

TEST REPORT

ACCORDING TO: FCC CFR 47 PART 15 Subpart C, section 15.231 and subpart B;
RSS-210, Issue 7, Annex 1; ICES-003 Issue 4:2004

FOR:

Visonic Ltd.

PowerCode Smoke Detector, model MCT-426

PowerCode Heat and Smoke Detector, model MCT-427

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1 Applicant information

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Telephone: +972 3645 6789
Fax: +972 3645 6788
E-mail: aelshtein@visonic.com
Contact name: Mr. Arik Elshtein

2 Equipment under test attributes

Products names: PowerCode Smoke Detector, model MCT-426
PowerCode Heat and Smoke Detector, model MCT-427
Product type: Transmitter
Operating frequency: 315 MHz
Hardware version: NP1360-R Ver. 1.0, PCB layout from July 06, 2009
Software release: JS-701342_Ver_2.S19 (Visonic P/N JS-701342)
RF module hardware: E-2348-1 RFT-302A 3V
Receipt date 1/7/2010

3 Manufacturer information

Manufacturer name: Visonic Ltd.
Address: Habarzel street 24, Tel Aviv 69710, Israel
Telephone: +972 3645 6789
Fax: +972 3645 6788
E-Mail: aelshtein@visonic.com
Contact name: Mr. Arik Elshtein

4 Test details

Project ID: 20149
Location: Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started: 1/7/2010
Test completed: 2/21/2010
Test specification(s): FCC Part 15, subpart C, §15.231; subpart B, §15.109
RSS-210 Issue 7:2007, Annex 1; ICES-003 issue 4:2004



5 Tests summary

Test	Status
Transmitter characteristics	
FCC Part 15, Section 231(a) / RSS-210, Section A1.1.1, Periodic operation requirements	Pass
FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions	Pass
FCC Part 15, Section 231(c) / RSS-210, Section A1.1.3, Occupied bandwidth	Pass
FCC Part 15, Section 207 / RSS-Gen, Section 7.2.2, Conducted emission	Not required
FCC Part 15, Section 203 / RSS-Gen, Section 7.1.4, Antenna requirements	Pass
Unintentional emissions	
FCC Part 15, Section 107 / RSS-Gen, Section 7.2.2, Conducted emission at AC power port	Not required
FCC Part 15, Section 109 / RSS-Gen, Section 7.1.6/ ICES-003 Section 5.5, Radiated emission	Pass

Testing was not completed against all relevant requirements of the test standard. However, 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:	Mrs. E. Pitt, test engineer	February 21, 2010	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	February 21, 2010	
Approved by:	Mr. M. Nikishin, EMC and radio group manager	February 22, 2010	



6 EUT description

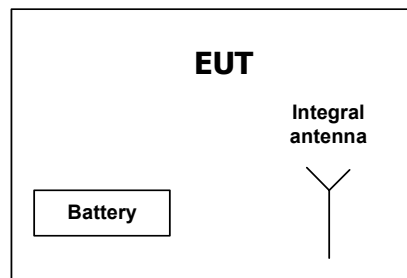
6.1 General information

The EUT is a heat and smoke automatic fire detector with integral audible signal for open area protection, designed to sense smoke or heat (not flame) and fitted with a PowerCode type UHF transmitter. The EUT, model name MCT-426, is a smoke detector and the EUT, model name MCT-427, is a heat and smoke detector.

The MCT-426 and MCT-427 detectors have the same RF part. Each EUT utilizes an integral antenna and is powered by 3 V lithium battery. The only difference is an additional temperature sensor based on the same PCB in MCT-427.

The devices were tested in the following way: the field strength of the fundamental emission was measured for the both models of the EUT to define the maximum emission. The final tests were performed for MCT-426 as the worst case.

6.2 Test configuration



6.3 Changes made in EUT

No changes were implemented in the EUT.



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6.4 Transmitter characteristics

Type of equipment							
X	Stand-alone (Equipment with or without its own control provisions)						
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)						
	Plug-in card (Equipment intended for a variety of host systems)						
Intended use		Condition of use					
	fixed	Always at a distance more than 2 m from all people					
X	mobile	Always at a distance more than 20 cm from all people					
	portable	May operate at a distance closer than 20 cm to human body					
Assigned frequency range		315 MHz					
Operating frequency		315 MHz					
Maximum rated output power		At transmitter 50 Ω RF output connector			dBm		
		Effective radiated power (for equipment with no RF connector)			-22 dBm		
Is transmitter output power variable?		X	No				
			Yes	continuous variable			
				stepped variable with stepsize			dB
				minimum RF power			dBm
		maximum RF power			dBm		
Antenna connection							
unique coupling		standard connector		X	integral		
				X	with temporary RF connector without temporary RF connector		
Antenna/s technical characteristics							
Type	Manufacturer		Model number		Gain		
Wire	Visonic		NA		NA		
Type of modulation			ASK				
Modulating test signal (baseband)			ID Code				
Transmitter duty cycle supplied for test		100 %	Tx ON time	msec	Period	msec	
Transmitter power source							
X	Battery	Nominal rated voltage	3 VDC	Battery type	Lithium		



Test specification:	FCC Section 15.231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:41:21 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

7 Transmitter tests

7.1 Periodic operation requirements

7.1.1 General

The EUT was verified for compliance with periodic operation requirements listed below:

- Continuous transmissions such as voice, video and the radio control of toys are not permitted;
- A transmitter activated automatically shall cease transmission within 5 seconds after activation;
- Periodic transmissions, excluding polling or supervision transmissions, at regular predetermined intervals are not permitted;
- Total duration of polling or supervision transmissions, including data, to determine system integrity in security or safety applications shall not exceed 2 seconds per hour according to FCC 15.231(a) requirements;
- Transmission of set-up information for security systems may exceed the transmission duration limits of 5 seconds, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

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.

7.1.2 Test procedure for transmitter shut down test

7.1.2.1 The EUT was set up as shown in Figure 7.1.1.

7.1.2.2 The spectrum analyzer center frequency was adjusted to the EUT carrier, span set to zero and video triggered for transmission.

7.1.2.3 The transmitter was activated either manually or automatically. Once manually operated transmitter was activated, the switch was immediately released.

7.1.2.4 The transmission time was captured and shown in Plot 7.1.1 to Plot 7.1.5.

Figure 7.1.1 Setup for transmitter shut down test





Test specification:	FCC Section 15.231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:41:21 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Table 7.1.1 Periodic operation requirements

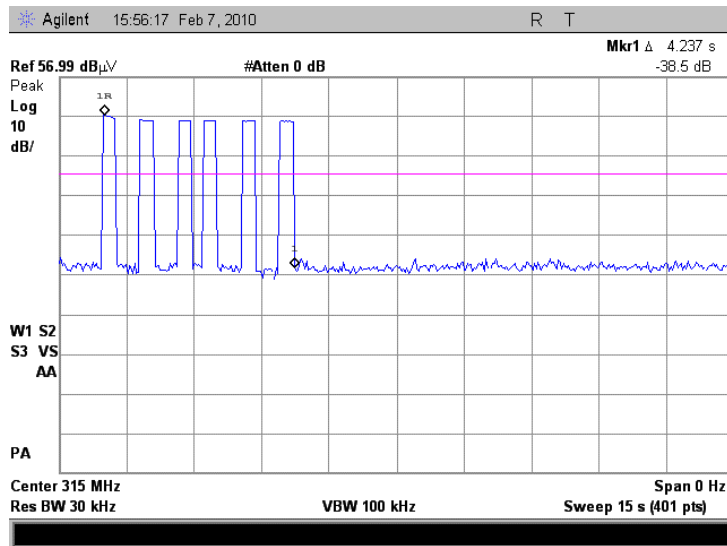
Requirement	Rationale	Verdict
Continuous transmissions are not permitted	Supplier declaration	Comply
A manually operated transmitter shall be deactivated within not more than 5 seconds of switch being released	NA	NA
Transmitter activated automatically shall cease transmission within 5 seconds	Plot 7.1.1	Comply
Periodic transmissions at regular predetermined intervals are not permitted	Supplier declaration	Comply
Total duration of polling or supervision transmissions shall not exceed 2 seconds per hour	Table 7.1.2	Comply
Transmission of set-up information for security systems may exceed the transmission duration limits of 5 seconds, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.	NA	NA



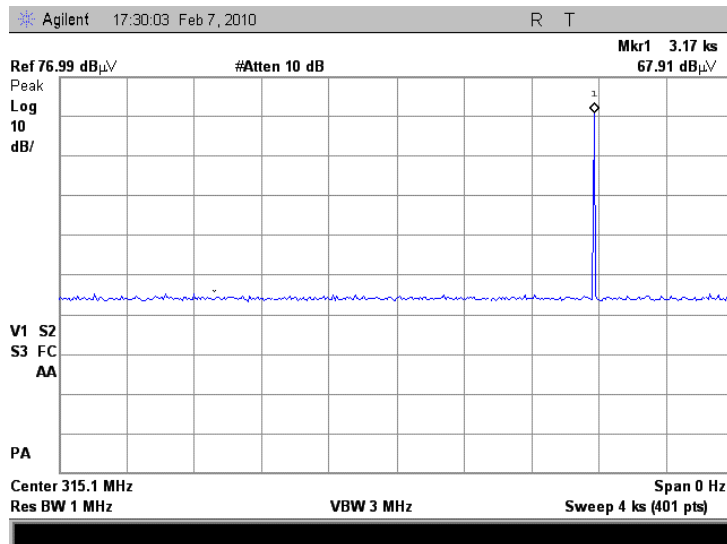
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Test specification:	FCC Section 15.231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:41:21 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.1.1 Transmitter shut down test result (alarm)



Plot 7.1.2 Transmitter shut down test result (supervision within 1 hour)

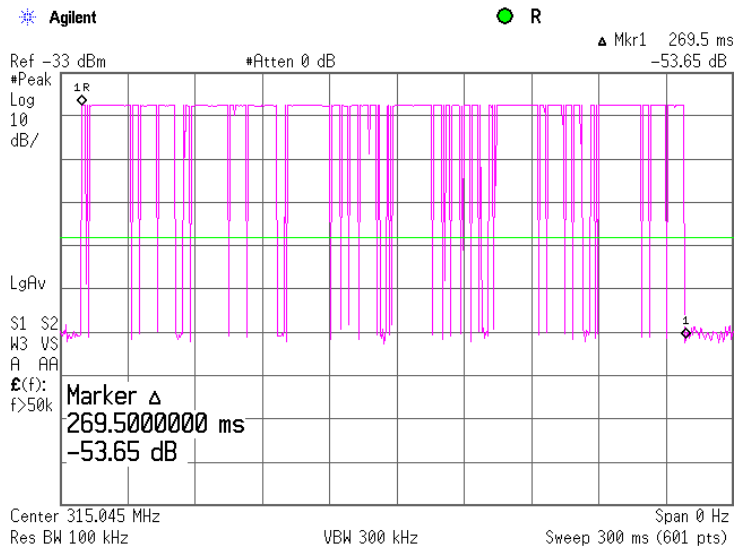




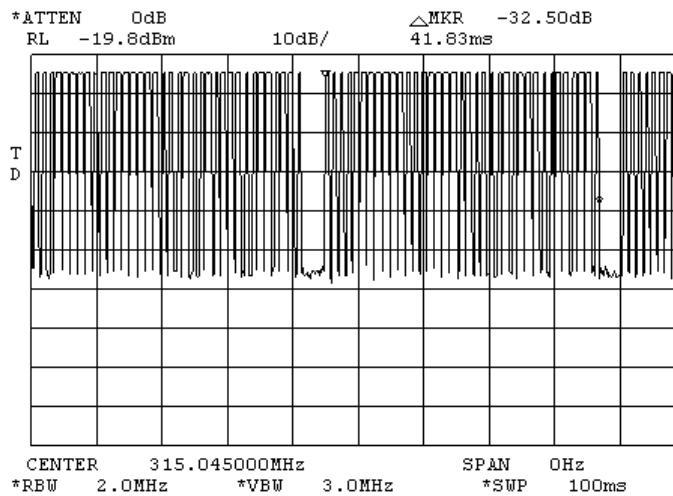
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Test specification:	FCC Section 15.231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:41:21 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.1.3 Transmitter shut down test result (supervision total transmission time)



