RF TEST REPORT

Test item	:	Industrial PDA
Model No.	:	BIP-1500
Order No.	:	1202-00288
Date of receipt	:	2012-02-24
Test duration	:	2012-03-13 ~ 2012-03-26
Date of issue	:	2012-04-06
Use of report	:	FCC Original Grant

Applicant : Bluebird Soft Inc.
558-5, Sinsa-dong, Kangnam-gu, Seoul, Korea

Test laboratory : Digital EMC Co., Ltd.
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, 449-080, Korea

Test specification	:	FCC Part 15.247 Subpart C
Test environment	:	See appended test report
Test result	:	☒ Pass ☐ Fail

Tested by:	Witnessed by:	Reviewed by:
Engineer S.K.Ryu	N/A	Technical Director Harvey Sung

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1. Equipment information

1.1 Equipment description

FCC Equipment Class	Part 15 Spread Spectrum Transmitter(DSS)
FCC ID	SS4BIP1500
Equipment type	Industrial PDA
Equipment model name	BIP-1500
Equipment add model name	N/A
Equipment serial no.	Identical prototype
Frequency band	2402 ~ 2480 MHz
Spread Spectrum	Frequency Hopping
Modulation type	GFSK, π/4-DQPSK, 8DPSK
Transmission rate	1Mbps, 2Mbps, 3Mbps
Channel Spacing	1.0 MHz
Power	DC 7.4 V
Antenna type	Internal Type: (Max. Peak Gain: 1.4 dBi)

1.2 Ancillary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

2. Information about test items

2.1 Test cases

This device was tested in maximum duty mode at maximum power of hopping enable / disable mode.

Test Case 1 (Basic Test Case)	EUT + PINPAD (13.56MHz RFID)
Test Case 2 (Additional Test Case)	EUT + Finger scan
Test Case 3 (Additional Test Case)	EUT + Payment
Test Case 4 (Additional Test Case)	EUT + Battery Cover

This EUT has 4 optional external modules so above 4 test cases were tested for compliance.

2.2 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

2.3 Tested frequency

- Hopping Function: Enable

	TX Frequency (MHz)	RX Frequency (MHz)
Hopping Band	2402 ~ 2480	2402 ~ 2480

- Hopping Function: Disable

	TX Frequency (MHz)	RX Frequency (MHz)
Lowest Channel	2402	2402
Middle Channel	2441	2441
Highest Channel	2480	2480

2.4 Tested environment

Temperature	:	22 ~ 24 °C
Relative humidity content	:	32 ~ 40 % R.H.
Details of power supply	:	DC 7.4 V

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing
→ None

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit (Using in 2400 ~ 2483.5MHz)	Test Condition	Status Note 1
I. Transmit mode (TX)				
15.247(a)	Carrier Frequency Separation	>= 20dB BW or >= Two-Thirds of the 20dB BW	Conducted	C
	Number of Hopping Frequencies	>= 15 hops		C
	20 dB Bandwidth	None		C
	Dwell Time	=< 0.4 seconds		C
15.247(b)	Transmitter Output Power	=< 1Watt , if CHs >= 75 Others =<0.125W		C
15.247(d)	Band-edge /Conducted	The radiated emission to any 100 kHz of out-band shall be at least 20dB below the highest in-band spectral density.		C
	Conducted Spurious Emissions			C
15.205, 15.209	Radiated Spurious Emissions	FCC 15.209 Limits	Radiated	C Note.2
15.207	AC Conducted Emissions	EN 55022	AC Line Conducted	C
15.203	Antenna Requirements	FCC 15.203	-	C

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

Note 2: This test item was performed in each axis. And the worst case data were reported.

The sample was tested according to the following specification:
ANSI C-63.4-2003, DA00-705

3.2 Transmitter requirements

3.2.1 Carrier Frequency Separation & Test Case 1

- Procedure:

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:

Span = wide enough to capture the peaks of two adjacent channels

RBW = 1% of the span Sweep = auto

VBW = ≥ RBW Detector function = peak

Trace = max hold

- Measurement Data: Comply

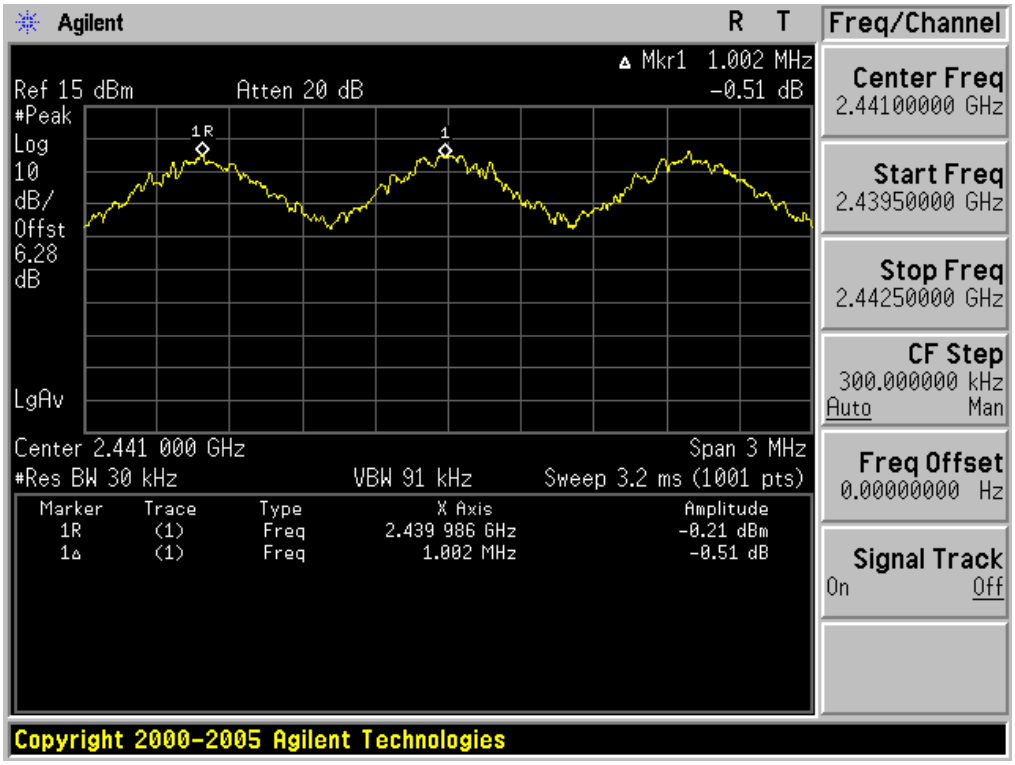
Hopping Mode	Test Mode	Peak of center channel (MHz)	Peak of adjacent Channel (MHz)	Test Result (MHz)
Enable	1Mbps	2439.986	2440.988	1.002
	2Mbps	2439.998	2441.000	1.002
	3Mbps	2441.000	2442.002	1.002

Note 1: See next pages for actual measured spectrum plots.

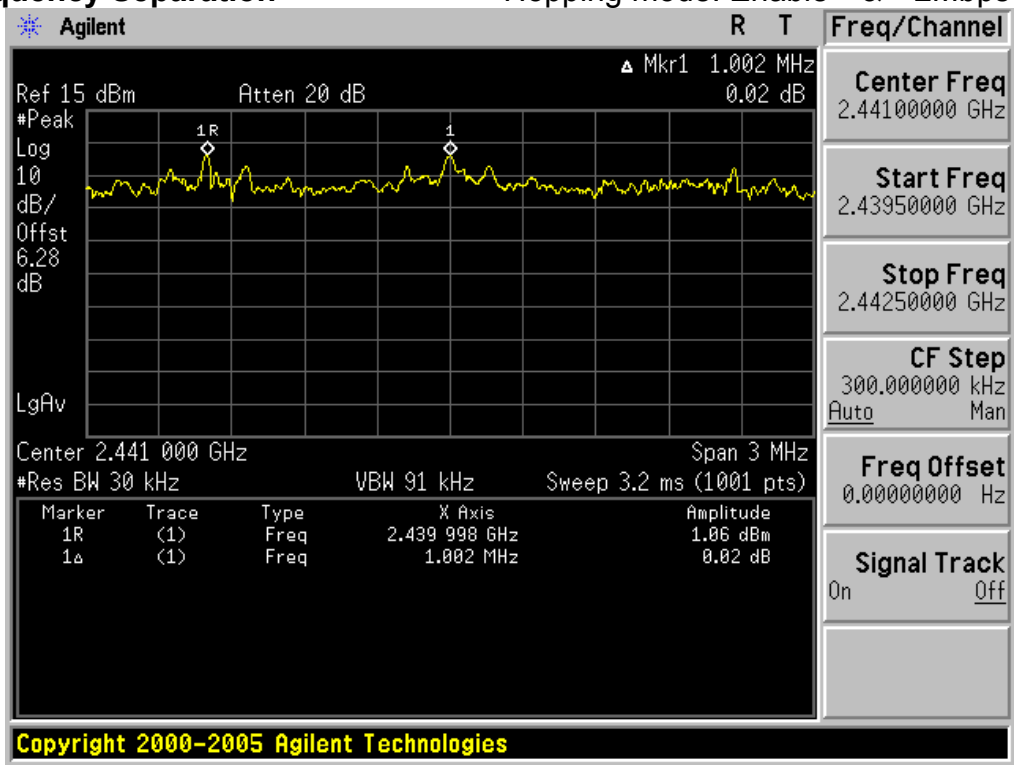
- **Minimum Standard:**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

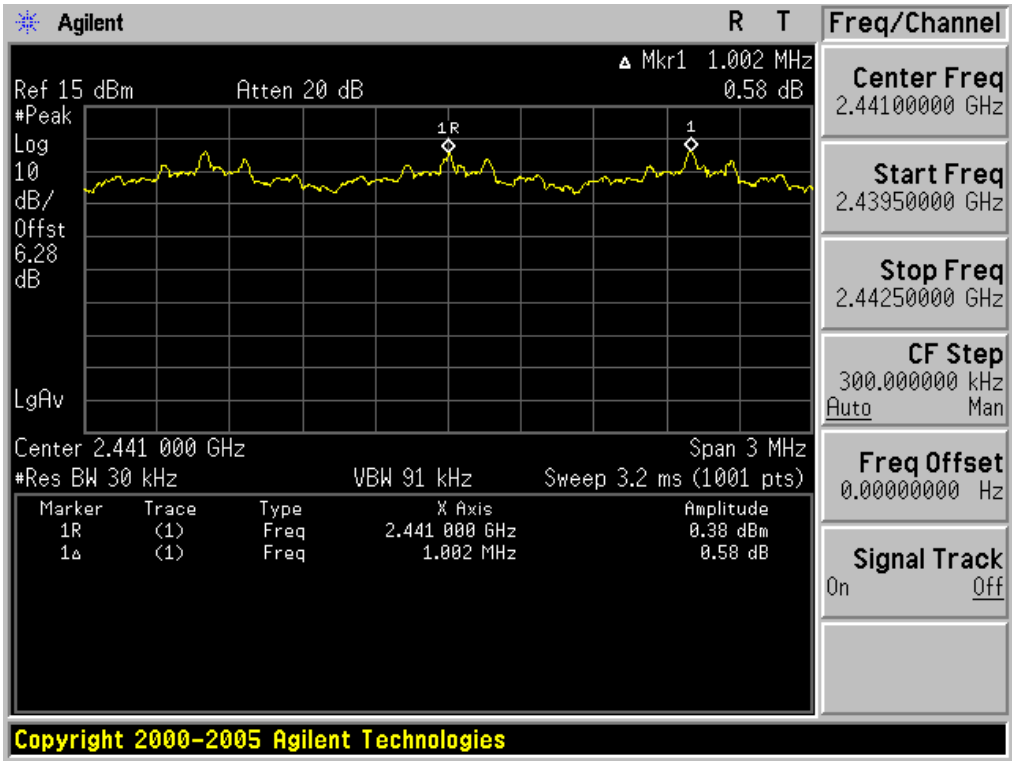
Carrier Frequency Separation Hopping mode: Enable & 1Mbps



Carrier Frequency Separation Hopping mode: Enable & 2Mbps



Carrier Frequency Separation Hopping mode: Enable & 3Mbps



3.2.2 Number of Hopping Frequencies & Test Case 1

- Procedure:

The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.
To get higher resolution, four frequency ranges within the 2400 ~ 2483.5 MHz FH band were examined.

The spectrum analyzer is set to:

Span = 25MHz
Plot 1: Start Frequency = 2389.5MHz, Stop Frequency = 2414.5 MHz
Plot 2: Start Frequency = 2414.5MHz, Stop Frequency = 2439.5 MHz
Plot 3: Start Frequency = 2439.5MHz, Stop Frequency = 2464.5 MHz
Plot 4: Start Frequency = 2464.5MHz, Stop Frequency = 2489.5 MHz
RBW = 1% of the span or more
Sweep = auto
VBW = ≥ RBW
Detector function = peak
Trace = max hold

- **Measurement Data: Comply**

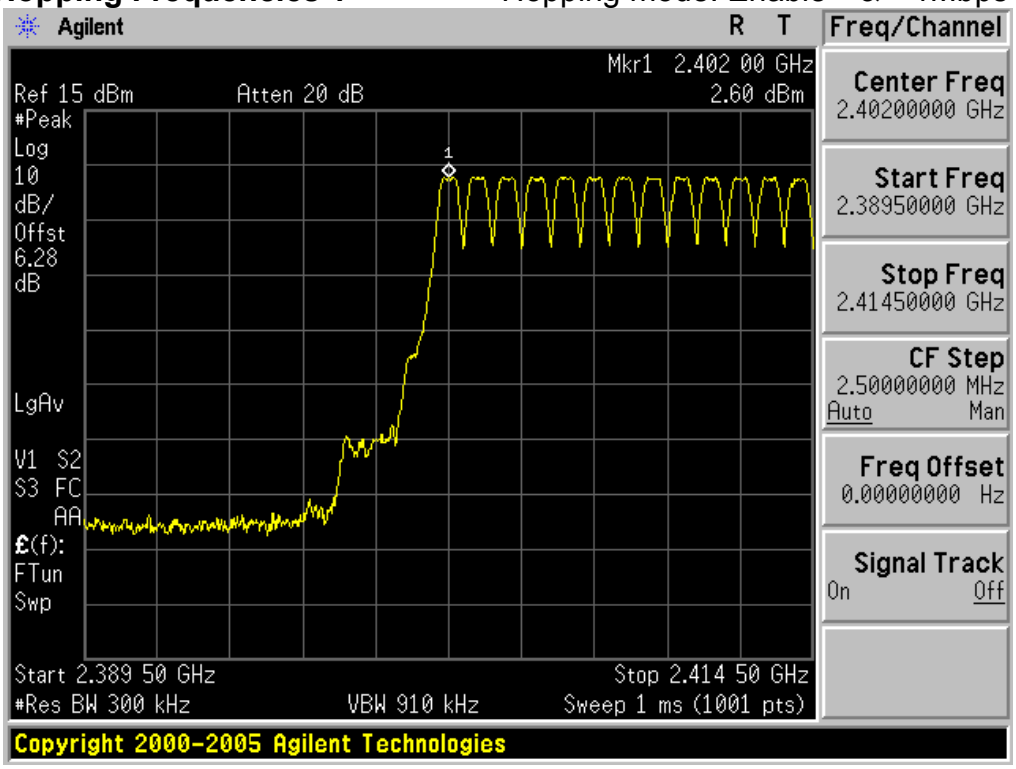
Hopping mode	Test mode	Test Result (Total Hops)
Enable	1Mbps	79
	2Mbps	79
	3Mbps	79

Note 1: See next pages for actual measured spectrum plots.

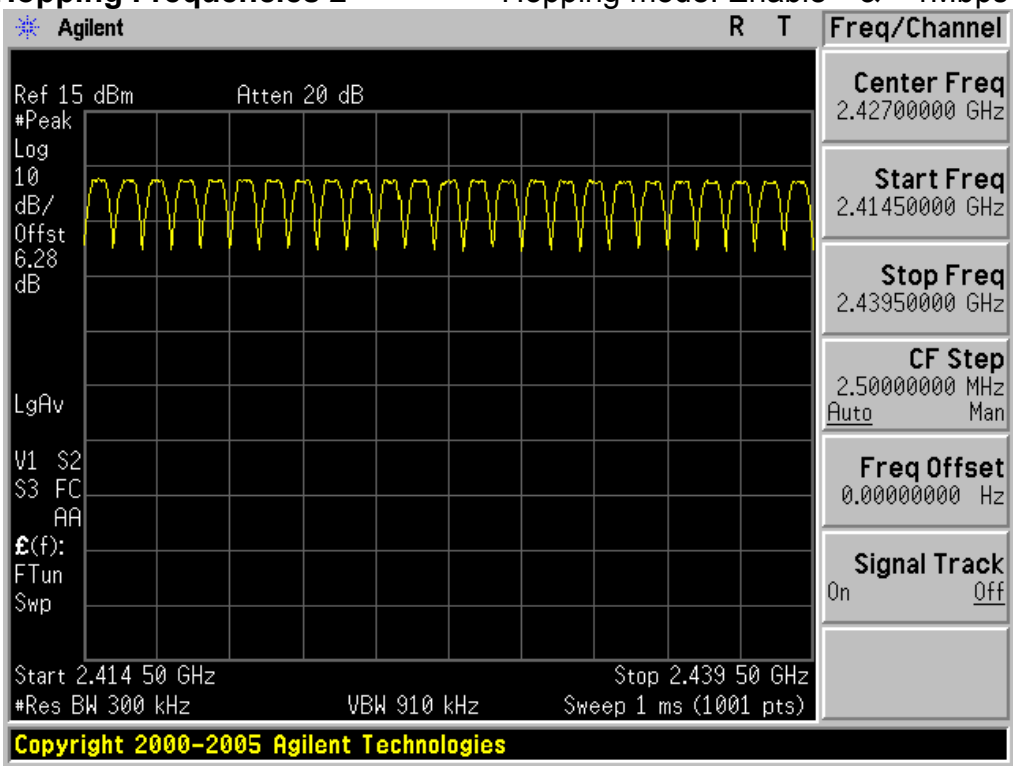
- Minimum Standard:

At least 15 hopes

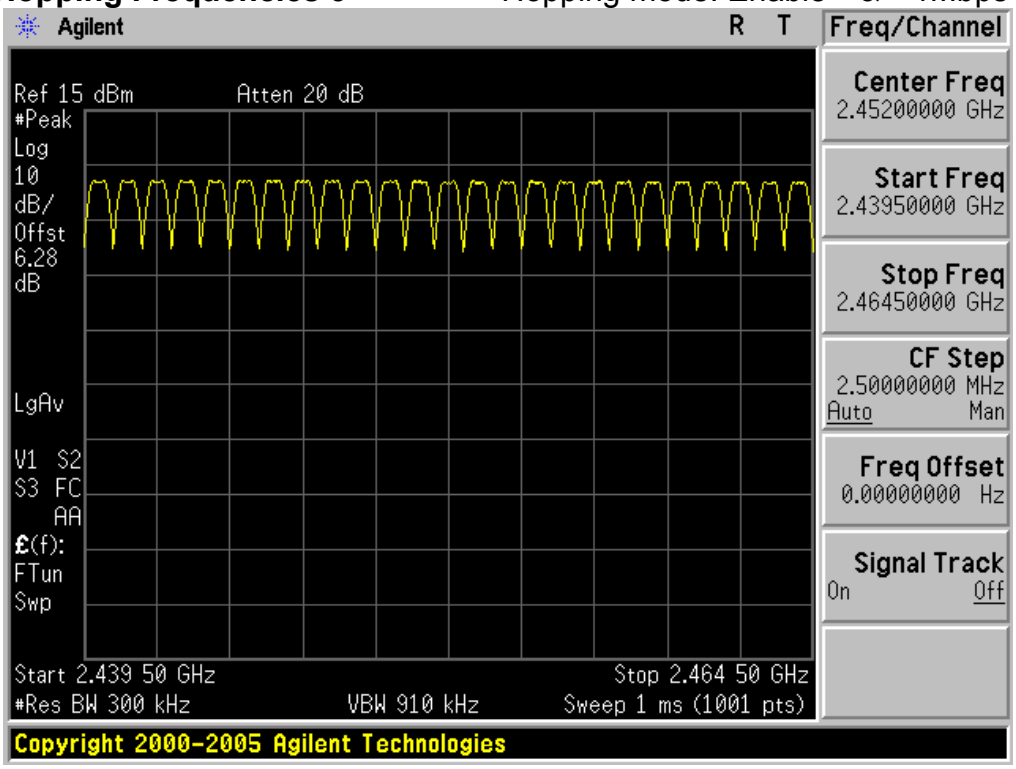
Number of Hopping Frequencies 1 Hopping mode: Enable & 1Mbps



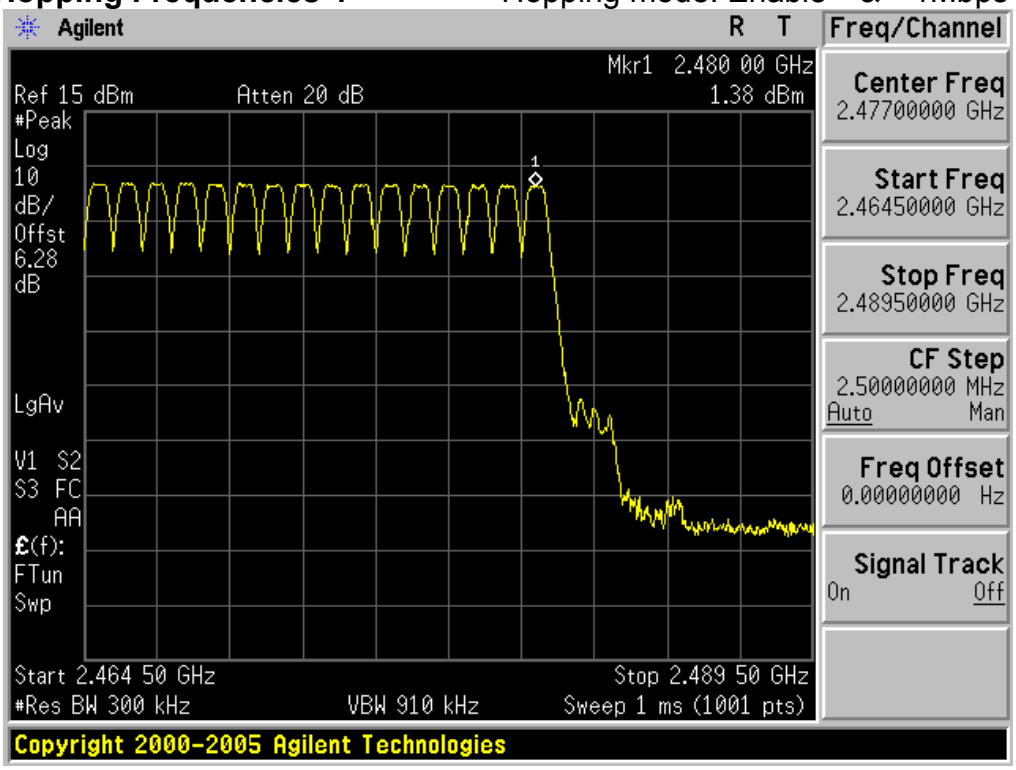
Number of Hopping Frequencies 2 Hopping mode: Enable & 1Mbps



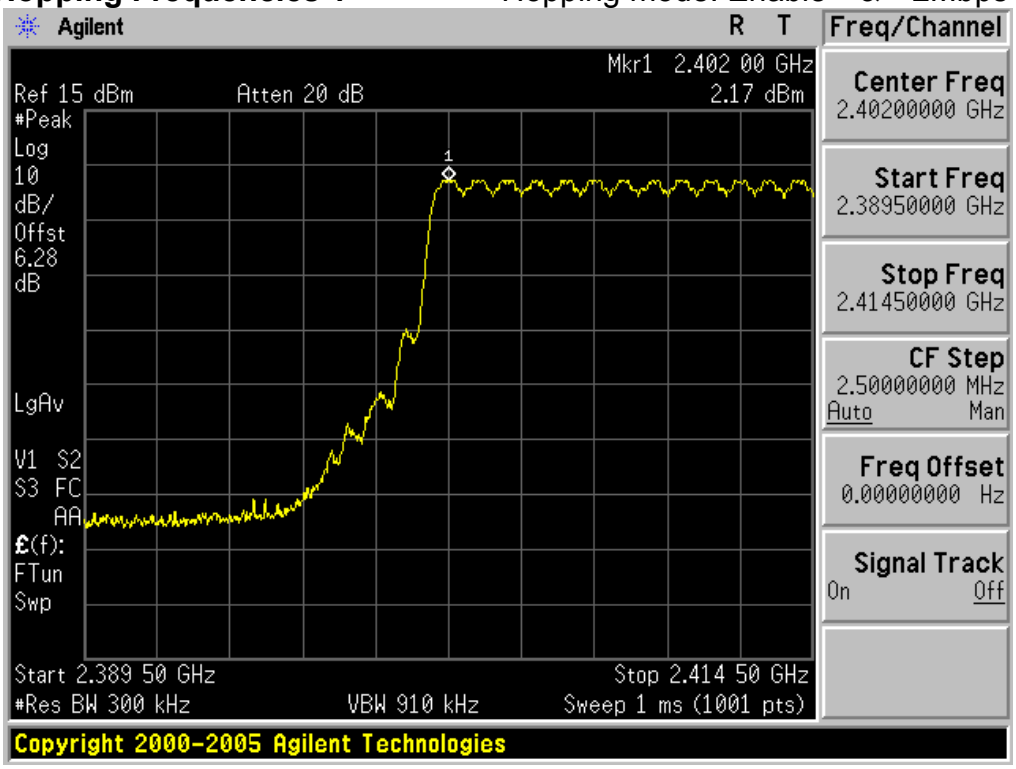
Number of Hopping Frequencies 3 Hopping mode: Enable & 1Mbps



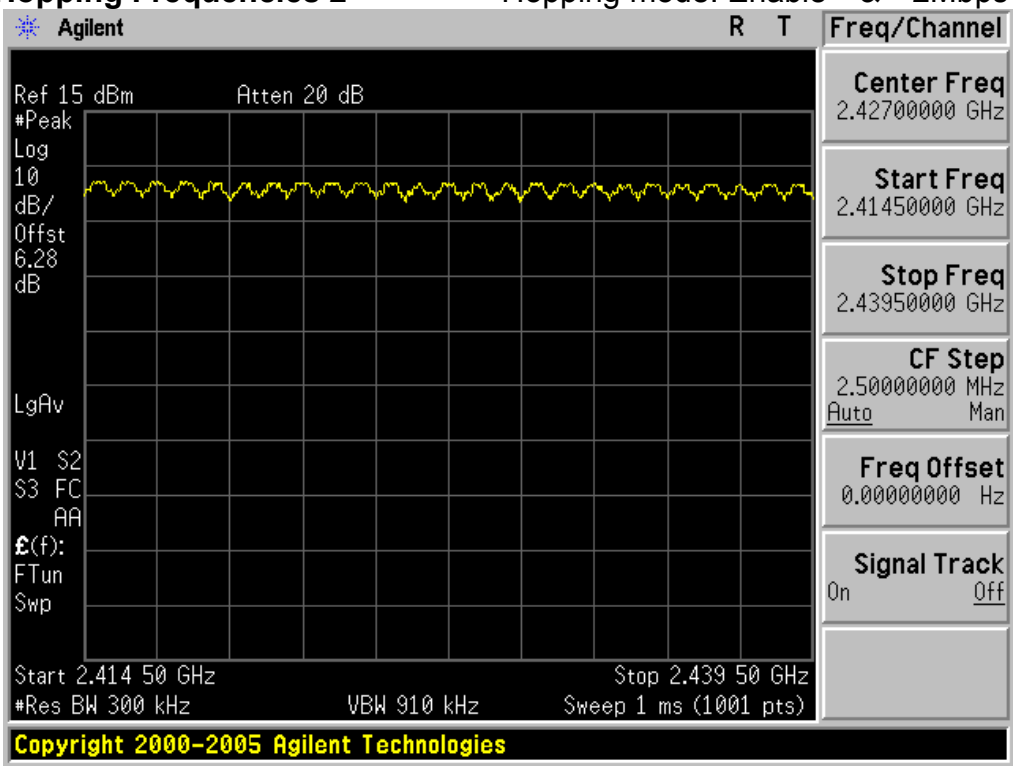
Number of Hopping Frequencies 4 Hopping mode: Enable & 1Mbps



