

TEST REPORT

**ACCORDING TO: FCC 47CFR part 15 subpart C § 15.247 and
RSS-210 issue 7, Annex 8**

FOR:

Yoggie Security Systems Ltd.

Wireless network application card

Model: Constant Connect and Protect

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1 Applicant information

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E-mail: ami@yoggie.com
Contact name: Mr. Ami Oz

2 Equipment under test attributes

Product name: Wireless network application card
Product type: Transceiver operating in 2412 – 2472 MHz range (802.11b/g protocol) /
2402 – 2480 MHz range (Core v2.1 + EDR protocol)
Model(s): Constant Connect and Protect
Serial number: 00000001
OEM Part number: 210-SA-00001
Lenovo Part number: 3321-20U
Receipt date: 5/14/2009

3 Manufacturer information

Manufacturer name: Yoggie Security Systems Ltd.
Address: Block 310, P.O.Box 156, Beth Halevy 42870, Israel
Telephone: +972 9894 4900
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E-Mail: ami@yoggie.com
Contact name: Mr. Ami Oz




4 Test details

Project ID: 19597
Location: Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started: 5/14/2009
Test completed: 6/17/2009
Test specification(s): FCC 47CFR part 15, subpart C §15.247 and RSS-210 issue 7, Annex 8 (FHSS)

5 Tests summary

Test	Status
Transmitter characteristics	
FCC Section 15.247(a)1, (g), (h), RSS-210 section A8.1(a), Frequency hopping requirements	Pass
FCC Section 15.247(a)1, RSS-210 section A8.1(a), 20 dB bandwidth	Pass
FCC Section 15.247(a)1, RSS-210 section A8.1(b), Frequency separation	Pass
FCC Section 15.247(a)1, RSS-210 section A8.1(d), Number of hopping frequencies	Pass
FCC Section 15.247(a)1, RSS-210 section A8.1(d), Average time of occupancy	Pass
FCC Section 15.247(b)(1), RSS-210 section A8.4(2), Peak output power	Pass
FCC Section 15.247(i), RSS-Gen, section 5.5, RF exposure	Pass
FCC Section 15.247(d), RSS-210 section A8.5, Emissions at band edges	Pass
FCC Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions	Pass
FCC Section 15.203, RSS-Gen, section 7.1.4, Antenna requirements	Pass
FCC Section 15.207(a), RSS-Gen section 7.2.2, Conducted emission	Pass

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested.
The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

	Name and Title	Date	Signature
Tested by:	Mr. L. Markel, test engineer	June 17, 2009	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	June 22, 2009	
Approved by:	Mr. M. Nikishin, EMC and radio group manager	June 23, 2009	

6 EUT description

6.1 General information

The EUT is a wireless card inserted into a laptop. It supports Wi-Fi and Bluetooth protocols and can transmit in one mode only at a time. No simultaneous transmission is allowed.

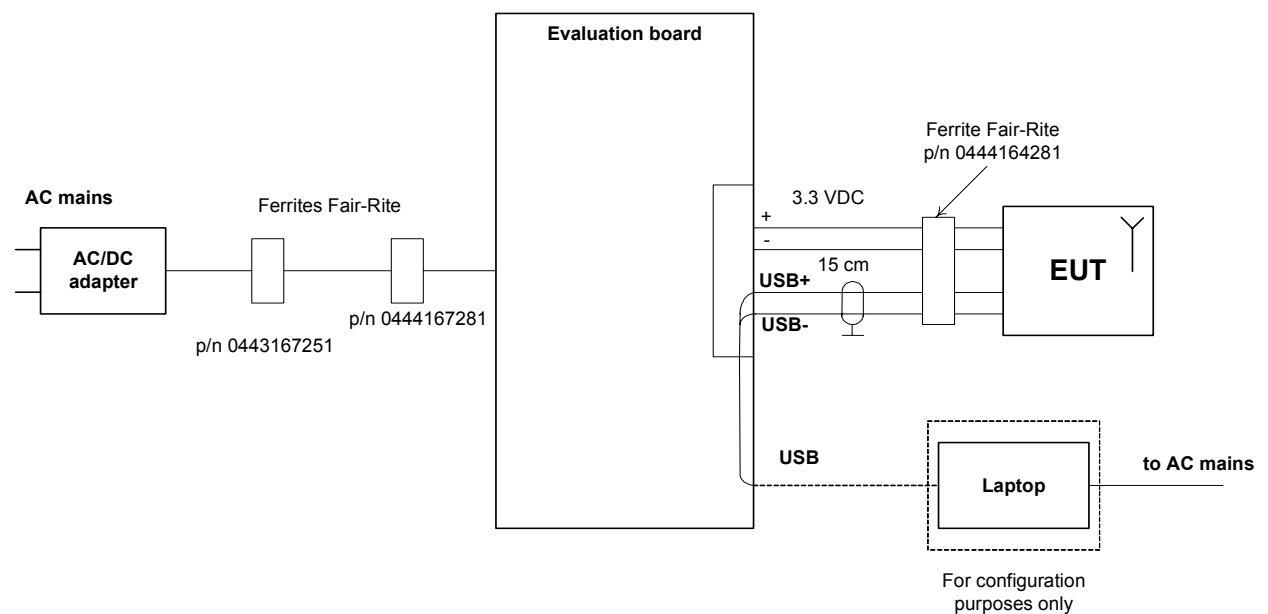
6.2 Ports and lines

Port type	Port description	Connected from	Connected to	Qty.	Cable type	Cable Length, m
Signal	USB	Evaluation board	Laptop	1	Shielded	1.5
Signal	Express card	EUT	Evaluation board	1	Shielded	0.15
Power	DC Power	Evaluation board	EUT	1	Unshielded	0.15
Power	DC Power	AC/DC adaptor	Evaluation board	1	Unshielded	1.5
Power	AC mains	AC/DC adapter	AC mains	1	2-pole wall-outlet	NA

6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Evaluation board	Yoggie Security Systems	2.1	000-PB-00301
Laptop	Lenovo	T400	L3-D754808/10

6.4 Test configuration



6.5 EUT configuration during the field strength measurement tests

Figure 6.5.1 The EUT in X-axis orthogonal position

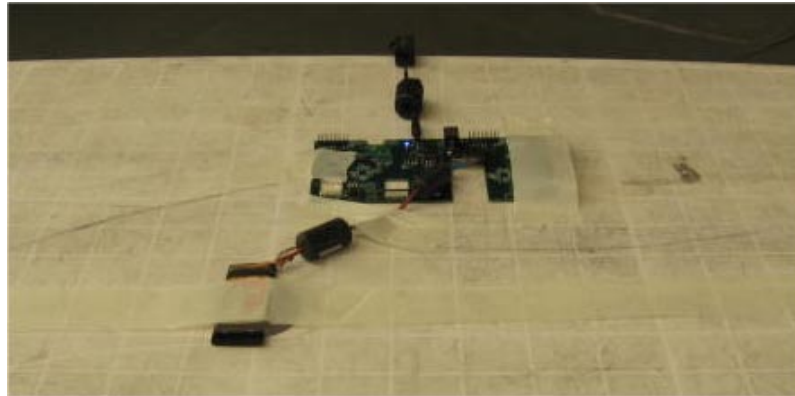


Figure 6.5.2 The EUT in Y-axis orthogonal position

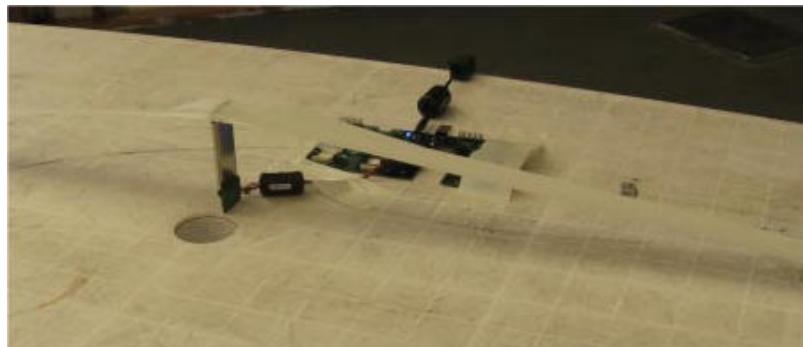
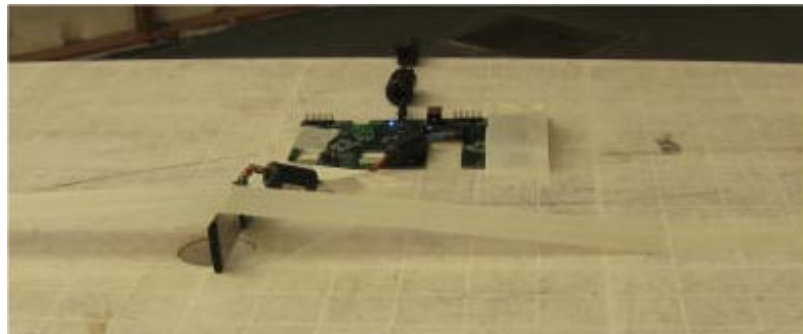


Figure 6.5.3 The EUT in Z-axis orthogonal position



6.6 Transmitter characteristics (Bluetooth)

Type of equipment			
<input type="checkbox"/> Stand-alone (Equipment with or without its own control provisions)			
<input type="checkbox"/> Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)			
<input checked="" type="checkbox"/> Plug-in card (Equipment intended for a variety of host systems)			
Intended use		Condition of use	
<input type="checkbox"/> fixed		Always at a distance more than 2 m from all people	
<input checked="" type="checkbox"/> mobile		Always at a distance more than 20 cm from all people	
<input type="checkbox"/> portable		May operate at a distance closer than 20 cm to human body	
Assigned frequency range		2400 – 2483.5 MHz	
Operating frequency range		2402 - 2480 MHz	
RF channel spacing		1, 2 MHz	
Maximum peak output power		At transmitter 50 Ω RF output connector	dBm
		Effective radiated power (for equipment with no RF connector)	-9.55 dBm
Is transmitter output power variable?		<input checked="" type="checkbox"/> No	
		<input type="checkbox"/> Yes	continuous variable
			stepped variable with stepsize
Antenna connection			
<input type="checkbox"/> unique coupling	<input type="checkbox"/> standard connector	<input checked="" type="checkbox"/> integral	<input type="checkbox"/> with temporary RF connector
			<input checked="" type="checkbox"/> without temporary RF connector
Antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Ceramic Chip Antenna	Pulse Engineering	P/N W3008E	3 dBi
Transmitter 99% power bandwidth	Type of modulation		Transmitter aggregate data rate/s, MBps
1 MHz	GFSK		1
2 MHz	DQPSK		2
2 MHz	8DPSK		3
Modulation type		FHSS	
Maximum transmitter duty cycle in normal use		50%	
Maximum transmitter duty cycle for test purposes		94 %	
Transmitter power source			
<input type="checkbox"/> V	<input type="checkbox"/> DC (PoE)	Nominal rated voltage	Battery type
			3.3 VDC
<input type="checkbox"/>	<input type="checkbox"/> AC mains	Nominal rated voltage	Frequency
			NA
Common power source for transmitter and receiver		<input checked="" type="checkbox"/> V	<input type="checkbox"/> yes <input type="checkbox"/> no

Test specification:	Section 15.247(a)1,(g),(h) / RSS-210, Section A8.1(a), Frequency hopping requirements		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/8/2009 4:12:15 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

7 Transmitter tests according to 47CFR part 15 subpart C and RSS-210 Annex 8 requirements

7.1 Frequency hopping requirements

The EUT was verified for compliance with frequency hopping requirements listed below:

- The EUT shall hop to channel frequencies that are selected from a pseudo-randomly ordered list;
- Each hopping frequency shall be used equally on the average;
- The EUT receiver shall have input bandwidth that match the hopping channel bandwidth of the corresponding transmitter and shall shift frequencies in synchronization with the transmitted signals;
- The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

The rationale for compliance with the above requirements was either test results or supplier declaration. The summary of results is provided in Table 7.1.1.

Table 7.1.1 Frequency hopping requirements

Requirement	Rationale	Verdict
The EUT shall hop to channel frequencies that are selected from a pseudo-randomly ordered list	Supplier declaration (refer to Table 7.1.2)	Comply
Each hopping frequency shall be used equally on the average	Supplier declaration	Comply
The EUT receiver shall have input bandwidth that match the hopping channel bandwidth of the corresponding transmitter	Supplier declaration	Comply
The EUT receiver shall shift frequencies in synchronization with the transmitted signals	Supplier declaration	Comply
Each transmitter operates independently and there is no synchronization with other transmitters for purposes other than to avoid simultaneous channel occupancy	Supplier declaration	Comply

Table 7.1.2 Frequency channel assignment

Frequency [MHz]	Frequency Assignment	Frequency [MHz]	Frequency Assignment	Frequency [MHz]	Frequency Assignment	Frequency [MHz]	Frequency Assignment
2402.00	F1	2422.00	F21	2442.00	F41	2462.00	F61
2403.00	F2	2423.00	F22	2443.00	F42	2463.00	F62
2404.00	F3	2424.00	F23	2444.00	F43	2464.00	F63
2405.00	F4	2425.00	F24	2445.00	F44	2465.00	F64
2406.00	F5	2426.00	F25	2446.00	F45	2466.00	F65
2407.00	F6	2427.00	F26	2447.00	F46	2467.00	F66
2408.00	F7	2428.00	F27	2448.00	F47	2468.00	F67
2409.00	F8	2429.00	F28	2449.00	F48	2469.00	F68
2410.00	F9	2430.00	F29	2450.00	F49	2470.00	F69
2411.00	F10	2431.00	F30	2451.00	F50	2471.00	F70
2412.00	F11	2432.00	F31	2452.00	F51	2472.00	F71
2413.00	F12	2433.00	F32	2453.00	F52	2473.00	F72
2414.00	F13	2434.00	F33	2454.00	F53	2474.00	F73
2415.00	F14	2435.00	F34	2455.00	F54	2475.00	F74
2416.00	F15	2436.00	F35	2456.00	F55	2476.00	F75
2417.00	F16	2437.00	F36	2457.00	F56	2477.00	F76
2418.00	F17	2438.00	F37	2458.00	F57	2478.00	F77
2419.00	F18	2439.00	F38	2459.00	F58	2479.00	F78
2420.00	F19	2440.00	F39	2460.00	F59	2480.00	F79
2421.00	F20	2441.00	F40	2461.00	F60		F80

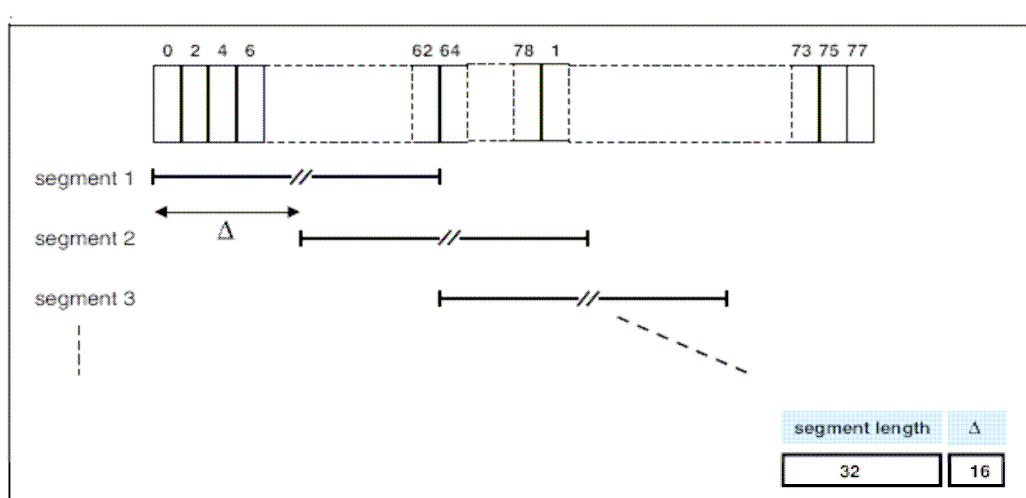


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Test specification:	Section 15.247(a)1,(g),(h) / RSS-210, Section A8.1(a), Frequency hopping requirements		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/8/2009 4:12:15 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

NOTE: According to BLUETOOTH Specifications the selection scheme chooses a segment of 32 hop frequencies spanning about 64 MHz and visits these hops in pseudo-random order. Next, a different 32-hop segment is chosen, etc. In the page, master page response, slave page response, page scan, inquiry, inquiry response and inquiry scan hopping sequences, the same 32-hop segment is used all the time (the segment is selected by the address; different devices will have different paging segments). When the basic channel hopping sequence is selected, the output constitutes a pseudo-random sequence that slides through the 79 hops.

Figure 7.1.1 Hop selection scheme



Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(a), 20 dB bandwidth		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:24:52 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

7.2 20 dB bandwidth

7.2.1 General

This test was performed to measure 20 dB bandwidth of the transmitter hopping channel. Specification test limits are given in Table 7.2.1.

Table 7.2.1 The 20 dB bandwidth limits

Assigned frequency, MHz	Maximum bandwidth, kHz	Modulation envelope reference points*, dBc
902.0 – 928.0	500	20
2400.0 – 2483.5	NA	
5725.0 – 5850.0	1000	

* - Modulation envelope reference points provided in terms of attenuation below the peak of modulated carrier.

7.2.2 Test procedure

7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.

7.2.2.2 The EUT was set to transmit modulated carrier at maximum data rate.

7.2.2.3 The transmitter bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.2.2 and associated plot.

7.2.2.4 The test was repeated for each data rate and each modulation format.

Figure 7.2.1 The 20 dB bandwidth test setup





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Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(a), 20 dB bandwidth		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:24:52 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Table 7.2.2 The 20 dB bandwidth test results

ASSIGNED FREQUENCY BAND: 2400.0 – 2483.5 MHz
 DETECTOR USED: Peak
 SWEEP TIME: Auto
 RESOLUTION BANDWIDTH: $\geq 1\%$ of the 20 dB bandwidth
 VIDEO BANDWIDTH: \geq RBW
 MODULATION ENVELOPE REFERENCE POINTS: 20.0 dBc
 MODULATING SIGNAL: PRBS
 FREQUENCY HOPPING: Disabled

Carrier frequency, MHz	Type of modulation	Data rate, Mbps	20 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
Low frequency						
2402.00	GFSK	1	960.0	NA	NA	Pass
2402.00	DQPSK	2	1380.0	NA	NA	Pass
2402.00	8DPSK	3	1365.0	NA	NA	Pass
Mid frequency						
2437.00	GFSK	1	975.0	NA	NA	Pass
2437.00	DQPSK	2	1380.0	NA	NA	Pass
2437.00	8DPSK	3	1357.5	NA	NA	Pass
High frequency						
2480.00	GFSK	1	967.5	NA	NA	Pass
2480.00	DQPSK	2	1372.5	NA	NA	Pass
2480.00	8DPSK	3	1357.0	NA	NA	Pass

Reference numbers of test equipment used

HL 1116	HL 2780	HL 2911						
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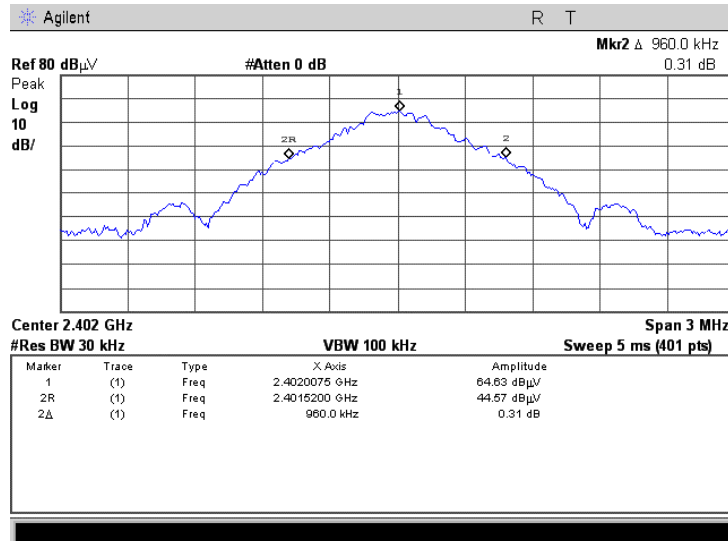
Full description is given in Appendix A.



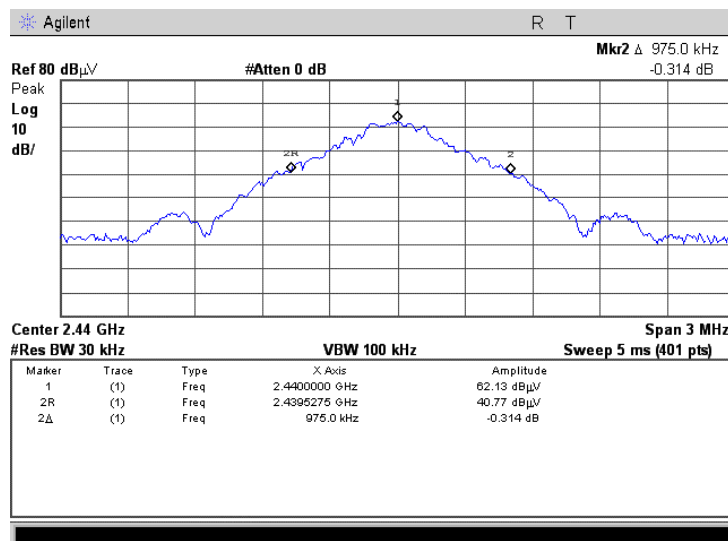
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Test specification:		Section 15.247(a)1/ RSS-210, Section A8.1(a), 20 dB bandwidth	
Test procedure:		Public notice DA 00-705	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 3:24:52 PM	
Temperature: 23°C		Air Pressure: 1009 hPa	Relative Humidity: 42%
Remarks:		Power Supply: 3.3 VDC	

Plot 7.2.1 The 20 dB bandwidth test result at low frequency with GFSK modulation @ 1 Mbps



Plot 7.2.2 The 20 dB bandwidth test result at mid frequency with GFSK modulation @ 1 Mbps

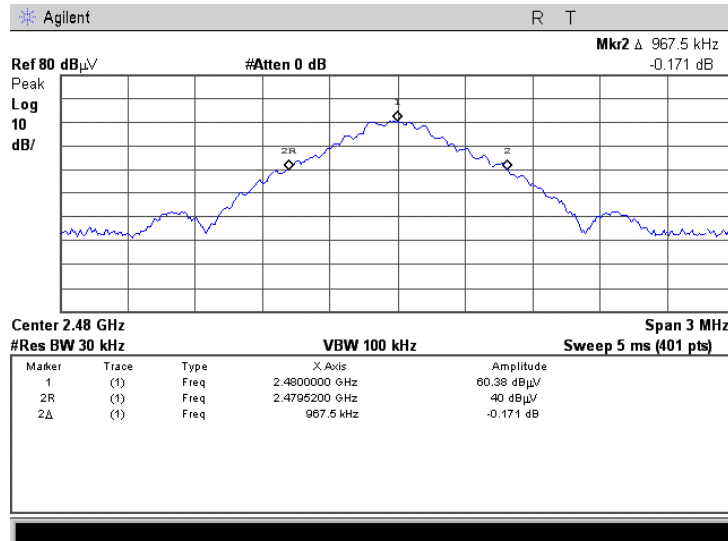




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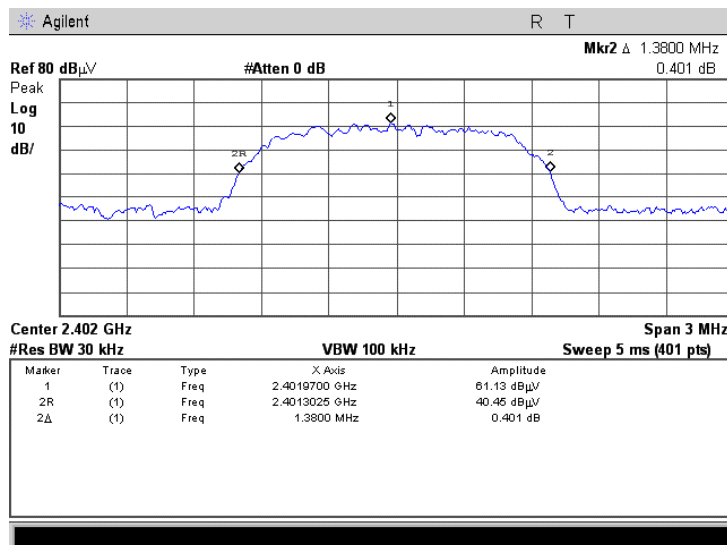
Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(a), 20 dB bandwidth		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:24:52 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.3 The 20 dB bandwidth test result at high frequency with GFSK modulation @ 1 Mbps

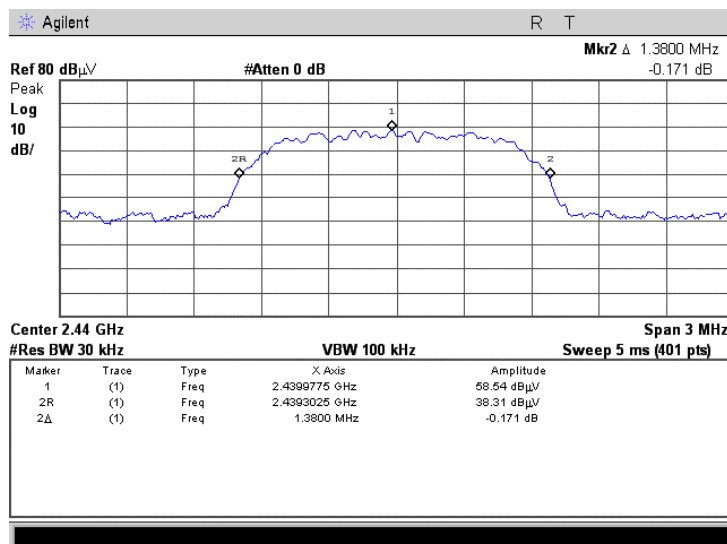


Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(a), 20 dB bandwidth		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:24:52 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.4 The 20 dB bandwidth test result at low frequency with DQPSK modulation @ 2 Mbps



Plot 7.2.5 The 20 dB bandwidth test result at mid frequency with DQPSK modulation @ 2 Mbps

