RF TEST REPORT

Test item	:	Handheld Terminal
Model No.	:	D3-POS
Order No.	:	1006-00266
Date of receipt	:	2010-06-21
Test duration	:	2010-08-03 ~ 2010-08-24
Date of issue	:	2010-09-14
Use of report	:	FCC Original Grant

Applicant : Partner Tech Corporation
10F, No. 233-2, Pao Chiao Road, Shin Tien, Taipei, Taiwan

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 ANSI C63.4-2003
Test environment	:	See appended test report
Test result	:	☒ Pass ☐ Fail

Tested by:	Witnessed by:	Reviewed by:
Engineer D.C. Cha	N/A	Manager W.J. Lee

CONTENTS

1. Equipment information

1.1 Equipment description

FCC Equipment Class	Part 15 Spread Spectrum Transmitter (DSS)
Equipment type	Handheld Terminal
Equipment model name	D3-POS
Equipment add model name	MF-2350
Equipment serial no.	Identical prototype
Frequency band	2402 ~ 2480 MHz
Spread Spectrum	Frequency Hopping
Modulation type	GFSK
Transmission rate	1Mbps
Channel Spacing	1.0 MHz
Antenna type	Internal Type: Chip Antenna (Max. Peak Gain: 2.1 dBi)
Power Supply	Li-ion polymer Battery: DC 7.4 V AC-DC Adaptor: AC 120 V 60 Hz

1.2 Ancillary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
Cradle	Cradle	AT10CIG00102	㈜ ATID	-
Adaptor	KSAH0950300T1M2	N/A	Kuan tech(Shenzhen) Co., Ltd.	-

2. Information about test items

2.1 Test mode & EUT Position

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

Test Case 1	EUT
Test Case 2	EUT + Adaptor
Test Case 3	EUT + Cradle + Adaptor

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	:	23 ~ 26 °C
Relative humidity content	:	28 ~ 49 % R.H.
Details of power supply	:	Battery: DC 7.4 V AC-DC Adaptor: AC 120V 60Hz

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing

→ The manufacturer carried out modifications to the EUT in order to meet the requirements of the standard applied.

1. Below ferrites fitted to adapter cable.(refer to external photo.)
   - HFA187102-0A2
   - LFB259128-000

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. Test Items				
15.247(a)	Carrier Frequency Separation	>= 20dB BW or >= Two-Thirds of the 20dB BW	Conducted	C Note. 2
	Number of Hopping Frequencies	>= 15 hops		C Note. 2
	20 dB Bandwidth	None		C Note. 2
	Dwell Time	=< 0.4 seconds		C Note. 2
15.247(b)	Transmitter Output Power	=< 1Watt , if CHs >= 75 Others =<0.125W		C Note. 2
15.247(c)	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 Note. 2
	Conducted Spurious Emissions			C Note. 2
15.205 15.209	Radiated Spurious Emissions	FCC 15.209 Limits	Radiated	C Note. 3
15.207	AC Conducted Emissions	EN 55022	AC Line Conducted	C Note. 4
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 at only test case 1.

Note 3: This test item was performed in all test cases. And the worst test results were reported.

Note 4: This test item was performed in test cases 2, 3. And the worst test results 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

- 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

VBW = ≥ RBW

Trace = max hold

Sweep = auto

Detector function = peak

- Measurement Data: Comply

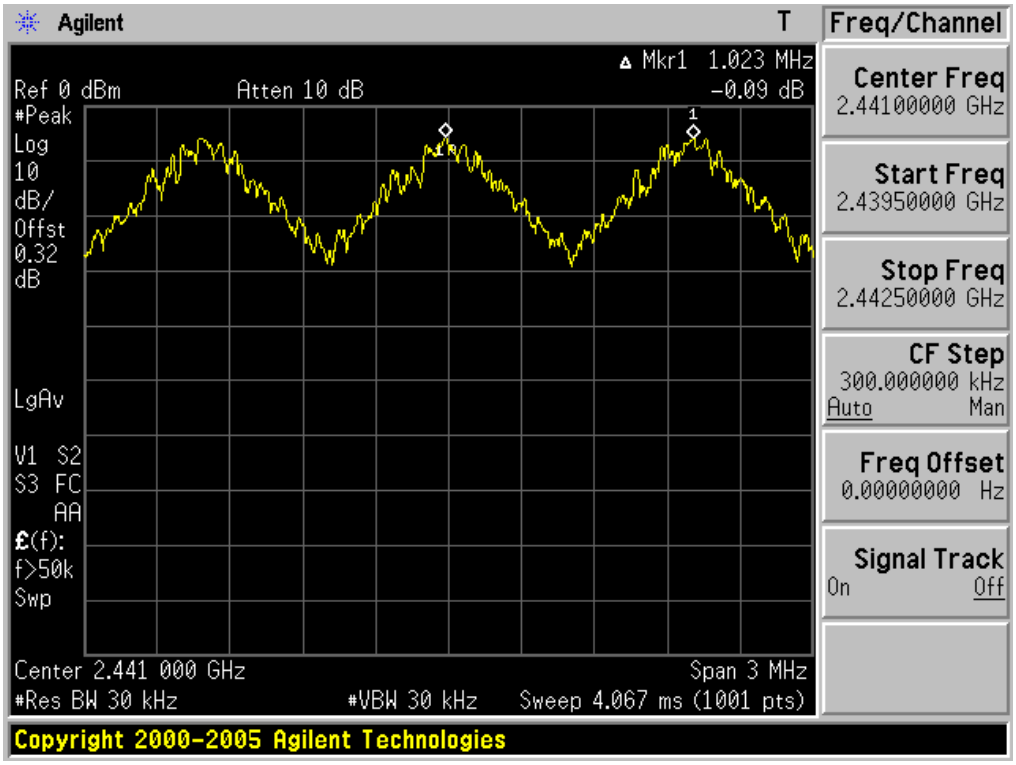
Hopping Mode	Test Mode	Peak of center channel (MHz)	Peak of adjacent Channel (MHz)	Test Result (MHz)
Enable	**1Mbps**	**2440.985**	**2442.008**	**1.023**

See next page for actual measured spectrum plot.

- **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



3.2.2 Number of Hopping Frequencies

- 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 = 25 MHz
Plot 1: Start Frequency = 2389.5 MHz, Stop Frequency = 2414.5 MHz
Plot 2: Start Frequency = 2414.5 MHz, Stop Frequency = 2439.5 MHz
Plot 3: Start Frequency = 2439.5 MHz, Stop Frequency = 2464.5 MHz
Plot 4: Start Frequency = 2464.5 MHz, 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**

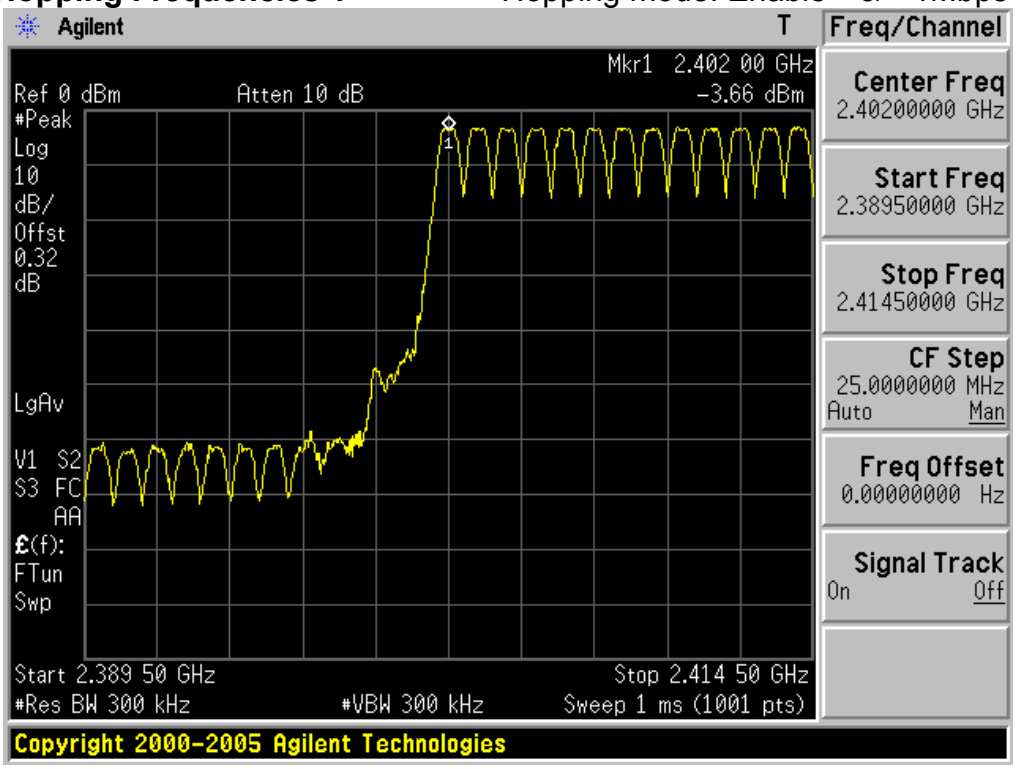
Hopping mode	Test mode	Test Result (Total Hops)
Enable	**Data rate: 1Mbps**	**79**

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

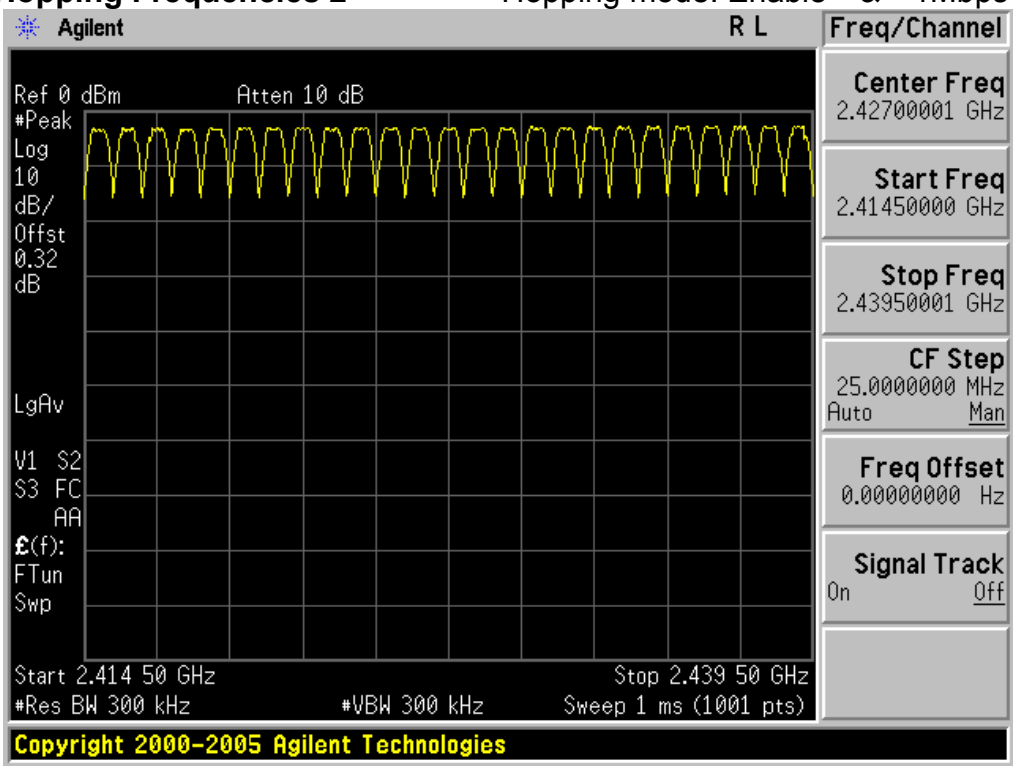
- Minimum Standard:

At least 15 hopes

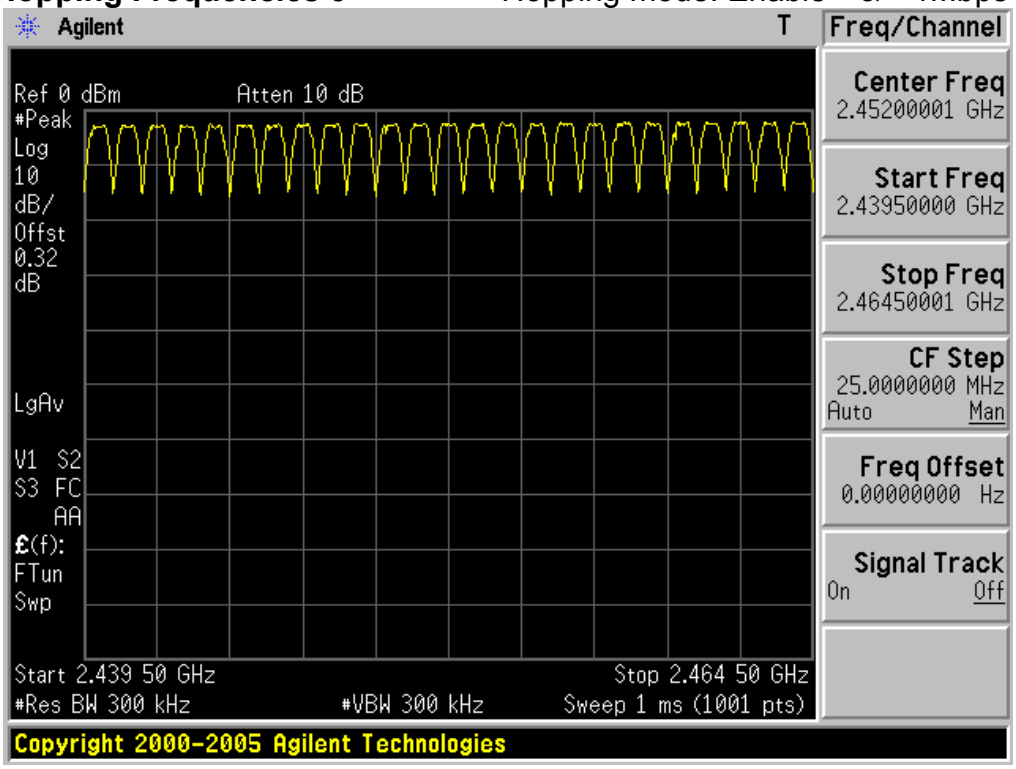
Number of Hopping Frequencies 1 Hopping mode: Enable & 1Mbps



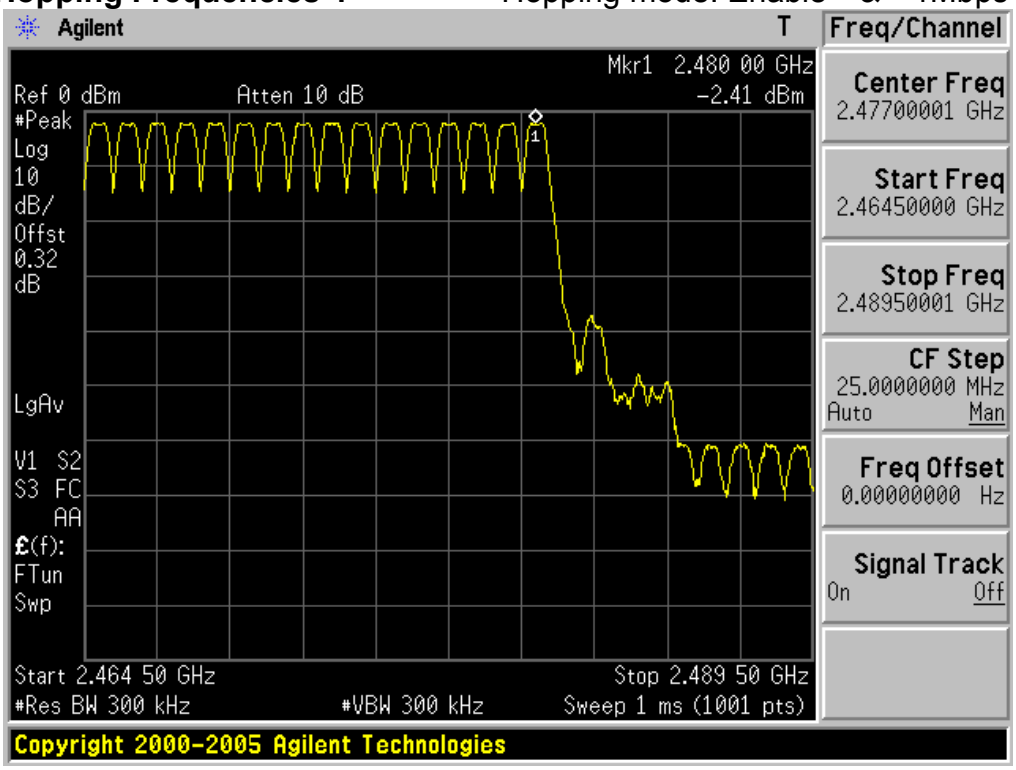
Number of Hopping Frequencies 2 Hopping mode: Enable & 1Mbps



