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BLUETOOTH TEST REPORT

Report Number: 100240318LEX-003
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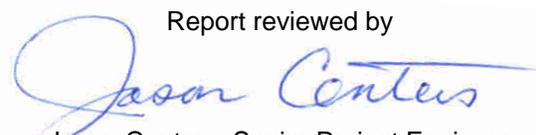
Product Name: "Zeus" Mobile Phone Type AAJ-6880004-BV
FCCID: PY7A6880004
ICID: 4170B-A6880004
Standards: FCC Part 15C, FCC Part 15B, RSS-GEN Issue 3,
and RSS-210 Issue 8

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Drive
Lexington, KY 40510

Client:
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Lund, Sweden 22188

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1 Introduction and Conclusion

The tests indicated in section 2 were performed on the product constructed as described in section 3. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test method, a list of the actual test equipment used, documentation photos, results and raw data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complied with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

The INTERTEK-Lexington is located at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters. The test site is listed with the FCC under registration number 485103. The test site is listed with Industry Canada under site number IC 2042M-1.

2 Test Summary

Page	Test full name	FCC Reference	IC Reference	Result
6	Peak Output Power	§ 15.247(b)(1)	RSS210 (A8.4)	Pass
9	20dB Bandwidth	§ 15.247(a)(1)	RSS210 (A8.1)	Pass
12	Channel Separation	§ 15.247(a)(1)	RSS210 (A8.1)	Pass
15	Number of Hopping Channels	§ 15.247(a)(1)(iii)	RSS210(A8.1)	Pass
17	Time of Occupancy	§ 15.247(a)(1)(iii)	RSS210 (A8.1)	Pass
21	Conducted Spurious Emissions	§ 15.247(d)	RSS210 (A8.5)	Pass
26	Radiated Spurious Emissions (Transmitter)	§ 15.247(d), § 15.209, and § 15.205	RSS-210 (A8.5)	Pass
31	Radiated Spurious Emissions (Receiver)	§ 15.109	RSS-Gen (6.1)	Pass
33	AC Powerline Conducted Emissions	§ 15.107, § 15.207	RSS-Gen (7.2.4)	Pass
36	Antenna Requirement per FCC Part 15.203	§ 15.203	RSS-Gen (7.1.2)	Pass

3 Description of Equipment Under Test

Equipment Under Test	
Manufacturer	Sony Ericsson Mobile Communications AB
Model Number	AAJ-6880004-BV
Serial Number	CBA1CEQB8
FCC Identifier	PY7A6880004
IC Identifier	4170B-A6880004
Receive Date	11/27/2010
Test Start Date	11/4/2010
Test End Date	12/3/2010
Device Received Condition	Good
Test Sample Type	Prototype
Frequency Band	2402 – 2480MHz
Mode(s) of Operation	Bluetooth
Modulation Type	FHSS
Transmission Control	Test Commands
Maximum Output Power	5.25mW
Test Channels	0, 39, 78
Antenna Type (15.203)	Internal PCB
Operating Voltage	3.6VDC

Description of Equipment Under Test

The "Zeus" Mobile Phone Type AAJ-6880004-BV was a handset which supports CDMA Cell and PCS bands and also has Bluetooth and WIFI radios.

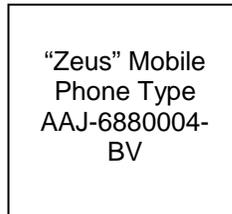
Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmitting a Bluetooth signal
2	Receive / idle mode
3	All testing was performed with a freshly charged battery.

3.1 System setup including cable interconnection details, support equipment and simplified block diagram

3.2 EUT Block Diagram:

The test sample was tested in stand alone mode and was not connected to any support equipment during the evaluation.



3.3 Cables:

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
USB Charging Cable	3ft	Yes	None	Mini-USB Port on Test Sample	AC Power Adapter

3.4 Support Equipment:

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop Computer	HP	Nc6000	CNU4120T70

* The laptop computer was used to configure the test sample prior to execution of the test. It was disconnected before the test was conducted.

4 Peak Output Power

4.1 Test Limits

§ 15.247(b): The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(1) 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.

4.2 Test Procedure

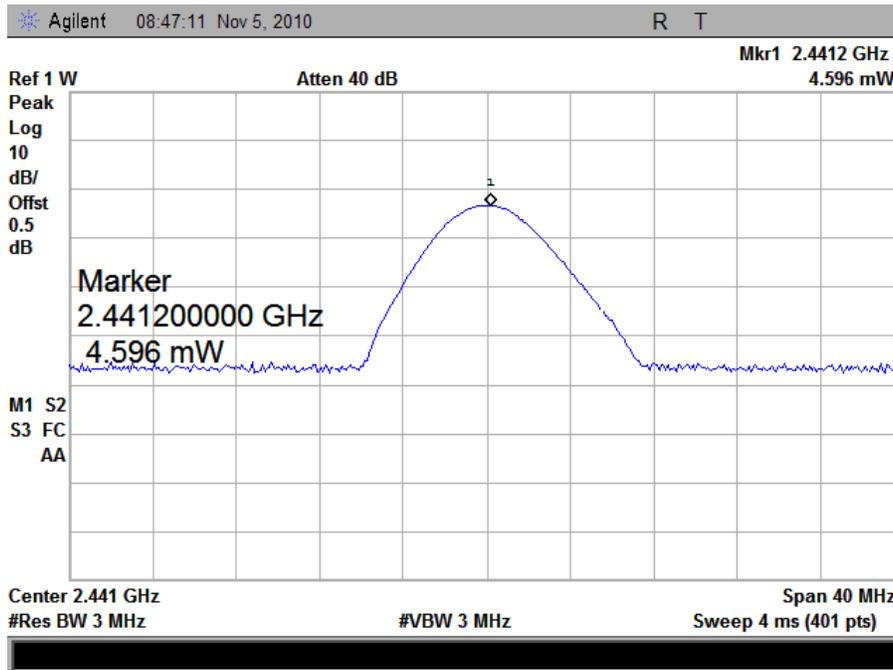
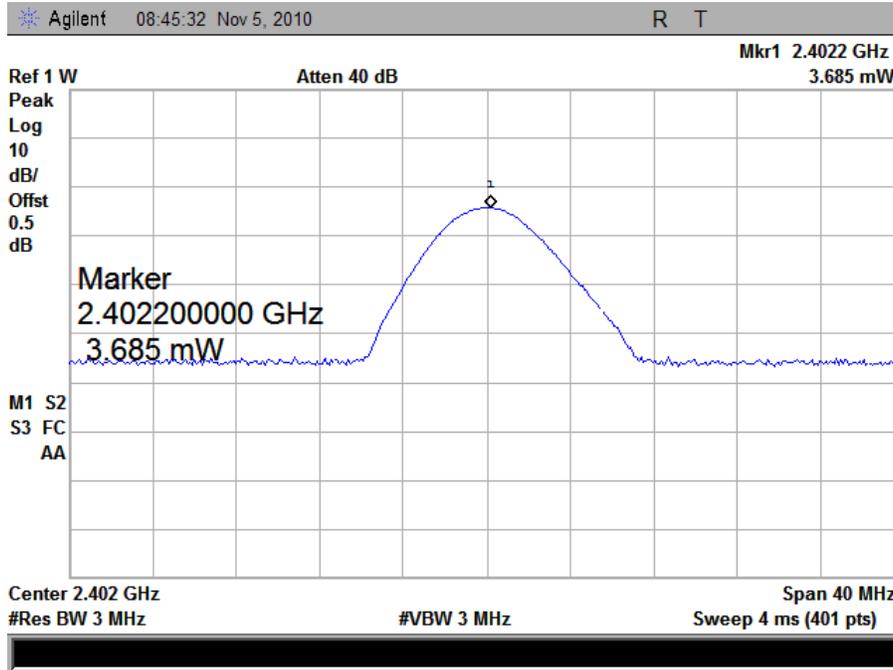
ANSI C63.10: 2009 and FCC Public Notice DA 00-705 Released March 30, 2000: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. The peak output power was measured using the marker to peak function of the spectrum analyzer.

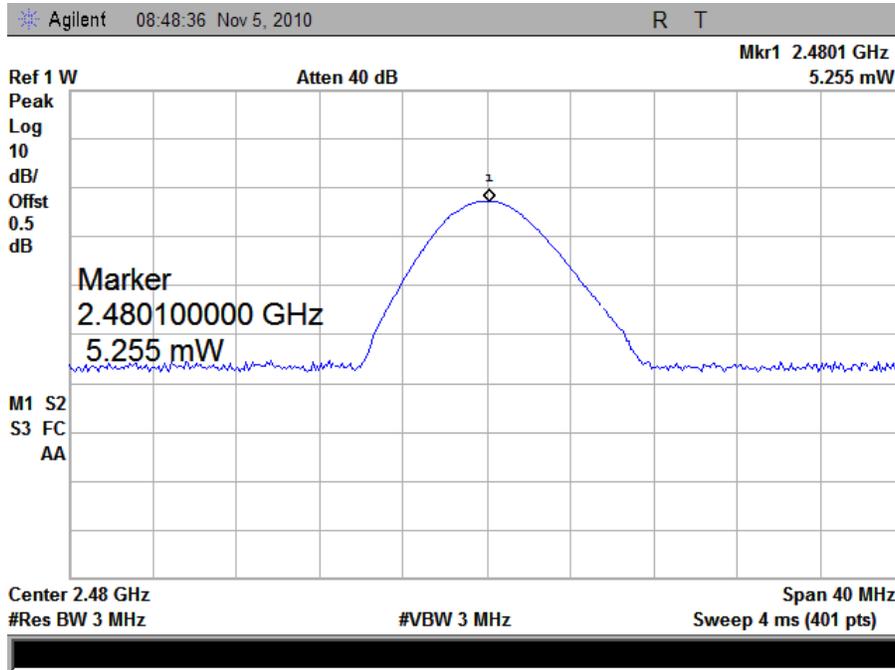
4.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMC Analyzer	2142	HP	E7405	9/1/2010	9/1/2011

4.4 Results:

Channel	Frequency (MHz)	Output Power (mW)	Limit (mW)	Pass / Fail
0	2402	3.68	1000	Pass
39	2441	4.59	1000	Pass
78	2480	5.25	1000	Pass