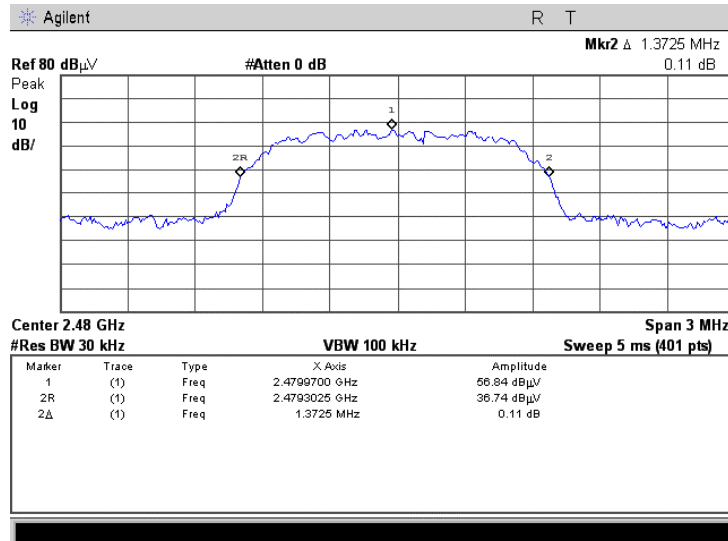




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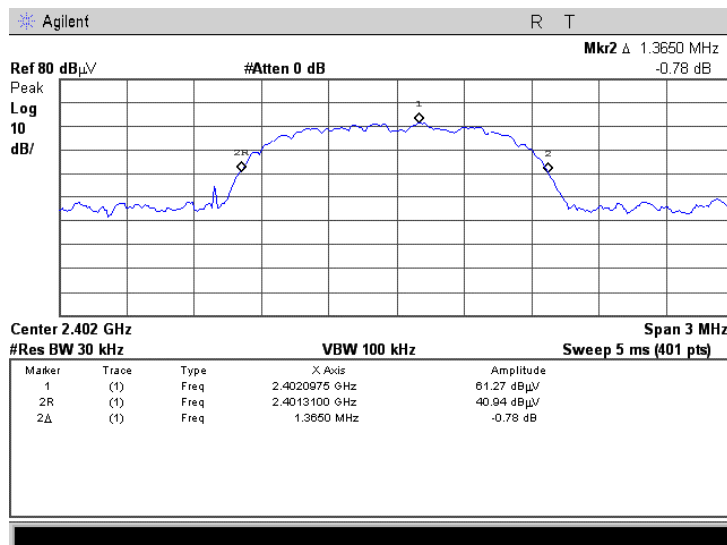
Test specification:		Section 15.247(a)1/ RSS-210, Section A8.1(a), 20 dB bandwidth	
Test procedure:		Public notice DA 00-705	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 3:24:52 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.6 The 20 dB bandwidth test result at high frequency with DQPSK modulation @ 2 Mbps

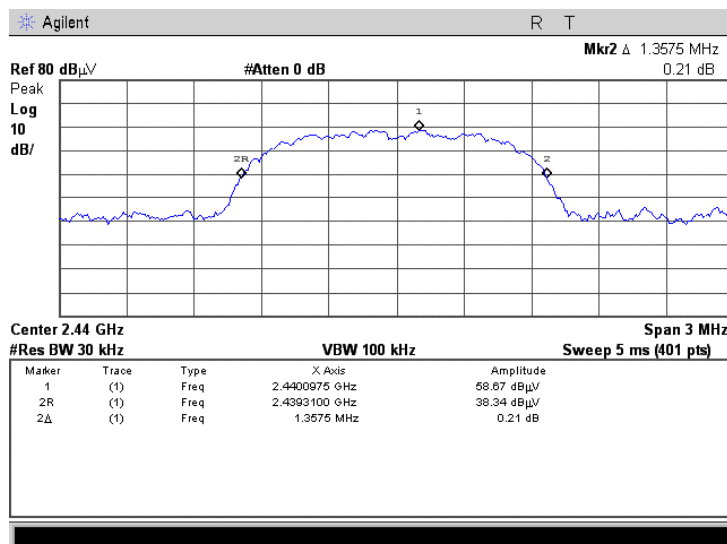


Test specification:		Section 15.247(a)1/ RSS-210, Section A8.1(a), 20 dB bandwidth	
Test procedure:		Public notice DA 00-705	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 3:24:52 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.7 The 20 dB bandwidth test result at low frequency with 8DPSK modulation @ 3 Mbps



Plot 7.2.8 The 20 dB bandwidth test result at mid frequency with 8DPSK modulation @ 3 Mbps

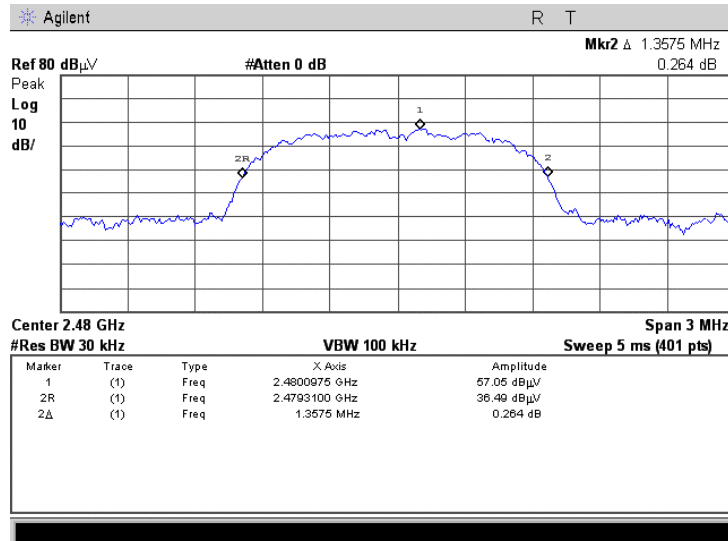




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Test specification:		Section 15.247(a)1/ RSS-210, Section A8.1(a), 20 dB bandwidth	
Test procedure:		Public notice DA 00-705	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 3:24:52 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.9 The 20 dB bandwidth test result at high frequency with 8DPSK modulation @ 3 Mbps



Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(b), Frequency separation		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/8/2009 4:44:17 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

7.3 Carrier frequency separation

7.3.1 General

This test was performed to measure frequency separation between the peaks of adjacent channels. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Carrier frequency separation limits

Assigned frequency range, MHz	Carrier frequency separation
902.0 – 928.0	25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater
2400.0 – 2483.5	
5725.0 – 5850.0	

7.3.2 Test procedure

- 7.3.2.1** The EUT was set up as shown in Figure 7.3.1, energized with frequency hopping function enabled and its proper operation was checked.
- 7.3.2.2** The spectrum analyzer span was set to capture the carrier frequency and both of adjacent channels, the lower and the higher. The resolution bandwidth was set wider than 1 % of the frequency span.
- 7.3.2.3** The spectrum analyzer was set in max hold mode and allowed trace to stabilize.
- 7.3.2.4** The frequency separation between the peaks of adjacent channels was measured as provided in Table 7.3.2 and associated plots.

Figure 7.3.1 Carrier frequency separation test setup





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Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(b), Frequency separation		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	6/8/2009 4:44:17 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

Table 7.3.2 Carrier frequency separation test results

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz
 MODULATION: GFSK, DQPSK, 8DPSK
 MODULATING SIGNAL: PRBS
 BIT RATE: 1/2/3 Mbps
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: $\geq 1\%$ of the span
 VIDEO BANDWIDTH: \geq RBW
 FREQUENCY HOPPING: Disabled*
 20 dB BANDWIDTH: 975.0 kHz for GFSK
 1380.0 kHz for DQPSK
 1365.0 kHz for 8DQPSK

Carrier frequency separation, kHz	Limit, kHz	Margin**	Verdict
GFSK 1 Mbps			
1995.0	975.0	-1020.0	Pass
DQPSK 2 Mbps			
2017.5	1380.0	-637.5	Pass
8DPSK 3 Mbps			
2002.5	1365.0	-637.5	Pass

*NOTE: Each channel was set manually.

** - Margin = Carrier frequency separation – specification limit.

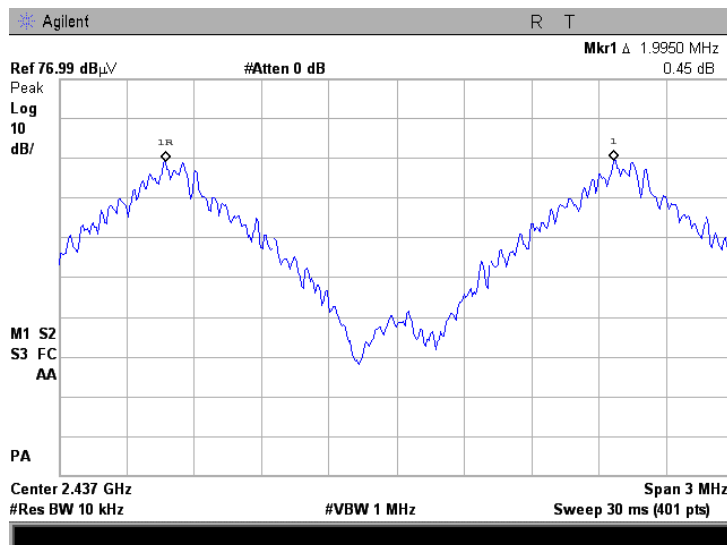
Reference numbers of test equipment used

HL 1116	HL 2780	HL 2869					
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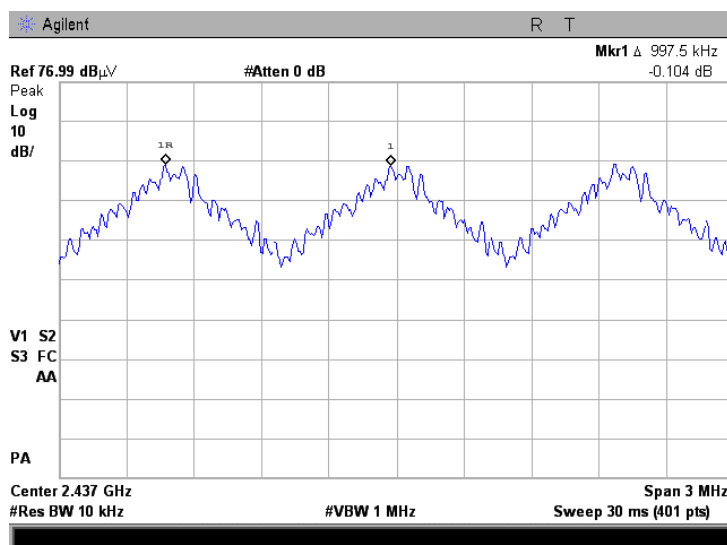
Full description is given in Appendix A.

Test specification:		Section 15.247(a)1/ RSS-210, Section A8.1(b), Frequency separation			
Test procedure:		Public notice DA 00-705			
Test mode:		Compliance		Verdict: PASS	
Date & Time:		6/8/2009 4:44:17 PM			
Temperature: 24°C		Air Pressure: 1012 hPa		Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:					

Plot 7.3.1 Carrier frequency separation, frequency hopping disabled, GFSK two even channels at hopping sequence

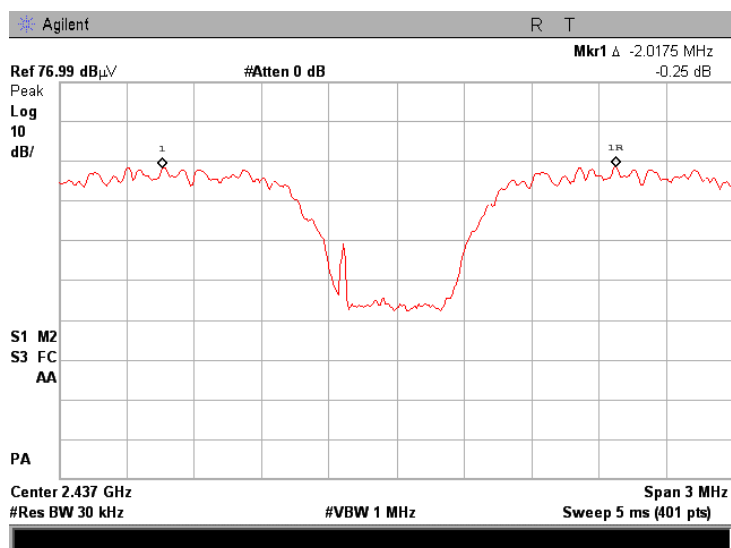


Plot 7.3.2 Carrier frequency separation, frequency hopping disabled, GFSK modulation

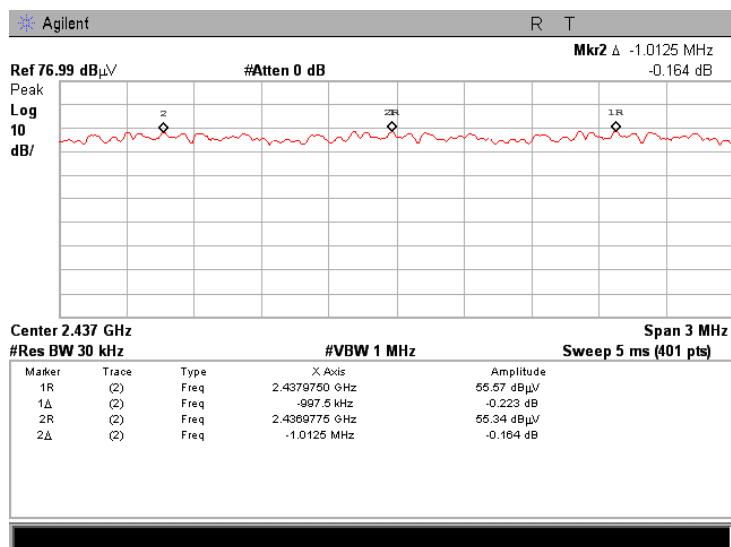


Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(b), Frequency separation				
Test procedure:	Public notice DA 00-705				
Test mode:	Compliance	Verdict:			PASS
Date & Time:	6/8/2009 4:44:17 PM				
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC		
Remarks:					

Plot 7.3.3 Carrier frequency separation, frequency hopping disabled, DQPSK two even channels at hopping sequence

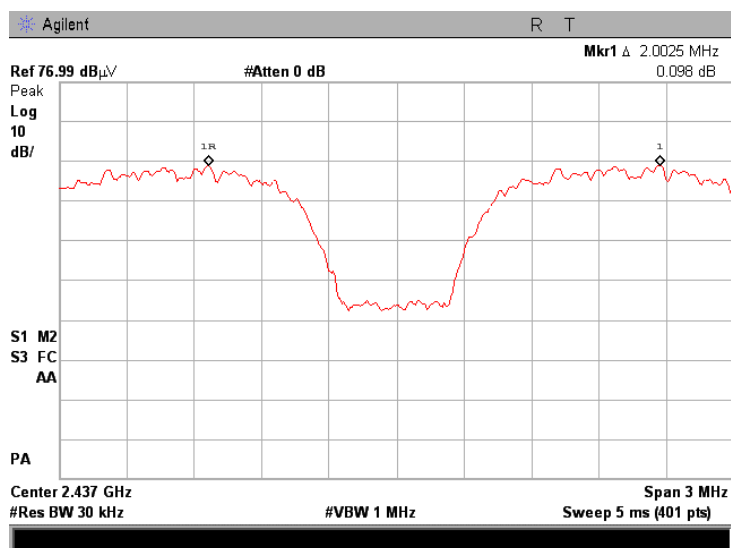


Plot 7.3.4 Carrier frequency separation, frequency hopping disabled, DQPSK modulation

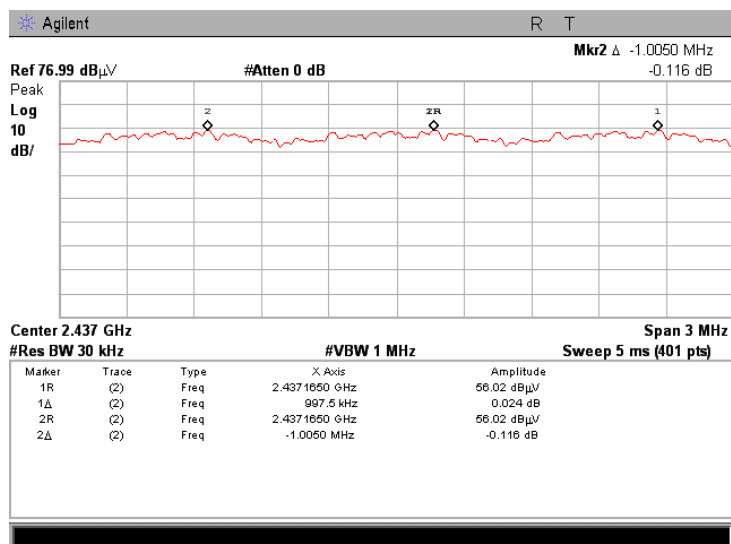


Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(b), Frequency separation		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	6/8/2009 4:44:17 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.3.5 Carrier frequency separation, frequency hopping disabled, 8DPSK two even channels at hopping sequence



Plot 7.3.6 Carrier frequency separation, frequency hopping disabled, 8DQPSK modulation

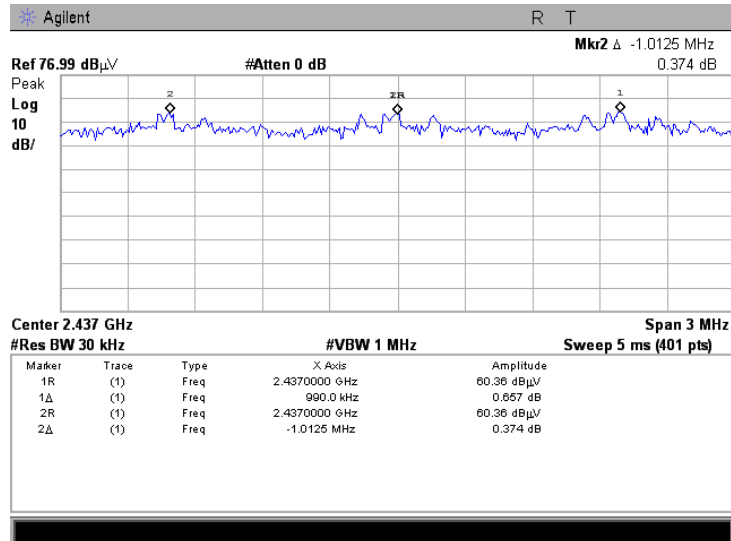




HERMON LABORATORIES

Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(b), Frequency separation		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/8/2009 4:44:17 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.3.7 Carrier frequency separation, frequency hopping disabled



Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(d), Number of hopping frequencies		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/8/2009 4:44:30 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

7.4 Number of hopping frequencies

7.4.1 General

This test was performed to calculate the number of hopping frequencies used by the EUT. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Minimum number of hopping frequencies

Assigned frequency range, MHz	Number of hopping frequencies
902.0 – 928.0	50 (if the 20 dB bandwidth is less than 250 kHz) 25 (if the 20 dB bandwidth is 250 kHz or greater)
2400.0 – 2483.5	15
5725.0 – 5850.0	75

7.4.2 Test procedure

7.4.2.1 The EUT was set up as shown in Figure 7.4.1, energized with frequency hopping function enabled and its proper operation was checked.

7.4.2.2 Initially the spectrum analyzer span was set equal to frequency band of operation and the resolution bandwidth was set wider than 1 % of the frequency span. If the separate hopping channels were not clearly resolved the frequency band of operation was broken to sections and the resolution bandwidth was set wider than 1 % of the frequency span of each section.

7.4.2.3 The spectrum analyzer was set in max hold mode and allowed trace to stabilize.

7.4.2.4 The number of frequency hopping channels was calculated as provided in Table 7.4.2 and associated plots.

Figure 7.4.1 Hopping frequencies test setup





HERMON LABORATORIES

Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(d), Number of hopping frequencies		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/8/2009 4:44:30 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

Table 7.4.2 Hopping frequencies test results

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz
 MODULATION: GFSK
 MODULATING SIGNAL: PRBS
 BIT RATE: 1 / 2 / 3 Mbps
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: $\geq 1\%$ of the span
 VIDEO BANDWIDTH: \geq RBW
 FREQUENCY HOPPING: Disabled

Number of hopping frequencies	Minimum number of hopping frequencies	Margin*	Verdict
79	15	-64	Pass

* - Margin = Number of hopping frequencies – Minimum number of hopping frequencies.

Reference numbers of test equipment used

HL 1116	HL 1424	HL 2869					
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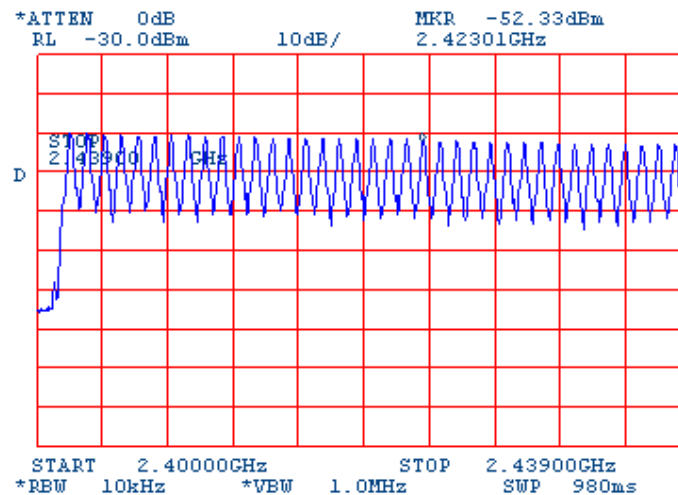
Full description is given in Appendix A.



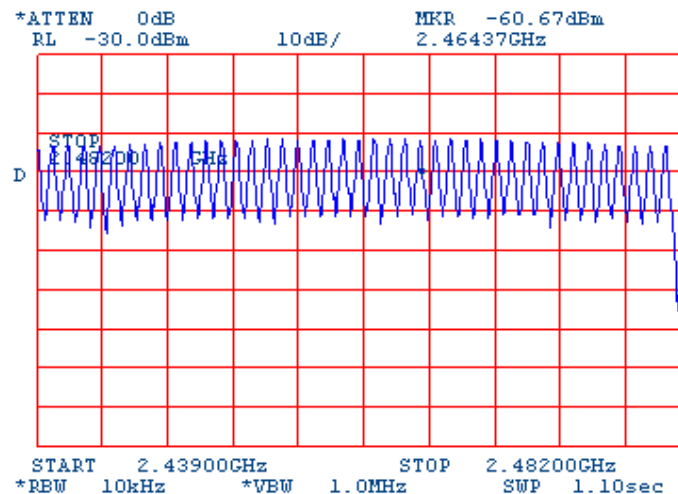
HERMON LABORATORIES

Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(d), Number of hopping frequencies		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/8/2009 4:44:30 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.4.1 Number of hopping frequencies, hopping disabled, GFSK modulation @ 1 Mbps



Plot 7.4.2 Number of hopping frequencies, hopping disabled, GFSK modulation @ 1 Mbps

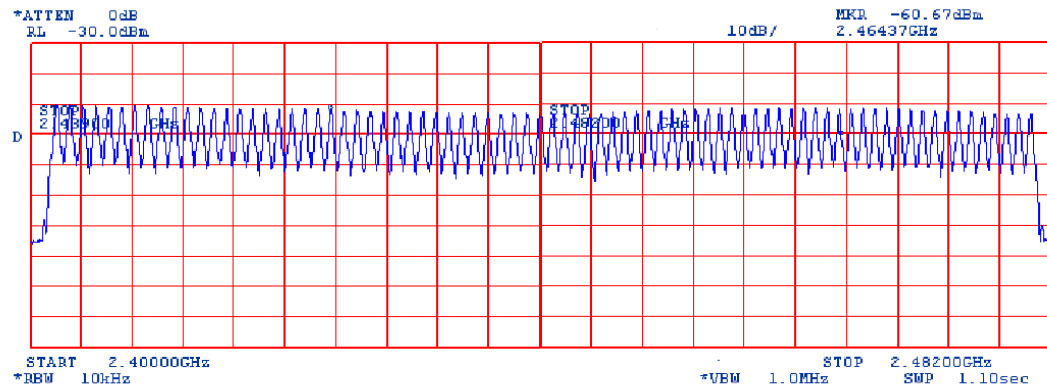




HERMON LABORATORIES

Test specification:	Section 15.247(a)1/ RSS-210, Section A8.1(d), Number of hopping frequencies		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/8/2009 4:44:30 PM		
Temperature: 24°C	Air Pressure: 1012 hPa	Relative Humidity: 48%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.4.3 Number of hopping frequencies, hopping disabled, GFSK modulation @ 1 Mbps



Test specification:	Section 15.247(a)1/RSS-210, Section A8.1(d), Average time of occupancy		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:28:27 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

7.5 Average time of occupancy

7.5.1 General

This test was performed to calculate the average time of occupancy (dwell time) on any frequency channel of the EUT. Specification test limits are given in Table 7.5.1.

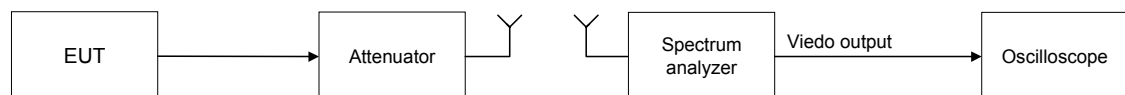
Table 7.5.1 Average time of occupancy limits

Assigned frequency range, MHz	Maximum average time of occupancy, s	Investigated period, s	Number of hopping frequencies
902.0 – 928.0	0.4	20.0	≥ 50
902.0 – 928.0	0.4	10.0	< 50
2400.0 – 2483.5	0.4	0.4 × N	79
5725.0 – 5850.0	0.4	30.0	≥ 75

7.5.2 Test procedure

- 7.5.2.1** The EUT was set up as shown in Figure 7.5.1, energized with frequency hopping function enabled and its proper operation was checked.
- 7.5.2.2** The spectrum analyzer span was set to zero centered on a hopping channel.
- 7.5.2.3** The single transmission duration and period were measured with oscilloscope.
- 7.5.2.4** The average time of occupancy was calculated as the single transmission time multiplied by the investigated period and divided by the single transmission period.
- 7.5.2.5** The test was repeated at each data rate and modulation type as provided in Table 7.5.2 and associated plots.