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



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



3.2.3 20 dB Bandwidth

- 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 20 dB bandwidth or more

VBW = ≥ RBW

Trace = max hold

Sweep = auto

Detector function = peak

- Measurement Data: Comply

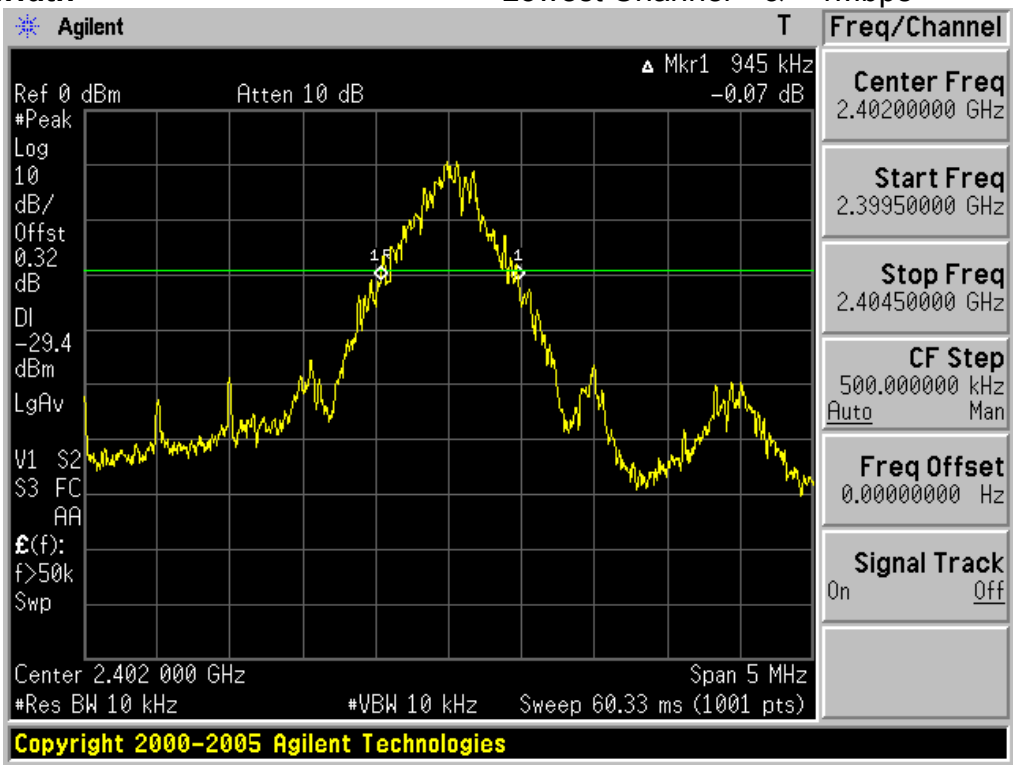
Hopping mode	Test mode	Tested Channel	Test Results (MHz)
Disable	Date rate: 1Mbps	Lowest	0.945
		Middle	0.940
		Highest	0.940

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

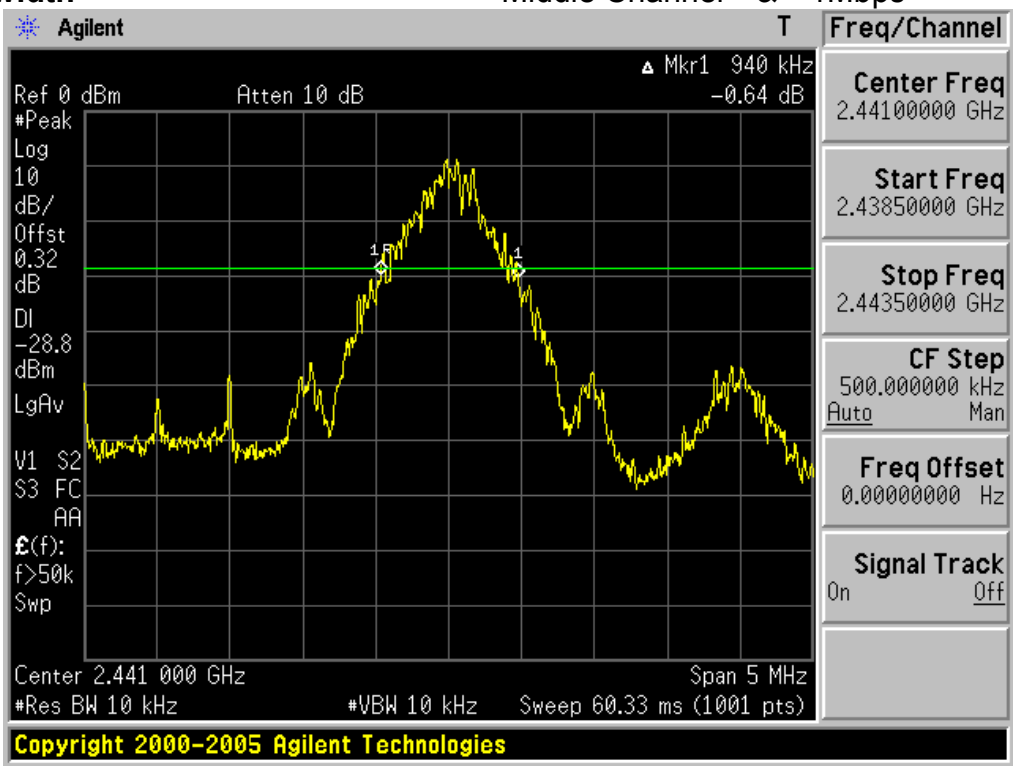
- Minimum Standard:

None

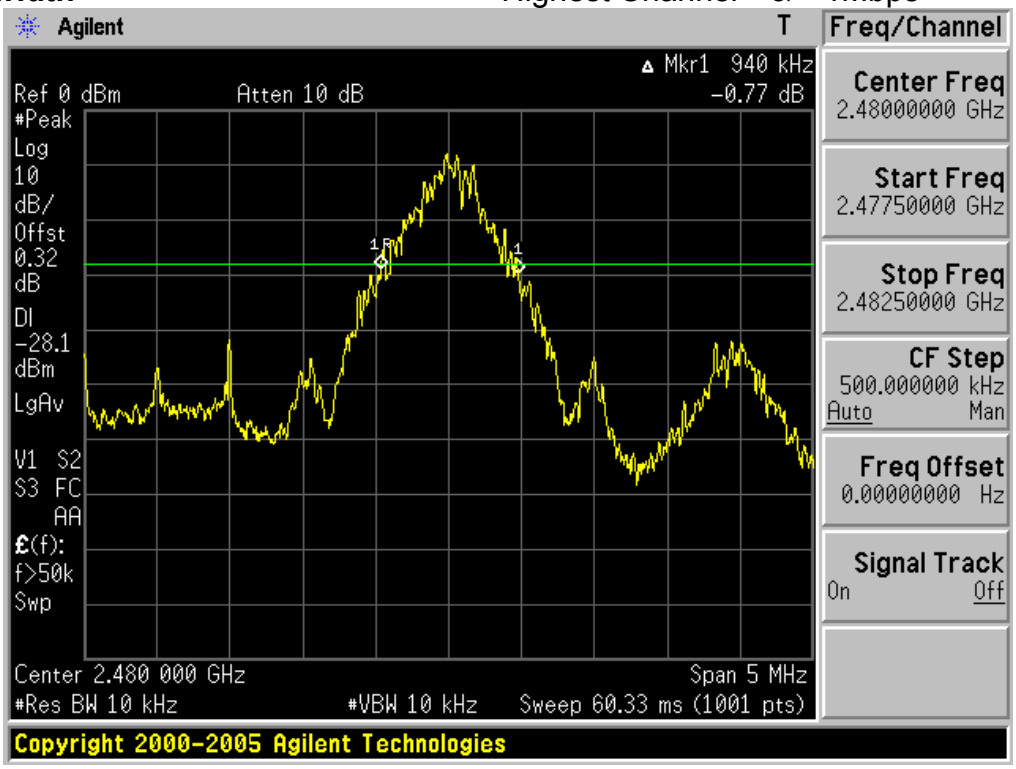
20dB Bandwidth Lowest Channel & 1Mbps



20dB Bandwidth Middle Channel & 1Mbps



20dB Bandwidth Highest Channel & 1Mbps



3.2.4 Time of Occupancy (Dwell Time)

- 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	**Data Rate: 1Mbps**	**DH 5**	**2.895**	**3.750**	**79**	**0.3088**

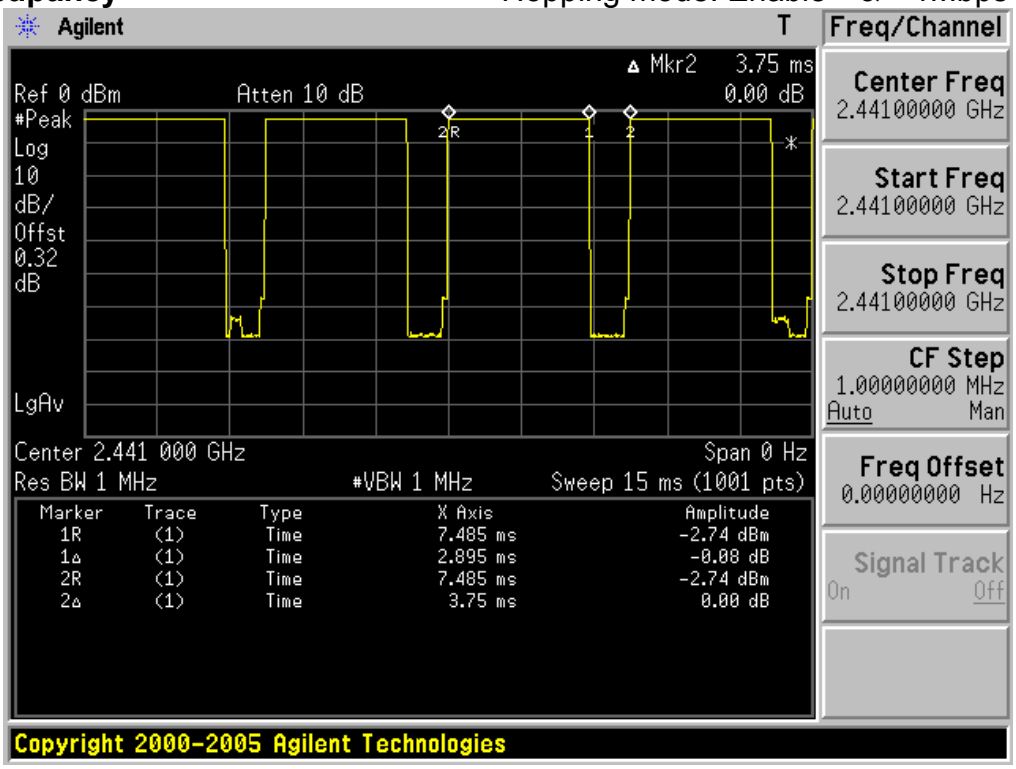
Note 1: Each new transmission event begins on the next channel in the hopping sequence after the final channel used in the previous transmission event.
DWELL TIME=(0.4 x Number of hopping Channels) x Burst On time / (period x Number of hopping Channels)

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



3.2.5 Peak Output Power

- 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 5 times of the 20 dB bandwidth
RBW = greater than the 20 dB bandwidth of the emission being measured
VBW = ≥ RBW Detector function = peak
Trace = max hold Sweep = auto

- **Measurement Data: Comply**

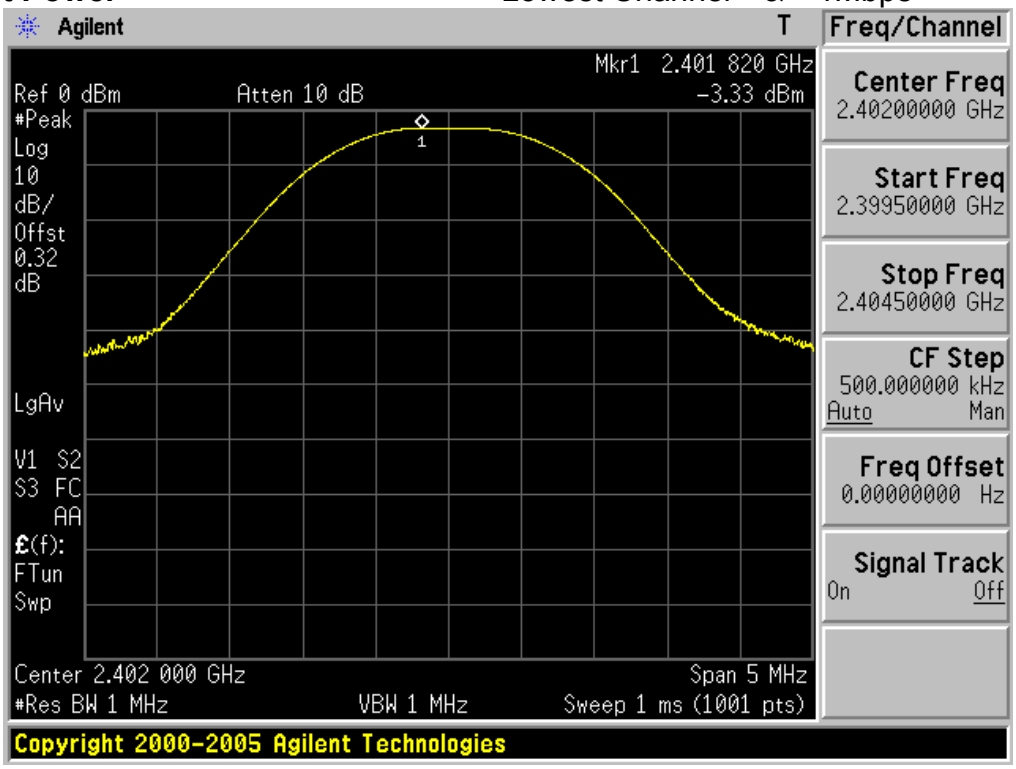
Hopping mode	Test mode	Tested Channel	Test Results	
			dBm	mW
Disable	Data rate: 1Mbps	Lowest	-3.33	0.465
		Middle	-2.71	0.536
		Highest	**-2.14**	**0.611**

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

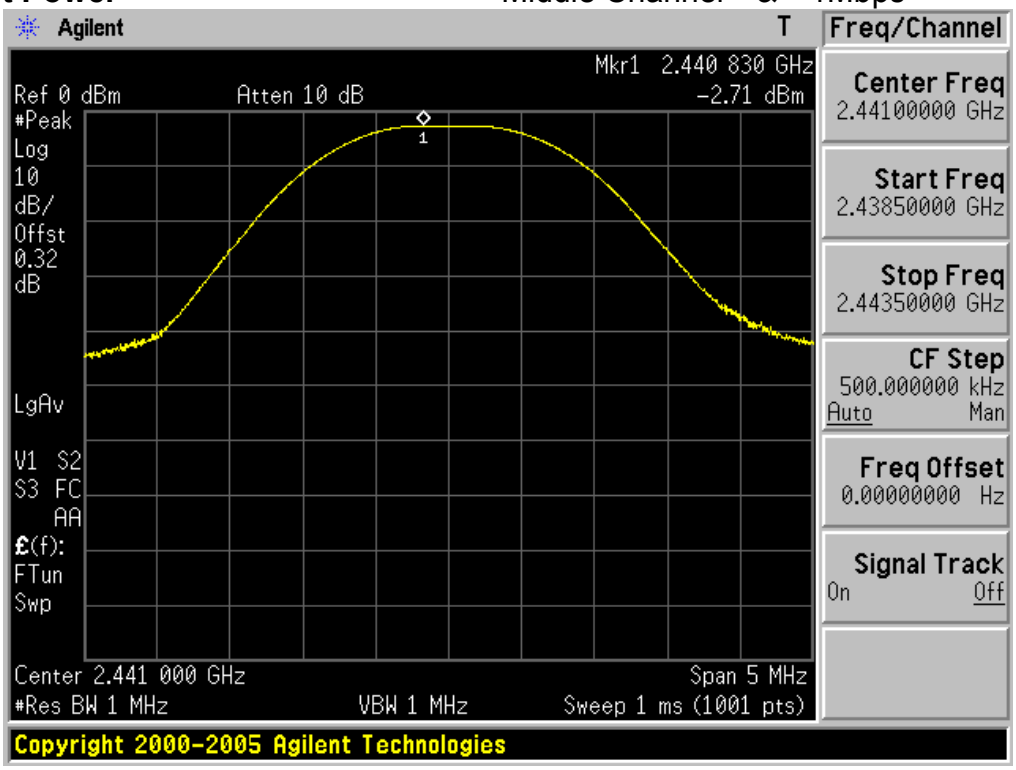
- Minimum Standard:

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**

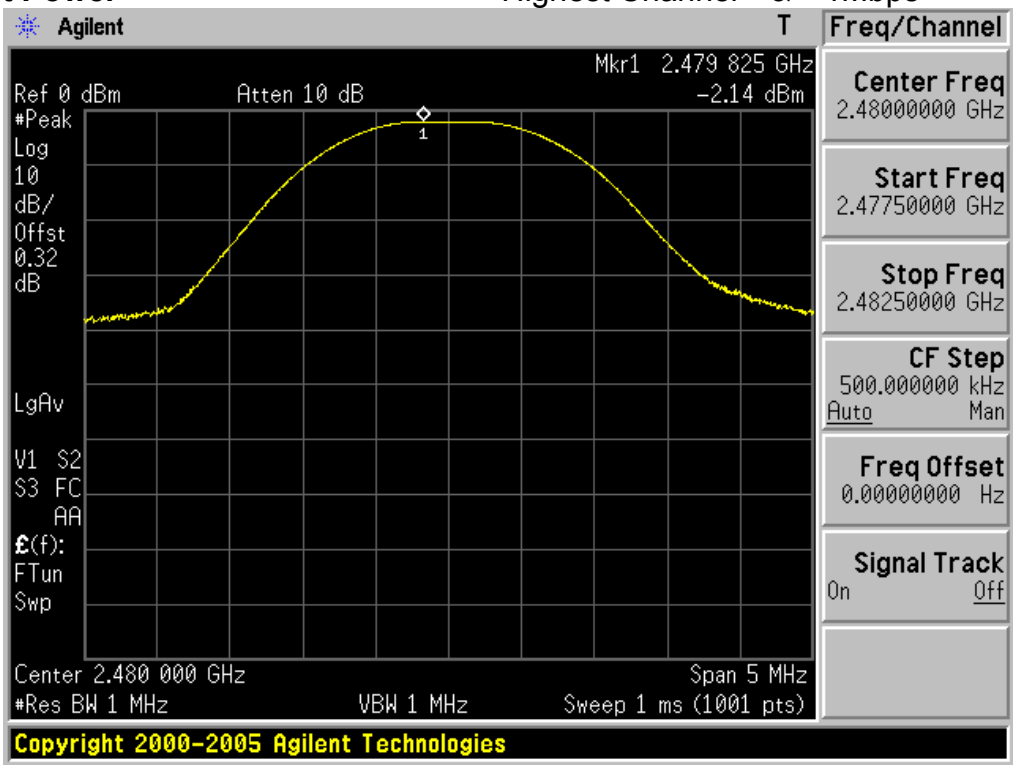
Peak Output Power Lowest Channel & 1Mbps



Peak Output Power Middle Channel & 1Mbps



Peak Output Power Highest Channel & 1Mbps



3.2.6 Conducted Spurious Emissions

- 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 = 2400 MHz, 2483.5 MHz

Span = 10 MHz 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

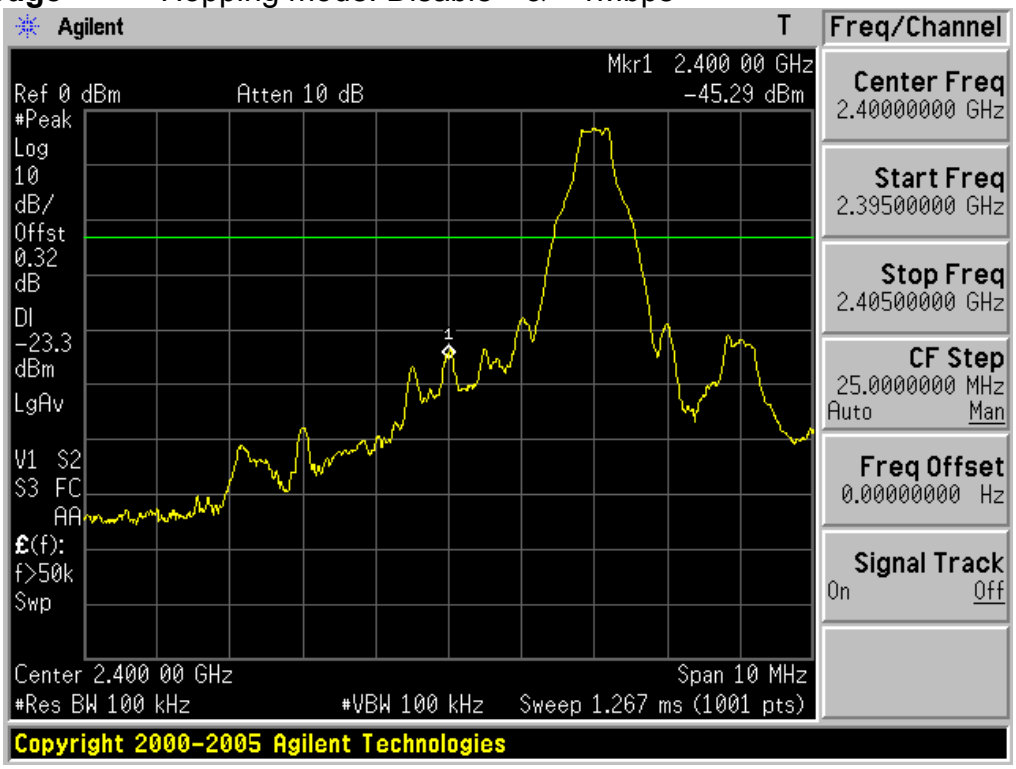
- Measurement Data: Comply

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

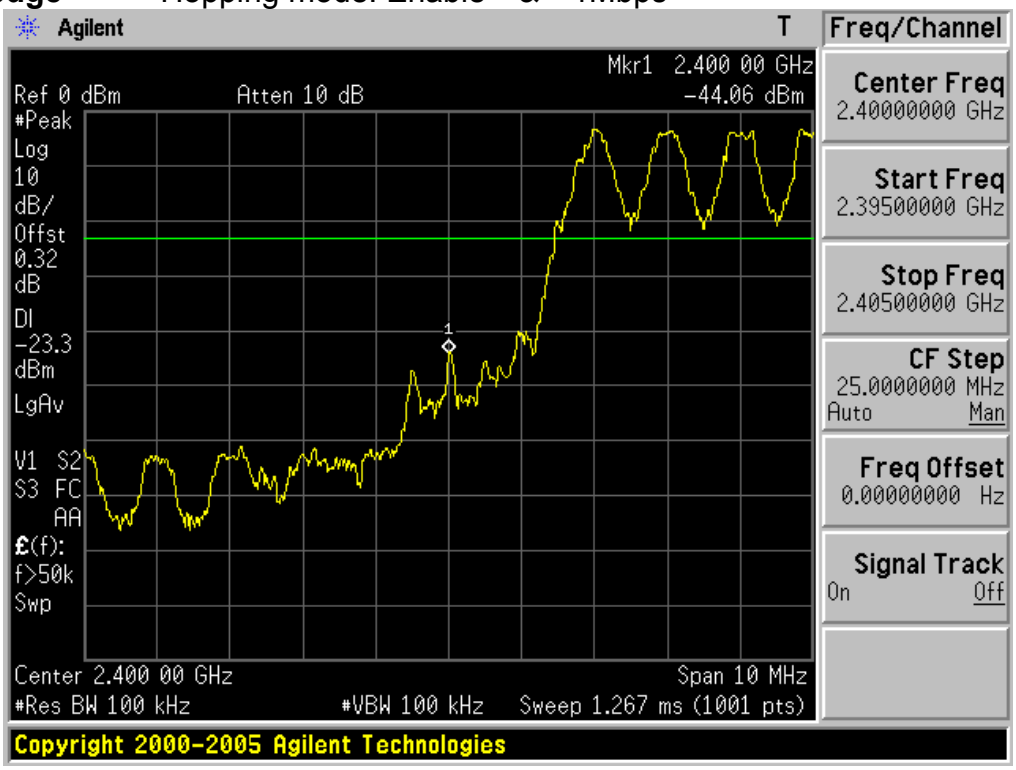
- **Minimum Standard:**

Minimum Standard:	> 20 dBc

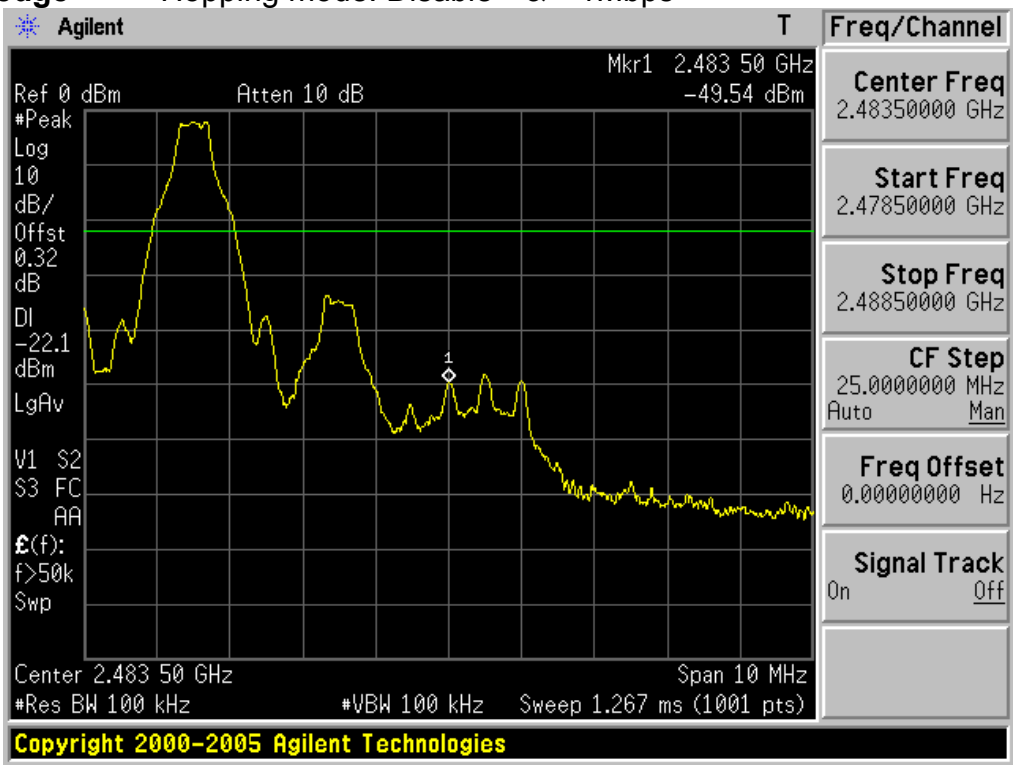
Low Band-edge Hopping mode: Disable & 1Mbps



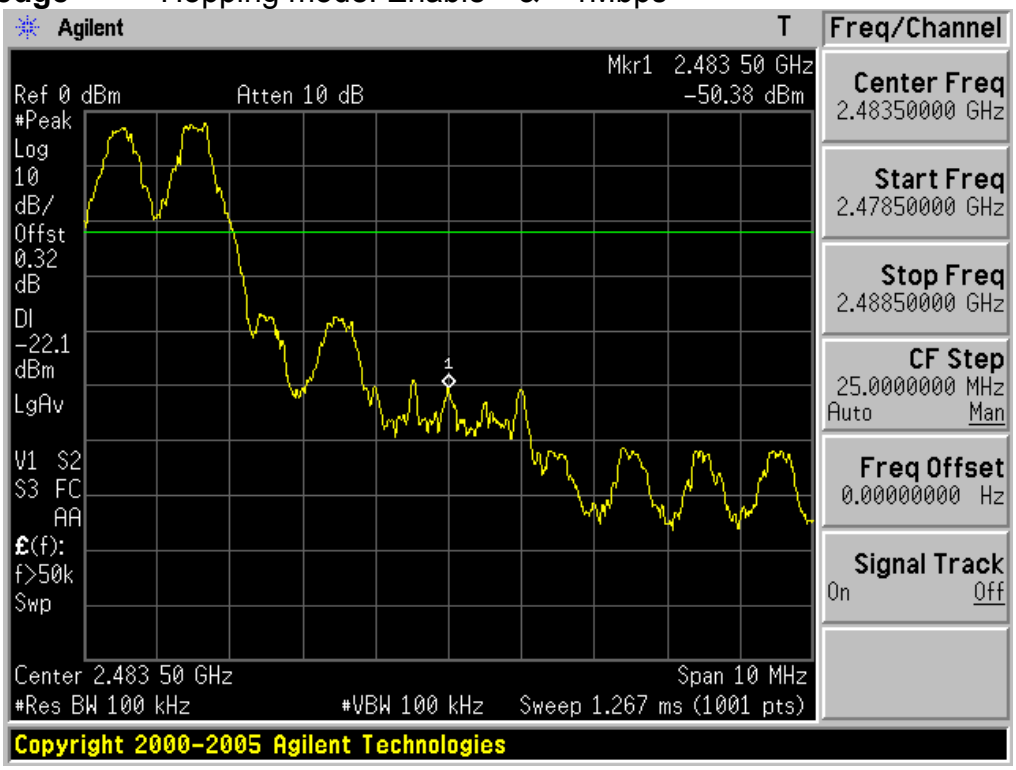
Low Band-edge Hopping mode: Enable & 1Mbps



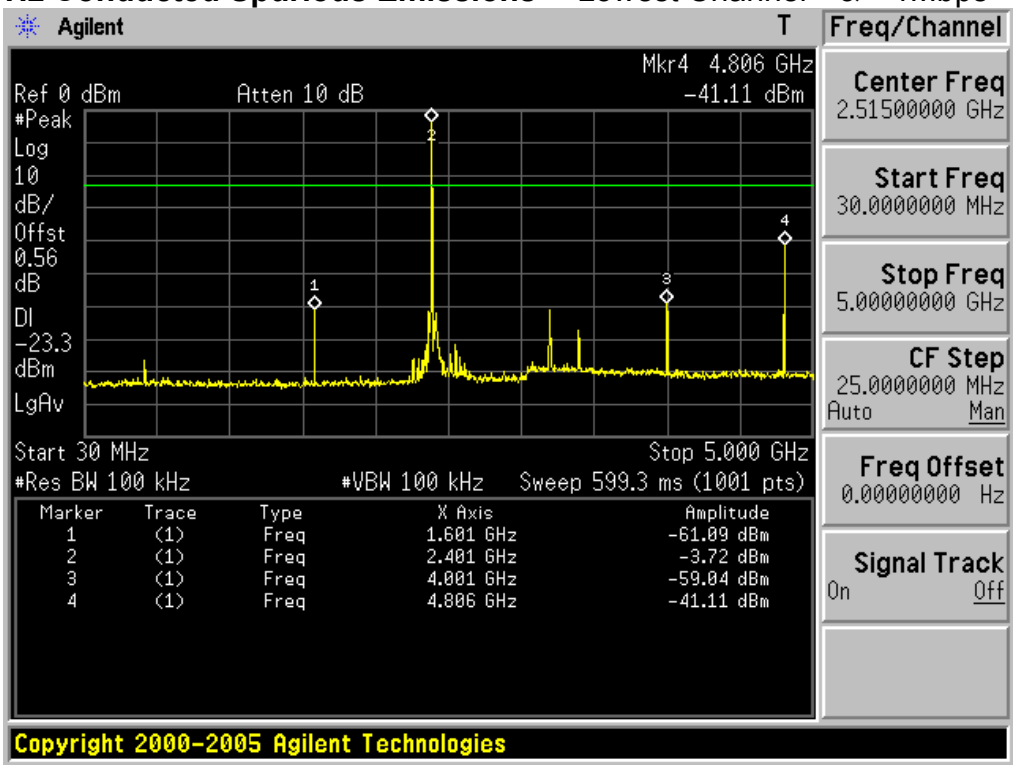
High Band-edge Hopping mode: Disable & 1Mbps