Plot 7.1.4 Transmitter shut down test result (supervision transmission burst duration)

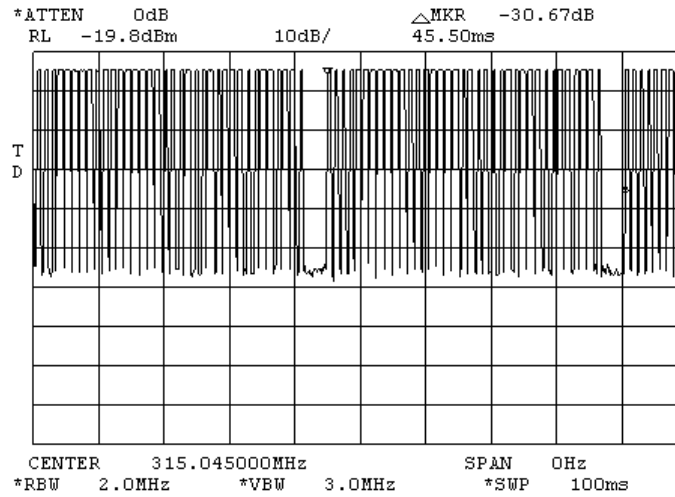




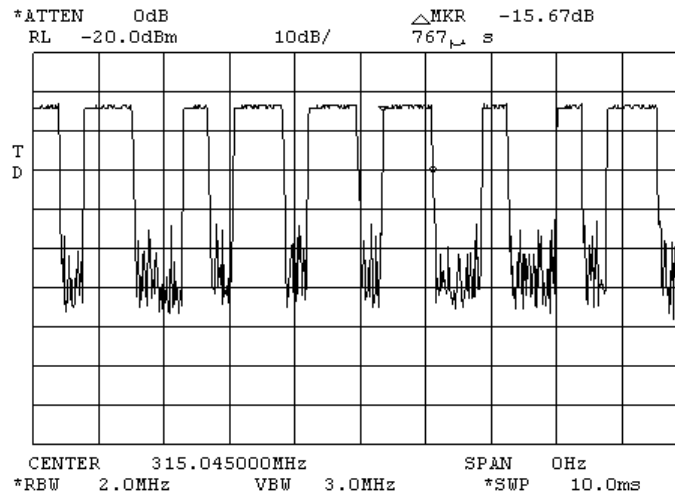
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Test specification:	FCC Section 15.231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:41:21 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.1.5 Transmitter shut down test result (supervision transmission burst period)



Plot 7.1.6 Transmitter shut down test result (supervision transmission first pulse duration)

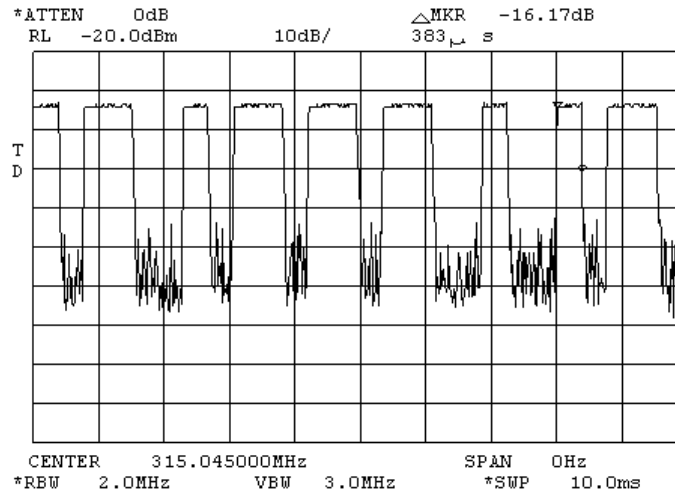




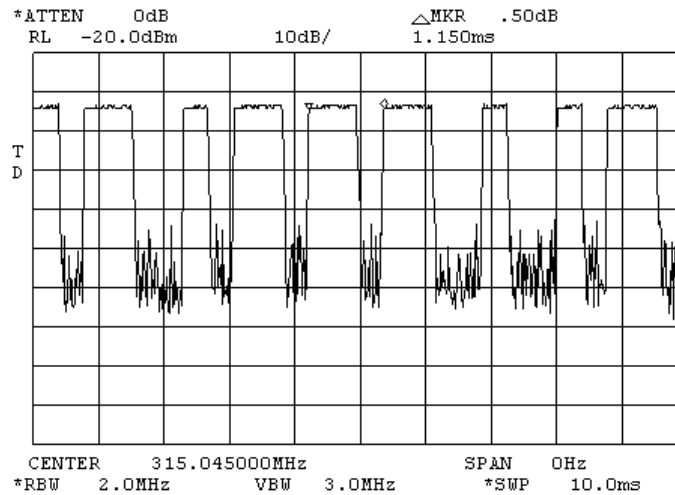
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Test specification:	FCC Section 15.231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:41:21 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.1.7 Transmitter shut down test result (supervision transmission second pulse duration)



Plot 7.1.8 Transmitter shut down test result (supervision transmission pulse period)





Test specification:	FCC Section 15.231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:41:21 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Table 7.1.2 Total duration of polling / supervision transmissions

Transmission pulse		Transmission burst		Number of pulses	Maximum number of transmissions within 1 hour	Total duration within 1 hour, ms
Duration, ms	Period, ms	Duration, ms	Period, ms			
0.767	1.15	41.83	45.50	6	1	167.39

NOTE: worst case according to longer pulse duration.

$$Total\ transmission\ duration, ms = \frac{41.83\ ms}{1.15\ ms} \times 0.767\ ms \times 6 \times 1 = 167.39\ ms$$

Each message includes 36 bits and Start pulse.

Bit may be "1" during 0.383 msec or "0" during 0.767 msec.
In the worst-case min 4bits in the message must be "1".
Start pulse time 0.383 msec.

Reference numbers of test equipment used

HL 2448	HL 2780	HL 3323					
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Full description is given in Appendix A.



Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

7.2 Field strength of emissions

7.2.1 General

This test was performed to measure field strength of fundamental and spurious emissions from the EUT. Specification test limits are given in Table 7.2.1 and Table 7.2.2.

Table 7.2.1 Radiated fundamental emission limits

Fundamental frequency, MHz	Field strength at 3 m, dB(μV/m)	
	Peak	Average
315	95.62	75.62

Table 7.2.2 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m, dB(μV/m)				
	Within restricted bands			Outside restricted bands	
	Peak	Quasi Peak	Average	Peak	Average
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	75.62	55.62
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			
Above 1000	74.0	NA	54.0		

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

$$Lim_{S_2} = Lim_{S_1} + 40 \log(S_1/S_2),$$
 where S_1 and S_2 – standard defined and test distance respectively in meters.

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

Note 1: The fundamental emission limit in dB(μV/m) was calculated as follows:

$$Lim_{AVR} = 20 \times \log(56.81818 \times F - 6136.3636) - \text{within } 130 - 174 \text{ MHz band};$$

$$Lim_{AVR} = 20 \times \log(41.6667 \times F - 7083.3333) - \text{within } 260 - 470 \text{ MHz band},$$

where F is the carrier frequency in MHz.

The limit for spurious emissions was 20 dB lower than fundamental emission limit.

The above limits provided in terms of average values, peak limit was 20 dB above the average limit.

Note 2: The above 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.



Test specification: FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions			
Test procedure: ANSI C63.4, Section 13.1.4			
Test mode: Compliance	Verdict: PASS		
Date & Time: 2/15/2010 11:37:59 AM			
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

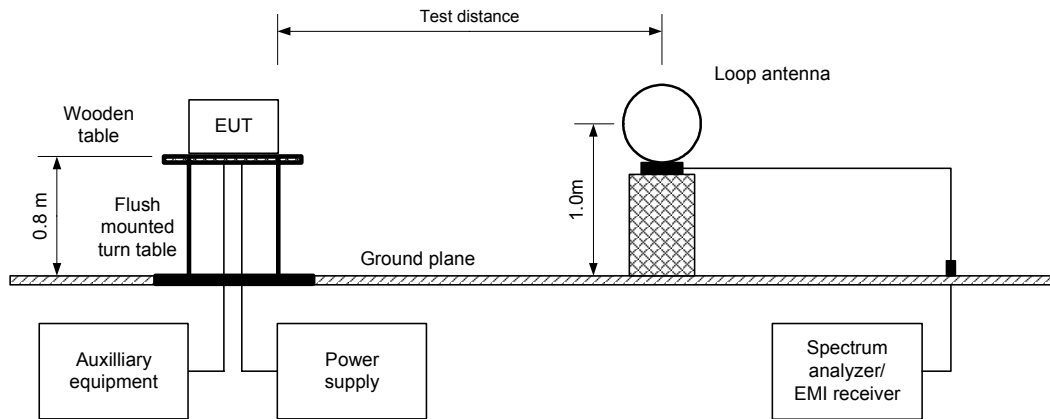
7.2.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

- 7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and the performance check was conducted.
- 7.2.2.2 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.
- 7.2.2.3 The measurements were performed in the EUT horizontal (typical) and vertical position.
- 7.2.2.4 The worst test results (the lowest margins) found in the EUT horizontal (typical) position were recorded in Table 7.2.3, Table 7.2.5 and shown in the associated plots.

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

- 7.2.3.1 The EUT was set up as shown in Figure 7.2.2, energized and the performance check was conducted.
- 7.2.3.2 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.
- 7.2.3.3 The measurements were performed in the EUT horizontal (typical) and vertical position.
- 7.2.3.4 The worst test results (the lowest margins) were recorded in Table 7.2.3, Table 7.2.5 and shown in the associated plots.

