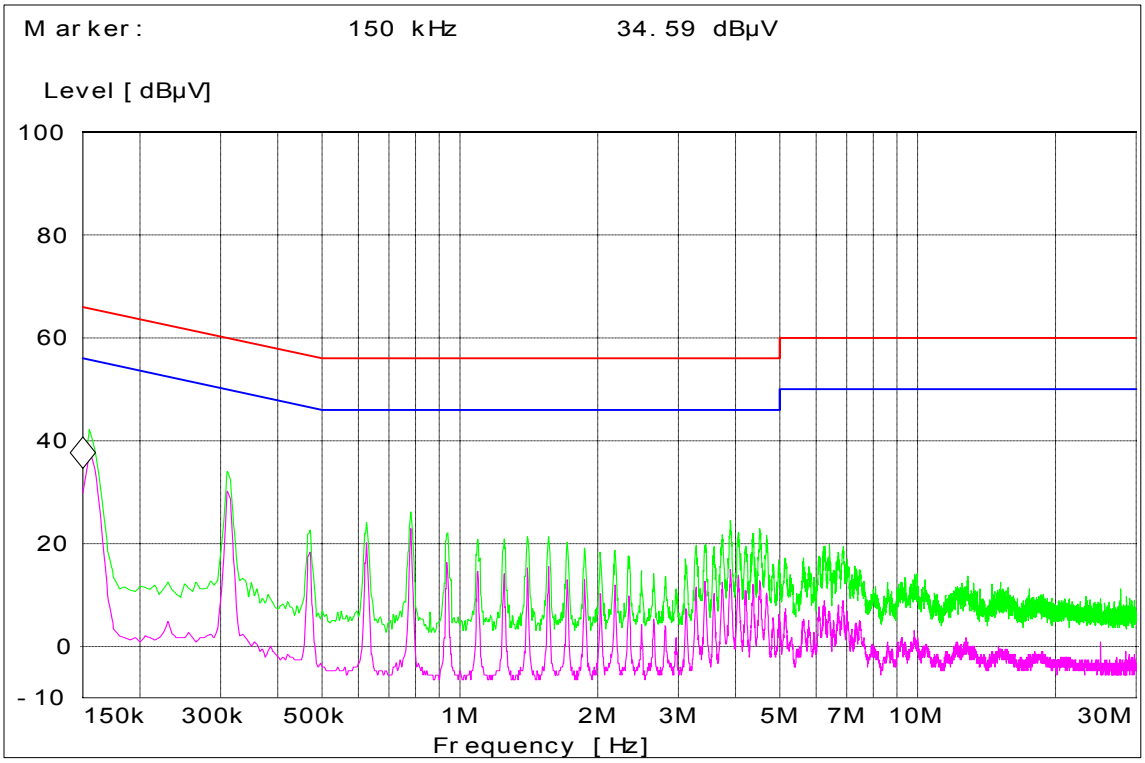
Channel 39 2441MHz - Tx Mode - Neutral Coupling Hopping