5 20dB Bandwidth

5.1 Test Limits

§ 15.247(a): Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

(1) 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

5.2 Test Procedure

ANSI C63.10: 2009 and FCC Public Notice DA 00-705 Released March 30, 2000: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

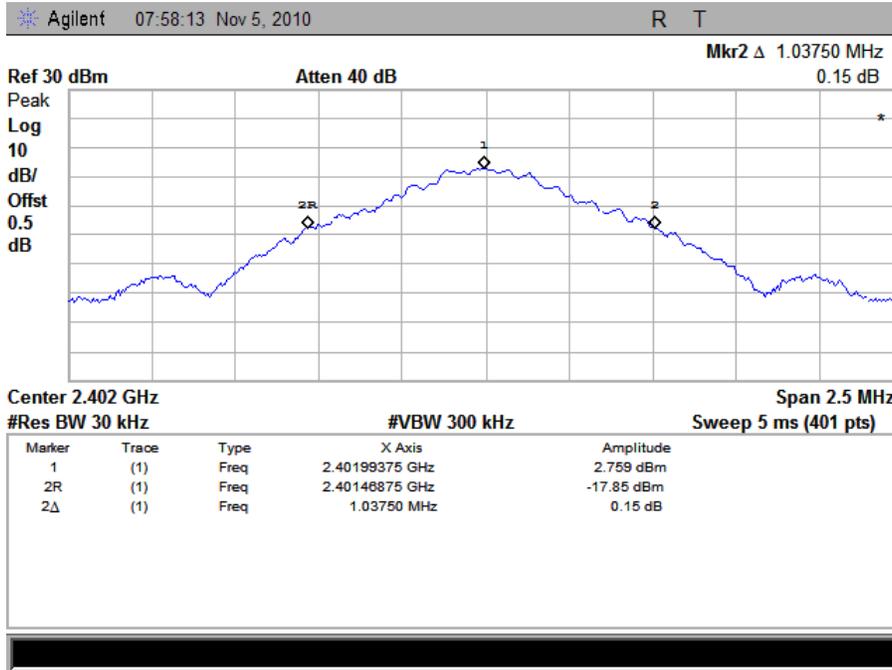
5.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	8/27/2010	8/27/2011
EMC Analyzer	2142	HP	E7405	9/1/2010	9/1/2011

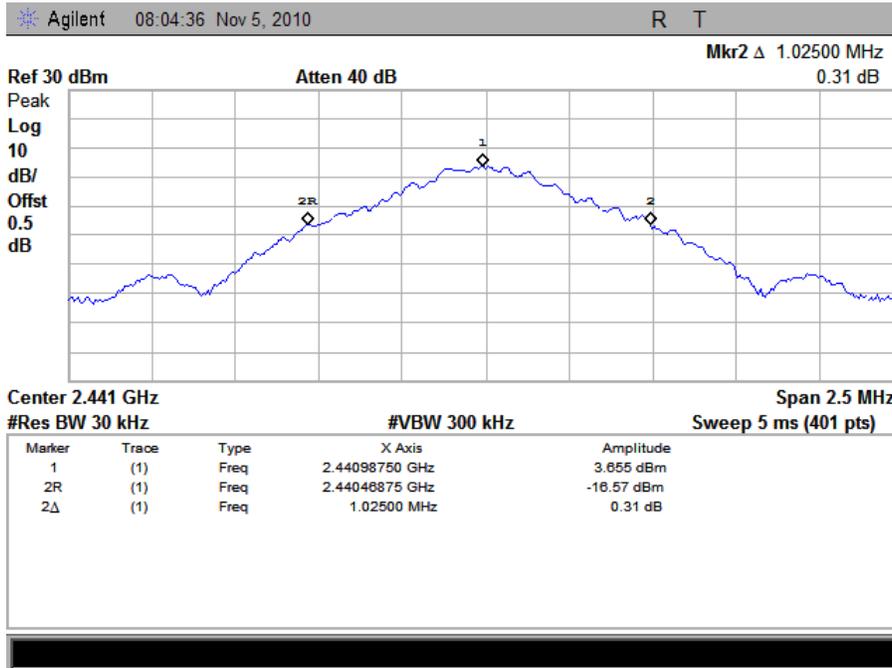
5.4 Results:

The 20dB bandwidth measurements are shown below. A 99% bandwidth measurement was also performed.

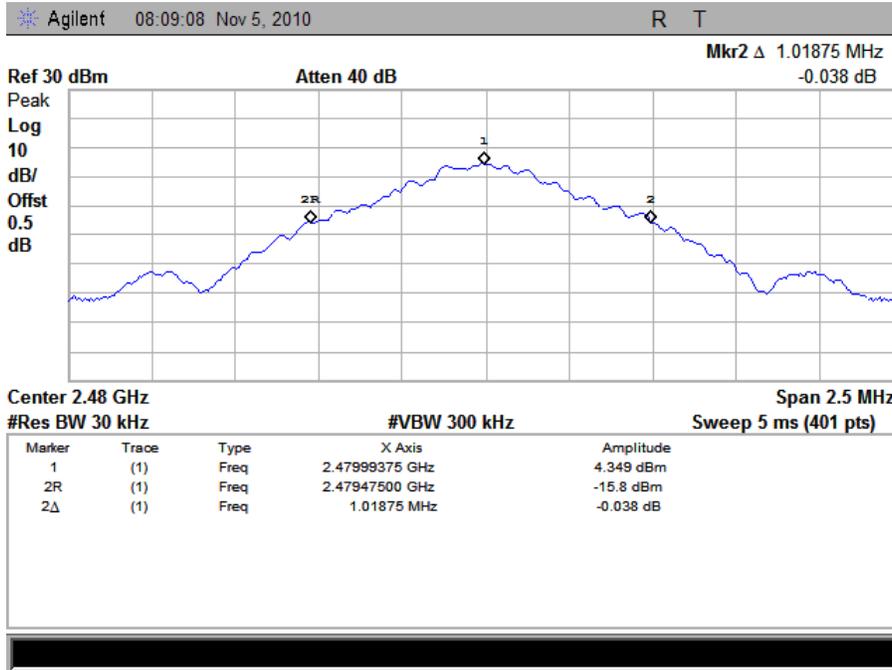
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
0	2402	1.037
39	2441	1.025
78	2480	1.018



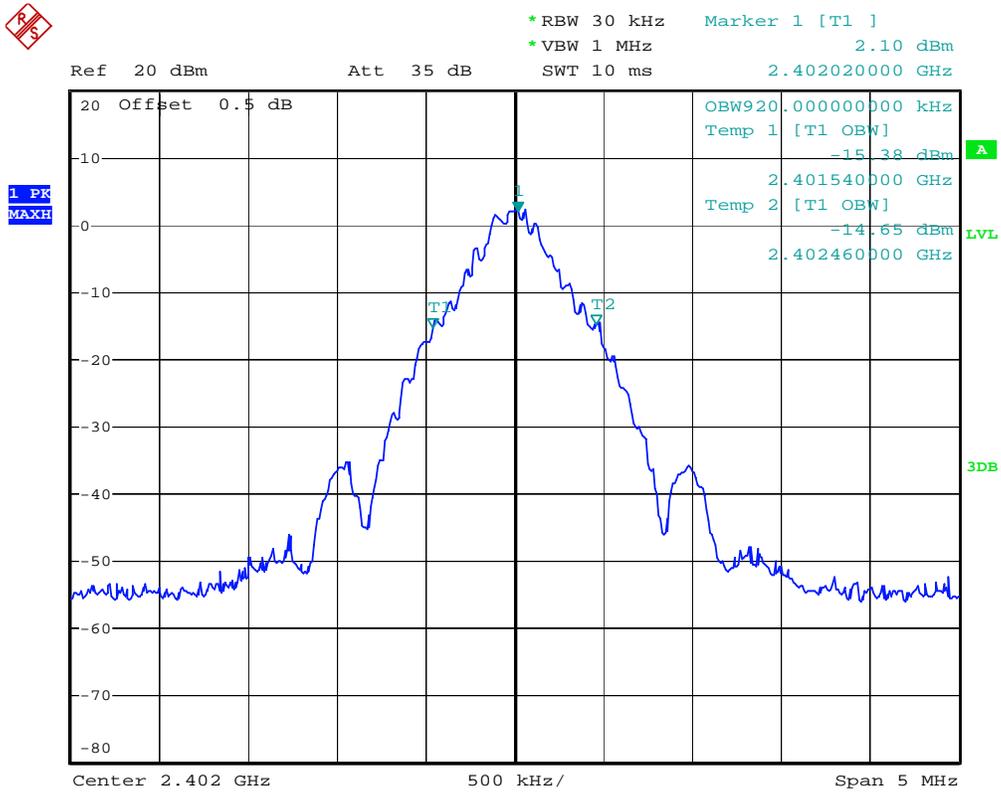
20dB Bandwidth, Channel 0



20dB Bandwidth, Channel 39



20dB Bandwidth, Channel 78



Date: 5.NOV.2010 14:06:07

99% Bandwidth, Channel 0

6 Channel Separation

6.1 Test Limits

§ 15.247(a): Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

(1) 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

6.2 Test Procedure

ANSI C63.10: 2009 and FCC Public Notice DA 00-705 Released March 30, 2000: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

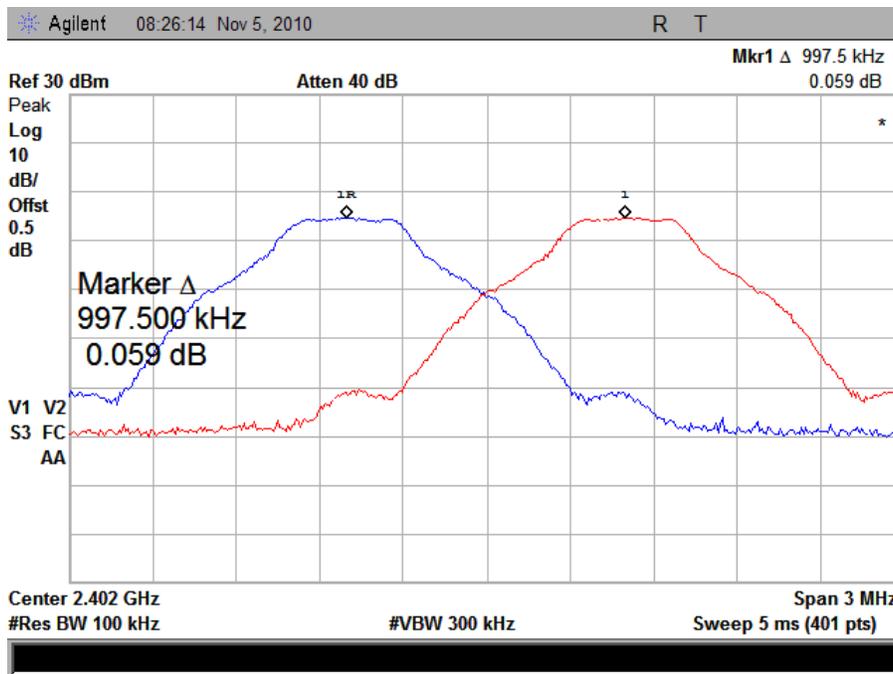
6.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMC Analyzer	2142	HP	E7405	9/1/2010	9/1/2011