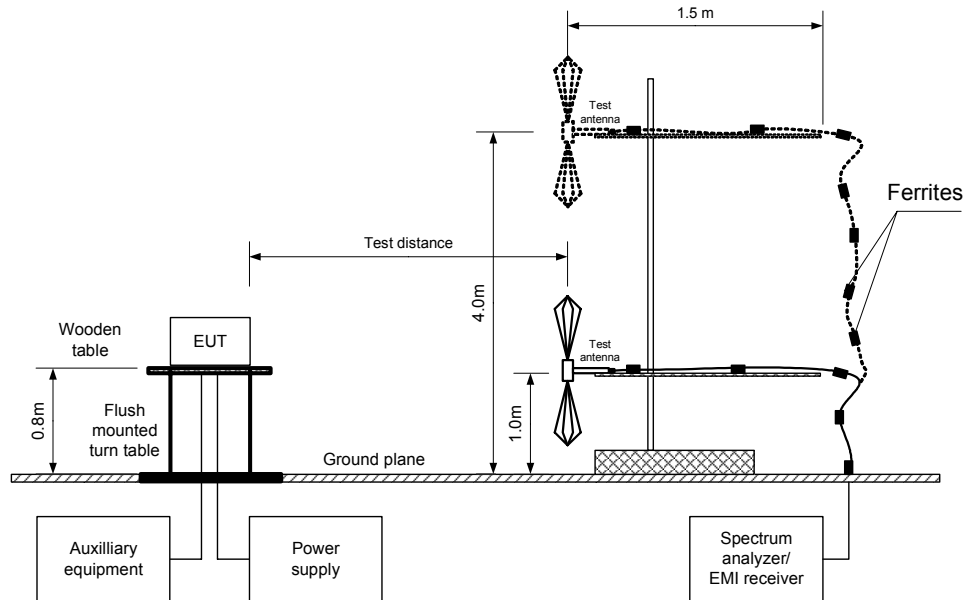
Figure 7.2.1 Setup for spurious emission field strength measurements below 30 MHz





Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Figure 7.2.2 Setup for spurious emission field strength measurements above 30 MHz





Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Table 7.2.3 Field strength of fundamental emission, spurious emissions outside restricted bands and within restricted bands at frequencies above 1 GHz

TEST DISTANCE: 3 m
 EUT POSITION: Typical (Horizontal)
 MODULATION: ASK
 MODULATING SIGNAL: ID code
 TRANSMITTER OUTPUT POWER: Maximum
 INVESTIGATED FREQUENCY RANGE: 0.009 – 3500 MHz
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 1 kHz (9 kHz – 150 kHz)
 9.0 kHz (150 kHz – 30 MHz)
 120 kHz (30 MHz – 1000 MHz)
 1.0 MHz (above 1000 MHz)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 MHz)
 Double ridged guide (above 1000 MHz)

F, MHz	Antenna		Azimuth, degrees*	Peak field strength			Avr factor, dB	Average field strength			Verdict
	Pol.	Height, m		Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**		Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
Fundamental emission, model MCT-426											
315.055	Hor	1.0	135	73.07	95.62	-22.55	-4.6	68.47	75.62	-7.15	Pass
Fundamental emission, model MCT-427											
315.025	Hor	1.0	135	72.64	95.62	-22.98	-4.6	68.04	75.62	-7.58	Pass
Spurious emissions, model MCT-426											
630.025	Hor	1.6	023	40.04	75.62	-35.58	-4.6	35.44	55.62	-20.18	Pass
945.133	Hor	1.0	175	53.88	75.62	-21.74	-4.6	49.24	55.62	-6.38	
1260.15	Hor	1.1	030	54.84	75.62	-20.78	-4.6	50.24	55.62	-5.38	
1575.23	Hor	1.0	340	58.38	74.00	-15.62	-4.6	53.78	54.00	-0.22	

*- EUT front panel refers to 0 degrees position of turntable.
 **- Margin = dB below (negative if above) specification limit.



Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Table 7.2.4 Average factor calculation

Transmission pulse		Transmission burst		Transmission off time between bursts ms	Average factor, dB
Duration, ms	Period, ms	Duration, ms	Period, ms		
1) 0.383 2) 0.767	1.15	41.83	45.50	3.67	-4.6

*- Average factor was calculated as follows

for pulse train longer than 100 ms:

$$Average\ factor = 20 \times \log_{10} \left(\frac{\sum T_x\ on\ within\ 100\ ms}{100\ ms} \right)$$

Each message includes 36 bits and a Start pulse.
 Bit may be "1" during 0.383 msec or "0" during 0.767 msec.
 In the worst case minimum 4bits in the message must be "1".
 Start pulse time is 0.383 msec.

In the 100msec of transmission 2 full messages may be and a part of the third.
 For Message 1: Ton=0.383 (start pulse)+4 x 0.383 + 32 x 0.767=26.459 msec
 For Message 2: the same 26.459 msec
 Message 3 = 100 - 41.83 x 2 - 3.67 x 2 = 9 msec. Ton=(9/1.15) x 0.767 = 6.0 msec

$$Average\ Factor = 20 \log(26.459 \times 2 + 6.0) / 100 = -4.6\ dB$$



Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Table 7.2.5 Field strength of emissions below 1 GHz within restricted bands

TEST DISTANCE: 3 m
 EUT POSITION: Typical (Horizontal)
 MODULATION: ASK
 MODULATING SIGNAL: ID code
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 1 kHz (9 kHz – 150 kHz)
 9.0 kHz (150 kHz – 30 MHz)
 120 kHz (30 MHz – 1000 MHz)
 ≥ Resolution bandwidth
 VIDEO BANDWIDTH:
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 MHz)

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*				
No emissions were found								Pass

*- Margin = Measured emission - specification limit.
 **- EUT front panel refer to 0 degrees position of turntable.

Table 7.2.6 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 0034	HL 0415	HL 0446	HL 0521	HL 0812	HL 1424	HL 1425	HL 1430
HL 1984	HL 2697	HL 2871	HL 2882	HL 2883	HL 3616	HL 3883	

Full description is given in Appendix A.



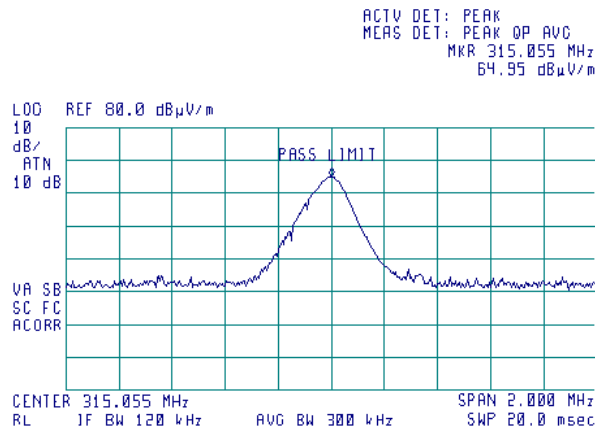
HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.1 Radiated emission measurements at the fundamental frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical
 EUT POSITION: Typical (Horizontal)
 MODEL: MCT-426

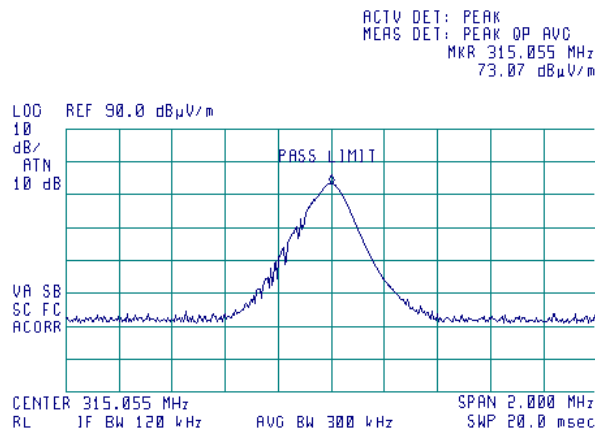
13:42:07 FEB 04, 2010



Plot 7.2.2 Radiated emission measurements at the fundamental frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Horizontal
 EUT POSITION: Typical (Horizontal)
 MODEL: MCT-426

13:35:28 FEB 04, 2010





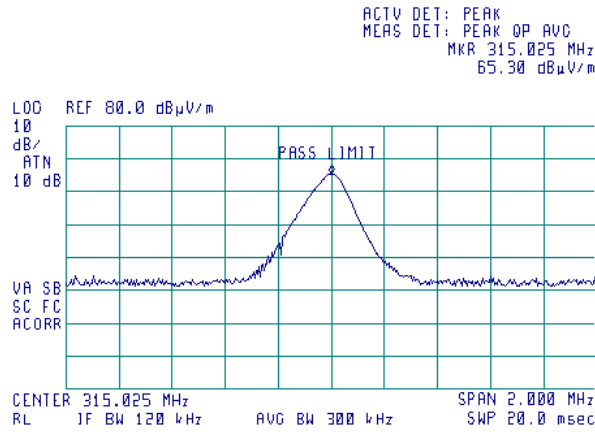
HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.3 Radiated emission measurements at the fundamental frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical
 EUT POSITION: Typical (Horizontal)
 MODEL: MCT-427

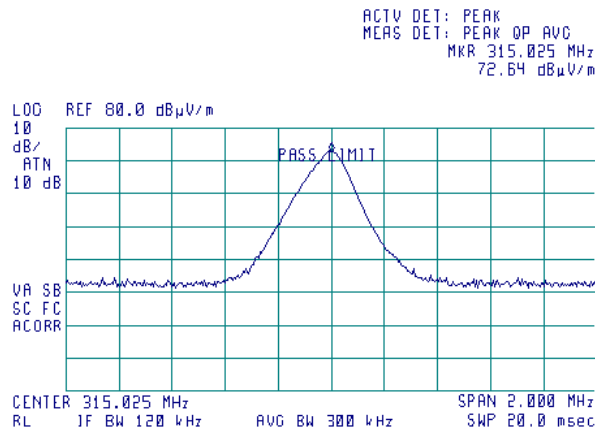
13:52:33 FEB 04, 2010



Plot 7.2.4 Radiated emission measurements at the fundamental frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Horizontal
 EUT POSITION: Typical (Horizontal)
 MODEL: MCT-427

13:57:58 FEB 04, 2010





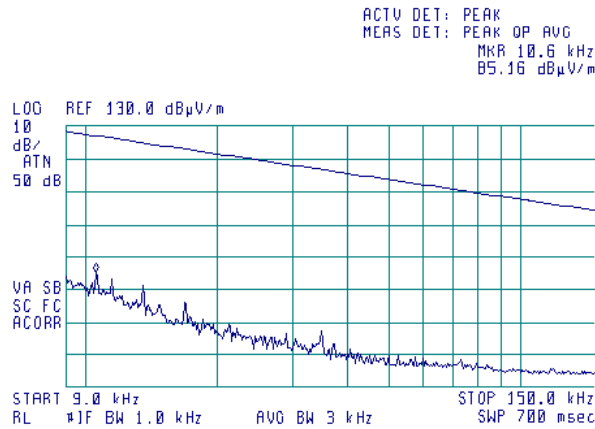
HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.5 Radiated emission measurements from 9 to 150 kHz

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
EUT POSITION: Typical (Horizontal)
MODEL: MCT-426

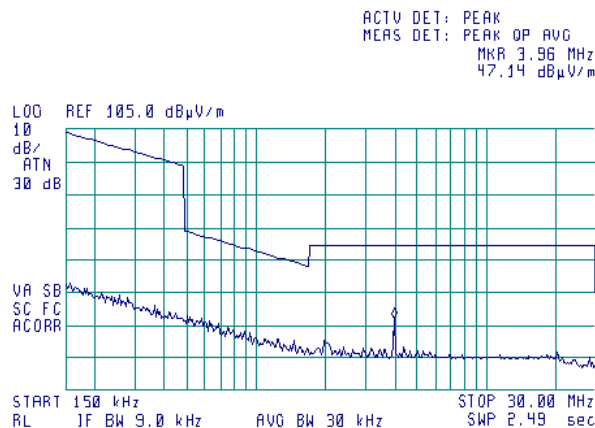
15:51:22 FEB 04, 2010



Plot 7.2.6 Radiated emission measurements from 0.15 to 30 MHz

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
EUT POSITION: Typical (Horizontal)
MODEL: MCT-426

