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Electrical

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TEST REPORT

ACCORDING TO: FCC part 27

FOR:

Arcadian Networks

Base station

Model:BSR 757

Table of contents

1 Applicant information

Client name:	Arcadian Networks Inc
Address:	400 Columbus Avenue Suite 210E, Valhalla NY 10595, USA
Telephone:	+972 3976 9847
Fax:	+972 3976 9998
E-mail:	hillel.hendler@arcadiannetworks.com
Contact name:	Mr. Hillel Hendler

2 Equipment under test attributes

Product name:	Base station
Model:	BSR 757
Receipt date:	11/11/2007

3 Manufacturer information

Manufacturer name:	Arcadian Networks Inc
Address:	400 Columbus Avenue Suite 210E, Valhalla NY 10595, USA
Telephone:	+972 3976 9847
Fax:	+972 3976 9998
E-Mail:	Arnon.afgin@arcadiannetworks.com
Contact name:	Mr. Arnon Afgin

4 Test details

Project ID:	18290
Location:	Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30500, Israel
Test started:	11/11/2007
Test completed:	4/11/2008
Test specifications:	FCC part 27:2007

5 Tests summary

Test	Status
Transmitter characteristics	
Section 27.50(b)(2), Peak output power at RF antenna connector	Pass*
Section 2.1091, 27.52, RF safety	Pass**
Section 27.53(c)(1), Spurious emissions RF antenna connector	Pass
Section 27.53(c)(3), Spurious emissions RF antenna connector in 763-775 MHz and 793-805 MHz	Pass
Section 27.53(c)(3), Band edge emissions RF antenna connector	Pass*
Section 27.53(c)(1), Radiated spurious emissions	Pass
Section 27.53(f), Radiated spurious emissions in 1559-1610 MHz band	Pass
Section 27.54, Frequency stability	Pass
Section 2.1049, Occupied bandwidth	Pass

* The EUT power settings to be limited to the end user:

1) 245 kHz CBW - for QPSK type of modulation the EUT power settings shall be 45 dBmV; for 16QAM, 64QAM and 256QAM - 43 dBmV;
2) 330 kHz CBW- for QPSK, 16QAM and 256QAM types of modulation the EUT power settings shall be 45 dBmV, for 64QAM - 44 dBmV.

** Pass as fixed type device.

The test results relate only to the items tested. Pass / fail decision was based on nominal values.

This test report replaces the previously issued test report identified by Doc ID:ARCRAD_FCC.18290.

	Name and Title	Date	Signature
Tested by:	Mr. E. Plotnichenko, test engineer	April 10, 2008	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	April 24, 2008	
Approved by:	Mr. M. Nikishin, EMC and Radio group leader	April 28, 2008	

6 EUT description

6.1 General information

The EUT is a part of a base station transceiver for point to multipoint broadband wireless access system. The EUT operates within 757 to 758 MHz band and is powered from AC mains.

6.2 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length	Indoor / outdoor
		From	To					
Power	AC mains	Voltage converter	AC mains	IEC 60320	1	Unshielded	1.5 m	Indoor
Power	DC	EUT	Voltage converter	DC jack	1	Unshielded	1.5 m	Indoor
Signal	Ethernet	EUT	Laptop	RJ 45	1	Unshielded	1.5 m	Indoor
Signal	RF	EUT	Antenna	F-type	1	Shielded	2 m	Outdoor

6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Laptop	IBM	X600	Unknown
Voltage converter	Gamatronic	NA	NA

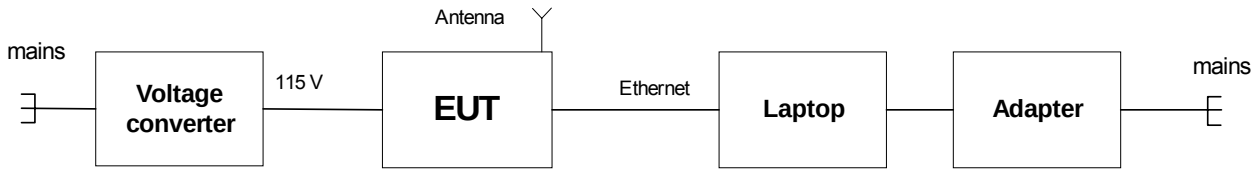
6.4 Operating frequencies

Source	Frequency, MHz				
Clocks	3.3	20.48	25.0	28.0	50.0
Tx amplifier	757.175		757.5		757.825
Transmitter IF	44				

6.5 Changes made in the EUT

No changes were implemented.

6.6 Test configuration



6.7 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**
X	fixed	Always at a distance more than 2 m from all people
	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	757.0 – 758.0 MHz
Operating frequency range	757.1325 – 757.8675 MHz (245 kHz channel bandwidth) 757.170 – 757.830 MHz (330 kHz channel bandwidth)

Maximum rated output power	At transmitter 50 Ω RF output connector	46.7 dBm
	Effective radiated power (for equipment with no RF connector)	NA

Is transmitter output power variable?		No		
	X	Yes		continuous variable
			X	stepped variable with stepsize: 1 dB
				minimum RF power: 26 dBm
				maximum RF power: 46.7 dBm

Antenna connection				
unique coupling	**X**	standard N-type connector	integral	with temporary RF connector
				without temporary RF connector

Antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Tuned Sector Panel Antenna	Transcom Corporation	VP-700	13.3 dBd

Modulating test signal (baseband)	PRBS
Type of multiplexing	TDMA
Transmitter duty cycle supplied for test	100 %

Transmitter 99% power bandwidth	**Bit rate, kbps**	**Symbol rate, kSym/sec**	**Type of modulation**
245 kHz	433	216	QPSK
	867	216	16QAM
	1245	207	64QAM
	2195	275	256QAM
330 kHz	583	291	QPSK
	1166	291	16QAM
	1668	278	64QAM
	2344	293	256QAM

RF channel spacing	**Frequency channel**		
	Low	**Mid**	**High**
245 kHz	757.1325	757.3775	757.8675
330 kHz	757.170	757.500	757.830

Transmitter power source					
		Nominal rated voltage		Battery type	
	DC	**Nominal rated voltage**			
X	AC mains	**Nominal rated voltage**	120 VAC	Frequency	60 Hz

Common power source for transmitter and receiver	**X** yes	no

Test specification:	Section 27.50(b)(2), Peak output power at RF antenna connector		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 ºC	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks:			

7 Transmitter characteristics

7.1 Peak output power test

7.1.1 General

This test was performed to measure the peak output power at RF antenna connector. Specification test limits are given in Table 7.1.1.

Table 7.1.1 Peak output power limits

Assigned frequency range, MHz	Maximum peak output power*	
	dBm	W
757.0 – 758.0	60.0	1000.0

* The peak output power limit was calculated by subtracting of antenna gain in dBd from maximum allowed ERP 60.0 dBm (1000 W):
60.0 dBm – 13.3 dBd = 46.7 dBm

7.1.2 Test procedure for measurements

7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and its proper operation was checked.

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

7.1.2.3 The peak output power was measured with spectrum analyzer to obtain RMS values as provided in Table 7.1.2, Table 7.1.3, Table 7.1.4, Table 7.1.5.