Figure 7.5.1 Average time of occupancy test setup



Test specification:	Section 15.247(a)1/RSS-210, Section A8.1(d), Average time of occupancy			
Test procedure:	Public notice DA 00-705			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	6/17/2009 3:28:27 PM			
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC	
Remarks:				

Table 7.5.2 Average time of occupancy test results

ASSIGNED FREQUENCY: 2400.00 – 2483.5 MHz
 MODULATION: GFSK / DQPSK / 8DPSK
 MODULATING SIGNAL: PRBS
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 10 kHz
 VIDEO BANDWIDTH: 300 kHz
 NUMBER OF HOPPING FREQUENCIES: 79
 INVESTIGATED PERIOD: 31.6 s
 FREQUENCY HOPPING: Enabled

Carrier frequency MHz	Single transmission duration, ms	Single transmission period, ms	Average time of occupancy*, m	Bit rate Mbps	Symbol rate Msymbol/s	Limit, ms	Margin ms**	Verdict
2437.0	0.726	2.526	115.0	Up to 3 Mbps	NA	400.0	-285.0	Pass

* - Average time of occupancy = (Single transmission duration × Investigated period) / (Single transmission period × number of hopping channels) = (0.726*31600)/(2.526*79) = 115.0 ms

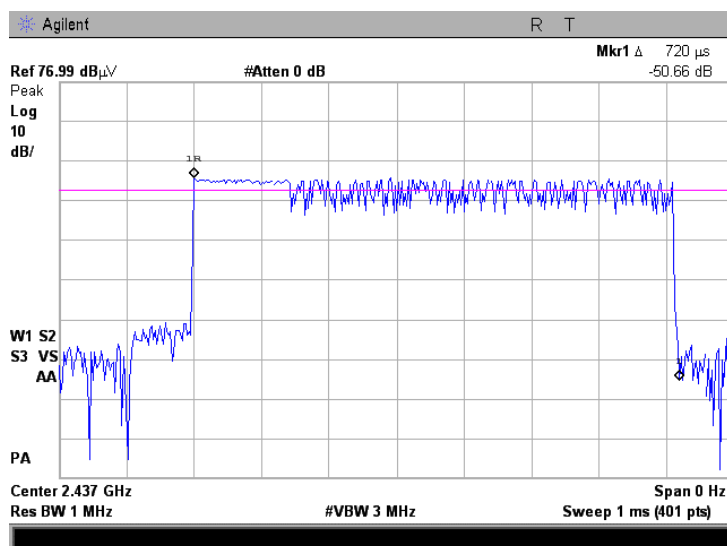
** - Margin = Average time of occupancy – specification limit.

Reference numbers of test equipment used

HL 2780	HL 1116	HL 2869	HL 1562				
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Full description is given in Appendix A.

Plot 7.5.1 Single transmission duration

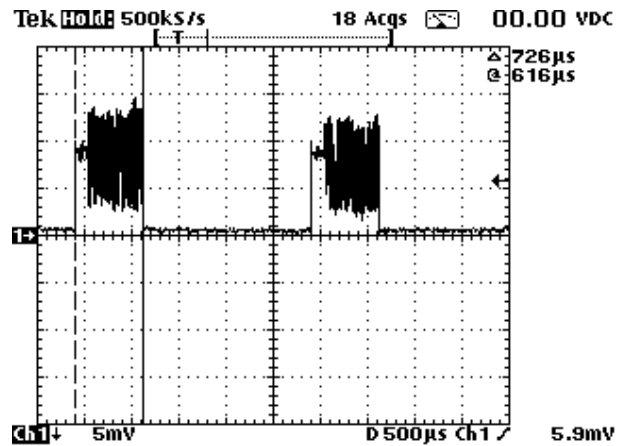




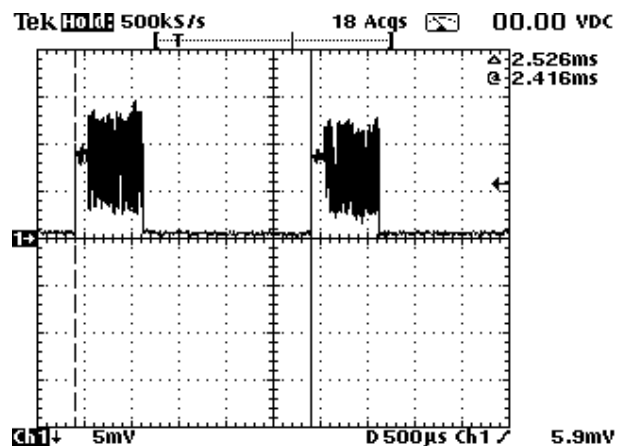
HERMON LABORATORIES

Test specification:	Section 15.247(a)1/RSS-210, Section A8.1(d), Average time of occupancy		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:28:27 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.2 Single transmission duration



Plot 7.5.3 Single transmission period





Test specification:		Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power	
Test procedure:		Public notice DA 00-705	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

7.6 Peak output power

7.6.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits are given in Table 7.6.1.

Table 7.6.1 Peak output power limits

Assigned frequency range, MHz	Peak output power*		Equivalent field strength limit @ 3m, dB(μV/m)*	Maximum antenna gain, dBi
	W	dBm		
902.0 – 928.0	0.125	21.0	122.2	6.0*
2400.0 – 2483.5	0.125 (<75 hopping channels)	21.0(<75 hopping channels)	122.2 (<75 hopping channels)	
	1.0 (≥75 hopping channels)	30.0 (≥75 hopping channels)	131.2 (≥75 hopping channels)	
5725.0 – 5850.0	1.0	30.0	131.2	

*- Equivalent field strength limit was calculated from the peak output power as follows: $E = \sqrt{30 \times P \times G} / r$, where P is peak output power in Watts, r is antenna to EUT distance in meters and G is transmitter antenna gain in dBi.

** - The limit is provided in terms of conducted RF power at the antenna connector. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power limit shall be reduced below the stated value as follows:

- by 1 dB for every 3 dB that the directional gain of antenna exceeds 6 dBi for fixed point-to-point transmitters operate in 2400-2483.5 MHz band;
- without any corresponding reduction for fixed point-to-point transmitters operate in 5725-5850 MHz band;
- by the amount in dB that the directional gain of antenna exceeds 6 dBi for the rest of transmitters.

7.6.2 Test procedure

7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and its proper operation was checked.

7.6.2.2 The EUT was adjusted to produce maximum available to end user RF output power.

7.6.2.3 The frequency span of spectrum analyzer was set approximately 5 times wider than 20 dB bandwidth of the EUT and the resolution bandwidth was set wider than 20 dB bandwidth of the EUT. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept in both vertical and horizontal polarizations.

7.6.2.4 The EUT was investigated in 3 orthogonal positions to determine the highest emission. The maximum field strength of the EUT carrier frequency was measured as provided in Table 7.6.2 and associated plots.

7.6.2.5 The maximum peak output power was calculated from the field strength of carrier as follows:

$$P = (E \times d)^2 / (30 \times G),$$

where P is the peak output power in W, E is the field strength in V/m, d is the test distance and G is the transmitter numeric antenna gain over an isotropic radiator.

The above equation was converted in logarithmic units for 3 m test distance:

$$\text{Peak output power in dBm} = \text{Field strength in dB}(\mu\text{V/m}) - \text{Transmitter antenna gain in dBi} - 95.2 \text{ dB}$$

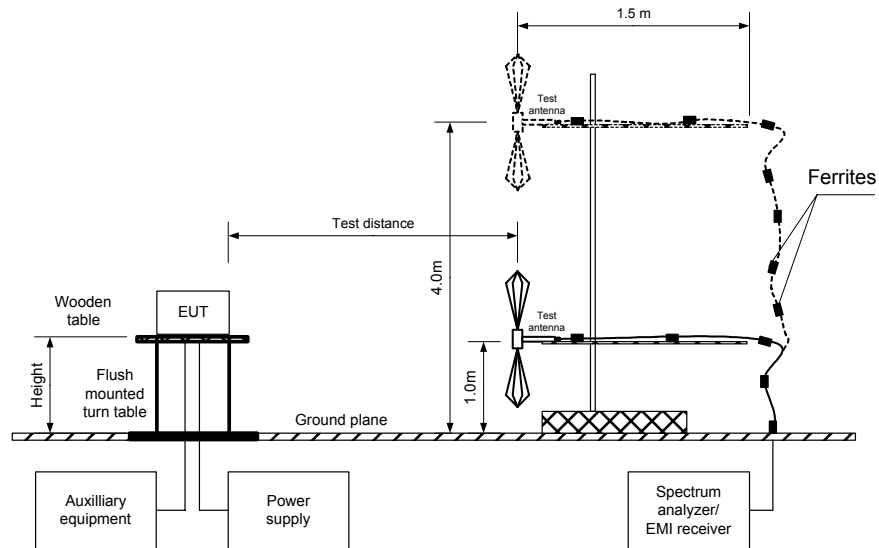
7.6.2.6 The worst test results (the lowest margins) were recorded in Table 7.6.2.



HERMON LABORATORIES

Test specification:		Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power	
Test procedure:		Public notice DA 00-705	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 3:31:43 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Figure 7.6.1 Setup for carrier field strength measurements





HERMON LABORATORIES

Test specification:	Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Table 7.6.2 Peak output power test results

ASSIGNED FREQUENCY: 2400.00 – 2483.5 MHz
 TEST DISTANCE: 3 m
 TEST SITE: OATS
 EUT HEIGHT: 0.8 m
 DETECTOR USED: Peak
 TEST ANTENNA TYPE: Double ridged guide (above 1000 MHz)
 MODULATING SIGNAL: PRBS
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 1 MHz
 VIDEO BANDWIDTH: 3 MHz
 FREQUENCY HOPPING: Disabled
 NUMBER OF FREQUENCY HOPPING CHANNELS: 79

MODULATION: GFSK
 BIT RATE: 1 Mbps
 20 dB EMISSION BANDWIDTH: 0.975 MHz

Frequency, MHz	Field strength, dB(μV/m)*	Antenna polarization	Antenna height, m	Azimuth, degrees**	EUT antenna gain, dBi	Peak output power, dBm***	Limit, dBm	Margin, dB****	Verdict
2402.00	86.00	H	1.1	000	3	-12.23	30.0	-42.23	Pass
2437.00	83.50	H	1.1	010	3	-14.73	30.0	-44.73	Pass
2480.00	81.67	H	1.1	000	3	-16.56	30.0	-46.56	Pass

MODULATION: 8DPSK
 BIT RATE: 3 Mbps
 20 dB EMISSION BANDWIDTH: 1.365 MHz

Frequency, MHz	Field strength, dB(μV/m)*	Antenna polarization	Antenna height, m	Azimuth, degrees**	EUT antenna gain, dBi	Peak output power, dBm***	Limit, dBm	Margin, dB****	Verdict
2402.00	87.33	H	1.0	000	3	-9.55	30.0	-39.55	Pass
2437.00	86.33	H	1.1	000	3	-10.55	30.0	-40.55	Pass
2480.00	83.00	H	1.1	000	3	-13.88	30.0	-43.88	Pass

NOTE: The EUT was investigated in 3 orthogonal positions to determine the highest emission and the maximum was found in X-axis position with received antenna in horizontal polarization.

* - Field strength, dB(μV/m) = Measured value, dB(μV) + Antenna Factor (dBμV/m) + Cable Loss (dB) = Measured value, dB(μV) + 30.5 dB

** - EUT front panel refer to 0 degrees position of turntable.

*** - Peak output power was calculated from the field strength of carrier as follows: $P = (E \times d)^2 / (30 \times G)$, where P is the peak output power in W, E is the field strength in V/m, d is the test distance in meters and G is the transmitter numeric antenna gain over an isotropic radiator. The above equation was converted in logarithmic units for 3 m test distance:

Peak output power (dBm) = Field strength in dB(μV/m) - Transmitter antenna gain (dBi) - 95.2 dB+RBW correction factor****

**** - Margin = Peak output power – specification limit.

***** - RBW correction factor – is a correction factor to extrapolate the results obtained with 1 MHz RBW (due to instrument limitation) to 20 dBc EBW.

RBW correction factor = 0 dB for GFSK and for 8DPSK: $10\log(1.365/1.0) = 1.35$ dB.

Reference numbers of test equipment used

HL 1424	HL 1984	HL 3122					
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Full description is given in Appendix A.

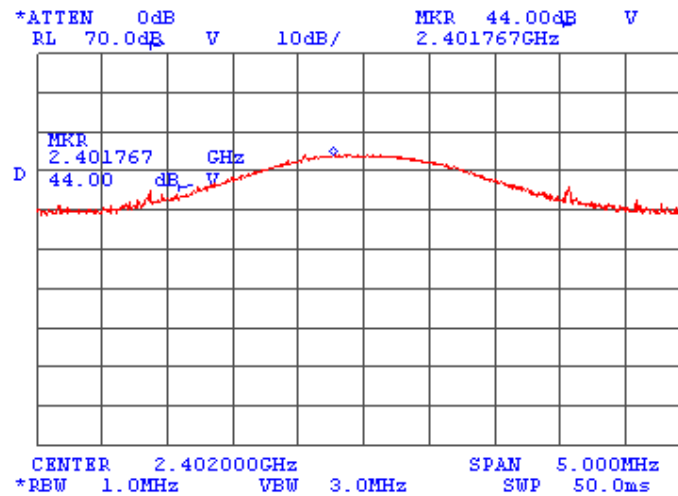


HERMON LABORATORIES

Test specification:	Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

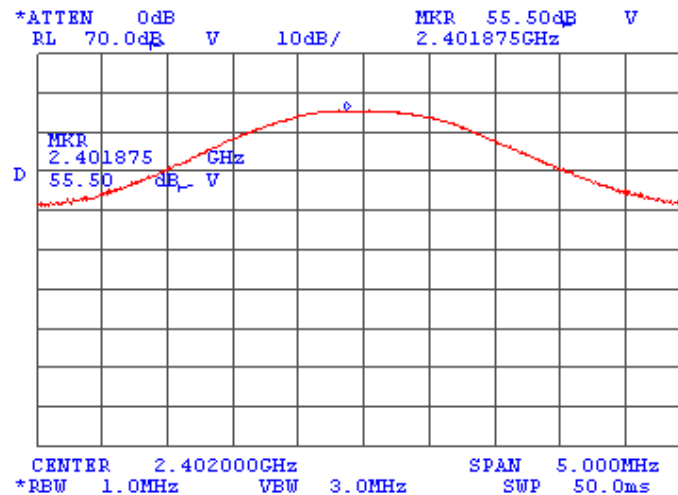
Plot 7.6.1 Field strength of carrier at low frequency, GFSK modulation @1 Mbps

EUT POSITION: X-axis
ANTENNA POLARIZATION: Vertical



Plot 7.6.2 Field strength of carrier at low frequency, GFSK modulation @1 Mbps

EUT POSITION: X-axis
ANTENNA POLARIZATION: Horizontal



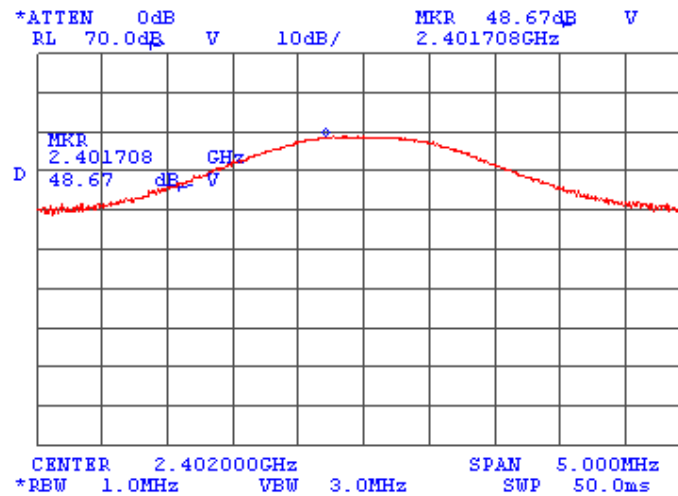


HERMON LABORATORIES

Test specification:	Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

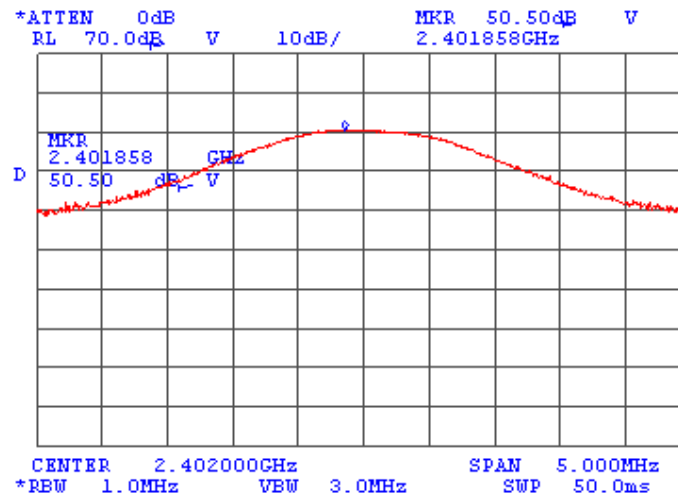
Plot 7.6.3 Field strength of carrier at low frequency, GFSK modulation @1 Mbps

EUT POSITION: Y-axis
ANTENNA POLARIZATION: Vertical



Plot 7.6.4 Field strength of carrier at low frequency, GFSK modulation @1 Mbps

EUT POSITION: Y-axis
ANTENNA POLARIZATION: Horizontal



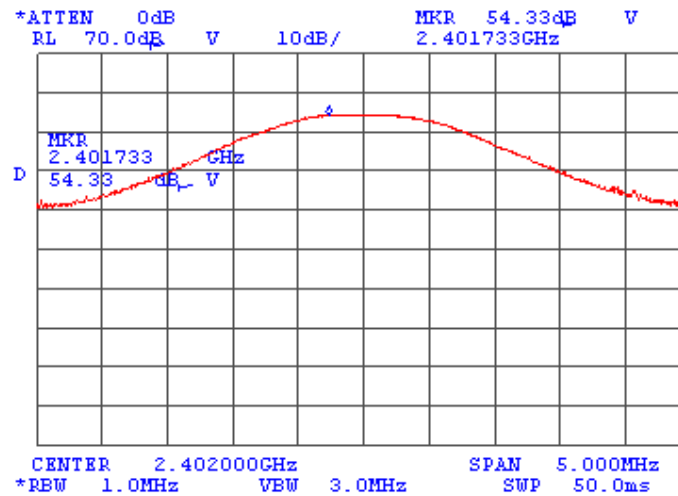


HERMON LABORATORIES

Test specification:	Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

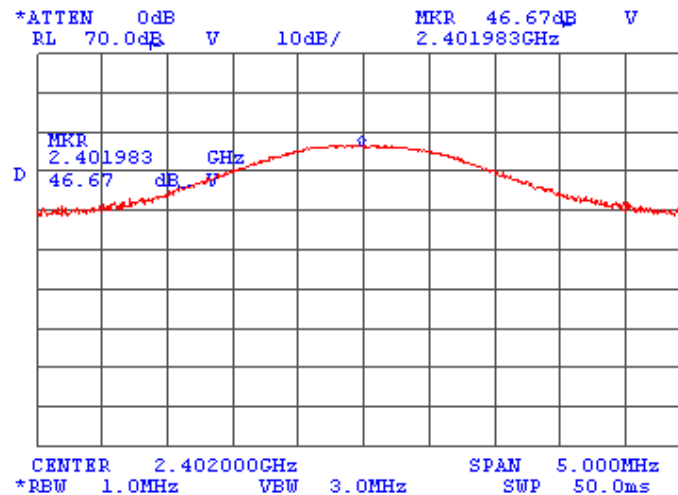
Plot 7.6.5 Field strength of carrier at low frequency, GFSK modulation @1 Mbps

EUT POSITION: Z-axis
ANTENNA POLARIZATION: Vertical



Plot 7.6.6 Field strength of carrier at low frequency, GFSK modulation @1 Mbps

EUT POSITION: Z-axis
ANTENNA POLARIZATION: Horizontal



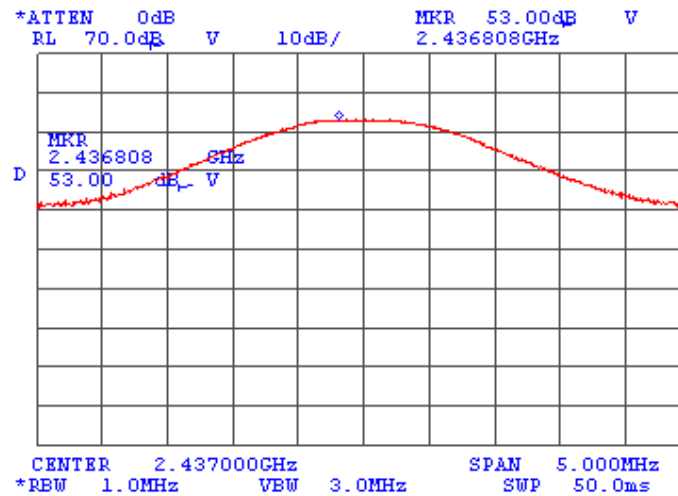


HERMON LABORATORIES

Test specification:	Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

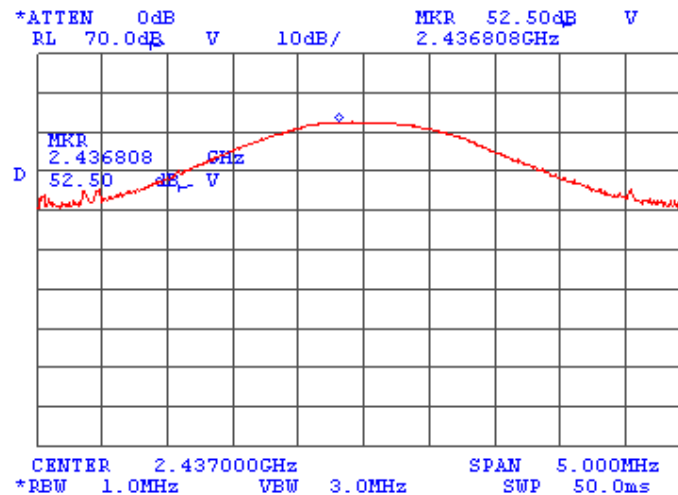
Plot 7.6.7 Field strength of carrier at mid frequency, GFSK modulation @1 Mbps

EUT POSITION: X-axis
ANTENNA POLARIZATION: Horizontal



Plot 7.6.8 Field strength of carrier at mid frequency, GFSK modulation @1 Mbps

EUT POSITION: X-axis
ANTENNA POLARIZATION: Vertical



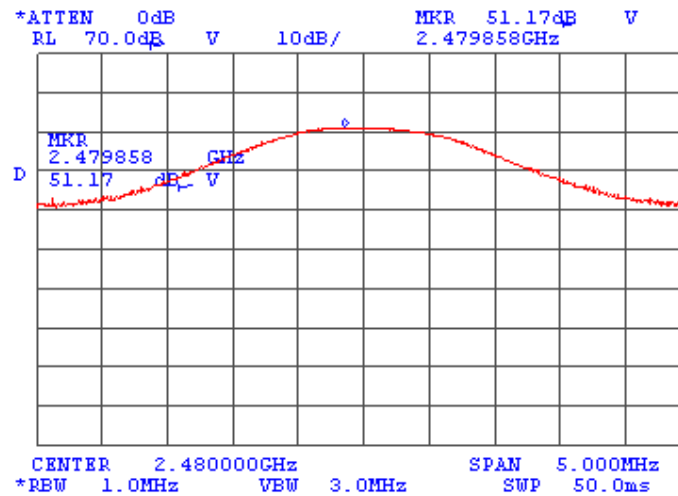


HERMON LABORATORIES

Test specification:	Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

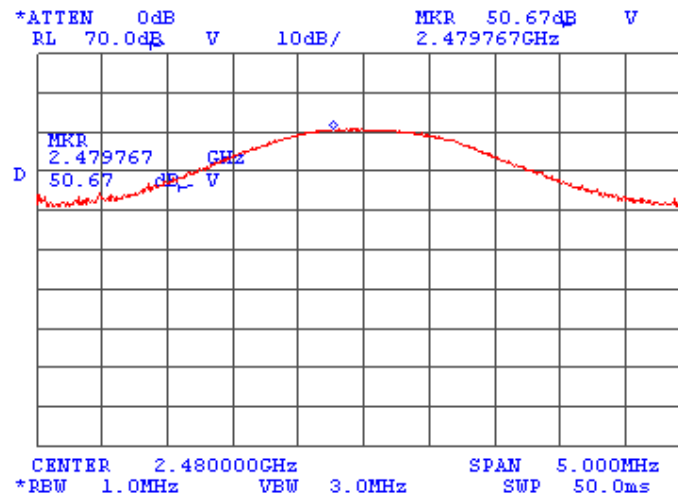
Plot 7.6.9 Field strength of carrier at high frequency, GFSK modulation @1 Mbps