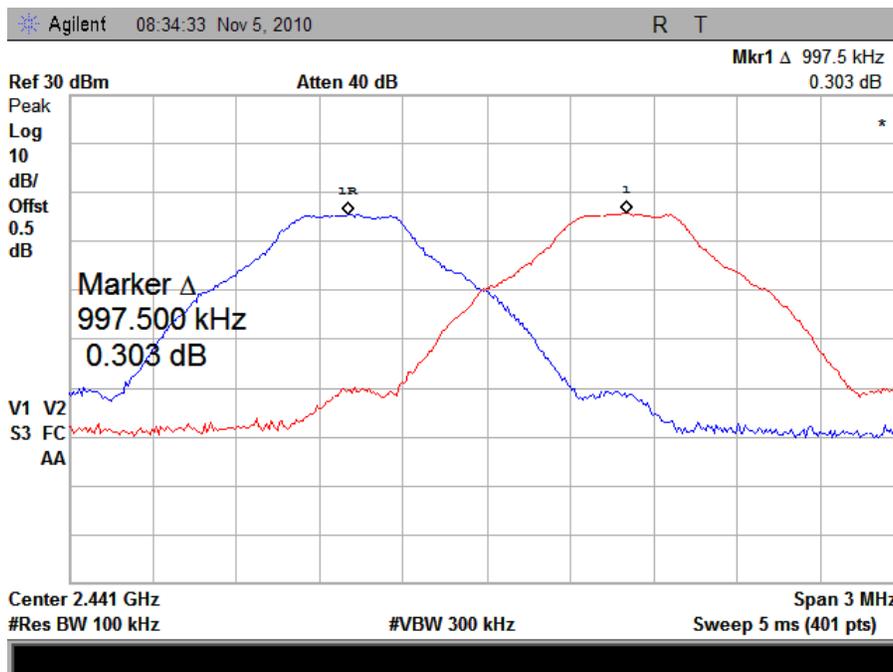
6.4 Results:

Channel	Frequency (MHz)	Adjacent Channel Separation (kHz)	Minimum Limit (kHz)*	Pass / Fail
0	2402	997.5	685	Pass
39	2441	997.5	685	Pass
78	2480	997.5	685	Pass

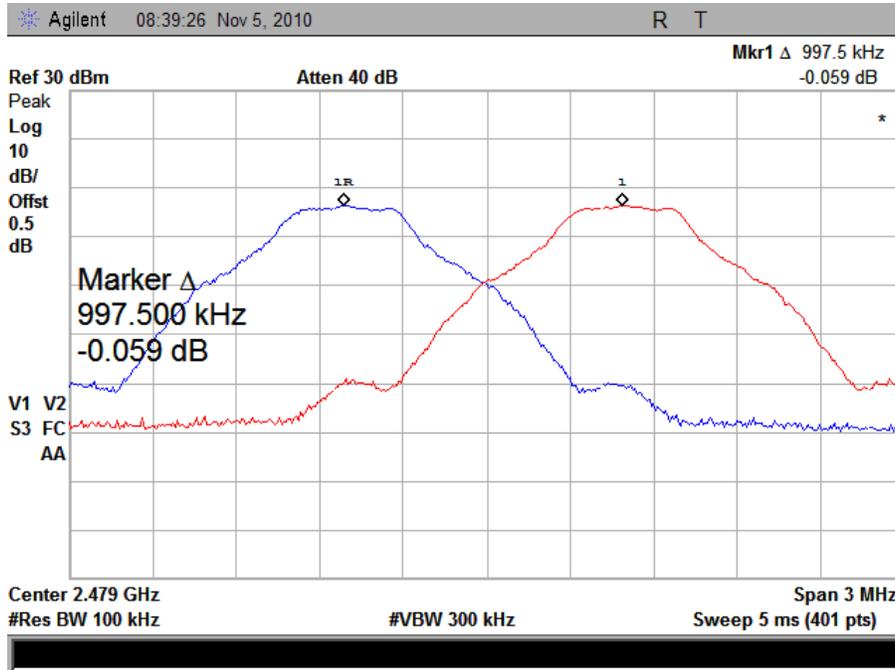
*Limit is derived from 2/3 of the the 20dB bandwidth



Hopping Channel Separation (Ch. 0 and Ch. 1)



Hopping Channel Separation (Ch. 38 and Ch. 39)



Hopping Channel Separation (Ch. 77 and Ch. 78)

7 Number of Hopping Channels

7.1 Test Limits

§ 15.247(a): Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

(1)(iii) Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

7.2 Test Procedure

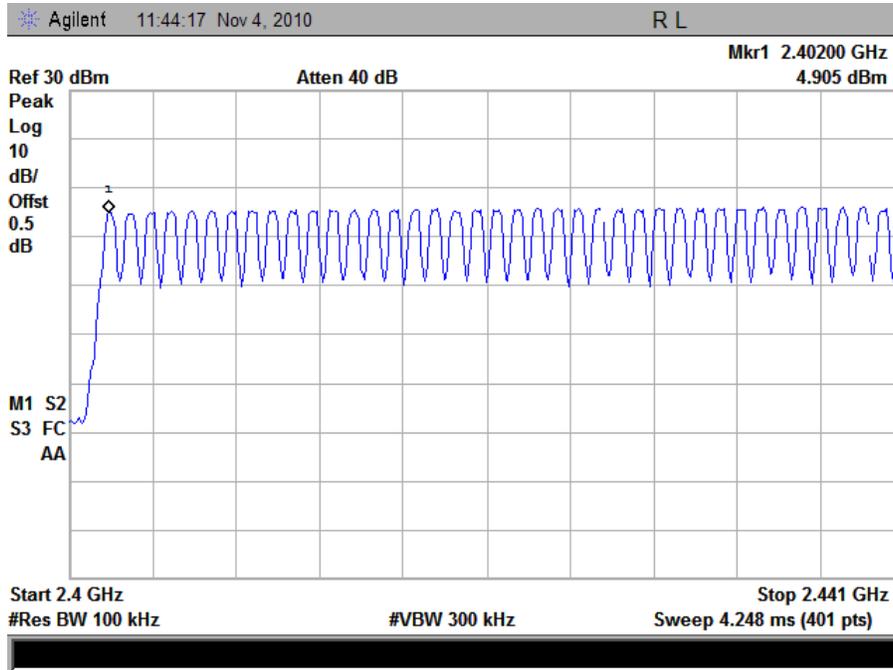
ANSI C63.10: 2009 and FCC Public Notice DA 00-705 Released March 30, 2000: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

7.3 Test Equipment Used:

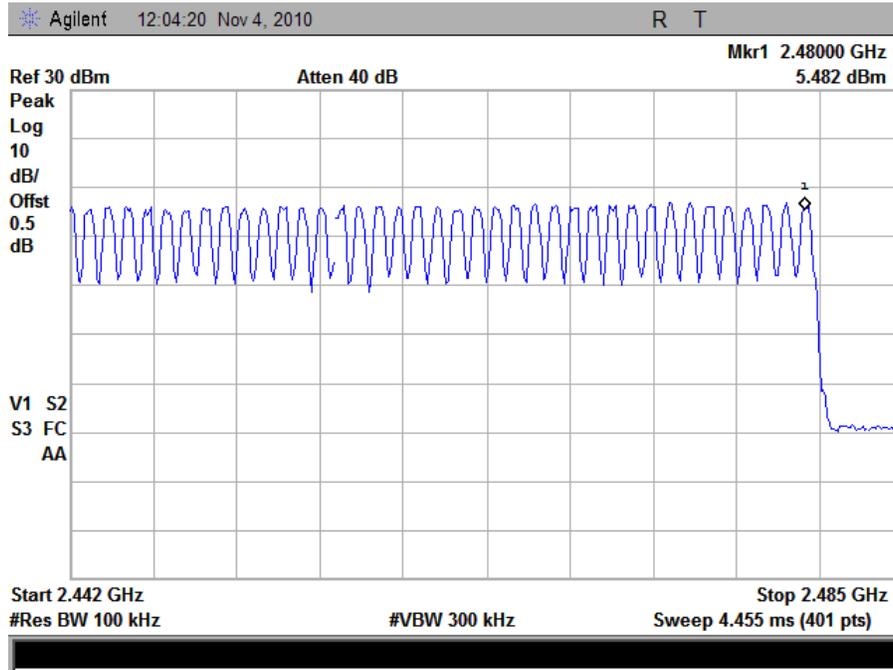
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMC Analyzer	2142	HP	E7405	9/1/2010	9/1/2011

7.4 Results:

The “Zeus” Mobile Phone Type AAJ-6880004-BV used 79 hopping channels as shown in the following plots.