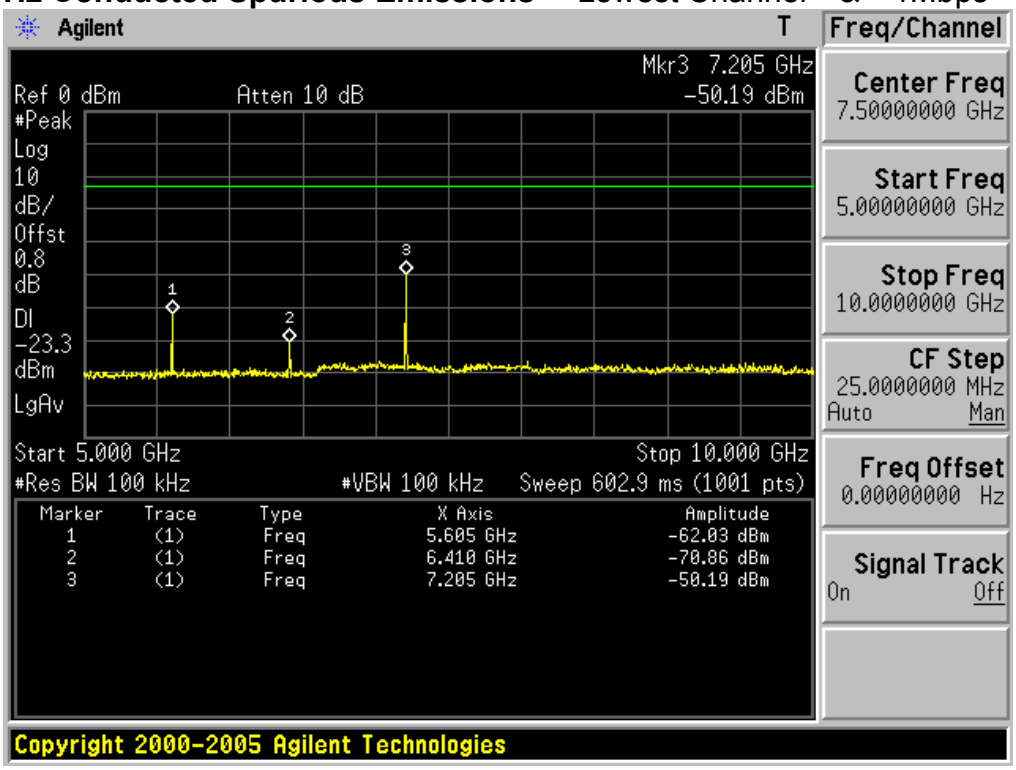
High Band-edge Hopping mode: Enable & 1Mbps



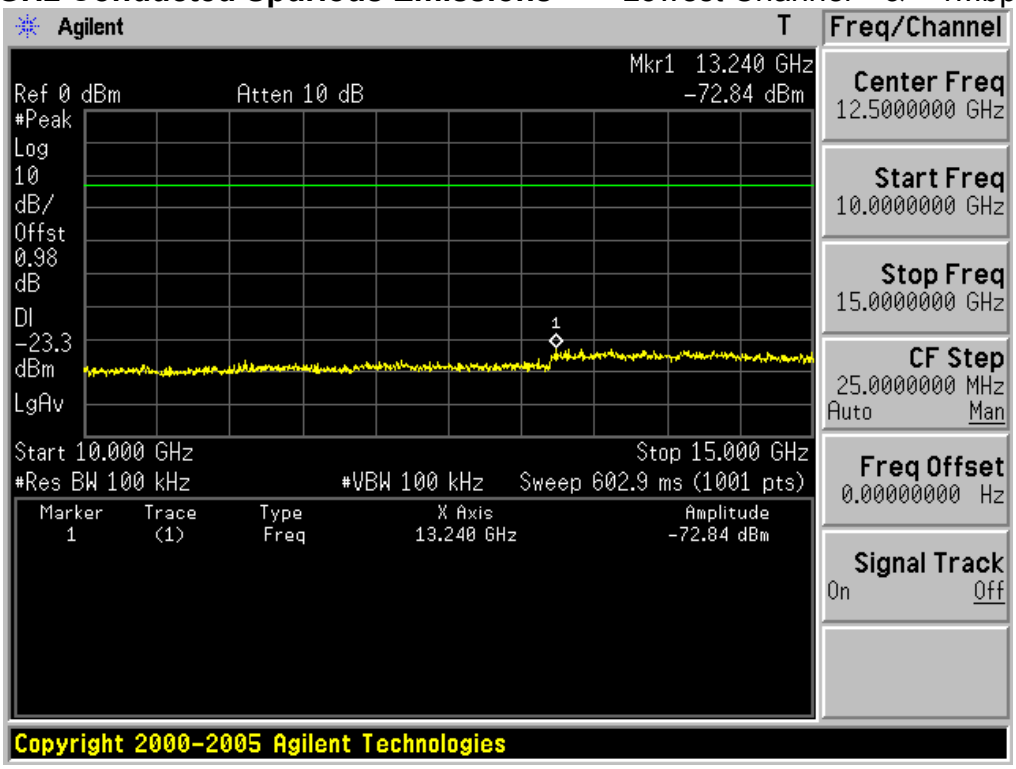
30MHz ~ 5GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



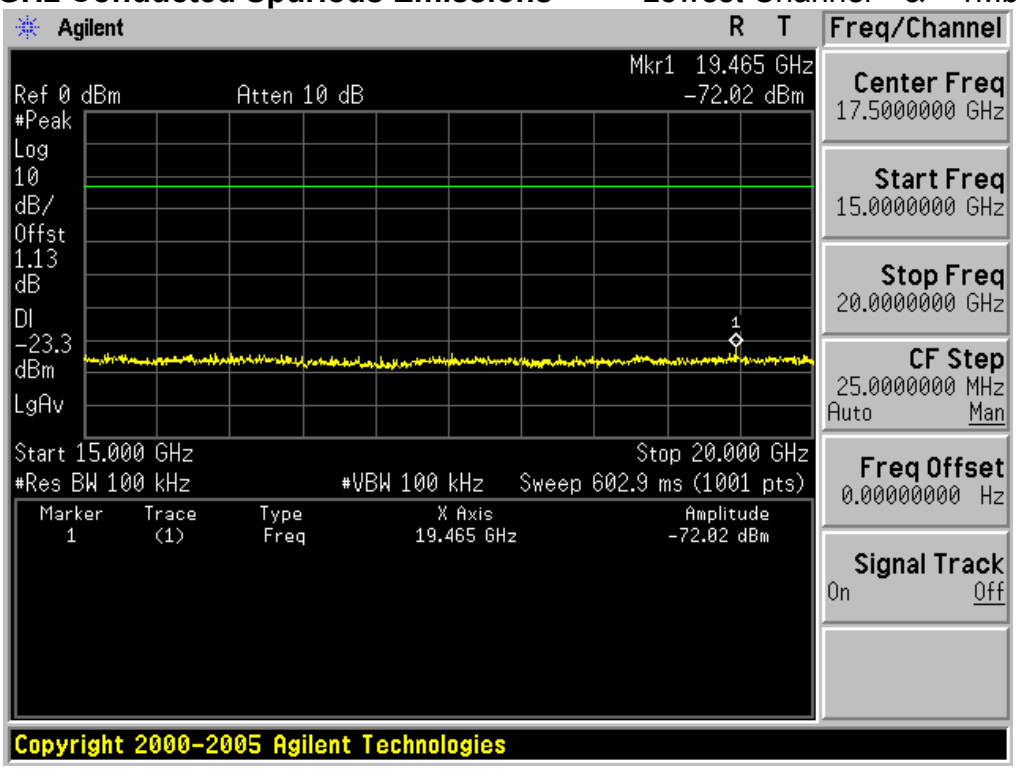
5GHz ~ 10GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



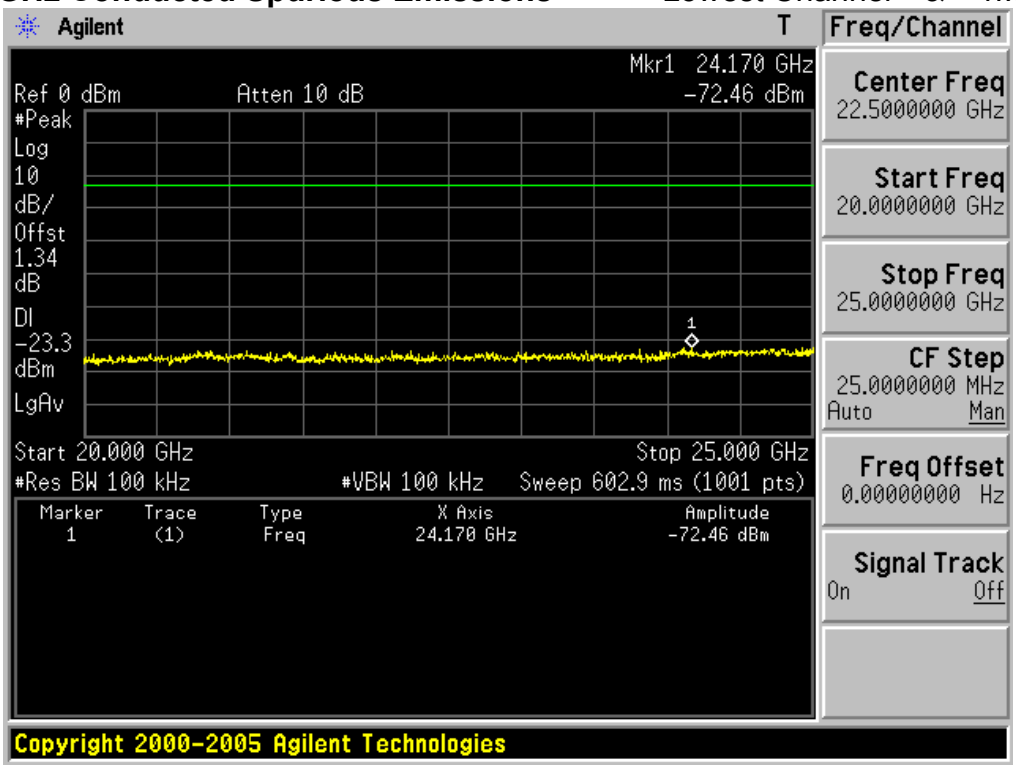
10GHz ~ 15GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



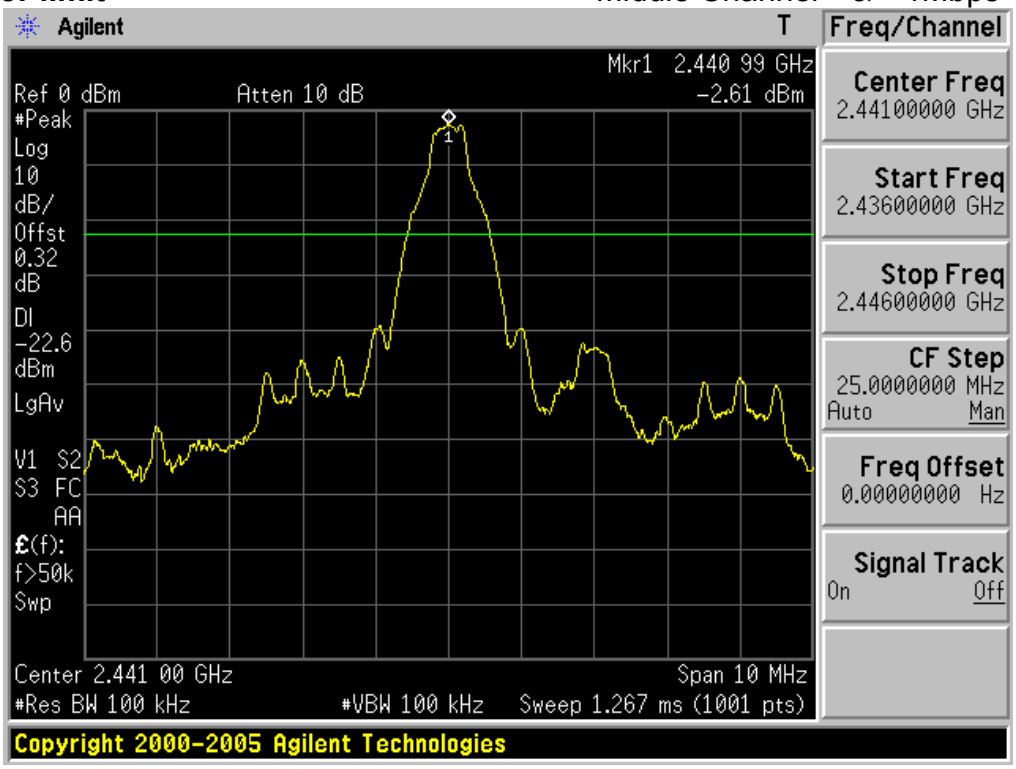
15GHz ~ 20GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



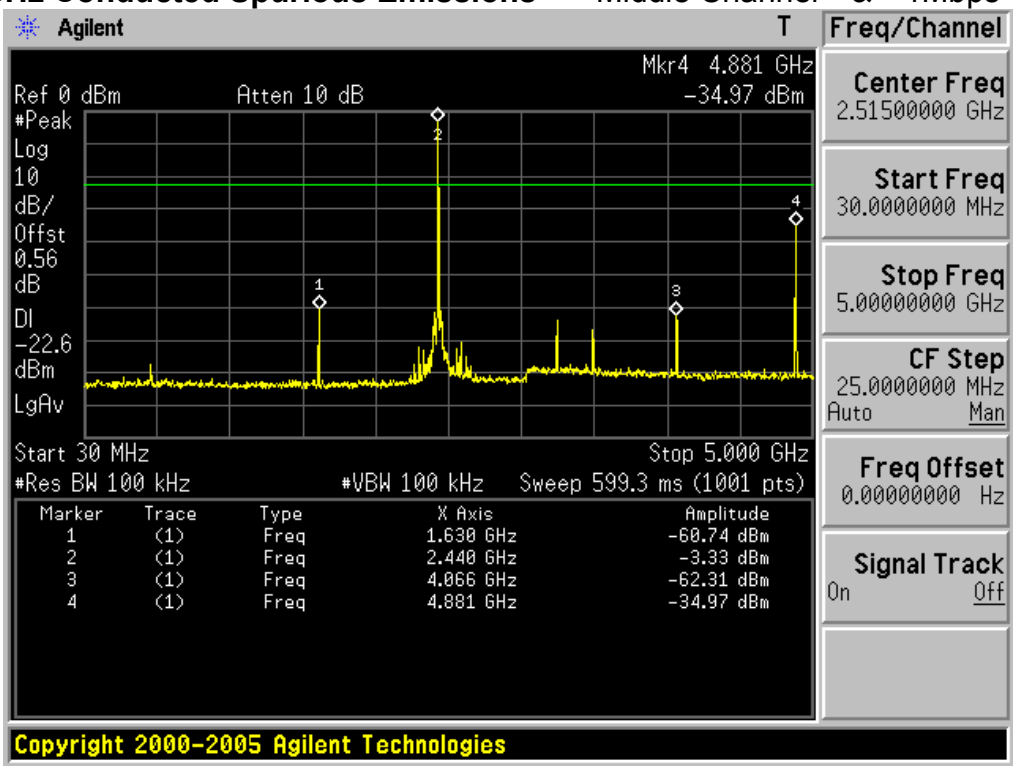
20GHz ~ 25GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



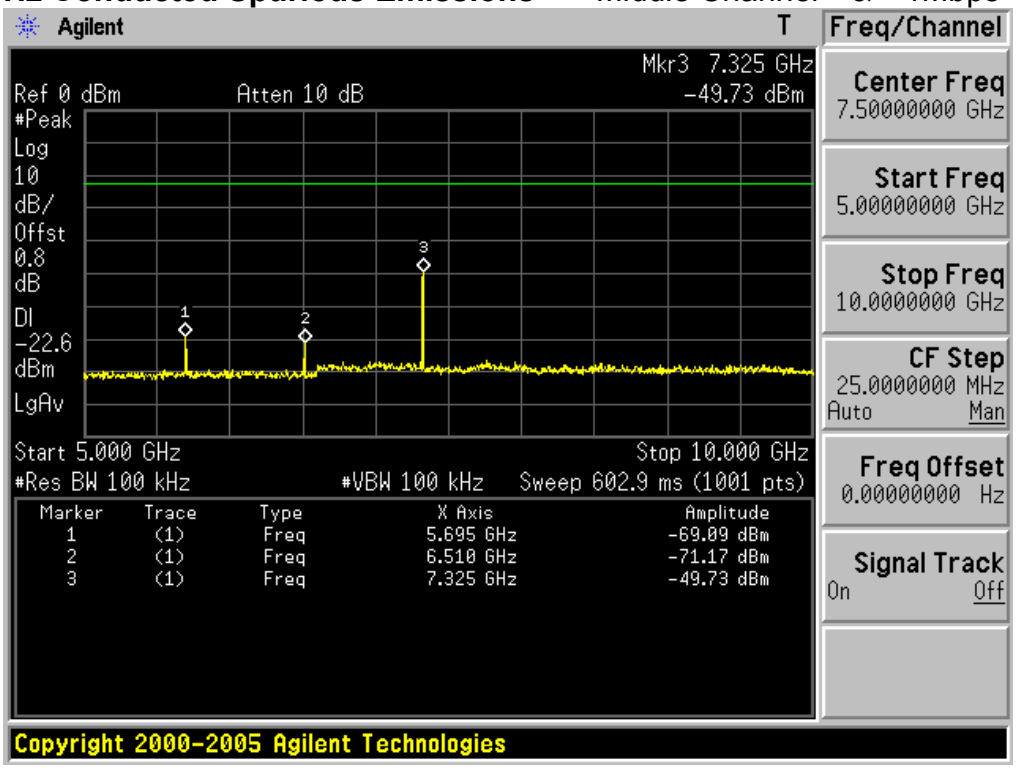
Reference for limit Middle Channel & 1Mbps