EUT POSITION: X-axis
ANTENNA POLARIZATION: Horizontal



Plot 7.6.10 Field strength of carrier at high frequency, GFSK modulation @1 Mbps

EUT POSITION: Z-axis
ANTENNA POLARIZATION: Vertical



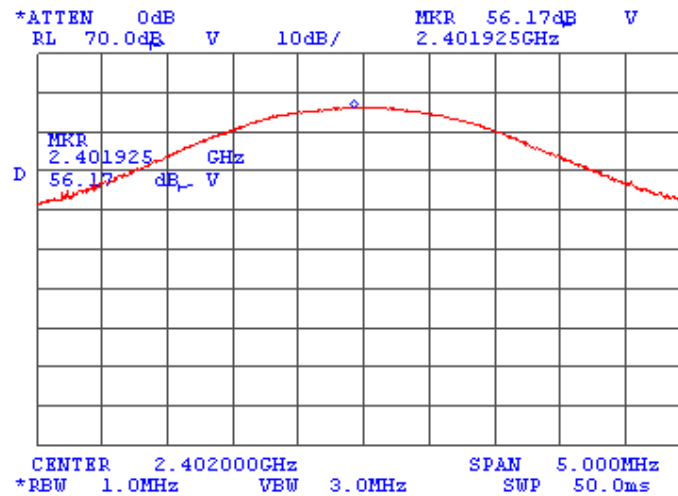


HERMON LABORATORIES

Test specification:	Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

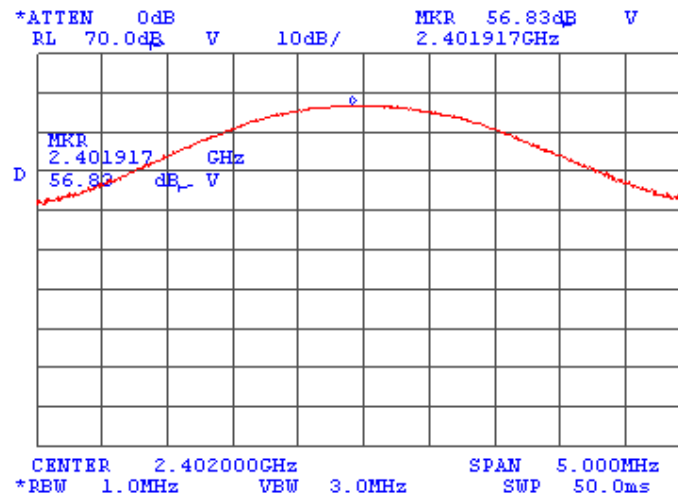
Plot 7.6.11 Field strength of carrier at low frequency, 8DPSK modulation @1 Mbps

EUT POSITION: Z-axis
ANTENNA POLARIZATION: Vertical



Plot 7.6.12 Field strength of carrier at low frequency, 8DPSK modulation @1 Mbps

EUT POSITION: X-axis
ANTENNA POLARIZATION: Horizontal



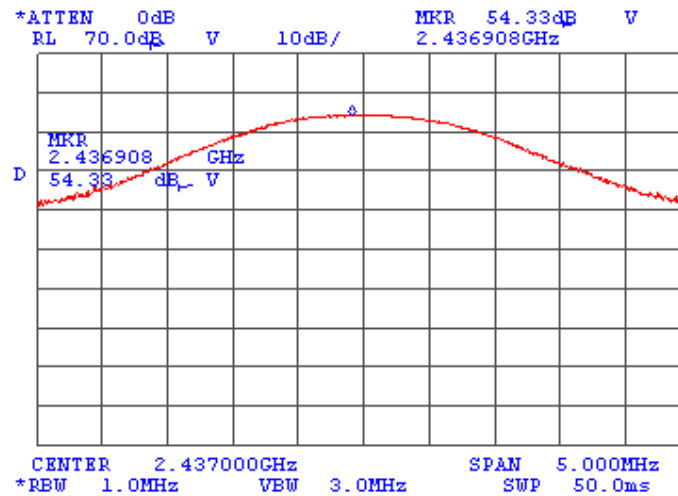


HERMON LABORATORIES

Test specification:	Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

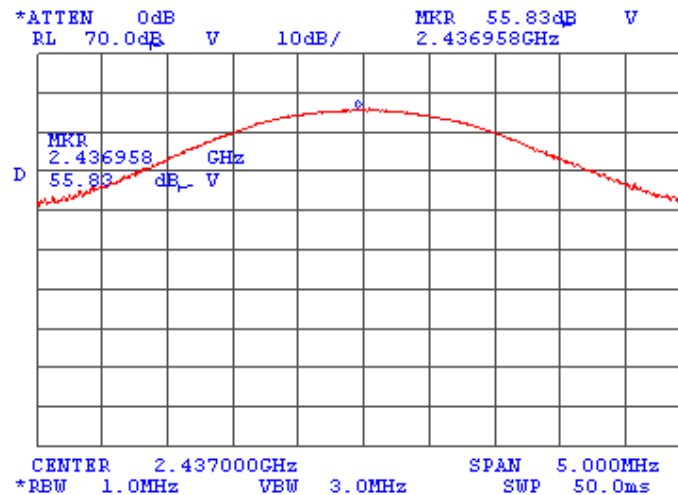
Plot 7.6.13 Field strength of carrier at mid frequency, 8DPSK modulation @1 Mbps

EUT POSITION: Z-axis
ANTENNA POLARIZATION: Vertical



Plot 7.6.14 Field strength of carrier at mid frequency, 8DPSK modulation @1 Mbps

EUT POSITION: X-axis
ANTENNA POLARIZATION: Horizontal



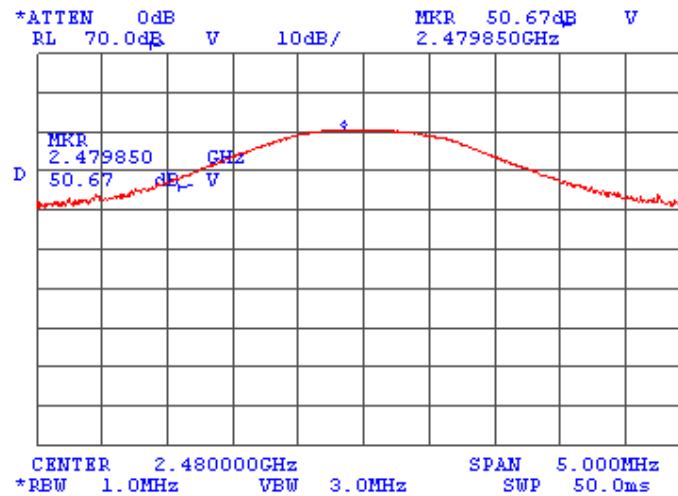


HERMON LABORATORIES

Test specification:	Section 15.247(b)/ RSS-210, Section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:31:43 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

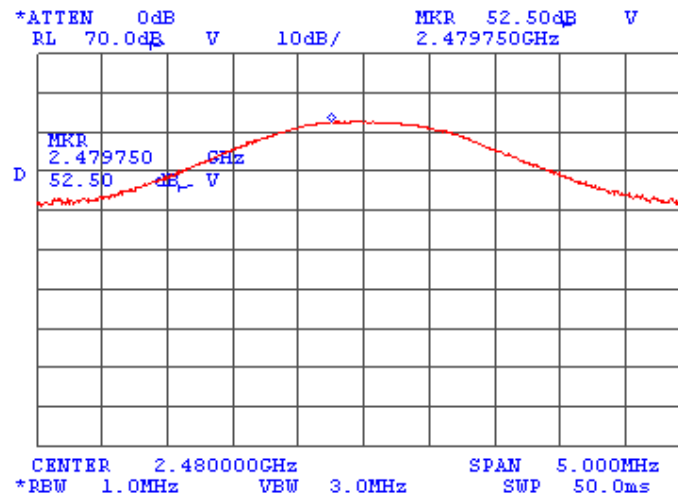
Plot 7.6.15 Field strength of carrier at high frequency, 8DPSK modulation @1 Mbps

EUT POSITION: Z-axis
ANTENNA POLARIZATION: Vertical



Plot 7.6.16 Field strength of carrier at high frequency, 8DPSK modulation @1 Mbps

EUT POSITION: X-axis
ANTENNA POLARIZATION: Horizontal



Test specification:		Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges	
Test procedure:		Public notice DA 00-705	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

7.7 Band edge radiated emissions

7.7.1 General

This test was performed to measure emissions, radiated from the EUT at the assigned frequency band edges. Specification test limits are given in Table 7.7.1.

Table 7.7.1 Band edge emission limits

Assigned frequency, MHz	Attenuation below carrier*, dBc	Field strength at 3 m within restricted bands, dB(μV/m)	
		Peak	Average
902.0 – 928.0	20.0	74.0	54.0
2400.0 – 2483.5			
5725.0 – 5850.0			

* - Band edge emission limit is provided in terms of attenuation below the peak of modulated carrier measured with the same resolution bandwidth.

7.7.2 Test procedure

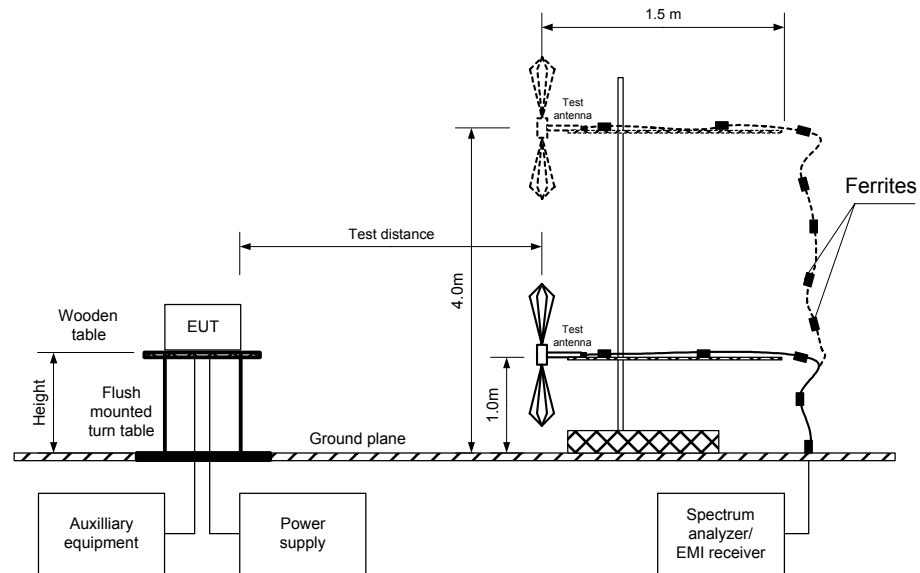
- 7.7.2.1 The EUT was set up as shown in Figure 7.7.1, energized normally modulated at the maximum data rate with its hopping function disabled and its proper operation was checked.
- 7.7.2.2 The EUT was adjusted to produce maximum available to end user RF output power at the lowest carrier frequency.
- 7.7.2.3 The spectrum analyzer span was set to capture the carrier frequency and associated modulation products. The resolution bandwidth was set wider than 1 % of the frequency span.
- 7.7.2.4 The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.
- 7.7.2.5 The maximum band edge emission and modulation product outside of the band were measured as provided in Table 7.7.2 and associated plots and referenced to the highest emission level measured within the authorized band.
- 7.7.2.6 The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the highest carrier frequency.
- 7.7.2.7 The above procedure was repeated with the frequency hopping function enabled.



HERMON LABORATORIES

Test specification:		Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges	
Test procedure:		Public notice DA 00-705	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 3:45:01 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Figure 7.7.1 Band edge emission test setup





HERMON LABORATORIES

Test specification:		Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges			
Test procedure:		Public notice DA 00-705			
Test mode:		Compliance		Verdict: PASS	
Date & Time:		6/17/2009 3:45:01 PM			
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%		Power Supply: 3.3 VDC	
Remarks:					

Table 7.7.2 Band edge emission test results

ASSIGNED FREQUENCY RANGE: 2400.0 – 2483.5 MHz
 DETECTOR USED: Peak
 MODULATION: GFSK / 8DPSK
 MODULATING SIGNAL: PRBS
 BIT RATE: 1/ 2 / 3 Mbps
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 RESOLUTION BANDWIDTH: $\geq 1\%$ of the span
 VIDEO BANDWIDTH: \geq RBW

Frequency, MHz	Band edge emission, dB μ V/m	Emission at carrier, dB μ V/m	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
Frequency hopping disabled						
2397.100 (GFSK)	48.17	84.2 (Plot 7.7.13)	-36.03	20.0	-17.83	Pass
2397.280 (8DPSK)	41.84	84.2 (Plot 7.7.13)	-42.36	20.0	-15.49	Pass
Frequency hopping enabled						
Highest bandedge emission meets 20 dBc limit at 2401.310 MHz (Plot 7.7.13)						Pass

*- Margin = Attenuation below carrier – specification limit.



HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges			
Test procedure:	Public notice DA 00-705			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	6/17/2009 3:45:01 PM			
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC	
Remarks:				

Table 7.7.3 Field strength of spurious emissions above 1 GHz within restricted bands

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz
 TEST DISTANCE: 3 m
 MODULATION: GFSK / 8DPSK
 MODULATING SIGNAL: PRBS
 BIT RATE: 1 / 3 Mbps
 DUTY CYCLE: 100 %
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 1000 kHz
 TEST ANTENNA TYPE: Double ridged guide
 FREQUENCY HOPPING: Disabled

frequency MHz	Antenna		Azimuth degrees	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)				Verdict
	Polarization	height m		Measured dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured dB(μV/m)	Calculated dB(μV/m)	Limit, dB(μV/m)	Margin dB***	
Frequency hopping disabled											
Low carrier frequency											
GFSK 1 Mbps											
2377.400	V (z-axis)	1.2	010	48.17	74.0	-25.83	34.26	34.26	54.0	-19.74	Pass
8DPSK 3 Mbps											
2389.800	V (z-axis)	1.2	010	48.06	74.0	-25.94	34.54	34.54	54.0	-19.46	
High carrier frequency											
GFSK 1 Mbps											
2499.790	V (z-axis)	1.2	010	48.75	74.0	-25.25	35.12	35.12	54.0	-18.88	Pass
8DPSK 3 Mbps											
2491.540	V (z-axis)	1.2	010	48.35	74.0	-25.65	35.09	35.09	54.0	-18.91	
Frequency hopping enabled											
Low carrier frequency											
2358.200	V (z-axis)	1.2	010	48.42	74.0	-25.58	34.37	34.37	54.0	-19.63	Pass
High carrier frequency											
2497.740	V (z-axis)	1.2	010	49.92	74.0	-24.08	35.24	35.24	54.0	-18.76	Pass

*- EUT front panel refers to 0 degrees position of turntable.

** - Margin = Measured field strength - specification limit.

*** - Margin = Calculated field strength - specification limit,
 where Calculated field strength = Measured field strength + average factor.

Reference numbers of test equipment used

HL 0521	HL 1984	HL 3123	HL 3616				
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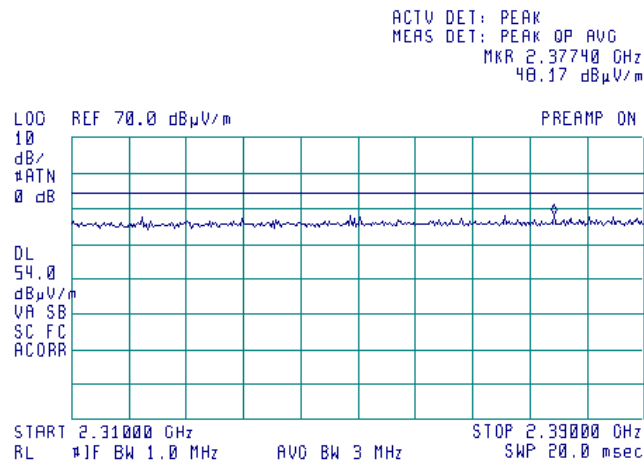
Full description is given in Appendix A.



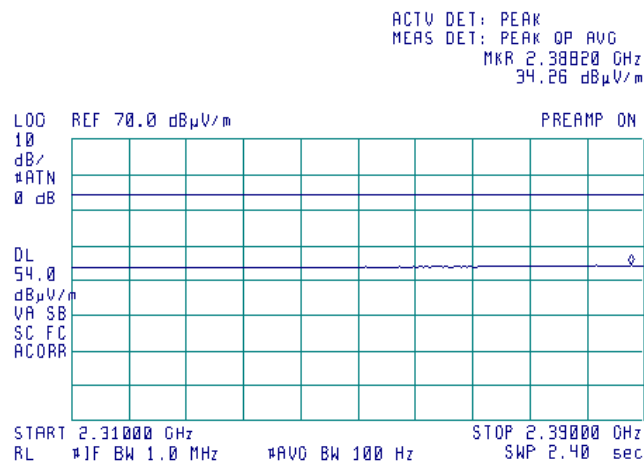
HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.7.1 The highest band edge emission at low carrier frequency with hopping function disabled, 2310.0 – 2390.0 MHz range, peak detector



Plot 7.7.2 The highest band edge emission at low carrier frequency with hopping function disabled, 2310.0 – 2390.0 MHz range, VBW = 100 Hz

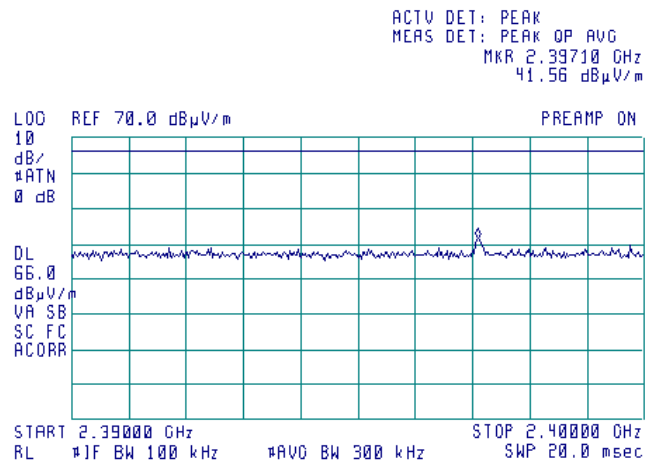




HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.7.3 The highest band edge emission at low carrier frequency with hopping function disabled,
2390.0 – 2400.0 MHz range

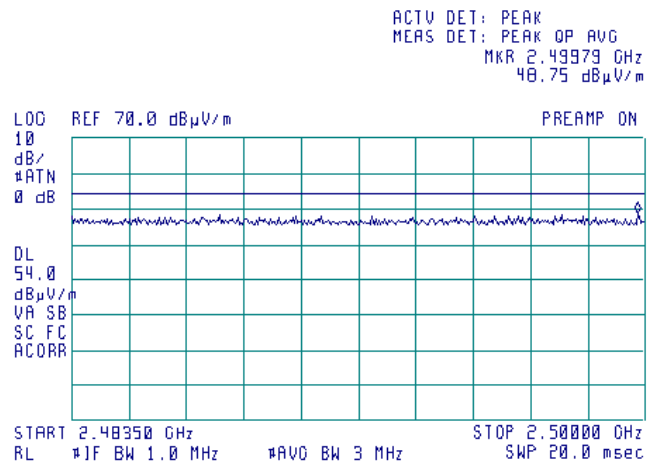




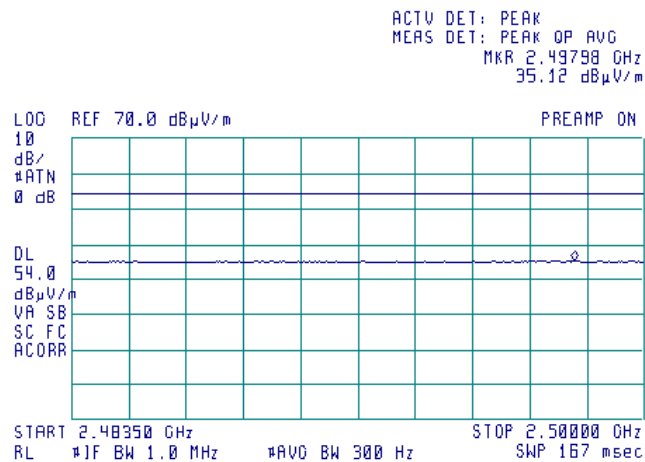
HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.7.4 The highest band edge emission at high carrier frequency with hopping function disabled, 2483.5 – 2500.0 MHz range, peak detector



Plot 7.7.5 The highest band edge emission at high carrier frequency with hopping function disabled, 2483.5 – 2500.0 MHz range, VBW = 100 Hz

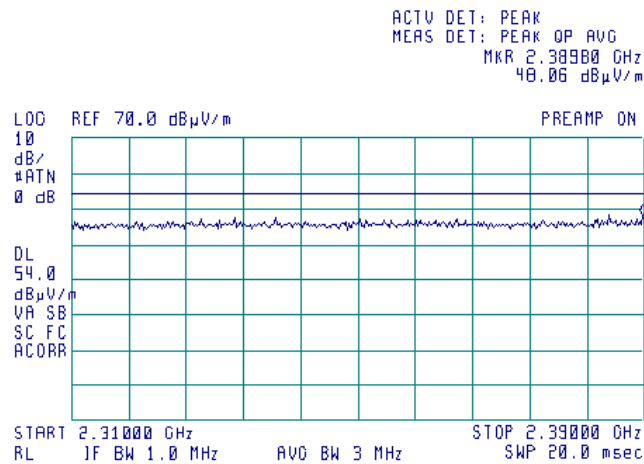




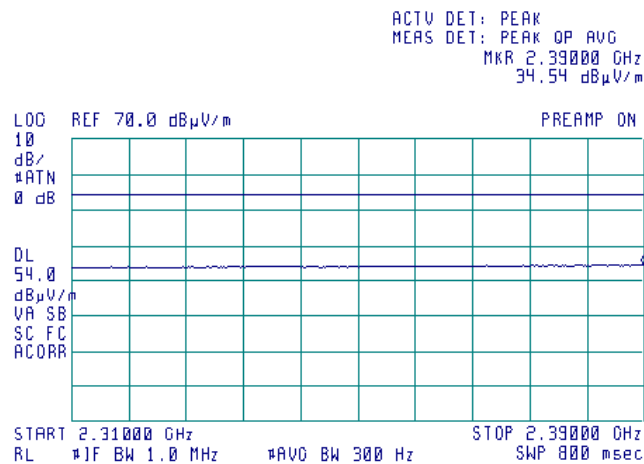
HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.7.6 The highest band edge emission at low carrier frequency with hopping function disabled, 2310.0 – 2390.0 MHz range, peak detector



Plot 7.7.7 The highest band edge emission at low carrier frequency with hopping function disabled, 2310.0 – 2390.0 MHz range, VBW = 100 Hz

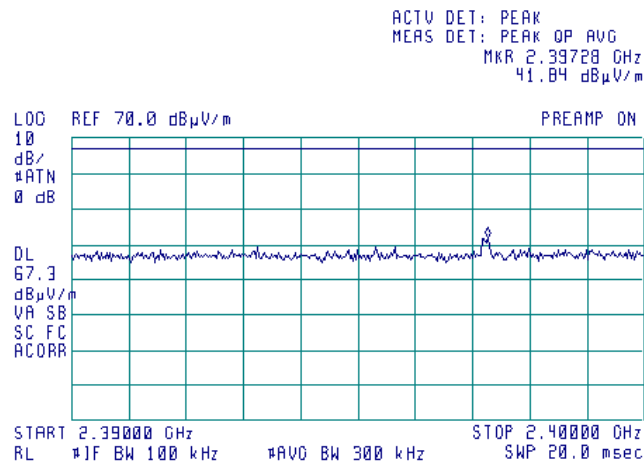




HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.7.8 The highest band edge emission at low carrier frequency with hopping function disabled, 2390.0 – 2400.0 MHz range

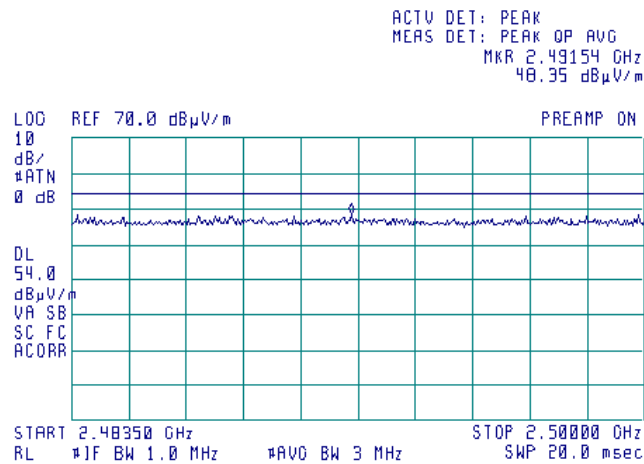




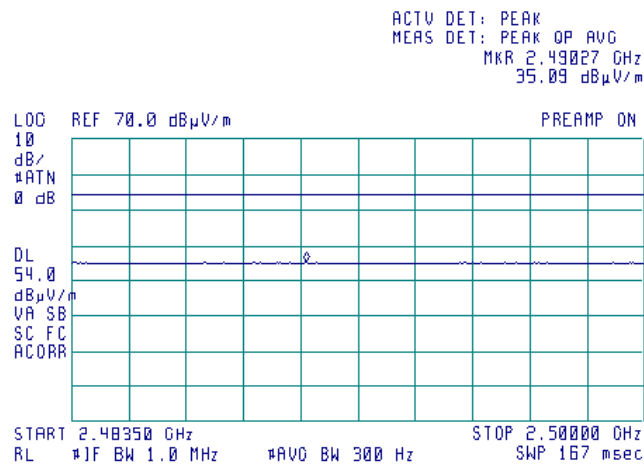
HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.7.9 The highest band edge emission at high carrier frequency with hopping function disabled, 2483.5 – 2500.0 MHz range, peak detector



Plot 7.7.10 The highest band edge emission at high carrier frequency with hopping function disabled, 2483.5 – 2500.0 MHz range, VBW = 100 Hz

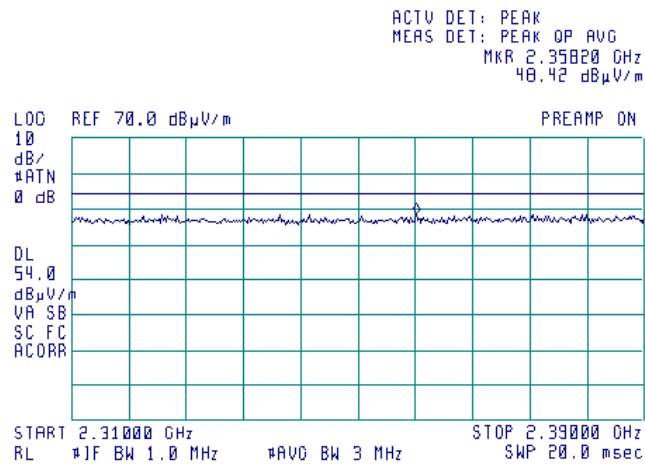




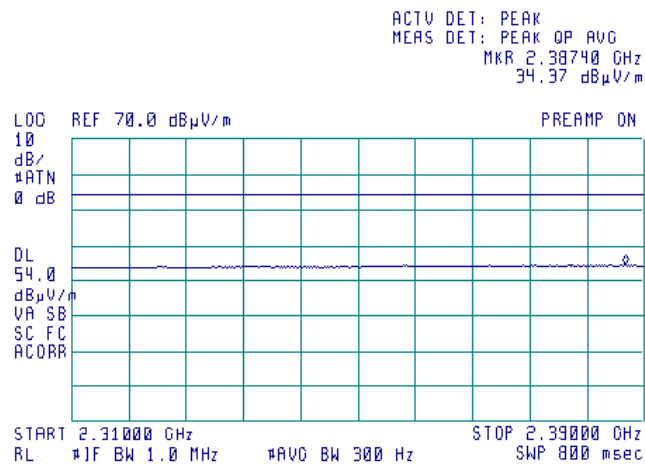
HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.7.11 The highest band edge emission at low carrier frequency with hopping function enabled, 2310.0 – 2390.0 MHz range, peak detector