Figure 7.1.1 Peak output power test setup

Test specification:	**Section 27.50(b)(2), Peak output power at RF antenna connector**		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	**Verdict:**	PASS
Date:	4/09/2008		
Temperature: 24 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 VAC
Remarks: 245 kHz CBW			

Table 7.1.2 Average output power test results for 245 kHz channel bandwidth

ASSIGNED FREQUENCY RANGE:	757.0 – 758.0 MHz
DETECTOR USED:	SAMPLE
RESOLUTION BANDWIDTH	3 kHz
VIDEO BANDWIDTH	10 kHz
AVERAGING	POWER, 100 SWEEP
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum

Carrier frequency, MHz	Spectrum analyzer reading, dBm	Cable loss, dB	EUT power settings,* dBmV	Limit, dBm	Margin**, dB	Verdict
QPSK						
757.1325	38.76	Included	**45**	46.7	-7.94	Pass
757.3775	38.68	Included	**45**	46.7	-8.02	Pass
787.8675	38.76	Included	**45**	46.7	-7.94	Pass
16QAM						
757.1325	37.67	Included	43	46.7	-9.03	Pass
757.3775	37.59	Included	43	46.7	-9.11	Pass
787.8675	37.60	Included	43	46.7	-9.10	Pass
64QAM						
757.1325	37.96	Included	43	46.7	-8.74	Pass
757.3775	37.93	Included	43	46.7	-8.77	Pass
787.8675	37.97	Included	43	46.7	-8.73	Pass
256QAM						
757.1325	37.89	Included	43	46.7	-8.81	Pass
757.3775	37.86	Included	43	46.7	-8.84	Pass
787.8675	37.81	Included	43	46.7	-8.89	Pass

* The EUT power settings that should be declared by the manufacturer to the end user (according to the limitations due the "Band edge emissions" test)
* Margin (dB)= RF output power (dBm)– Limit (dBm)

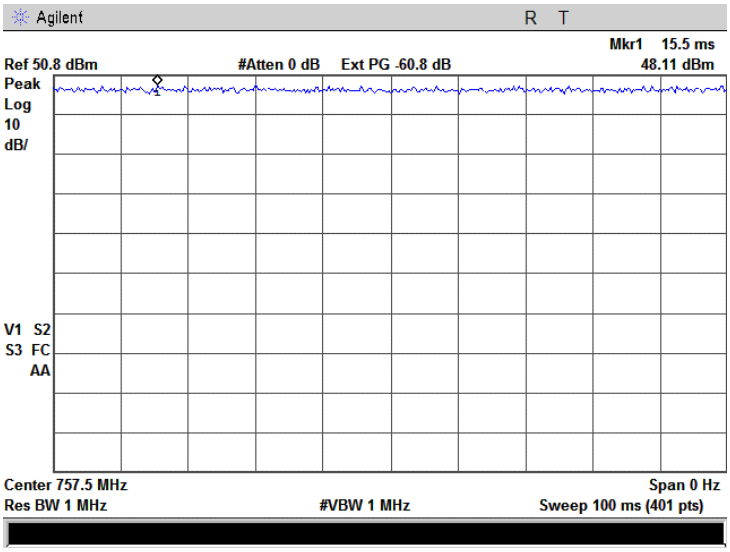
Reference numbers of test equipment used

HL 1876	HL 2883	HL 2909	HL 3180	HL 3181	HL 3385		

Full description is given in Appendix

Test specification:	Section 27.50(b)(2), Peak output power at RF antenna connector		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.1.1 Duty cycle measurement



Test specification:	Section 27.50(b)(2), Peak output power at RF antenna connector		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 ºC	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Table 7.1.3 Average output power test results for 330 kHz channel bandwidth

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
DETECTOR USED: SAMPLE
RESOLUTION BANDWIDTH 3 kHz
VIDEO BANDWIDTH 10 kHz
AVERAGING POWER, 100 SWEEP
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Carrier frequency, MHz	Spectrum analyzer reading, dBm	Cable loss, dB	EUT power settings*, dBmV	Limit, dBm	Margin**, dB	Verdict
QPSK						
757.17	39.14	Included	45	46.7	-7.56	Pass
757.50	39.14	Included	45	46.7	-7.56	Pass
787.83	39.22	Included	45	46.7	-7.48	Pass
16QAM						
757.17	40.58	Included	45	46.7	-6.12	Pass
757.50	40.21	Included	45	46.7	-6.49	Pass
787.83	40.26	Included	45	46.7	-6.44	Pass
64QAM						
757.17	39.65	Included	**44**	46.7	-7.05	Pass
757.50	39.57	Included	**44**	46.7	-7.13	Pass
757.83	39.58	Included	**44**	46.7	-7.12	Pass
256QAM						
757.17	40.56	Included	45	46.7	-6.14	Pass
757.50	40.73	Included	45	46.7	-5.97	Pass
787.83	40.62	Included	45	46.7	-6.08	Pass

* The EUT power settings that should be declared by the manufacturer to the end user (according to the limitations due the "Band edge emissions" test)
** Margin (dB)= RF output power (dBm)– Limit (dBm)

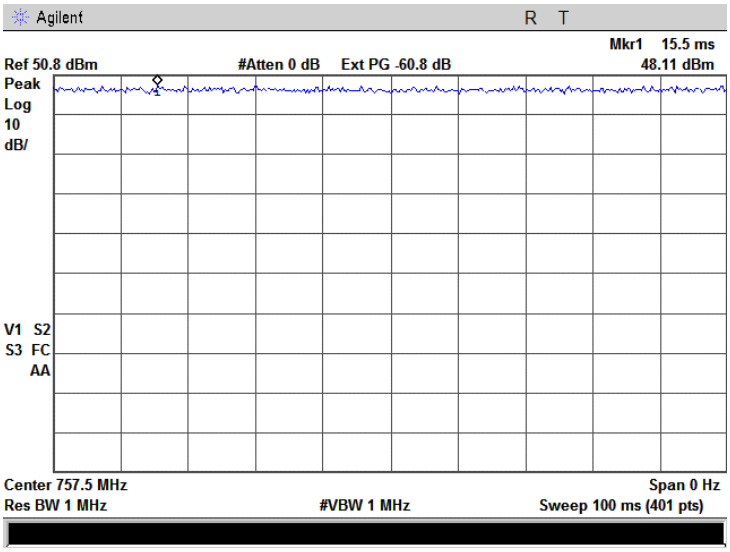
Reference numbers of test equipment used

HL 1876	HL 2883	HL 2909	HL 3180	HL 3181	HL 3385		

Full description is given in Appendix

Test specification:	Section 27.50(b)(2), Peak output power at RF antenna connector		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.1.2 Duty cycle measurement



Test specification:	Sections 2.1091, 27.52, RF radiation exposure evaluation		
Test procedure:	47 CFR, Section 1.1307(b)		
Test mode:	Compliance	Verdict:	PASS
Date:	4/11/2008		
Temperature: 23 ºC	Air Pressure: 1007 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

7.2 RF exposure

7.2.1 General

This test was performed to determine the minimum safe distance between the transmitter antenna and human to avoid public exposure in excess of limits for general population (uncontrolled exposure). Specification test limits are given in Table 7.2.1.

Table 7.2.1 RF exposure limits

Frequency range, MHz	Power density*		Electric field strength**, V/m
	mW/cm^2	W/m^2	
757.17	0.52	5.2	44.2
757.83	0.52	5.2	44.2

* - Power density limit within 300 - 1500 MHz was calculated according to the following equation: S = F / 1500, where S is power density in mW/cm^2 and F is frequency in MHz

** - Electric field strength limit was calculated from power density as follows: E = sqrt (S×120×π), where E is electric field strength in V/m and S is power density in W/m^2

7.2.2 Test procedure

7.2.2.1 The EUT, connected to the antenna providing the maximum directional gain, was set up as shown in Figure 7.2.1.

7.2.2.2 The E-field probe was pointed to the EUT antenna zero azimuth at a 3 m distance, the maximum field strength reading was recorded in Table 7.2.2.

7.2.2.3 The E-field probe was slowly moved toward the EUT until E-field equivalent to the maximum permitted power density was measured.

7.2.2.4 The probe was investigated over a cross-section area equivalent to the antenna size at various test distances to detect the maximum radial from the antenna.