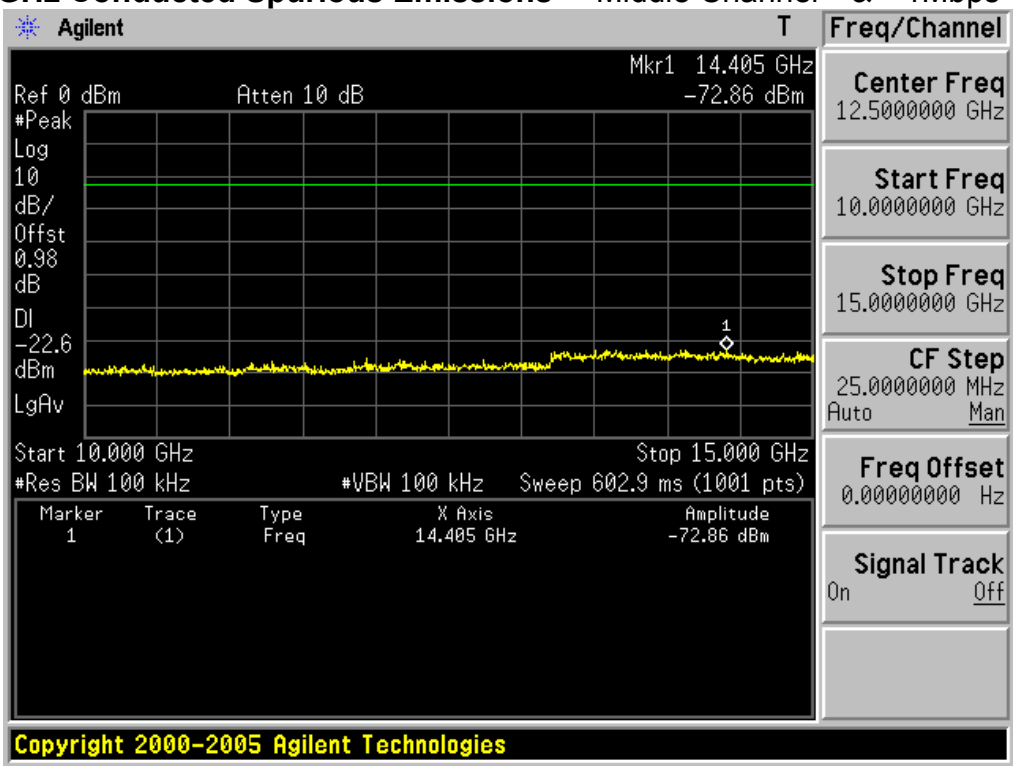
30MHz ~ 5GHz Conducted Spurious Emissions Middle Channel & 1Mbps



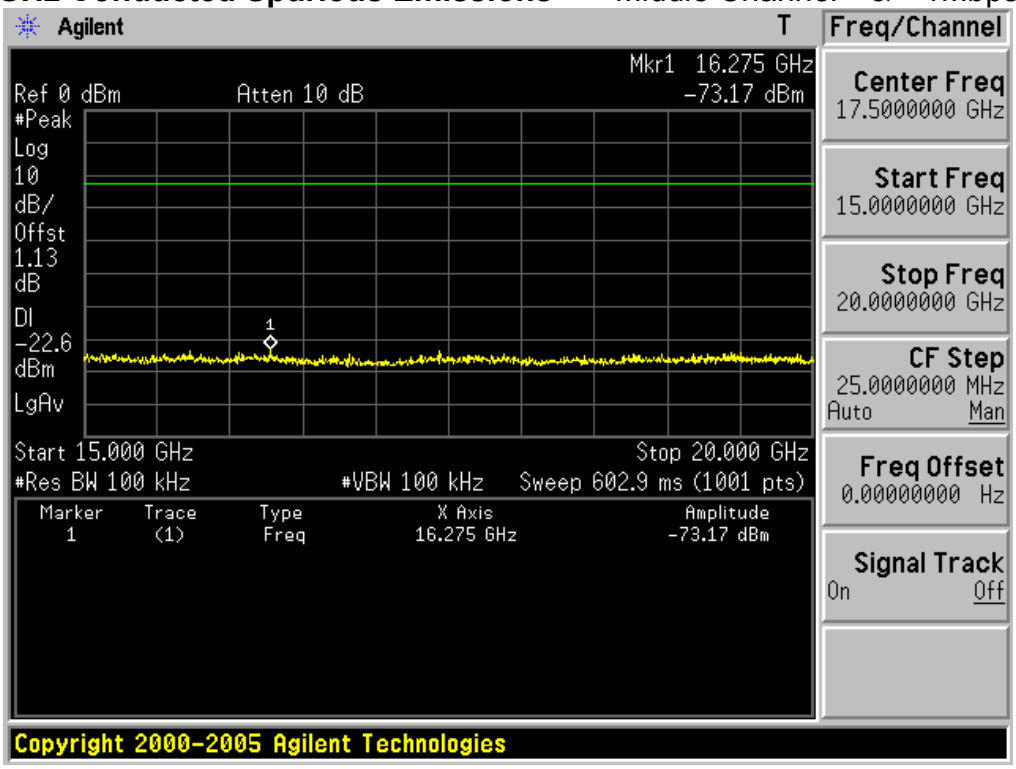
5GHz ~ 10GHz Conducted Spurious Emissions Middle Channel & 1Mbps



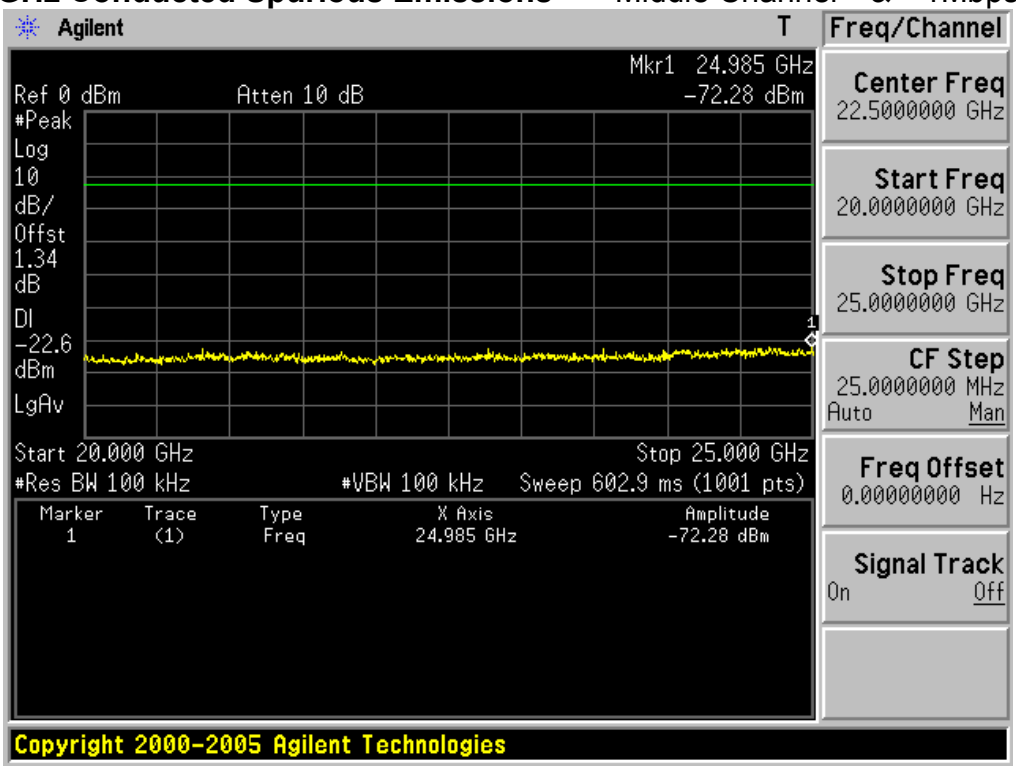
10GHz ~ 15GHz Conducted Spurious Emissions Middle Channel & 1Mbps



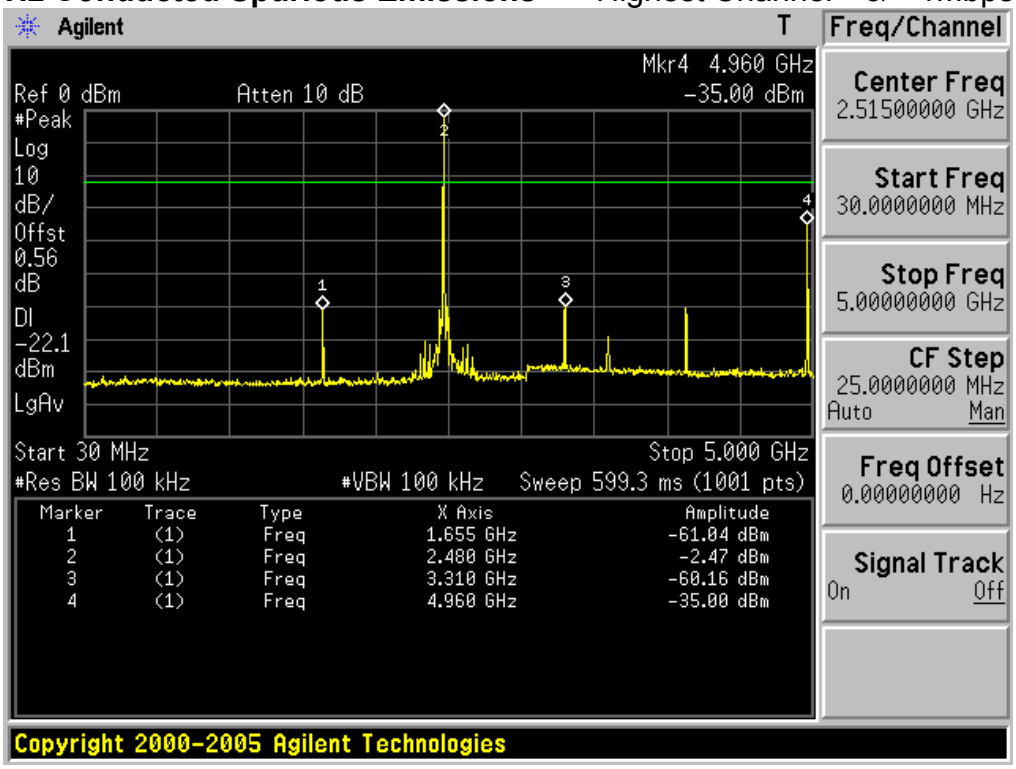
15GHz ~ 20GHz Conducted Spurious Emissions Middle Channel & 1Mbps



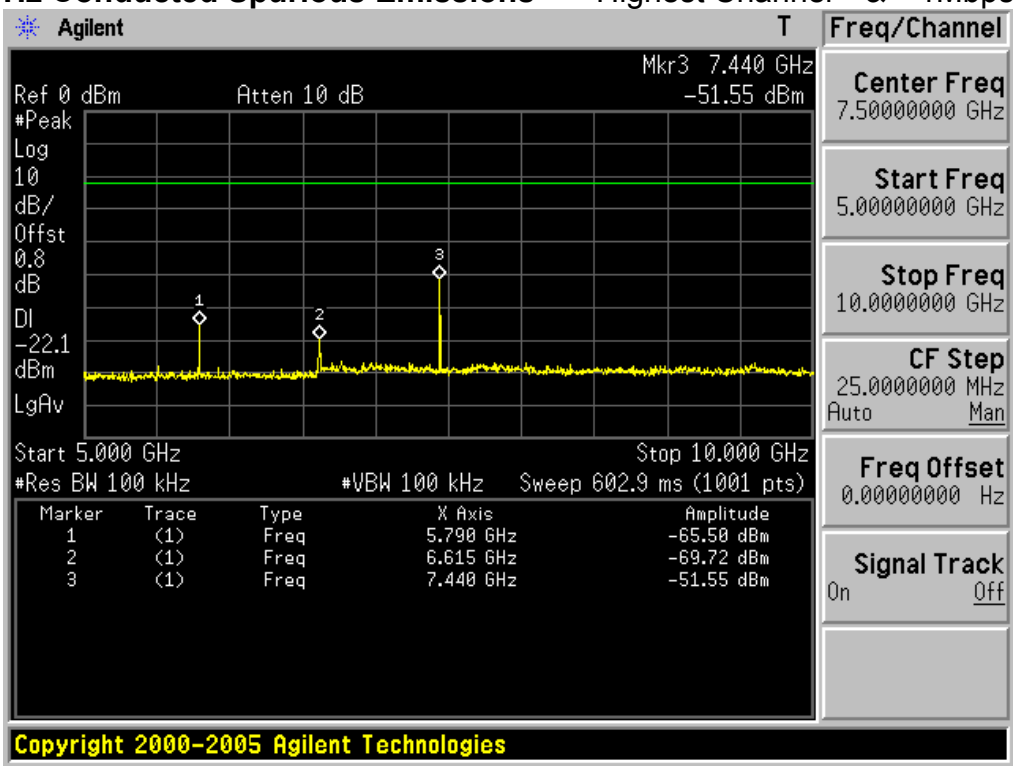
20GHz ~ 25GHz Conducted Spurious Emissions Middle Channel & 1Mbps



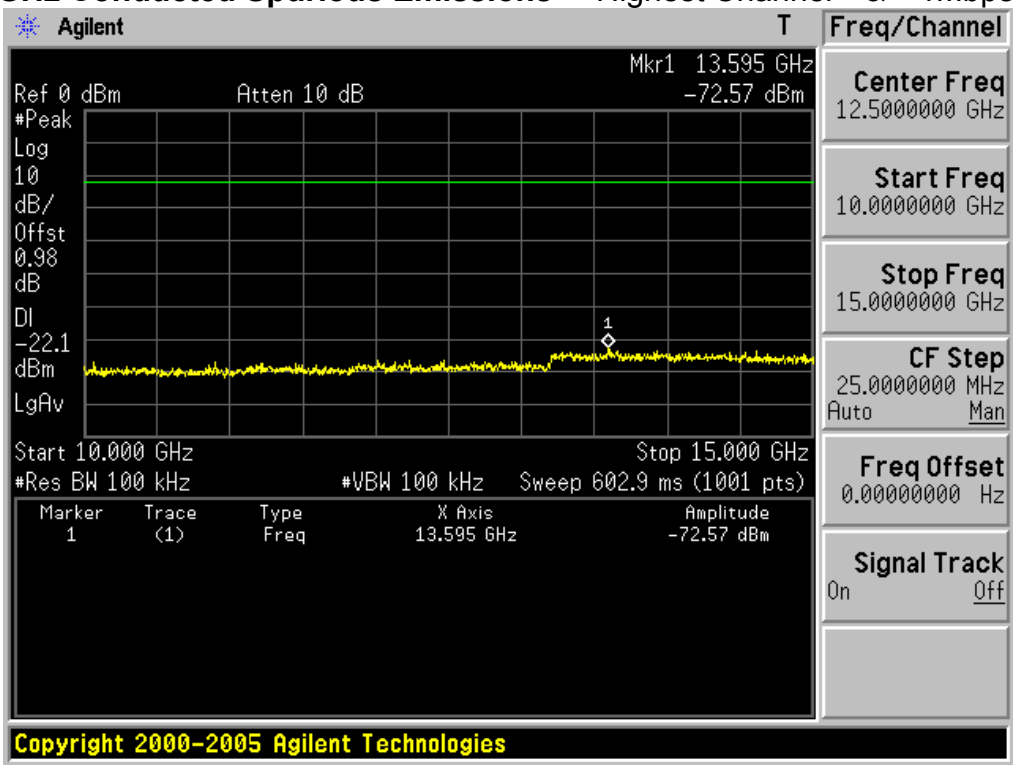
30MHz ~ 5GHz Conducted Spurious Emissions Highest Channel & 1Mbps



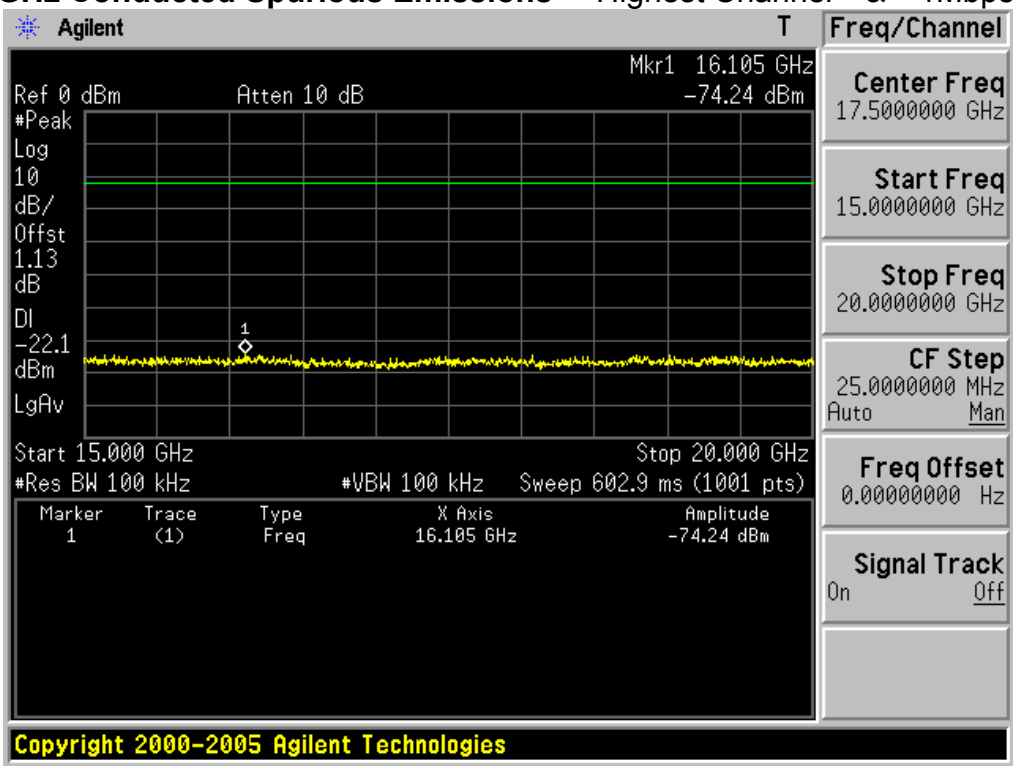
5GHz ~ 10GHz Conducted Spurious Emissions Highest Channel & 1Mbps