Plot 7.7.12 The highest band edge emission at low carrier frequency with hopping function enabled, 2310.0 – 2390.0 MHz range, VBW = 100 Hz

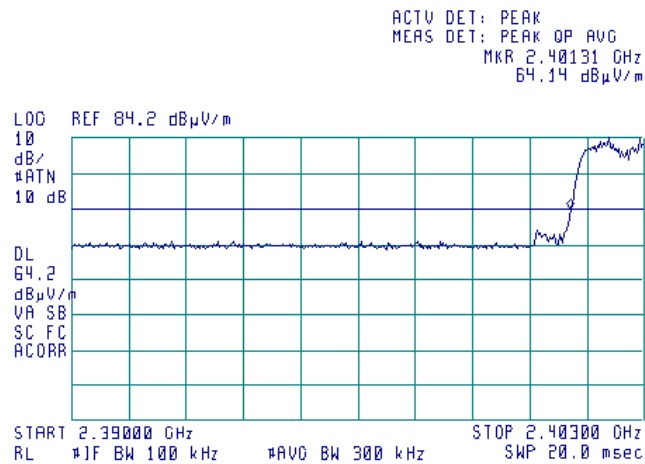




HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.7.13 The highest band edge emission at low carrier frequency with hopping function enabled,
2390.0 – 2400.0 MHz range

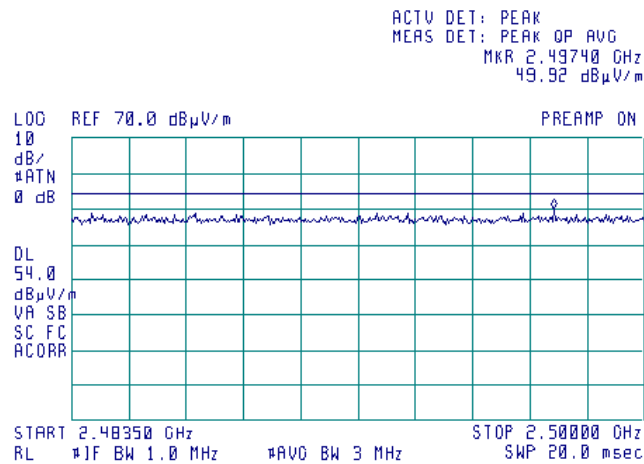




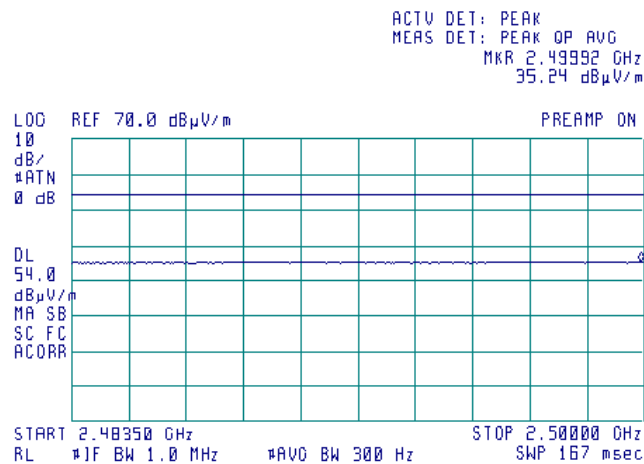
HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:45:01 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.7.14 The highest band edge emission at high carrier frequency with hopping function enabled, 2483.5 – 2500.0 MHz range, peak detector



Plot 7.7.15 The highest band edge emission at high carrier frequency with hopping function enabled, 2483.5 – 2500.0 MHz range, VBW = 100 Hz





Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

7.8 Field strength of spurious emissions

7.8.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 7.8.1.

Table 7.8.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB(μV/m)***			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc***
	Peak	Quasi Peak	Average	
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	20.0
0.090 – 0.110	NA	108.5 – 106.8**	NA	
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**	
0.490 – 1.705	NA	73.8 – 63.0**	NA	
1.705 – 30.0*		69.5		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 - 1000		54.0		
1000 – 10 th harmonic	74.0	NA	54.0	

*- The limit for 3 m test distance was calculated using the inverse square distance extrapolation factor as follows:

$$\text{Lim}_{S2} = \text{Lim}_{S1} + 40 \log (S_1/S_2),$$

where S_1 and S_2 – standard defined and test distance respectively in meters.

** - The limit decreases linearly with the logarithm of frequency.

*** - The field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

7.8.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

7.8.2.1 The EUT was set up as shown in Figure 7.8.1, energized and the performance check was conducted.

7.8.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated around its vertical axis.

7.8.2.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.

7.8.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.8.3.1 The EUT was set up as shown in Figure 7.8.2, energized and the performance check was conducted.

7.8.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360°, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

7.8.3.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.

Test specification:		Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions	
Test procedure:		Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/4/2009 9:02:58 AM	
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

Figure 7.8.1 Setup for spurious emission field strength measurements below 30 MHz

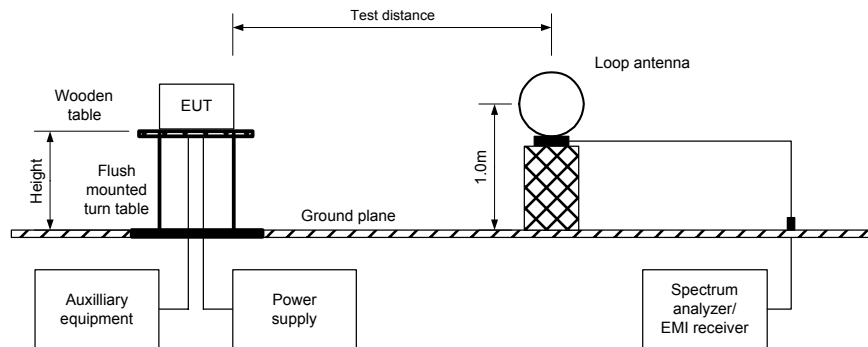
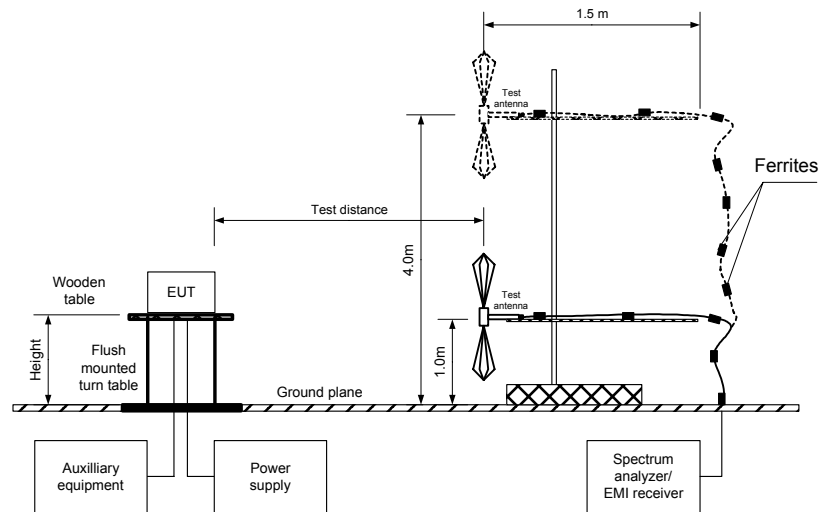


Figure 7.8.2 Setup for spurious emission field strength measurements above 30 MHz





HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

Table 7.8.2 Field strength of emissions outside restricted bands

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 - 25000 MHz
 TEST DISTANCE: 3 m
 MODULATION: GFSK
 MODULATING SIGNAL: PRBS
 BIT RATE: 3 Mbps
 DUTY CYCLE: 100 %
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 TRANSMITTER OUTPUT POWER: -12.23 dBm at low carrier frequency
 -14.73 dBm at mid carrier frequency
 -16.56 dBm at high carrier frequency
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 100 kHz
 VIDEO BANDWIDTH: 300 kHz
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 MHz)
 Double ridged guide (above 1000 MHz)
 FREQUENCY HOPPING: Disabled

Frequency MHz	Field strength of spurious, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	Field strength of carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB**	Verdict
All emissions were found at least 20 dB below the spurious limit									Pass

*- EUT front panel refers to 0 degrees position of turntable.

**- Margin = Attenuation below carrier – specification limit.



HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions			
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	6/4/2009 9:02:58 AM			
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC	
Remarks:				

Table 7.8.3 Field strength of spurious emissions above 1 GHz within restricted bands

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz
 INVESTIGATED FREQUENCY RANGE: 1000 - 25000 MHz
 TEST DISTANCE: 3 m
 MODULATION: GFSK
 MODULATING SIGNAL: PRBS
 BIT RATE: 3 Mbps
 DUTY CYCLE: 100 %
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 TRANSMITTER OUTPUT POWER: -12.23 dBm at low carrier frequency
 -14.73 dBm at mid carrier frequency
 -16.56 dBm at high carrier frequency
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 1000 kHz
 TEST ANTENNA TYPE: Double ridged guide
 FREQUENCY HOPPING: Disabled

frequency MHz	Antenna		'Azimuth degrees'	'Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)			Verdict
	'Polarization'	'Height m'		'Measured dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
Low carrier frequency										
4804.000	H	1.0	020	48.88	74.00	-25.12	44.79	54.0	-9.21	Pass
Mid carrier frequency										
4874.000	H	1.0	020	48.18	74.00	-25.82	45.60	54.0	-8.40	Pass
High carrier frequency										
4960.000	V	1.1	170	46.81	74.00	-27.19	42.11	54.0	-11.89	Pass

*- EUT front panel refers to 0 degrees position of turntable.

**- Margin = Measured field strength - specification limit.



HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

Table 7.8.4 Field strength of spurious emissions below 1 GHz within restricted bands

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
 TEST DISTANCE: 3 m
 MODULATION: GFSK
 MODULATING SIGNAL: PRBS
 BIT RATE: 3 Mbps
 DUTY CYCLE: 100 %
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 TRANSMITTER OUTPUT POWER: -12.23 dBm at low carrier frequency
 -14.73 dBm at mid carrier frequency
 -16.56 dBm at high carrier frequency
 RESOLUTION BANDWIDTH: 1 kHz (9 kHz – 150 kHz)
 9.0 kHz (150 kHz – 30 MHz)
 120 kHz (30 MHz – 1000 MHz)
 VIDEO BANDWIDTH: > Resolution bandwidth
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 MHz)
 FREQUENCY HOPPING: Disabled

Frequency MHz	Peak emission, dB(μV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB'				
High carrier frequency								
399.999	29.8	25.10	46.00	-20.9	H	1.2	060	Pass

*- Margin = Measured emission - specification limit.

**- EUT front panel refer to 0 degrees position of turntable.

NOTE: The spurious emissions sweeps were performed with EUT configured to 3 Mbps 8DPSK modulation assuming maximum output power, however spurious emissions measurements were performed with EUT configured to 1 Mbps GFSK modulation, since it was found as the worst case.

Table 7.8.5 Restricted bands

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.29 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.42 - 16.423	156.7 - 156.9	1660 - 1710	5350 - 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 - 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

Reference numbers of test equipment used

HL 0446	HL 0521	HL 0604	HL 0768	HL 1984	HL 2254	HL 2780	HL 2882
HL 3121	HL 3532	HL 3534	HL 3535	HL 3616			

Full description is given in Appendix A.

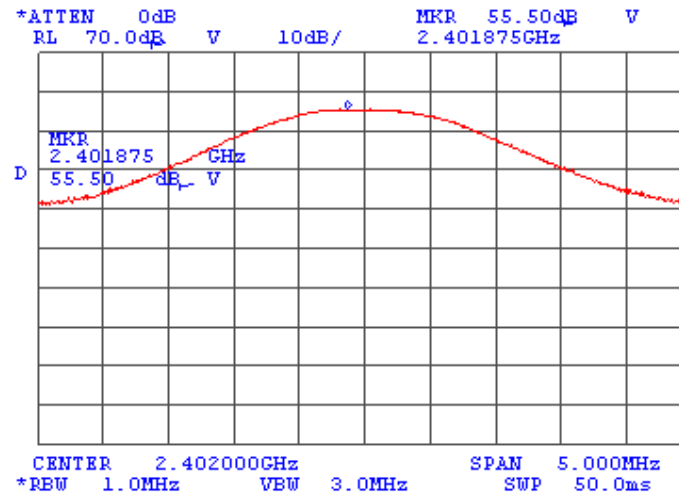


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

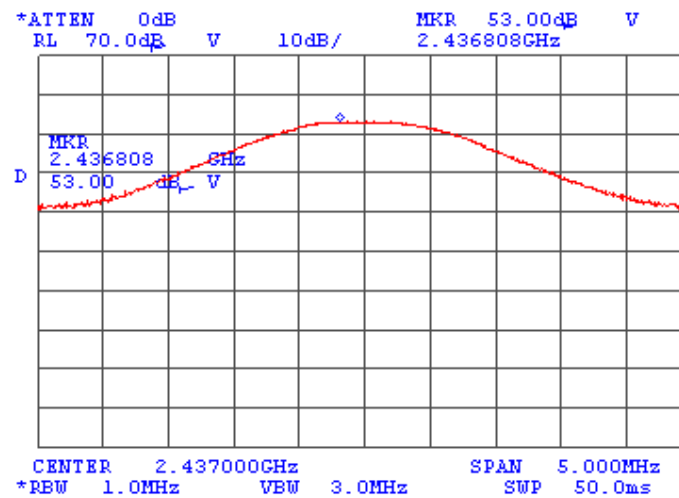
Plot 7.8.1 Radiated emission measurements at the low carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m



Plot 7.8.2 Radiated emission measurements at the mid carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m



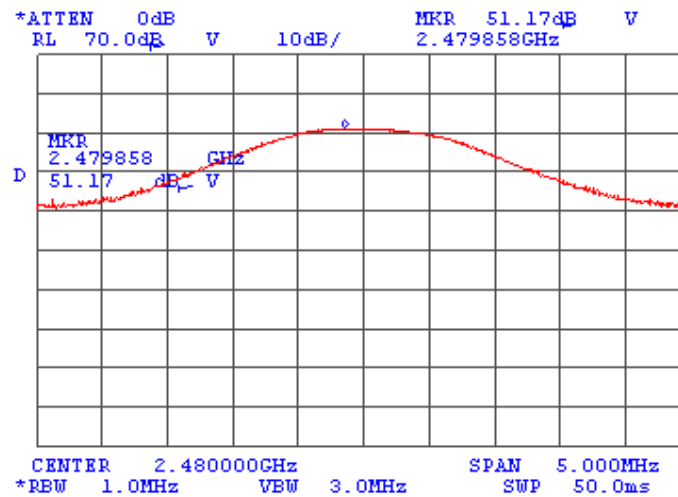


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.8.3 Radiated emission measurements at the high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m



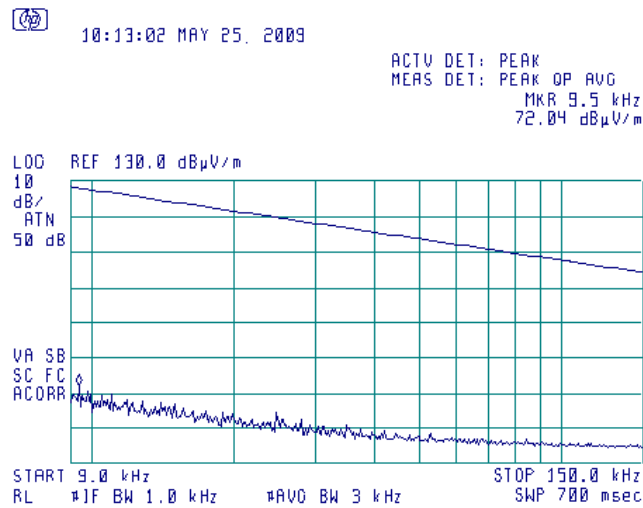


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

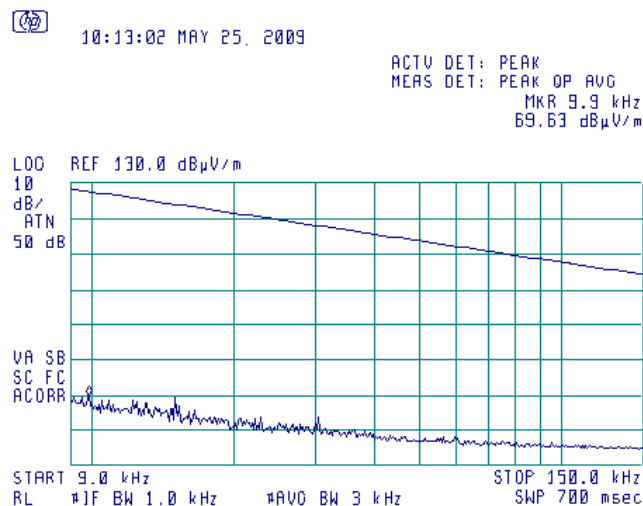
Plot 7.8.4 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 7.8.5 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



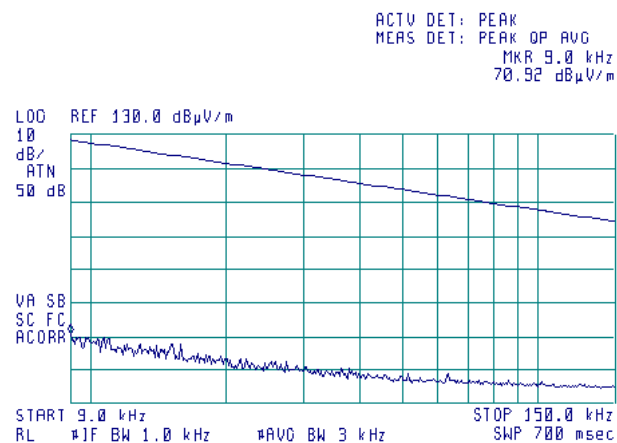


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

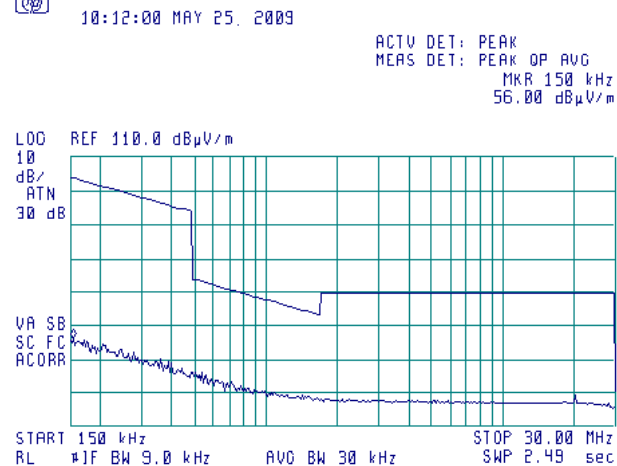
Plot 7.8.6 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 7.8.7 Radiated emission measurements from 0.15 to 30 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



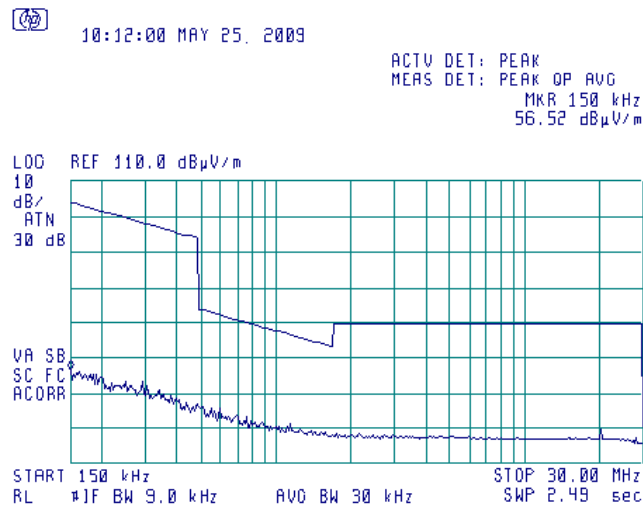


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

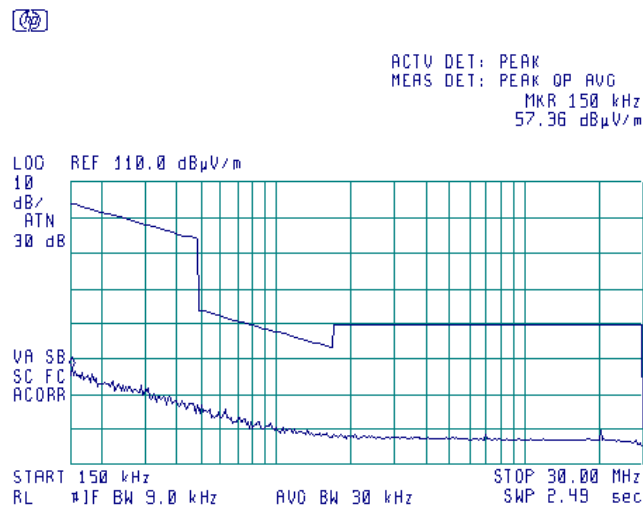
Plot 7.8.8 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 7.8.9 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



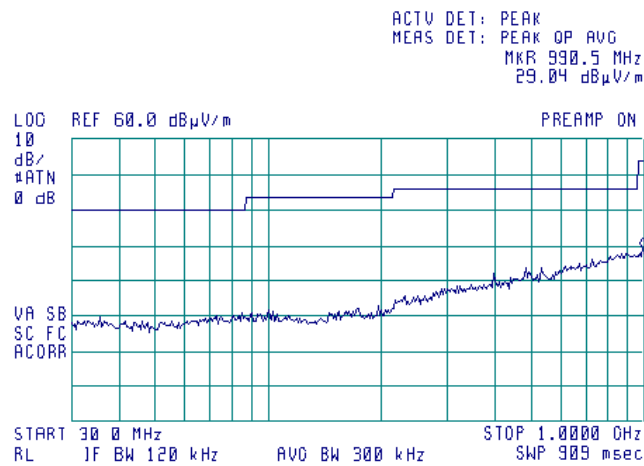


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

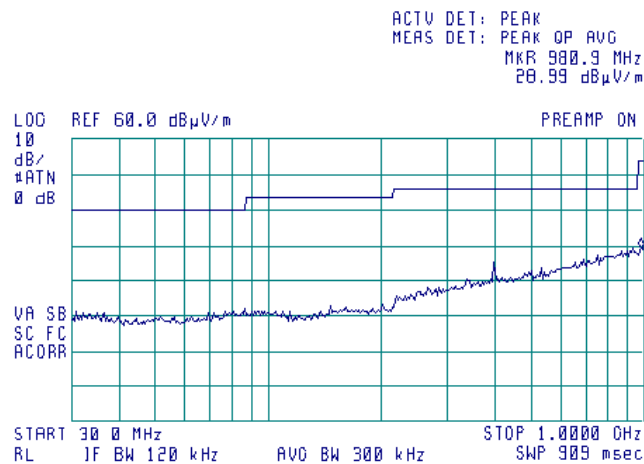
Plot 7.8.10 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.8.11 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



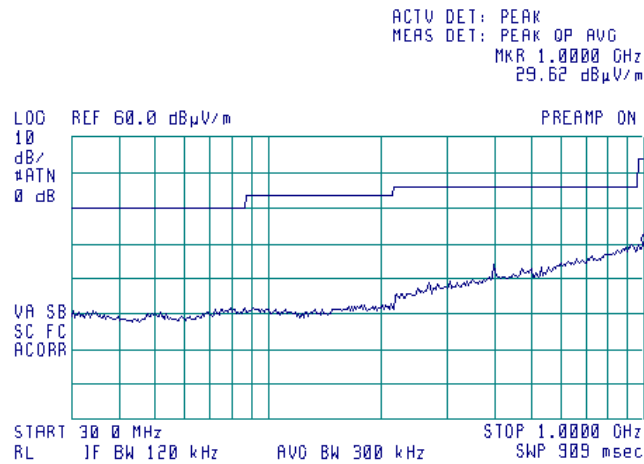


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.8.12 Radiated emission measurements from 30 to 1000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



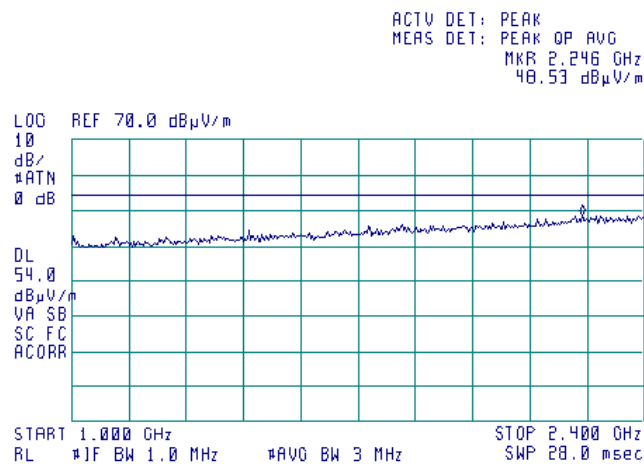


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

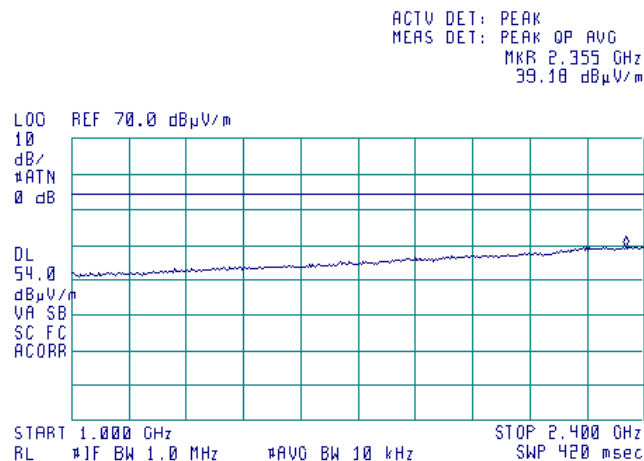
Plot 7.8.13 Radiated emission measurements from 1000 to 2400 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: Peak