7.2.2.5 The obtained antenna to probe distance was recorded in Table 7.2.2 as a minimum separation distance.

7.2.2.6 The test was repeated at the rest of test distances according to Table 7.2.2.

7.2.2.7 The test was repeated at the high frequency according to Table 7.2.3.

Test specification:	Sections 2.1091, 27.52, RF radiation exposure evaluation		
Test procedure:	47 CFR, Section 1.1307(b)		
Test mode:	Compliance	Verdict:	PASS
Date:	4/11/2008		
Temperature: 23 ºC	Air Pressure: 1007 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

Table 7.2.2 Maximum permissible exposure (MPE) measurement at low frequency (330 kHz CBW)

Test distance, m	Field strength, V/m	Equivalent power density, mW/cm^2	Limit, mW/cm^2	Margin, mW/cm^2	Verdict
3.0	23.2	0.142845	0.52	-0.37715	Pass
2.5	23.6	0.147813	0.52	-0.37219	Pass
2.0	35.3	0.330703	0.52	-0.1893	Pass
1.5	43.4	0.499883	0.52	-0.02012	Pass
1.0	78.2	1.622941	0.52	1.102941	Pass**
0.5	67.1	1.194907	0.52	0.674907	Pass**
0.2	72.3	1.387285	0.52	0.867285	Pass**

* - Equivalent power density was calculated from electric field strength as follows: $S = 0.1 \times E^2/(120 \times \pi)$, where E is electric field strength in V/m and S is power density in mW/cm^2

** - The EUT is classified as fixed device, a warning about 2 m safe distance is required in User Manual

Table 7.2.3 Maximum permissible exposure (MPE) measurement at high frequency (330 kHz CBW)

Test distance, m	Field strength, V/m	Equivalent power density, mW/cm^2	Limit, mW/cm^2	Margin, mW/cm^2	Verdict
3.0	26.2	0.182176	0.52	-0.33782	Pass
2.5	33.3	0.294291	0.52	-0.22571	Pass
2.0	39.5	0.414079	0.52	-0.10592	Pass
1.5	45.4	0.547017	0.52	0.027017	Pass**
1.0	72.6	1.398822	0.52	0.878822	Pass**
0.5	89.2	2.111635	0.52	1.591635	Pass**
0.2	107.1	3.044164	0.52	2.524164	Pass**

* - Equivalent power density was calculated from electric field strength as follows: $S = 0.1 \times E^2/(120 \times \pi)$, where E is electric field strength in V/m and S is power density in mW/cm^2

** - The EUT is classified as fixed device, a warning about 2 m safe distance is required in User Manual

Reference numbers of test equipment used

HL 0613	HL 1629						

Full description is given in Appendix A.

Test specification:	Sections 2.1091, 27.52, RF radiation exposure evaluation		
Test procedure:	47 CFR, Section 1.1307(b)		
Test mode:	Compliance	Verdict:	PASS
Date:	4/11/2008		
Temperature: 23 ºC	Air Pressure: 1007 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

Table 7.2.4 Maximum permissible exposure (MPE) measurement at low frequency (245 kHz CBW)

Test distance, m	Field strength, V/m	Equivalent power density, mW/cm^2	Limit, mW/cm^2	Margin, mW/cm^2	Verdict
3.0	23.70	0.149068	0.52	-0.370932	Pass
2.5	18.40	0.089851	0.52	-0.430149	Pass
2.0	28.30	0.212550	0.52	-0.307450	Pass
1.5	31.70	0.266691	0.52	-0.253309	Pass
1.0	41.60	0.459278	0.52	-0.060722	Pass
0.5	73.40	1.429820	0.52	0.909820	Pass**
0.2	96.00	2.445860	0.52	1.925860	Pass**

* - Equivalent power density was calculated from electric field strength as follows: $S = 0.1 \times E^2/(120 \times \pi)$, where E is electric field strength in V/m and S is power density in mW/cm^2
** - The EUT is classified as fixed device, a warning about 2 m safe distance is required in User Manual

Table 7.2.5 Maximum permissible exposure (MPE) measurement at high frequency (245 kHz CBW)

Test distance, m	Field strength, V/m	Equivalent power density, mW/cm^2	Limit, mW/cm^2	Margin, mW/cm^2	Verdict
3.0	23.70	0.149068	0.52	-0.370932	Pass
2.5	18.20	0.087909	0.52	-0.432091	Pass
2.0	28.30	0.212550	0.52	-0.307450	Pass
1.5	31.60	0.265011	0.52	-0.254989	Pass
1.0	41.20	0.450488	0.52	-0.069512	Pass
0.5	73.20	1.422038	0.52	0.902038	Pass**
0.2	96.00	2.445860	0.52	1.925860	Pass**

* - Equivalent power density was calculated from electric field strength as follows: $S = 0.1 \times E^2/(120 \times \pi)$, where E is electric field strength in V/m and S is power density in mW/cm^2
** - The EUT is classified as fixed device, a warning about 2 m safe distance is required in User Manual

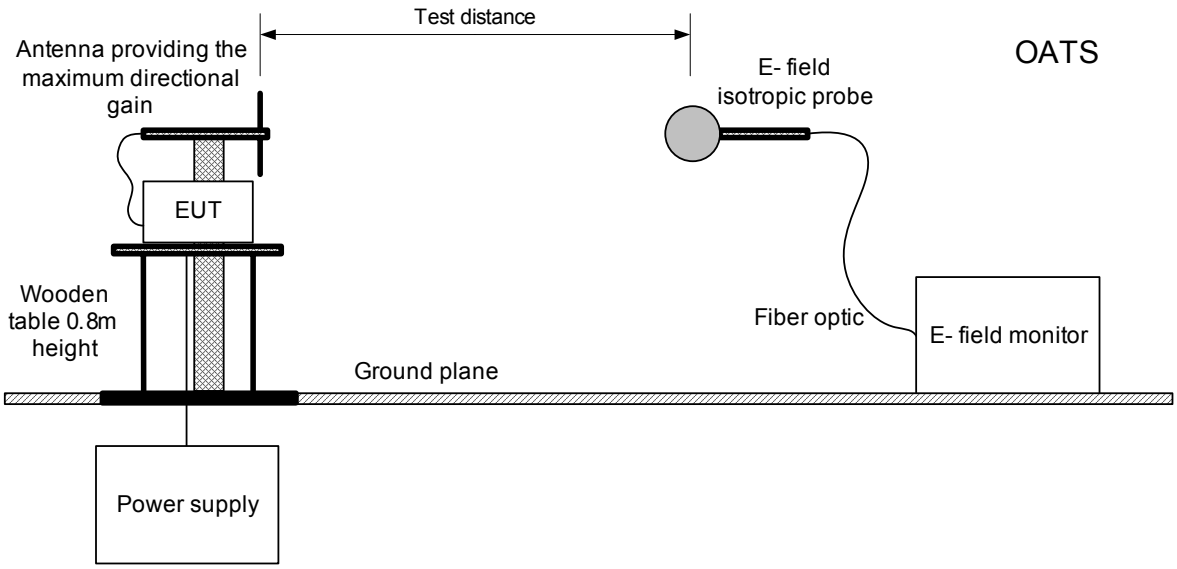
Reference numbers of test equipment used

HL 0613	HL 1629						

Full description is given in Appendix A.

Test specification:	Sections 2.1091, 27.52, RF radiation exposure evaluation		
Test procedure:	47 CFR, Section 1.1307(b)		
Test mode:	Compliance	Verdict:	PASS
Date:	4/11/2008		
Temperature: 23 ºC	Air Pressure: 1007 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

Figure 7.2.1 Maximum permissible exposure (MPE) measurement setup



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks:			

7.3 Spurious emissions at RF antenna connector test

7.3.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Spurious emission limits

Frequency, MHz*	Attenuation below carrier, dBc	Spurious emissions, dBm
0.009 – 10^{th} harmonic	43+10logP*	-13

* - P is transmitter output power in Watts.

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 adjusted to produce maximum available for end user RF output power.