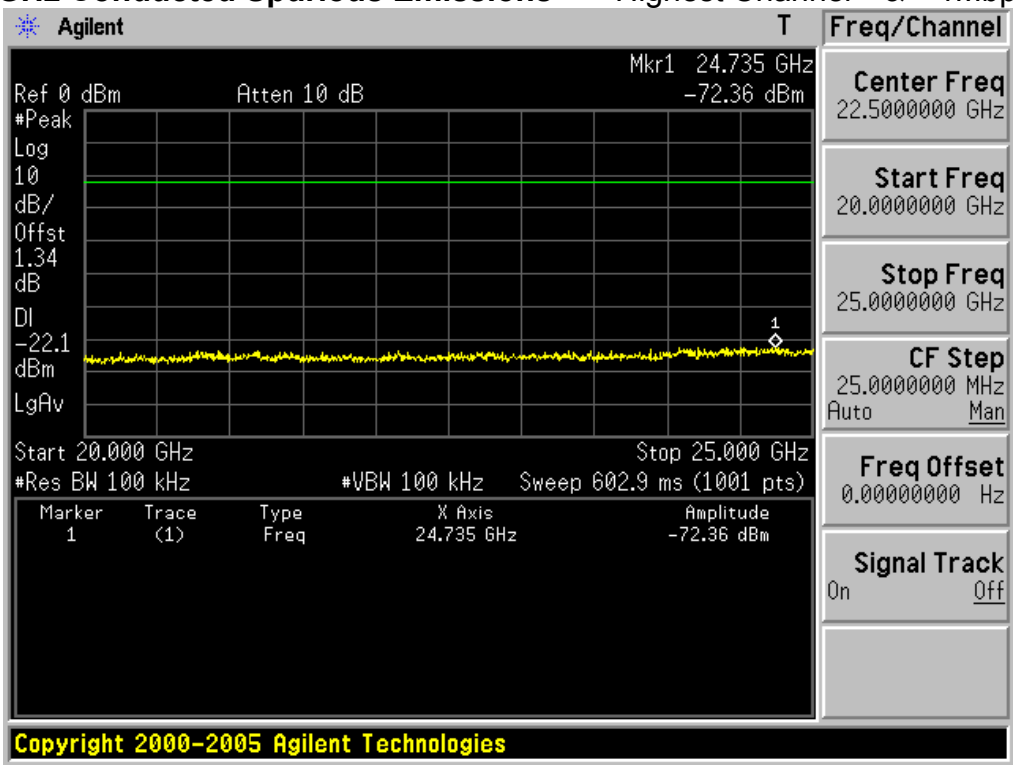
10GHz ~ 15GHz Conducted Spurious Emissions Highest Channel & 1Mbps



15GHz ~ 20GHz Conducted Spurious Emissions Highest Channel & 1Mbps



20GHz ~ 25GHz Conducted Spurious Emissions Highest Channel & 1Mbps



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

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.

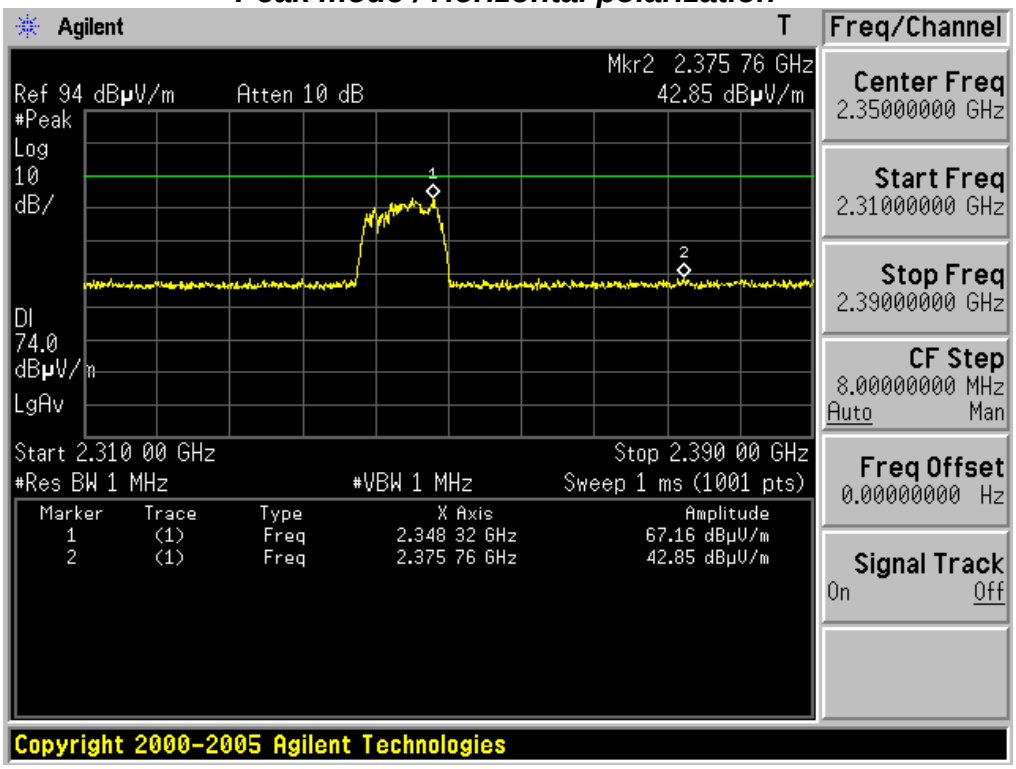
▪ FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

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.

Restricted Band Edge Lowest Channel & 1Mbps & Test Case 1

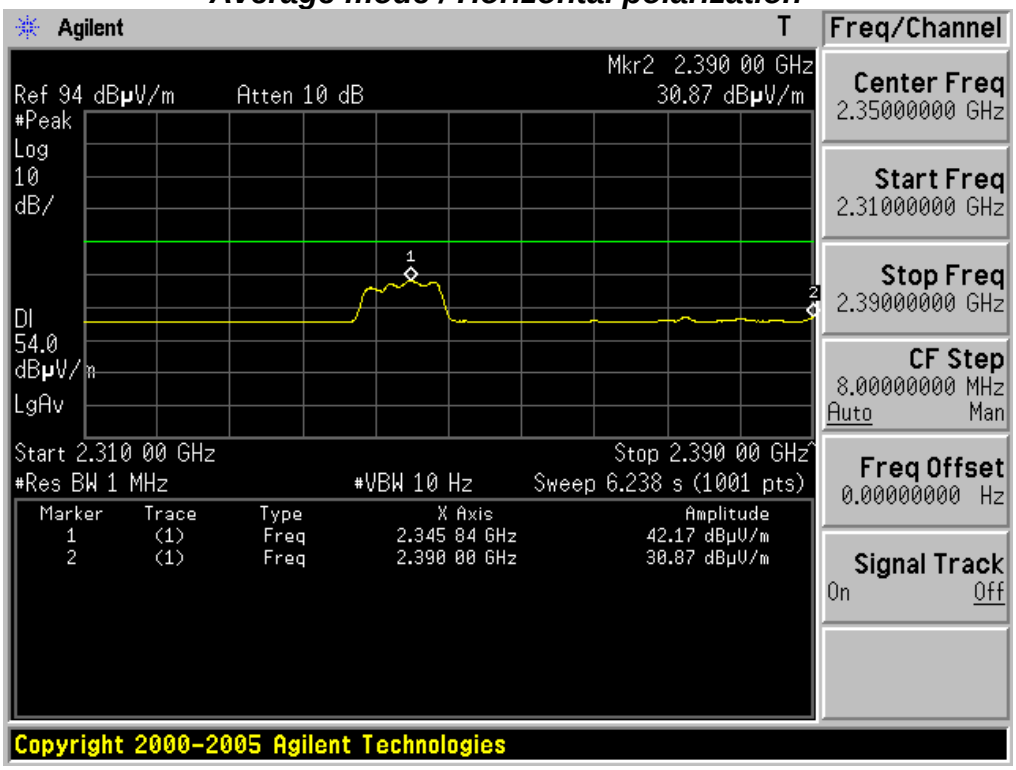
Peak mode / Horizontal polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Lowest Channel & 1Mbps & Test Case 1

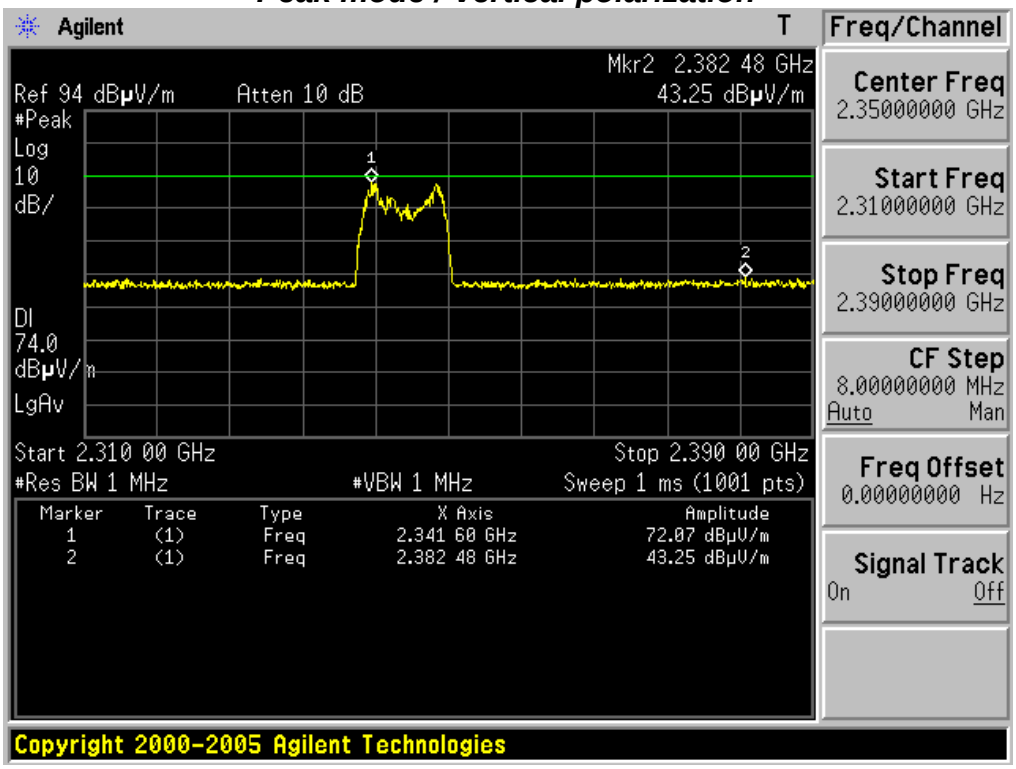
Average mode / Horizontal polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Lowest Channel & 1Mbps & Test Case 1

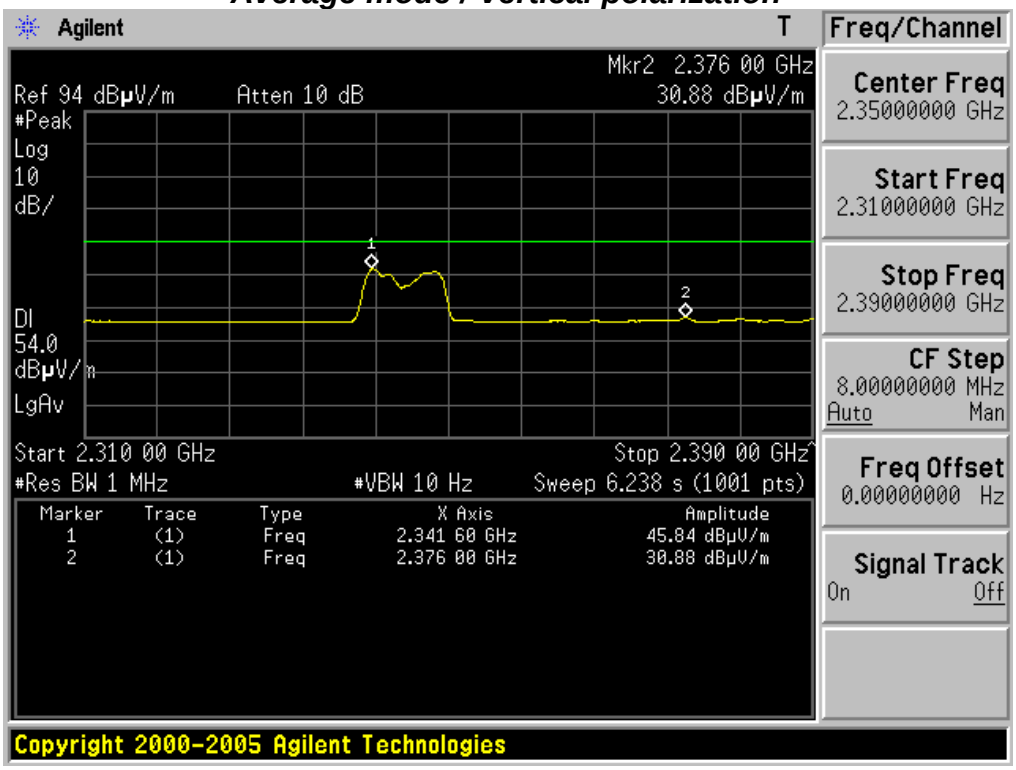
Peak mode / Vertical polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Lowest Channel & 1Mbps & Test Case 1

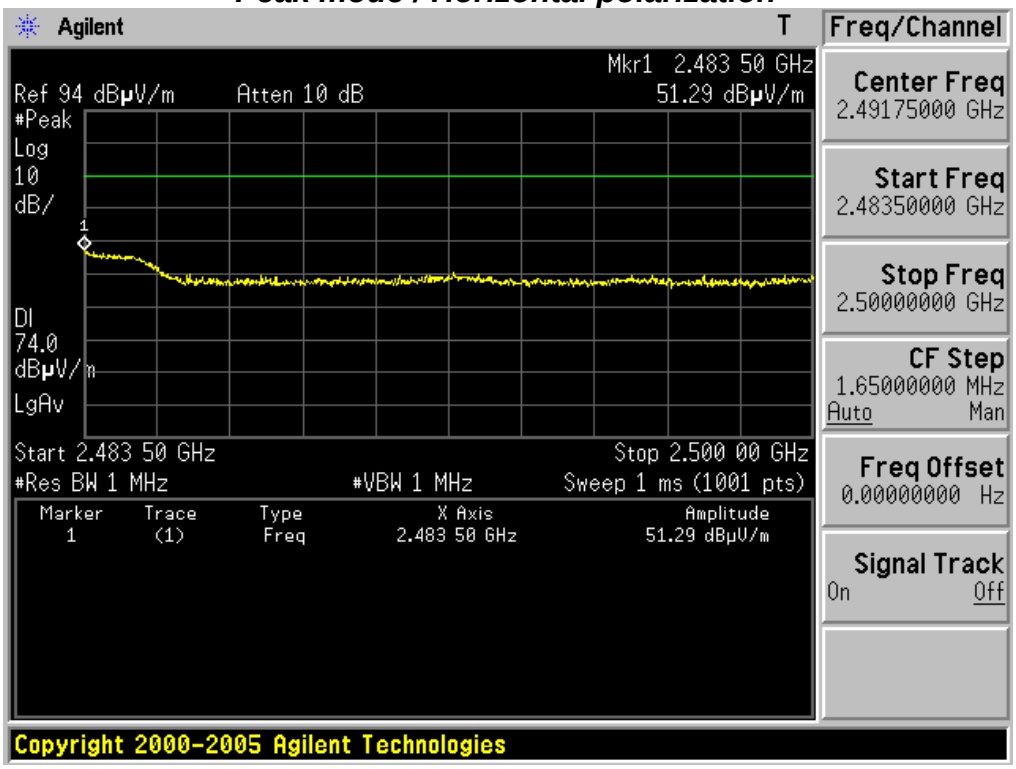
Average mode / Vertical polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