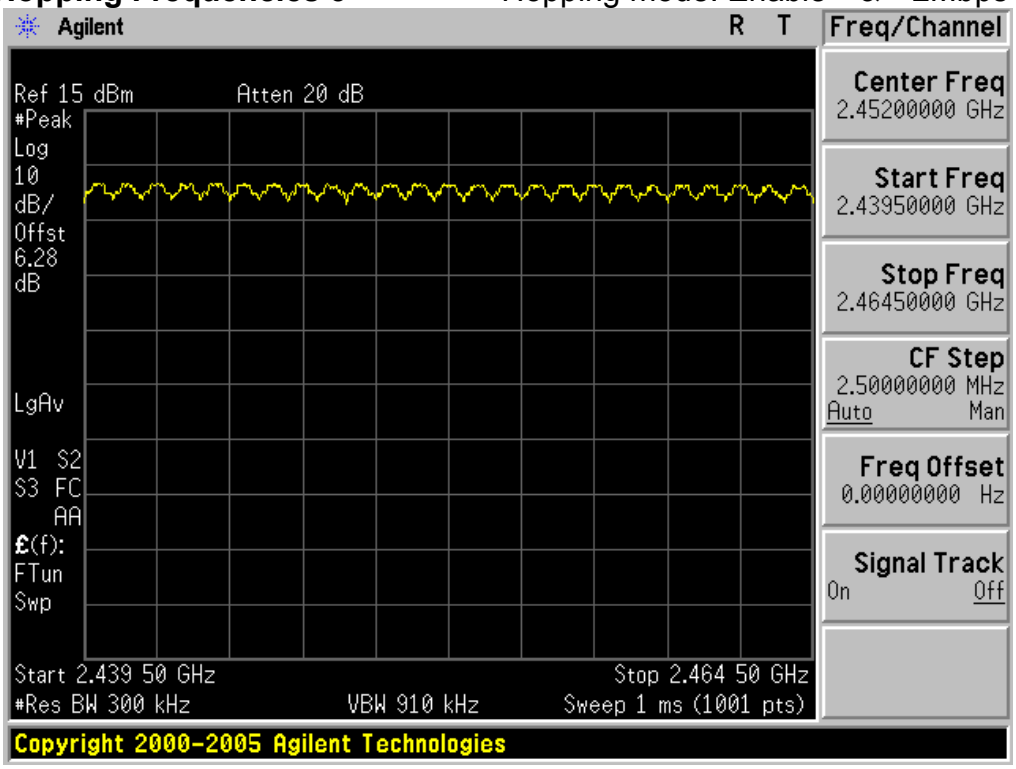
Number of Hopping Frequencies 1 Hopping mode: Enable & 2Mbps



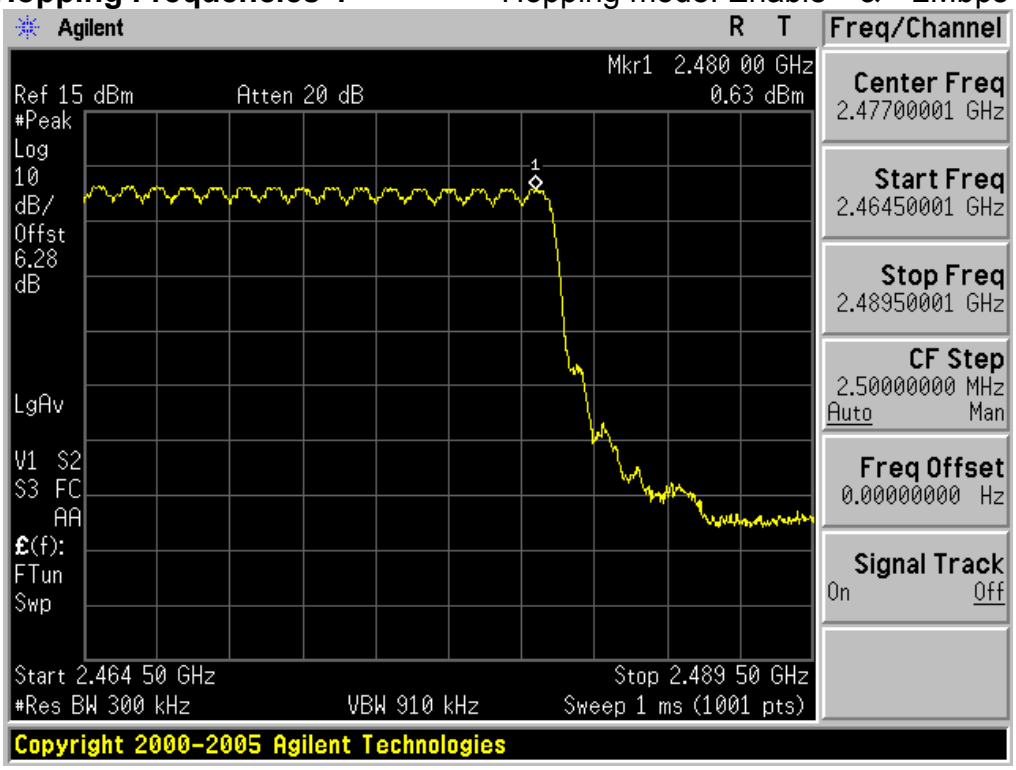
Number of Hopping Frequencies 2 Hopping mode: Enable & 2Mbps



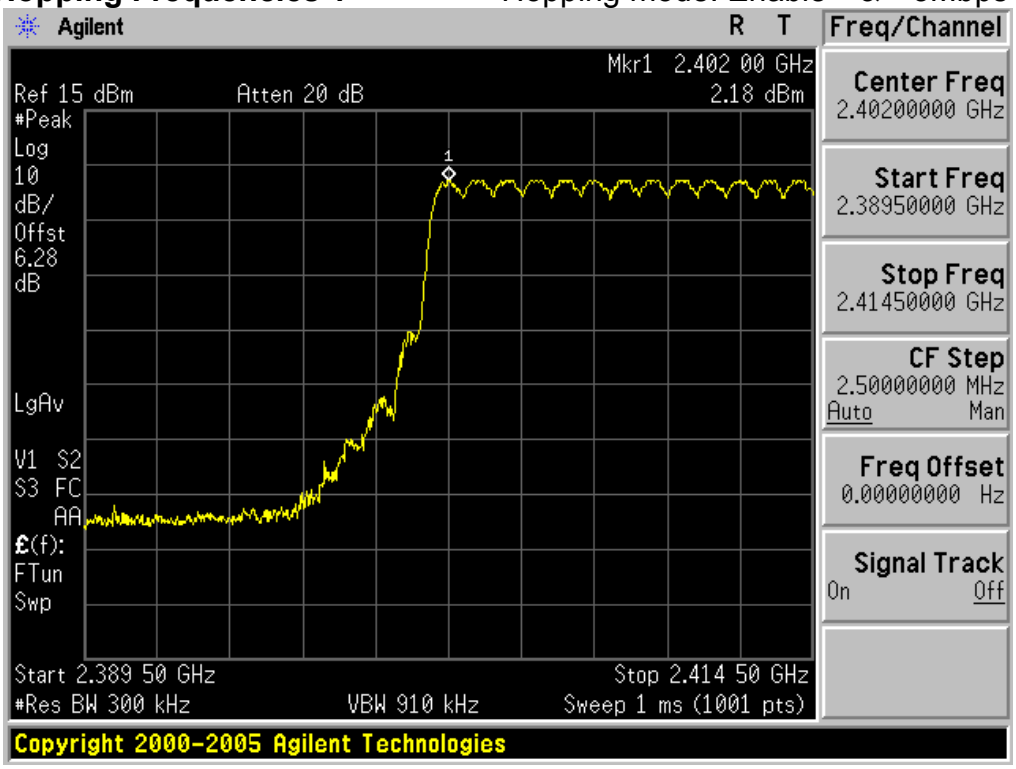
Number of Hopping Frequencies 3 Hopping mode: Enable & 2Mbps



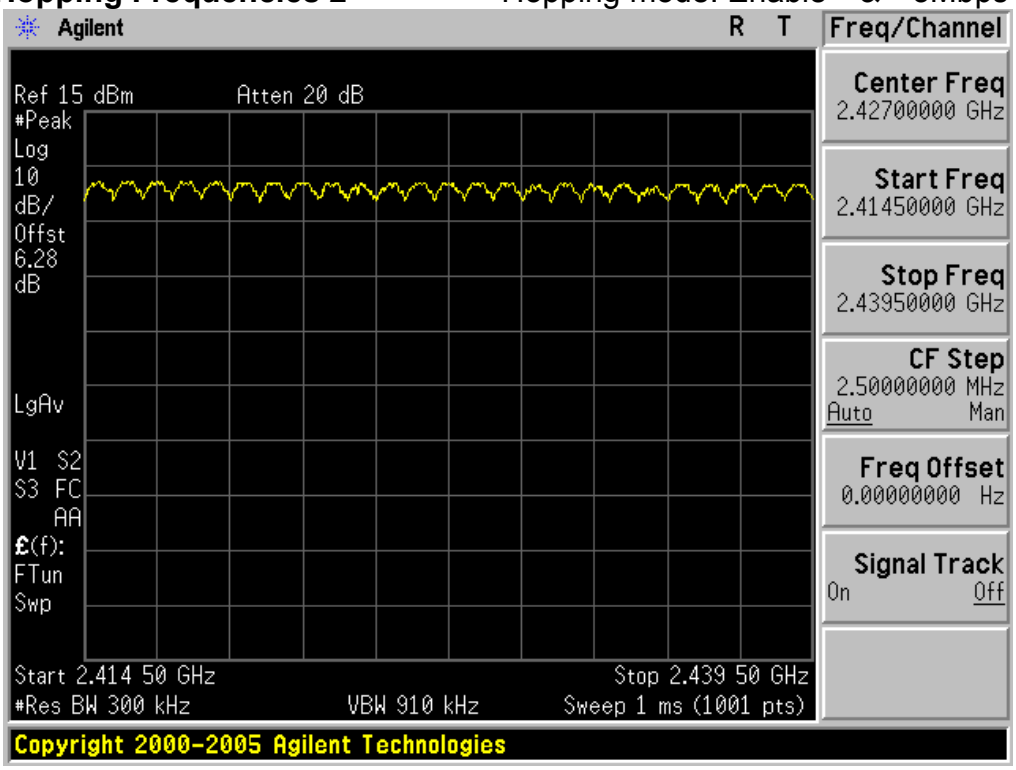
Number of Hopping Frequencies 4 Hopping mode: Enable & 2Mbps



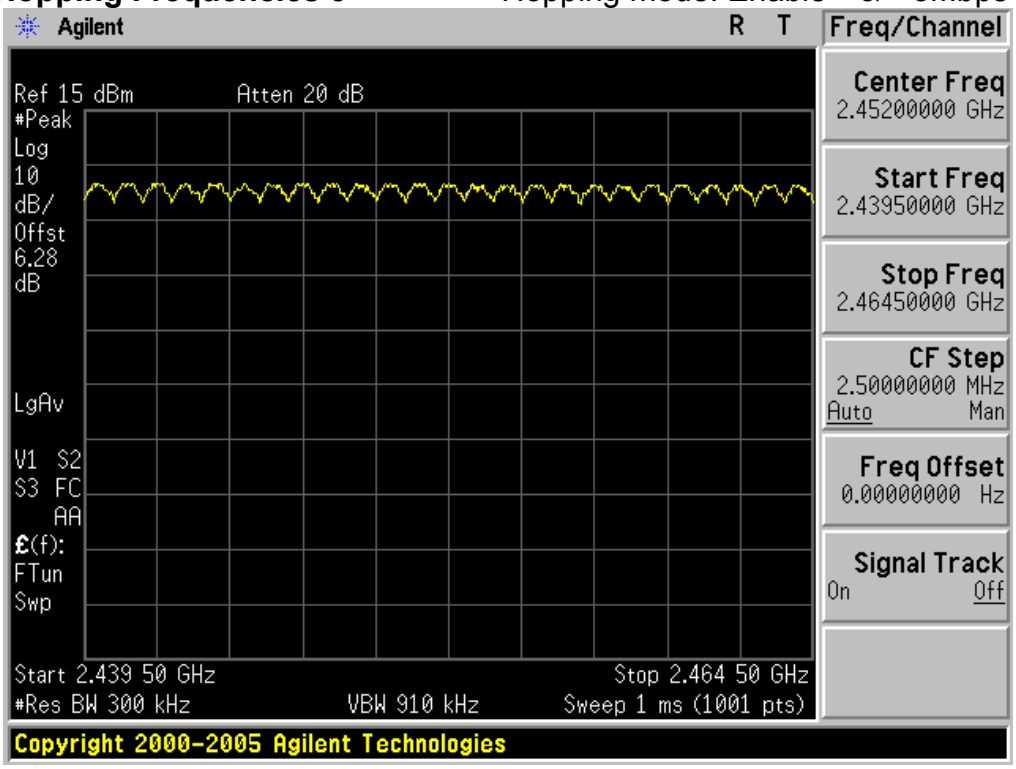
Number of Hopping Frequencies 1 Hopping mode: Enable & 3Mbps



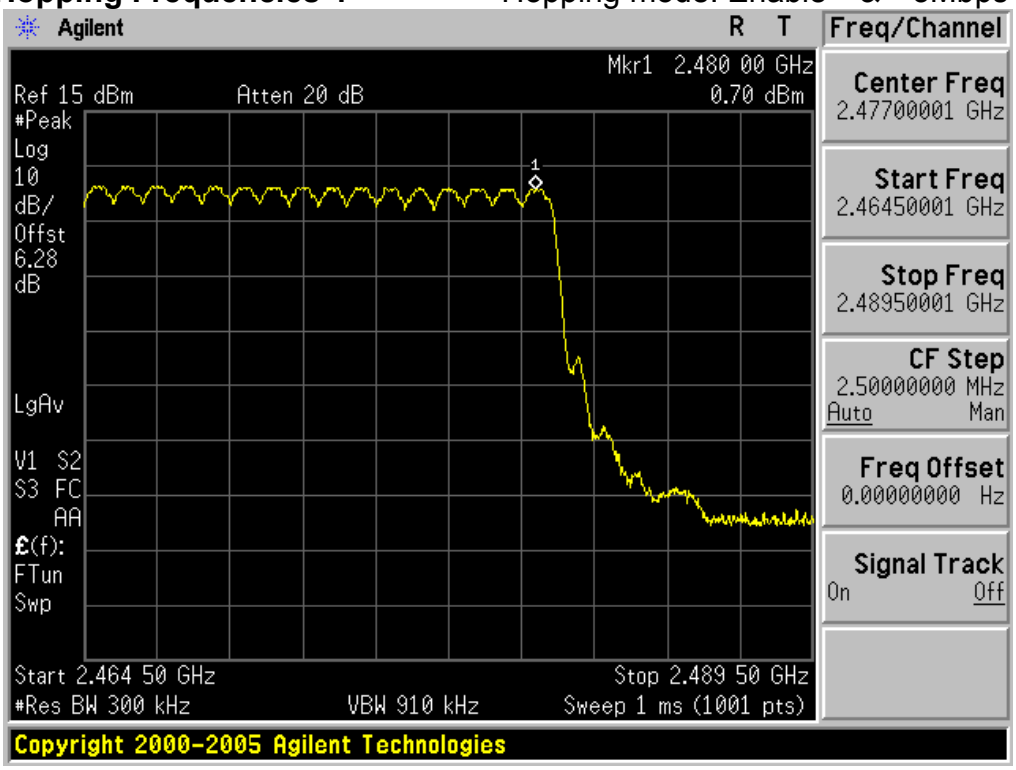
Number of Hopping Frequencies 2 Hopping mode: Enable & 3Mbps



Number of Hopping Frequencies 3 Hopping mode: Enable & 3Mbps



Number of Hopping Frequencies 4 Hopping mode: Enable & 3Mbps



3.2.3 20 dB Bandwidth & Test Case 1

- Procedure:

The bandwidth at 20 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest Frequencies

Span = approximately 2 or 3 times of the 20 dB bandwidth

RBW = 1% of the 20dB bandwidth or more

VBW = ≥ RBW

Trace = max hold

Sweep = auto

Detector function = peak

- Measurement Data: Comply

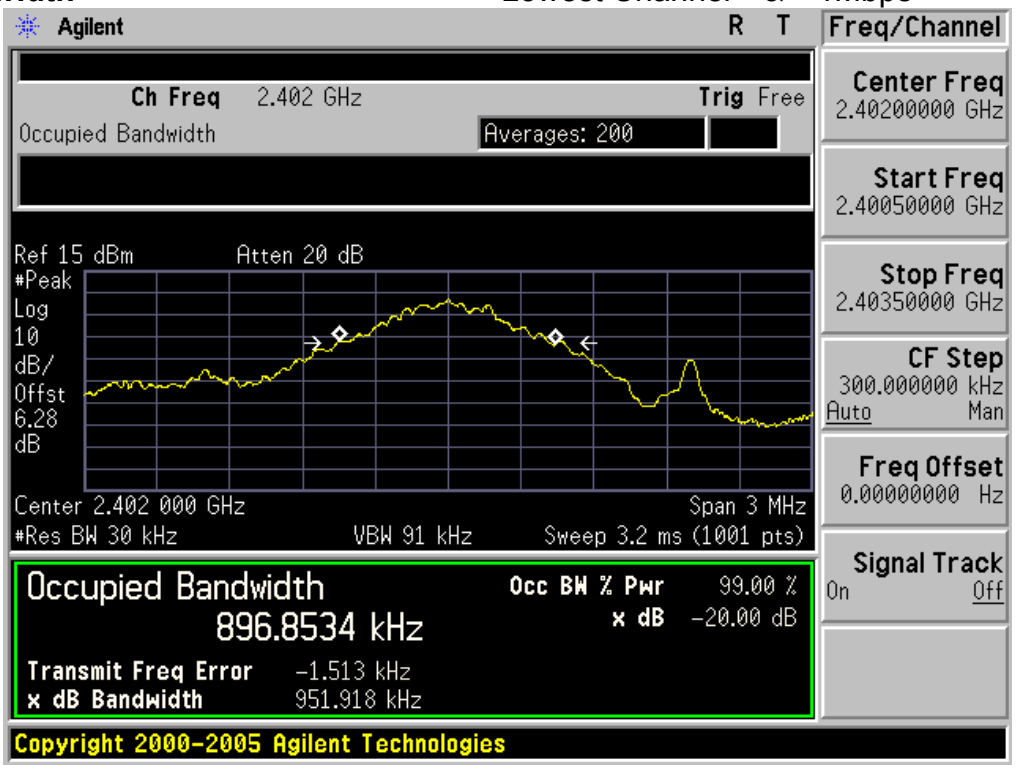
Hopping mode	Test mode	Tested Channel	Test Results(MHz)	
			20dB Bandwidth	Occupied Bandwidth(99%)
Disable	1Mbps	Lowest	0.952	0.897
		Middle	0.941	0.871
		Highest	0.937	0.871
	2Mbps	Lowest	1.274	1.201
		Middle	1.267	1.191
		Highest	1.281	1.187
	3Mbps	Lowest	1.297	1.218
		Middle	1.284	1.210
		Highest	1.290	1.199

Note 1: See next pages for actual measured spectrum plots.

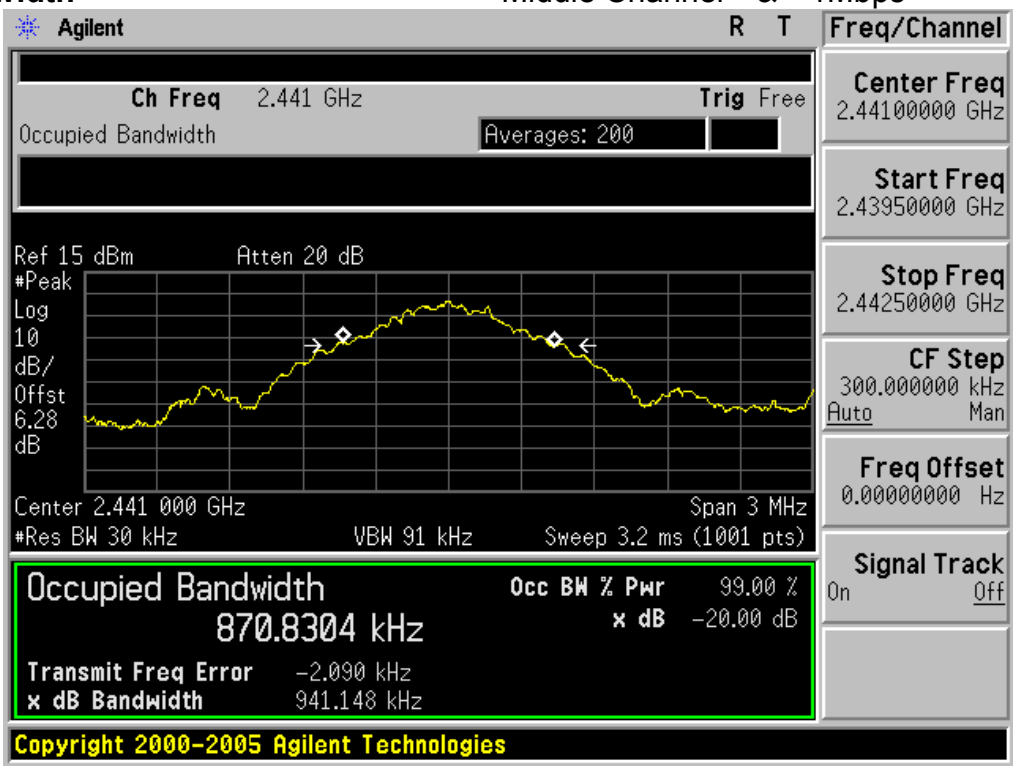
- Minimum Standard:

None

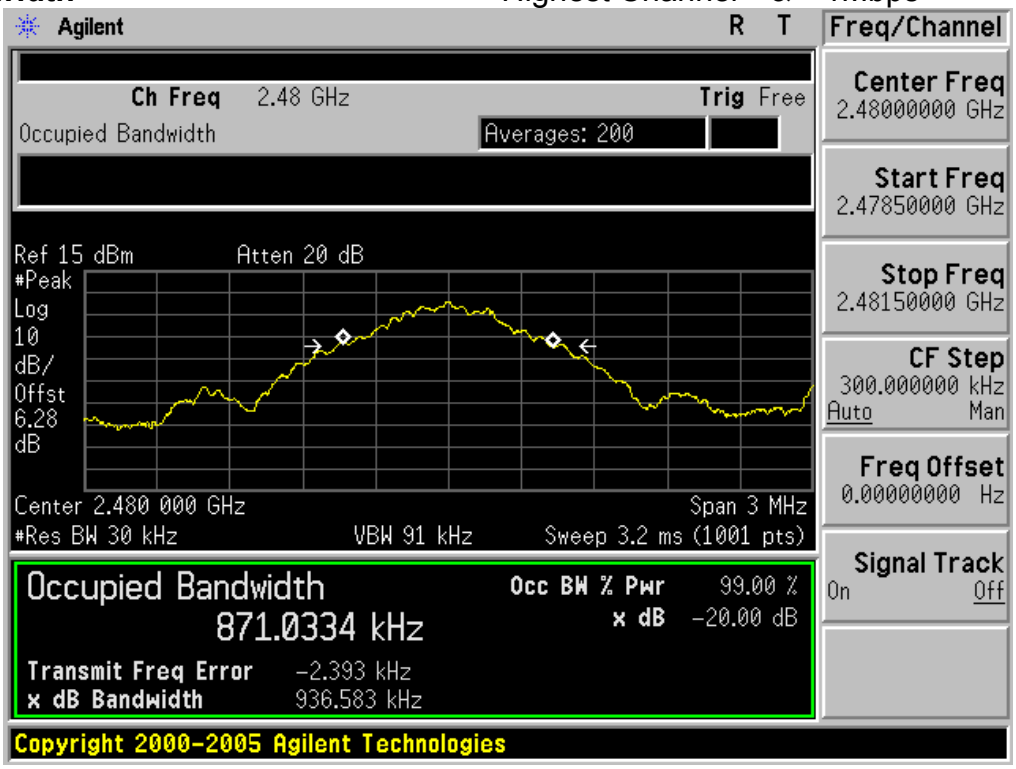
20dB Bandwidth Lowest Channel & 1Mbps



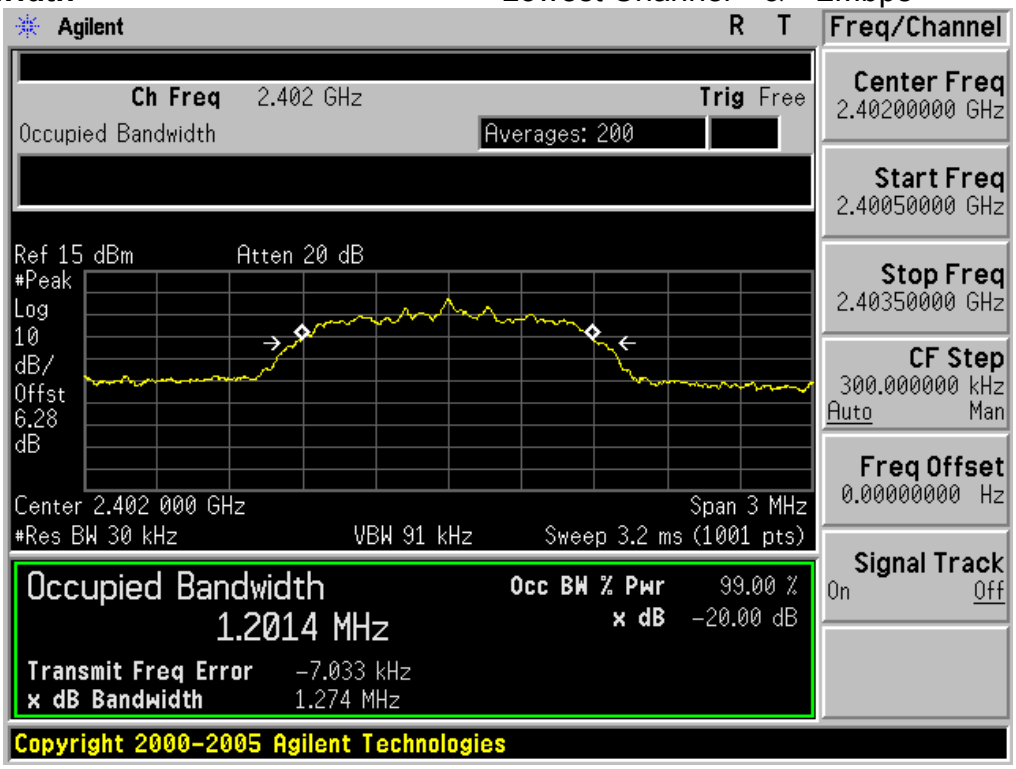
20dB Bandwidth Middle Channel & 1Mbps



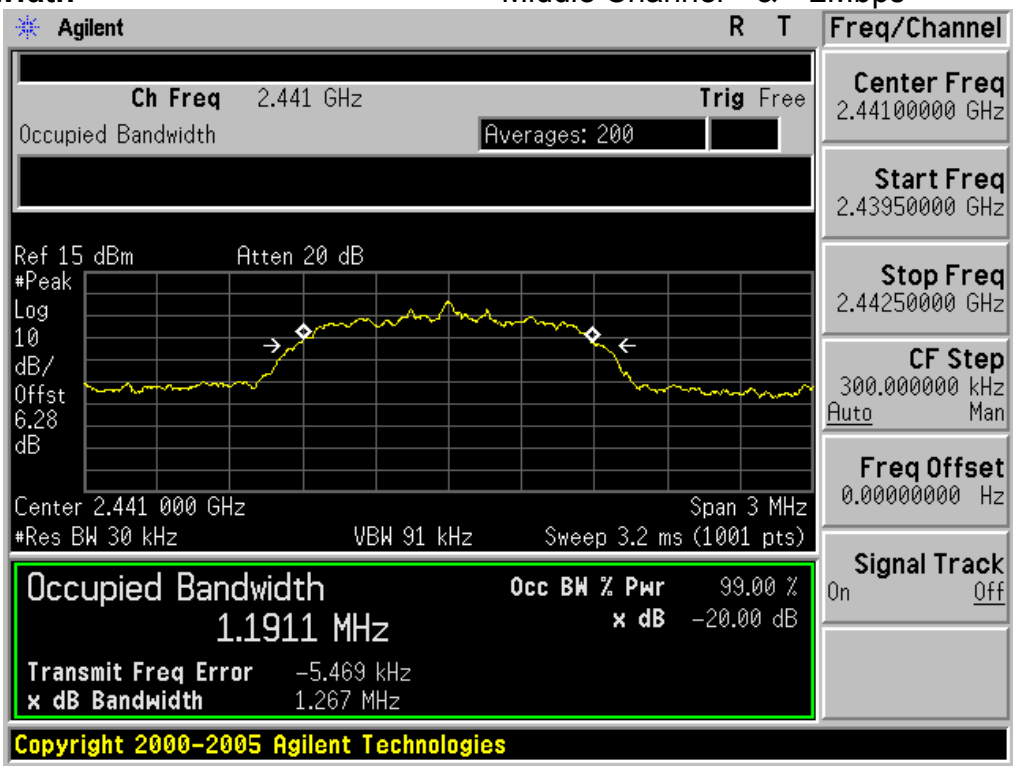
20dB Bandwidth Highest Channel & 1Mbps



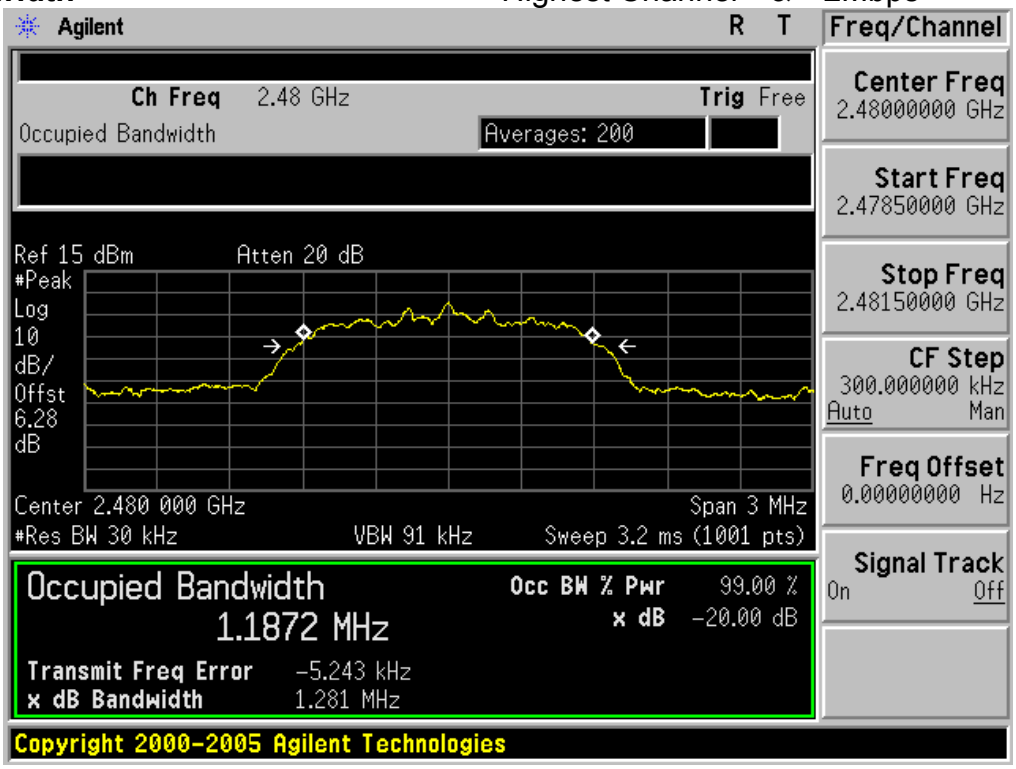
20dB Bandwidth Lowest Channel & 2Mbps



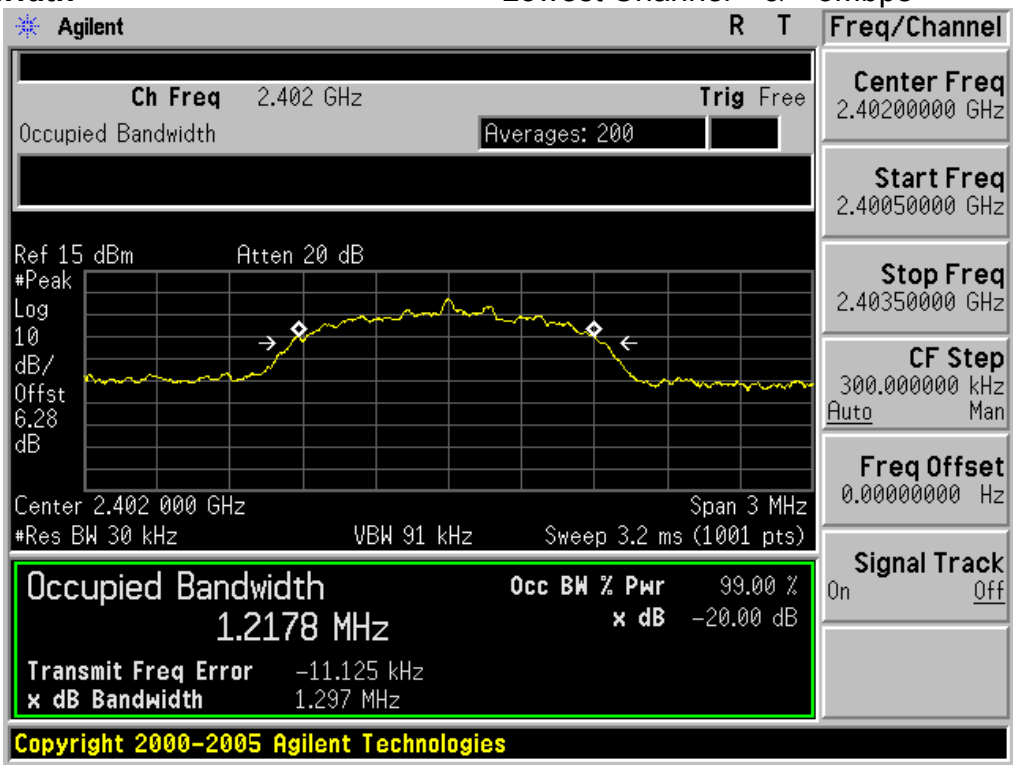
20dB Bandwidth Middle Channel & 2Mbps



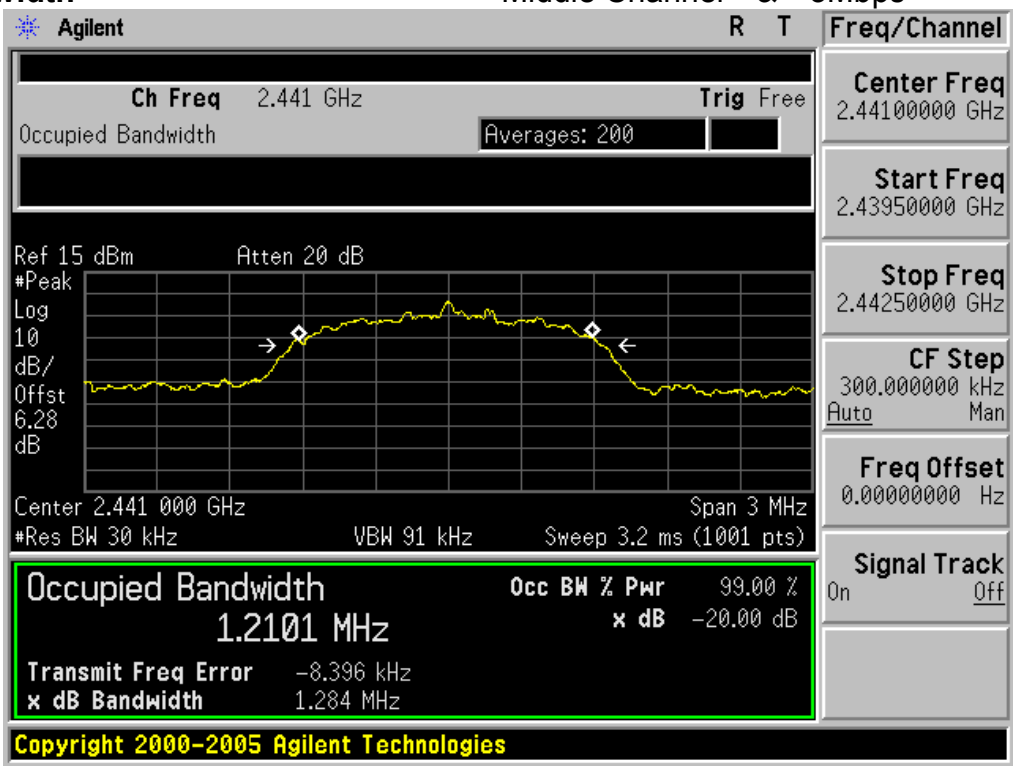
20dB Bandwidth Highest Channel & 2Mbps



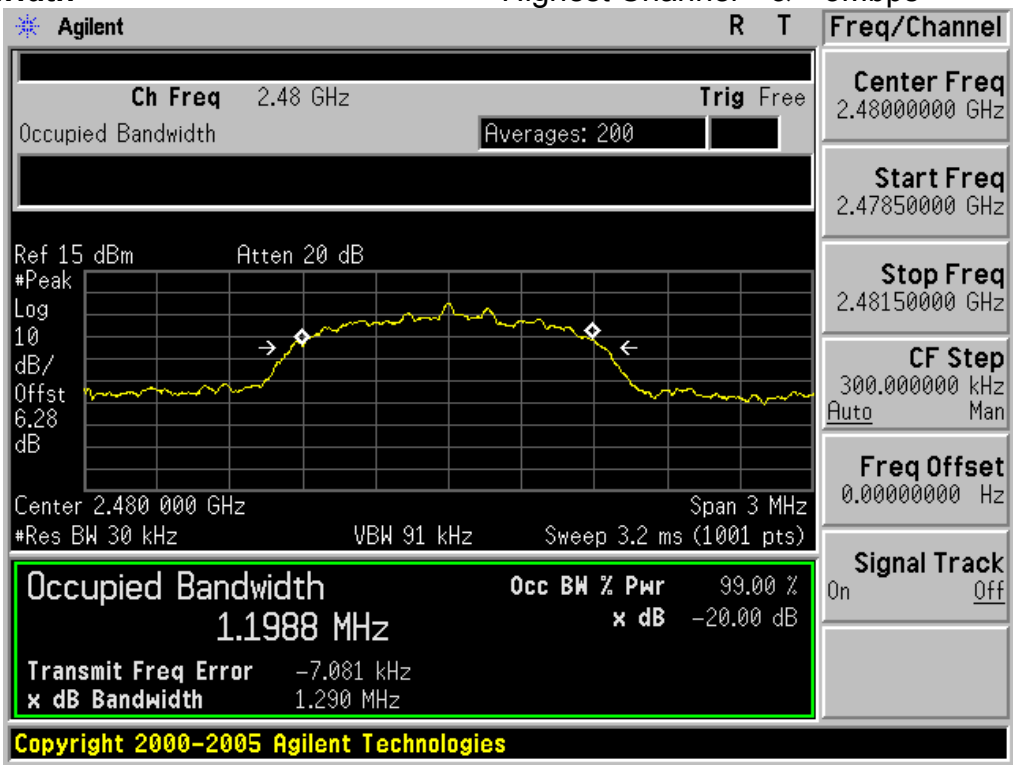
20dB Bandwidth Lowest Channel & 3Mbps



20dB Bandwidth Middle Channel & 3Mbps



20dB Bandwidth Highest Channel & 3Mbps



3.2.4 Time of Occupancy (Dwell Time) & Test Case 1

- Procedure:

The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

Center frequency = 2441 MHz	Span = zero
RBW = 1 MHz	VBW = ≥ RBW
Trace = max hold	Detector function = peak

- Measurement Data: Comply

Hopping mode	Test mode	Packet Type	Burst On Time (ms)	Period (ms)	Number of hopping Channels	Test Result (s)
Enable	1Mbps	DH 1	0.395	1.250	79	0.126
		DH 3	1.650	2.510		0.263
		DH 5	2.895	3.750		0.308
	2Mbps	2 DH 1	0.395	1.255	79	0.126
		2 DH 3	1.635	2.505		0.261
		2 DH 5	2.880	3.750		0.307
	3Mbps	3 DH 1	0.400	1.250	79	0.128
		3 DH 3	1.665	2.505		0.266
		3 DH 5	2.910	3.750		0.310

Note 1: Each new transmission event begins on the next channel in the hopping sequence after the final channel used in the previous transmission event.

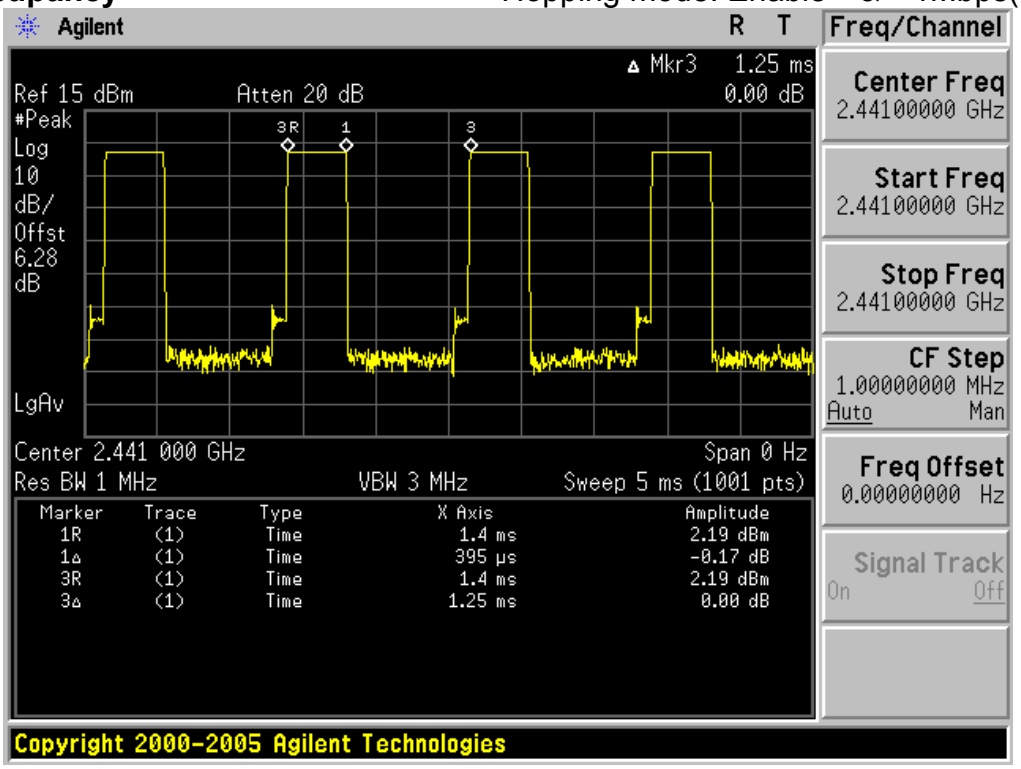
DWELL TIME=(0.4 x Number of hopping Channels) x Burst On time / (period x Number of hopping Channels)

Note 2: See next pages for actual measured spectrum plots.

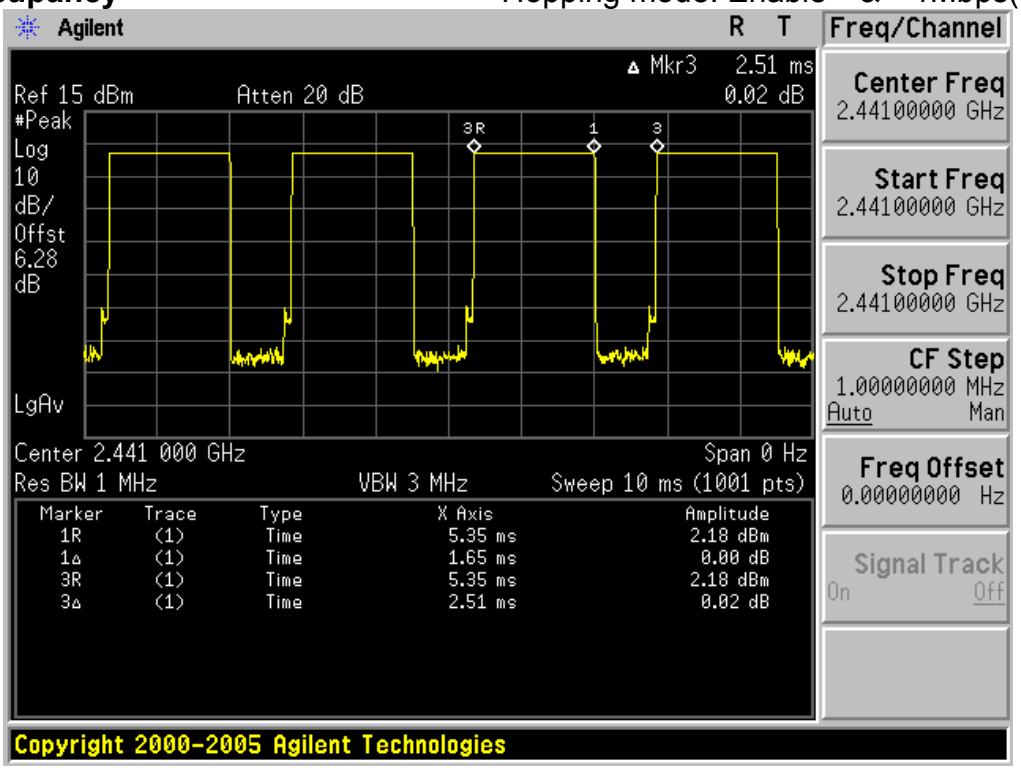
- Minimum Standard:

No greater than 0.4 seconds

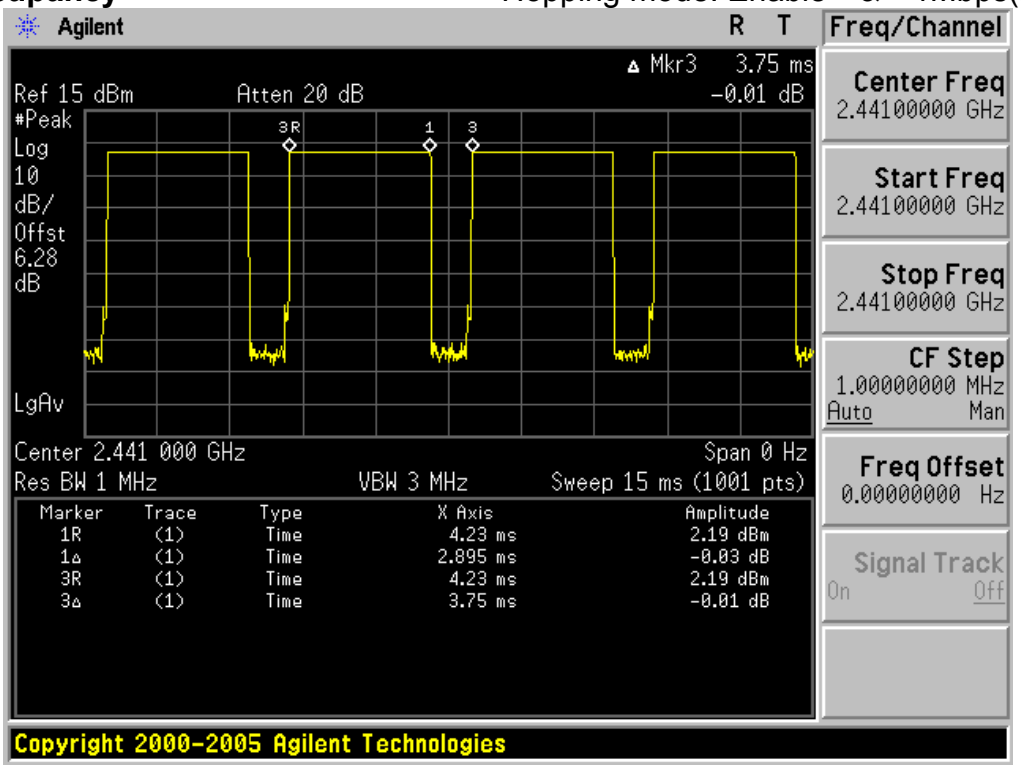
Time of Occupancy Hopping mode: Enable & 1Mbps(DH1)



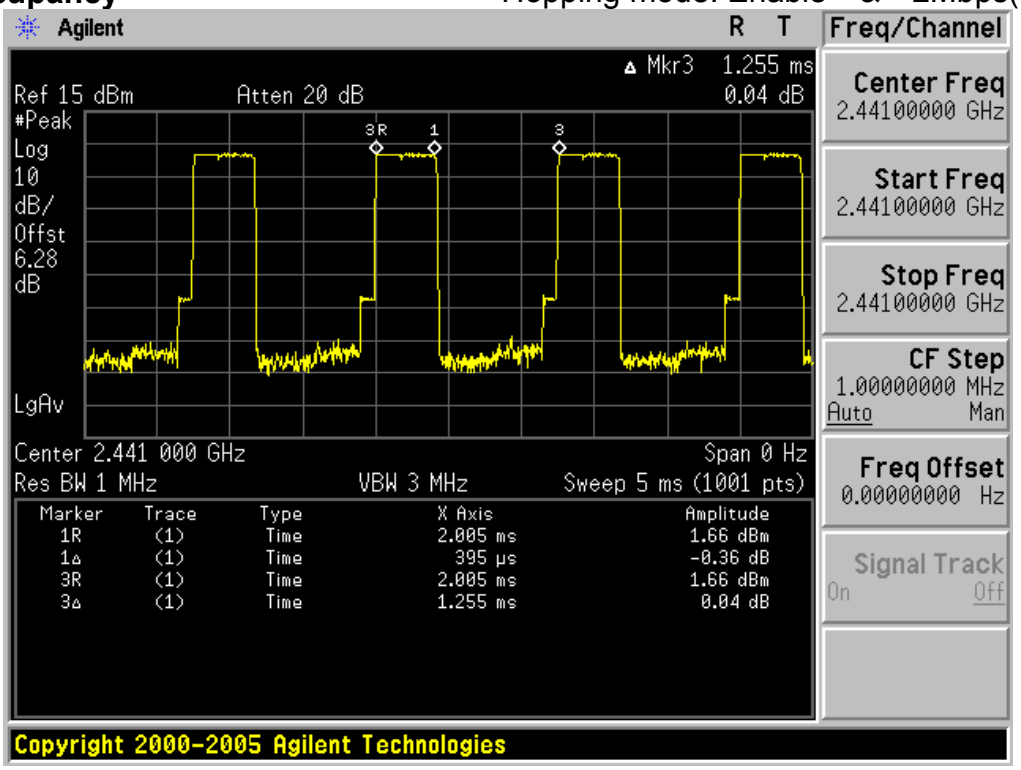
Time of Occupancy Hopping mode: Enable & 1Mbps(DH3)



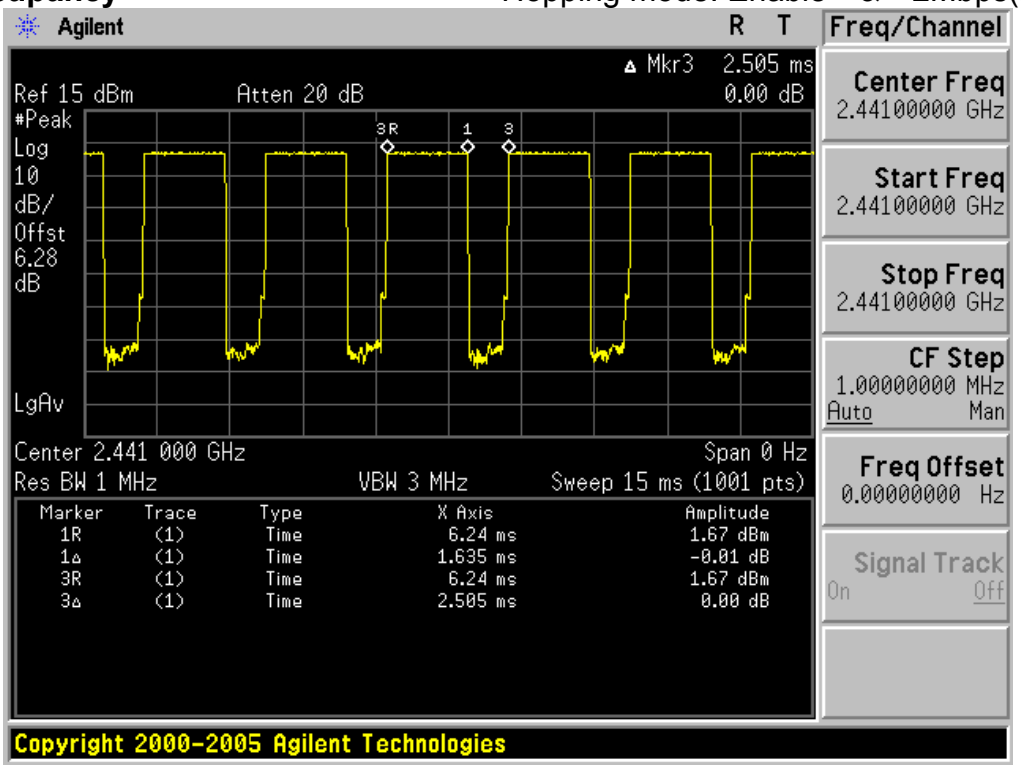
Time of Occupancy Hopping mode: Enable & 1Mbps(DH5)



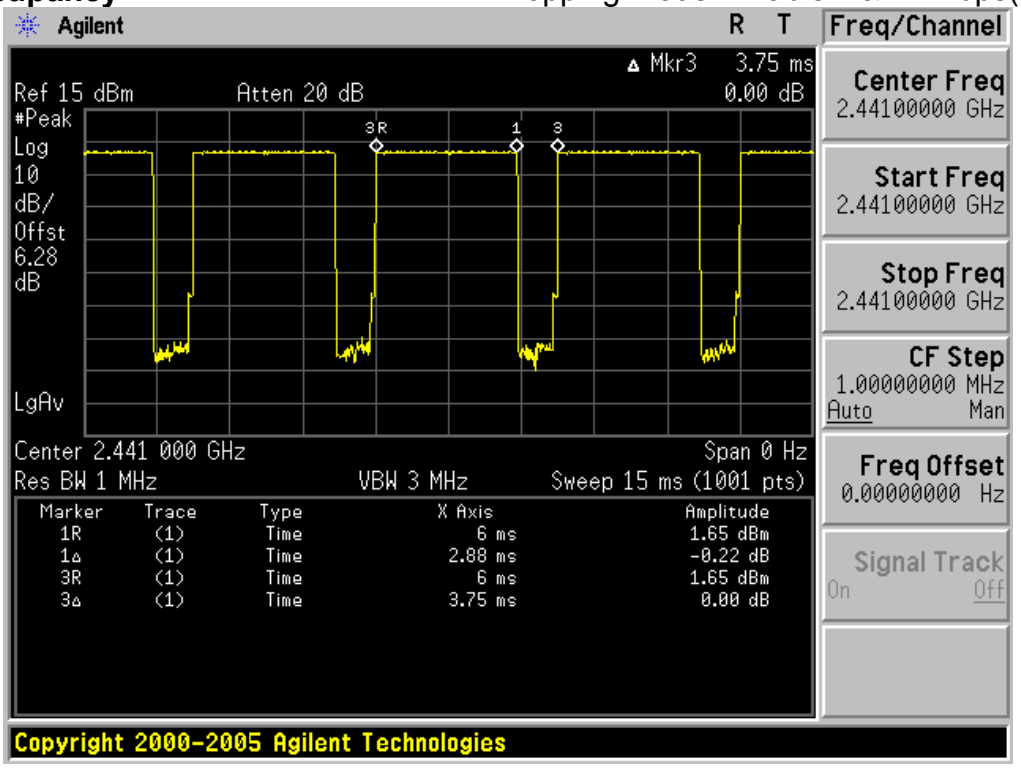
Time of Occupancy Hopping mode: Enable & 2Mbps(DH1)