7.3.2.3 The spurious emission was measured with spectrum analyzer as provided in Table 7.3.2 and associated plots.

Figure 7.3.1 Spurious emission test setup

Test specification:	**Section 27.53(c)(1), Spurious emissions at RF antenna connector**		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date:	4/06/2008		
Temperature: 24 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 48 %	**Power Supply:** 120 VAC
Remarks: 245 kHz CBW			

Table 7.3.2 Spurious emission test results for 245 kHz channel bandwidth

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 8000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 64QAM (as a representative of the worst case)
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
EUT POWER SETTINGS 45 dBmV

Frequency, MHz	Bit rate, kbps	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low channel						
747.8	1245	100	-13.14	-13.00	-0.14	Pass
2271.5	1245	1000	-43.00	-13.00	-30.00	Pass
4542.775	1245	1000	-26.83	-13.00	-13.83	Pass
Mid channel						
747.8	1245	100	-13.32	-13.00	-0.32	Pass
2272.5	1245	1000	-43.17	-13.00	-30.17	Pass
4544.150	1245	1000	-26.67	-13.00	-13.67	Pass
High channel						
748.8	1245	100	-13.52	-13.00	-0.52	Pass
2273.5	1245	1000	-42.50	-13.00	-29.50	Pass
4547.150	1245	1000	-26.67	-13.00	-13.67	Pass

*****- Margin = Spurious emission – specification limit.

Reference numbers of test equipment used

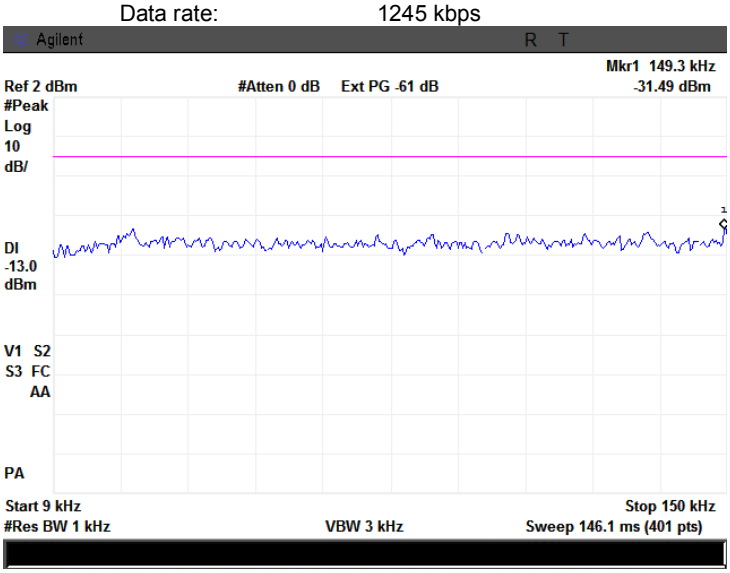
HL 1424	HL 1876	HL 2871	HL 2883	HL 2951	HL 3175	HL 3181		

Full description is given in Appendix A.

Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

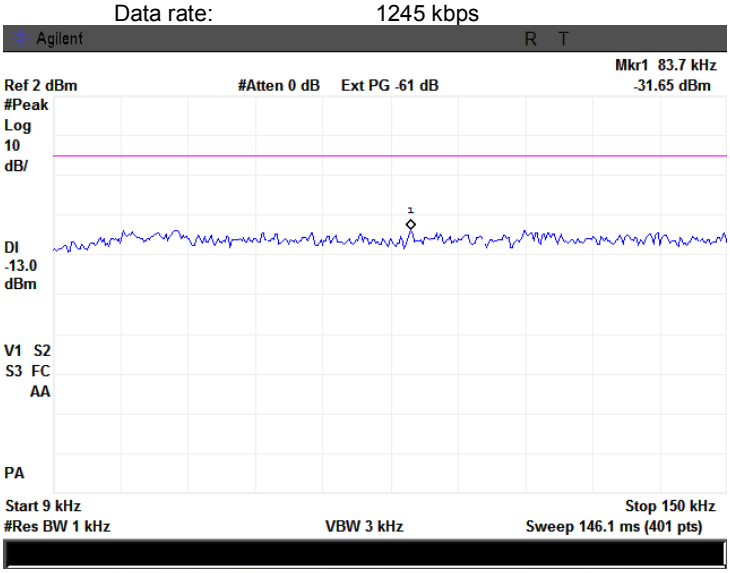
Plot 7.3.1 Spurious emission measurements at RF antenna connector, low channel

Frequency range: 9 – 150 kHz
Modulation: 64QAM
Data rate: 1245 kbps



Plot 7.3.2 Spurious emission measurements at RF antenna connector, mid channel

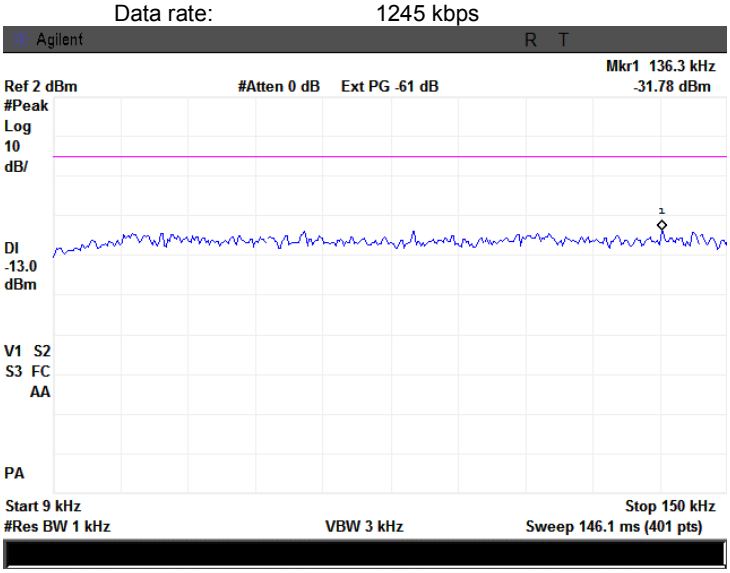
Frequency range: 9 – 150 kHz
Modulation: 64QAM
Data rate: 1245 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

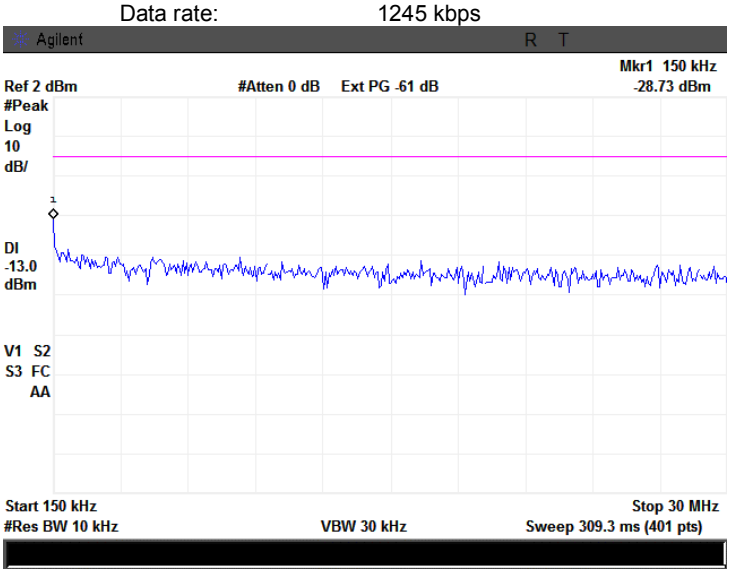
Plot 7.3.3 Spurious emission measurements at RF antenna connector, high channel

Frequency range: 9 – 150 kHz
Modulation: 64QAM
Data rate: 1245 kbps



Plot 7.3.4 Spurious emission measurements at RF antenna connector, low channel

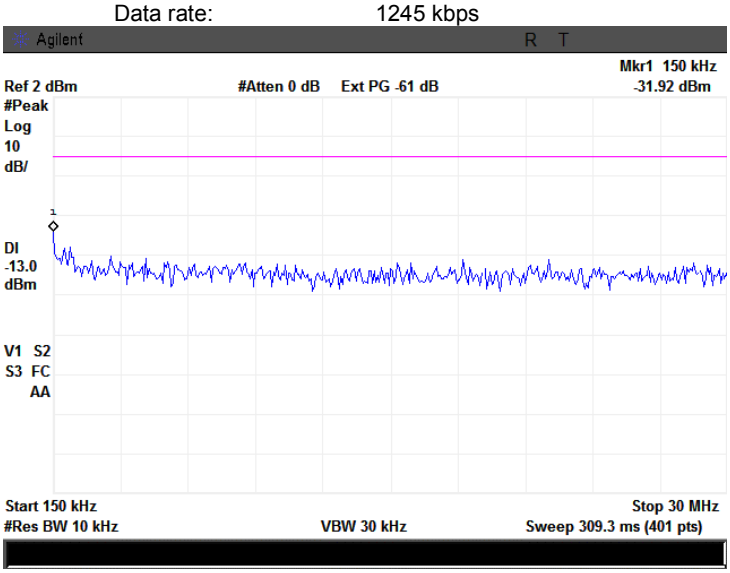
Frequency range: 150 kHz – 30 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