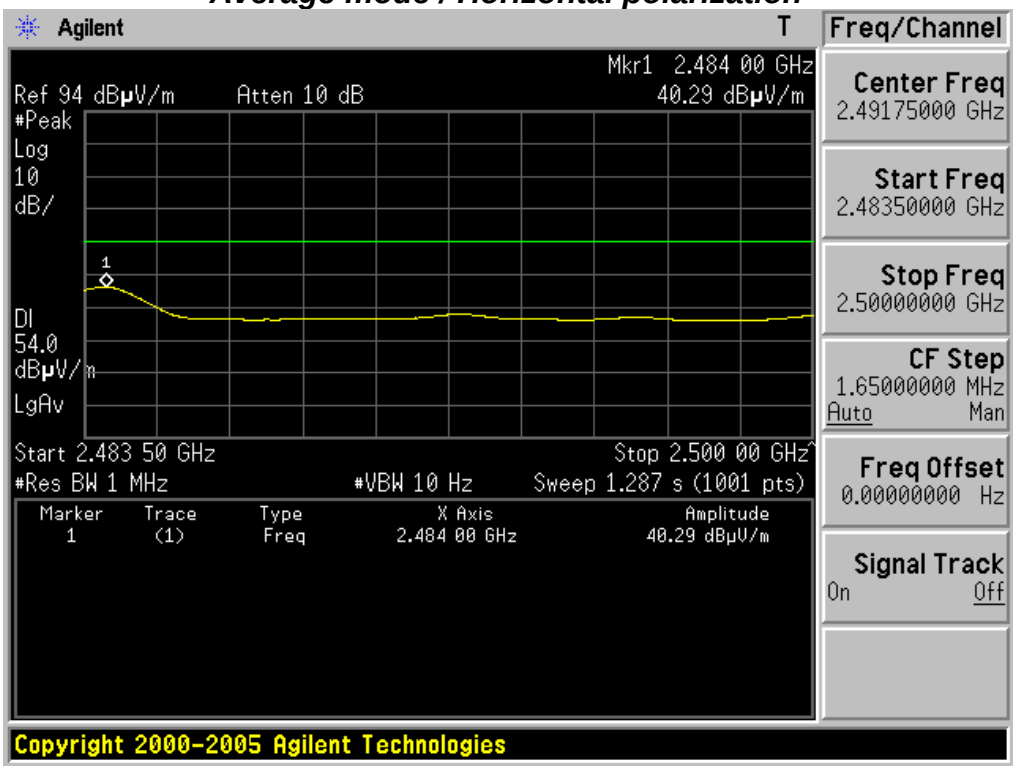
Restricted Band Edge Highest Channel & 1Mbps & Test Case 1

Peak mode / Horizontal polarization



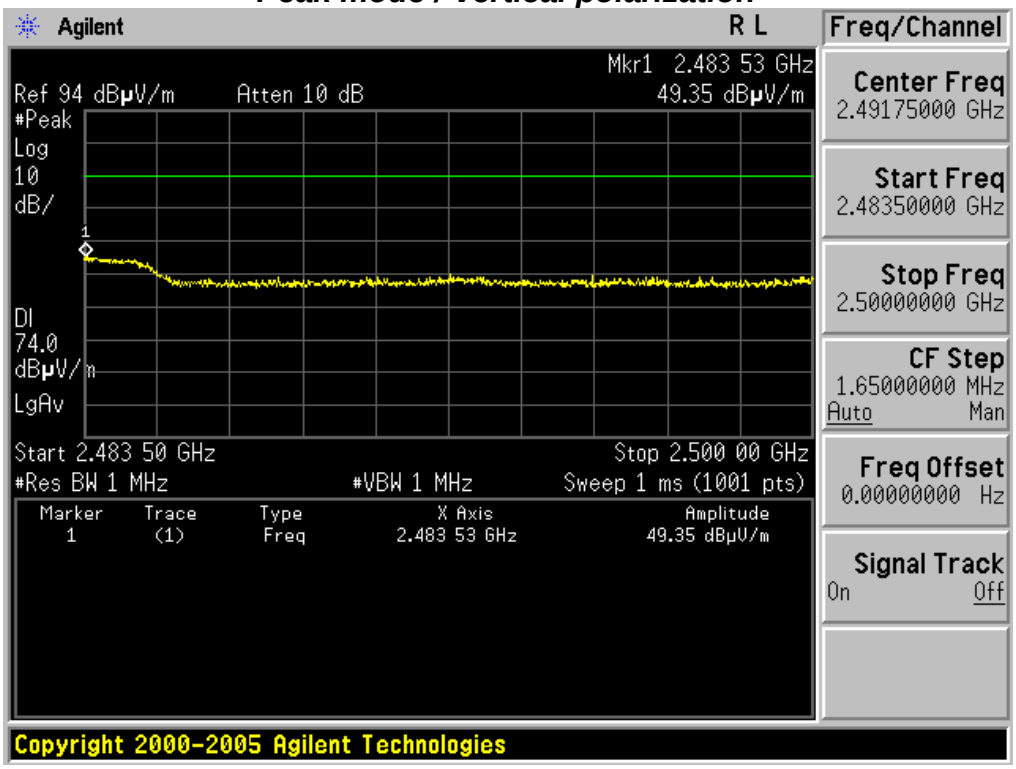
Restricted Band Edge Highest Channel & 1Mbps & Test Case 1

Average mode / Horizontal polarization



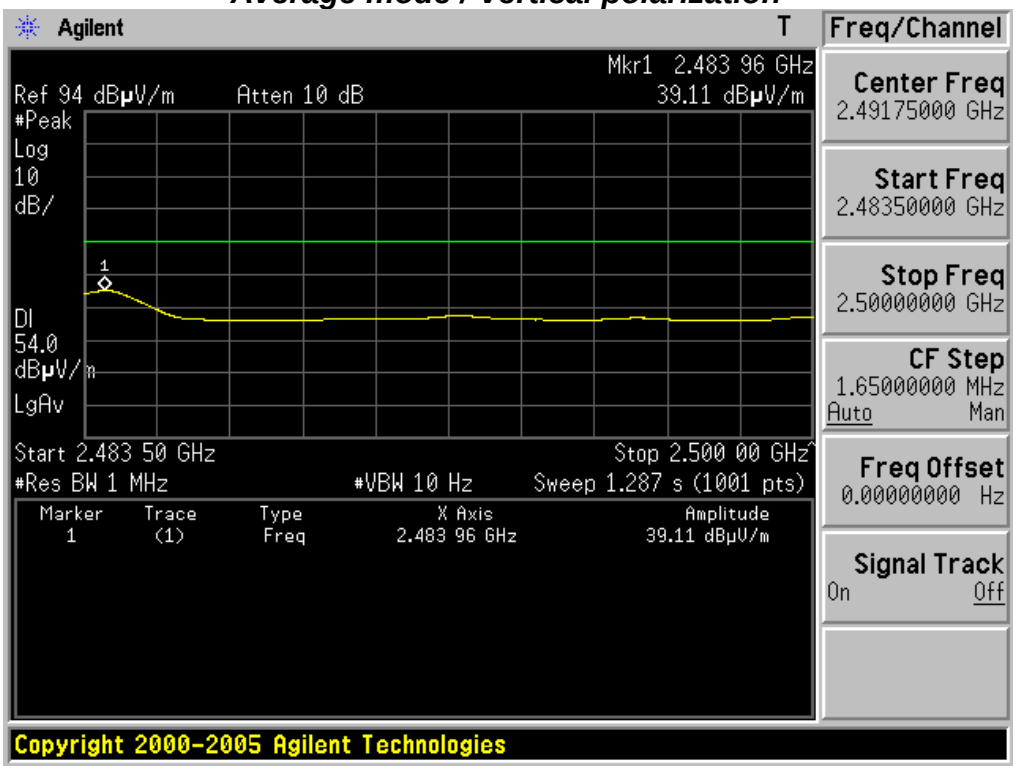
Restricted Band Edge Highest Channel & 1Mbps & Test Case 1

Peak mode / Vertical polarization



Restricted Band Edge Highest Channel & 1Mbps & Test Case 1

Average mode / Vertical polarization



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

Digital EMC

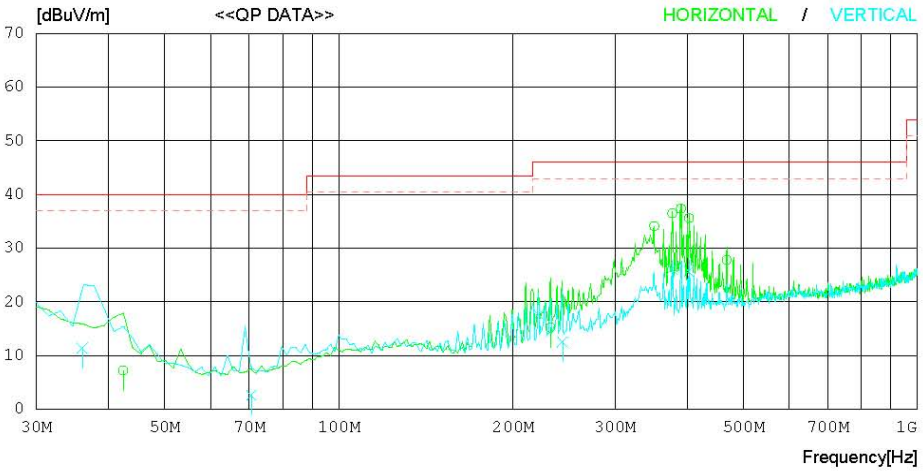
RADIATED EMISSION

Date : 2010-08-03

Model Name	:	D3-POS	Reference No.	:	
Model No.	:	#1	Power Supply	:	DC 7.4 V
Serial No.	:	Identical prototype	Temp/Humi	:	25 'C 28 % R.H.
Test Condition	:	2402 MHz	Operator	:	D.C.CHA

Memo : Test Case 1

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	42.371	16.8	12.2	0.8	22.6	7.2	40.0	32.8	104	116
2	232.099	24.5	12.4	1.8	23.5	15.2	46.0	30.8	105	234
3	350.969	41.0	15.0	2.2	24.1	34.1	46.0	11.9	100	67
4	376.994	42.9	15.5	2.3	24.2	36.5	46.0	9.5	102	251
5	390.006	43.6	15.8	2.3	24.3	37.4	46.0	8.6	103	113
6	403.004	41.6	16.1	2.3	24.4	35.6	46.0	10.4	100	320
7	467.987	32.7	17.1	2.5	24.5	27.8	46.0	18.2	106	164
----- Vertical ------										
8	36.009	17.8	15.4	0.8	22.6	11.4	40.0	28.6	100	96
9	70.664	17.9	6.4	1.0	22.7	2.6	40.0	37.4	105	115
10	221.698	27.5	11.8	1.7	23.4	17.6	46.0	28.4	103	210
11	243.622	21.2	13.0	1.8	23.5	12.5	46.0	33.5	106	274
12	377.018	32.5	15.5	2.3	24.2	26.1	46.0	19.9	100	100
13	402.963	31.7	16.1	2.3	24.4	25.7	46.0	20.3	105	265

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

Digital EMC

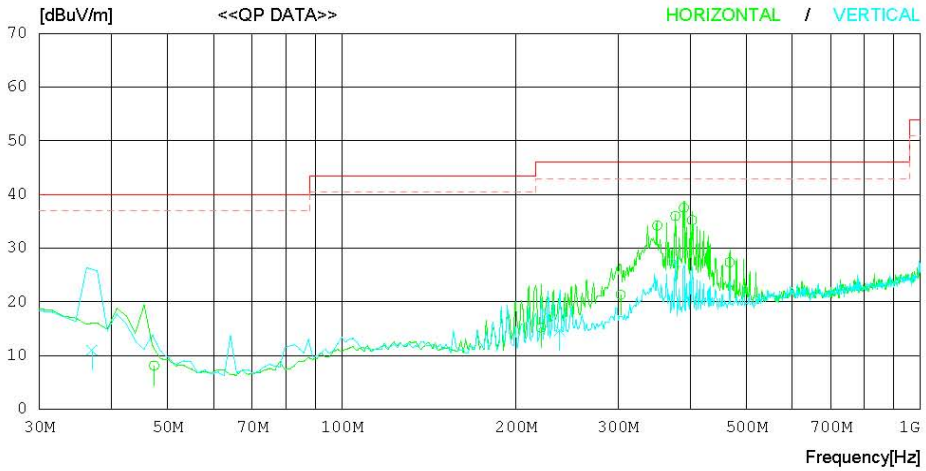
RADIATED EMISSION

Date : 2010-08-03

Model Name	:	D3-POS	Reference No.	:	
Model No.	:	#1	Power Supply	:	DC 7.4 V
Serial No.	:	Identical prototype	Temp/Humi	:	25 'C 28 % R.H.
Test Condition	:	2441 MHz	Operator	:	D.C.CHA

Memo : Test Case 1

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	47.363	20.5	9.4	0.9	22.7	8.1	40.0	31.9	400	20
2	221.025	25.1	11.8	1.7	23.4	15.2	46.0	30.8	201	257
3	303.389	29.1	14.0	2.0	23.8	21.3	46.0	24.7	100	1
4	351.001	41.1	15.0	2.2	24.1	34.2	46.0	11.8	100	1
5	376.994	42.4	15.5	2.3	24.2	36.0	46.0	10.0	100	55
6	389.998	43.7	15.8	2.3	24.3	37.5	46.0	8.5	100	66
7	402.955	41.2	16.1	2.3	24.4	35.2	46.0	10.8	100	94
8	467.963	32.3	17.1	2.5	24.5	27.4	46.0	18.6	201	82
----- Vertical ------										
9	36.987	17.8	15.0	0.8	22.6	11.0	40.0	29.0	300	7
10	227.171	27.0	12.1	1.8	23.4	17.5	46.0	28.5	201	130
11	238.141	23.6	12.7	1.8	23.5	14.6	46.0	31.4	201	358
12	377.002	33.8	15.5	2.3	24.2	27.4	46.0	18.6	100	1

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

Digital EMC

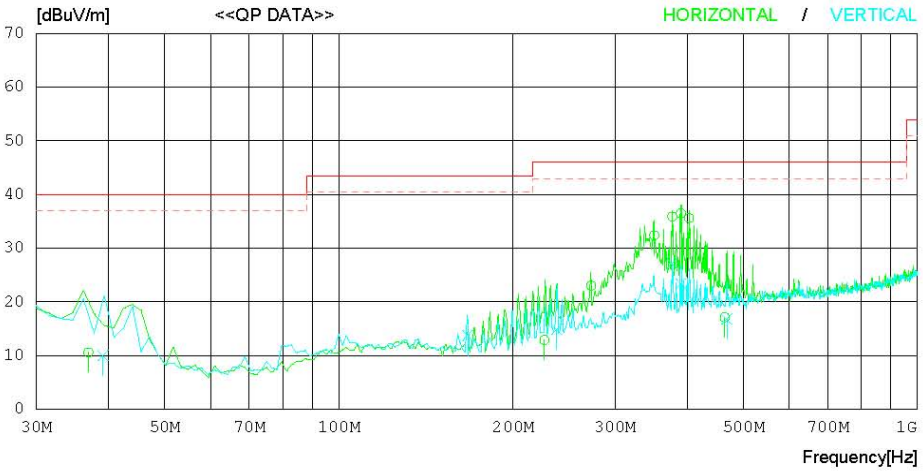
RADIATED EMISSION

Date : 2010-08-03

Model Name	:	D3-POS	Reference No.	:	
Model No.	:	#1	Power Supply	:	DC 7.4 V
Serial No.	:	Identical prototype	Temp/Humi	:	25 'C 28 % R.H.
Test Condition	:	2480 MHz	Operator	:	D.C.CHA

Memo : Test Case 1

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	36.915	17.4	15.0	0.8	22.6	10.6	40.0	29.4	106	197
2	226.554	22.4	12.1	1.8	23.4	12.9	46.0	33.1	101	100
3	272.980	31.1	13.6	1.9	23.6	23.0	46.0	23.0	103	105
4	350.945	39.3	15.0	2.2	24.1	32.4	46.0	13.6	100	176
5	376.978	42.3	15.5	2.3	24.2	35.9	46.0	10.1	106	293
6	389.942	42.7	15.8	2.3	24.3	36.5	46.0	9.5	100	78
7	402.955	41.6	16.1	2.3	24.4	35.6	46.0	10.4	110	265
8	464.291	22.0	17.1	2.5	24.5	17.1	46.0	28.9	105	344
----- Vertical ------										
9	39.118	17.8	14.0	0.8	22.6	10.0	40.0	30.0	106	98
10	166.947	25.1	10.2	1.5	23.1	13.7	43.5	29.8	102	157
11	238.093	23.9	12.7	1.8	23.5	14.9	46.0	31.1	225	247
12	376.962	33.5	15.5	2.3	24.2	27.1	46.0	18.9	100	248
13	390.039	29.6	15.8	2.3	24.3	23.4	46.0	22.6	230	174
14	468.377	21.6	17.2	2.5	24.5	16.8	46.0	29.2	150	160

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

▪ Lowest Channel

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB/m)	D.C.F	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV			PK	AV	PK	AV	PK	AV
4803.033	H	59.92	47.86	5.14	-30.77	34.29	22.23	74.00	54.00	39.71	31.77
4803.080	V	59.18	47.80	5.14	-30.77	33.55	22.17	74.00	54.00	40.45	31.83
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB/m)	D.C.F	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV			PK	AV	PK	AV	PK	AV
4882.155	H	58.12	46.13	5.32	-30.77	32.67	20.68	74.00	54.00	41.33	33.32
4882.108	V	58.96	47.12	5.32	-30.77	33.51	21.67	74.00	54.00	40.49	32.33
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB/m)	D.C.F	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV			PK	AV	PK	AV	PK	AV
4959.895	H	62.98	53.08	5.90	-30.77	38.11	28.21	74.00	54.00	35.89	25.79
4960.005	V	62.84	52.98	5.90	-30.77	37.97	28.11	74.00	54.00	36.03	25.89
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Note.