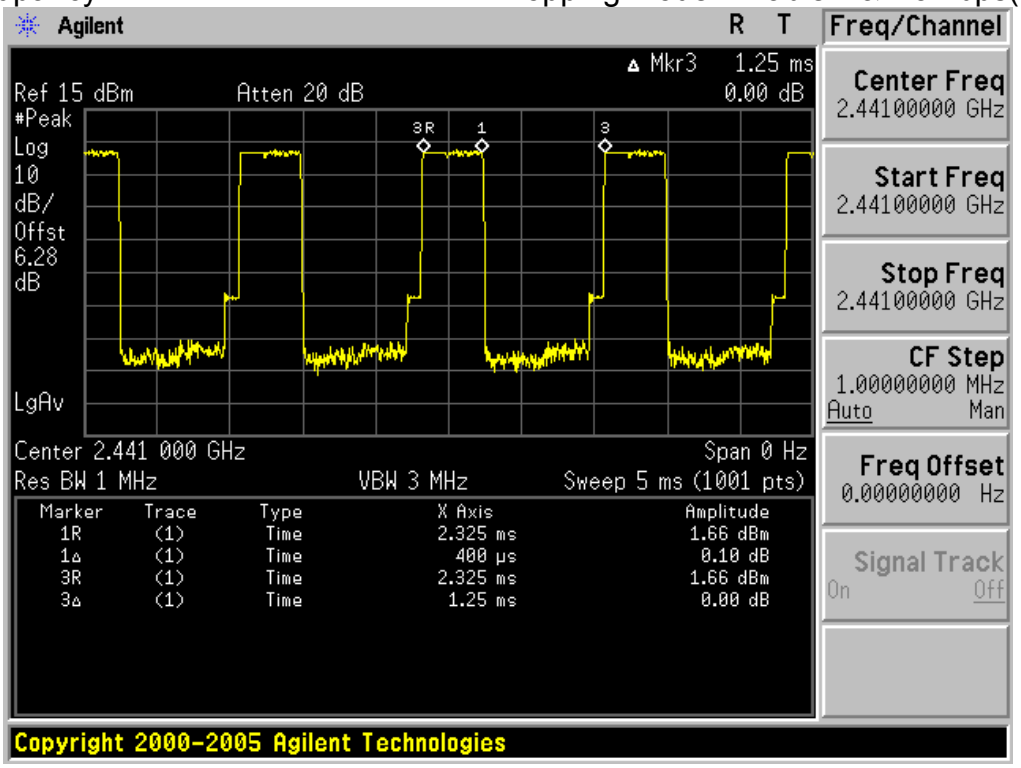
Time of Occupancy Hopping mode: Enable & 2Mbps(DH3)



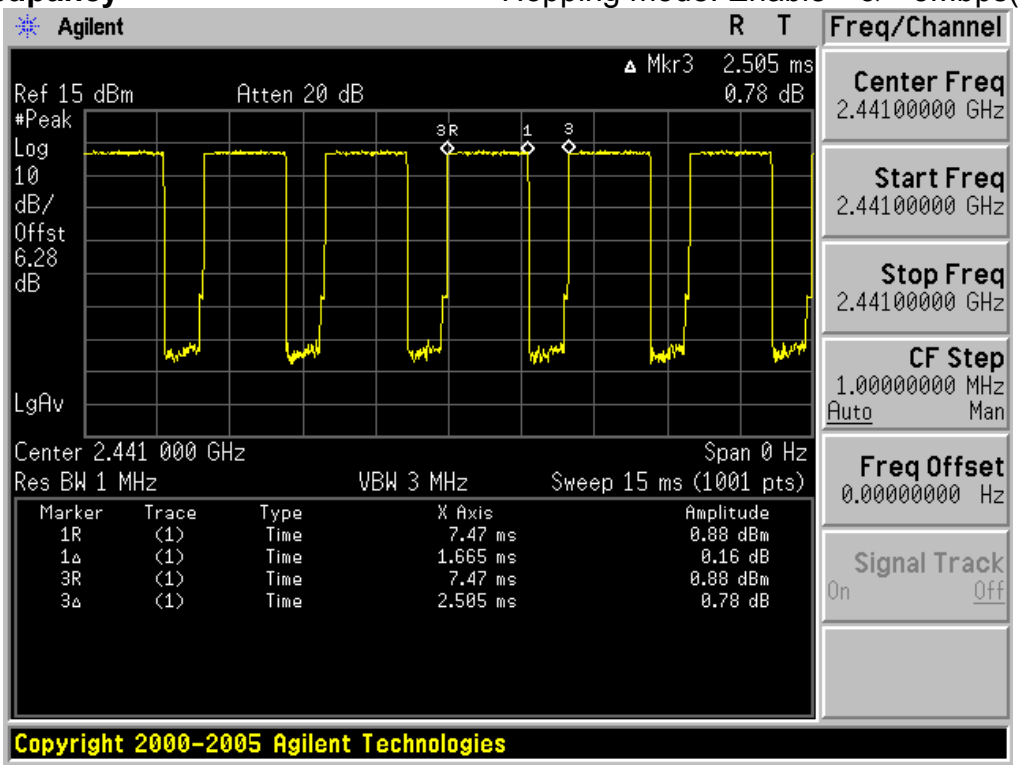
Time of Occupancy Hopping mode: Enable & 2Mbps(DH5)



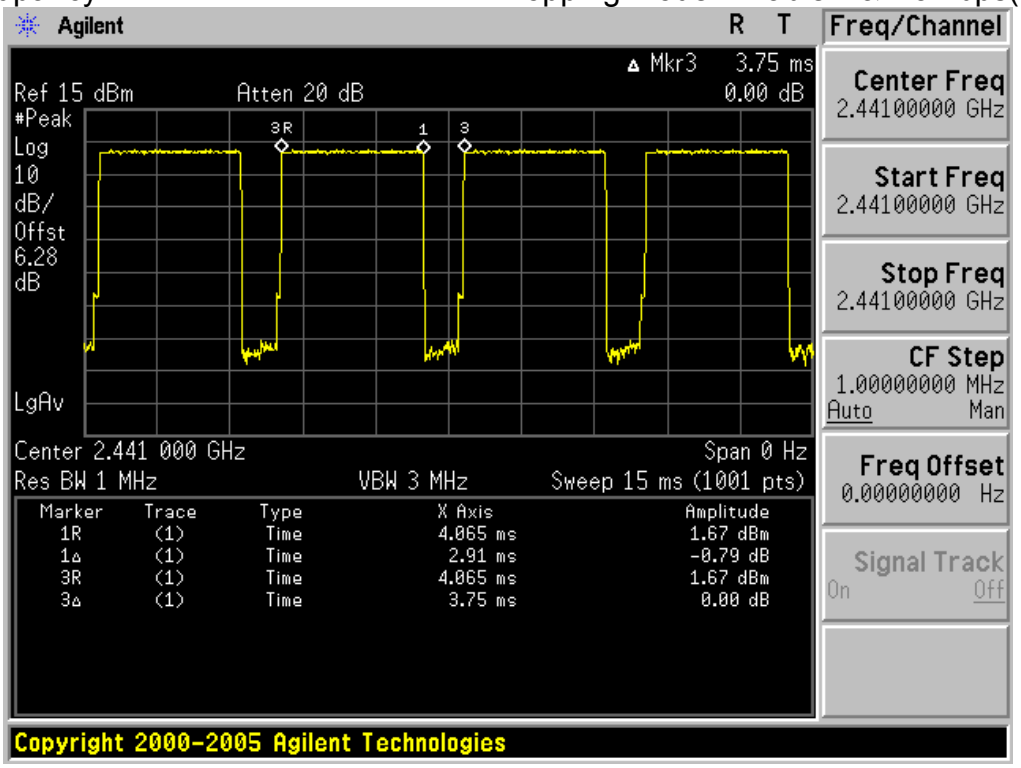
Time of Occupancy Hopping mode: Enable & 3Mbps(DH1)



Time of Occupancy Hopping mode: Enable & 3Mbps(DH3)



Time of Occupancy Hopping mode: Enable & 3Mbps(DH5)



3.2.5 Peak Output Power & Test Case 1

- Procedure:

The peak output power was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.
After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest Frequencies
Span = approximately 10 times of the 20 dB bandwidth
RBW = greater than the 20dB bandwidth of the emission being measured
VBW = ≥ RBW Detector function = peak
Trace = max hold Sweep = auto

- **Measurement Data: Comply**

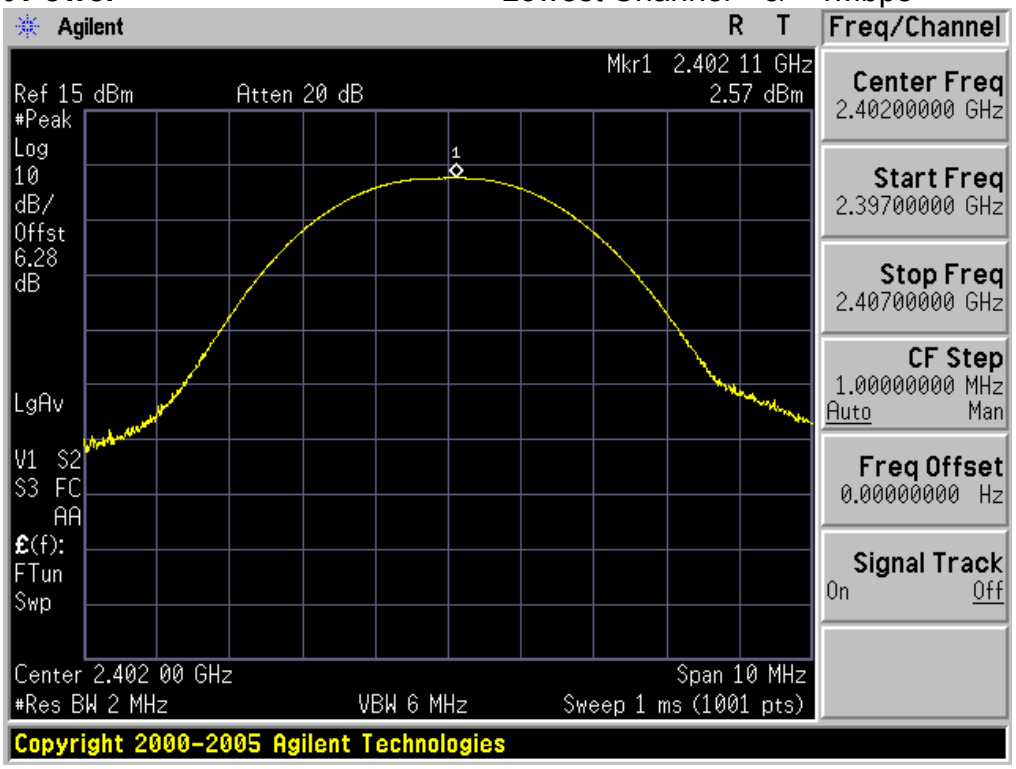
Hopping mode	Test mode	Tested Channel	Test Results	
			dBm	mW
Disable	1Mbps	**Lowest**	**2.57**	**1.81**
		Middle	2.15	1.64
		Highest	1.35	1.36
	2Mbps	**Lowest**	**2.68**	**1.85**
		Middle	2.16	1.64
		Highest	1.31	1.35
	3Mbps	**Lowest**	**3.12**	**2.05**
		Middle	2.56	1.80
		Highest	1.71	1.48

Note 1: See next pages for actual measured spectrum plots.

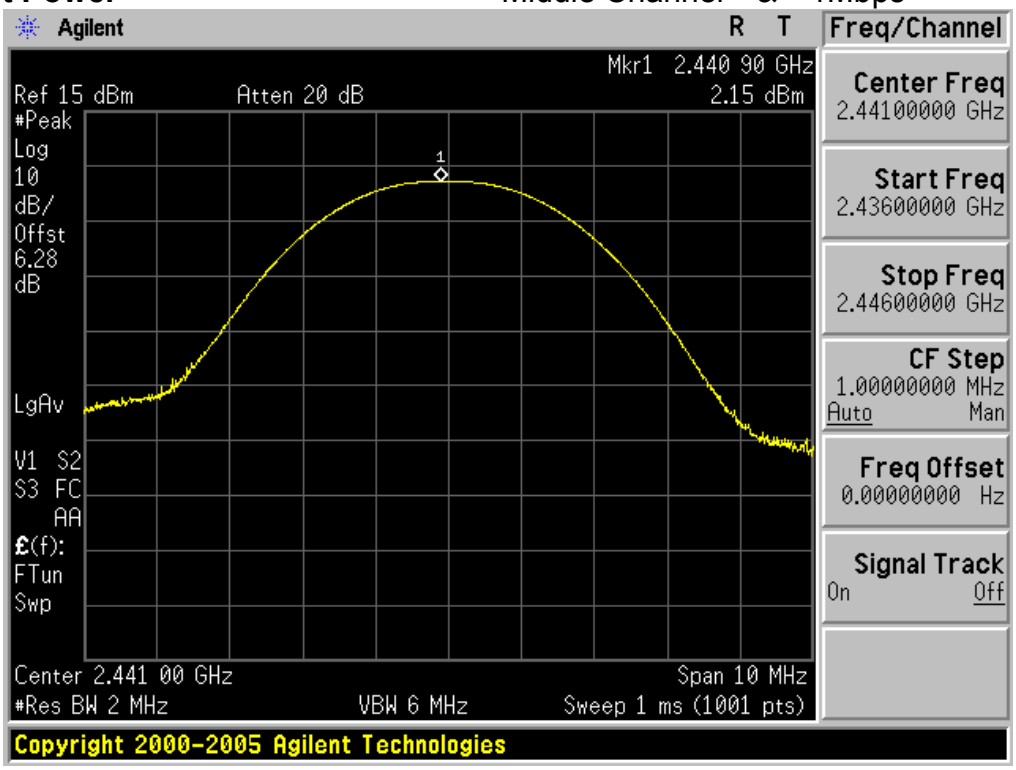
- Minimum Standard:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: **1 Watt**. For all other frequency hopping systems in the 2400-2483.5 MHz band: **0.125 Watts**

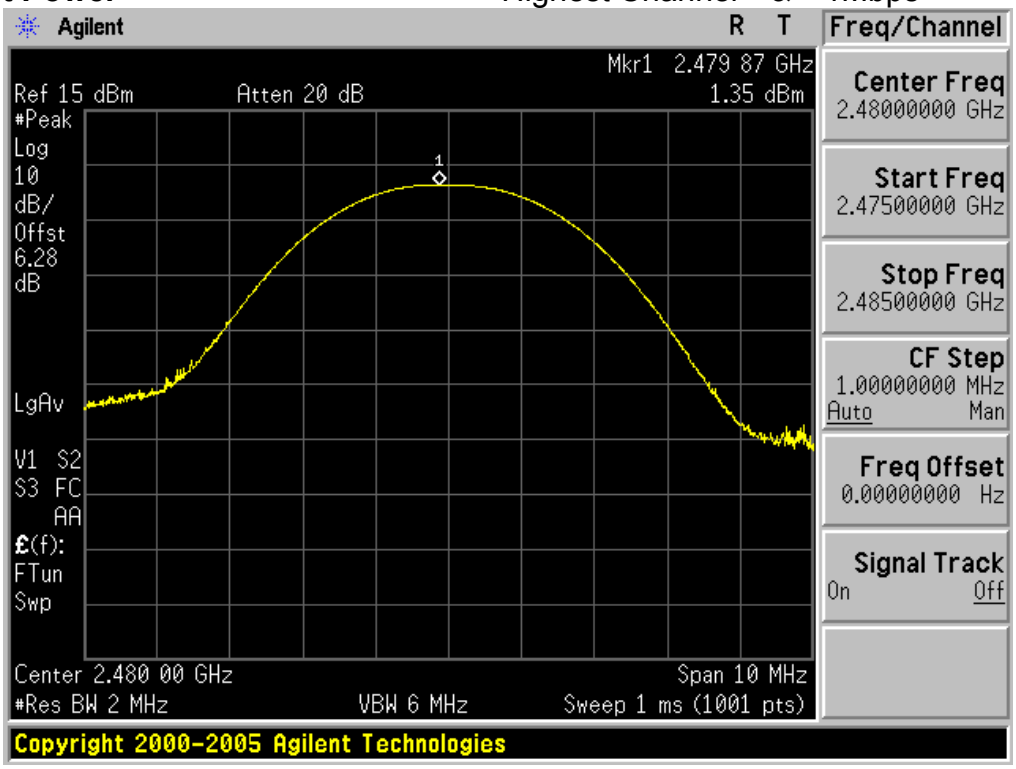
Peak Output Power Lowest Channel & 1Mbps



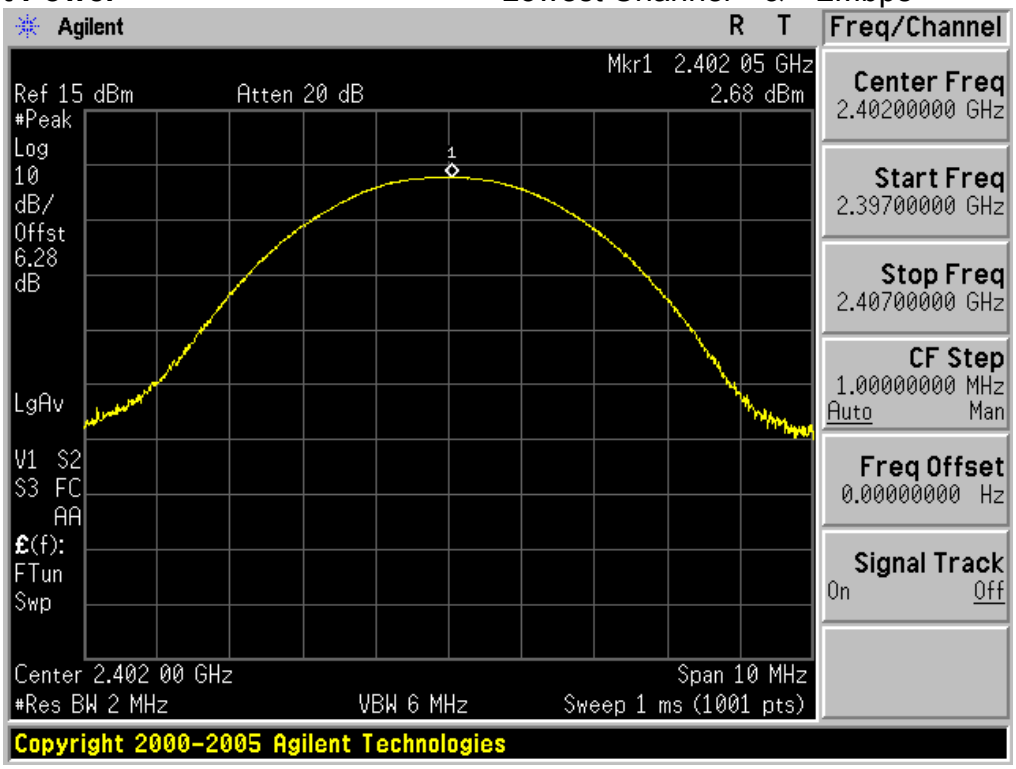
Peak Output Power Middle Channel & 1Mbps



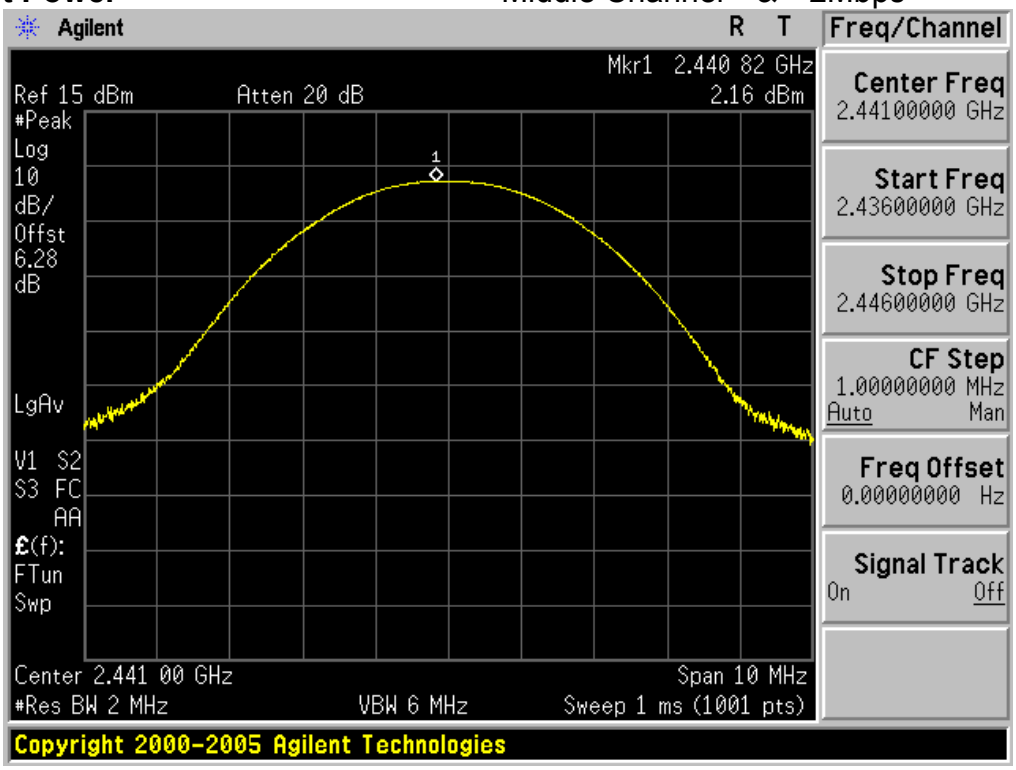
Peak Output Power Highest Channel & 1Mbps



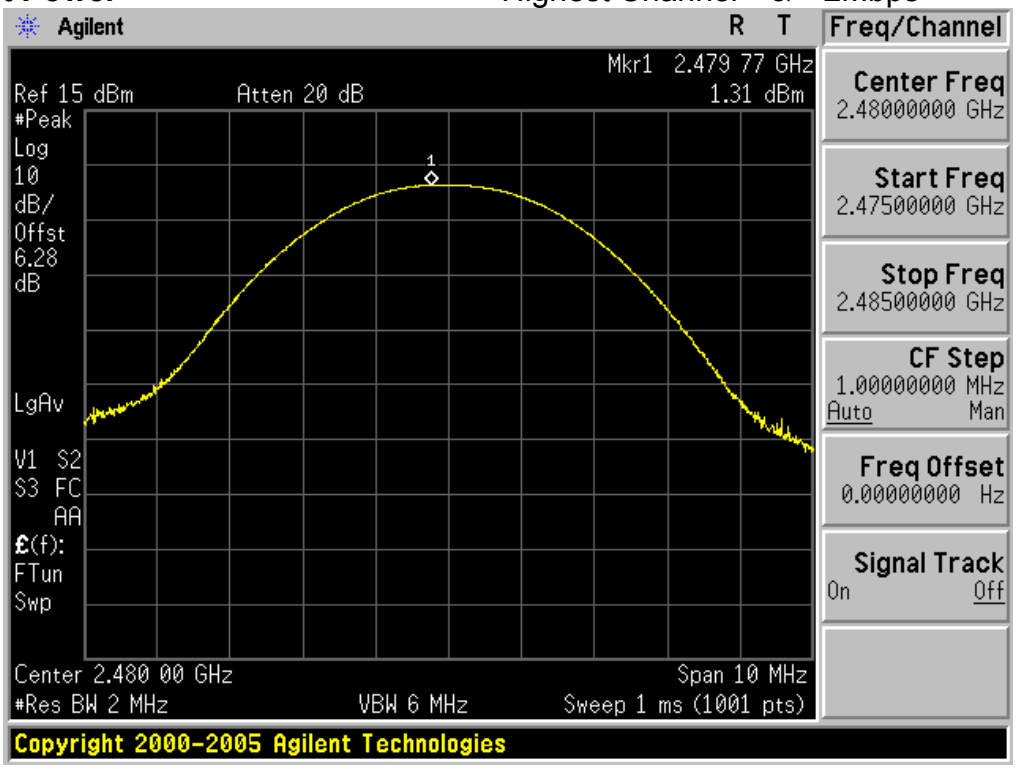
Peak Output Power Lowest Channel & 2Mbps



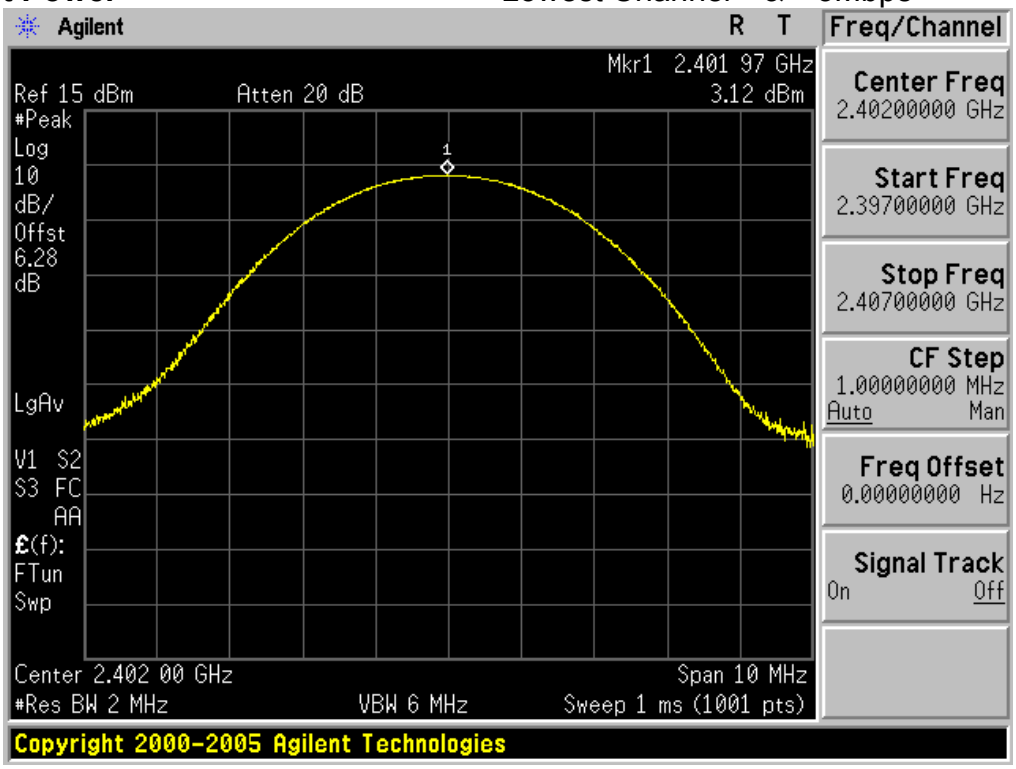
Peak Output Power Middle Channel & 2Mbps



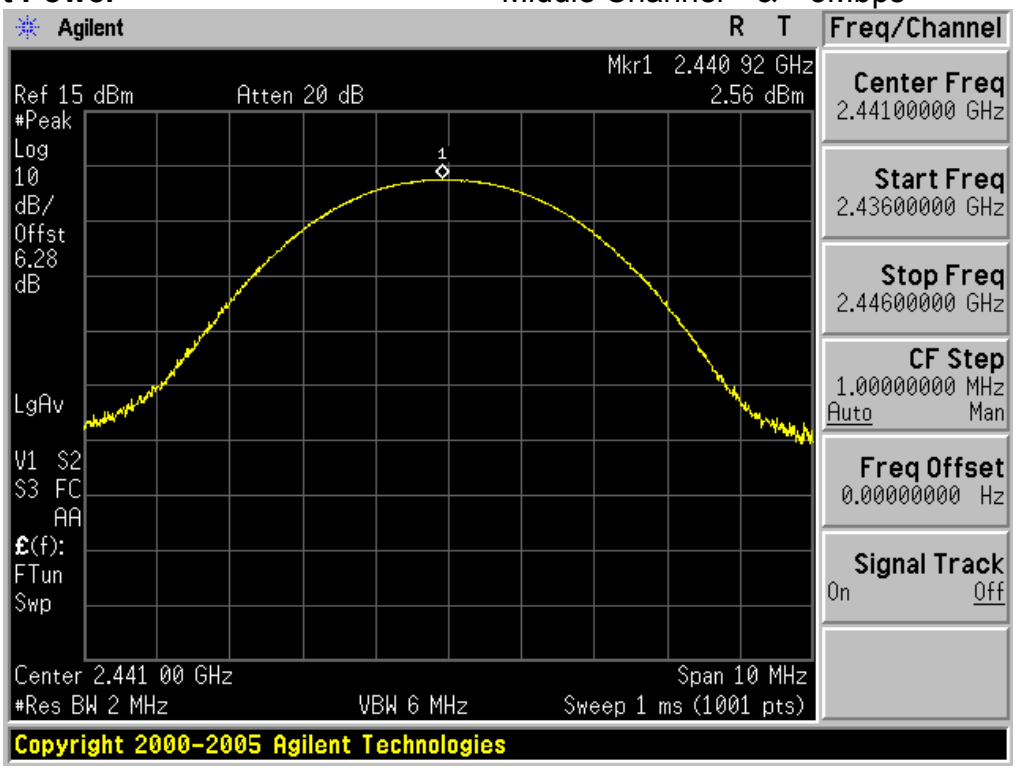
Peak Output Power Highest Channel & 2Mbps