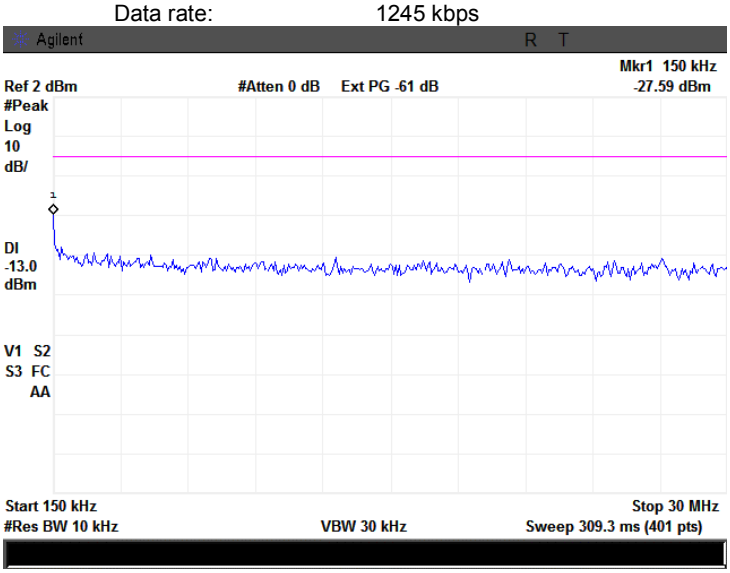
Plot 7.3.5 Spurious emission measurements at RF antenna connector, mid channel

Frequency range: 150 kHz – 30 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Plot 7.3.6 Spurious emission measurements at RF antenna connector, high channel

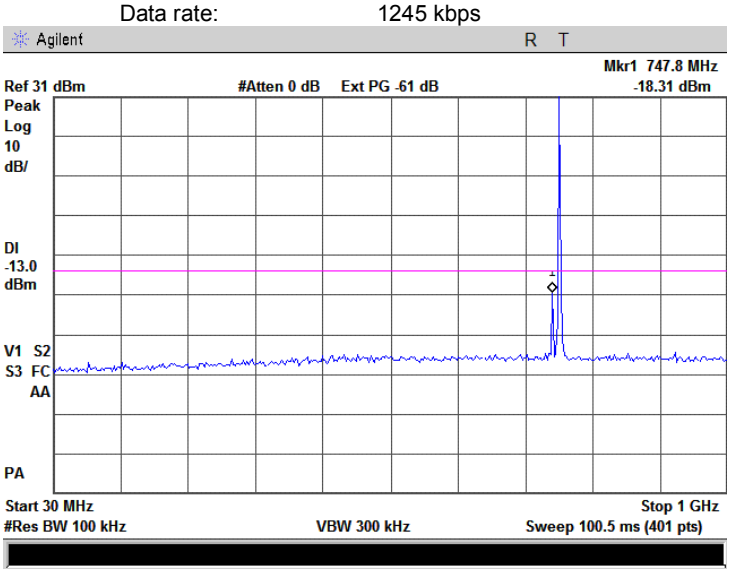
Frequency range: 150 kHz – 30 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

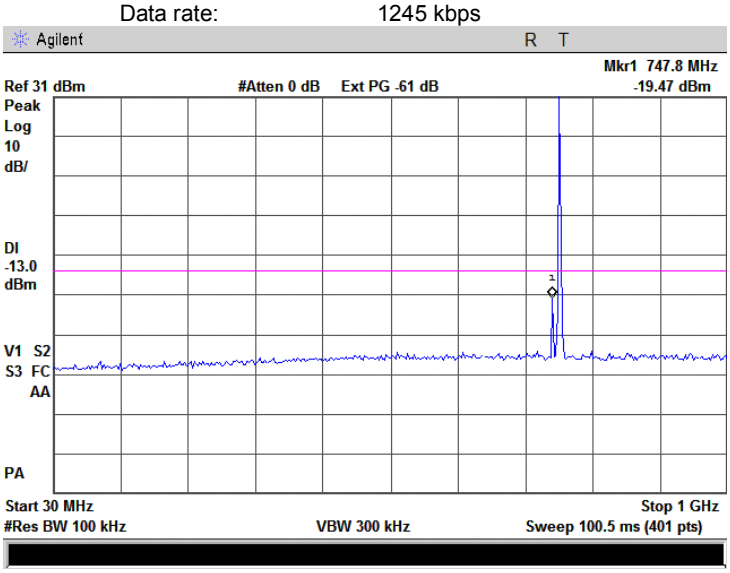
Plot 7.3.7 Spurious emission measurements at RF antenna connector, low channel

Frequency range: 30 – 1000 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Plot 7.3.8 Spurious emission measurements at RF antenna connector, mid channel

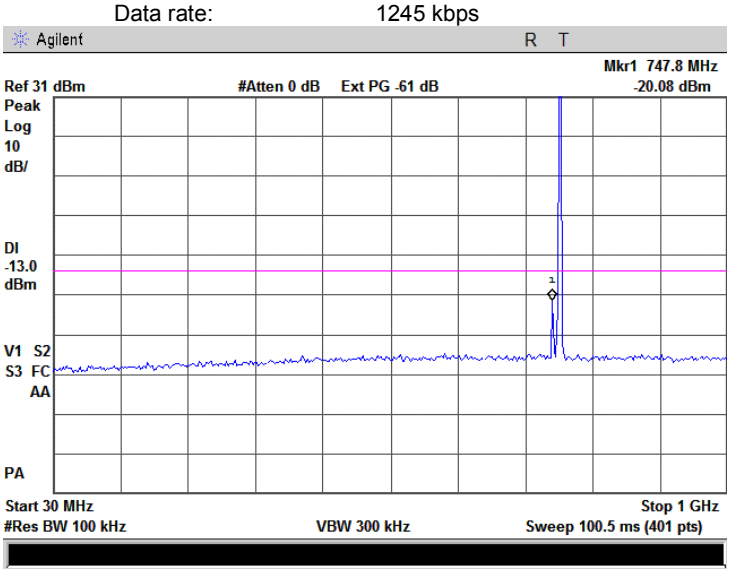
Frequency range: 30 – 1000 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

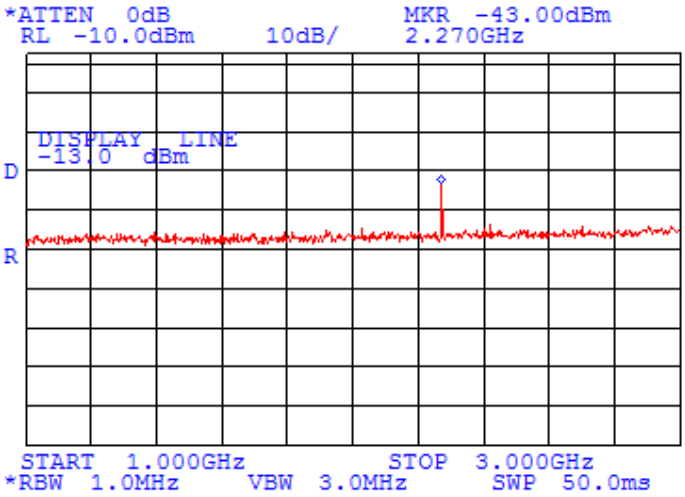
Plot 7.3.9 Spurious emission measurements at RF antenna connector, high channel

Frequency range: 30 – 1000 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Plot 7.3.10 Spurious emission measurements at RF antenna connector, low channel

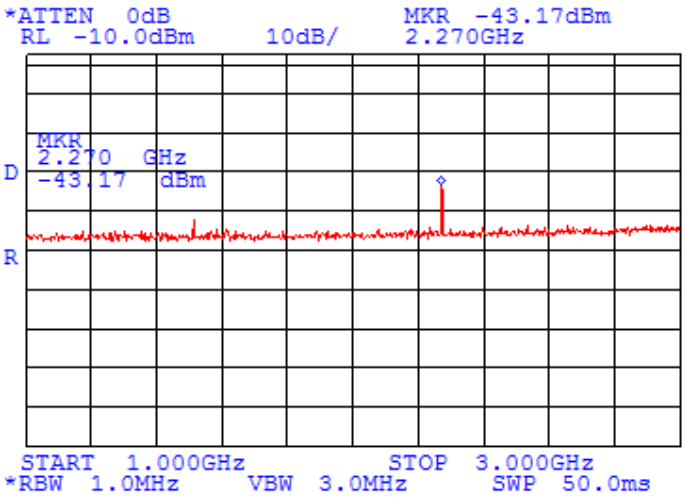
Frequency range: 1000 – 3000 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