1. Except for the above table: All other spurious emissions were less than 45 dB for the limit.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F + D.C.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   D.C.F (Duty Cycle Correction Factor) = 20log(The worst Case DWELL Time/100ms)
   = 20log(2.895ms / 100ms) = -30.77dB

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

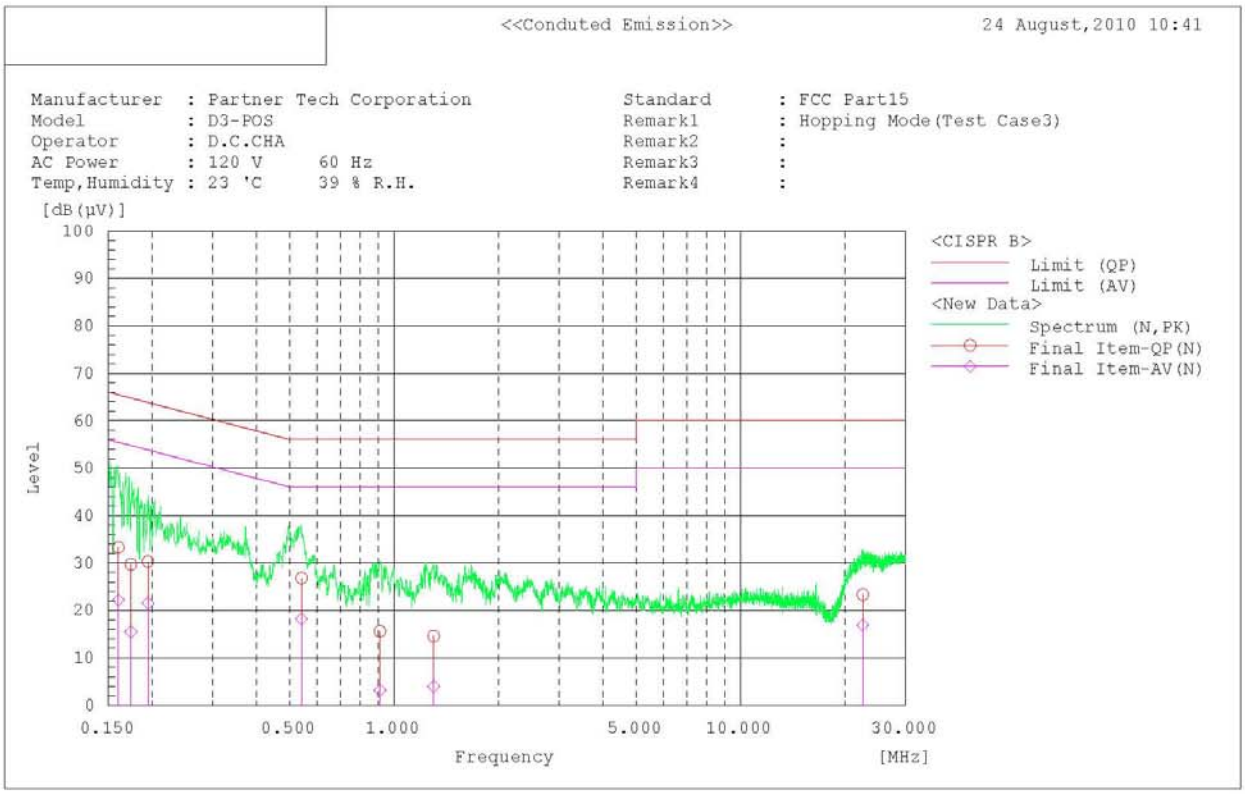
Note 1: See next pages for actual measured spectrum plots and data.

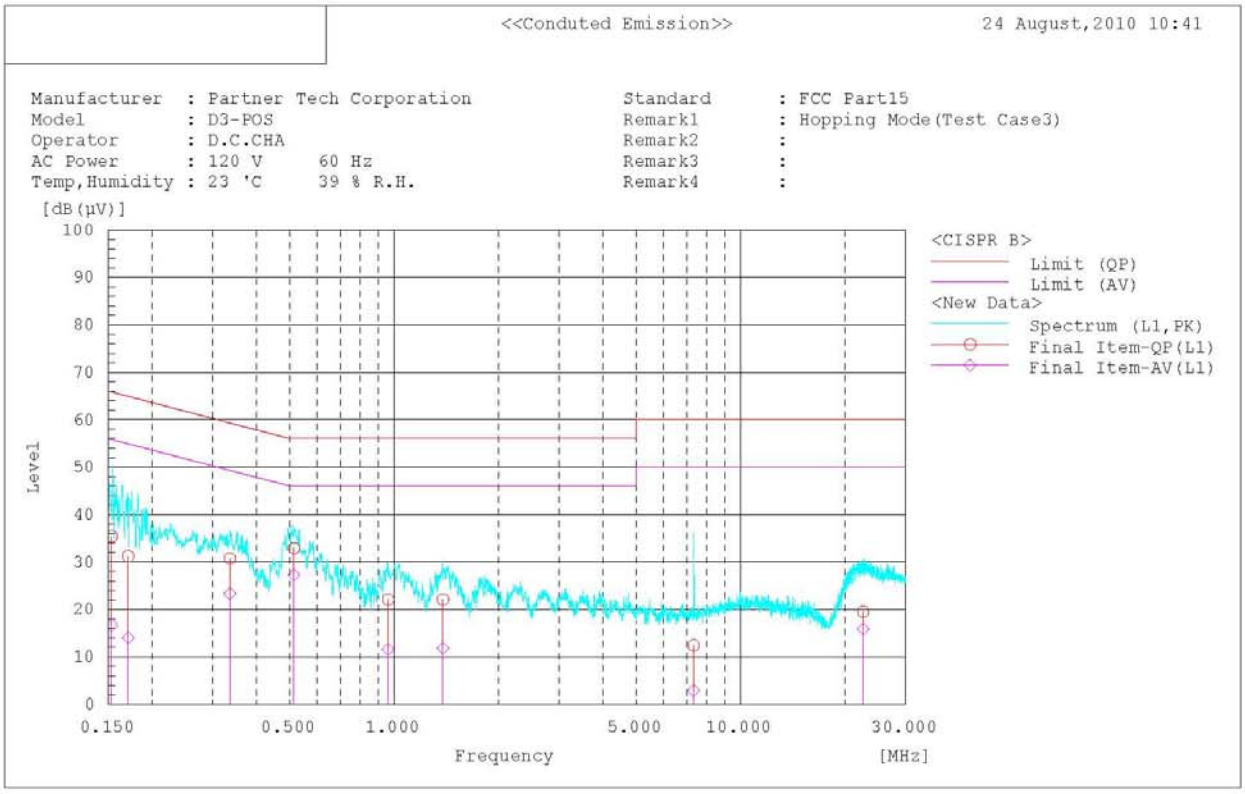
- Minimum Standard: FCC Part 15.207(a)/EN 55022

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 (Graph) 1Mbps & Test Case 3





AC Line Conducted Emissions (Data List) 1Mbps & Test Case 3

<<Conduted Emission>>

24 August,2010 10:41

Standard : FCC Part15
Manufacturer : Partner Tech Corporation
Model : D3-POS
Operator : D.C.CHA
AC Power : 120 V 60 Hz
Temp,Humidity : 23 'C 39 % R.H.
Remark1 : Hopping Mode(Test Case3)
Remark2 :
Remark3 :
Remark4 :

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	0.160	33.2	22.1	0.1	33.3	22.2	65.5	55.5	32.2	33.3	
2	0.174	29.6	15.4	0.1	29.7	15.5	64.8	54.8	35.1	39.3	
3	0.195	30.2	21.4	0.1	30.3	21.5	63.8	53.8	33.5	32.3	
4	0.541	26.7	18.1	0.1	26.8	18.2	56.0	46.0	29.2	27.8	
5	0.910	15.5	3.1	0.1	15.6	3.2	56.0	46.0	40.4	42.8	
6	1.301	14.5	3.9	0.1	14.6	4.0	56.0	46.0	41.4	42.0	
7	22.554	21.9	15.5	1.4	23.3	16.9	60.0	50.0	36.7	33.1	

--- 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	0.153	35.1	16.4	0.3	35.4	16.7	65.8	55.8	30.4	39.1	
2	0.171	30.9	13.8	0.3	31.2	14.1	64.9	54.9	33.7	40.8	
3	0.336	30.4	23.0	0.3	30.7	23.3	59.3	49.3	28.6	26.0	
4	0.514	32.6	27.0	0.3	32.9	27.3	56.0	46.0	23.1	18.7	
5	0.962	21.8	11.3	0.3	22.1	11.6	56.0	46.0	33.9	34.4	
6	1.384	21.8	11.5	0.3	22.1	11.8	56.0	46.0	33.9	34.2	
7	7.325	11.8	2.3	0.6	12.4	2.9	60.0	50.0	47.6	47.1	
8	22.587	18.2	14.6	1.3	19.5	15.9	60.0	50.0	40.5	34.1	

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 is permanently attached by 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.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
☒	Spectrum Analyzer	Agilent	E4440A	25/09/09	25/09/10	MY45304199
☐	Spectrum Analyzer	Rohde Schwarz	FSQ26	25/02/10	25/02/11	200445
☐	Spectrum Analyzer(RE)	H.P	8563E	13/10/09	13/10/10	3551A04634
☐	Power Meter	H.P	EPM-442A	01/07/10	01/07/11	GB37170413
☐	Power Sensor	H.P	8481A	01/07/10	01/07/11	3318A96332
☐	Power Sensor	Rohde Schwarz	NRP-Z81	17/10/09	17/10/10	100036
☐	Power Divider	Agilent	11636B	13/10/09	13/10/10	56471
☐	Power Splitter	Anritsu	K241B	13/10/09	13/10/10	20611
☐	Power Splitter	Anritsu	K241B	01/07/10	01/07/11	017060
☐	Frequency Counter	H.P	5342A	01/07/10	01/07/11	2119A04450
☐	TEMP & HUMIDITY Chamber	JISCO	KR-100/J-RHC2	10/10/09	10/10/10	30604493/021031
☒	Digital Multimeter	H.P	34401A	12/03/10	12/03/11	3146A13475, US36122178
☐	Multifunction Synthesizer	HP	8904A	06/10/09	06/10/10	3633A08404
☒	Signal Generator	Rohde Schwarz	SMR20	12/03/10	12/03/11	101251
☐	Signal Generator	H.P	ESG-3000A	01/07/10	01/07/11	US37230529
☐	Vector Signal Generator	Rohde Schwarz	SMJ100A	11/01/10	11/01/11	100148
☐	Vector Signal Generator	Rohde Schwarz	SMBV100A	23/02/10	23/02/11	255571
☐	Audio Analyzer	H.P	8903B	02/07/10	02/07/11	3011A09448
☐	Modulation Analyzer	H.P	8901B	01/07/10	01/07/11	3028A03029
☐	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	02/07/10	02/07/11	GB43461134
☐	Universal Radio communication Tester	Rohde Schwarz	CMU 200	12/03/10	12/03/11	106760
☐	Bluetooth Tester	TESCOM	TC-3000B	01/07/10	01/07/11	3000B000268
☐	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-3
☒	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-2
☐	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-4
☐	AC Power supply	DAEKWANG	5KVA	12/03/10	12/03/11	20060321-1
☐	DC Power Supply	HP	6622A	12/03/10	12/03/11	3448A03760
☐	DC Power Supply	HP	6633A	12/03/10	12/03/11	3524A06634
☐	BAND Reject Filter	Microwave Circuits	N0308372	06/10/09	06/10/10	3125-01DC0352
☐	BAND Reject Filter	Wainwright	WRCG1750	06/10/09	06/10/10	2
☐	High-Pass Filter	ANRITSU	MP526D	06/10/09	06/10/10	M27756
☐	High-pass filter	Wainwright	WHNX2.1	N/A	N/A	1
☒	High-pass filter	Wainwright	WHNX3.0	N/A	N/A	9
☐	High-pass filter	Wainwright	WHNX5.0	N/A	N/A	8
☐	High-Pass Filter	Wainwright	WHKX8.5	N/A	N/A	1
☐	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	23/09/09	23/09/10	21097
☐	HORN ANT	ETS	3115	14/07/10	14/07/11	6419
☒	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/11	154
☐	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/11	155

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
☐	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	06/10/10	2116
☐	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	06/10/10	2117
☐	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	05/10/10	2261
☐	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	05/10/10	2262
☐	LOOP Antenna	ETS	6502	05/11/09	05/11/10	3471
☐	Coaxial Fixed Attenuators	Agilent	8491B	01/07/10	01/07/11	MY39260700
☐	Attenuator (3dB)	WEINSCHEL	56-3	16/12/09	16/12/10	Y2342
☐	Attenuator (3dB)	WEINSCHEL	56-3	16/12/09	16/12/10	Y2370
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	01/10/09	01/10/10	BP4386
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	11/01/10	11/01/11	BP4387
☐	Attenuator (10dB)	WEINSCHEL	31696	06/10/09	06/10/10	446
☐	Attenuator (10dB)	WEINSCHEL	31696	06/10/09	06/10/10	408
☐	Attenuator (20dB)	WEINSCHEL	86-20-11	06/10/09	06/10/10	432
☐	Attenuator (30dB)	JFW	50FH-030-300	12/03/10	12/03/11	060320-1
☐	Attenuator (40dB)	WEINSCHEL	57-40-33	01/10/09	01/10/10	NN837
☐	Termination	H.P	HP-909D	02/07/10	02/07/11	02750
☐	Termination	H.P	HP-909D	02/07/10	02/07/11	02702
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0088CAN	01/07/10	01/07/11	788
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0185CAN	01/07/10	01/07/11	790
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0215CAN	01/07/10	01/07/11	112
☒	Amplifier (30dB)	Agilent	8449B	23/04/10	23/04/11	3008A01590
☐	Amplifier (30dB)	H.P	8449B	13/05/10	13/05/11	3008A00370
☐	Amplifier	EMPOWER	BBS3Q7ELU	02/11/09	02/11/10	1020
☐	RF Power Amplifier	OPHIRRF	5069F	01/07/10	01/07/11	1006
☒	EMI TEST RECEIVER	R&S	ESU	29/01/10	29/01/11	100014
☒	BILOG ANTENNA	SCHAFFNER	CBL 6112D	28/10/09	28/10/10	22609
☒	Amplifier (22dB)	H.P	8447E	29/01/10	29/01/11	2945A02865
☐	EMI TEST RECEIVER	R&S	ESCI	12/05/10	12/05/11	100364
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP 9108 A-1	07/10/09	07/10/10	1098
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	06/10/09	06/10/10	91031946
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A	07/07/10	07/07/11	590
☐	Low Noise Pre Amplifier	TSJ	MLA-100K01-B01-2	12/03/10	12/03/11	1252741
☐	Amplifier (25dB)	Agilent	8447D	12/03/10	12/03/11	2944A10144
☐	Amplifier (25dB)	Agilent	8447D	01/07/10	01/07/11	2648A04922
☒	Spectrum Analyzer(CE)	H.P	8591E	12/03/10	12/03/11	3649A05889
☒	LISN	Kyoritsu	KNW-407	29/01/10	29/01/11	8-317-8
☒	LISN	Kyoritsu	KNW-242	29/01/10	29/01/11	8-654-15
☒	CVCF	NF Electronic	4420	12/03/10	12/03/11	304935/337980
☒	50 ohm Terminator	HME	CT-01	12/01/10	12/01/11	N/A
☒	RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	02/07/10	02/07/11	4N-170-3