Number of Hopping Channels 0 – 39



Number of Hopping Channels 40 – 78

8 Time of Occupancy

8.1 Test Limits

§ 15.247(a): Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

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

8.2 Test Procedure

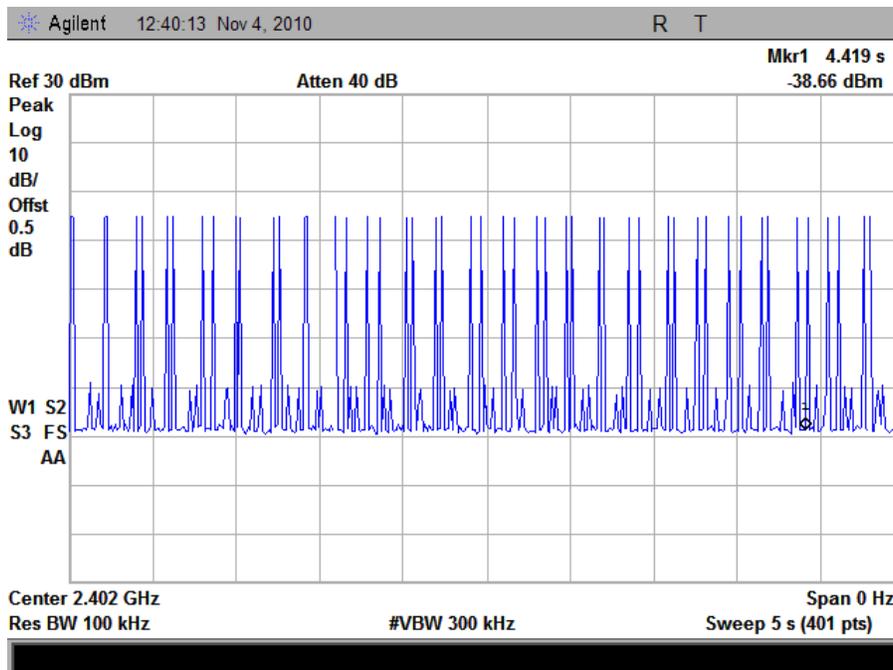
ANSI C63.10: 2009 and FCC Public Notice DA 00-705 Released March 30, 2000: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

8.3 Test Equipment Used:

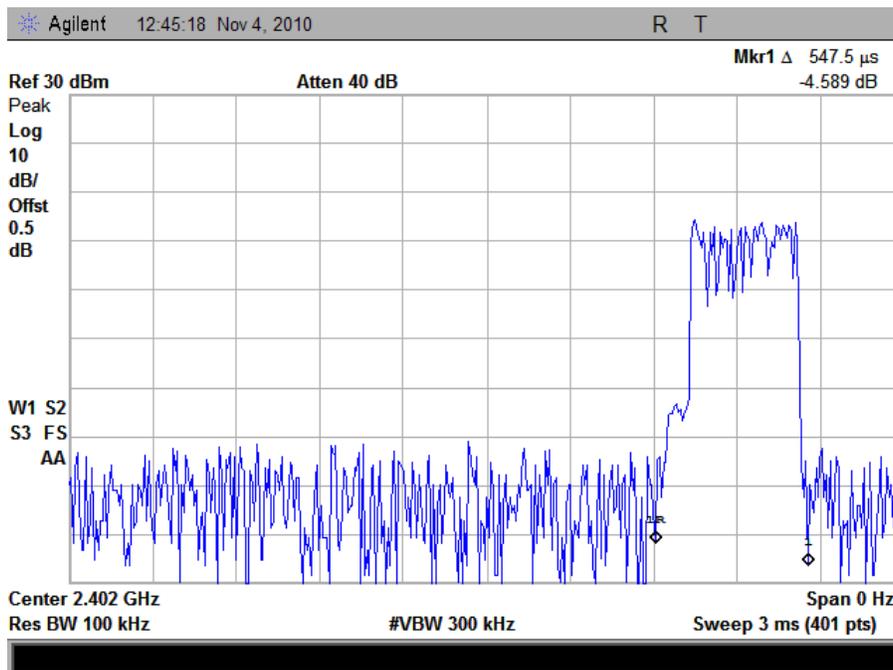
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMC Analyzer	2142	HP	E7405	9/1/2010	9/1/2011

8.4 Results:

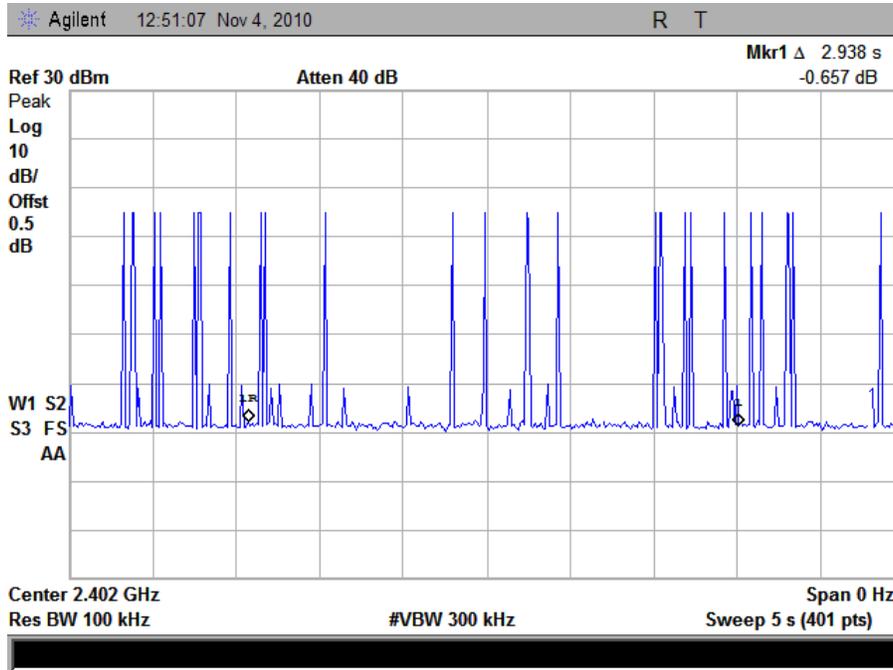
Mode	Number of Transmissions in a 31.6sec Frame (79 Hopping Ch x 0.4)	Transmission Time (mS)	Result (mS)	Limit (mS)
DH1	49 (times in 5sec) * (31.6sec / 5sec) = 310	0.548	169.88	400
DH3	25 (times in 5sec) * (31.6sec / 5sec) = 158	1.763	278.55	400
DH5	19 (times in 5sec) * (31.6sec / 5sec) = 120	3.025	363	400
Time of occupancy = Transmission Time x Number of Transmissions				



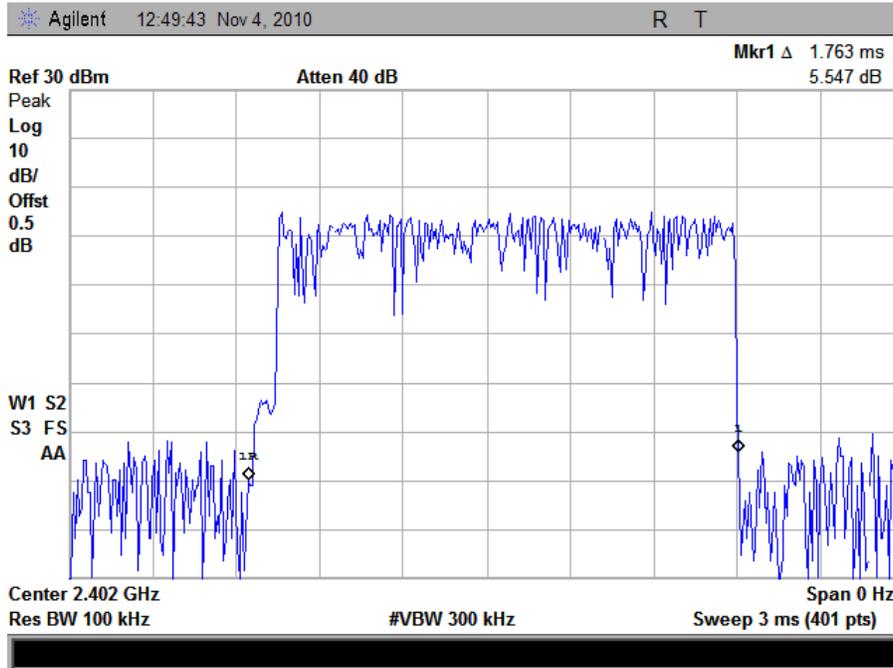
Dwell Time, DH1



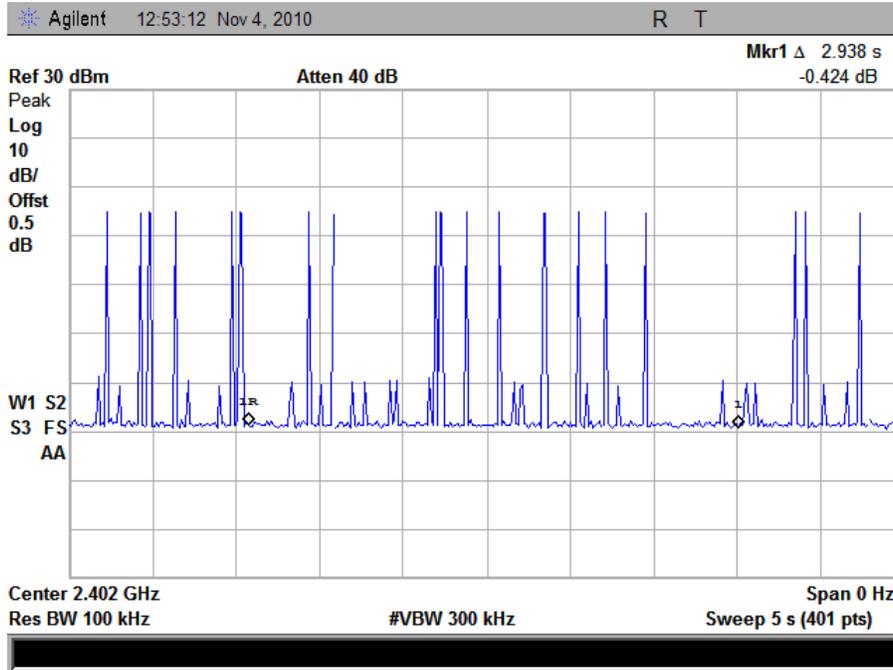
Dwell Time, DH1 (Single Pulse)