Plot 7.8.14 Radiated emission measurements from 1000 to 2400 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: VBW = 10 kHz



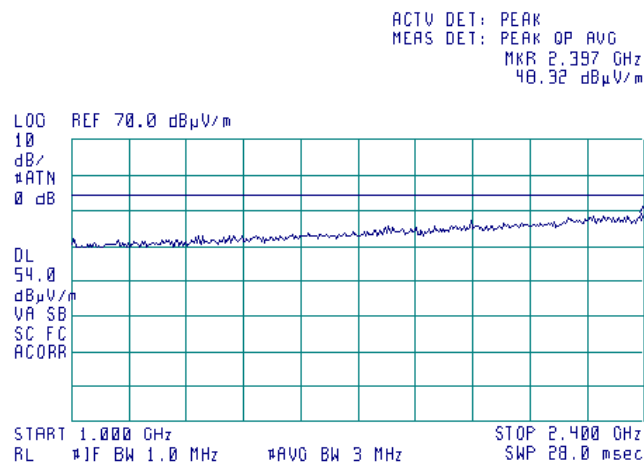


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

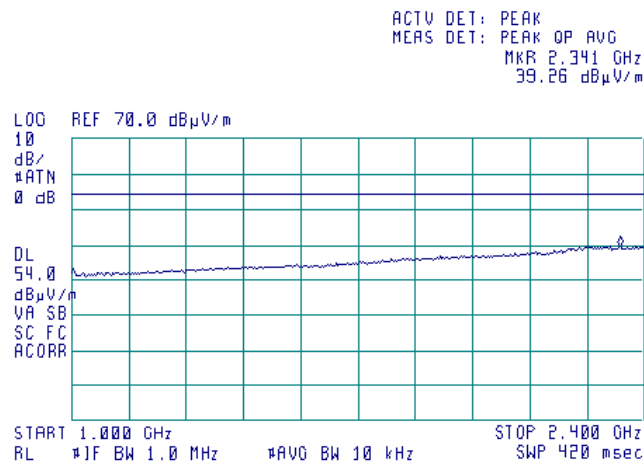
Plot 7.8.15 Radiated emission measurements from 1000 to 2400 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: Peak



Plot 7.8.16 Radiated emission measurements from 1000 to 2400 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: VBW = 10 kHz



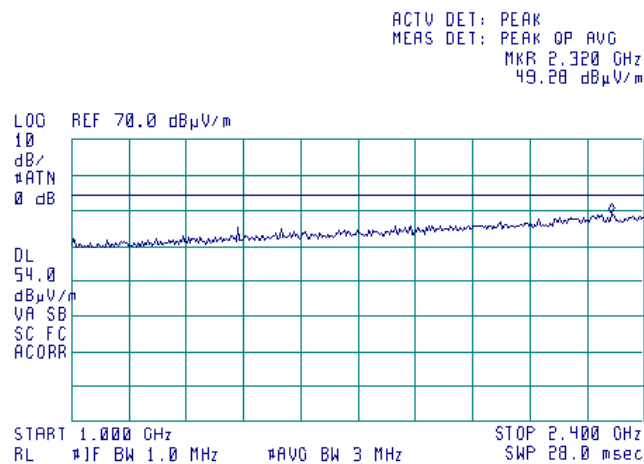


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

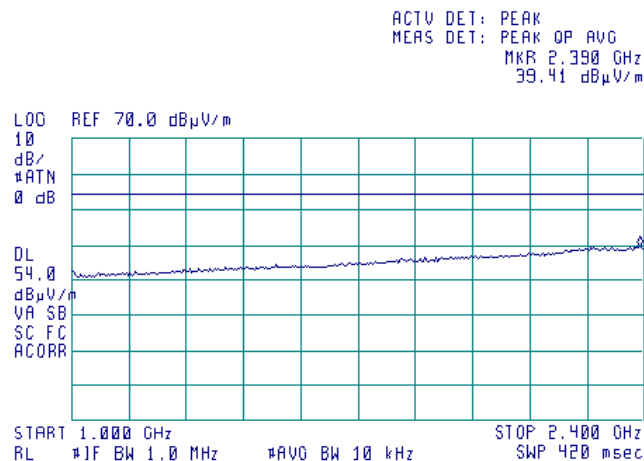
Plot 7.8.17 Radiated emission measurements from 1000 to 2400 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: Peak



Plot 7.8.18 Radiated emission measurements from 1000 to 2400 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: VBW = 10 kHz



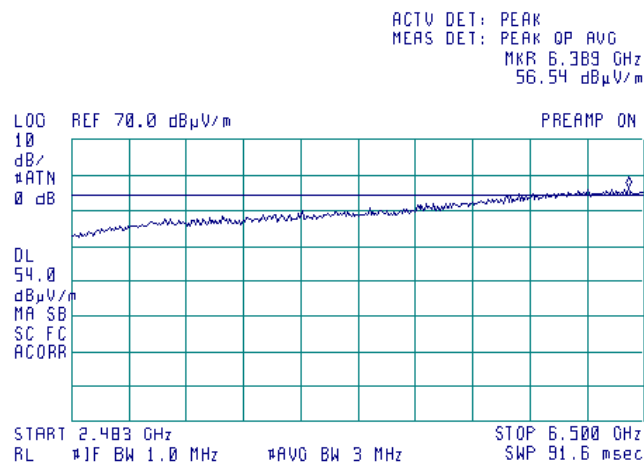


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

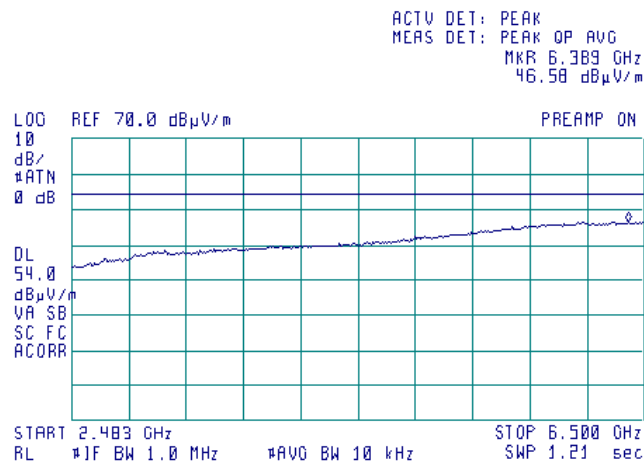
Plot 7.8.19 Radiated emission measurements from 2483.5 to 6500 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: Peak



Plot 7.8.20 Radiated emission measurements from 2483.5 to 6500 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: VBW = 10 kHz



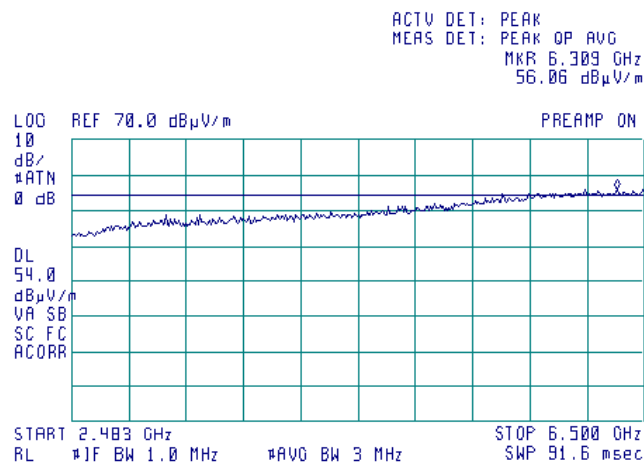


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

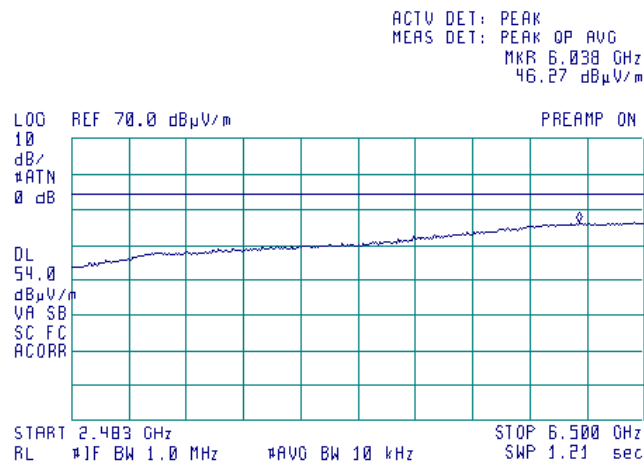
Plot 7.8.21 Radiated emission measurements from 2483.5 to 6500 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: Peak



Plot 7.8.22 Radiated emission measurements from 2483.5 to 6500 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: VBW = 10 kHz



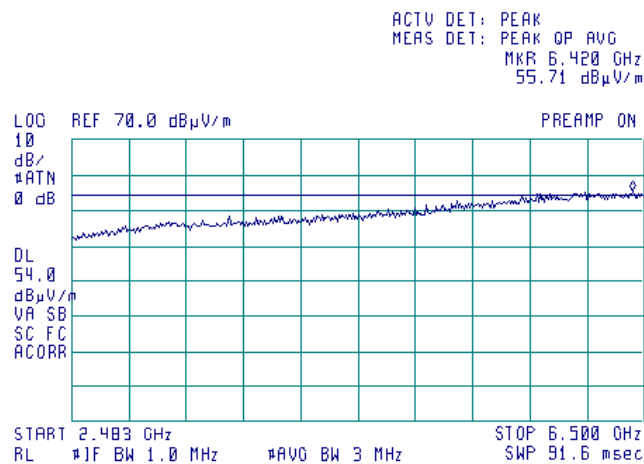


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

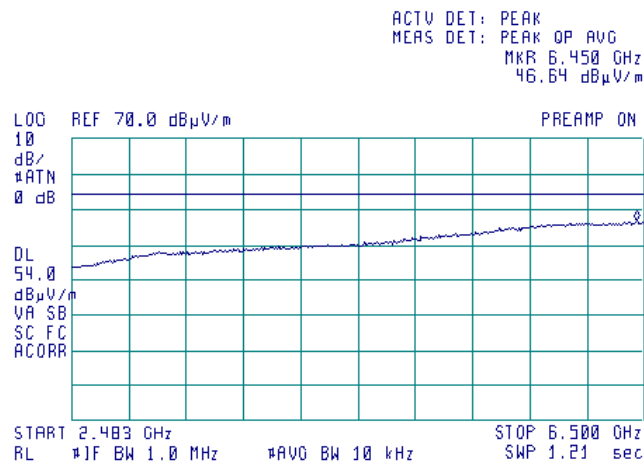
Plot 7.8.23 Radiated emission measurements from 2500 to 6500 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: Peak



Plot 7.8.24 Radiated emission measurements from 2500 to 6500 MHz at the high carrier frequency

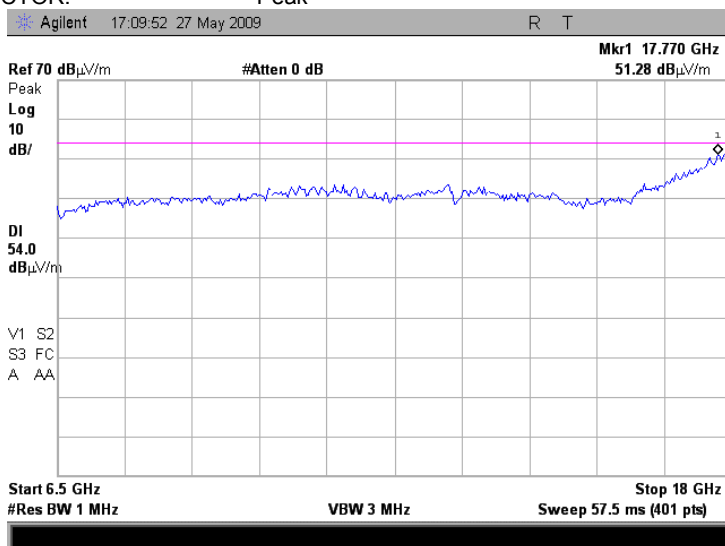
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: VBW = 10 kHz



Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

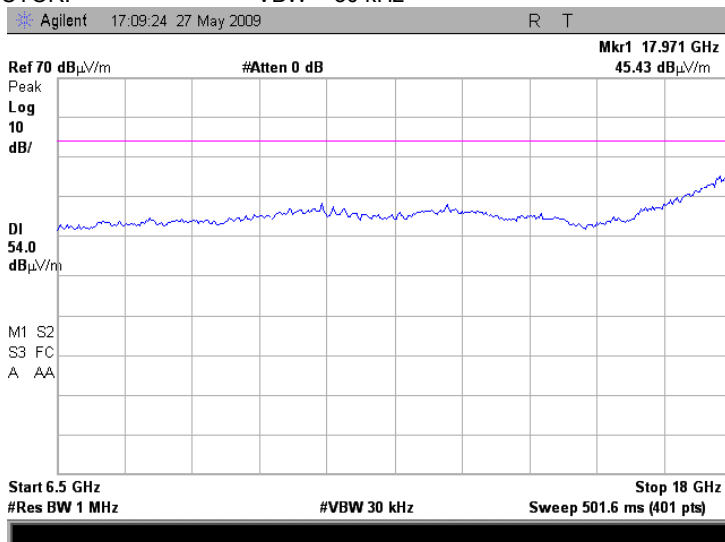
Plot 7.8.25 Radiated emission measurements from 6500 to 18000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: Peak



Plot 7.8.26 Radiated emission measurements from 6500 to 18000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: VBW = 30 kHz



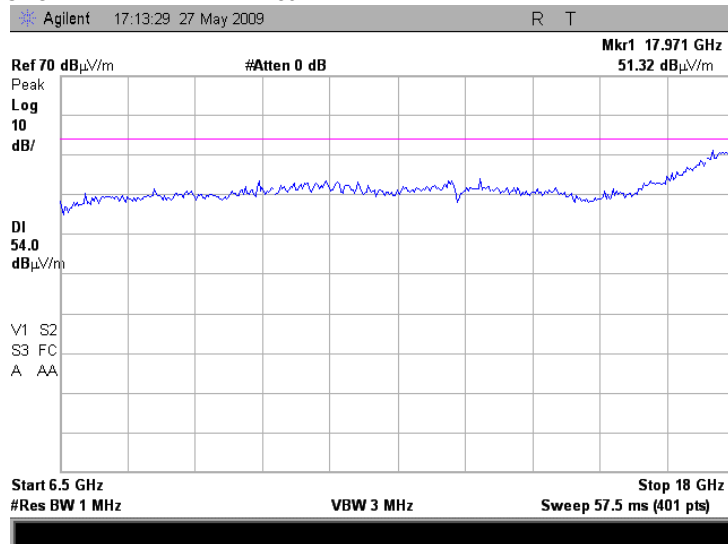


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

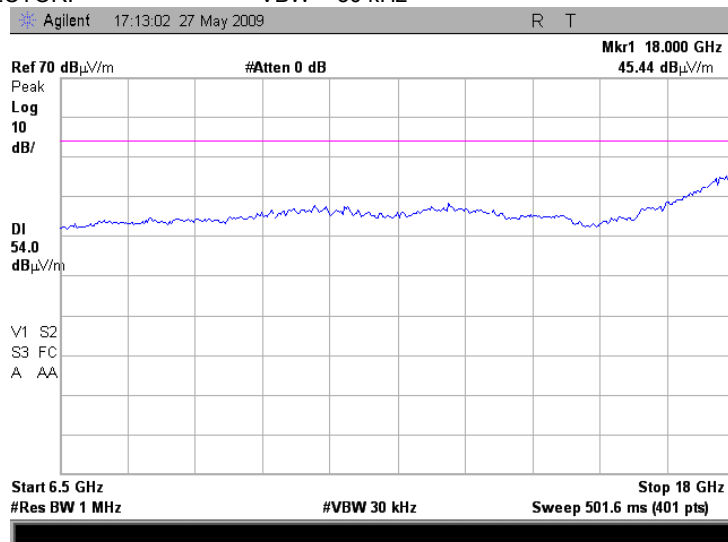
Plot 7.8.27 Radiated emission measurements from 6500 to 18000 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: Peak



Plot 7.8.28 Radiated emission measurements from 6500 to 18000 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: VBW = 30 kHz



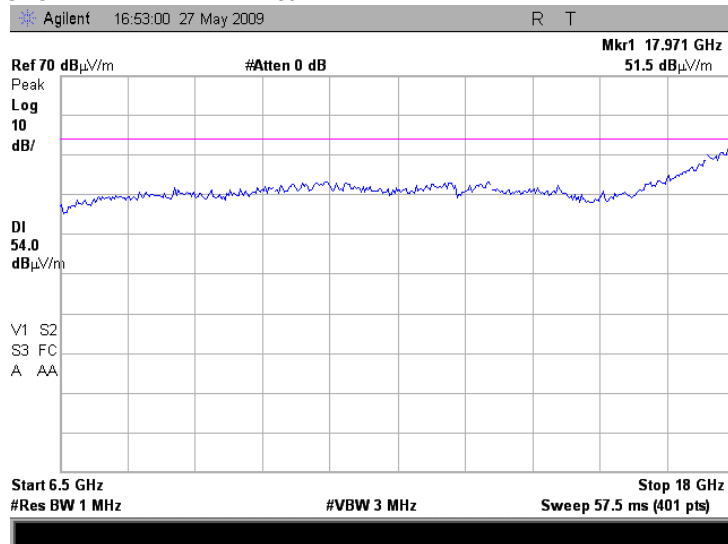


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

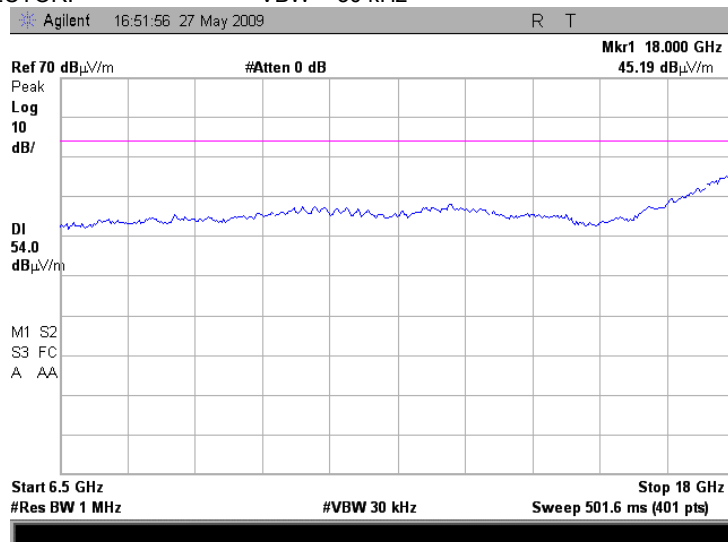
Plot 7.8.29 Radiated emission measurements from 6500 to 18000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: Peak



Plot 7.8.30 Radiated emission measurements from 6500 to 18000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DETECTOR: VBW = 30 kHz



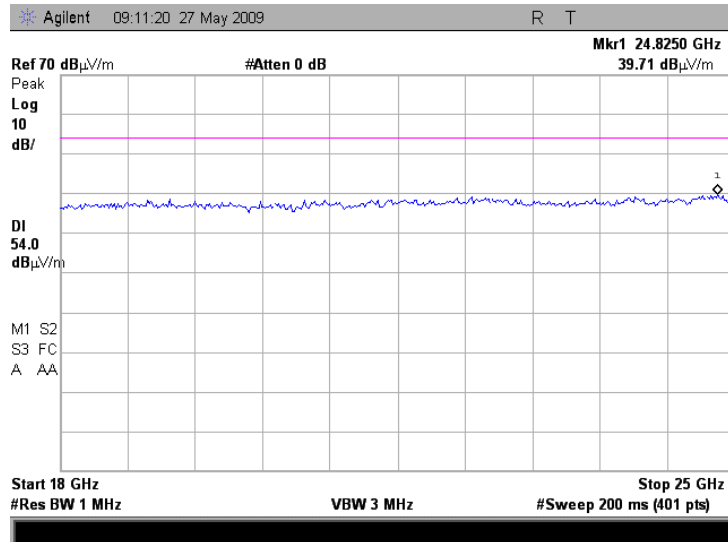


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

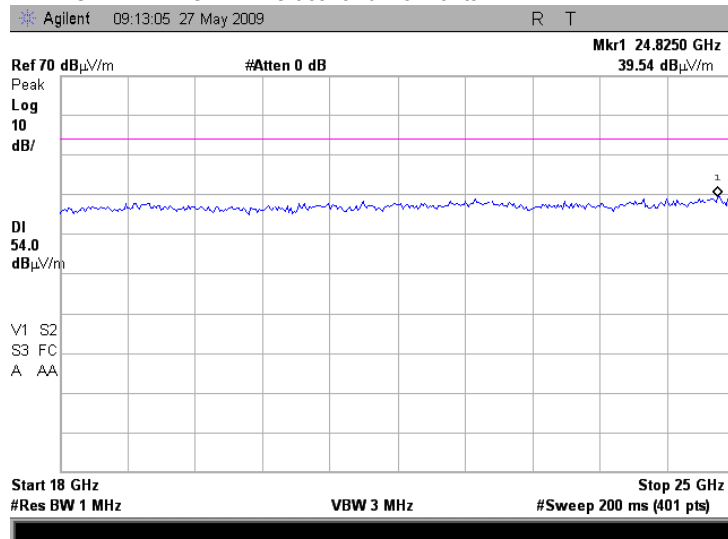
Plot 7.8.31 Radiated emission measurements from 18000 to 25000 MHz at the low carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.8.32 Radiated emission measurements from 18000 to 25000 MHz at the mid carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



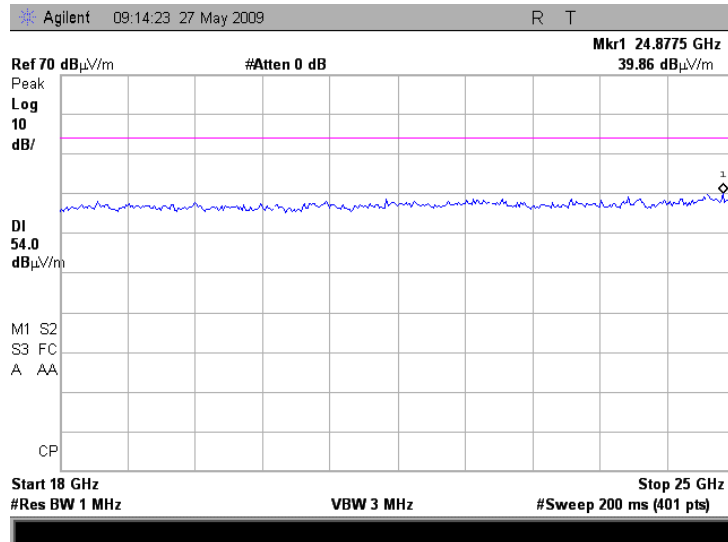


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.8.33 Radiated emission measurements from 18000 to 25000 MHz at the high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



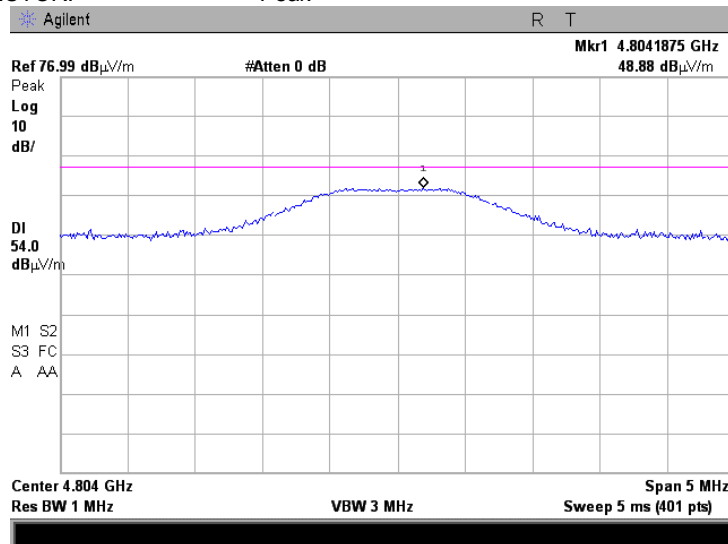


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

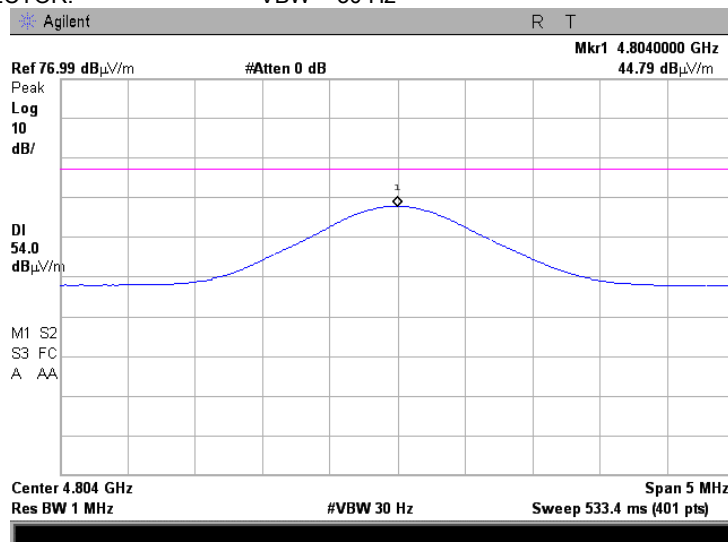
Plot 7.8.34 Radiated emission measurements at the second harmonic of low carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 7.8.35 Radiated emission measurements at the second harmonic of low carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: VBW = 30 Hz