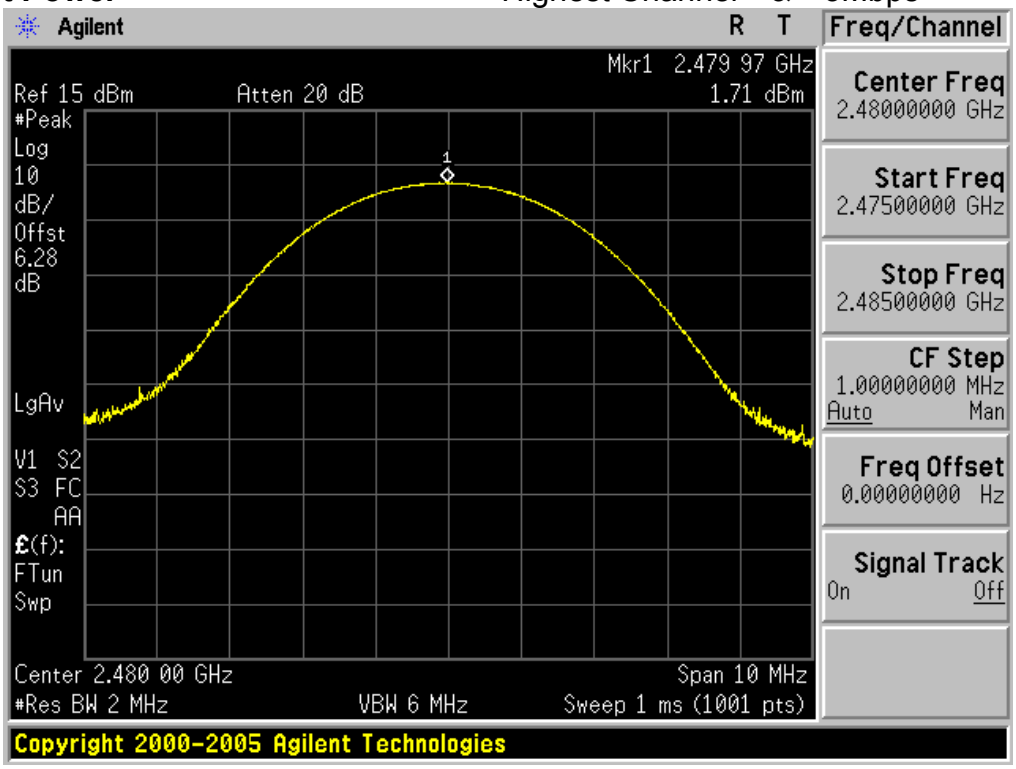
Peak Output Power Lowest Channel & 3Mbps



Peak Output Power Middle Channel & 3Mbps



Peak Output Power Highest Channel & 3Mbps



3.2.6 Conducted Spurious Emissions & Test Case 1

- Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

For Band-edge testing the spectrum analyzer is set to:

Tested frequency = the highest and the lowest Frequencies

Center frequency = 2400MHz, 2483.5MHz

Span = 10MHz Detector function = peak

RBW = 1% of the span VBW = ≥ RBW

Trace = max hold Sweep = auto

For spurious testing the spectrum analyzer is set to:

Tested frequency = the highest, middle and the lowest Frequencies

RBW = 100 kHz VBW = ≥ RBW

Detector function = peak Sweep = auto

Trace = max hold

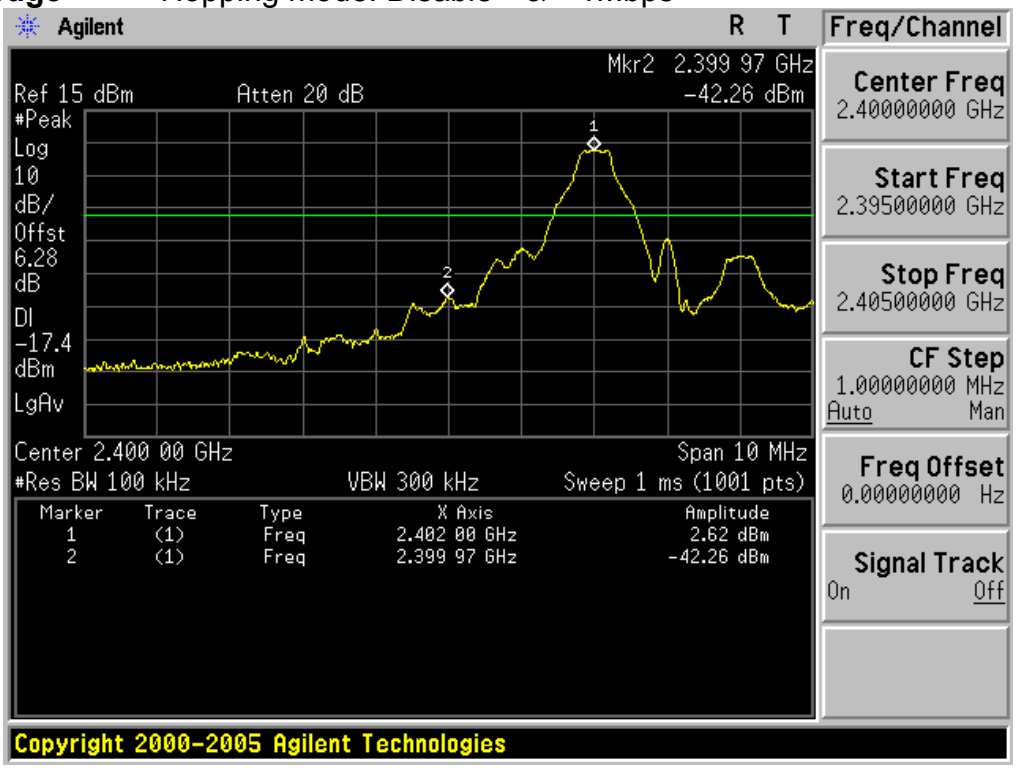
- Measurement Data: Comply

Note 1: See next pages for actual measured spectrum plots.

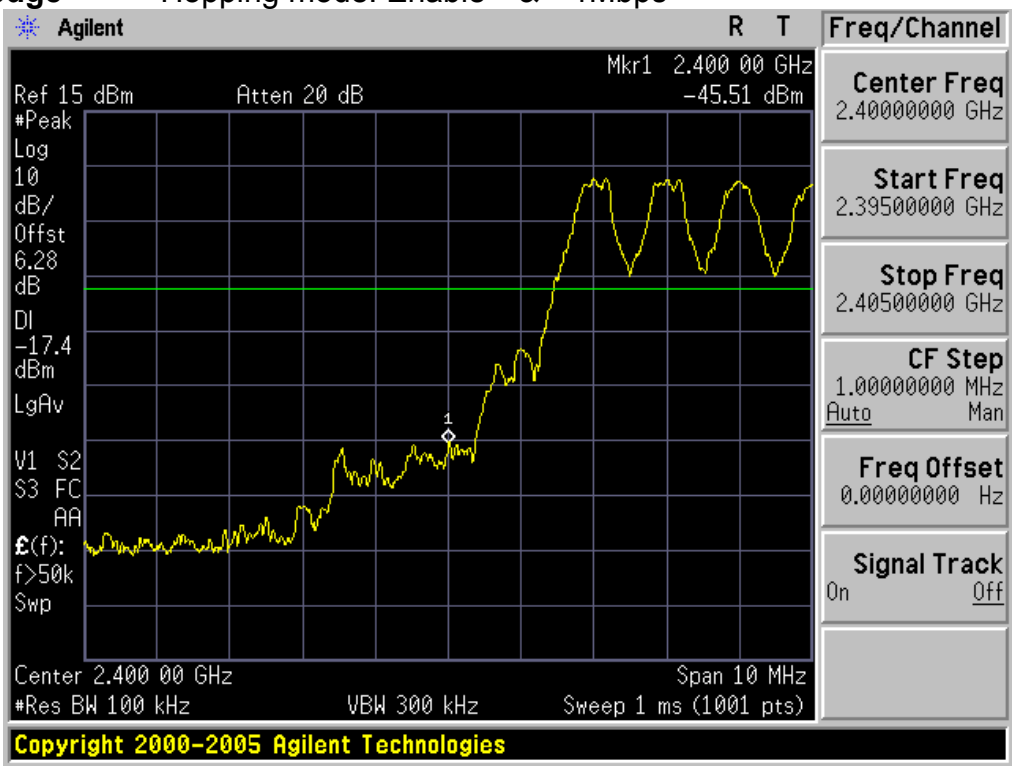
- **Minimum Standard:**

Minimum Standard:	> 20 dBc

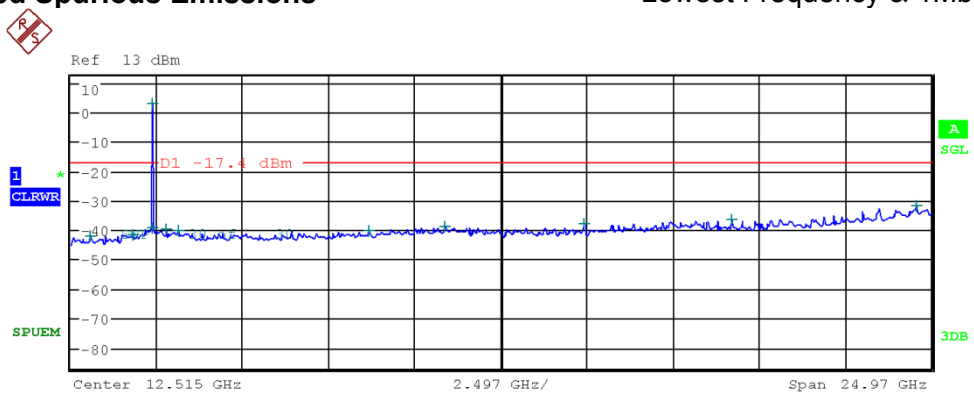
Low Band-edge Hopping mode: Disable & 1Mbps



Low Band-edge Hopping mode: Enable & 1Mbps

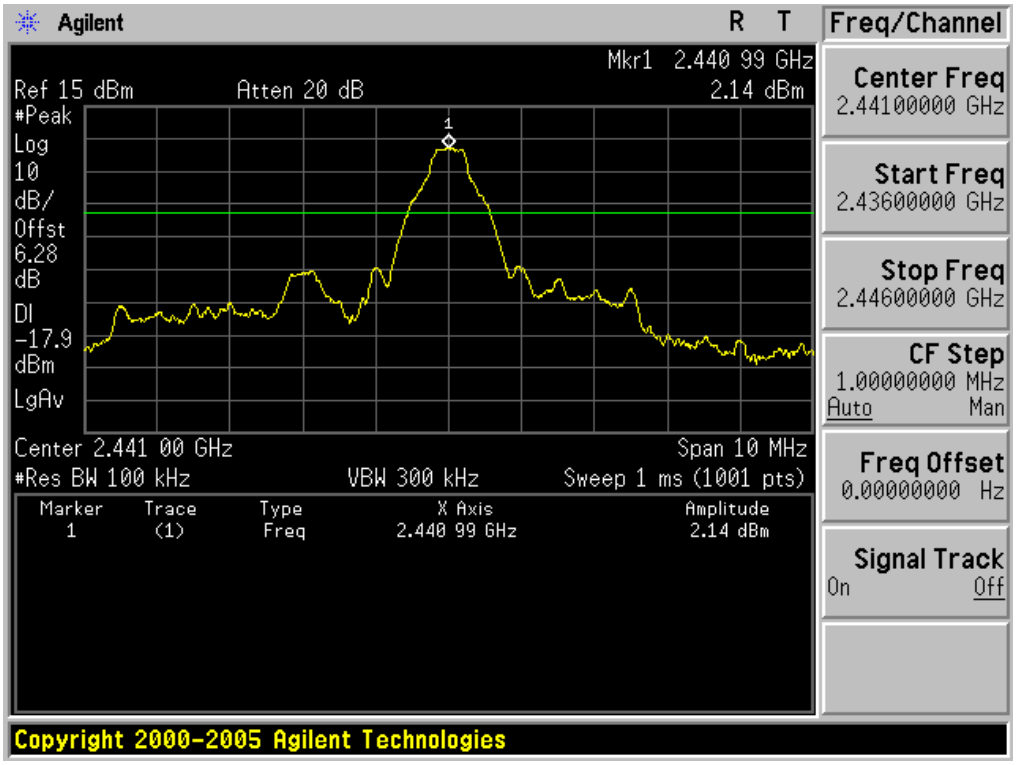


Conducted Spurious Emissions Lowest Frequency & 1Mbps

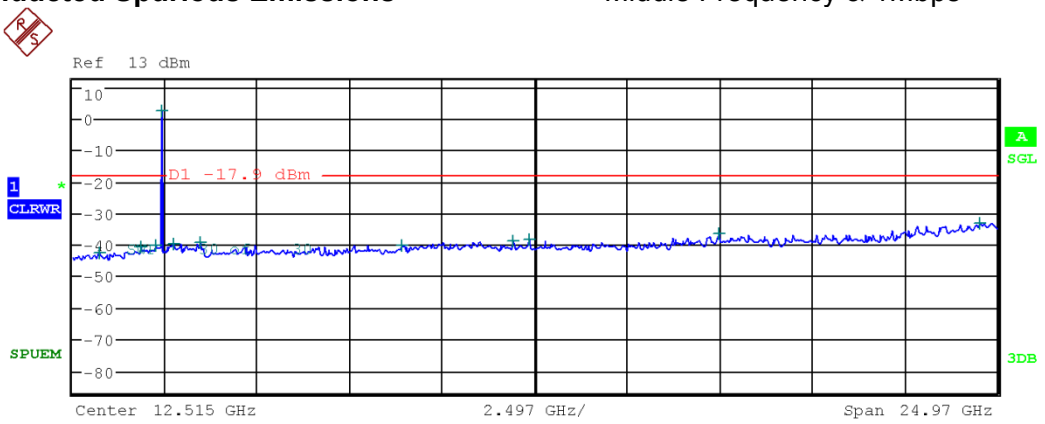


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	584.840000 M	-42.02	-200.00
1.000 G	2.000 G	100.00 k	1.812000 G	-41.68	-200.00
2.000 G	2.400 G	100.00 k	2.372600 G	-39.46	-200.00
2.400 G	2.483 G	100.00 k	2.401991 G	3.13	-200.00
2.483 G	3.000 G	100.00 k	2.796396 G	-39.77	-200.00
3.000 G	6.000 G	100.00 k	3.162000 G	-40.39	-200.00
6.000 G	9.000 G	100.00 k	8.653667 G	-40.22	-200.00
9.000 G	12.000 G	100.00 k	10.866667 G	-38.74	-200.00
12.000 G	15.000 G	100.00 k	14.924667 G	-38.12	-200.00
15.000 G	20.000 G	100.00 k	19.192778 G	-36.38	-200.00
20.000 G	25.000 G	100.00 k	24.543889 G	-31.81	-200.00

Reference for limit Middle Frequency & 1Mbps

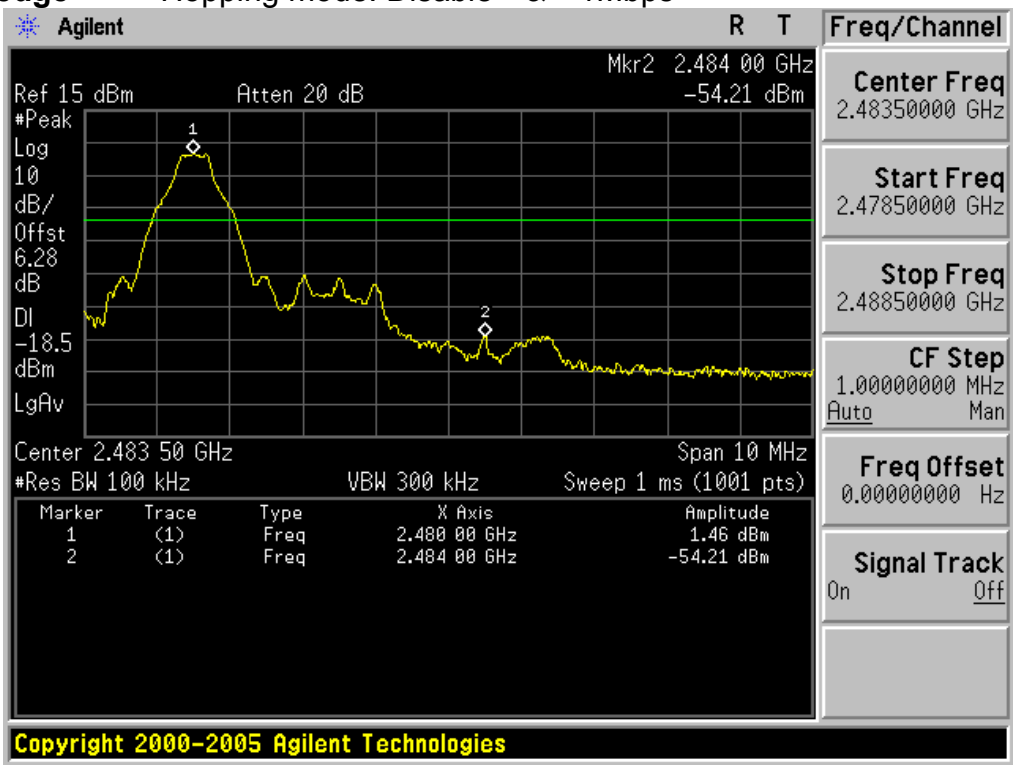


Conducted Spurious Emissions Middle Frequency & 1Mbps

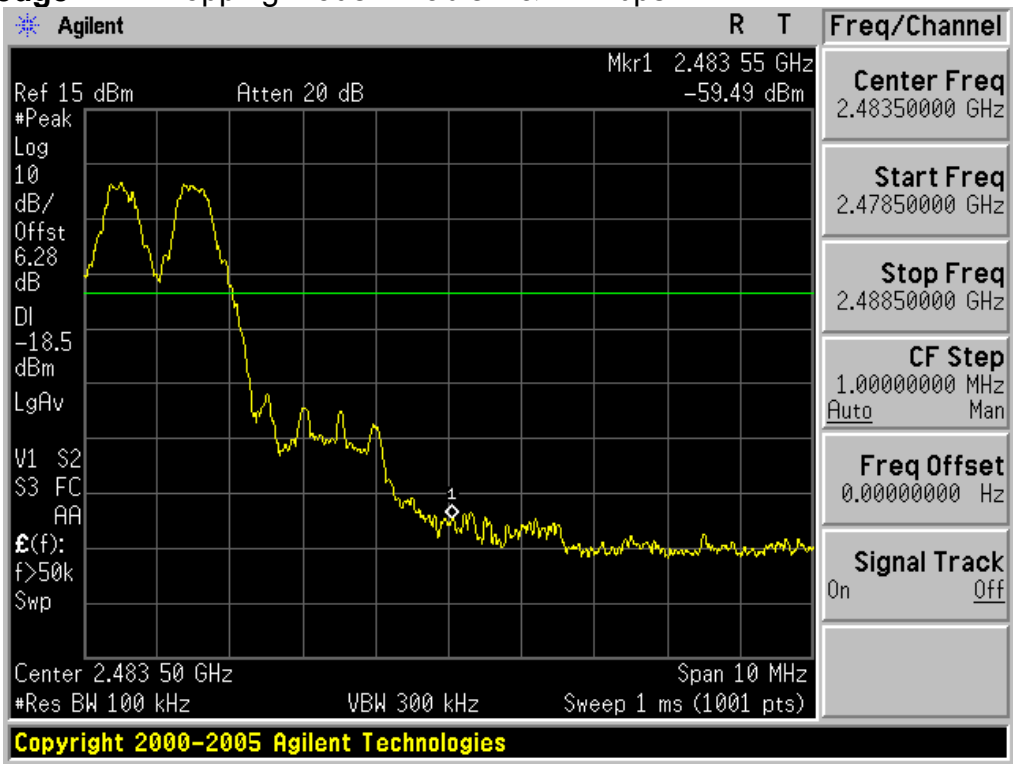


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	744.890000 M	-42.82	-200.00
1.000 G	2.000 G	100.00 k	1.883000 G	-40.61	-200.00
2.000 G	2.400 G	100.00 k	2.290600 G	-40.10	-200.00
2.400 G	2.483 G	100.00 k	2.440994 G	2.40	-200.00
2.483 G	3.000 G	100.00 k	2.765251 G	-39.64	-200.00
3.000 G	6.000 G	100.00 k	3.479667 G	-39.13	-200.00
6.000 G	9.000 G	100.00 k	8.902333 G	-40.11	-200.00
9.000 G	12.000 G	100.00 k	11.934000 G	-39.10	-200.00
12.000 G	15.000 G	100.00 k	12.370000 G	-38.52	-200.00
15.000 G	20.000 G	100.00 k	17.492222 G	-36.40	-200.00
20.000 G	25.000 G	100.00 k	24.500556 G	-33.25	-200.00

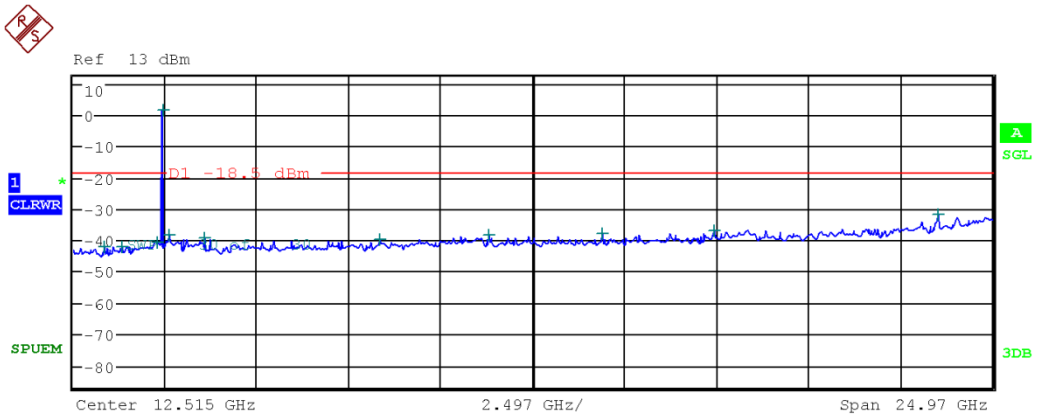
High Band-edge Hopping mode: Disable & 1Mbps



High Band-edge Hopping mode: Enable & 1Mbps

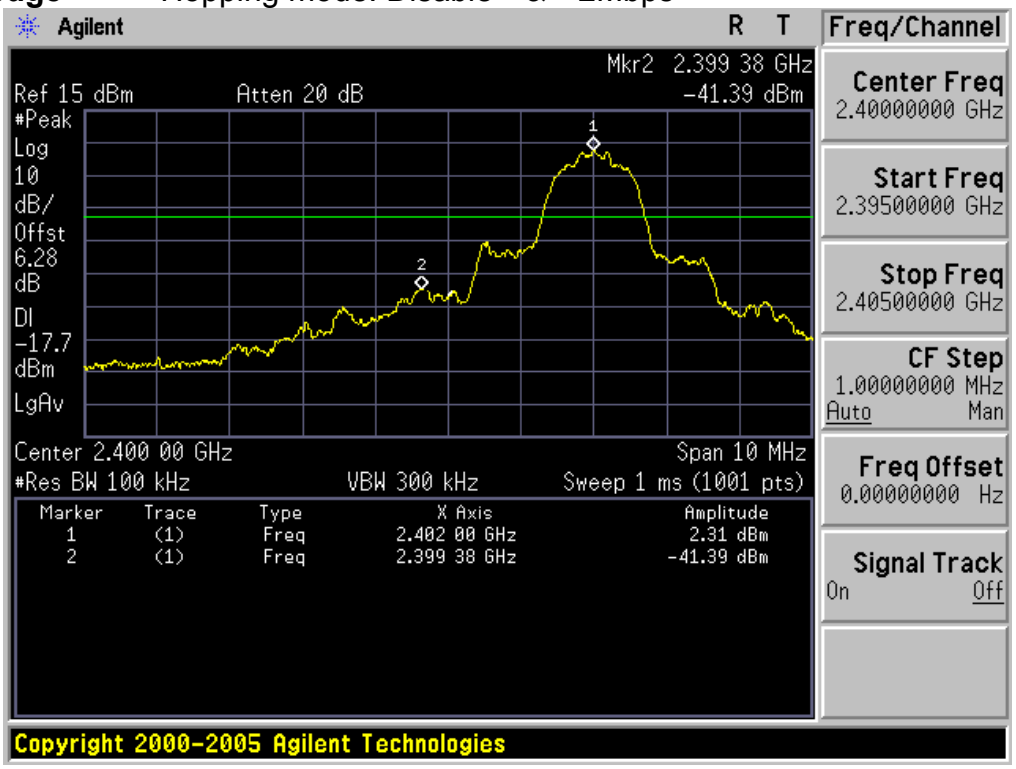


Conducted Spurious Emissions Highest Frequency & 1Mbps

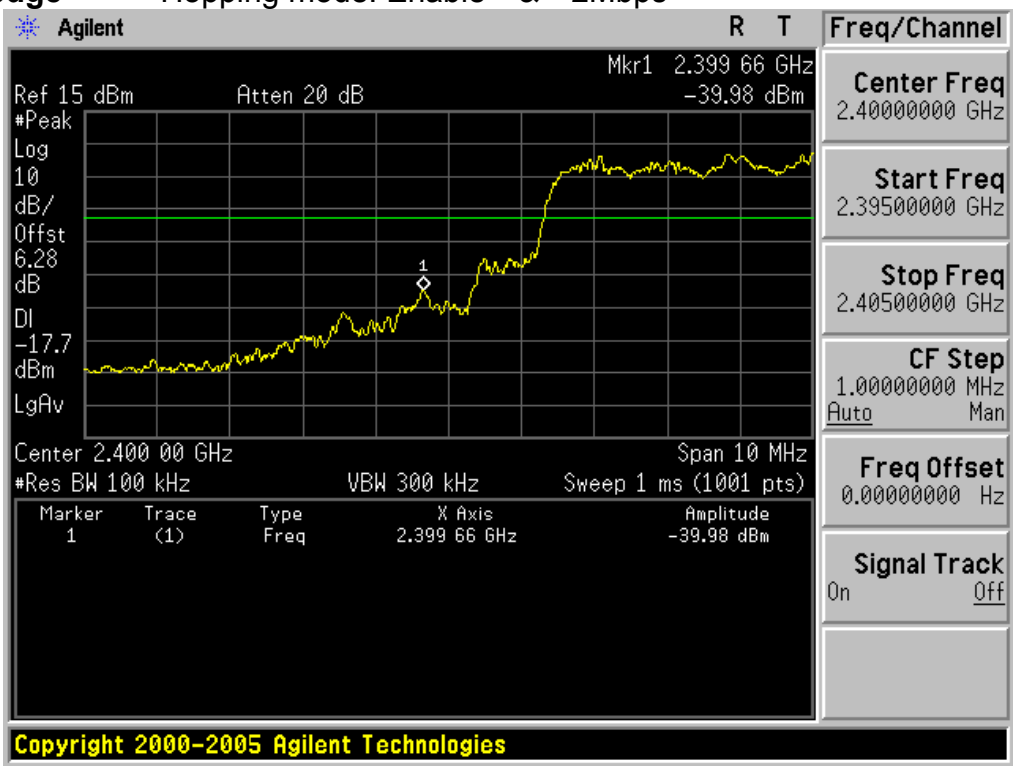


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	862.260000 M	-41.99	-200.00
1.000 G	2.000 G	100.00 k	1.361000 G	-42.02	-200.00
2.000 G	2.400 G	100.00 k	2.301120 G	-40.74	-200.00
2.400 G	2.483 G	100.00 k	2.479997 G	1.60	-200.00
2.483 G	3.000 G	100.00 k	2.637675 G	-38.63	-200.00
3.000 G	6.000 G	100.00 k	3.594333 G	-39.42	-200.00
6.000 G	9.000 G	100.00 k	8.370000 G	-39.96	-200.00
9.000 G	12.000 G	100.00 k	11.294667 G	-38.37	-200.00
12.000 G	15.000 G	100.00 k	14.390000 G	-37.96	-200.00
15.000 G	20.000 G	100.00 k	17.451111 G	-36.85	-200.00
20.000 G	25.000 G	100.00 k	23.512222 G	-31.95	-200.00