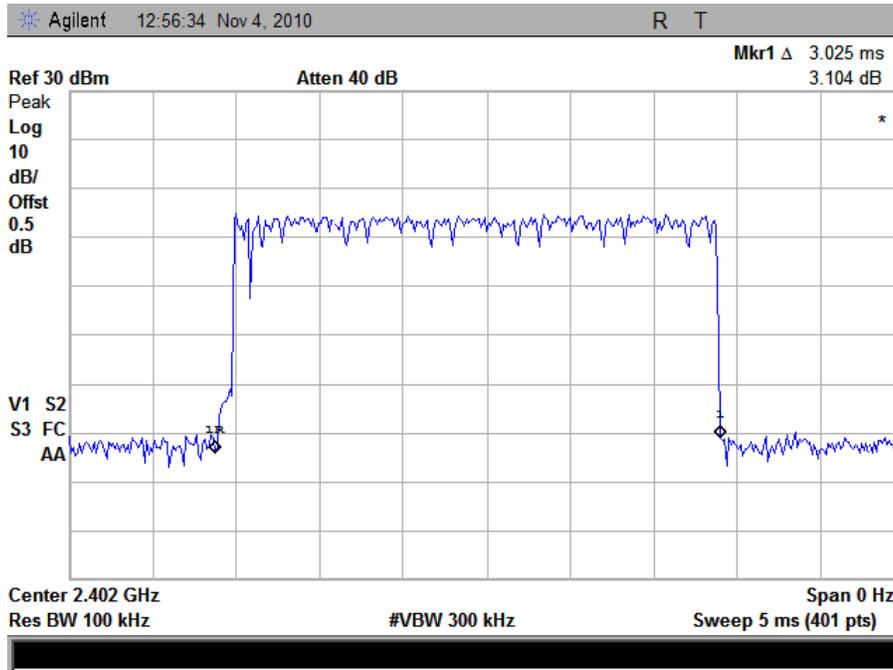
Dwell Time, DH3



Dwell Time, DH3 (Single Pulse)



Dwell Time, DH5



Dwell Time, DH5 (Single Pulse)

9 Conducted Spurious Emissions

9.1 Test Limits

§ 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

9.2 Test Procedure

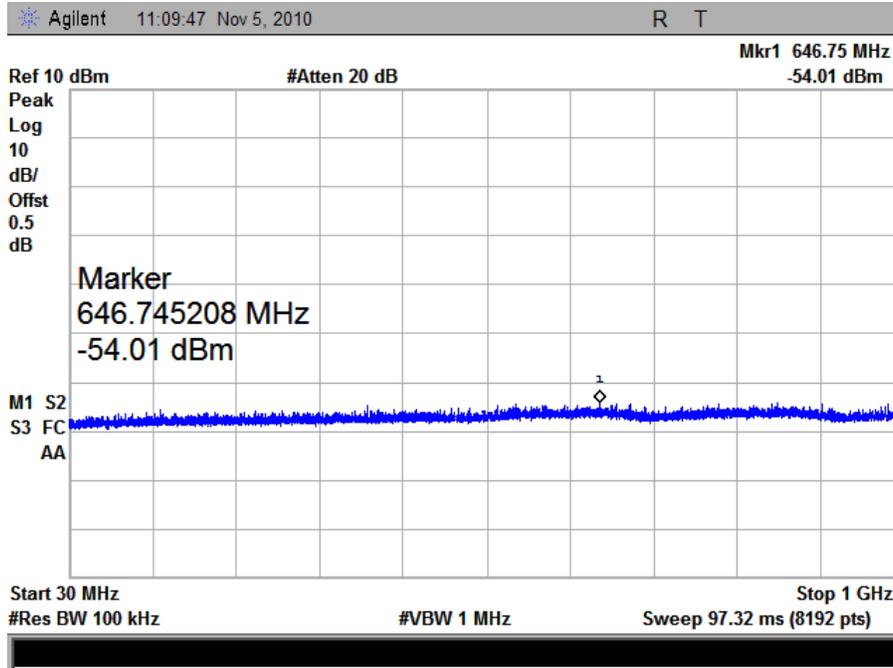
ANSI C63.10: 2009 and FCC Public Notice DA 00-705 Released March 30, 2000: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

9.3 Test Equipment Used:

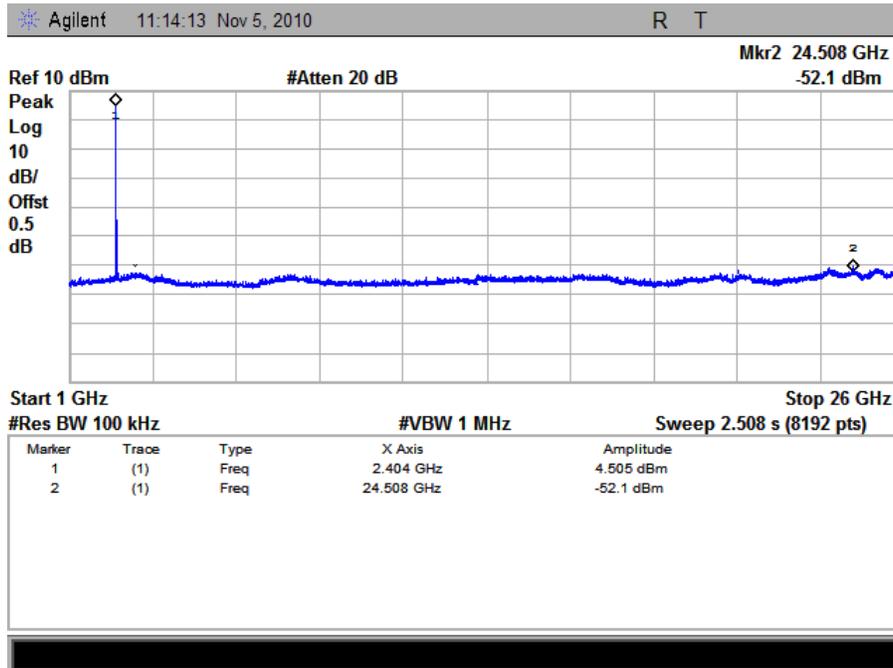
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMC Analyzer	2142	HP	E7405	9/1/2010	9/1/2011

9.4 Results:

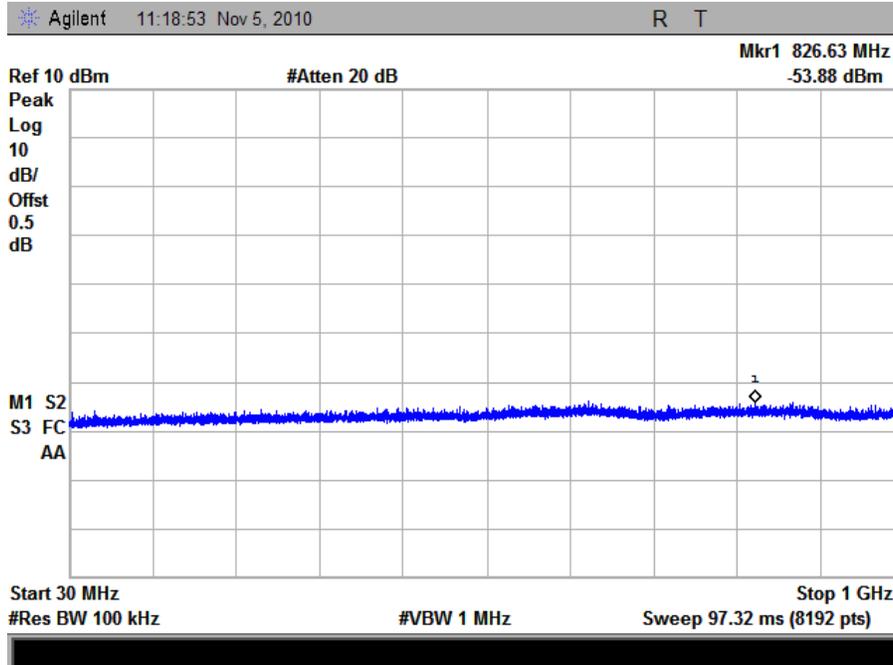
The following plots show that there are no conducted spurious emissions exceeding the 20dB down criteria. Plots are also presented showing the band edge compliance.



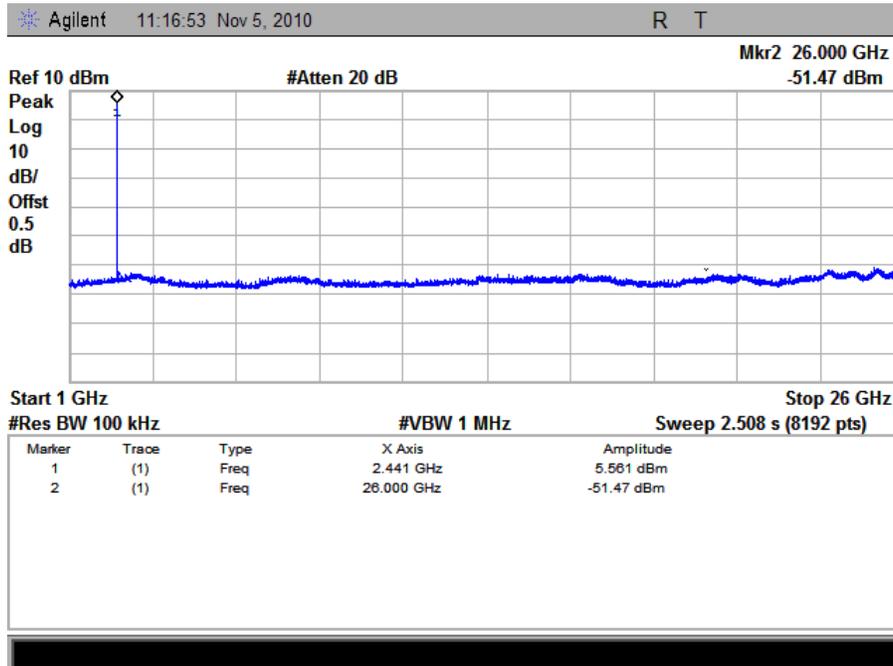
Conducted Spurious Emissions at Antenna Port Channel 0