15:47:20 FEB 04, 2010





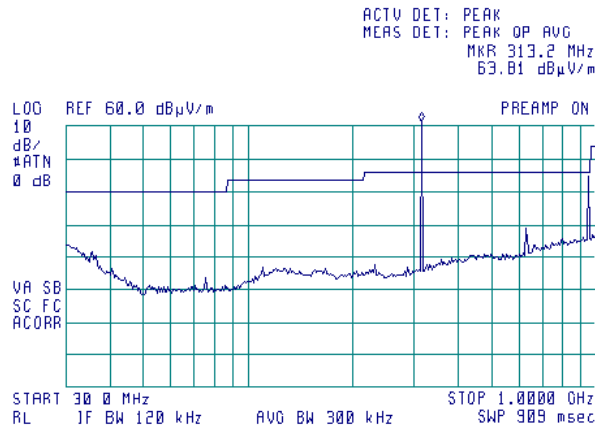
HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.7 Radiated emission measurements from 30 to 1000 MHz

TEST SITE: Anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Horizontal)
 MODEL: MCT-426

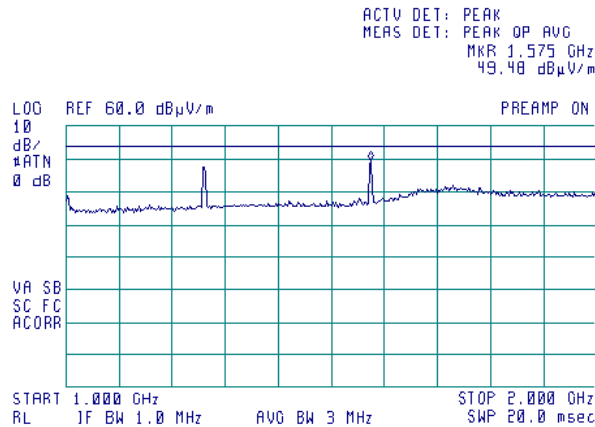
15:19:42 FEB 04, 2010



Plot 7.2.8 Radiated emission measurements from 1000 to 2000 MHz

TEST SITE: Anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Horizontal)
 MODEL: MCT-426

14:59:18 FEB 04, 2010



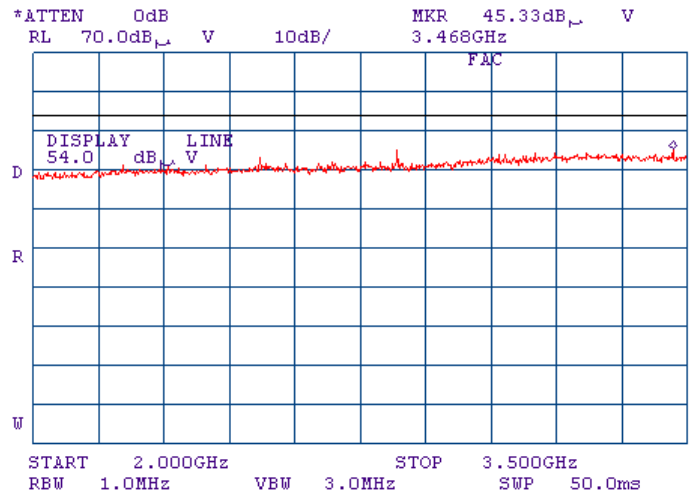


HERMON LABORATORIES

Test specification: FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions			
Test procedure: ANSI C63.4, Section 13.1.4			
Test mode: Compliance	Verdict: PASS		
Date & Time: 2/15/2010 11:37:59 AM			
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.9 Radiated emission measurements from 2000 to 3500 MHz

TEST SITE: Anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Horizontal)
 MODEL: MCT-426





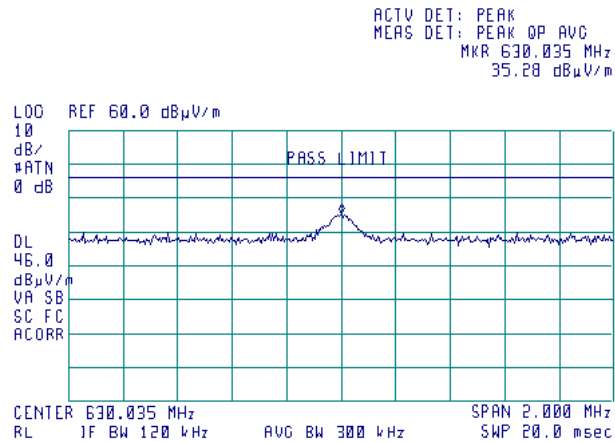
HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.10 Radiated emission measurements at the second harmonic frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical
 EUT POSITION: Typical (Horizontal)

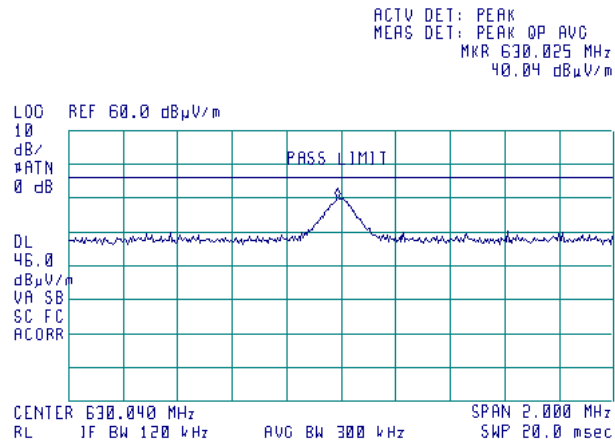
14:10:04 FEB 04, 2010



Plot 7.2.11 Radiated emission measurements at the second harmonic frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Horizontal
 EUT POSITION: Typical (Horizontal)

14:04:46 FEB 04, 2010





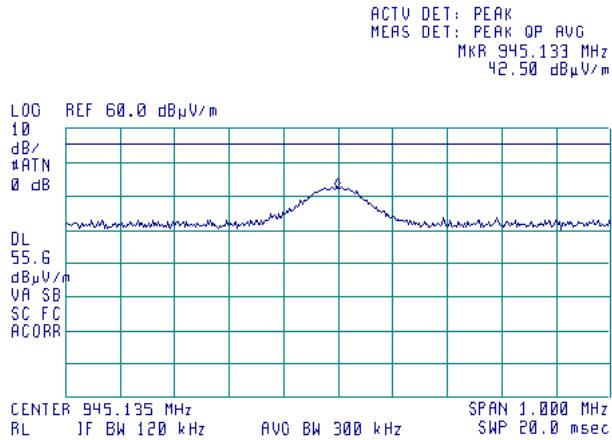
HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.12 Radiated emission measurements at the third harmonic frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
EUT POSITION: Typical (Horizontal)

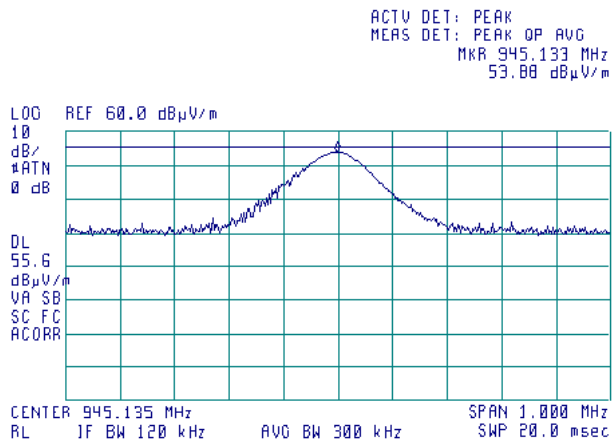
11:56:35 FEB 11, 2010



Plot 7.2.13 Radiated emission measurements at the third harmonic frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
EUT POSITION: Typical (Horizontal)

11:51:22 FEB 11, 2010





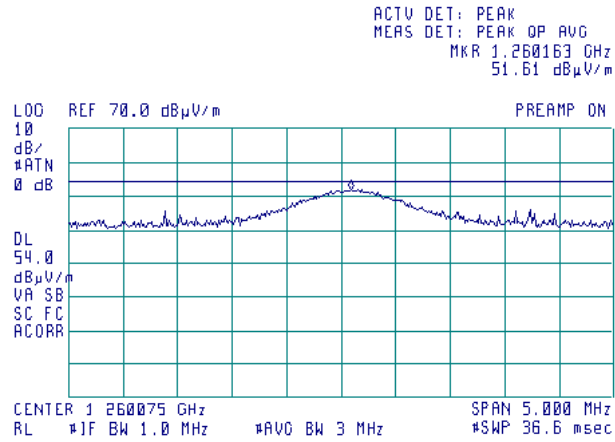
HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.14 Radiated emission measurements at the fourth harmonic frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical
 EUT POSITION: Typical (Horizontal)

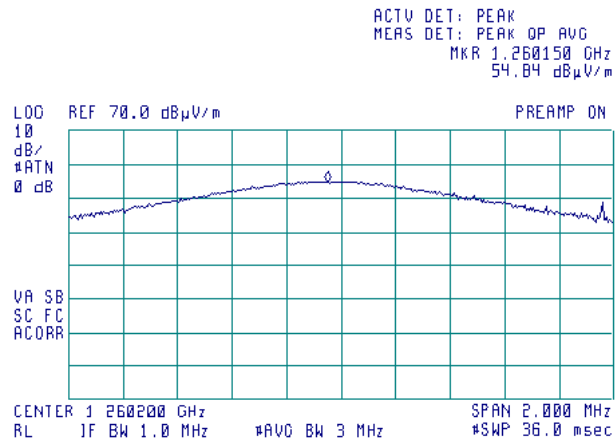
16:18:31 FEB 08, 2010



Plot 7.2.15 Radiated emission measurements at the fourth harmonic frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Horizontal
 EUT POSITION: Typical (Horizontal)

17:20:09 FEB 08, 2010





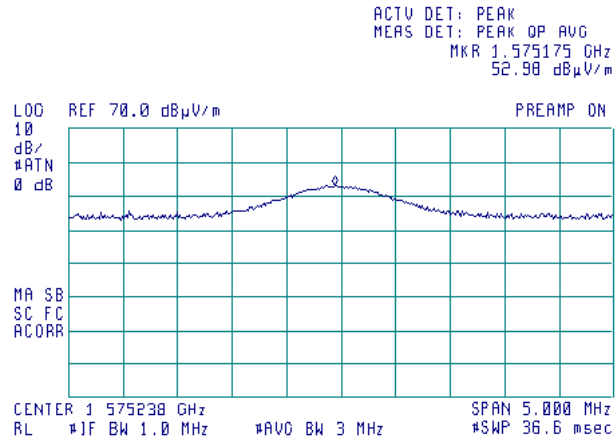
HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.16 Radiated emission measurements at the fifth harmonic frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical
 EUT POSITION: Typical (Horizontal)

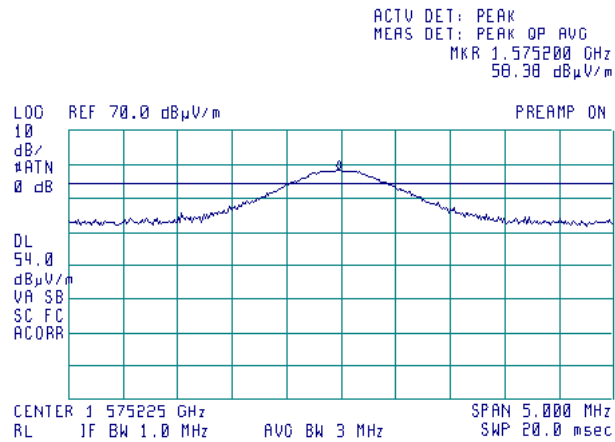
16:38:40 FEB 08, 2010



Plot 7.2.17 Radiated emission measurements at the fifth harmonic frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Horizontal
 EUT POSITION: Typical (Horizontal)