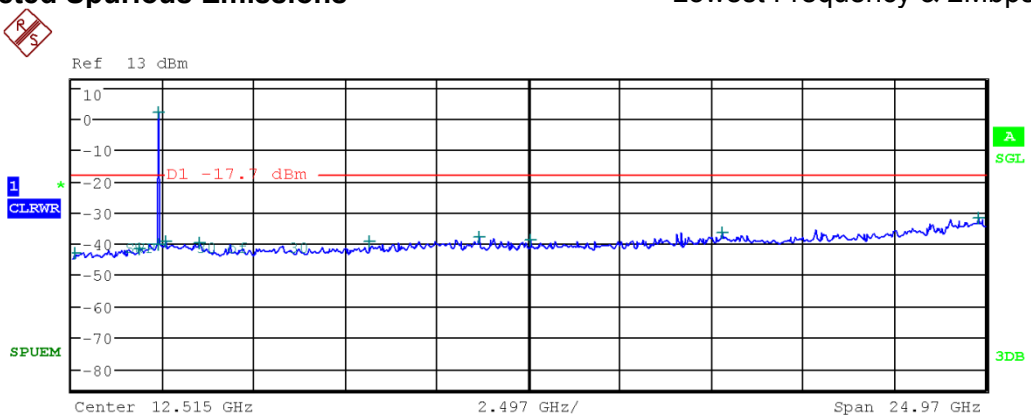
Low Band-edge Hopping mode: Disable & 2Mbps



Low Band-edge Hopping mode: Enable & 2Mbps

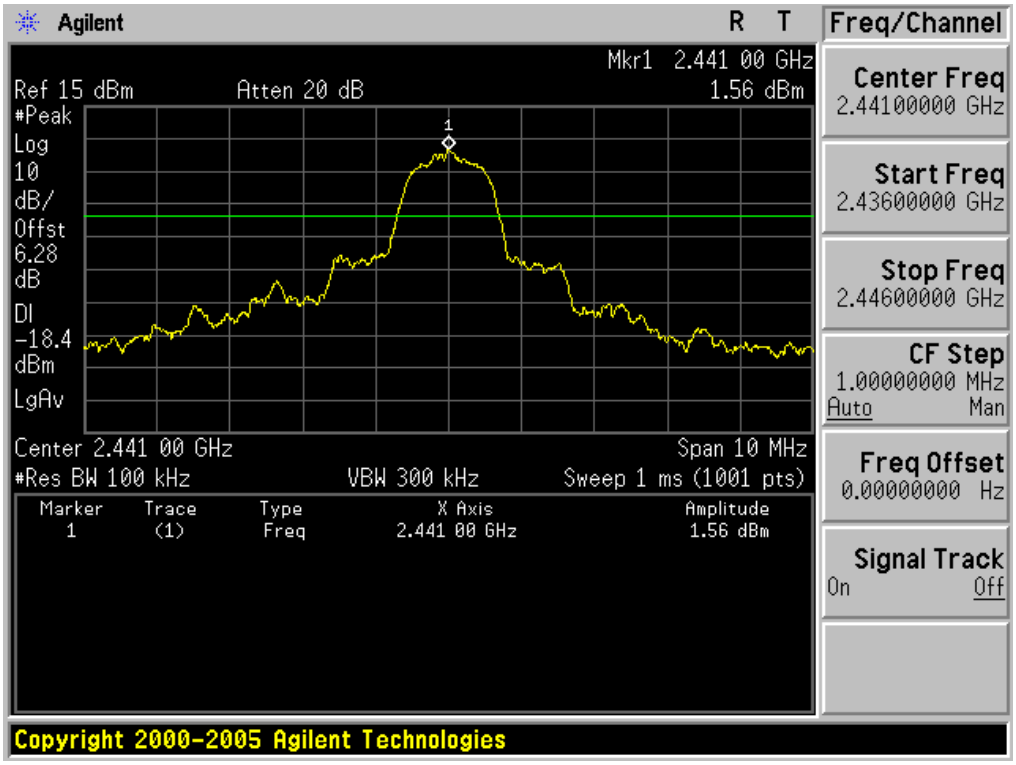


Conducted Spurious Emissions Lowest Frequency & 2Mbps

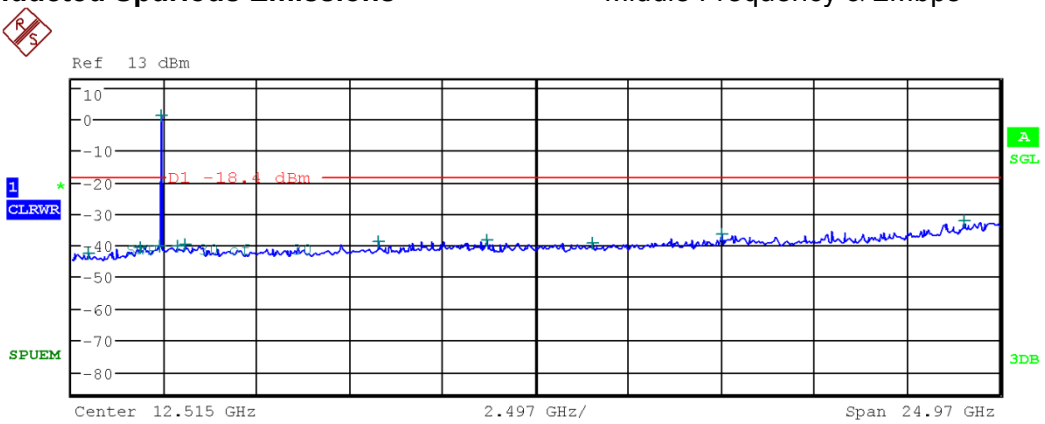


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	110.510000 M	-42.96	-200.00
1.000 G	2.000 G	100.00 k	1.851000 G	-41.69	-200.00
2.000 G	2.400 G	100.00 k	2.373400 G	-40.13	-200.00
2.400 G	2.483 G	100.00 k	2.401866 G	2.11	-200.00
2.483 G	3.000 G	100.00 k	2.590312 G	-39.49	-200.00
3.000 G	6.000 G	100.00 k	3.512667 G	-39.94	-200.00
6.000 G	9.000 G	100.00 k	8.148000 G	-39.21	-200.00
9.000 G	12.000 G	100.00 k	11.141000 G	-38.11	-200.00
12.000 G	15.000 G	100.00 k	12.564000 G	-39.01	-200.00
15.000 G	20.000 G	100.00 k	17.807222 G	-36.45	-200.00
20.000 G	25.000 G	100.00 k	24.818333 G	-31.96	-200.00

Reference for limit Middle Frequency & 2Mbps

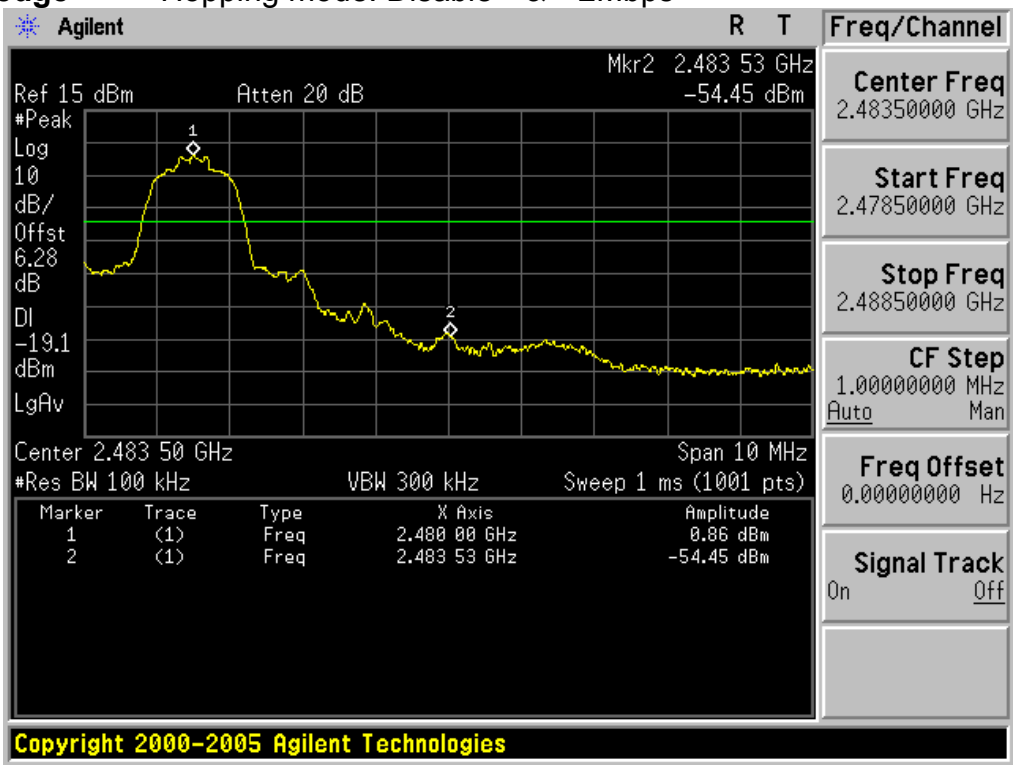


Conducted Spurious Emissions Middle Frequency & 2Mbps

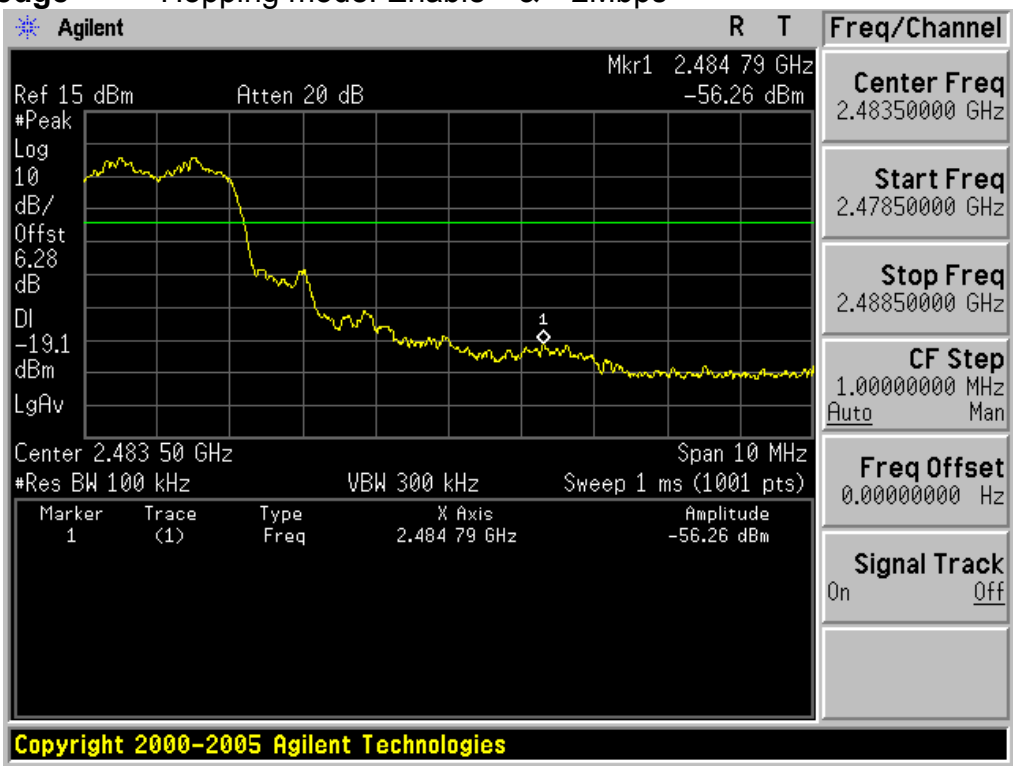


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	478.140000 M	-42.75	-200.00
1.000 G	2.000 G	100.00 k	1.882000 G	-40.93	-200.00
2.000 G	2.400 G	100.00 k	2.372400 G	-40.31	-200.00
2.400 G	2.483 G	100.00 k	2.440873 G	1.11	-200.00
2.483 G	3.000 G	100.00 k	2.889779 G	-40.16	-200.00
3.000 G	6.000 G	100.00 k	3.057000 G	-40.04	-200.00
6.000 G	9.000 G	100.00 k	8.269333 G	-38.79	-200.00
9.000 G	12.000 G	100.00 k	11.176333 G	-38.32	-200.00
12.000 G	15.000 G	100.00 k	14.043000 G	-39.11	-200.00
15.000 G	20.000 G	100.00 k	17.515556 G	-36.56	-200.00
20.000 G	25.000 G	100.00 k	24.033333 G	-32.27	-200.00

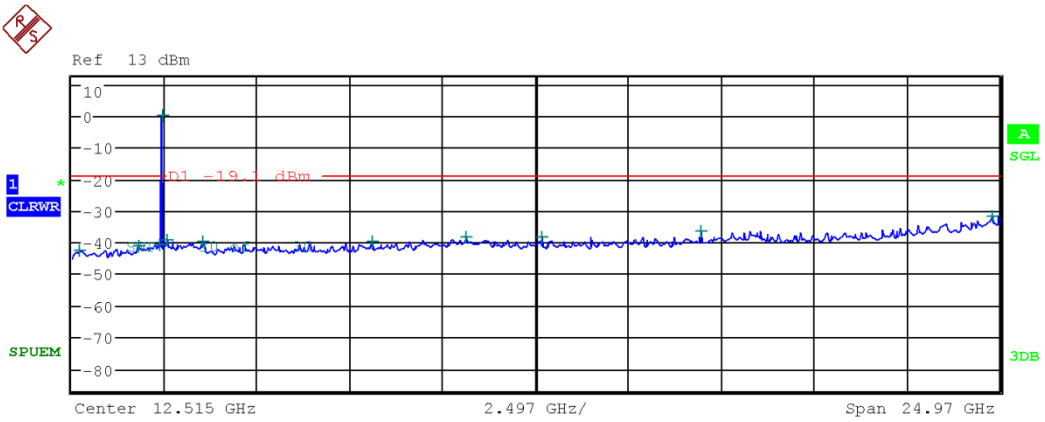
High Band-edge Hopping mode: Disable & 2Mbps



High Band-edge Hopping mode: Enable & 2Mbps

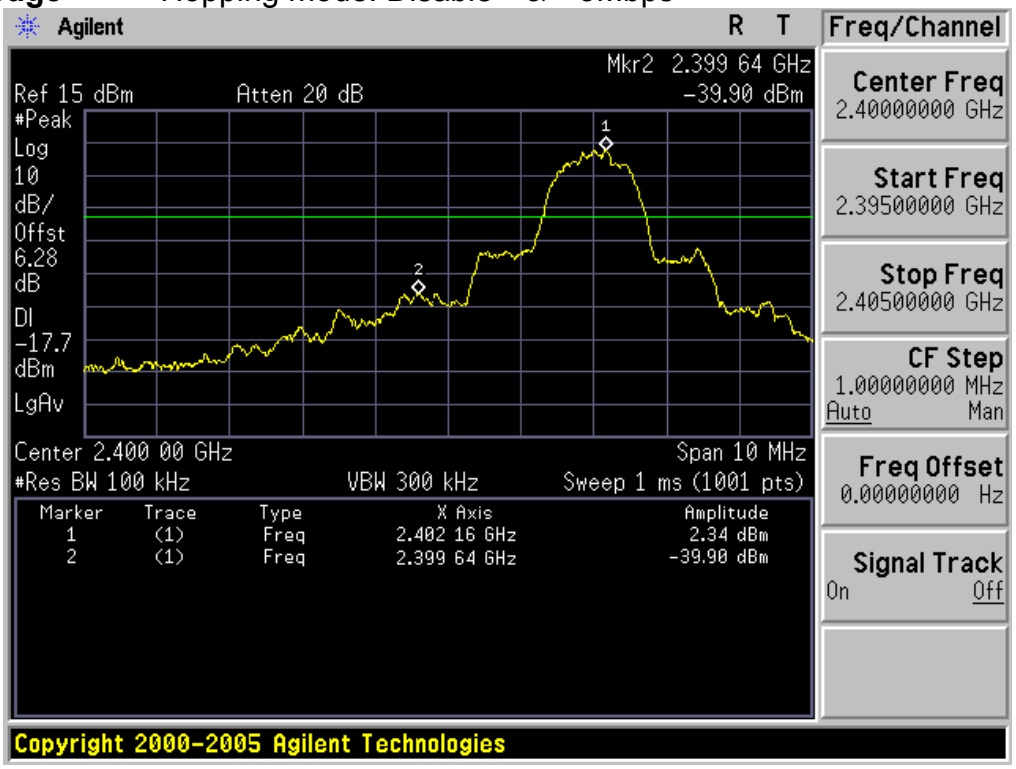


Conducted Spurious Emissions Highest Frequency & 2Mbps

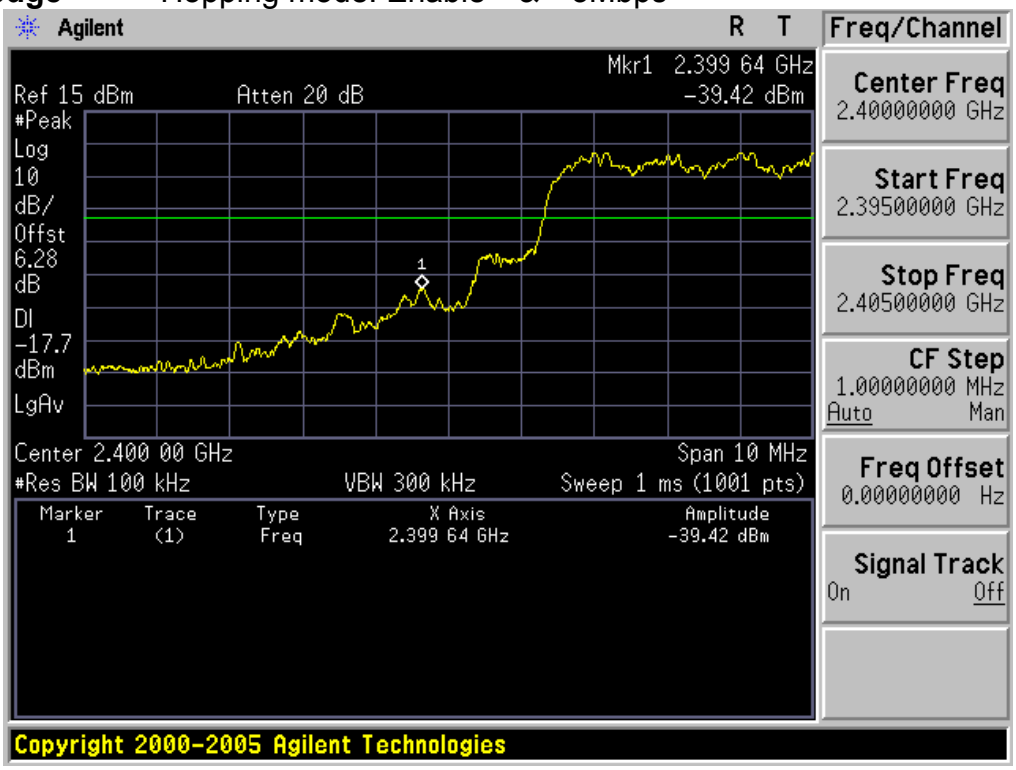


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	248.250000 M	-42.52	-200.00
1.000 G	2.000 G	100.00 k	1.844000 G	-41.46	-200.00
2.000 G	2.400 G	100.00 k	2.395320 G	-40.55	-200.00
2.400 G	2.483 G	100.00 k	2.479872 G	0.23	-200.00
2.483 G	3.000 G	100.00 k	2.574042 G	-39.14	-200.00
3.000 G	6.000 G	100.00 k	3.568333 G	-40.00	-200.00
6.000 G	9.000 G	100.00 k	8.104000 G	-39.95	-200.00
9.000 G	12.000 G	100.00 k	10.623000 G	-38.34	-200.00
12.000 G	15.000 G	100.00 k	12.686333 G	-38.44	-200.00
15.000 G	20.000 G	100.00 k	16.960556 G	-36.51	-200.00
20.000 G	25.000 G	100.00 k	24.812222 G	-31.99	-200.00

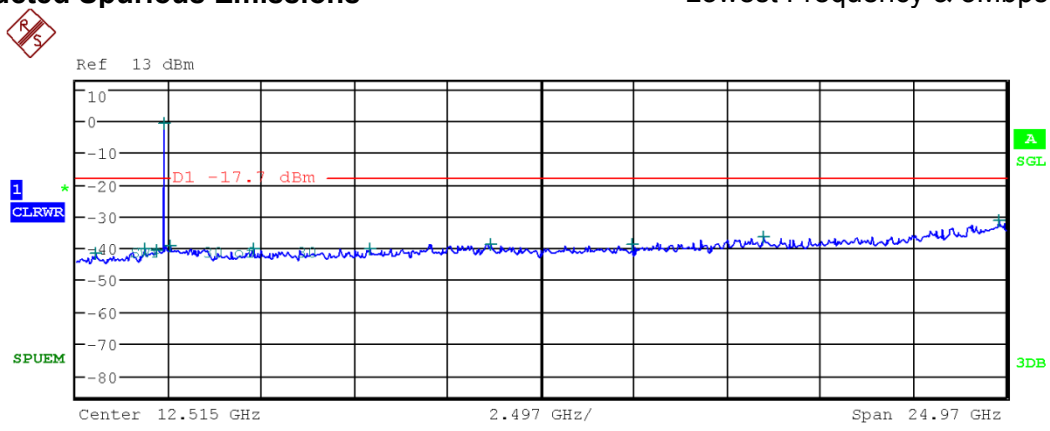
Low Band-edge Hopping mode: Disable & 3Mbps



Low Band-edge Hopping mode: Enable & 3Mbps

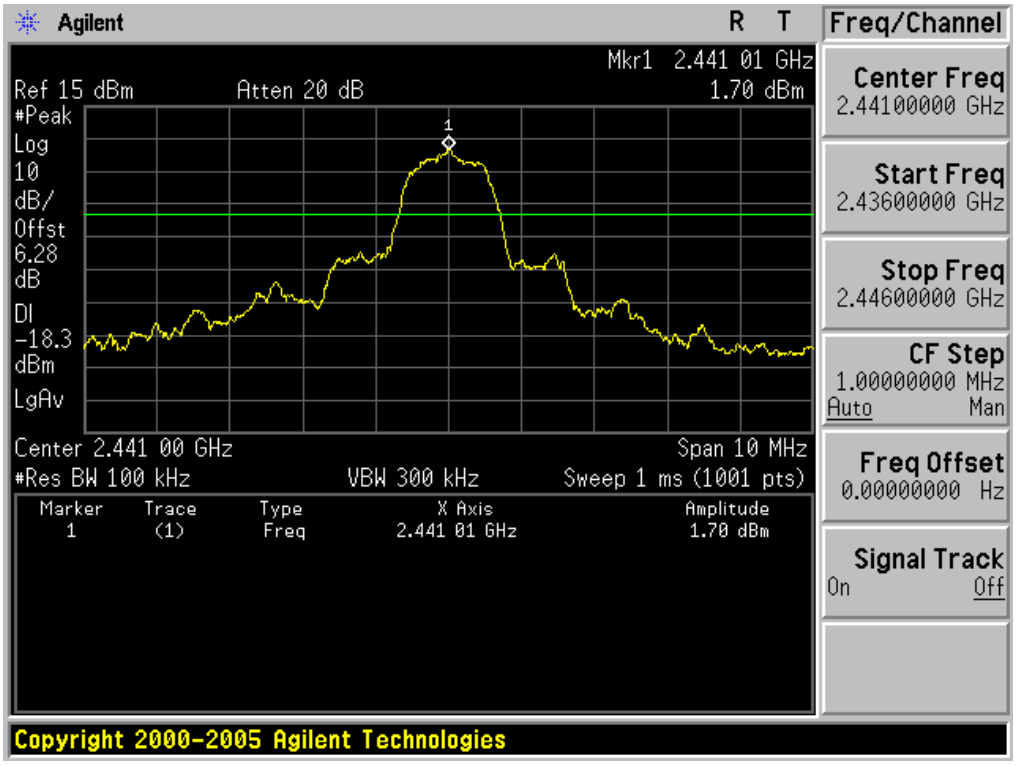


Conducted Spurious Emissions Lowest Frequency & 3Mbps

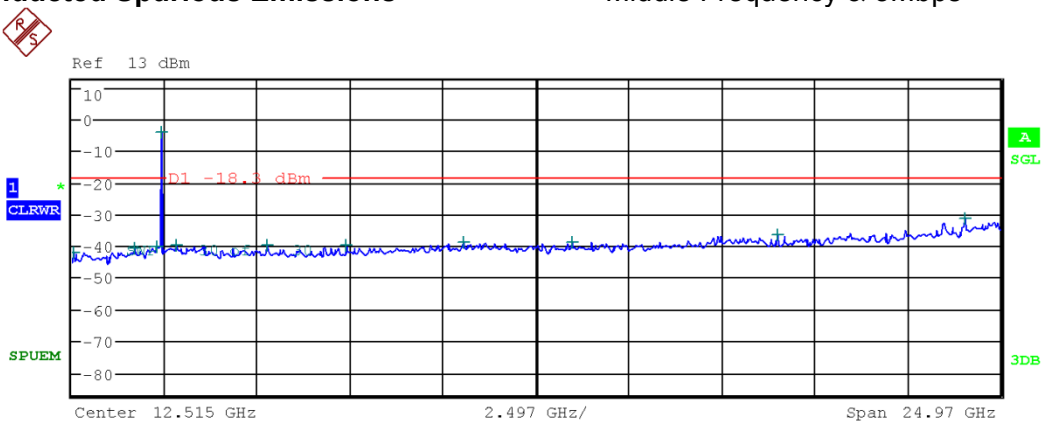


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	564.470000 M	-41.59	-200.00
1.000 G	2.000 G	100.00 k	1.879000 G	-40.41	-200.00
2.000 G	2.400 G	100.00 k	2.199040 G	-40.93	-200.00
2.400 G	2.483 G	100.00 k	2.401566 G	-1.05	-200.00
2.483 G	3.000 G	100.00 k	2.555448 G	-39.22	-200.00
3.000 G	6.000 G	100.00 k	4.804333 G	-40.38	-200.00
6.000 G	9.000 G	100.00 k	7.894000 G	-40.24	-200.00
9.000 G	12.000 G	100.00 k	11.157333 G	-38.67	-200.00
12.000 G	15.000 G	100.00 k	14.961333 G	-38.88	-200.00
15.000 G	20.000 G	100.00 k	18.463889 G	-36.54	-200.00
20.000 G	25.000 G	100.00 k	24.817222 G	-31.42	-200.00