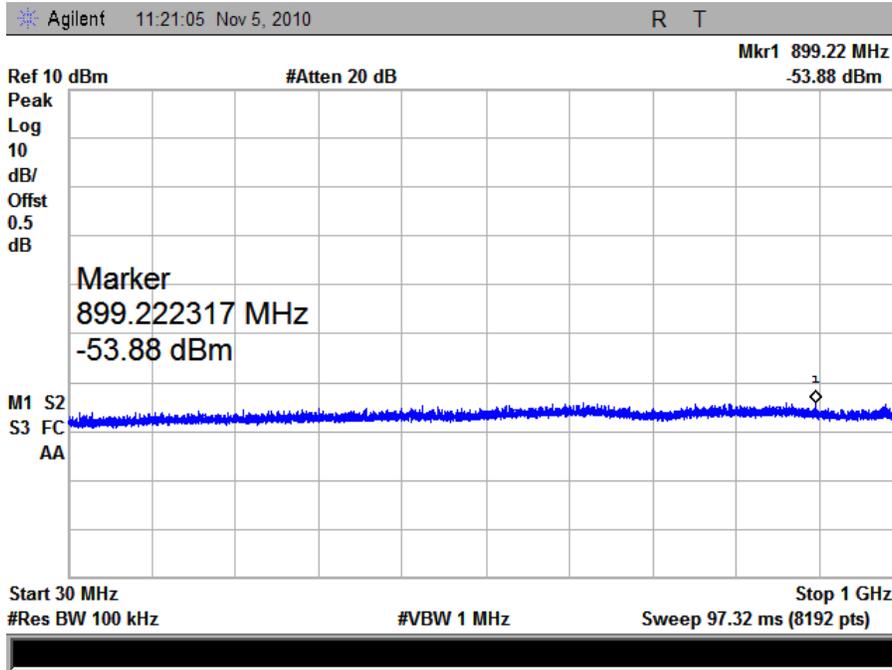
Conducted Spurious Emissions at Antenna Port Channel 0



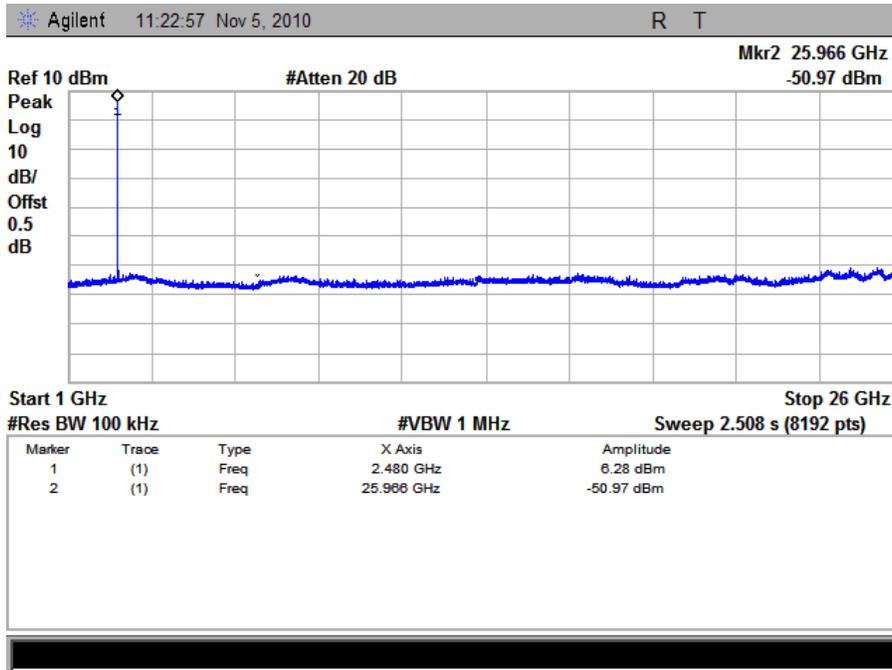
Conducted Spurious Emissions at Antenna Port Channel 39



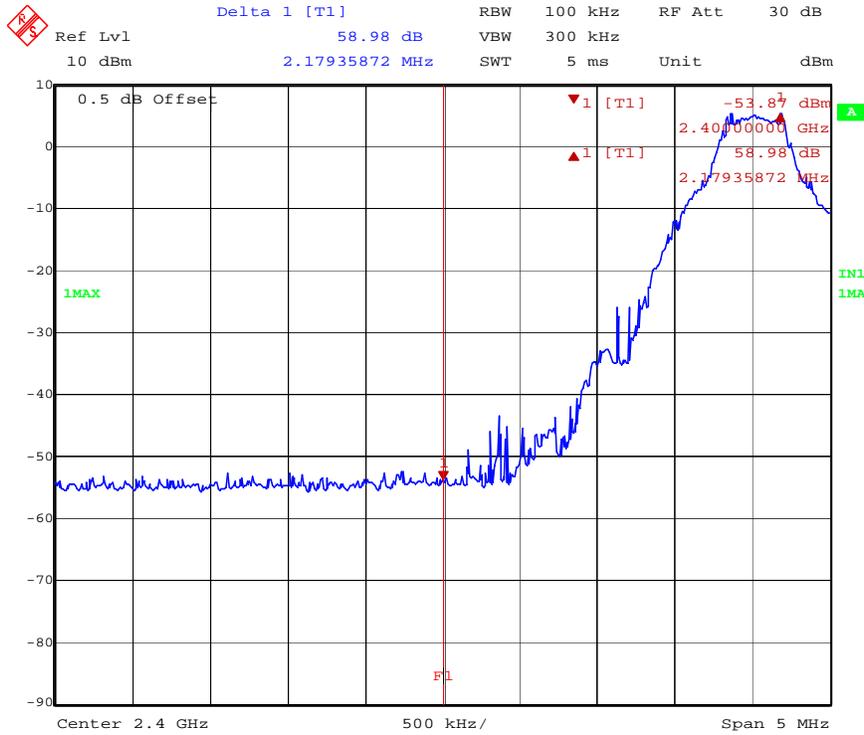
Conducted Spurious Emissions at Antenna Port Channel 39



Conducted Spurious Emissions at Antenna Port Channel 78

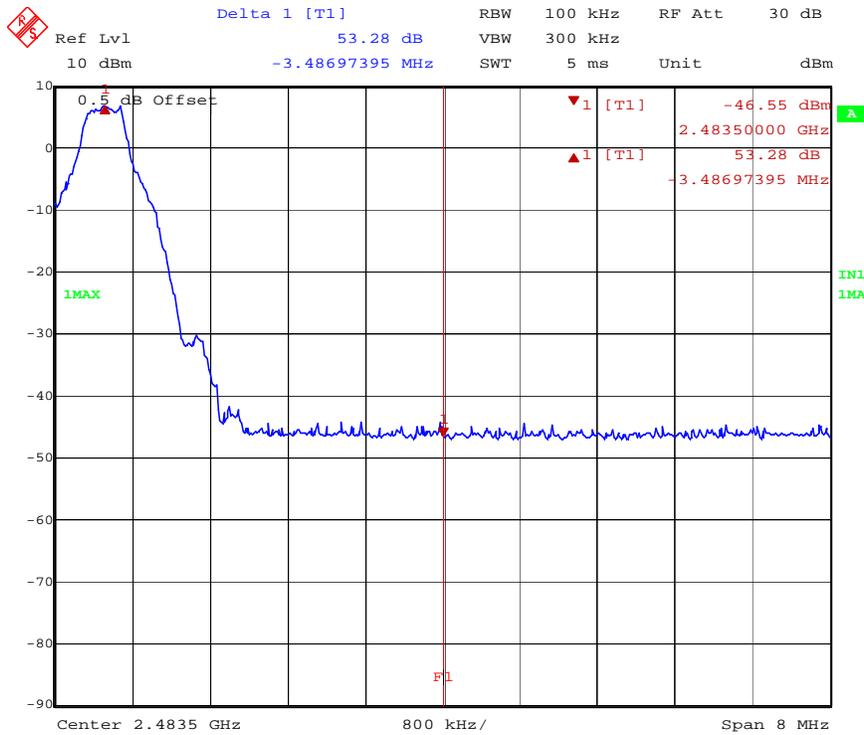


Conducted Spurious Emissions at Antenna Port Channel 78



Date: 7.JAN.2011 15:03:58

Low Band Edge Plot (Marker Delta = -58.98dB)



Date: 7.JAN.2011 14:56:40

High Band Edge Plot (Delta = -53.28dB)

10 Radiated Spurious Emissions (Transmitter)

10.1 Test Limits

§ 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Part 15.205(a): Restricted Bands of Operations

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
10.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	(²)
13.36–13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.

² Above 38.6

Part 15.209(a): Field Strength Limits for Restricted Bands of Operation

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400 / F (kHz)	300
0.490 - 1.705	24,000 / F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

10.2 Test Procedure

ANSI C63.10: 2009 and FCC Public Notice DA 00-705 Released March 30, 2000: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

10.3 Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculations are listed below:

Formula:

$$FS = RA + AF + CF$$

FS = Field Strength in dB μ V/m

RA = Receiver Amplitude in dB μ V

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB (Including preamplifier and filter attenuation)

Example Calculation:

RA = 19.48 dB μ V

AF = 18.52 dB

CF = 0.78 dB

FS = 19.48 + 18.52 + 0.78 = 38.78 dB μ V/m

Level in μ V/m = Common Antilogarithm [(38.78 dB μ V/m)/20] = 86.89 μ V/m

10.4 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2010	6/29/2011
Preamplifier	987410	Miteq	AFS44-00102000-30-10P-44	6/17/2010	6/17/2011
Preamplifier	SF456200904	Mini-Circuits	ZX60-3018G-S+	2/12/2010	2/12/2011
Biconnilog Antenna	00051864	ETS	3142C	12/21/2009	12/21/2010
Horn Antenna	6556	ETS	3115	8/9/2010	8/9/2011
System Controller	121701-1	Sunol Sciences	SC99V	Time of Use	Time of Use
High Pass Filter	3986-01 DC0408	Microwave Circuits, Inc.	H3G020G2	2/10/2010	2/10/2011

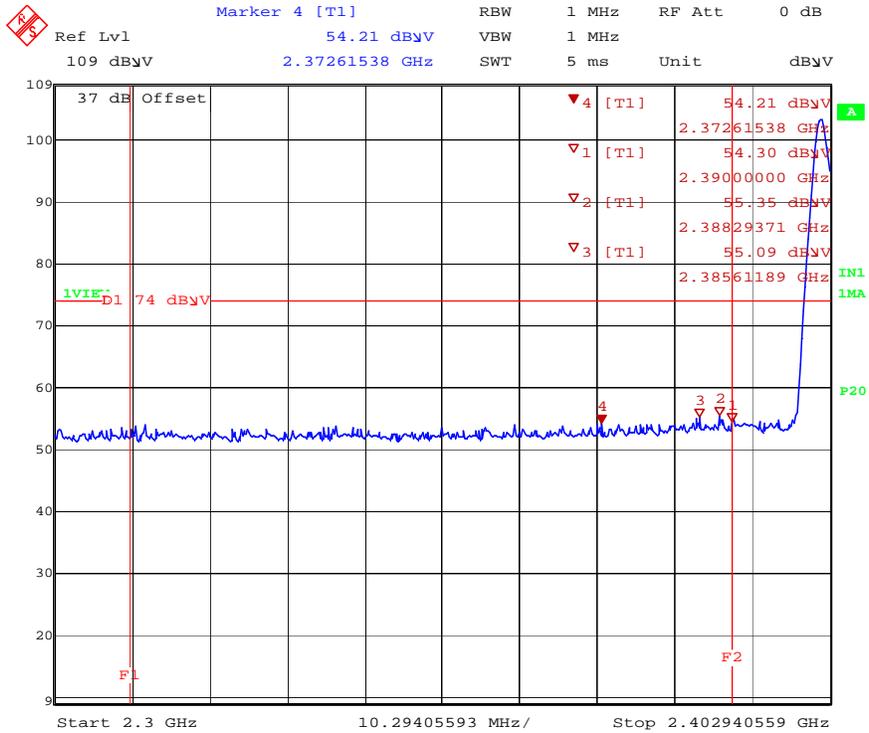
10.5 Results:

All spurious emissions were attenuated by at least 20dB below the level of the fundamental as required by Part 15.247(d). Additionally, all emissions falling within restricted bands of operation and at the band edges were found to be below the limit specified in Part 15.209(a). The spurious emissions listed in the following table are the worst case emissions. Plots are also presented showing compliance with the restricted bands immediately adjacent to the transmit band.