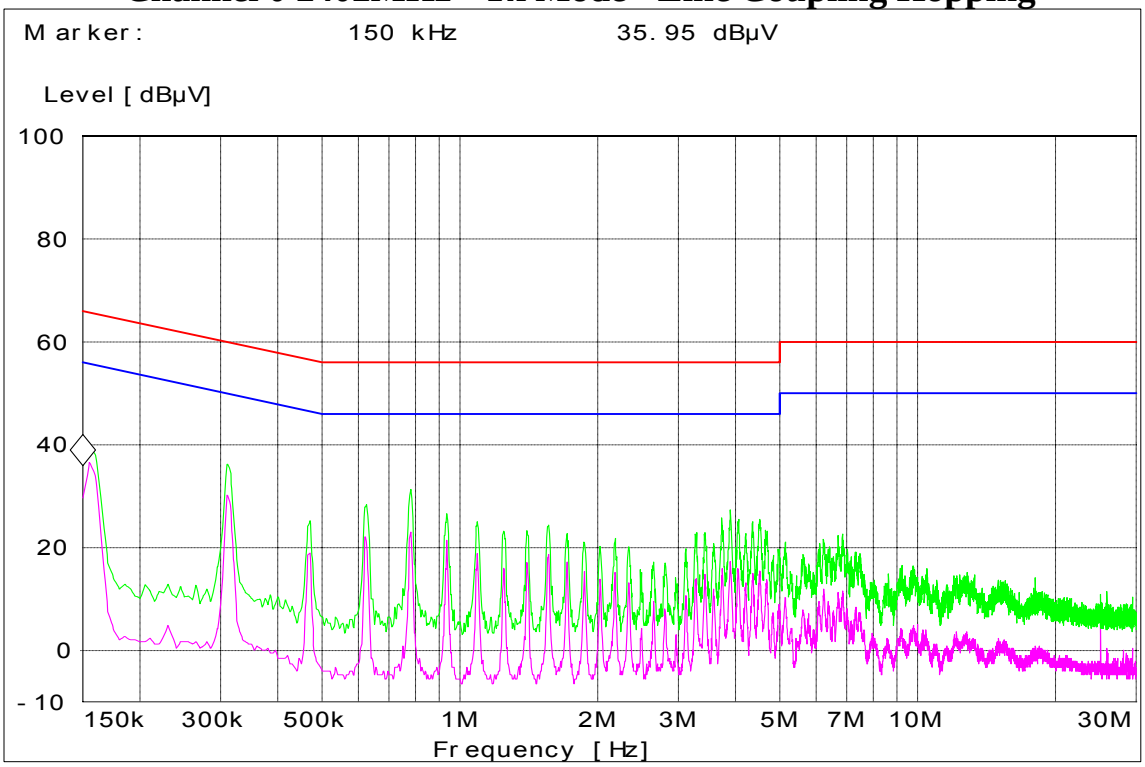
Channel 78 2480MHz - Tx Mode - Line Coupling Hopping



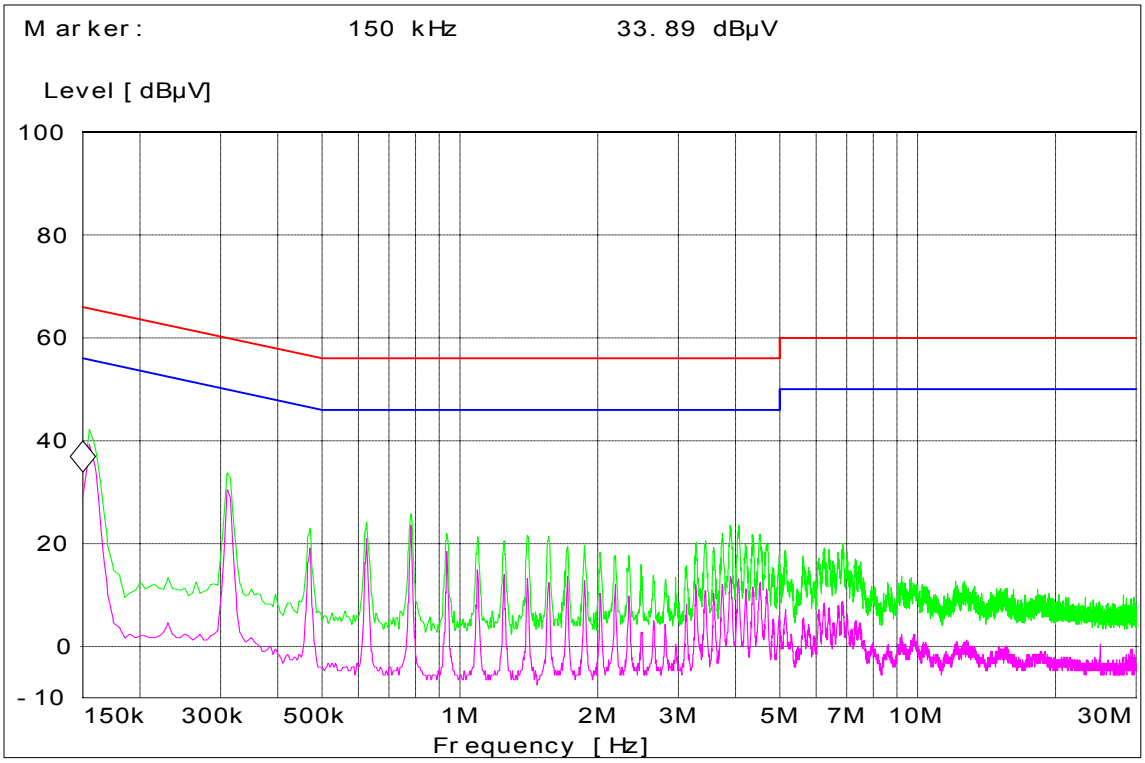
Channel 78 2480MHz - Tx Mode - Neutral Coupling Hopping