Reference for limit Middle Frequency & 3Mbps

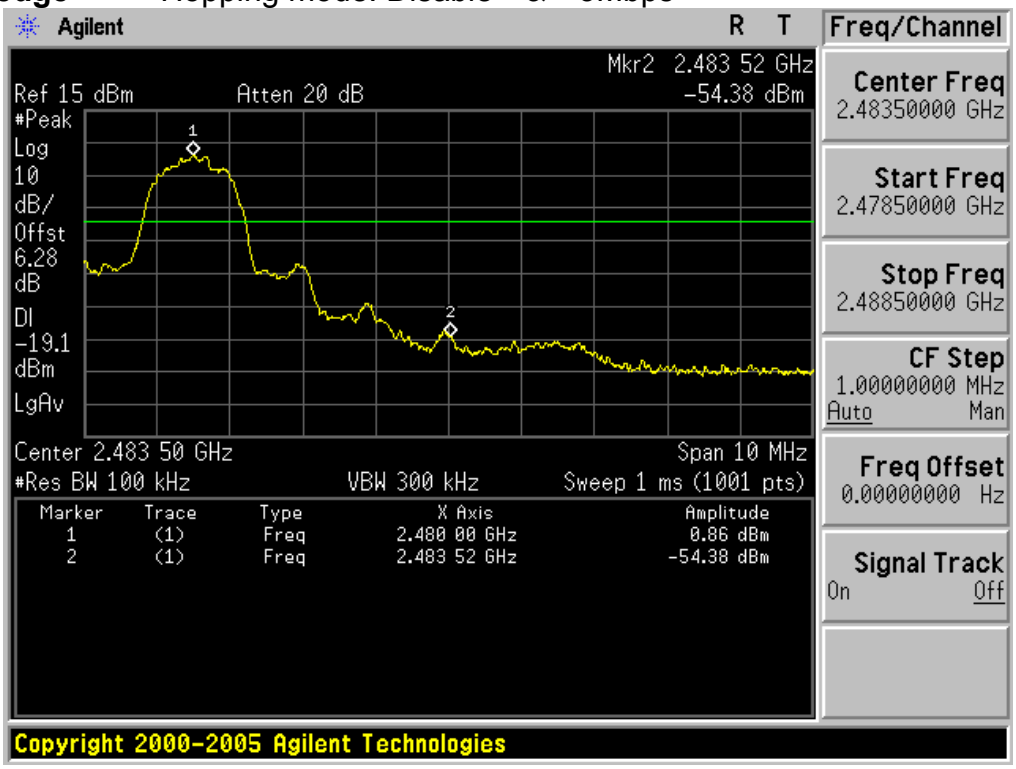


Conducted Spurious Emissions Middle Frequency & 3Mbps

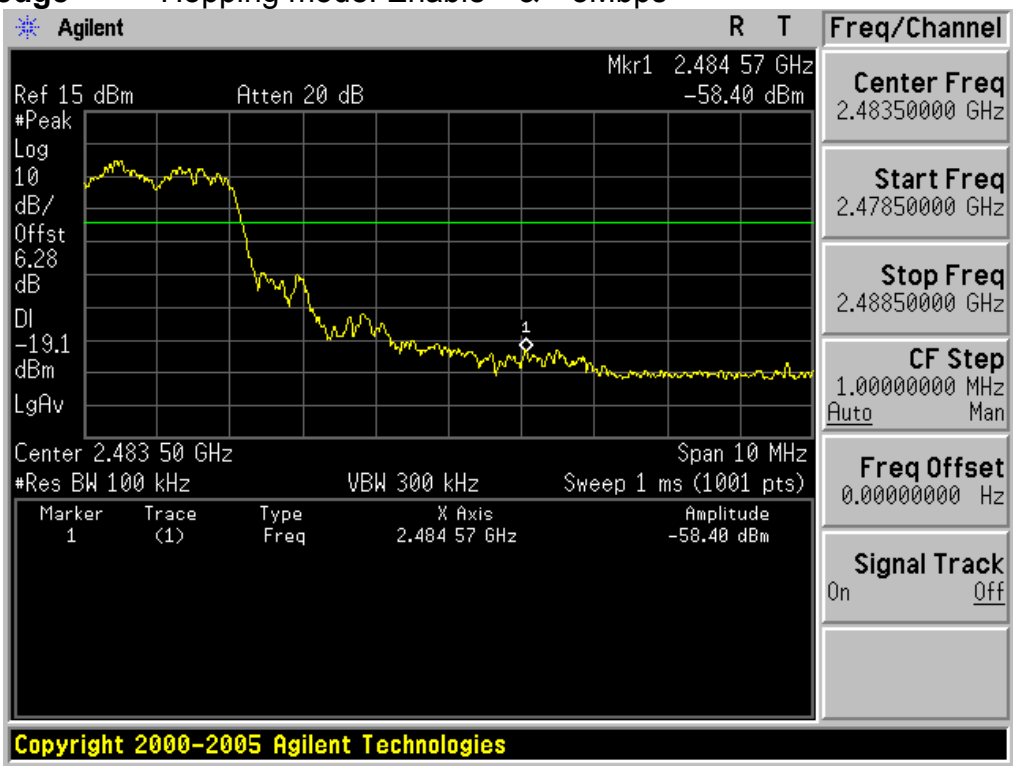


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	51.340000 M	-42.06	-200.00
1.000 G	2.000 G	100.00 k	1.705000 G	-40.87	-200.00
2.000 G	2.400 G	100.00 k	2.323600 G	-40.35	-200.00
2.400 G	2.483 G	100.00 k	2.441057 G	-4.01	-200.00
2.483 G	3.000 G	100.00 k	2.848149 G	-39.69	-200.00
3.000 G	6.000 G	100.00 k	5.269667 G	-39.89	-200.00
6.000 G	9.000 G	100.00 k	7.397000 G	-39.68	-200.00
9.000 G	12.000 G	100.00 k	10.568000 G	-39.00	-200.00
12.000 G	15.000 G	100.00 k	13.490000 G	-38.65	-200.00
15.000 G	20.000 G	100.00 k	19.002778 G	-36.70	-200.00
20.000 G	25.000 G	100.00 k	24.048889 G	-31.57	-200.00

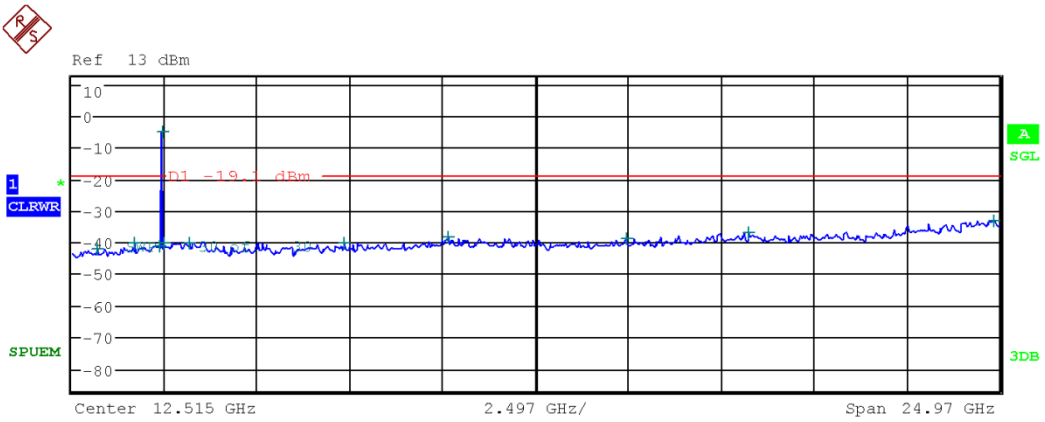
High Band-edge Hopping mode: Disable & 3Mbps



High Band-edge Hopping mode: Enable & 3Mbps



Conducted Spurious Emissions Highest Frequency & 3Mbps



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	709.970000 M	-42.24	-200.00
1.000 G	2.000 G	100.00 k	1.707000 G	-40.24	-200.00
2.000 G	2.400 G	100.00 k	2.390880 G	-41.30	-200.00
2.400 G	2.483 G	100.00 k	2.480072 G	-4.97	-200.00
2.483 G	3.000 G	100.00 k	2.517382 G	-40.12	-200.00
3.000 G	6.000 G	100.00 k	3.183667 G	-40.10	-200.00
6.000 G	9.000 G	100.00 k	7.343333 G	-40.43	-200.00
9.000 G	12.000 G	100.00 k	10.135667 G	-38.23	-200.00
12.000 G	15.000 G	100.00 k	14.973000 G	-38.82	-200.00
15.000 G	20.000 G	100.00 k	18.229444 G	-37.02	-200.00
20.000 G	25.000 G	100.00 k	24.820556 G	-33.01	-200.00

3.2.7 Radiated Spurious Emissions

- Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Tested frequency = Low, Middle, High Frequencies

Frequency Range = 30 MHz ~ 10th harmonic.

RBW and VBW = 1. Frequency range: 30MHz ~ 1GHz
RBW = 120KHz / VBW = ≥ RBW
2. Frequency range: 1GHz ~ 10th harmonics
Peak mode: RBW = 1MHz / VBW = ≥ RBW
Average mode: RBW = 1MHz / VBW = 10Hz

Detector function = Peak Sweep = auto

Trace = max hold

- Measurement Data: Comply

Note 1: See next pages for actual measured spectrum plots and data.

- Minimum Standard:

▪ FCC Part 15.209(a) and (b)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

▪ FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	3600 ~ 4400	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	4.5 ~ 5.15	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~ 156.52525	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.7 ~ 156.9	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900	13.25 ~ 13.4	
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358		

▪ FCC Part 15.205(b): The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 1 & 1Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2399.850	H	Y axis	PK	40.30	-1.01	39.29	74.00	34.71
2399.850	H	Y axis	AV	31.14	-1.01	30.13	54.00	23.87
4804.520	H	Y axis	PK	49.84	8.34	58.18	74.00	15.82
4804.520	H	Y axis	AV	37.68	8.34	46.02	54.00	7.98

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.340	H	Y axis	PK	50.17	8.51	58.68	74.00	15.32
4882.340	H	Y axis	AV	37.45	8.51	45.96	54.00	8.04

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.330	H	Y axis	PK	52.78	-1.06	51.72	74.00	22.28
2484.330	H	Y axis	AV	33.46	-1.06	32.40	54.00	21.60
4959.780	H	Y axis	PK	48.68	8.57	57.25	74.00	16.75
4959.780	H	Y axis	AV	36.54	8.57	45.11	54.00	8.89

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 1 & 2Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2398.550	H	Y axis	PK	42.56	-1.01	41.55	74.00	32.45
2398.550	H	Y axis	AV	36.48	-1.01	35.47	54.00	18.53
4804.020	H	Y axis	PK	48.88	8.34	57.22	74.00	16.78
4804.020	H	Y axis	AV	36.28	8.34	44.62	54.00	9.38

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.540	H	Y axis	PK	48.46	8.51	56.97	74.00	17.03
4882.540	H	Y axis	AV	37.89	8.51	46.40	54.00	7.60

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.500	H	Y axis	PK	53.86	-1.06	52.80	74.00	21.20
2484.500	H	Y axis	AV	40.25	-1.06	39.19	54.00	14.81
4960.010	H	Y axis	PK	47.69	8.57	56.26	74.00	17.74
4960.010	H	Y axis	AV	36.87	8.57	45.44	54.00	8.56

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 1 & 3Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2388.650	H	Y axis	PK	51.98	-1.01	50.97	74.00	23.03
2388.650	H	Y axis	AV	34.59	-1.01	33.58	54.00	20.42
4804.000	H	Y axis	PK	47.56	8.34	55.90	74.00	18.10
4804.000	H	Y axis	AV	35.45	8.34	43.79	54.00	10.21

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.060	H	Y axis	PK	49.87	8.51	58.38	74.00	15.62
4882.060	H	Y axis	AV	35.44	8.51	43.95	54.00	10.05

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.880	H	Y axis	PK	53.44	-1.06	52.38	74.00	21.62
2483.880	H	Y axis	AV	34.92	-1.06	33.86	54.00	20.14
4960.020	H	Y axis	PK	46.86	8.57	55.43	74.00	18.57
4960.020	H	Y axis	AV	34.25	8.57	42.82	54.00	11.18

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 2 & 1Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2399.860	H	Y axis	PK	39.48	-1.01	38.47	74.00	35.53
2399.860	H	Y axis	AV	31.11	-1.01	30.10	54.00	23.90
4804.200	H	Y axis	PK	48.97	8.34	57.31	74.00	16.69
4804.200	H	Y axis	AV	37.54	8.34	45.88	54.00	8.12

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.050	H	Y	PK	49.58	8.51	58.09	74.00	15.91
4882.050	H	Y	AV	37.15	8.51	45.66	54.00	8.34

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.260	H	Y	PK	51.74	-1.06	50.68	74.00	23.32
2484.260	H	Y	AV	33.06	-1.06	32.00	54.00	22.00
4959.860	H	Y	PK	48.68	8.57	57.25	74.00	16.75
4959.860	H	Y	AV	36.24	8.57	44.81	54.00	9.19

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 2 & 2Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2398.520	H	Y	PK	42.31	-1.01	41.30	74.00	32.70
2398.520	H	Y	AV	36.54	-1.01	35.53	54.00	18.47
4804.030	H	Y	PK	48.57	8.34	56.91	74.00	17.09
4804.030	H	Y	AV	36.22	8.34	44.56	54.00	9.44

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.420	H	Y	PK	48.45	8.51	56.96	74.00	17.04
4882.420	H	Y	AV	37.98	8.51	46.49	54.00	7.51

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.480	H	Y	PK	53.56	-1.06	52.50	74.00	21.50
2484.480	H	Y	AV	40.18	-1.06	39.12	54.00	14.88
4960.120	H	Y	PK	47.55	8.57	56.12	74.00	17.88
4960.120	H	Y	AV	36.87	8.57	45.44	54.00	8.56

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 2 & 3Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2388.450	H	Y	PK	51.26	-1.01	50.25	74.00	23.75
2388.450	H	Y	AV	34.44	-1.01	33.43	54.00	20.57
4804.000	H	Y	PK	47.21	8.34	55.55	74.00	18.45
4804.000	H	Y	AV	35.44	8.34	43.78	54.00	10.22

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.030	H	Y	PK	49.75	8.51	58.26	74.00	15.74
4882.030	H	Y	AV	34.98	8.51	43.49	54.00	10.51

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.890	H	Y	PK	52.86	-1.06	51.80	74.00	22.20
2483.890	H	Y	AV	34.68	-1.06	33.62	54.00	20.38
4960.000	H	Y	PK	46.78	8.57	55.35	74.00	18.65
4960.000	H	Y	AV	34.55	8.57	43.12	54.00	10.88

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 3 & 1Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2398.680	H	Y	PK	41.01	-1.01	40.00	74.00	34.00
2398.680	H	Y	AV	31.69	-1.01	30.68	54.00	23.32
4804.000	H	Y	PK	48.67	8.34	57.01	74.00	16.99
4804.000	H	Y	AV	37.92	8.34	46.26	54.00	7.74

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.000	H	Y	PK	49.66	8.51	58.17	74.00	15.83
4882.000	H	Y	AV	38.25	8.51	46.76	54.00	7.24

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.030	H	Y	PK	50.98	-1.06	49.92	74.00	24.08
2484.030	H	Y	AV	34.65	-1.06	33.59	54.00	20.41
4960.000	H	Y	PK	49.08	8.57	57.65	74.00	16.35
4960.000	H	Y	AV	37.01	8.57	45.58	54.00	8.42

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 3 & 2Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2398.920	H	Y	PK	42.15	-1.01	41.14	74.00	32.86
2398.920	H	Y	AV	37.35	-1.01	36.34	54.00	17.66
4804.000	H	Y	PK	47.69	8.34	56.03	74.00	17.97
4804.000	H	Y	AV	36.52	8.34	44.86	54.00	9.14

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.000	H	Y	PK	46.79	8.51	55.30	74.00	18.70
4882.000	H	Y	AV	37.68	8.51	46.19	54.00	7.81

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2485.030	H	Y	PK	53.82	-1.06	52.76	74.00	21.24
2485.030	H	Y	AV	41.03	-1.06	39.97	54.00	14.03
4960.000	H	Y	PK	48.35	8.57	56.92	74.00	17.08
4960.000	H	Y	AV	37.24	8.57	45.81	54.00	8.19

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 3 & 3Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2394.980	H	Y	PK	52.67	-1.01	51.66	74.00	22.34
2394.980	H	Y	AV	35.61	-1.01	34.60	54.00	19.40
4804.000	H	Y	PK	48.22	8.34	56.56	74.00	17.44
4804.000	H	Y	AV	35.46	8.34	43.80	54.00	10.20

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.000	H	Y	PK	47.56	8.51	56.07	74.00	17.93
4882.000	H	Y	AV	35.87	8.51	44.38	54.00	9.62

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.250	H	Y	PK	51.85	-1.06	50.79	74.00	23.21
2484.250	H	Y	AV	35.88	-1.06	34.82	54.00	19.18
4960.000	H	Y	PK	47.68	8.57	56.25	74.00	17.75
4960.000	H	Y	AV	34.88	8.57	43.45	54.00	10.55

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 4 & 1Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2399.570	H	Y	PK	40.02	-1.01	39.01	74.00	34.99
2399.570	H	Y	AV	31.54	-1.01	30.53	54.00	23.47
4804.060	H	Y	PK	48.67	8.34	57.01	74.00	16.99
4804.060	H	Y	AV	37.64	8.34	45.98	54.00	8.02

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.000	H	Y	PK	49.57	8.51	58.08	74.00	15.92
4882.000	H	Y	AV	37.25	8.51	45.76	54.00	8.24

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.360	H	Y	PK	51.23	-1.06	50.17	74.00	23.83
2484.360	H	Y	AV	33.24	-1.06	32.18	54.00	21.82
4960.000	H	Y	PK	48.55	8.57	57.12	74.00	16.88
4960.000	H	Y	AV	36.33	8.57	44.90	54.00	9.10

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 4 & 2Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2399.020	H	Y	PK	41.68	-1.01	40.67	74.00	33.33
2399.020	H	Y	AV	36.45	-1.01	35.44	54.00	18.56
4804.000	H	Y	PK	48.51	8.34	56.85	74.00	17.15
4804.000	H	Y	AV	36.34	8.34	44.68	54.00	9.32

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.000	H	Y	PK	47.68	8.51	56.19	74.00	17.81
4882.000	H	Y	AV	37.25	8.51	45.76	54.00	8.24

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.350	H	Y	PK	54.01	-1.06	52.95	74.00	21.05
2484.350	H	Y	AV	41.25	-1.06	40.19	54.00	13.81
4960.050	H	Y	PK	48.05	8.57	56.62	74.00	17.38
4960.050	H	Y	AV	37.02	8.57	45.59	54.00	8.41

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Radiated Spurious Emissions & Test Case 4 & 3Mbps

▪ Lowest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2391.540	H	Y	PK	52.15	-1.01	51.14	74.00	22.86
2391.540	H	Y	AV	34.88	-1.01	33.87	54.00	20.13
4804.000	H	Y	PK	47.52	8.34	55.86	74.00	18.14
4804.000	H	Y	AV	35.49	8.34	43.83	54.00	10.17

▪ Middle Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.000	H	Y	PK	48.67	8.51	57.18	74.00	16.82
4882.000	H	Y	AV	35.20	8.51	43.71	54.00	10.29

▪ Highest Channel

Freq. (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.020	H	Y	PK	51.29	-1.06	50.23	74.00	23.78
2484.020	H	Y	AV	35.24	-1.06	34.18	54.00	19.82
4960.000	H	Y	PK	47.65	8.57	56.22	74.00	17.78
4960.000	H	Y	AV	35.25	8.57	43.82	54.00	10.18

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

3.2.8 AC Line Conducted Emissions

- Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak and average detector mode with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

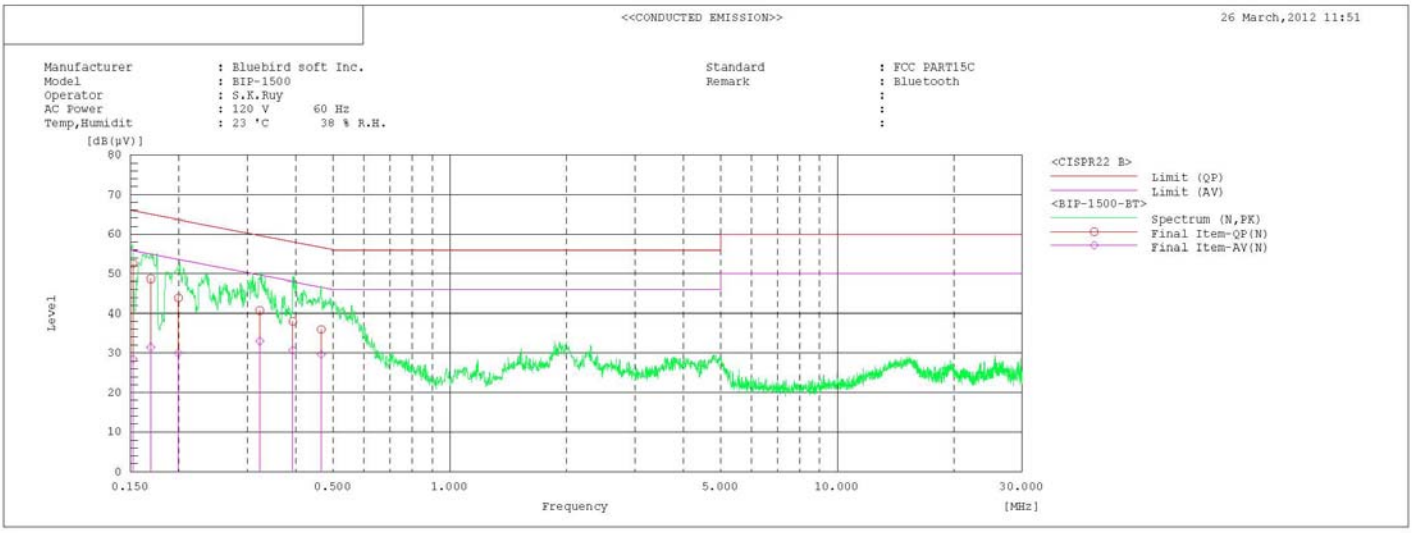
- Measurement Data: Comply

- Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

AC Line Conducted Emissions Test Case 1 & Modulation: ***GFSK***

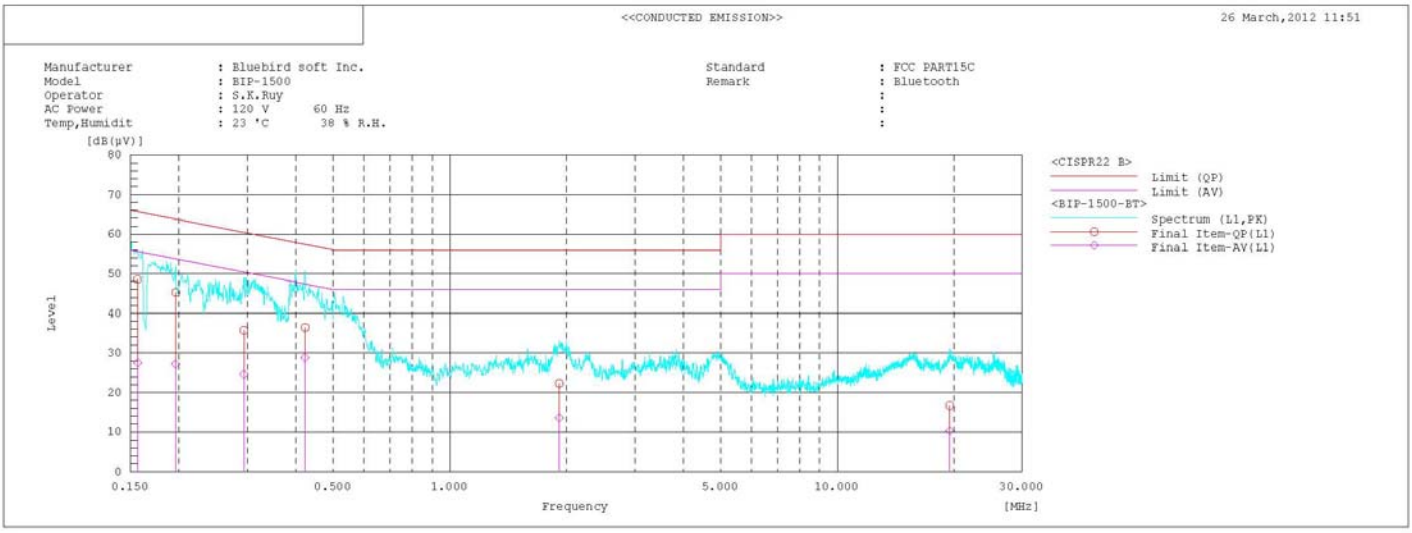


Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.152	52.4	28.3	0.2	52.6	28.5	65.9	55.9	13.3	27.4	
2	0.169	48.5	31.3	0.2	48.7	31.5	65.0	55.0	16.3	23.5	
3	0.199	43.7	29.8	0.2	43.9	30.0	63.7	53.7	19.8	23.7	
4	0.323	40.5	32.8	0.2	40.7	33.0	59.6	49.6	18.9	16.6	
5	0.393	37.8	30.5	0.2	38.0	30.7	58.0	48.0	20.0	17.3	
6	0.465	35.7	29.5	0.2	35.9	29.7	56.6	46.6	20.7	16.9	

AC Line Conducted Emissions Test Case 1 & Modulation: ***GFSK***

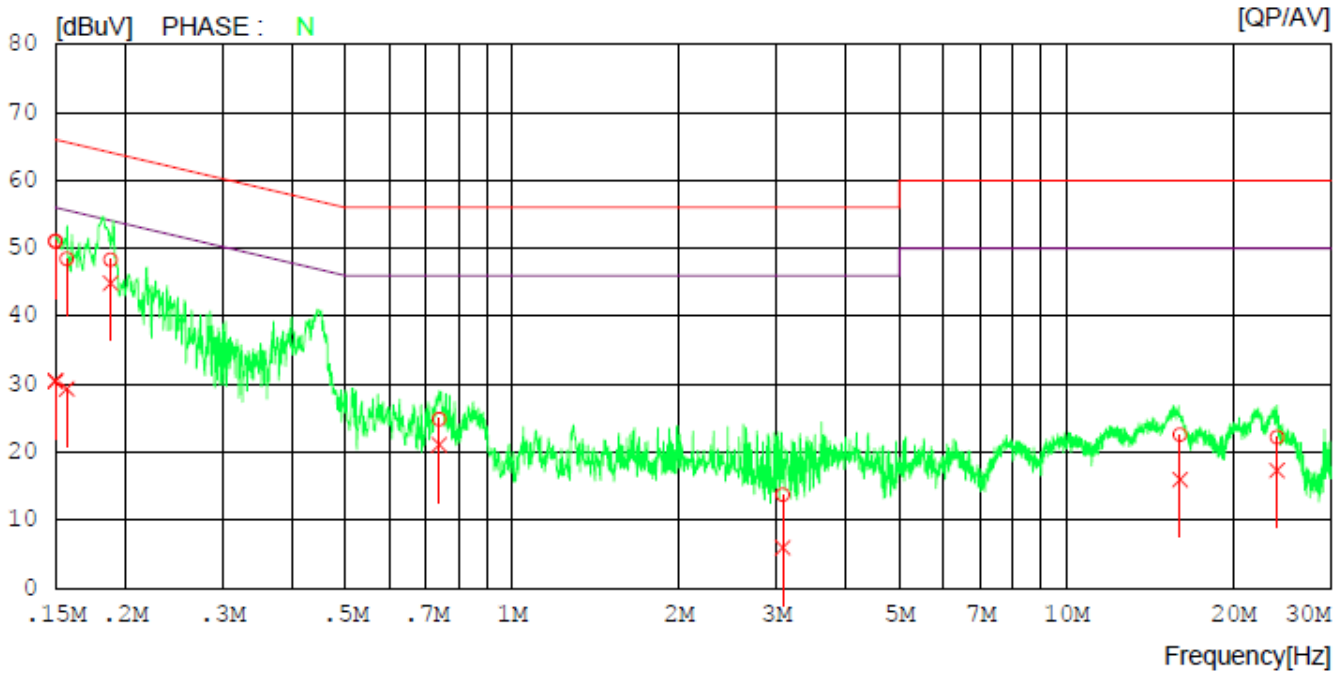


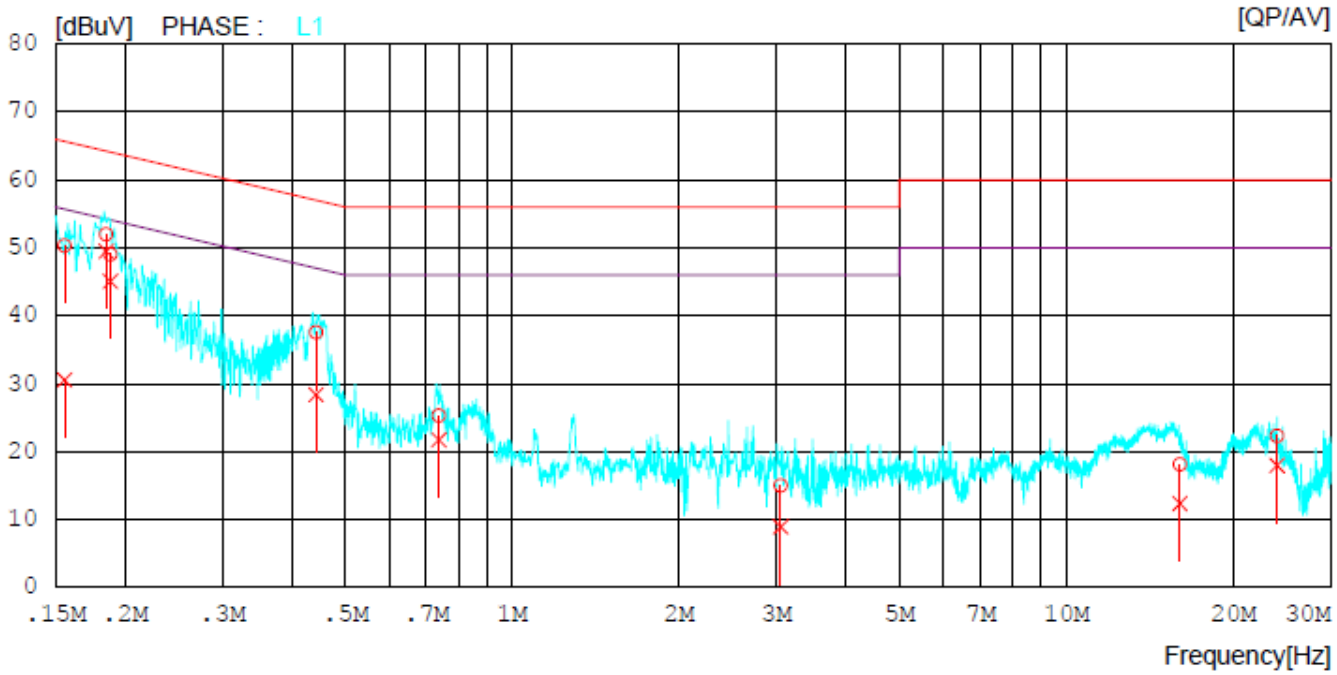
Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.156	48.5	27.4	0.1	48.6	27.5	65.7	55.7	17.1	28.2	
2	0.196	45.2	27.1	0.1	45.3	27.2	63.8	53.8	18.5	26.6	
3	0.294	35.6	24.5	0.1	35.7	24.6	60.4	50.4	24.7	25.8	
4	0.423	36.3	28.7	0.1	36.4	28.8	57.4	47.4	21.0	18.6	
5	1.915	22.1	13.4	0.2	22.3	13.6	56.0	46.0	33.7	32.4	
6	19.490	15.6	9.2	1.1	16.7	10.3	60.0	50.0	43.3	39.7	