Worst Case Spurious Measurements

TX Channel	Spurious Frequency	Polarity	Corr. Peak Reading. (dBuV/m)	Corr. Avg Reading. (dBuV/m)	Peak Limit (dBuV/m)	Avg. Limit (dBuV/m)	Results	Comments
0	4.804 GHz	V	38.951	29.931	74	54	Compliant	Restricted Band
	7.206 GHz	V	44.066	33.906	74	54	Compliant	
	12.01 GHz	V	49.837	38.767	74	54	Compliant	Restricted Band
	4.804 GHz	H	41.551	31.081	74	54	Compliant	Restricted Band
	7.206 GHz	H	43.207	34.237	74	54	Compliant	
39	12.01 GHz	H	49.067	38.917	74	54	Compliant	Restricted Band
	4.882 GHz	V	40.584	30.584	74	54	Compliant	Restricted Band
	7.323 GHz	V	43.919	34.729	74	54	Compliant	Restricted Band
	12.205 GHz	V	47.284	37.994	74	54	Compliant	
	4.882 GHz	H	44.604	31.864	74	54	Compliant	Restricted Band
78	7.323 GHz	H	48.779	34.619	74	54	Compliant	Restricted Band
	12.205 GHz	H	47.044	37.804	74	54	Compliant	
	4.96 GHz	V	40.83	31.285	74	54	Compliant	Restricted Band
	7.44 GHz	V	42.748	35.562	74	54	Compliant	Restricted Band
	12.4 GHz	V	46.524	38.21	74	54	Compliant	
78	4.96 GHz	H	40.461	30.621	74	54	Compliant	Restricted Band
	7.44 GHz	H	43.618	35.448	74	54	Compliant	Restricted Band
	12.4 GHz	H	48.685	38.715	74	54	Compliant	

*Emissions were investigated with the test sample positioned in 3 orthogonal axis and the worst case reported.



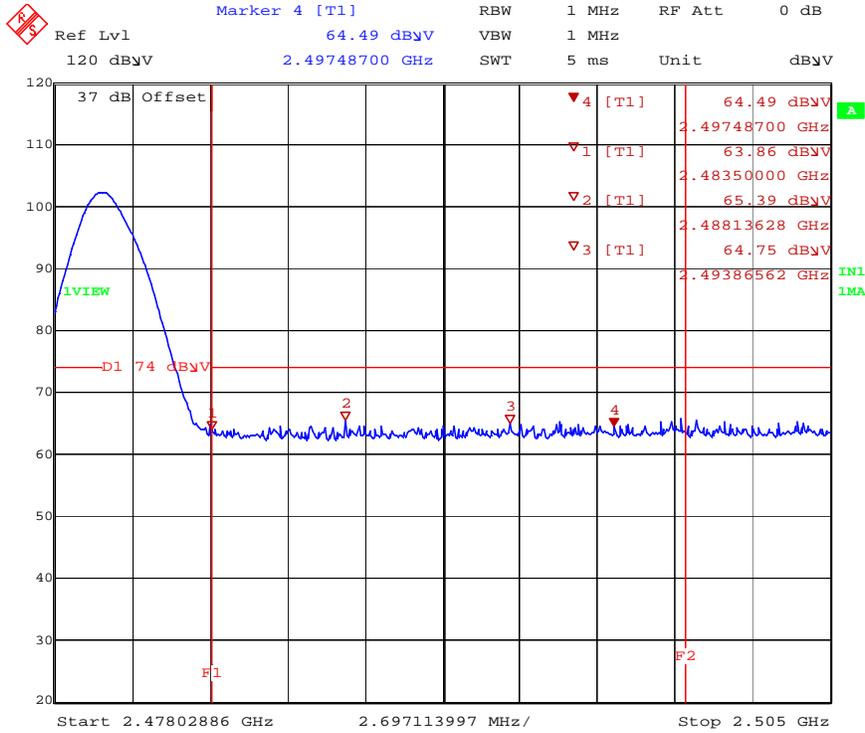
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Low Channel Band Edge Emissions (Peak Detection)



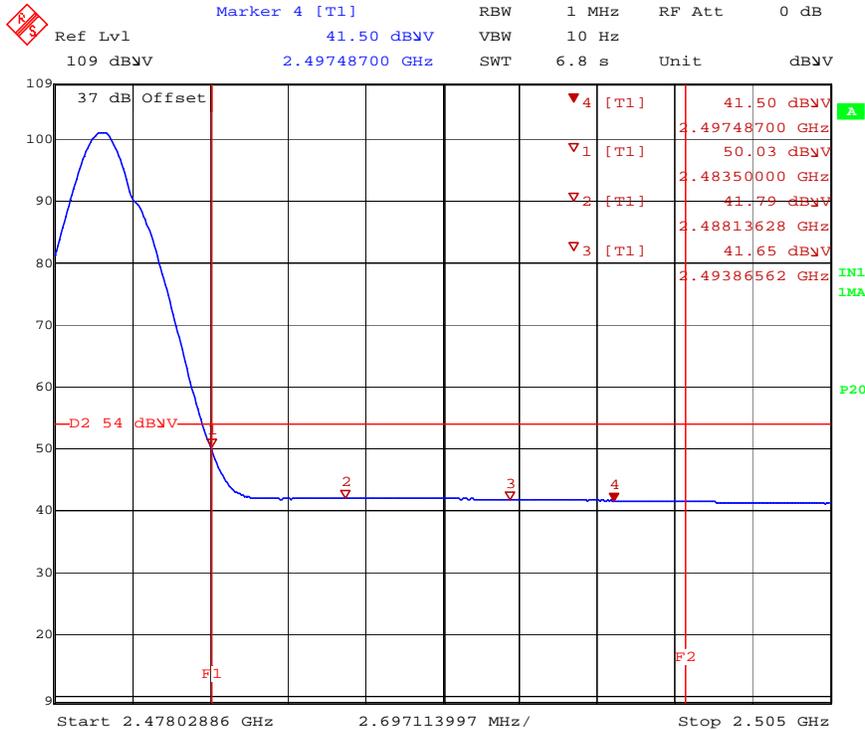
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Low Channel Band Edge Emissions (Average Detection)



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High Channel Band Edge Emissions (Peak Detection)



Date: 10.JAN.2011 09:08:37

High Channel Band Edge Emissions (Average Detection)

11 Radiated Spurious Emissions (Receiver)

11.1 Test Limits

§ 15.109: Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/meter)	Field strength (dBuV/m)
30–88	100	40
88–216	150	43.5
216–960	200	46
Above 960	500	54

These limits are identical to those in RSS-GEN

11.2 Test Procedure

ANSI C63.4: 2003

11.3 Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculations are listed below:

Formula:

$$FS = RA + AF + CF$$

FS = Field Strength in dB μ V/m

RA = Receiver Amplitude in dB μ V

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB (Including preamplifier and filter attenuation)

Example Calculation:

$$RA = 19.48 \text{ dB}\mu\text{V}$$

$$AF = 18.52 \text{ dB}$$

$$CF = 0.78 \text{ dB}$$

$$FS = 19.48 + 18.52 + 0.78 = 38.78 \text{ dB}\mu\text{V/m}$$

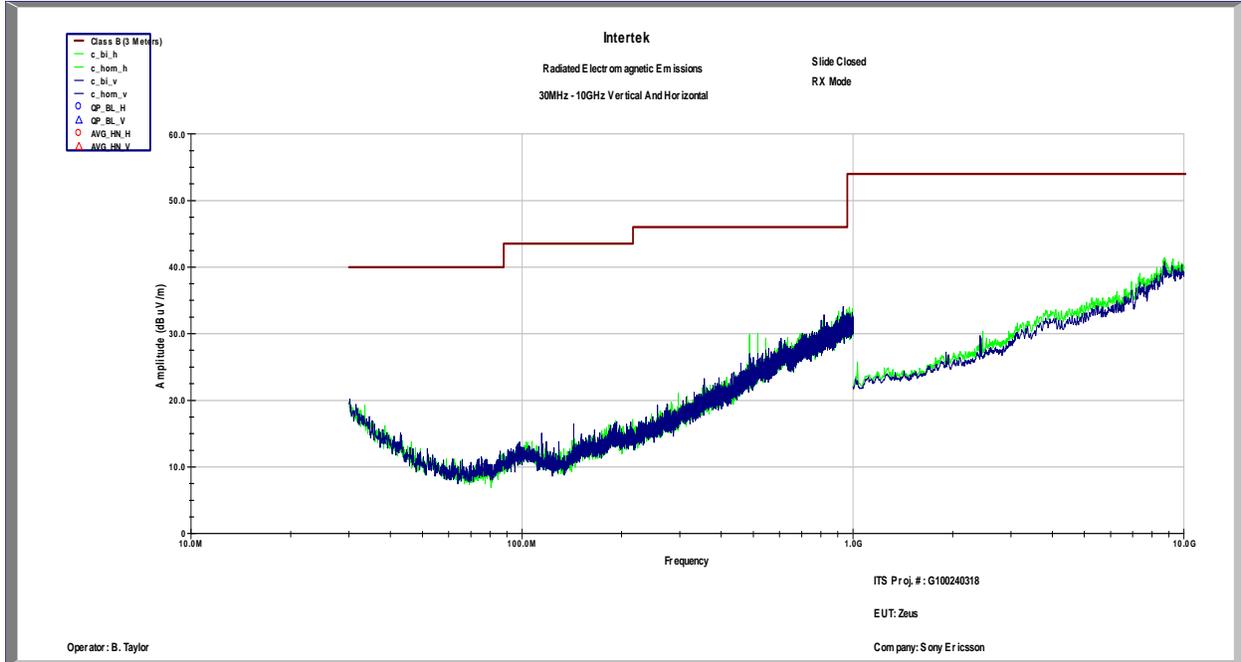
$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(38.78 \text{ dB}\mu\text{V/m})/20] = 86.89 \mu\text{V/m}$$