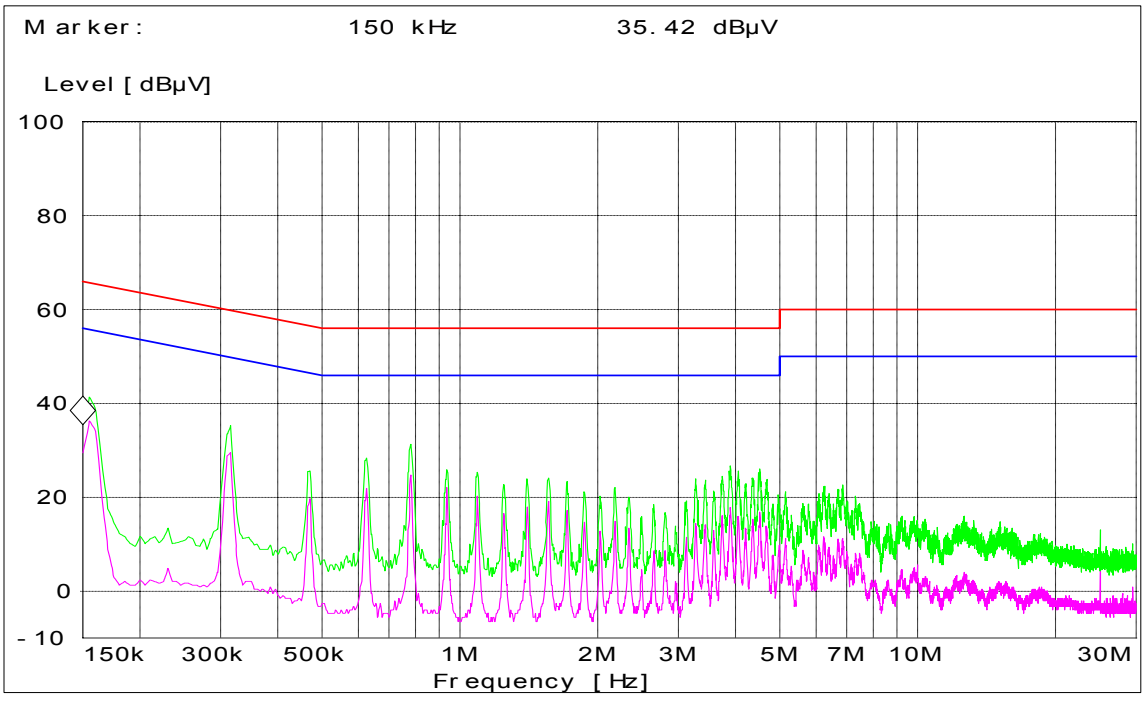
Channel 0 2402MHz - Tx Mode - Line Coupling Hopping



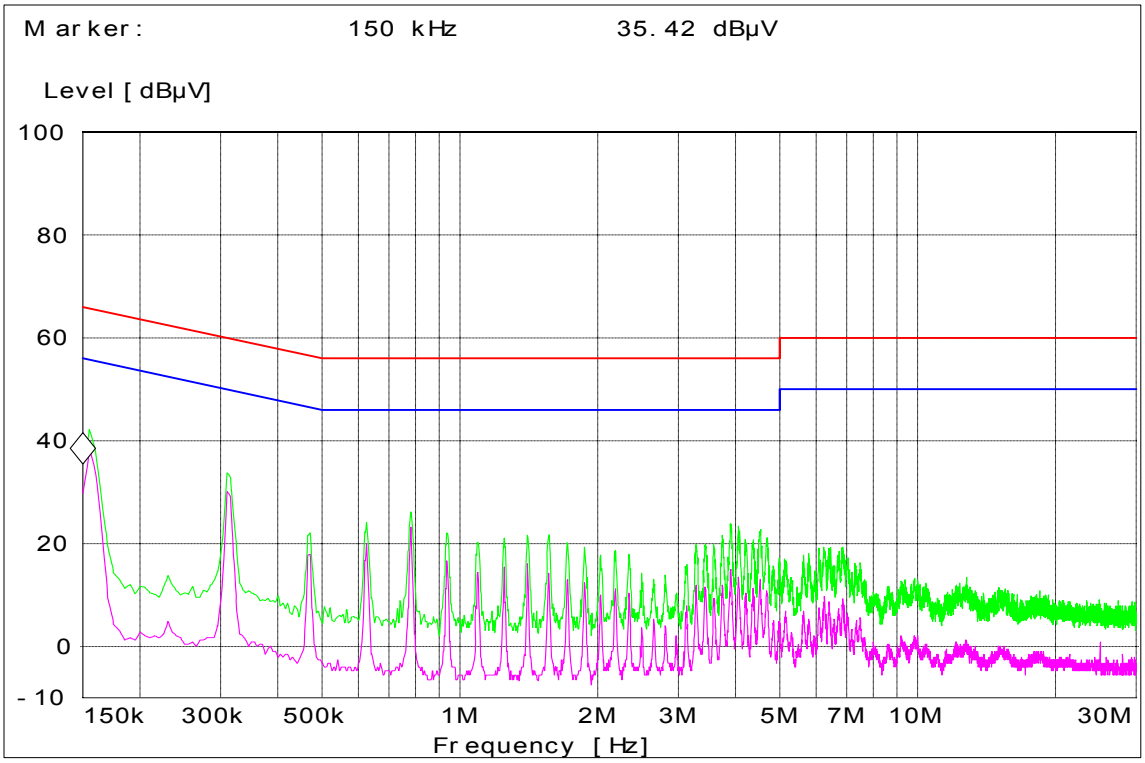
Channel 0 2402MHz - Tx Mode - Neutral Coupling Nonhopping