AC Line Conducted Emissions Test Case 2 & Modulation: ***GFSK***

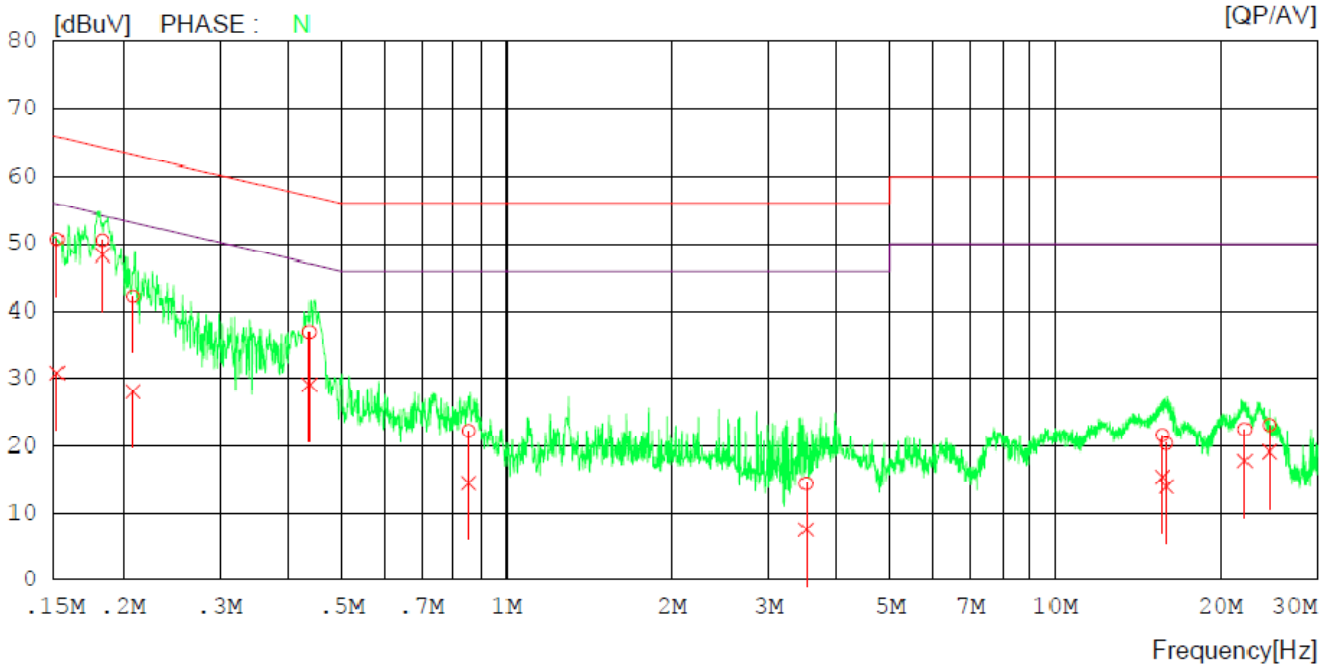


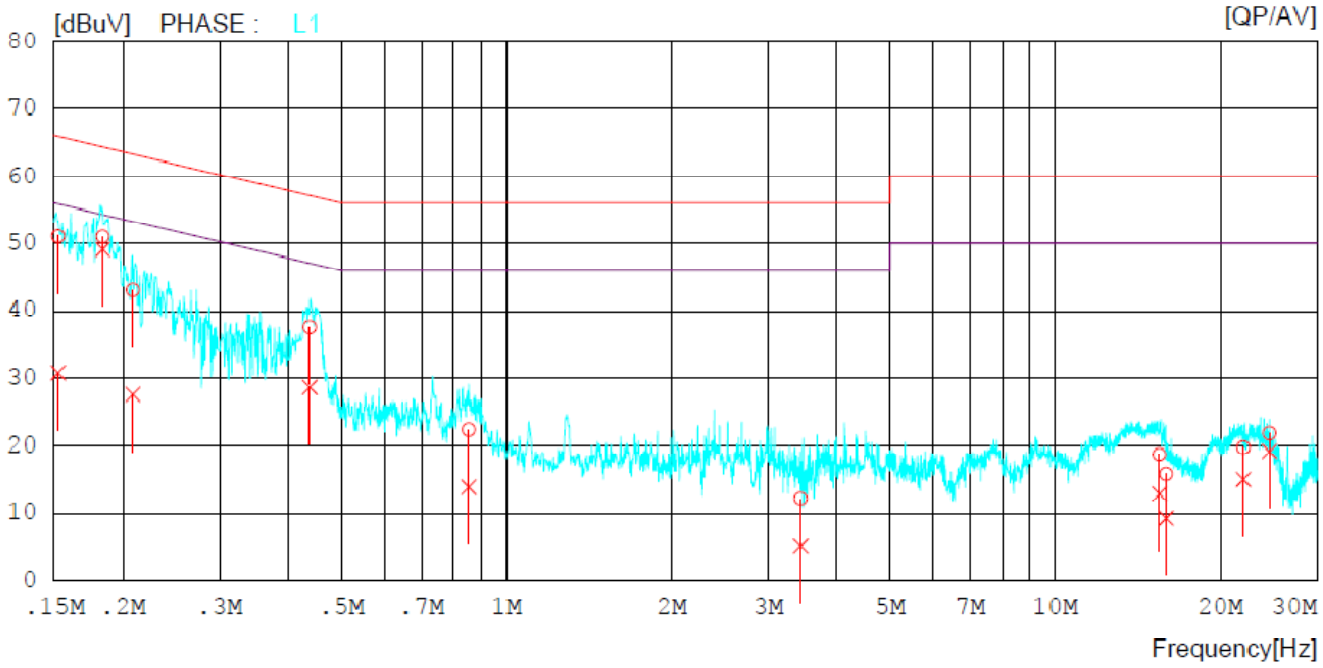


AC Line Conducted Emissions Test Case 2 & Modulation: ***GFSK***

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15001	50.7	30.1	0.3	51.0	30.4	66.0	56.0	15.0	25.6	N
2	0.15001	50.8	30.2	0.3	51.1	30.5	66.0	56.0	14.9	25.5	N
3	0.15724	48.1	29.0	0.3	48.4	29.3	65.6	55.6	17.2	26.3	N
4	0.18861	48.1	44.7	0.2	48.3	44.9	64.1	54.1	15.8	9.2	N
5	0.73859	24.6	20.9	0.2	24.8	21.1	56.0	46.0	31.2	24.9	N
6	3.07850	13.3	5.5	0.4	13.7	5.9	56.0	46.0	42.3	40.1	N
7	16.04350	21.6	15.0	1.0	22.6	16.0	60.0	50.0	37.4	34.0	N
8	24.00050	21.0	16.1	1.2	22.2	17.3	60.0	50.0	37.8	32.7	N
9	0.15585	50.0	30.3	0.3	50.3	30.6	65.7	55.7	15.4	25.1	L1
10	0.18515	51.8	49.3	0.2	52.0	49.5	64.3	54.3	12.3	4.8	L1
11	0.18850	48.8	44.9	0.2	49.0	45.1	64.1	54.1	15.1	9.0	L1
12	0.44291	37.4	28.2	0.2	37.6	28.4	57.0	47.0	19.4	18.6	L1
13	0.73795	25.1	21.5	0.2	25.3	21.7	56.0	46.0	30.7	24.3	L1
14	3.05250	14.6	8.5	0.4	15.0	8.9	56.0	46.0	41.0	37.1	L1
15	16.03500	17.2	11.3	1.0	18.2	12.3	60.0	50.0	41.8	37.7	L1
16	24.00250	21.1	16.8	1.2	22.3	18.0	60.0	50.0	37.7	32.0	L1

AC Line Conducted Emissions Test Case 3 & Modulation: ***GFSK***

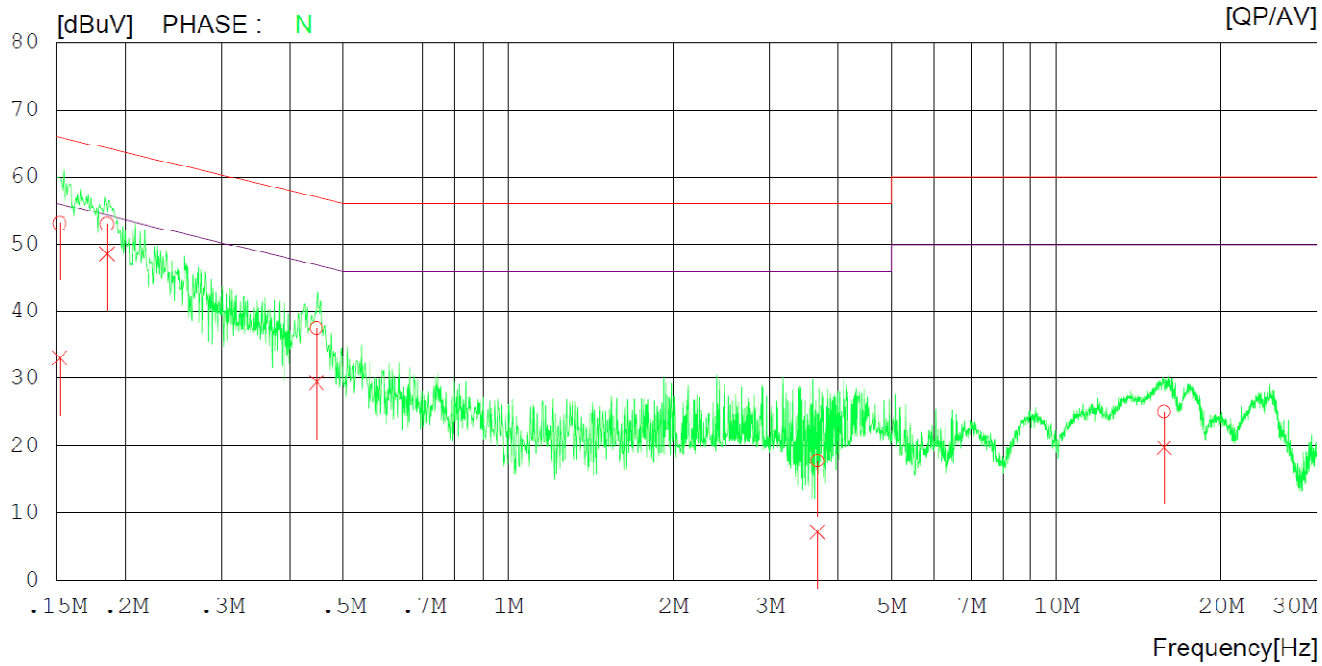


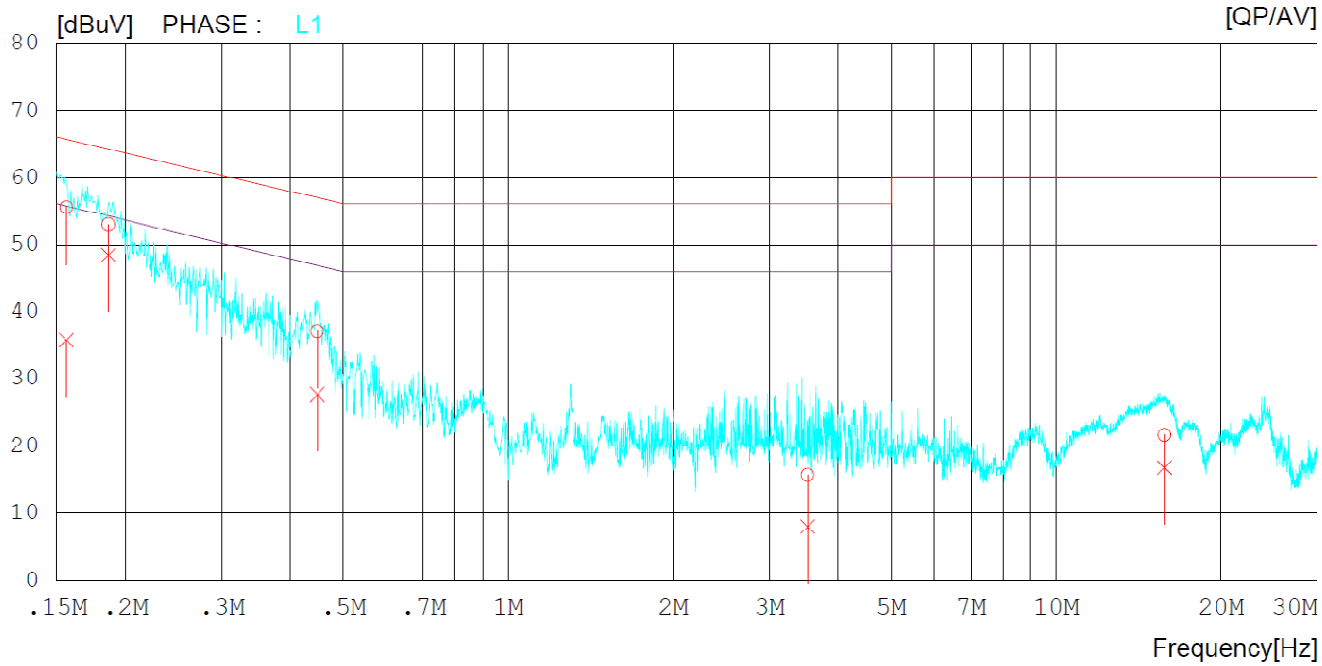


AC Line Conducted Emissions Test Case 3 & Modulation: ***GFSK***

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15178	50.4	30.5	0.3	50.7	30.8	65.9	55.9	15.2	25.1	N
2	0.18398	50.4	48.1	0.2	50.6	48.3	64.3	54.3	13.7	6.0	N
3	0.20856	42.0	27.8	0.2	42.2	28.0	63.3	53.3	21.1	25.3	N
4	0.43744	36.7	28.8	0.2	36.9	29.0	57.1	47.1	20.2	18.1	N
5	0.85185	21.9	14.1	0.3	22.2	14.4	56.0	46.0	33.8	31.6	N
6	3.51550	13.9	7.1	0.4	14.3	7.5	56.0	46.0	41.7	38.5	N
7	15.66300	20.6	14.3	1.0	21.6	15.3	60.0	50.0	38.4	34.7	N
8	15.92350	19.3	12.9	1.0	20.3	13.9	60.0	50.0	39.7	36.1	N
9	22.16000	21.2	16.6	1.2	22.4	17.8	60.0	50.0	37.6	32.2	N
10	24.57650	21.9	17.9	1.2	23.1	19.1	60.0	50.0	36.9	30.9	N
11	0.15240	50.7	30.4	0.3	51.0	30.7	65.9	55.9	14.9	25.2	L1
12	0.18380	50.8	48.9	0.2	51.0	49.1	64.3	54.3	13.3	5.2	L1
13	0.20856	42.9	27.4	0.2	43.1	27.6	63.3	53.3	20.2	25.7	L1
14	0.43795	37.3	28.4	0.2	37.5	28.6	57.1	47.1	19.6	18.5	L1
15	0.85359	22.0	13.6	0.3	22.3	13.9	56.0	46.0	33.7	32.1	L1
16	3.43700	11.8	4.7	0.4	12.2	5.1	56.0	46.0	43.8	40.9	L1
17	15.47950	17.8	11.9	1.0	18.8	12.9	60.0	50.0	41.2	37.1	L1
18	15.92450	14.8	8.3	1.0	15.8	9.3	60.0	50.0	44.2	40.7	L1
19	22.03550	18.6	13.8	1.2	19.8	15.0	60.0	50.0	40.2	35.0	L1
20	24.57650	20.6	18.0	1.2	21.8	19.2	60.0	50.0	38.2	30.8	L1

AC Line Conducted Emissions Test Case 4 & Modulation: ***GFSK***





AC Line Conducted Emissions Test Case 4 & Modulation: ***GFSK***

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15185	52.8	32.7	0.3	53.1	33.0	65.9	55.9	12.8	22.9	N
2	0.18531	52.8	48.3	0.2	53.0	48.5	64.2	54.2	11.2	5.7	N
3	0.44698	37.3	29.2	0.2	37.5	29.4	56.9	46.9	19.4	17.5	N
4	3.66950	17.3	6.6	0.4	17.7	7.0	56.0	46.0	38.3	39.0	N
5	15.75850	24.1	18.7	1.0	25.1	19.7	60.0	50.0	34.9	30.3	N
6	0.15621	55.2	35.4	0.3	55.5	35.7	65.7	55.7	10.2	20.0	L1
7	0.18636	52.8	48.2	0.2	53.0	48.4	64.2	54.2	11.2	5.8	L1
8	0.44836	36.9	27.5	0.2	37.1	27.7	56.9	46.9	19.8	19.2	L1
9	3.52050	15.3	7.5	0.4	15.7	7.9	56.0	46.0	40.3	38.1	L1
10	15.78150	20.7	15.8	1.0	21.7	16.8	60.0	50.0	38.3	33.2	L1

3.2.9 Antenna Requirements

- Procedure:
Describe how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

- Conclusion: Comply
→ The antenna type is a Chip antenna. The antenna is attached permanently using soldering.
(Refer to Internal photo file.)

- Minimum Standard:

> 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.

APPENDIX I

TEST EQUIPMENT FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
☒	Spectrum Analyzer	Agilent	E4440A	11/09/30	12/09/30	MY45304199
☒	Spectrum Analyzer	Rohde Schwarz	FSQ26	12/01/09	13/01/09	200445
☐	Spectrum analyzer	Agilent	E4404B	12/03/05	13/03/05	US41061134
☐	Spectrum Analyzer(RE)	H.P	8563E	11/10/04	12/10/04	3551A04634
☐	MXA Signal Analyzer	Agilent Technologies, Inc	N9020A	12/01/09	13/01/09	MY49100833
☐	Power Meter	H.P	EPM-442A	11/07/01	12/07/01	GB37170413
☐	Power Sensor	H.P	8481A	11/07/01	12/07/01	3318A96332
☐	Wideband Power Sensor	Rohde Schwarz	NRP-Z81	11/06/04	12/06/04	1137.9009.02-101001
☐	Virtual Power Meter(S/W)	Rohde Schwarz	R&S Power Viewer Plus	-	-	V 4.1.0
☐	Power Divider	Agilent	11636B	11/09/30	12/09/30	56471
☐	4-Way Power Divider	ET Industries	D-0526-4	11/12/01	12/12/01	210195001
☒	Power Splitter	Anritsu	K241B	11/09/30	12/09/30	020611
☐	Power Splitter	Anritsu	K241B	11/07/01	12/07/01	017060
☐	Power Splitters & Dividers	Aeroflex/Weinschel	1594	12/02/07	13/02/07	1177
☐	Frequency Counter	H.P	5342A	11/07/01	12/07/01	2119A04450
☐	TEMP & HUMIDITY Chamber	JISCO	KR-100/J-RHC2	11/09/30	12/09/30	30604493/021031
☐	TEMP & HUMIDITY Chamber	SJ SCIENCE	TEMI850-10	12/03/06	13/03/06	S7400LE267 1226
☒	Digital Multimeter	H.P	34401A	12/03/05	13/03/05	3146A13475, US36122178
☐	Multifunction Synthesizer	HP	8904A	11/10/06	12/10/06	3633A08404
☒	Signal Generator	Rohde Schwarz	SMR20	12/03/05	13/03/05	101251
☐	Signal Generator	H.P	ESG-3000A	11/07/01	12/07/01	US37230529
☒	Vector Signal Generator	Rohde Schwarz	SMJ100A	12/01/09	13/01/09	100148
☐	Vector Signal Generator	Rohde Schwarz	SMBV100A	12/01/09	13/01/09	255571
☐	Audio Analyzer	H.P	8903B	11/07/02	12/07/02	3011A09448
☐	Modulation Analyzer	H.P	8901B	11/07/01	12/07/01	3028A03029
☐	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	12/03/05	13/03/05	GB43461134
☐	Universal Radio communication Tester	Rohde Schwarz	CMU200	12/03/06	13/03/06	106760
☒	Bluetooth Tester	TESCOM	TC-3000B	11/07/01	12/07/01	3000B000268
☒	Thermo hygrometer	BODYCOM	BJ5478	12/01/13	13/01/13	090205-3
☐	Thermo hygrometer	BODYCOM	BJ5478	12/01/13	13/01/13	090205-2
☐	Thermo hygrometer	BODYCOM	BJ5478	12/01/13	13/01/13	090205-4
☐	AC Power supply	DAEKWANG	5KVA	12/03/05	13/03/05	20060321-1
☒	DC Power Supply	HP	6622A	12/03/05	13/03/05	3448A03760
☐	DC Power Supply	HP	6633A	12/03/05	13/03/05	3524A06634
☐	DC Power Supply	Protek	PWS-3010D	11/09/30	12/09/30	4072702
☐	DC Power Supply	SM techno	SDP30-5D	11/05/20	12/05/20	305DKA013
☐	BAND Reject Filter	Microwave Circuits	N0308372	11/09/30	12/09/30	3125-01DC0352
☐	BAND Reject Filter	Wainwright	WRCG1750	11/09/30	12/09/30	2

	Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
☐	High-Pass Filter	ANRITSU	MP526D	11/09/30	12/09/30	M27756
☐	High-pass filter	Wainwright	WHNX2.1	11/09/30	12/09/30	1
☒	High-pass filter	Wainwright	WHNX3.0	11/09/30	12/09/30	9
☐	High-pass filter	Wainwright	WHNX5.0	11/09/19	12/09/19	8
☐	High-Pass Filter	Wainwright	WHKX8.5	11/09/19	12/09/19	1
☐	High-Pass Filter	Wainwright	WHKX1.0	11/09/30	12/09/30	9
☐	Tunable Notch Filter	Wainwright	WRCT800.0 /960.0-0.2/40-8SSK	N/A	N/A	32
☐	Tunable Notch Filter	Wainwright	WRCD1700.0 /2000.0-0.2/40-10SSK	N/A	N/A	53
☐	Tunable Notch Filter	Wainwright	WRCT1900.0/ 2200.0-5/40-10SSK	N/A	N/A	30
☒	HORN ANT	ETS	3115	11/09/06	12/09/06	21097
☐	HORN ANT	ETS	3115	12/02/20	13/02/20	6419
☒	HORN ANT	A.H.Systems	SAS-574	11/03/25	13/03/25	154
☐	HORN ANT	A.H.Systems	SAS-574	11/03/25	13/03/25	155
☐	HORN ANT	SCHWARZBECK	BBHA9120A	10/04/13	12/04/13	322
☐	Dipole Antenna	Schwarzbeck	VHA9103	12/03/12	13/03/12	2116
☐	Dipole Antenna	Schwarzbeck	VHA9103	11/11/22	12/11/22	2117
☐	Dipole Antenna	Schwarzbeck	UHA9105	12/03/12	13/03/12	2261
☐	Dipole Antenna	Schwarzbeck	UHA9105	11/11/22	12/11/22	2262
☐	LOOP Antenna	ETS	6502	10/10/29	12/10/29	3471
☐	Coaxial Fixed Attenuators	Agilent	8491B	11/07/02	12/07/02	MY39260700
☒	Attenuator (3dB)	WEINSCHEL	56-3	11/09/30	12/09/30	Y2342
☐	Attenuator (3dB)	WEINSCHEL	56-3	11/09/30	12/09/30	Y2370
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	11/09/30	12/09/30	BP4386
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	12/01/09	13/01/09	BP4387
☐	Attenuator (10dB)	WEINSCHEL	86-10-11	11/09/30	12/09/30	446
☐	Attenuator (10dB)	WEINSCHEL	86-10-11	11/09/30	12/09/30	408
☐	Attenuator (20dB)	WEINSCHEL	86-20-11	11/09/30	12/09/30	432
☐	Attenuator (30dB)	JFW	50FH-030-300	12/03/05	13/03/05	060320-1
☐	Attenuator (40dB)	WEINSCHEL	57-40-33	11/09/30	12/09/30	NN837
☐	Termination	H.P	HP-909D	11/07/02	12/07/02	02750
☐	Termination	H.P	HP-909D	11/07/02	12/07/02	02702
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0088CAN	11/07/01	12/07/01	788
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0185CAN	11/07/01	12/07/01	790
☒	Amplifier (30dB)	Agilent	8449B	12/03/05	13/03/05	3008A01590
☐	Amplifier (30dB)	H.P	8449B	12/03/05	13/03/05	3008A00370
☐	Amplifier	EMPOWER	BBS3Q7ELU	11/09/30	12/09/30	1020
☐	RF Power Amplifier	OPHIRRF	5069F	11/07/01	12/07/01	1006
☒	EMI TEST RECEIVER	R&S	ESU	12/01/09	13/01/09	100014

	Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
☒	BILOG ANTENNA	SCHAFFNER	CBL6112B	10/07/14	12/07/14	2737
☒	Amplifier (22dB)	H.P	8447E	12/01/09	13/01/09	2945A02865
☐	EMI TEST RECEIVER	R&S	ESCI	12/03/06	13/03/06	100364
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	10/11/29	12/11/29	91032789
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A1	10/11/29	12/11/29	1098
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	10/12/21	12/12/21	91031946
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A1	10/07/07	12/07/07	0590
☐	Low Noise Pre Amplifier	TSJ	MLA-100K01-B01-2	12/03/05	13/03/05	1252741
☐	Low Noise Pre Amplifier	TSJ	MLA-00108-B02-36	12/01/09	13/01/09	1518831
☐	Amplifier (25dB)	Agilent	8447D	12/03/05	13/03/05	2944A10700
☐	Amplifier (25dB)	Agilent	8447D	11/07/01	12/07/01	2648A04922
☒	Spectrum Analyzer(CE)	H.P	8591E	12/03/05	13/03/05	3649A05889
☒	LISN	Kyoritsu	KNW-407	12/01/09	13/01/09	8-317-8
☒	LISN	Kyoritsu	KNW-242	11/07/02	12/07/02	8-654-15
☒	CVCF	NF Electronic	4420	11/09/15	12/09/15	304935/4420023
☒	50 ohm Terminator	HME	CT-01	12/01/09	13/01/09	N/A
☒	RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	11/07/02	12/07/02	4N-170-3
☒	EMI Test Receiver	R&S	ECSI	12/03/05	13/03/05	100364
☒	LISN	R&S	ESH2-Z5	11/09/30	12/09/30	8287391006
☒	CVCF	NF Electronic	4420	12/03/05	13/03/05	304935/337980
☒	RFI/FIELD Intensity Meter	ES4152	424059	11/09/30	12/09/30	424059
☐	Wideband Radio Communication Tester	R&S	CMW500	11/09/30	12/09/30	100989