11.4 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2010	6/29/2011
Preamplifier	SF456200904	Mini-Circuits	ZX60-3018G-S+	2/12/2010	2/12/2011
Biconnilog Antenna	00051864	ETS	3142C	12/21/2009	12/21/2010
System Controller	121701-1	Sunol Sciences	SC99V	Time of Use	Time of Use

11.5 Results:

All spurious emissions with the test sample in receive mode were below the limits specified in Part 15.109 for a class B digital device and RSS-GEN Section 6.1. All peak detected emissions were at least 15dB below the limit.



Peak Scan (Receive Mode)

12 AC Powerline Conducted Emissions

12.1 Test Limits

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

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	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.

12.2 Test Procedure

ANSI C63.4: 2003

12.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2010	6/29/2011
LISN	3333	Teseq	NNB52	2/23/2010	2/23/2011

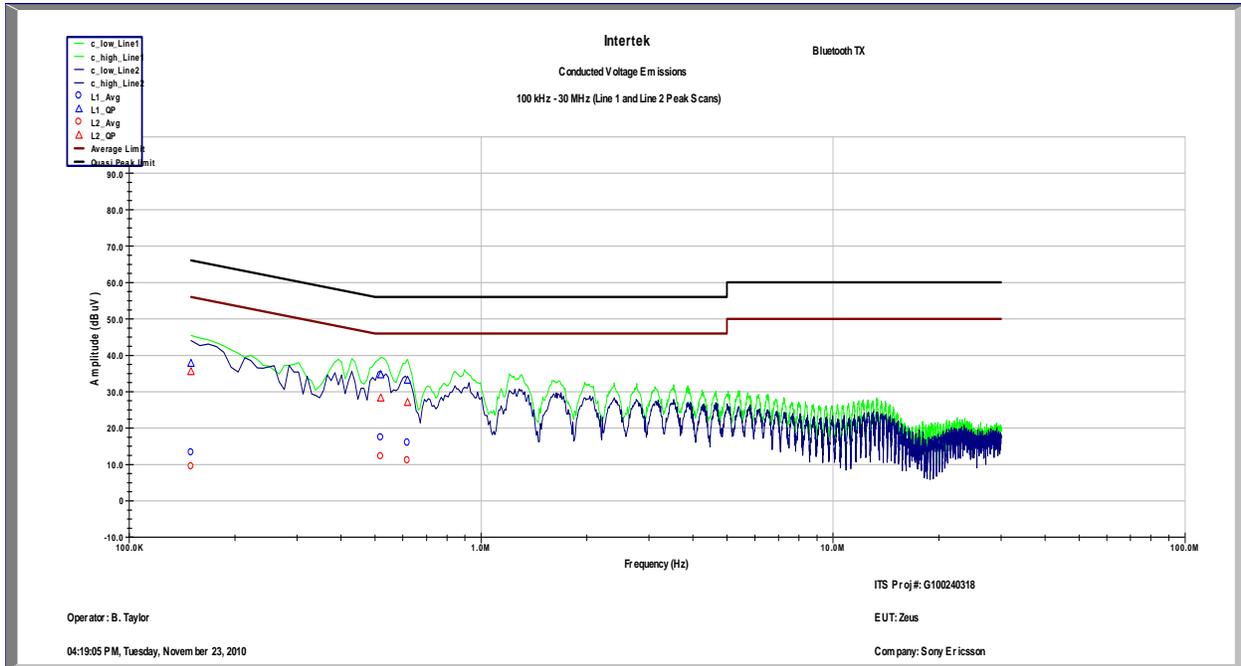
12.4 Results:

Conducted Voltage Emissions on Power Lines								
Test Engineer: Bryan Taylor		Start Date: 11/23/2010		End Date: 11/23/2010				
Temperature: 22.1C		Humidity: 46.40%		Pressure: 989.4mBar				
Specification: FCC Part 15		Test Limit: Class B		RBW: 9kHz				
Notes: Tested in Bluetooth Mode								
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Line 1	150.0 KHz	37.76	66	-28.24	13.26	56	-42.74	Compliant
Line 1	519.0 KHz	34.57	56	-21.43	17.34	46	-28.66	Compliant
Line 1	618.0 KHz	33.09	56	-22.91	15.9	46	-30.1	Compliant
Line 2	150.0 KHz	35.48	66	-30.52	9.42	56	-46.58	Compliant
Line 2	519.0 KHz	28.23	56	-27.77	12.15	46	-33.85	Compliant
Line 2	618.0 KHz	27.01	56	-28.99	11.05	46	-34.95	Compliant

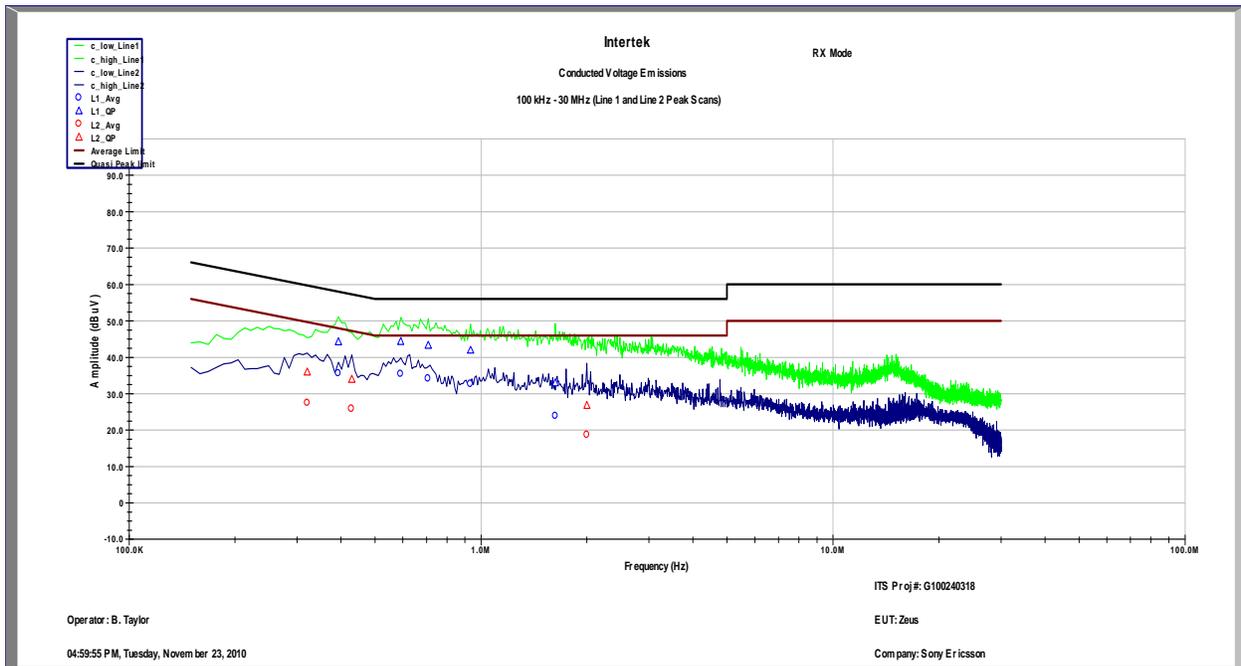
Quasi-Peak and Average Measurements (Bluetooth Transmitting Mode)

Conducted Voltage Emissions on Power Lines								
Test Engineer: Bryan Taylor		Start Date: 11/23/2010		End Date: 11/23/2010				
Temperature: 22.1C		Humidity: 46.40%		Pressure: 989.4mBar				
Specification: FCC Part 15		Test Limit: Class B		RBW: 9kHz				
Notes: Tested in Receive Mode								
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Line 1	393.0 KHz	44.21	58	-13.79	35.53	48	-12.47	Compliant
Line 1	591.0 KHz	44.29	56	-11.71	35.36	46	-10.64	Compliant
Line 1	708.0 KHz	43.26	56	-12.74	34.11	46	-11.89	Compliant
Line 1	933.0 KHz	41.92	56	-14.08	32.62	46	-13.38	Compliant
Line 1	1.626 MHz	32.97	56	-23.03	23.77	46	-22.23	Compliant
Line 2	321.0 KHz	35.93	59.68	-23.75	27.37	49.68	-22.31	Compliant
Line 2	429.0 KHz	33.91	57.27	-23.36	25.77	47.27	-21.5	Compliant
Line 2	1.999 MHz	26.78	56	-29.22	18.67	46	-27.33	Compliant

Quasi-Peak and Average Measurements (Receive Mode)



Peak Scan (Line 1 and 2) – Bluetooth Transmit Mode



Peak Scan (Line 1 and 2) – Receive Mode

13 Antenna Requirement per FCC Part 15.203**13.1 Test Limits**

§ 15.203: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

13.2 Results:

The sample tested met the antenna requirement. The antenna used was permanently attached and integral to the PCB.

14 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of $k = 2$, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty	Notes
Radiated emissions, 30 to 1000 MHz	+3.9dB	
Radiated emissions, 1 to 18 GHz	+4.2dB	
Radiated emissions, 18 to 40 GHz	+4.3dB	
Power Port Conducted emissions, 150kHz to 30 MHz	+2.8dB	

15 Revision History

Revision Level	Date	Report Number	Notes
0	1/7/2011	100240318LEX-003	Original Issue