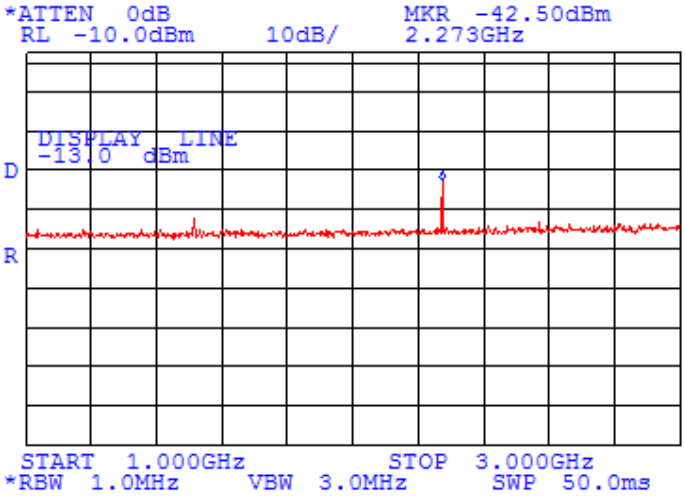
Plot 7.3.11 Spurious emission measurements at RF antenna connector, mid channel

Frequency range: 1000 – 3000 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Plot 7.3.12 Spurious emission measurements at RF antenna connector, high channel

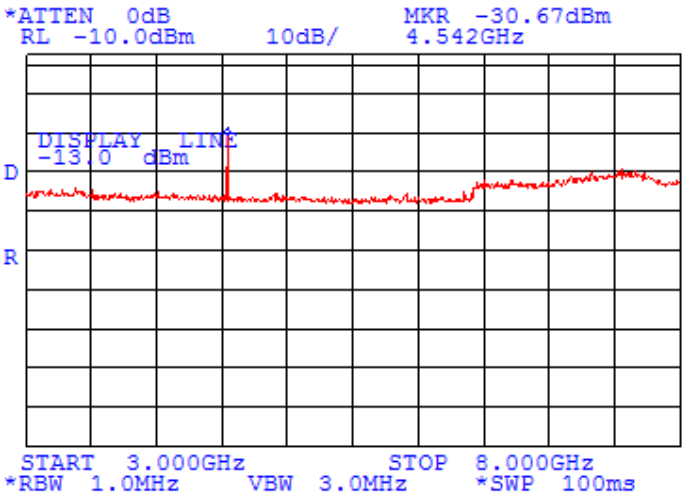
Frequency range: 1000 – 3000 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

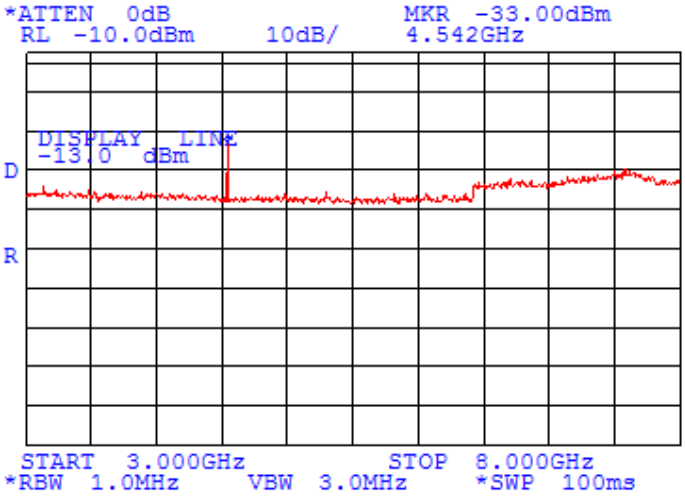
Plot 7.3.13 Spurious emission measurements at RF antenna connector, low channel

Frequency range: 3000 – 8000 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Plot 7.3.14 Spurious emission measurements at RF antenna connector, mid channel

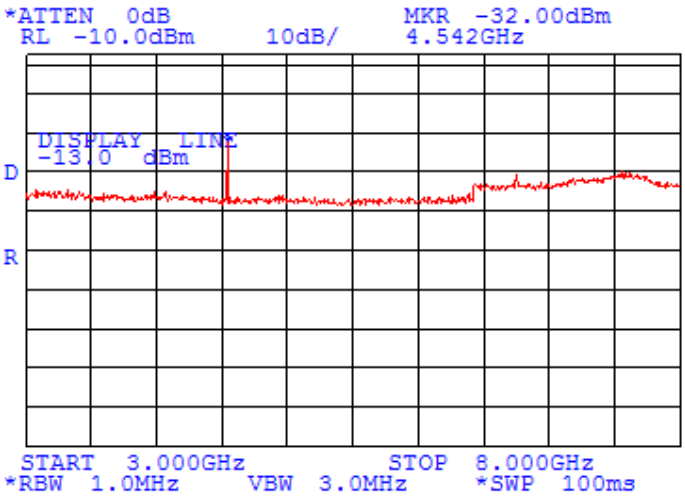
Frequency range: 3000 – 8000 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

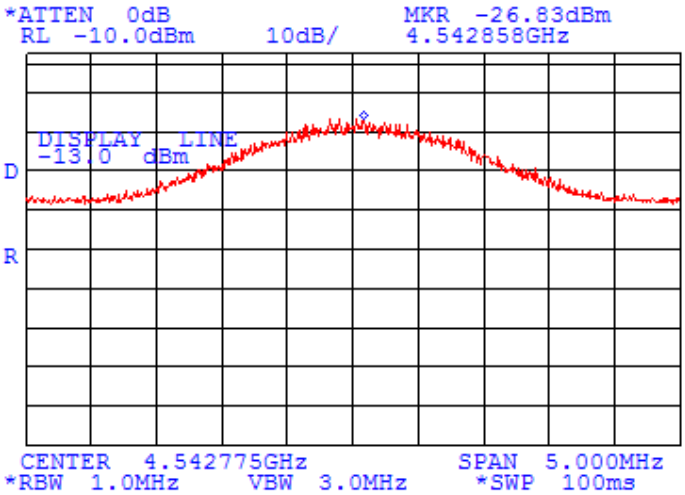
Plot 7.3.15 Spurious emission measurements at RF antenna connector, high channel

Frequency range: 3000 – 8000 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Plot 7.3.16 Spurious emission measurements at RF antenna connector, the 6th harmonic of the low channel

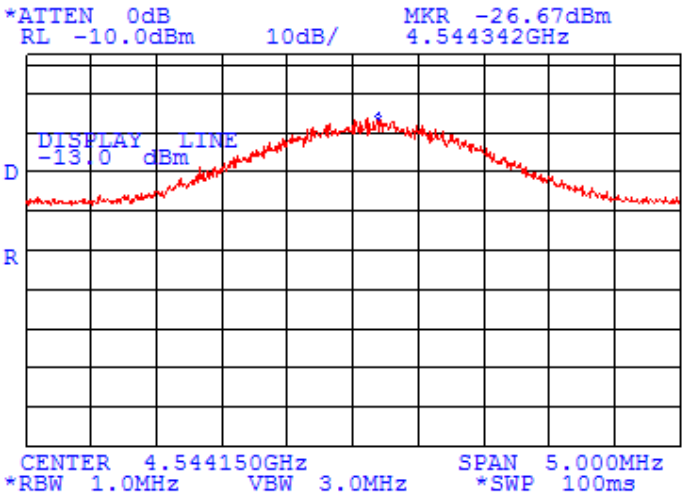
Carrier frequency: 757.1325 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