16:46:16 FEB 08, 2010

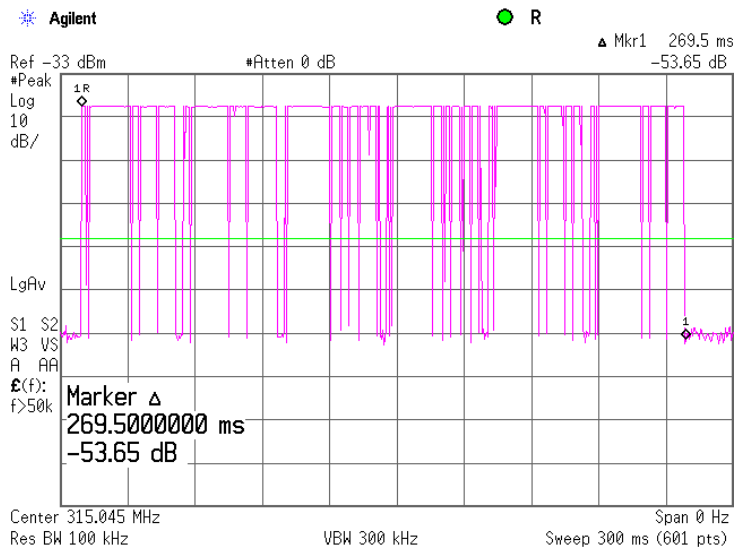




HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

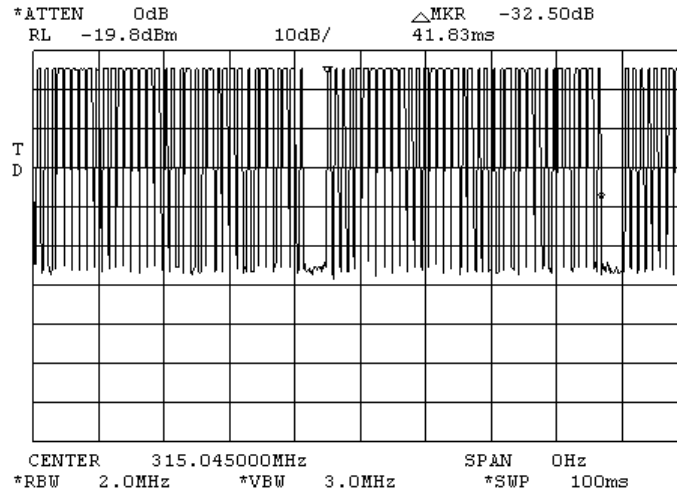
Plot 7.2.18 Transmission train duration



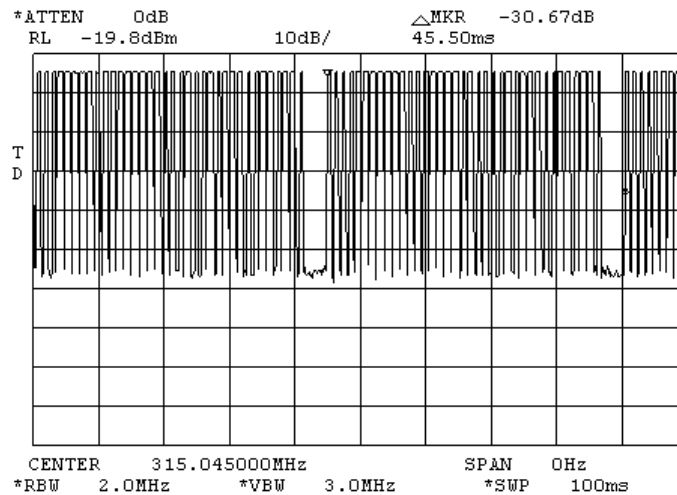


Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.19 Transmission burst duration



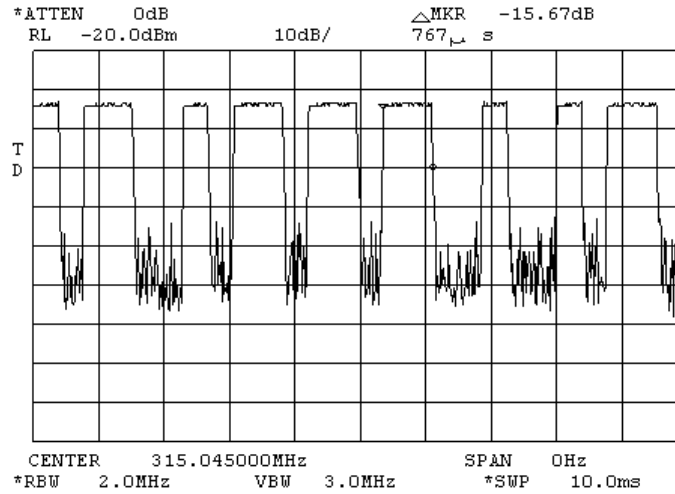
Plot 7.2.20 Transmission burst period



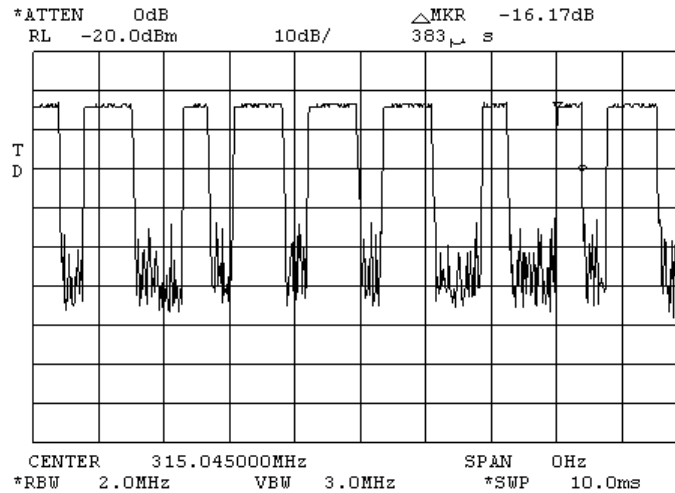


Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.21 Transmission first pulse duration



Plot 7.2.22 Transmission second pulse duration

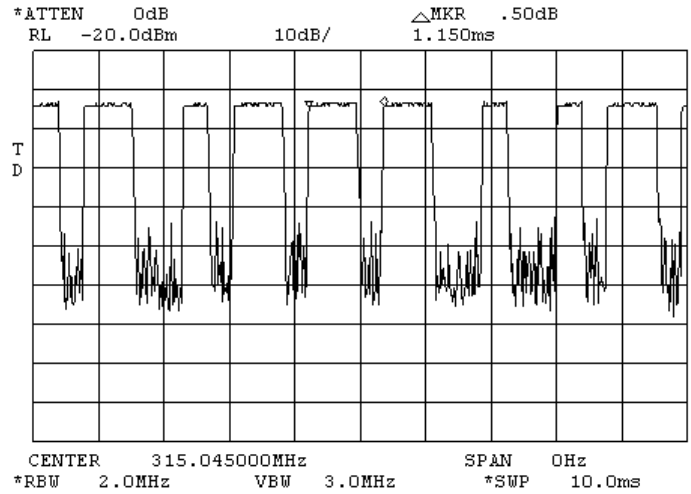




HERMON LABORATORIES

Test specification:	FCC Section 15.231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/15/2010 11:37:59 AM		
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

Plot 7.2.23 Transmission pulse period





Test specification: FCC Section 15.231(c) / RSS-210, Section A1.1.3, Occupied bandwidth			
Test procedure: ANSI C63.4, Section 13.1.7			
Test mode: Compliance	Verdict: PASS		
Date & Time: 2/15/2010 11:42:31 AM			
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery
Remarks:			

7.3 Occupied bandwidth test

7.3.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.3.1. The test results are provided in Table 7.3.2 and associated plots.

Table 7.3.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, % of the carrier frequency
70 - 900	20.0	0.25

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

7.3.2 Test procedure

7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

7.3.2.2 The EUT was set to transmit modulated carrier.

7.3.2.3 The transmitter occupied bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.3.2 and associated plot.

Figure 7.3.1 Occupied bandwidth test setup





Test specification:		FCC Section 15.231(c) / RSS-210, Section A1.1.3, Occupied bandwidth			
Test procedure:		ANSI C63.4, Section 13.1.7			
Test mode:	Compliance	Verdict:		PASS	
Date & Time:	2/15/2010 11:42:31 AM				
Temperature: 22.1 °C	Air Pressure: 1016 hPa	Relative Humidity: 46 %	Power Supply: 3 V battery		
Remarks:					

Table 7.3.2 Occupied bandwidth test results

DETECTOR USED: Peak hold
 RESOLUTION BANDWIDTH: 10 kHz
 VIDEO BANDWIDTH: 30 kHz
 MODULATION ENVELOPE REFERENCE POINTS: 20 dBc
 MODULATION: FSK
 MODULATING SIGNAL: ID code

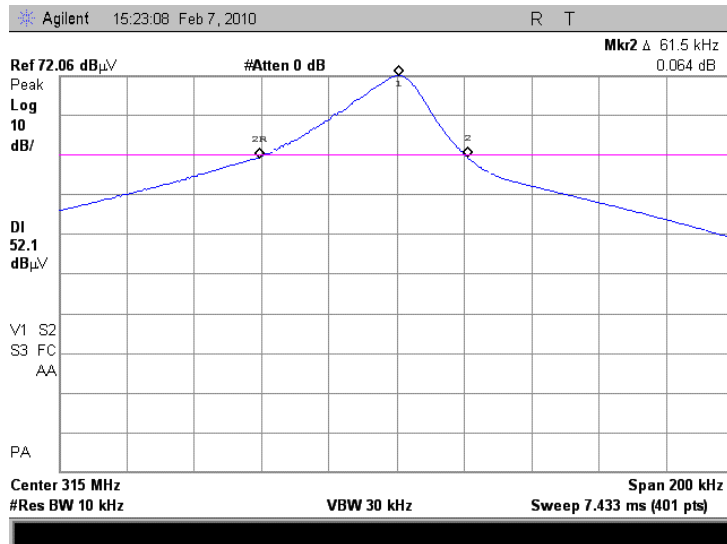
Carrier frequency, MHz	Occupied bandwidth, kHz	Limit		Margin, kHz	Verdict
		% of the carrier frequency	kHz		
315	61.5	0.25	787.50	-726.0	Pass

Reference numbers of test equipment used

HL 2448	HL 2780	HL 3323						
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Full description is given in Appendix A.