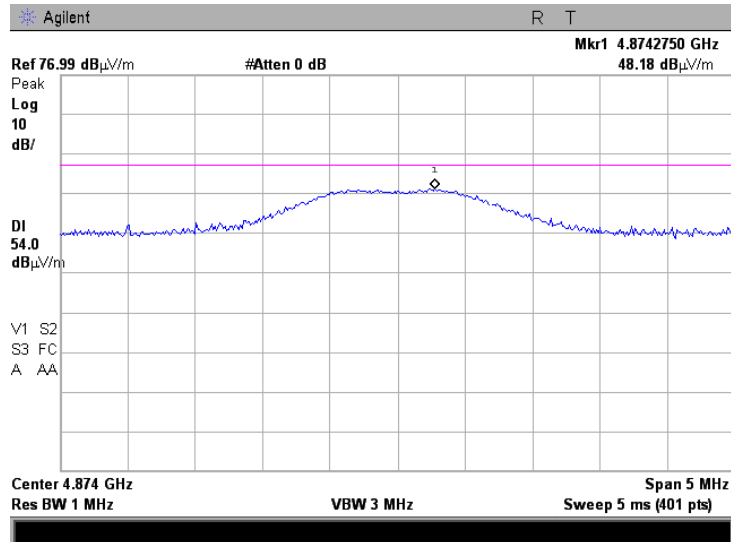


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

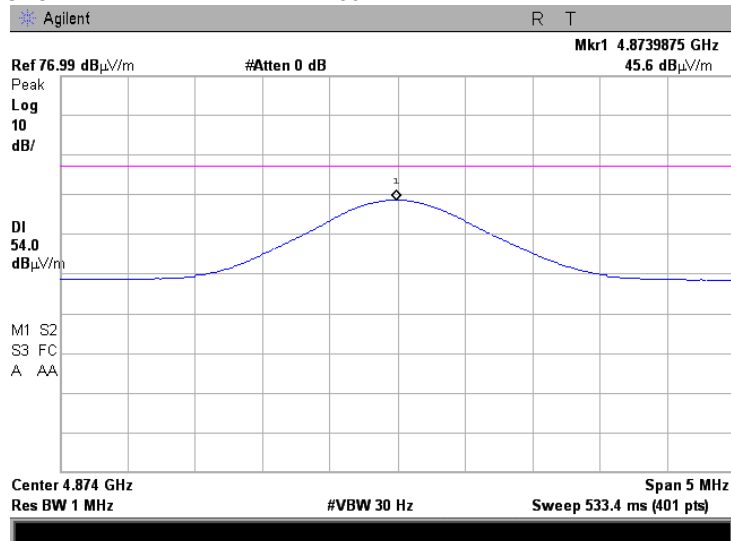
Plot 7.8.36 Radiated emission measurements at the second harmonic of mid carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 7.8.37 Radiated emission measurements at the second harmonic of mid carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: VBW = 30 Hz



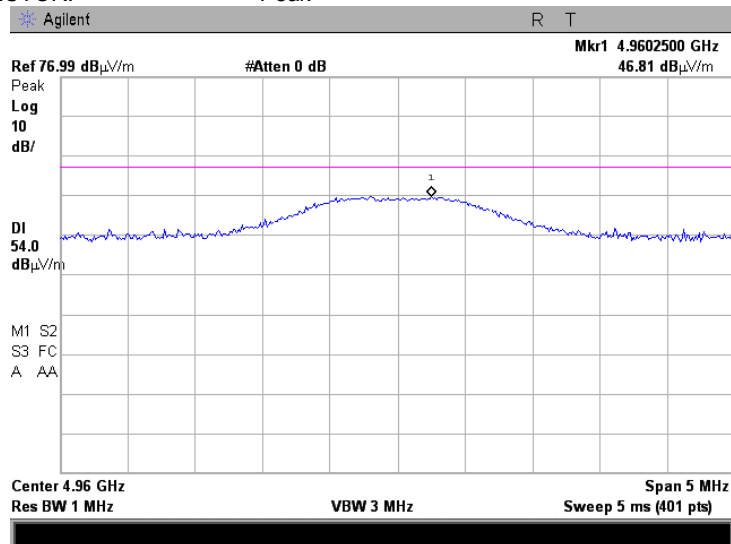


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

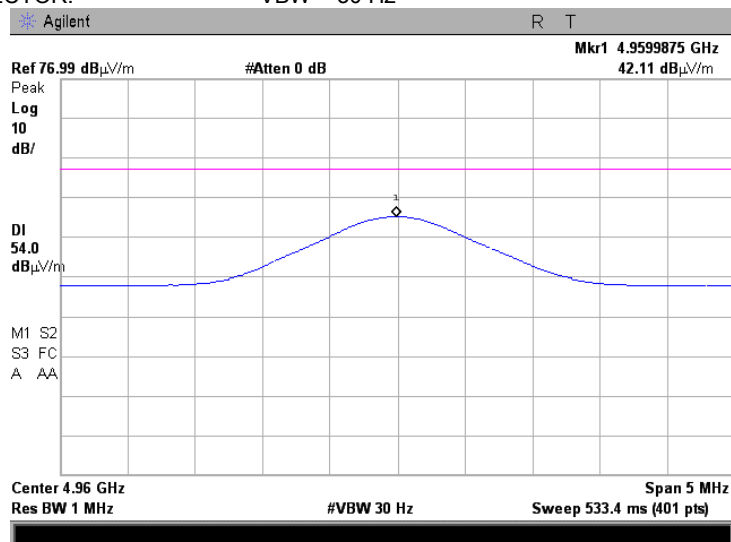
Plot 7.8.38 Radiated emission measurements at the second harmonic of high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 7.8.39 Radiated emission measurements at the second harmonic of high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: VBW = 30 Hz



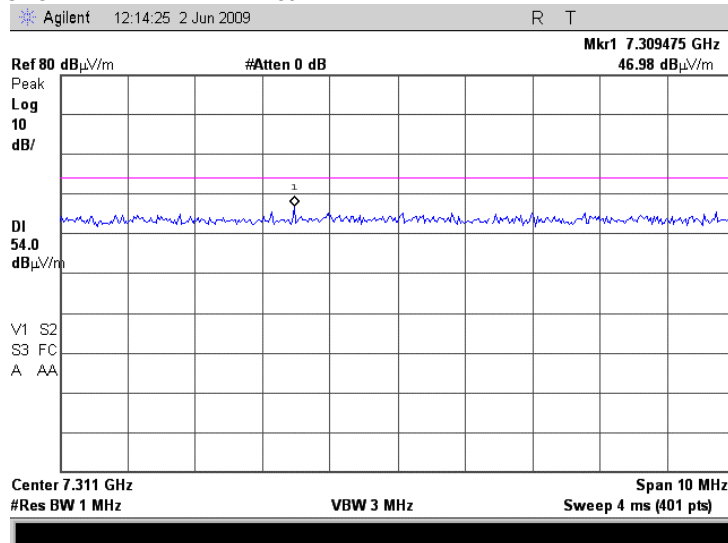


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

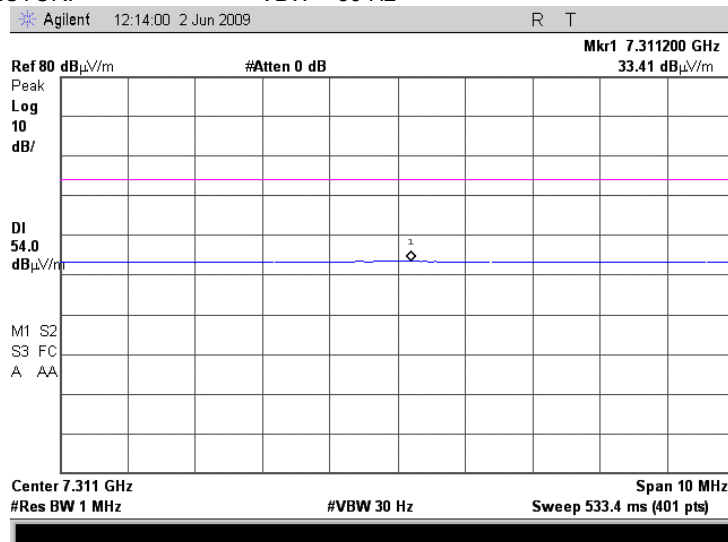
Plot 7.8.40 Radiated emission measurements at the third harmonic of mid carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 7.8.41 Radiated emission measurements at the third harmonic of mid carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: VBW = 30 Hz



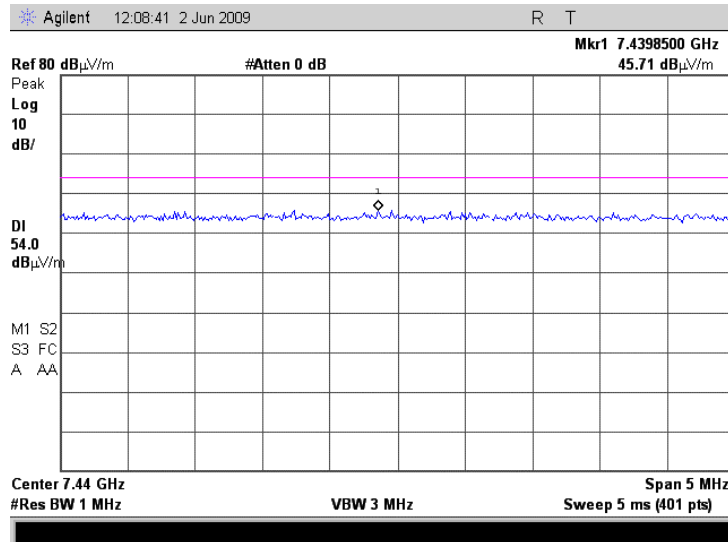


HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

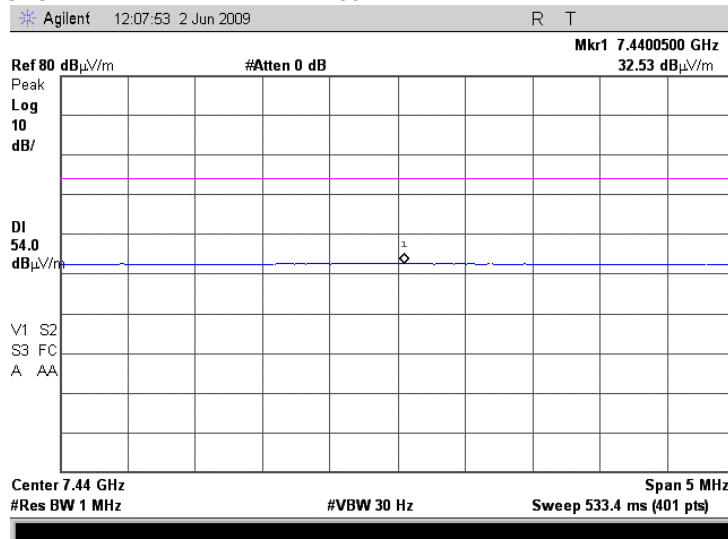
Plot 7.8.42 Radiated emission measurements at the third harmonic of high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 7.8.43 Radiated emission measurements at the third harmonic of high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
DETECTOR: VBW = 30 Hz

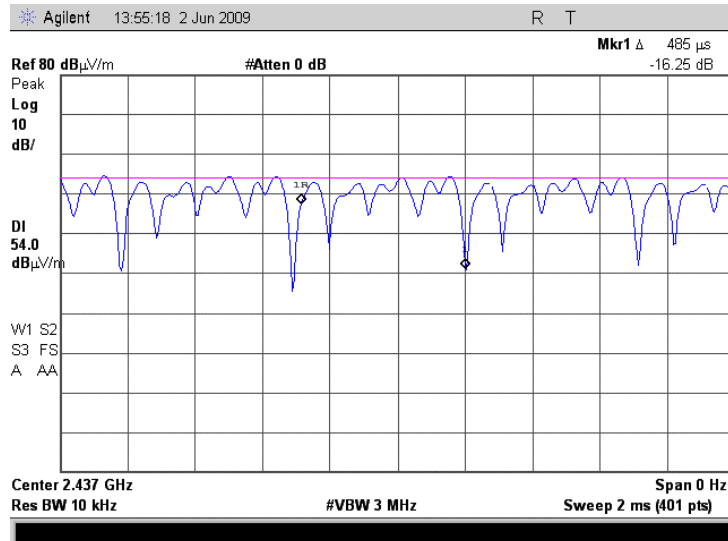




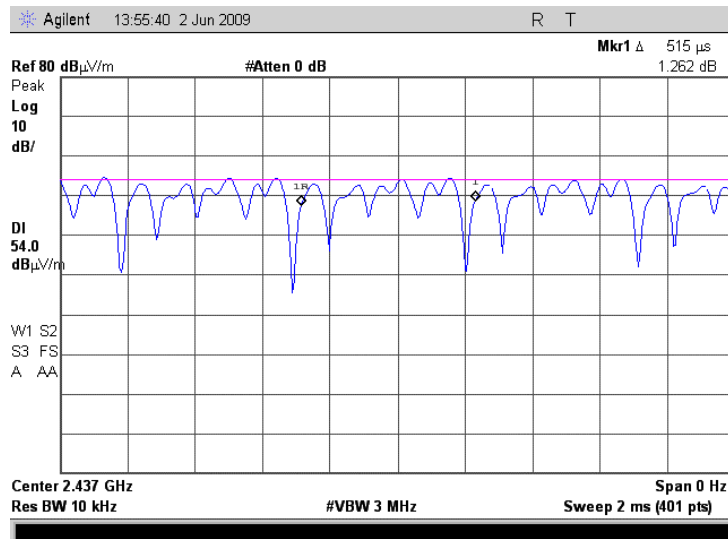
HERMON LABORATORIES

Test specification:	Section 15.247(d) / RSS-210, Section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/4/2009 9:02:58 AM		
Temperature: 22°C	Air Pressure: 1015 hPa	Relative Humidity: 52%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.8.44 Transmission pulse duration



Plot 7.8.45 Transmission pulse period



Test specification:	Section 15.203/ RSS-Gen, section 7.1.4, Antenna requirements		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:20:22 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

7.9 Antenna requirements

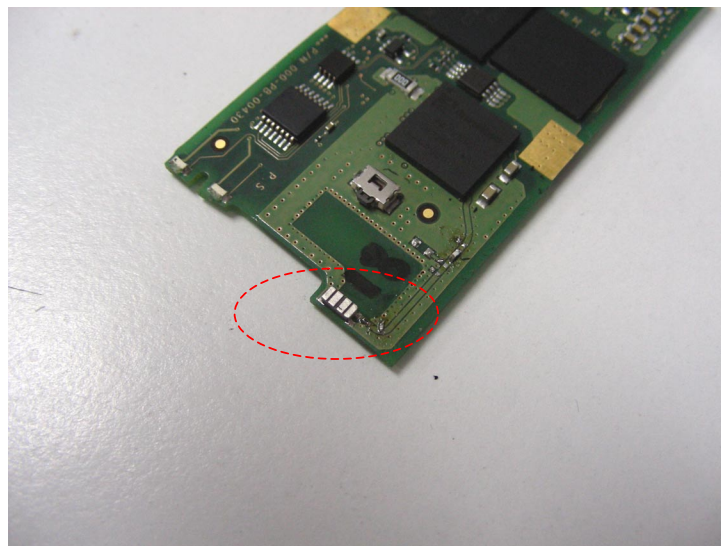
The EUT was verified for compliance with antenna requirements. A transmitter shall be designed to ensure that no antenna other than that furnished by the responsible party will be used with the device. It may be either permanently attached or employs a unique antenna connector for every antenna proposed for use with the EUT. This requirement does not apply to professionally installed transmitters.

The rationale for compliance with the above requirements was either visual inspection results or supplier declaration. The summary of results is provided in Table 7.9.1.

Table 7.9.1 Antenna requirements

Requirement	Rationale	Verdict
The transmitter antenna is permanently attached	Visual inspection	Comply
The transmitter employs a unique antenna connector	NA	
The transmitter requires professional installation	NA	

Photograph 7.9.1 Antenna assembly



Test specification:		FCC section 15.207(a) / RSS-Gen, Section 7.2.2, Conducted emission	
Test procedure:		ANSI C63.4, Section 13.1.3	
Test mode:		Verdict: PASS	
Date & Time:			
Temperature: 23°C		Air Pressure: 1009 hPa	Relative Humidity: 42%
Remarks:		Power Supply: 3.3 VDC	

7.10 Conducted emissions

7.10.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.10.1.

Table 7.10.1 Limits for conducted emissions

Frequency, MHz	Class B limit, dB(μV)	
	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5.0	56	46
5.0 - 30	60	50

* The limit decreases linearly with the logarithm of frequency.

7.10.2 Test procedure

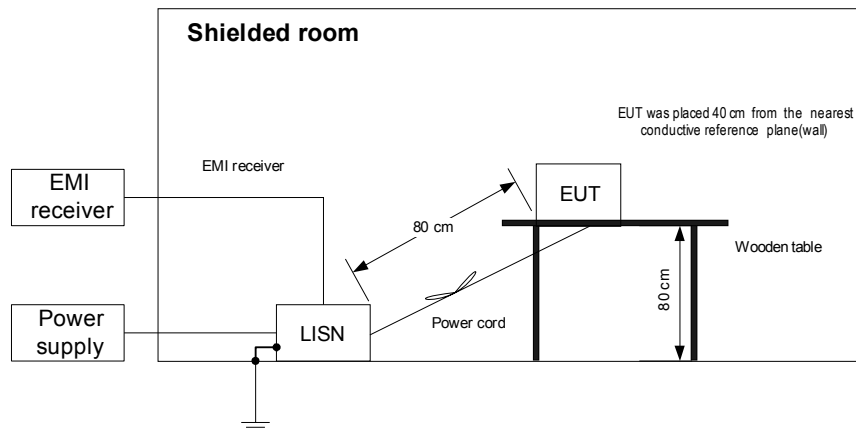
7.10.2.1 The EUT was set up as shown in Figure 7.10.1, energized and the performance check was conducted.

7.10.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 7.10.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

7.10.2.3 The position of the device cables was varied to determine maximum emission level.

7.10.2.4 The worst test results (the lowest margins) were recorded in Table 7.10.2 and shown in the associated plots.

Figure 7.10.1 Setup for conducted emission measurements, table-top equipment





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Test specification:		FCC section 15.207(a) / RSS-Gen, Section 7.2.2, Conducted emission			
Test procedure:		ANSI C63.4, Section 13.1.3			
Test mode:		Compliance		Verdict: PASS	
Date & Time:		6/17/2009 3:20:22 PM			
Temperature: 23°C		Air Pressure: 1009 hPa		Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:					

Table 7.10.2 Conducted emission test results

LINE: AC mains
 EUT OPERATING MODE: Transmit
 EUT SET UP: TABLE-TOP
 TEST SITE: SHIELDED ROOM
 DETECTORS USED: PEAK / QUASI-PEAK / AVERAGE
 FREQUENCY RANGE: 150 kHz - 30 MHz
 RESOLUTION BANDWIDTH: 9 kHz

Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.192450	51.75	46.93	63.94	-17.01	28.86	53.94	-25.08	L1	Pass
0.200300	50.48	47.54	63.64	-16.10	33.01	53.64	-20.63		
0.209225	49.59	45.01	63.30	-18.29	23.79	53.30	-29.51		
0.189000	50.60	45.62	64.10	-18.48	22.76	54.10	-31.34	L2	Pass
0.195600	49.75	47.16	63.82	-16.66	29.28	53.82	-24.54		
0.208825	48.46	43.84	63.31	-19.47	23.79	53.31	-29.52		

* - Margin = Measured emission - specification limit.

Reference numbers of test equipment used

HL 0447	HL 0580	HL 1503	HL 2924	HL 3170	HL 3612		
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Full description is given in Appendix A.

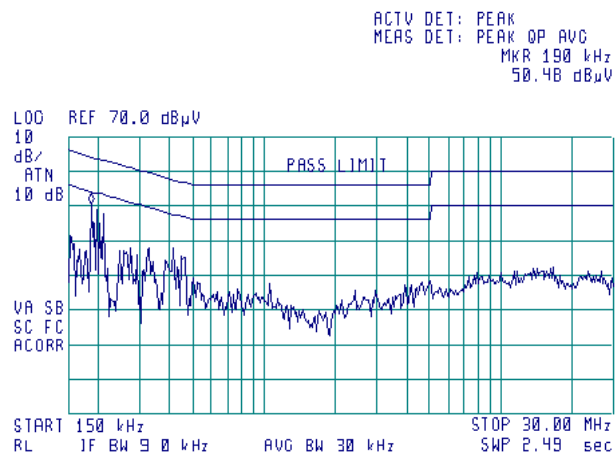


HERMON LABORATORIES

Test specification:		FCC section 15.207(a) / RSS-Gen, Section 7.2.2, Conducted emission	
Test procedure:		ANSI C63.4, Section 13.1.3	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 3:20:22 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

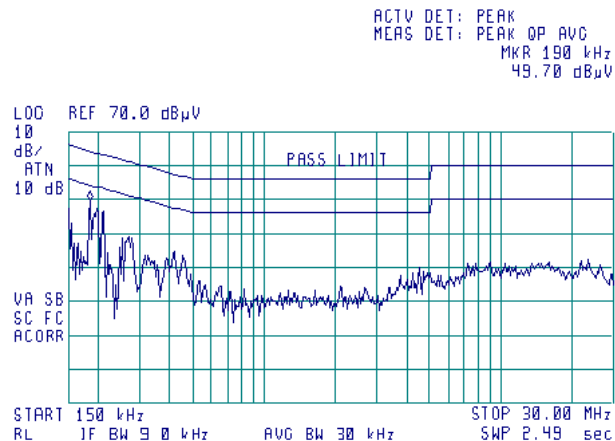
Plot 7.10.1 Conducted emission measurements

LINE: L1
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 7.10.2 Conducted emission measurements

LINE: L2
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	29-Jun-08	29-Jun-09
0447	LISN, 16/2, 300V RMS, 50 Ohm/50 uH + 5 Ohm, STD CISPR 16-1	Hermon Laboratories	LISN 16 - 1	066	04-Nov-08	04-Nov-09
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard Co	8546A	3617A 00319, 3448A002 53	29-Aug-08	29-Aug-09
0580	DC block adaptor 10 kHz - 2.2 GHz	Anritsu	MA8601 A	580	23-Nov-08	23-Nov-09
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	11-Jan-09	11-Jan-10
0768	Antenna Standard Gain Horn, 18-26.5 GHz, WR-42, 25 dB gain	Quinstar Technology	QWH-4200-BA	110	23-Dec-08	23-Dec-11
1116	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz	Hermon Laboratories	A1-18	186	23-Jan-09	23-Jan-10
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies	8564EC	3946A002 19	28-Aug-08	28-Aug-09
1503	Cable RF, 6 m, BNC/BNC	Belden	M17/167 MIL-C-17	1503	01-Jan-09	01-Jan-10
1562	Oscilloscope 100 MHz, DMM	Tektronix	THS720A	B039444	21-Sep-08	21-Sep-09
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	23-Jan-09	23-Jan-10
2254	Cable 40 GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	11-Jun-09	11-Jun-10
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	12-Jun-08	12-Jun-10
2869	Cable, 18 GHz, 1.2 m, SMA - SMA, Right Angle	Gore	NA	91P72073	04-Feb-09	04-Feb-10
2882	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC-MNFN-3.0	211539 001	04-Feb-09	04-Feb-10
2911	Cable 18 GHz, 1.5 m, SMA-SMA	Gore	NA	89386	05-Oct-08	05-Oct-09
2924	Line Impedance Stabilization Network (LISN), 50Ohm/50 uH+50Ohm, 25 A, 2 lines, STD: MIL-461E, CISPR 16-1	Electro-Metrics	FCC VDE 25-2	1178	16-Jun-09	16-Jun-10
3121	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3121	07-Dec-08	07-Dec-09
3122	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3122	07-Dec-08	07-Dec-09
3123	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3123	01-Jan-09	01-Jan-10
3170	Attenuator, N-type, 10 dB, DC to 6 GHz, 1 W	Mini-Circuits	UNAT-10+	NA	01-Jan-09	01-Jan-10
3532	Amplifier, low noise, 2 to 8 GHz	Quinstar Technology	QLJ-02084040-J0	111590020 01	23-Nov-08	23-Nov-09
3534	Amplifier, low noise, 6 to 18 GHz	Quinstar Technology	QLJ-06184040-J0	111590010 02	07-Dec-08	07-Dec-09
3535	Amplifier, low noise, 18 to 40 GHz	Quinstar Technology	QLJ-18404537-J0	111590030 01	07-Dec-08	07-Dec-09
3612	Cable RF, 17.5 m, N type-N type	Teldor	RG-214/U	NA	17-Nov-08	17-Nov-09
3616	Cable RF, 6.5 m, N type-N type, DC-6.5 GHz	Suhner Switzerland	Rg 214/U	NA	07-Dec-08	07-Dec-09

9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted carrier power at RF antenna connector	Below 12.4 GHz: ± 1.7 dB 12.4 GHz to 40 GHz: ± 2.3 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Occupied bandwidth	± 8.0 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.

10 APPENDIX C Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility.

Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47), Registration Numbers 90624 for OATS and 90623 for the anechoic chamber; by Industry Canada for electromagnetic emissions (file numbers IC 2186A-1 for OATS and IC 2186A-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), has a status of a Telefication - Listed Testing Laboratory, Certificate No. L138/00; assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01).

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e-mail: mail@hermonlabs.com
website: www.hermonlabs.com

Person for contact: Mr. Alex Usoskin, CEO.