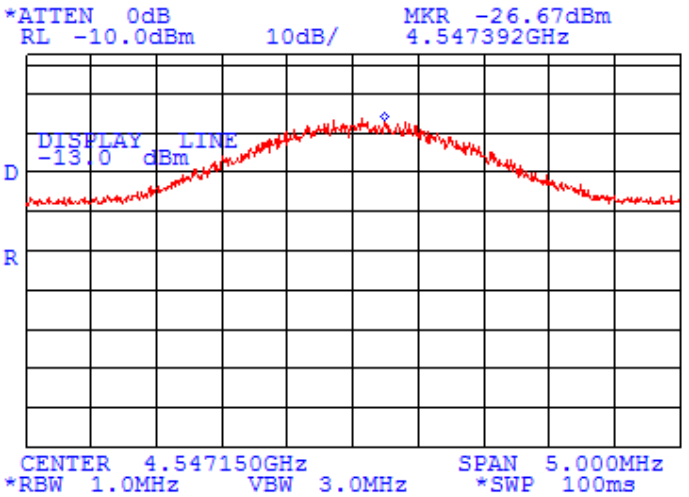
Plot 7.3.17 Spurious emission measurements at RF antenna connector, the 6th harmonic of the mid channel

Carrier frequency: 757.3775 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Plot 7.3.18 Spurious emission measurements at RF antenna connector, the 6th harmonic of the high channel

Carrier frequency: 757.8675 MHz
Modulation: 64QAM
Data rate: 1245 kbps



Test specification:	**Section 27.53(c)(1), Spurious emissions at RF antenna connector**		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date:	4/06/2008		
Temperature: 24 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 48 %	**Power Supply:** 120 VAC
Remarks: 330 kHz CBW			

Table 7.3.3 Spurious emission test results for 330 kHz channel bandwidth

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 8000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATING SIGNAL: PRBS
MODULATION: 256QAM (the worst case in the peak power test)
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
EUT POWER SETTINGS 45 dBmV

Frequency, MHz	Bit rate, kbps	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low channel						
747.8	2344	100	-13.23	-13.00	-0.23	Pass
4543.0	2344	1000	-26.69	-13.00	-13.69	Pass
Mid channel						
747.8	2344	100	-13.34	-13.00	-0.34	Pass
4545.0	2344	1000	-26.74	-13.00	-13.74	Pass
High channel						
747.8	2344	100	-13.5	-13.00	-0.5	Pass
4547.0	2344	1000	-26.74	-13.00	-13.74	Pass

Reference numbers of test equipment used

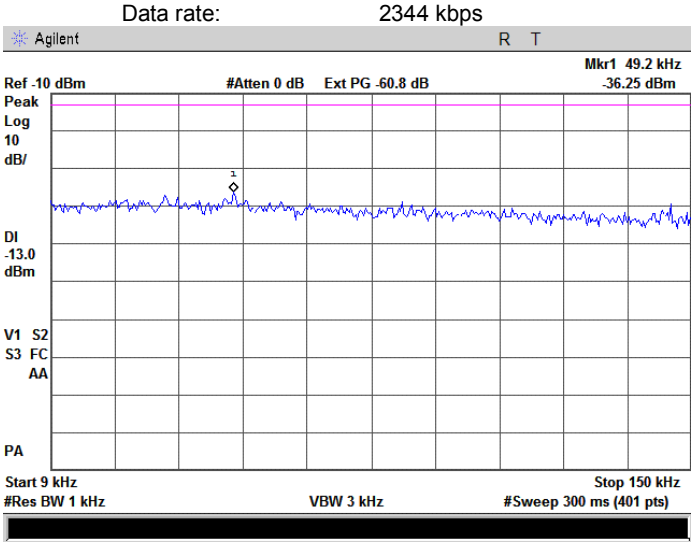
HL 1424	HL 1876	HL 2871	HL 3175	HL 3181			

Full description is given in Appendix A.

Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

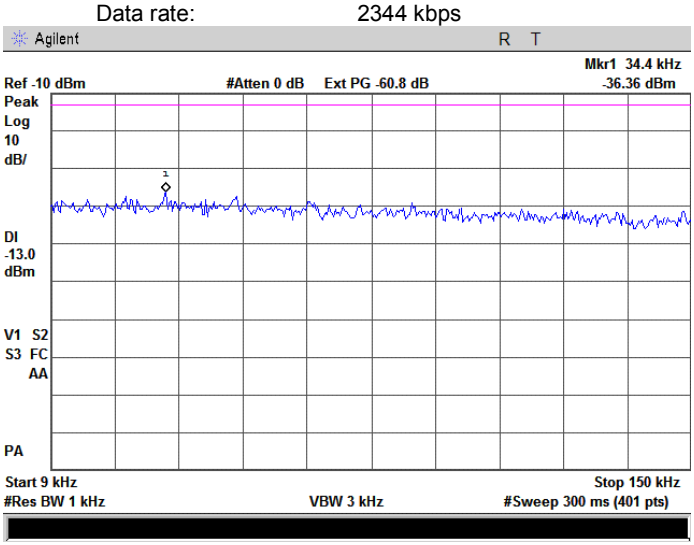
Plot 7.3.19 Spurious emission measurements at RF antenna connector, low channel

Frequency range: 9 – 150 kHz
Modulation: 256QAM
Data rate: 2344 kbps



Plot 7.3.20 Spurious emission measurements at RF antenna connector, mid channel

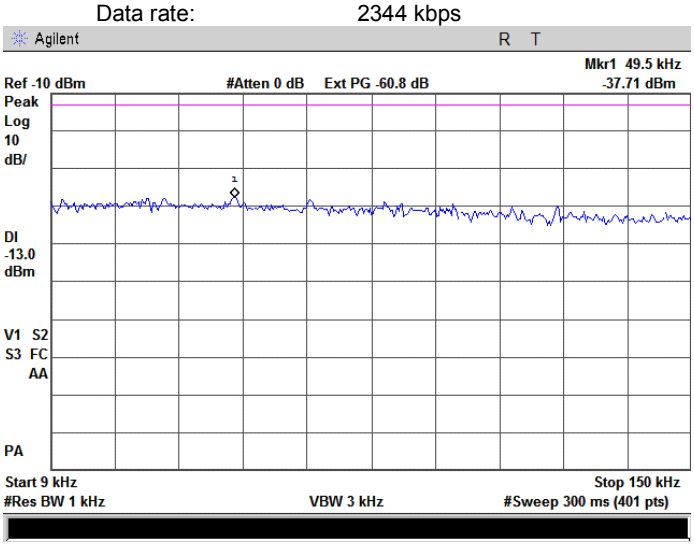
Frequency range: 9 – 150 kHz
Modulation: 256QAM
Data rate: 2344 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

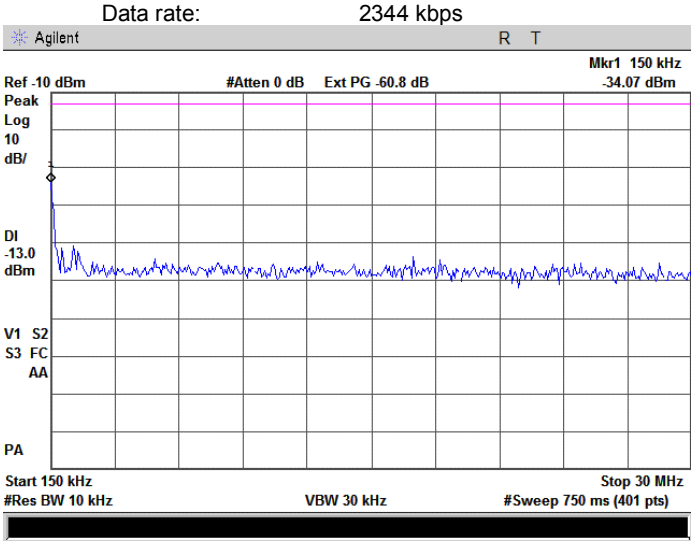
Plot 7.3.21 Spurious emission measurements at RF antenna connector, high channel