Plot 7.3.1 Occupied bandwidth test result





Test specification:	FCC Section 15.203/ RSS-Gen, Section 7.1.4, Antenna requirement		
Test procedure:	Visual inspection / supplier declaration		
Test mode:	Compliance	Verdict:	
Date & Time:	2/8/2010 2:08:52 PM		
Temperature: 21 °C	Air Pressure: 1010 hPa	Relative Humidity: 42 %	Power Supply: 3 V battery
Remarks:			

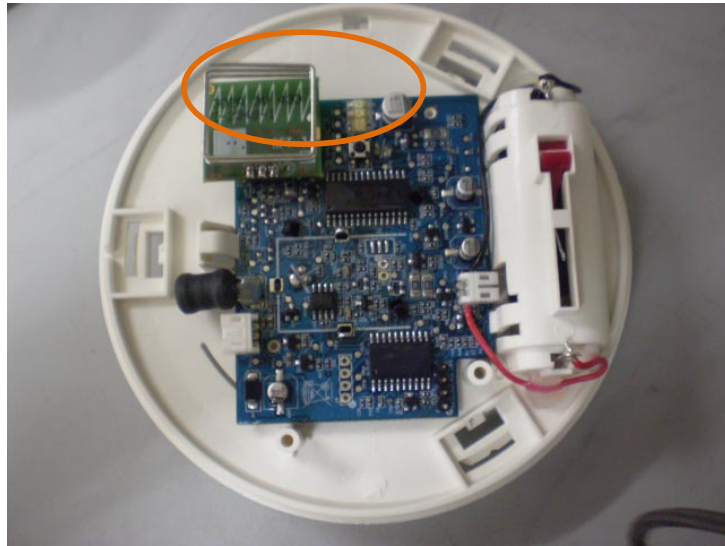
7.4 Antenna requirements

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 7.4.1.

Table 7.4.1 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 7.4.1 Antenna assembly





Test specification: FCC Section 15.109/ ICES-003, Radiated emission			
Test procedure: ANSI C63.4, Sections 11.6 and 12.1.4			
Test mode: Compliance		Verdict: PASS	
Date & Time: 2/21/2010 11:31:23 AM			
Temperature: 23.1 °C	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 3 VDC battery
Remarks:			

7.5 Radiated emission measurements

7.5.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 7.5.1.

Table 7.5.1 Radiated emission test limits according to FCC Part 15, Section 109

Frequency, MHz	Class B limit, dB(μV/m)		Class A limit, dB(μV/m)	
	10 m distance	3 m distance	10 m distance	3 m distance
30 - 88	29.5*	40.0	39.0	49.5*
88 - 216	33.0*	43.5	43.5	54.0*
216 - 960	35.5*	46.0	46.4	56.9*
Above 960	43.5*	54.0	49.5	60.0*

Table 7.5.2 Radiated emission limits according to ICES-003, Section 5

Frequency, MHz	Class B limit, dB(μV/m)		Class A limit, dB(μV/m)	
	10 m distance	3 m distance	10 m distance	3 m distance
30 - 230	30	40.5*	40	50.5*
230 - 1000	37	47.5*	47	57.5*

* - The limit for test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows: $Lim_{S_2} = Lim_{S_1} + 20 \log(S_1/S_2)$, where S_1 and S_2 – standard defined and test distance respectively in meters.

7.5.2 Test procedure

7.5.2.1 The EUT was set up as shown in Figure 7.5.1 and associated photograph/s, energized and the performance check was conducted.

7.5.2.2 The specified frequency range was investigated with biconilog antenna connected to 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 and the EUT cables position was varied.

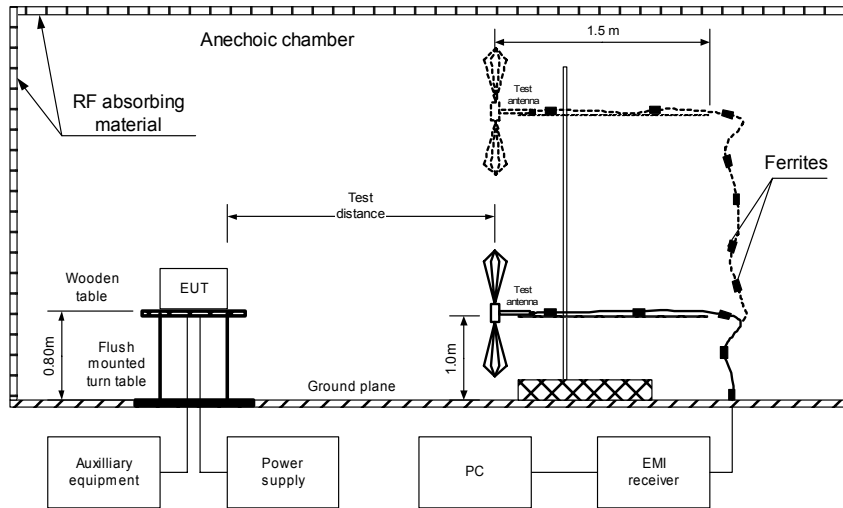
7.5.2.3 The worst test results (the lowest margins) were recorded in Table 7.5.3 and shown in the associated plots.



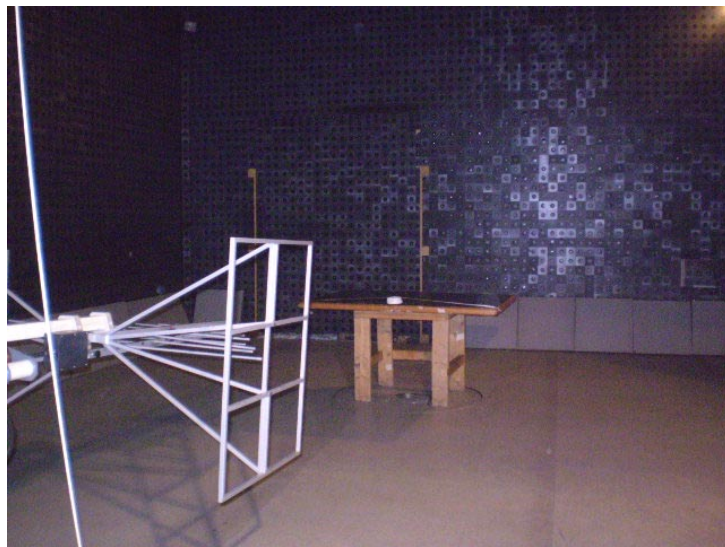
HERMON LABORATORIES

Test specification: FCC Section 15.109/ ICES-003, Radiated emission			
Test procedure: ANSI C63.4, Sections 11.6 and 12.1.4			
Test mode: Compliance		Verdict: PASS	
Date & Time: 2/21/2010 11:31:23 AM			
Temperature: 23.1 °C	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 3 VDC battery
Remarks:			

Figure 7.5.1 Setup for radiated emission measurements in anechoic chamber, table-top equipment



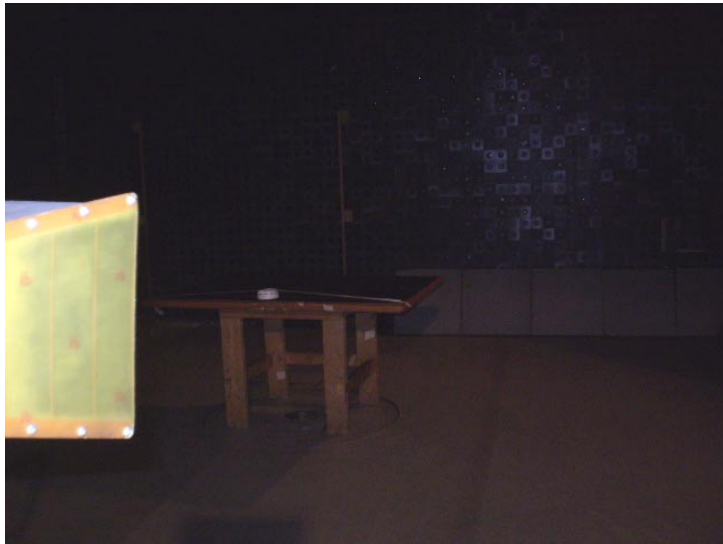
Photograph 7.5.1 Setup for radiated emission measurements in 30-1000 MHz





Test specification: FCC Section 15.109/ ICES-003, Radiated emission			
Test procedure: ANSI C63.4, Sections 11.6 and 12.1.4			
Test mode: Compliance	Verdict: PASS		
Date & Time: 2/21/2010 11:31:23 AM			
Temperature: 23.1 °C	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 3 VDC battery
Remarks:			

Photograph 7.5.2 Setup for radiated emission measurements above 1000 MHz



Photograph 7.5.3 Setup for final radiated emission measurements, EUT close view





Test specification: FCC Section 15.109/ ICES-003, Radiated emission			
Test procedure: ANSI C63.4, Sections 11.6 and 12.1.4			
Test mode: Compliance	Verdict: PASS		
Date & Time: 2/21/2010 11:31:23 AM			
Temperature: 23.1 °C	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 3 VDC battery
Remarks:			

Table 7.5.3 Radiated emission test results

EUT SET UP: TABLE-TOP
LIMIT: Class B
EUT OPERATING MODE: Receive / Stand-by
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / QUASI-PEAK
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

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*				
No emissions were found								Pass

TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz – 2900 MHz
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak			Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
	Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*	Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
No emissions were found										Pass

*- Margin = Measured emission - specification limit.
**- EUT front panel refer to 0 degrees position of turntable.

Reference numbers of test equipment used

HL 0521	HL 0604	HL 2871	HL 2432	HL 3616			
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Full description is given in Appendix A.



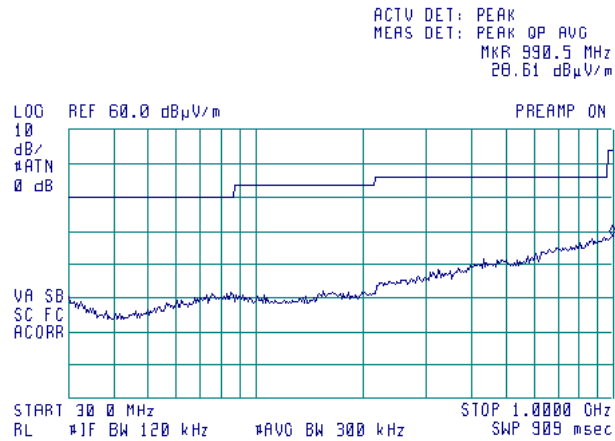
HERMON LABORATORIES

Test specification: FCC Section 15.109/ ICES-003, Radiated emission			
Test procedure: ANSI C63.4, Sections 11.6 and 12.1.4			
Test mode: Compliance	Verdict: PASS		
Date & Time: 2/21/2010 11:31:23 AM			
Temperature: 23.1 °C	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 3 VDC battery
Remarks:			

Plot 7.5.1 Radiated emission measurements in 30 - 1000 MHz range, vertical antenna polarization

TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive / Stand-by

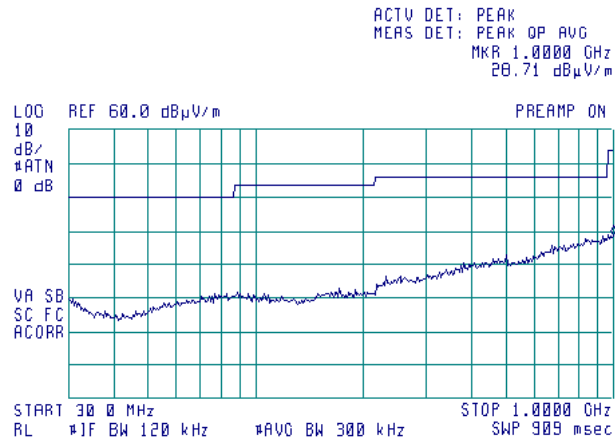
11:10:30 FEB 21, 2010



Plot 7.5.2 Radiated emission measurements in 30 - 1000 MHz range, horizontal antenna polarization

TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive / Stand-by

11:12:09 FEB 21, 2010





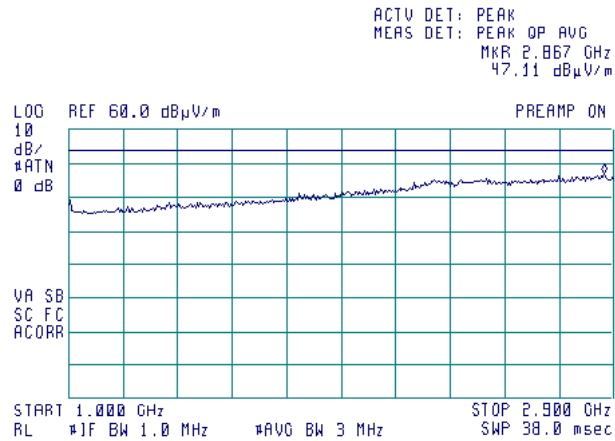
HERMON LABORATORIES

Test specification: FCC Section 15.109/ ICES-003, Radiated emission			
Test procedure: ANSI C63.4, Sections 11.6 and 12.1.4			
Test mode: Compliance	Verdict: PASS		
Date & Time: 2/21/2010 11:31:23 AM			
Temperature: 23.1 °C	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 3 VDC battery
Remarks:			

Plot 7.5.3 Radiated emission measurements above 1000 MHz, vertical antenna polarization

TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive / Stand-by

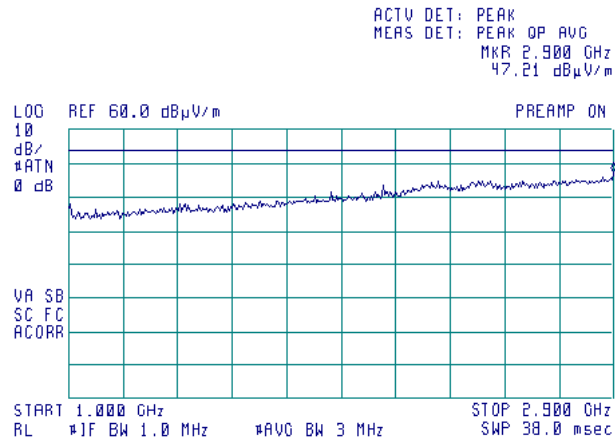
11:01:27 FEB 21, 2010



Plot 7.5.4 Radiated emission measurements above 1000 MHz, horizontal antenna polarization

TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive / Stand-by

11:06:01 FEB 21, 2010



**8 APPENDIX A Test equipment and ancillaries used for tests**

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0034	Antenna, Log Periodic, 200 - 1000 MHz	Electro-Metrics	LPA 25/30	1988	23-Dec-09	23-Dec-10
0415	Cable, Coax, RF, RG-214	Hermon Laboratories	CC-3	056	01-Dec-09	01-Dec-10
0446	Antenna, Loop active, 10kHz-30MHz	EMCO	6502	2857	29-Jun-09	29-Jun-10
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard	8546A	3617A 00319, 3448A002 53	27-Aug-09	27-Aug-10
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	11-Jan-10	11-Jan-11
0812	Cable Coax, RG-214, 11.5 m, N-type connectors	Hermon Laboratories	C214-11	148	02-Dec-09	02-Dec-10
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies	8564EC	3946A002 19	28-Aug-09	28-Aug-10
1425	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1426, HL1427	Agilent Technologies	8542E	3710A002 22, 3705A002 04	28-Aug-09	28-Aug-10
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies	8542E	3807A002 62,3705A0 0217	31-Aug-09	31-Aug-10
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	29-Jan-10	29-Jan-11
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	29-Jan-10	29-Jan-11
2448	Cable RF, 0.7 m	Harbour Industries	MIL 17/60- RG142	2448	01-Sep-09	01-Sep-10
2697	Antenna, 30 MHz - 3.0 GHz	Sunol Sciences. Corp. Pleasanton, California USA	JB3	A022805	11-Jan-10	11-Jan-11
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 62	05-Jul-09	05-Jul-10
2871	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-8155- 00	2871	16-Sep-09	16-Sep-10
2882	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC- MNFN-3.0	211539 001	30-Dec-09	30-Dec-10
2883	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC- MNFN-3.0	211539 003	01-Dec-09	01-Dec-10
3323	UHF TEM CELL, 100 MHz to 3000 MHz	TESCOM CO., LTD	TC-5060B	506039018 8	27-Aug-08	27-Aug-10
3616	Cable RF, 6.5 m, N type-N type, DC-6.5 GHz	Suhner Switzerland	Rg 214/U	NA	02-Dec-09	02-Dec-10
3883	Preamplifier, 0.1 to 18 GHz, Gain 25 dB, N-type(f) in, N-type(m) out.	Agilent Technologies	87405C	MY470104 06	13-Jan-10	13-Jan-11

9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Radiated emissions at 3 m measuring distance Horizontal polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB
Vertical polarization	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
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
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Occupied bandwidth	± 8.0 %

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, IC 2186A-2 for anechoic chamber, IC 2186A-3 for full-anechoic chamber for RE measurements above 1 GHz), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, G-27 for full-anechoic chamber for RE measurements above 1 GHz, C-845 for conducted emissions site, T-1606 for conducted emissions at telecommunication ports), has a status of a Telefication - Listed Testing Laboratory, Certificate No. L138/00. 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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Person for contact: Mr. Alex Usoskin, CEO.

11 APPENDIX D Specification references

47CFR part 15: 2009	Radio Frequency Devices.
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
ICES-003 Issue 4: 2004	Digital Apparatus
CAN/CSA-CEI/IEC CISPR 22: 2002	Information Technology Equipment- Radio Disturbance Characteristics- Limits and Methods of measurement

12 APPENDIX E Test equipment correction factors

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
Log periodic antenna
Electro-Metrics, model LPA-25/30
Ser.No.1988, HL 0034

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
200	12.6	625	20.4
225	12.2	650	20.9
250	13.4	675	22.0
275	14.3	700	22.2
300	15.2	725	22.7
325	15.7	750	22.5
350	15.9	775	22.7
375	16.4	800	22.8
400	17.0	825	23.2
425	17.4	850	23.5
450	17.9	875	23.9
475	18.6	900	24.0
500	19.1	925	24.0
525	19.3	950	24.2
550	19.6	975	24.7
575	19.8	1000	25.1
600	20.0		

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(μV) to convert it into field intensity in dB(μV/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).

**Antenna factor
Double-ridged guide horn antenna
Model 3115, serial number: 00027177, HL 2432**

Frequency, MHz	Antenna factor. dB(1/m)
1000.0	24.7
1500.0	25.7
2000.0	27.8
2500.0	28.9
3000.0	30.7
3500.0	31.8
4000.0	33.0
4500.0	32.8
5000.0	34.2
5500.0	34.9
6000.0	35.2
6500.0	35.4
7000.0	36.3
7500.0	37.3
8000.0	37.5
8500.0	38.0
9000.0	38.3
9500.0	38.3
10000.0	38.7
10500.0	38.7
11000.0	38.9
11500.0	39.5
12000.0	39.5
12500.0	39.4
13000.0	40.5
13500.0	40.8
14000.0	41.5
14500.0	41.3
15000.0	40.2
15500.0	38.7
16000.0	38.5
16500.0	39.8
17000.0	41.9
17500.0	45.8
18000.0	49.1

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 calibration
Sunol Sciences Inc., model JB3, serial number A022805, HL 2697

Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain
30	22.2	-22.5	0.01	620	19.7	6.3	4.27	1215	24.9	7.0	5.05	1810	28.3	7.1	5.08	2405	30.9	6.9	4.93
35	18.5	-17.4	0.02	625	19.7	6.5	4.42	1220	24.9	7.0	4.99	1815	28.5	6.9	4.91	2410	30.9	6.9	4.89
40	14.7	-12.5	0.06	630	19.6	6.6	4.57	1225	25.1	6.9	4.91	1820	28.6	6.8	4.74	2415	31.0	6.9	4.85
45	11.3	-8.1	0.16	635	19.7	6.5	4.48	1230	25.2	6.8	4.92	1825	28.7	6.8	4.76	2420	31.0	6.8	4.82
45	11.3	-8.1	0.16	640	19.9	6.4	4.40	1235	25.1	7.0	4.96	1830	28.7	6.8	4.76	2425	31.1	6.8	4.81
50	8.9	-4.7	0.34	645	19.9	6.5	4.45	1240	25.0	7.1	5.09	1835	28.7	6.7	4.72	2430	31.0	6.9	4.87
55	7.9	-2.8	0.52	650	19.9	6.5	4.51	1245	25.0	7.1	5.12	1840	28.8	6.7	4.69	2435	31.0	6.9	4.88
60	7.8	-2.1	0.62	655	19.9	6.6	4.60	1250	25.0	7.1	5.15	1845	28.6	6.9	4.90	2440	31.2	6.8	4.74
65	8.5	2.0	0.83	660	19.9	6.7	4.69	1255	25.0	7.2	5.25	1850	28.4	7.1	5.12	2445	31.1	6.9	4.91
70	9.0	-1.9	0.64	665	19.9	6.7	4.70	1260	24.9	7.3	5.36	1855	28.5	7.0	5.07	2450	31.0	7.0	4.96
75	8.8	-1.1	0.78	670	20.0	6.7	4.71	1265	25.0	7.3	5.31	1860	28.6	7.0	5.01	2455	31.0	7.0	5.01
80	8.4	-0.2	0.97	675	20.1	6.7	4.71	1270	25.1	7.2	5.26	1865	28.5	7.1	5.17	2460	30.9	7.2	5.19
85	8.0	0.8	1.20	680	20.1	6.7	4.71	1275	25.3	7.0	5.05	1870	28.4	7.3	5.33	2465	31.1	6.9	4.95
90	8.2	1.1	1.29	685	20.1	6.8	4.79	1280	25.5	6.8	4.94	1875	28.4	7.2	5.28	2470	31.3	6.8	4.76
95	9.2	0.5	1.13	690	20.1	6.9	4.88	1285	25.4	7.0	4.97	1880	28.5	7.2	5.22	2475	31.4	6.7	4.69
100	10.6	-0.4	0.92	695	20.2	6.8	4.82	1290	25.3	7.1	5.10	1885	28.5	7.2	5.22	2480	31.3	6.8	4.79
110	12.6	-1.6	0.70	705	20.4	6.8	4.75	1300	25.2	7.3	5.33	1895	28.6	7.2	5.24	2490	31.1	7.0	4.99
120	13.9	-2.1	0.62	715	20.5	6.8	4.80	1310	25.5	7.1	5.09	1905	28.5	7.3	5.36	2500	30.9	7.2	5.27
125	14.2	-2.0	0.63	720	20.5	6.9	4.85	1315	25.6	7.2	5.23	1910	28.5	7.4	5.45	2505	31.1	7.1	5.15
130	14.2	-1.7	0.68	725	20.6	6.8	4.81	1320	25.3	7.3	5.36	1915	28.5	7.3	5.38	2510	31.0	7.2	5.22
140	13.4	-0.3	0.94	735	20.9	6.7	4.65	1330	25.6	7.0	5.06	1925	28.6	7.3	5.35	2520	31.2	7.0	5.05
150	12.9	0.8	1.21	745	21.0	6.6	4.59	1340	25.7	7.1	5.09	1935	28.5	7.4	5.54	2530	31.0	7.3	5.37
160	12.7	1.6	1.44	755	21.0	6.8	4.74	1350	25.7	7.1	5.09	1945	28.5	7.5	5.59	2540	31.2	7.1	5.08
165	12.0	2.0	1.59	760	21.0	6.8	4.73	1355	25.8	7.2	5.05	1950	28.5	7.5	5.48	2545	31.0	7.3	4.43
170	12.2	2.6	1.83	765	21.1	6.8	4.73	1360	25.9	6.9	4.95	1955	28.6	7.5	5.57	2550	31.0	7.3	5.39
175	11.8	3.3	2.13	770	21.3	6.7	4.64	1365	26.0	6.9	4.95	1960	28.6	7.5	5.65	2555	31.1	7.2	5.30
180	11.6	3.7	2.36	775	21.3	6.7	4.68	1370	26.0	7.0	4.96	1965	28.7	7.4	5.47	2560	31.0	7.4	5.47
185	11.5	4.0	2.54	780	21.3	6.7	4.72	1375	26.0	7.0	5.01	1970	28.9	7.2	5.29	2565	30.8	7.6	5.70
190	11.2	4.2	2.61	785	21.2	6.8	4.77	1380	26.1	7.0	5.03	1975	28.9	7.2	5.22	2570	31.0	7.3	5.22
200	13.1	3.2	2.07	795	21.4	6.8	4.79	1390	26.1	6.9	4.92	1985	29.1	7.1	5.11	2580	31.6	6.9	4.87
205	12.0	4.4	2.76	800	21.5	6.8	4.77	1395	26.2	6.9	4.94	1990	29.1	7.0	5.06	2585	31.6	6.8	4.79
210	11.0	5.6	3.66	805	21.6	6.7	4.71	1400	26.2	7.0	4.96	1995	29.1	7.1	5.09	2590	31.6	6.9	4.88
215	11.3	5.6	3.69	810	21.7	6.7	4.65	1405	26.1	7.0	4.92	2000	29.1	7.1	5.11	2595	31.5	7.0	4.97
220	11.6	5.5	3.52	815	21.7	6.7	4.72	1410	26.1	7.1	5.09	2005	29.5	7.1	5.16	2600	31.6	6.9	4.86
225	11.7	5.5	3.55	820	21.7	6.8	4.80	1415	26.2	7.0	5.02	2010	29.1	7.1	5.15	2605	31.3	7.2	5.30
230	11.9	5.5	3.57	825	21.7	6.8	4.82	1420	26.3	7.0	4.96	2015	29.2	7.1	5.13	2610	31.4	7.1	5.15
235	12.1	5.5	3.56	830	21.7	6.9	4.85	1425	26.2	7.1	5.10	2020	29.2	7.1	5.18	2615	31.7	6.9	4.88
240	12.3	5.5	3.54	835	21.8	6.8	4.82	1430	26.1	7.2	5.25	2025	29.3	7.1	5.08	2620	31.8	7.0	4.97
245	12.3	5.7	3.71	840	21.9	6.8	4.80	1435	26.1	7.2	5.24	2030	29.3	7.0	5.05	2625	31.4	7.1	5.17
250	12.3	5.9	3.88	845	21.9	6.8	4.83	1440	26.2	7.2	5.24	2035	29.3	7.1	5.07	2630	31.6	7.0	5.00
255	12.5	5.9	3.85	850	22.0	6.8	4.86	1445	26.3	7.1	5.11	2040	29.3	7.1	5.13	2635	31.6	6.8	4.82
260	12.7	5.8	3.83	855	22.0	6.8	4.80	1450	26.5	7.0	4.98	2045	29.2	7.2	5.23	2640	31.7	7.0	4.98
265	13.2	5.5	3.54	860	22.1	6.8	4.74	1455	26.4	7.1	5.07	2050	29.2	7.2	5.27	2645	31.7	6.9	4.93
270	13.7	5.2	3.27	865	22.0	6.9	4.92	1460	26.4	7.1	5.17	2055	29.3	7.2	5.21	2650	31.8	6.9	4.85
275	13.7	5.3	3.39	870	21.9	7.1	5.11	1465	26.4	7.2	5.19	2060	29.5	7.0	5.02	2655	31.8	6.9	4.85
280	13.7	5.4	3.50	875	22.0	7.1	5.08	1470	26.4	7.2	5.22	2065	29.4	7.1	5.08	2660	31.7	7.0	5.02
285	13.6	5.6	3.61	880	22.0	7.0	5.05	1475	26.4	7.1	5.17	2070	29.4	7.1	5.10	2665	31.6	6.7	4.71
290	13.7	5.7	3.72	885	22.1	7.0	5.06	1480	26.5	7.1	5.12	2075	29.5	7.0	5.10	2670	32.0	6.7	4.67
295	13.8	5.8	3.77	890	22.1	7.0	5.06	1485	26.5	7.1	5.14	2080	29.8	6.8	4.76	2675	31.9	6.8	4.81
300	13.9	5.8	3.81	895	22.2	7.1	5.09	1490	26.5	7.1	5.17	2085	29.7	6.9	4.89	2680	31.7	7.0	5.04
305	14.0	5.9	3.85	900	22.2	7.1	5.12	1495	26.5	7.2	5.24	2090	29.7	6.9	4.86	2685	31.9	6.8	4.83
310	14.1	5.9	3.88	905	22.3	7.1	5.09	1500	26.5	7.2	5.31	2095	29.8	6.8	4.78	2690	32.1	6.7	4.72
315	14.3	5.9	3.89	910	22.3	7.0	5.05	1505	26.5	7.2	5.27	2100	29.9	6.8	4.75	2695	32.1	6.7	4.71
320	14.4	5.9	3.90	915	22.4	7.0	4.99	1510	26.6	7.2	5.23	2105	29.8	6.8	4.81	2700	32.0	6.8	4.81
325	14.5	5.9	3.92	920	22.6	6.9	4.92	1515	26.6	7.2	5.20	2110	29.9	6.8	4.76	2705	32.0	6.8	4.80
330	14.6	5.9	3.93	925	22.7	6.9	4.85	1520	26.5	7.3	5.38	2115	29.9	6.8	4.76	2710	32.1	6.8	4.79
335	14.7	6.0	4.02	930	22.8	6.8	4.77	1525	26.6	7.3	5.37	2120	29.9	6.8	4.84	2715	32.1	6.7	4.71
340	14.7	6.2	4.12	935	22.8	6.8	4.83	1530	26.6	7.3	5.38	2125	29.9	6.9	4.89	2720	32.4	6.5	4.47
345	14.8	6.1	4.06	940	22.9	6.8	4.89	1535	26.6	7.4	5.44	2130	29.9	6.8	4.90	2725	32.2	6.7	4.63
350	15.1	6.0	3.99	945	22.8	6.9	4.87	1540	26.5	7.4	5.53	2135	29.8	6.9	4.94	2730	31.9	7.0	5.05
355	15.3	5.9	3.88	950	22.9	6.9	4.85	1545	26.5	7.5	5.58	2140	29.8	7.1	5.08	2735	31.6	7.4	5.44
360	15.6	5.8	3.78	955	23.0	6.8	4.81	1550	26.5	7.5	5.63	2145	29.9	6.9	4.92	2740	31.6	7.1	5.46
365	15.5	5.9	3.89	960	23.1	6.8	4.77	1555	26.7	7.3	5.39	2150	29.9	7.0	4.98	2745	31.9	7.0	5.06
370	15.5	6.0	4.01	965	23.1	6.7	4.73	1560	26.9	7.1	5.16	2155	29.8	7.1	5.10	2750	32.0	6.9	4.94
375	15.6	6.1	4.03	970	23.2	6.7	4.69	1565	26.9	7.2	5.23	2160	29.8	7.1	5.09	2755	32.0	7.0	4.98
380	15.7	6.1	4.05	975	23.2	6.8	4.82	1570	26.9	7.2	5.30	2165	29.9	7.0	5.00	2760	32.0	7.0	5.06
385	15.7	6.2	4.15	980	23.5	6.6	4.54	1575	27.0	7.2	5.23	2170	29.9	7.1	5.07	2765	32.2	6.8	4.80
390	15.7	6.3	4.25	985	23.5	6.6	4												



Cable loss
Cable Coaxial, RG-58/RG-214, s/n 056, HL 0415
+ Cable Coaxial, RG-214, 11.5m, s/n 148, HL 0812

No.	Frequency, MHz	Cable loss, dB	Measured uncertainty, dB
1	20	0.73	±0.12
2	30	0.91	
3	50	1.2	
4	80	1.56	
5	100	1.76	
6	200	2.59	
7	300	3.26	
8	400	3.93	
9	500	4.42	
10	600	4.92	
11	700	5.36	
12	800	5.88	
13	900	6.41	
14	1000	6.71	
15	1500	8.63	
16	2000	10.39	

Cable loss
Cable coaxial, Huber-Suhner, 18 GHz, 6.4 m, SMA - SMA, model 198-8155-00,
HL 2871

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.12	5750	2.34	12000	3.55
30	0.14	6000	2.39	12250	3.61
100	0.27	6250	2.46	12500	3.67
250	0.45	6500	2.52	12750	3.74
500	0.63	6750	2.58	13000	3.79
750	0.76	7000	2.64	13250	3.82
1000	0.89	7250	2.68	13500	3.83
1250	1.01	7500	2.73	13750	3.83
1500	1.12	7750	2.78	14000	3.88
1750	1.23	8000	2.83	14250	3.93
2000	1.32	8250	2.88	14500	3.96
2250	1.41	8500	2.94	14750	4.01
2500	1.49	8750	2.97	15000	4.00
2750	1.58	9000	3.02	15250	4.01
3000	1.66	9250	3.07	15500	4.00
3250	1.73	9500	3.13	15750	4.13
3500	1.80	9750	3.18	16000	4.22
3750	1.87	10000	3.21	16250	4.29
4000	1.93	10250	3.26	16500	4.29
4250	2.01	10500	3.30	16750	4.32
4500	2.06	10750	3.36	17000	4.37
4750	2.12	11000	3.39	17250	4.45
5000	2.17	11250	3.44	17500	4.49
5250	2.24	11500	3.48	17750	4.53
5500	2.29	11750	3.52	18000	4.55

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, Bird, 18 GHz, N-type, M-F, model TC-MNFN-3.0, S/N 211539 003
HL 2883

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	5750	1.70	12000	2.46
30	0.12	6000	1.75	12250	2.48
100	0.21	6250	1.80	12500	2.52
250	0.34	6500	1.81	12750	2.50
500	0.47	6750	1.86	13000	2.54
750	0.59	7000	1.86	13250	2.48
1000	0.67	7250	1.92	13500	2.63
1250	0.76	7500	1.96	13750	2.65
1500	0.84	7750	1.98	14000	2.72
1750	0.92	8000	2.02	14250	2.67
2000	0.98	8250	2.03	14500	2.70
2250	1.05	8500	2.05	14750	2.72
2500	1.12	8750	2.11	15000	2.79
2750	1.17	9000	2.17	15250	2.80
3000	1.22	9250	2.17	15500	2.83
3250	1.27	9500	2.20	15750	2.75
3500	1.33	9750	2.19	16000	2.82
3750	1.38	10000	2.22	16250	2.85
4000	1.42	10250	2.25	16500	2.90
4250	1.46	10500	2.30	16750	2.89
4500	1.51	10750	2.28	17000	2.88
4750	1.54	11000	2.32	17250	2.85
5000	1.59	11250	2.34	17500	2.96
5250	1.62	11500	2.39	17750	3.04
5500	1.65	11750	2.42	18000	3.04

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
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
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
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
PCB	printed circuit board
PM	pulse modulation
ppm	part per million (10^{-6})
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

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