11 APPENDIX D Specification references

FCC 47CFR part 15: 2008	Radio Frequency Devices.
Public notice DA 00- 705: 2000	Filing and measurement guidelines for frequency hopping spread spectrum systems.
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
RSS-210 Issue 7: 2007	Low Power Licence- Exempt Radiocommunication Devices
RSS-Gen Issue 2: 2007	General Requirements and Information for the Certification of Radiocommunication Equipment

12 APPENDIX E Test equipment correction factors

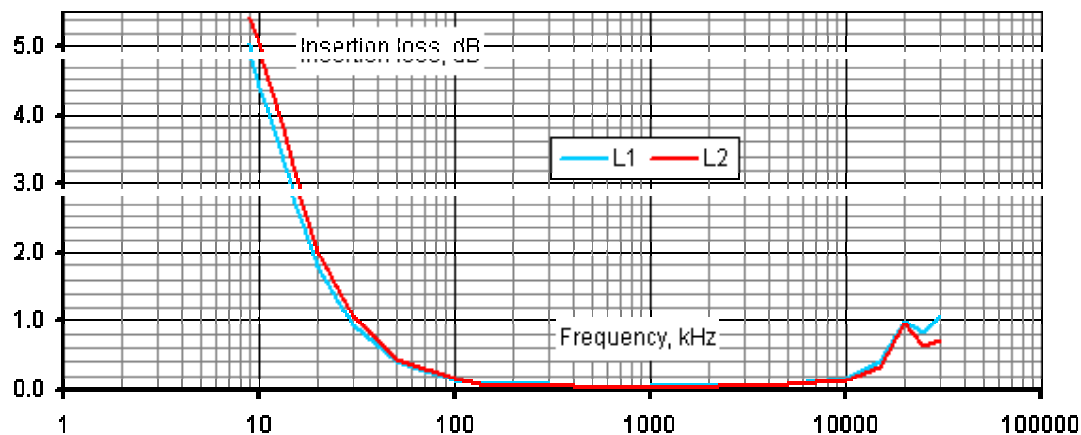
Correction factor
Line impedance stabilization network
Model LISN 16 - 1
Hermon Laboratories, HL 0447

Frequency, kHz	Correction factor, dB
10	4.9
15	2.86
20	1.83
25	1.25
30	0.91
35	0.69
40	0.53
50	0.35
60	0.25
70	0.18
80	0.14
90	0.11
100	0.09
125	0.06
150	0.04

The correction factor in dB is to be added to meter readings of an interference analyzer or a spectrum analyzer.

Correction factor
Line impedance stabilization network
Model FCC VDE 25-2, Electro-Metrics, HL 2924

Frequency, kHz	Insertion loss, dB		Measurement uncertainty, dB
	L1	L2	
9	5.03	5.43	0.6
10	4.47	5.07	
20	1.77	2.00	
30	0.93	1.07	
50	0.41	0.45	
100	0.14	0.16	
150	0.09	0.06	
200	0.07	0.07	
300	0.07	0.05	
400	0.05	0.05	
500	0.02	0.03	
1000	0.05	0.02	
5000	0.07	0.08	
10000	0.17	0.15	
15000	0.42	0.32	
20000	0.99	0.97	
25000	0.83	0.63	
30000	1.07	0.71	



Antenna factor
Active loop antenna
Model 6502, S/N 2857, HL 0446

Frequency, MHz	Magnetic antenna factor, dB	Electric antenna factor, dB
0.009	-32.8	18.7
0.010	-33.8	17.7
0.020	-38.3	13.2
0.050	-41.1	10.4
0.075	-41.3	10.2
0.100	-41.6	9.9
0.150	-41.7	9.8
0.250	-41.6	9.9
0.500	-41.8	9.8
0.750	-41.9	9.7
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.2
4.000	-41.4	10.1
5.000	-41.5	10.1
10.000	-41.9	9.6
15.000	-41.9	9.6
20.000	-42.2	9.3
25.000	-42.8	8.7
30.000	-44.0	7.5

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field intensity in dB(μ V/m).

Antenna factor
Standard gain horn antenna
Quinstar Technology
Model QWH
Ser.No.110, HL 0768

Frequency min, GHz	Frequency max, GHz	Antenna factor, dB(1/m)
18.000	26.500	32.01
26.500	40.000	35.48
40.000	60.000	39.03
60.000	90.000	42.55
90.000	140.000	46.23
140.000	220.000	50.11

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field intensity in dB(μ V/m).

Antenna factor
Biconilog antenna EMCO Model 3141
Ser.No.1011, HL 0604

Frequency, MHz	Antenna Factor, dB(1/m)	Frequency, MHz	Antenna Factor, dB(1/m)
26	7.8	940	24.0
28	7.8	960	24.1
30	7.8	980	24.5
40	7.2	1000	24.9
60	7.1	1020	25.0
70	8.5	1040	25.2
80	9.4	1060	25.4
90	9.8	1080	25.6
100	9.7	1100	25.7
110	9.3	1120	26.0
120	8.8	1140	26.4
130	8.7	1160	27.0
140	9.2	1180	27.0
150	9.8	1200	26.7
160	10.2	1220	26.5
170	10.4	1240	26.5
180	10.4	1260	26.5
190	10.3	1280	26.6
200	10.6	1300	27.0
220	11.6	1320	27.8
240	12.4	1340	28.3
260	12.8	1360	28.2
280	13.7	1380	27.9
300	14.7	1400	27.9
320	15.2	1420	27.9
340	15.4	1440	27.8
360	16.1	1460	27.8
380	16.4	1480	28.0
400	16.6	1500	28.5
420	16.7	1520	28.9
440	17.0	1540	29.6
460	17.7	1560	29.8
480	18.1	1580	29.6
500	18.5	1600	29.5
520	19.1	1620	29.3
540	19.5	1640	29.2
560	19.8	1660	29.4
580	20.6	1680	29.6
600	21.3	1700	29.8
620	21.5	1720	30.3
640	21.2	1740	30.8
660	21.4	1760	31.1
680	21.9	1780	31.0
700	22.2	1800	30.9
720	22.2	1820	30.7
740	22.1	1840	30.6
760	22.3	1860	30.6
780	22.6	1880	30.6
800	22.7	1900	30.6
820	22.9	1920	30.7
840	23.1	1940	30.9
860	23.4	1960	31.2
880	23.8	1980	31.6
900	24.1	2000	32.0
920	24.1		

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field intensity in dB(μ V/m).

Antenna factor
Double-ridged wave guide horn antenna
Model 3115, S/N 9911-5964, HL1984

Frequency, MHz	Antenna factor, dB(1/m)
1000.0	24.7
1500.0	25.7
2000.0	27.6
2500.0	28.9
3000.0	31.2
3500.0	32.0
4000.0	32.5
4500.0	32.7
5000.0	33.6
5500.0	35.1
6000.0	35.4
6500.0	34.9
7000.0	36.1
7500.0	37.8
8000.0	38.0
8500.0	38.1
9000.0	39.1
9500.0	38.3
10000.0	38.6
10500.0	38.2
11000.0	38.7
11500.0	39.5
12000.0	40.0
12500.0	40.4
13000.0	40.5
13500.0	41.1
14000.0	41.6
14500.0	41.7
15000.0	38.7
15500.0	38.2
16000.0	38.8
16500.0	40.5
17000.0	42.5
17500.0	45.9
18000.0	49.4

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field intensity in dB(μ V/m).

Cable loss
Cable coaxial, 6 m, model: M17/167 MIL-C-17, HL 1503

Frequency, MHz	Cable loss, dB
0.15	0.043
1	0.077
3	0.139
5	0.169
10	0.248
30	0.430
50	0.561
75	0.697
100	0.822
300	1.446
500	1.901
800	2.663
1000	2.829
1500	3.569
2000	4.179

Cable loss
Cable 40 GHz, 0.8 m, blue, model: KPS-1503A-800-KPS, S/N W4907, HL 2254

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.04	5.10	0.80	15.00	1.49
0.05	0.07	5.30	0.83	15.50	1.49
0.10	0.09	5.50	0.83	16.00	1.46
0.20	0.15	5.70	0.84	16.50	1.47
0.30	0.19	5.90	0.87	17.00	1.50
0.40	0.25	6.10	0.86	17.50	1.57
0.50	0.29	6.30	0.89	18.00	1.63
0.60	0.33	6.50	0.90	18.50	1.57
0.70	0.37	6.70	0.89	19.00	1.63
0.80	0.41	6.90	0.93	19.50	1.65
0.90	0.44	7.10	0.92	20.00	1.64
1.00	0.45	7.30	0.95	20.50	1.75
1.10	0.48	7.50	0.96	21.00	1.72
1.20	0.51	7.70	0.97	21.50	1.78
1.30	0.53	7.90	1.01	22.00	1.76
1.40	0.54	8.10	1.00	22.50	1.72
1.50	0.57	8.30	1.05	23.00	1.83
1.60	0.59	8.50	1.04	23.50	1.80
1.70	0.04	8.70	1.07	24.00	1.90
1.80	0.07	8.90	1.11	24.50	1.81
1.90	0.09	9.10	1.09	25.00	1.98
2.00	0.15	9.30	1.14	25.50	1.91
2.10	0.19	9.50	1.12	26.00	2.02
2.20	0.25	9.70	1.15	26.50	1.92
2.30	0.29	9.90	1.16	27.00	1.97
2.40	0.33	10.10	1.16	28.00	2.02
2.50	0.37	10.30	1.19	29.00	1.95
2.60	0.41	10.50	1.14	30.00	1.94
2.70	0.44	10.70	1.19	31.00	2.11
2.80	0.45	10.90	1.17	32.00	2.17
2.90	0.48	11.10	1.13	33.00	2.27
3.10	0.61	11.30	1.20	34.00	2.27
3.30	0.64	11.50	1.13	35.00	2.29
3.50	0.65	11.70	1.20	36.00	2.35
3.70	0.68	11.90	1.18	37.00	2.37
3.90	0.69	12.10	1.14	38.00	2.40
4.10	0.71	12.40	1.19	39.00	2.57
4.30	0.73	13.00	1.34	40.00	2.36
4.50	0.75	13.50	1.33		
4.70	0.77	14.00	1.48		
4.90	0.79	14.50	1.45		

Cable loss
Cable coaxial, Gore, 18 GHz, 1.1 m, SMA - SMA, model Right Angle, S/N 91P72071
HL 2869

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	5750	0.87	12000	1.30
30	0.06	6000	0.87	12250	1.33
100	0.10	6250	0.89	12500	1.35
250	0.18	6500	0.92	12750	1.36
500	0.25	6750	0.94	13000	1.38
750	0.27	7000	0.98	13250	1.41
1000	0.34	7250	0.99	13500	1.39
1250	0.35	7500	1.02	13750	1.41
1500	0.42	7750	1.03	14000	1.42
1750	0.44	8000	1.04	14250	1.46
2000	0.49	8250	1.04	14500	1.39
2250	0.52	8500	1.08	14750	1.46
2500	0.55	8750	1.08	15000	1.40
2750	0.59	9000	1.12	15250	1.47
3000	0.61	9250	1.12	15500	1.36
3250	0.64	9500	1.15	15750	1.49
3500	0.67	9750	1.14	16000	1.51
3750	0.69	10000	1.19	16250	1.60
4000	0.70	10250	1.20	16500	1.56
4250	0.74	10500	1.23	16750	1.66
4500	0.76	10750	1.24	17000	1.71
4750	0.77	11000	1.24	17250	1.78
5000	0.79	11250	1.25	17500	1.75
5250	0.82	11500	1.28	17750	1.77
5500	0.84	11750	1.29	18000	1.86

Cable loss
Cable coaxial, Bird, 18 GHz, N-type, M-F, model TC-MNFN-3.0, S/N 211539 001
HL 2882

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.08	5750	1.78	12000	2.57
30	0.12	6000	1.84	12250	2.62
100	0.22	6250	1.87	12500	2.66
250	0.35	6500	1.92	12750	2.68
500	0.49	6750	1.96	13000	2.67
750	0.60	7000	2.01	13250	2.75
1000	0.68	7250	2.08	13500	2.77
1250	0.78	7500	2.12	13750	2.90
1500	0.85	7750	2.19	14000	3.00
1750	0.92	8000	2.22	14250	3.12
2000	0.98	8250	2.28	14500	2.98
2250	1.06	8500	2.29	14750	3.03
2500	1.11	8750	2.27	15000	2.99
2750	1.19	9000	2.28	15250	2.99
3000	1.25	9250	2.26	15500	2.98
3250	1.30	9500	2.29	15750	2.98
3500	1.34	9750	2.33	16000	2.99
3750	1.40	10000	2.34	16250	3.05
4000	1.45	10250	2.41	16500	3.11
4250	1.51	10500	2.46	16750	3.18
4500	1.54	10750	2.48	17000	3.23
4750	1.59	11000	2.48	17250	3.21
5000	1.63	11250	2.52	17500	3.22
5250	1.68	11500	2.53	17750	3.22
5500	1.72	11750	2.56	18000	3.25

Cable loss
Cable coaxial, Gore, 18 GHz, 1.5 m, SMA-SMA, S/N 89386
HL 2911

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	5750	1.32	12000	2.04
30	0.09	6000	1.34	12250	2.04
100	0.16	6250	1.41	12500	2.07
250	0.27	6500	1.43	12750	1.96
500	0.38	6750	1.46	13000	1.97
750	0.49	7000	1.49	13250	2.01
1000	0.55	7250	1.52	13500	2.04
1250	0.62	7500	1.56	13750	2.12
1500	0.68	7750	1.66	14000	2.16
1750	0.74	8000	1.69	14250	2.16
2000	0.78	8250	1.78	14500	2.28
2250	0.83	8500	1.73	14750	2.26
2500	0.88	8750	1.71	15000	2.22
2750	0.97	9000	1.72	15250	2.34
3000	1.00	9250	1.74	15500	2.41
3250	1.03	9500	1.76	15750	2.45
3500	1.05	9750	1.80	16000	2.57
3750	1.09	10000	1.89	16250	2.54
4000	1.14	10250	1.94	16500	2.55
4250	1.17	10500	1.99	16750	2.52
4500	1.21	10750	1.92	17000	2.42
4750	1.22	11000	1.96	17250	2.49
5000	1.24	11250	1.97	17500	2.62
5250	1.28	11500	2.02	17750	2.70
5500	1.30	11750	2.07	18000	2.76

Cable loss
Microwave Cable Assembly, 18 GHz, 6.4 m, SMA – SMA, Huber-Suhner, model 198-9155-00
HL 3121

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.08	3600	2.10	7400	3.08	11200	3.85	15100	4.58
30	0.18	3700	2.14	7500	3.11	11300	3.85	15200	4.60
50	0.26	3800	2.18	7600	3.14	11400	3.86	15300	4.63
100	0.34	3900	2.19	7700	3.16	11500	3.86	15400	4.65
200	0.47	4000	2.25	7800	3.18	11600	3.87	15500	4.71
300	0.59	4100	2.25	7900	3.20	11700	3.85	15600	4.70
400	0.66	4200	2.28	8000	3.22	11800	3.96	15700	4.69
500	0.75	4300	2.35	8100	3.26	11900	3.92	15800	4.71
600	0.83	4400	2.35	8200	3.27	12000	3.92	15900	4.74
700	0.90	4500	2.38	8300	3.29	12100	3.94	16000	4.69
800	0.96	4600	2.43	8400	3.30	12200	3.94	16100	4.72
900	1.02	4700	2.43	8500	3.31	12300	3.99	16200	4.71
1000	1.07	4800	2.45	8600	3.33	12400	4.02	16300	4.74
1100	1.12	4900	2.48	8700	3.35	12500	4.10	16400	4.74
1200	1.15	5000	2.55	8800	3.36	12600	4.09	16500	4.75
1300	1.22	5100	2.54	8900	3.38	12700	4.15	16600	4.78
1400	1.28	5200	2.56	9000	3.40	12800	4.15	16700	4.86
1500	1.29	5300	2.58	9100	3.41	12900	4.08	16800	4.84
1600	1.36	5400	2.61	9200	3.45	13000	4.21	16900	4.83
1700	1.40	5500	2.64	9300	3.48	13100	4.19	17000	4.86
1800	1.45	5600	2.69	9400	3.52	13200	4.29	17100	4.83
1900	1.51	5700	2.67	9500	3.54	13300	4.24	17200	4.90
2000	1.50	5800	2.71	9600	3.59	13400	4.26	17300	4.91
2100	1.56	5900	2.73	9700	3.59	13500	4.26	17400	4.94
2200	1.59	6000	2.75	9800	3.62	13600	4.29	17500	4.93
2300	1.63	6100	2.81	9900	3.70	13700	4.35	17600	4.93
2400	1.73	6200	2.80	10000	3.70	13800	4.31	17700	5.00
2500	1.73	6300	2.82	10100	3.72	13900	4.29	17800	5.01
2600	1.78	6400	2.85	10200	3.73	14000	4.32	17900	5.00
2700	1.84	6500	2.87	10300	3.75	14100	4.33	18000	5.00
2800	1.84	6600	2.90	10400	3.76	14200	4.34		
2900	1.91	6700	2.91	10500	3.77	14300	4.36		
3000	1.91	6800	2.94	10600	3.79	14400	4.38		
3100	1.97	6900	2.96	10700	3.80	14600	4.42		
3200	1.98	7000	2.98	10800	3.81	14700	4.42		
3300	2.04	7100	3.01	10900	3.81	14800	4.55		
3400	2.04	7200	3.02	11000	3.83	14900	4.55		
3500	2.10	7300	3.04	11100	3.84	15000	4.55		

Cable loss
Microwave Cable Assembly, 18 GHz, 6.4 m, SMA – SMA, Huber-Suhner, model 198-9155-00
HL 3122

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.11	3600	2.08	7400	3.07	11200	3.92	15100	4.61
30	0.17	3700	2.12	7500	3.09	11300	3.95	15200	4.58
50	0.23	3800	2.15	7600	3.14	11400	3.93	15300	4.62
100	0.32	3900	2.18	7700	3.15	11500	3.93	15400	4.62
200	0.47	4000	2.21	7800	3.19	11600	3.94	15500	4.65
300	0.58	4100	2.24	7900	3.22	11700	3.97	15600	4.66
400	0.66	4200	2.27	8000	3.20	11800	3.98	15700	4.66
500	0.74	4300	2.31	8100	3.21	11900	4.08	15800	4.72
600	0.81	4400	2.31	8200	3.24	12000	4.03	15900	4.78
700	0.88	4500	2.36	8300	3.27	12100	4.06	16000	4.89
800	0.95	4600	2.37	8400	3.32	12200	4.05	16100	4.95
900	1.00	4700	2.40	8500	3.35	12300	4.16	16200	4.92
1000	1.06	4800	2.43	8600	3.35	12400	4.18	16300	4.95
1100	1.11	4900	2.45	8700	3.33	12500	4.20	16400	5.02
1200	1.16	5000	2.50	8800	3.37	12600	4.22	16500	5.04
1300	1.21	5100	2.51	8900	3.39	12700	4.23	16600	5.06
1400	1.26	5200	2.55	9000	3.45	12800	4.28	16700	5.17
1500	1.31	5300	2.56	9100	3.46	12900	4.26	16800	5.16
1600	1.35	5400	2.59	9200	3.47	13000	4.28	16900	5.19
1700	1.39	5500	2.62	9300	3.46	13100	4.28	17000	5.23
1800	1.44	5600	2.65	9400	3.50	13200	4.28	17100	5.30
1900	1.47	5700	2.67	9500	3.50	13300	4.29	17200	5.26
2000	1.52	5800	2.71	9600	3.53	13400	4.34	17300	5.30
2100	1.55	5900	2.72	9700	3.52	13500	4.31	17400	5.30
2200	1.60	6000	2.73	9800	3.54	13600	4.35	17500	5.36
2300	1.63	6100	2.76	9900	3.56	13700	4.36	17600	5.40
2400	1.67	6200	2.78	10000	3.57	13800	4.37	17700	5.47
2500	1.70	6300	2.81	10100	3.60	13900	4.41	17800	5.56
2600	1.74	6400	2.85	10200	3.69	14000	4.42	17900	5.45
2700	1.78	6500	2.87	10300	3.69	14100	4.45	18000	5.47
2800	1.83	6600	2.87	10400	3.67	14200	4.49		
2900	1.85	6700	2.90	10500	3.70	14300	4.55		
3000	1.89	6800	2.91	10600	3.70	14400	4.62		
3100	1.92	6900	2.96	10700	3.76	14600	4.54		
3200	1.96	7000	2.99	10800	3.88	14700	4.58		
3300	1.99	7100	3.01	10900	3.88	14800	4.57		
3400	2.03	7200	3.04	11000	3.85	14900	4.65		
3500	2.06	7300	3.08	11100	3.85	15000	4.64		

Cable loss
Microwave Cable Assembly, 18 GHz, 6.4 m, SMA – SMA, Huber-Suhner, model 198-9155-00
HL 3123

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.11	3600	1.97	7400	3.12	11200	3.90	15100	4.74
30	0.17	3700	1.97	7500	3.13	11300	3.93	15200	4.70
50	0.25	3800	2.03	7600	3.16	11400	3.88	15300	4.73
100	0.32	3900	2.04	7700	3.18	11500	3.87	15400	4.78
200	0.46	4000	2.10	7800	3.20	11600	3.90	15500	4.75
300	0.58	4100	1.97	7900	3.23	11700	3.86	15600	4.76
400	0.65	4200	1.97	8000	3.25	11800	3.88	15700	4.75
500	0.74	4300	2.03	8100	3.26	11900	3.86	15800	4.78
600	0.82	4400	2.04	8200	3.28	12000	3.89	15900	4.79
700	0.89	4500	2.10	8300	3.31	12100	3.94	16000	4.73
800	0.95	4600	1.97	8400	3.31	12200	3.92	16100	4.78
900	1.01	4700	1.97	8500	3.32	12300	3.96	16200	4.84
1000	1.07	4800	2.03	8600	3.34	12400	4.01	16300	4.90
1100	1.11	4900	2.04	8700	3.35	12500	4.07	16400	4.87
1200	1.17	5000	2.10	8800	3.37	12600	4.08	16500	4.90
1300	1.22	5100	2.53	8900	3.39	12700	4.17	16600	4.98
1400	1.27	5200	2.55	9000	3.42	12800	4.26	16700	5.05
1500	1.29	5300	2.60	9100	3.43	12900	4.16	16800	5.04
1600	1.35	5400	2.61	9200	3.51	13000	4.21	16900	5.02
1700	1.40	5500	2.64	9300	3.52	13100	4.24	17000	5.09
1800	1.44	5600	2.70	9400	3.54	13200	4.27	17100	5.07
1900	1.51	5700	2.67	9500	3.63	13300	4.31	17200	5.10
2000	1.49	5800	2.71	9600	3.61	13400	4.33	17300	5.13
2100	1.55	5900	2.74	9700	3.71	13500	4.25	17400	5.23
2200	1.58	6000	2.80	9800	3.66	13600	4.27	17500	5.21
2300	1.62	6100	2.79	9900	3.77	13700	4.33	17600	5.22
2400	1.72	6200	2.81	10000	3.75	13800	4.33	17700	5.36
2500	1.76	6300	2.83	10100	3.77	13900	4.31	17800	5.35
2600	1.78	6400	2.86	10200	3.80	14000	4.30	17900	5.45
2700	1.80	6500	2.88	10300	3.79	14100	4.30	18000	5.43
2800	1.86	6600	2.90	10400	3.87	14200	4.31		
2900	1.90	6700	2.92	10500	3.83	14300	4.37		
3000	1.90	6800	2.98	10600	3.88	14400	4.35		
3100	1.97	6900	2.98	10700	3.86	14600	4.53		
3200	1.97	7000	3.00	10800	3.87	14700	4.50		
3300	2.03	7100	3.02	10900	3.90	14800	4.62		
3400	2.04	7200	3.04	11000	3.84	14900	4.65		
3500	2.10	7300	3.06	11100	3.88	15000	4.79		

Cable loss
Cable coaxial, RG-214/U, N type-N type, 17 m
Teldor, HL 3612

Frequency, GHz	Cable loss, dB
0.1	0.05
0.5	0.07
1	0.10
3	0.22
5	0.29
10	0.39
30	0.68
50	0.90
100	1.27
150	1.58
200	1.80
250	2.12
300	2.36
350	2.60
400	2.82
450	2.99
500	3.23
550	3.40
600	3.56
650	3.71
700	3.90
750	4.04
800	4.23
850	4.39
900	4.55
950	4.65
1000	4.79

Cable loss
Cable coaxial, RG-214/U, N type-N type, 6.5 m
Suhner Switzerland, HL 3616

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.13	1750	2.66	3550	4.44	5350	6.08
30	0.25	1800	2.72	3600	4.46	5400	6.12
50	0.32	1850	2.78	3650	4.59	5450	6.17
100	0.48	1900	2.81	3700	4.60	5500	6.25
150	0.60	1950	2.86	3750	4.72	5550	6.31
200	0.71	2000	2.94	3800	4.72	5600	6.35
250	0.81	2050	2.97	3850	4.86	5650	6.41
300	0.91	2100	3.01	3900	4.85	5700	6.50
350	1.00	2150	3.06	3950	4.99	5750	6.52
400	1.07	2200	3.11	4000	4.90	5800	6.57
450	1.14	2250	3.16	4050	5.04	5850	6.61
500	1.23	2300	3.21	4100	5.01	5900	6.71
550	1.30	2350	3.26	4150	5.10	5950	6.70
600	1.37	2400	3.31	4200	5.08	6000	6.75
650	1.44	2450	3.35	4250	5.18	6050	6.74
700	1.50	2500	3.39	4300	5.14	6100	6.84
750	1.58	2550	3.46	4350	5.22	6150	6.87
800	1.64	2600	3.48	4400	5.21	6200	6.93
850	1.69	2650	3.55	4450	5.29	6250	6.96
900	1.77	2700	3.59	4500	5.31	6300	7.02
950	1.79	2750	3.66	4550	5.39	6350	7.04
1000	1.87	2800	3.68	4600	5.41	6400	7.10
1050	1.92	2850	3.75	4650	5.49	6450	7.11
1100	1.98	2900	3.79	4700	5.52	6500	7.19
1150	2.05	2950	3.86	4750	5.60		
1200	2.09	3000	3.89	4800	5.64		
1250	2.15	3050	3.94	4850	5.73		
1300	2.21	3100	3.98	4900	5.70		
1350	2.27	3150	4.03	4950	5.73		
1400	2.33	3200	4.06	5000	5.75		
1450	2.38	3250	4.12	5050	5.83		
1500	2.44	3300	4.14	5100	5.82		
1550	2.48	3350	4.22	5150	5.91		
1600	2.52	3400	4.24	5200	5.92		
1650	2.56	3450	4.31	5250	5.98		
1700	2.62	3500	4.35	5300	6.01		

13 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μ V)	decibel referred to one microvolt
dB(μ V/m)	decibel referred to one microvolt per meter
dB(μ A)	decibel referred to one microampere
dB Ω	decibel referred to one Ohm
DC	direct current
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
k	kilo
kHz	kilohertz
LISN	line impedance stabilization network
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μ s	microsecond
NA	not applicable
NB	narrow band
OATS	open area test site
Ω	Ohm
PM	pulse modulation
PS	power supply
QP	quasi-peak
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt
VA	volt-ampere
WB	wideband

END OF DOCUMENT