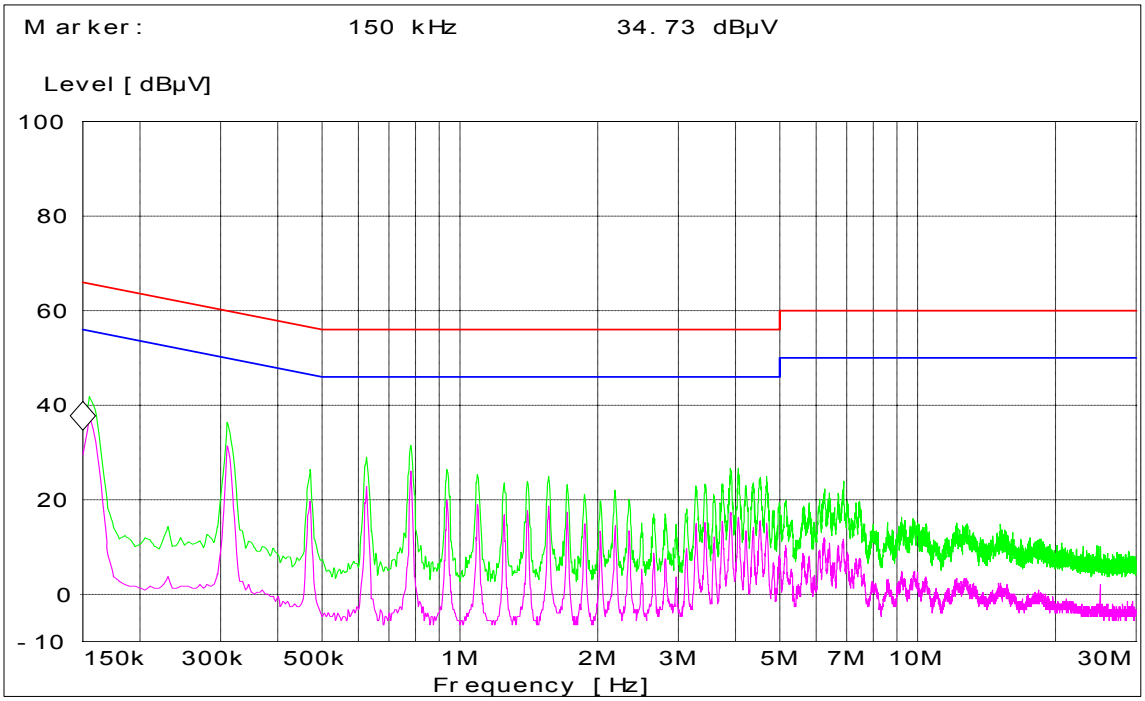
Channel 39 2441MHz - Tx Mode - Line Coupling Hopping



Channel 39 2441MHz - Tx Mode - Neutral Coupling Nonhopping



Channel 78 2480MHz - Tx Mode - Line Coupling Nonhopping



Channel 78 2480MHz - Tx Mode - Neutral Coupling Nonhopping

End of Test Report