Frequency range: 9 – 150 kHz
Modulation: 256QAM
Data rate: 2344 kbps



Plot 7.3.22 Spurious emission measurements at RF antenna connector, low channel

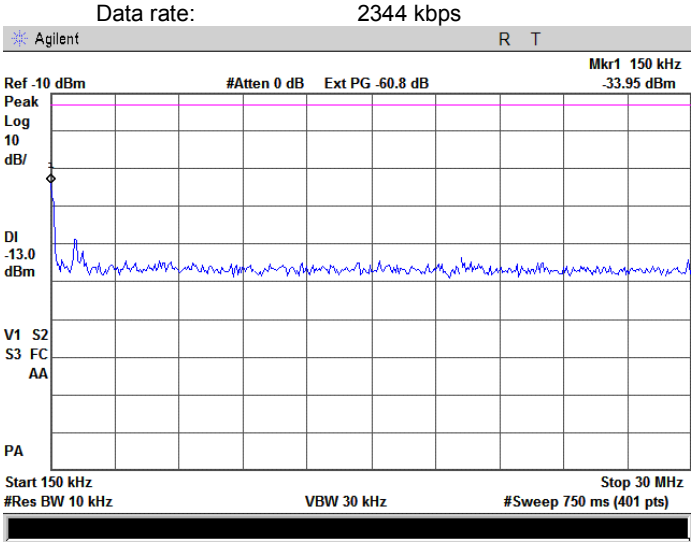
Frequency range: 150 kHz – 30 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

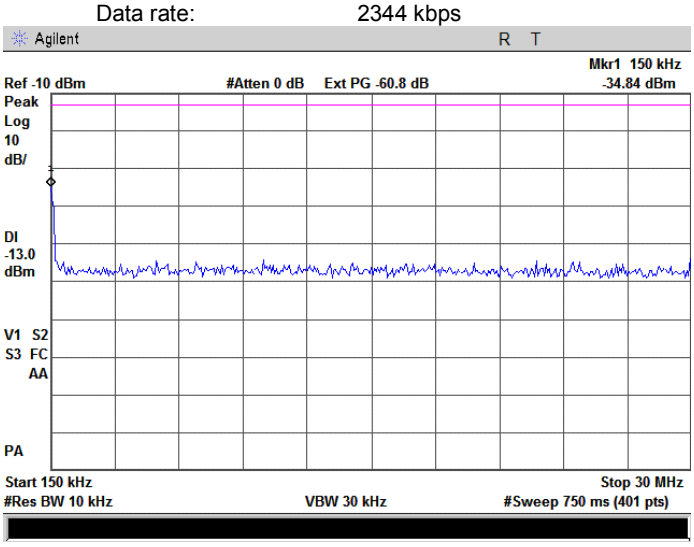
Plot 7.3.23 Spurious emission measurements at RF antenna connector, mid channel

Frequency range: 150 kHz – 30 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Plot 7.3.24 Spurious emission measurements at RF antenna connector, high channel

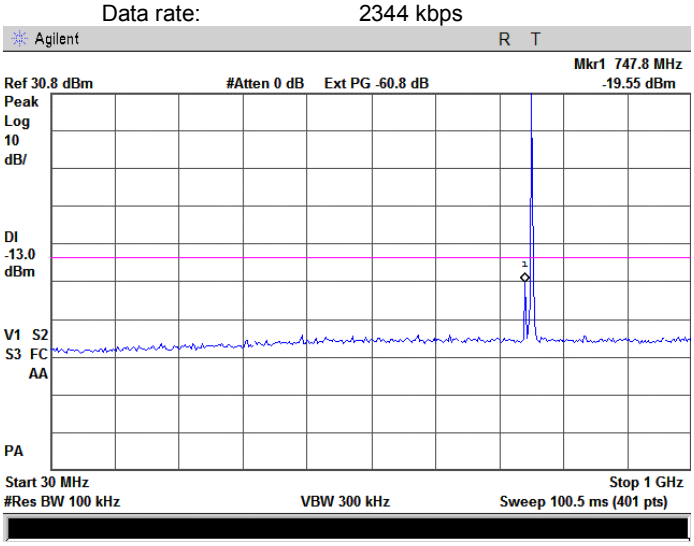
Frequency range: 150 kHz – 30 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

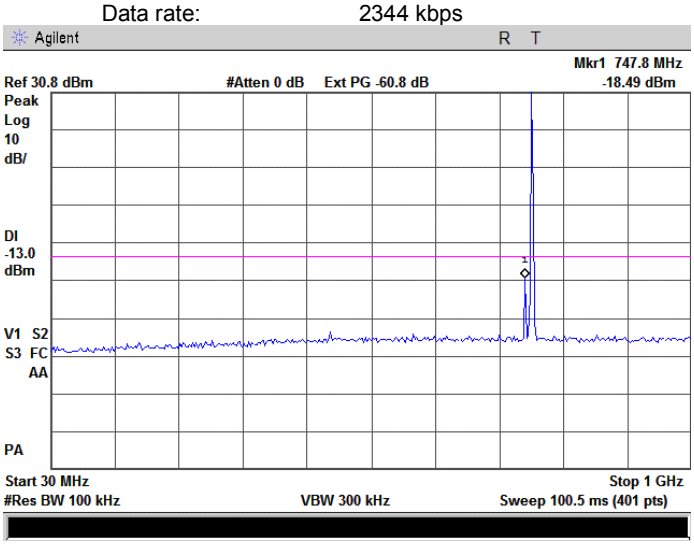
Plot 7.3.25 Spurious emission measurements at RF antenna connector, low channel

Frequency range: 30 – 1000 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Plot 7.3.26 Spurious emission measurements at RF antenna connector, mid channel

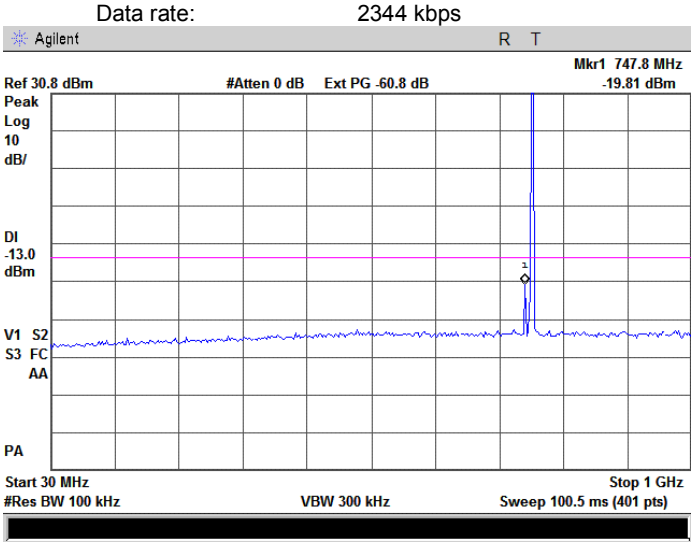
Frequency range: 30 – 1000 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

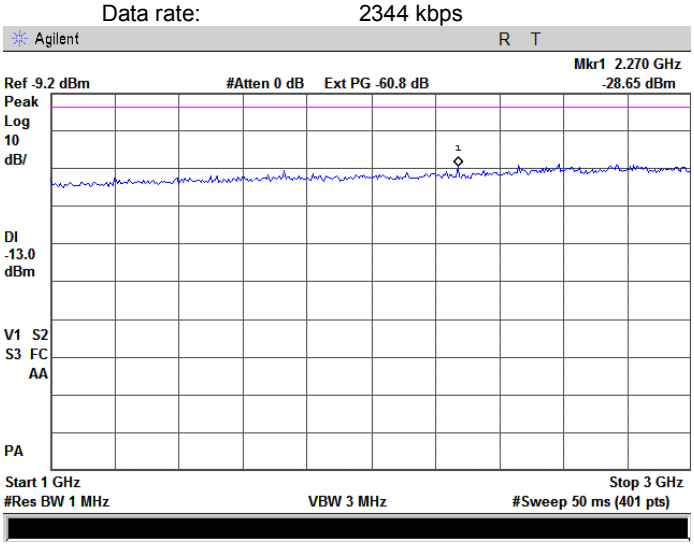
Plot 7.3.27 Spurious emission measurements at RF antenna connector, high channel

Frequency range: 30 – 1000 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Plot 7.3.28 Spurious emission measurements at RF antenna connector, low channel

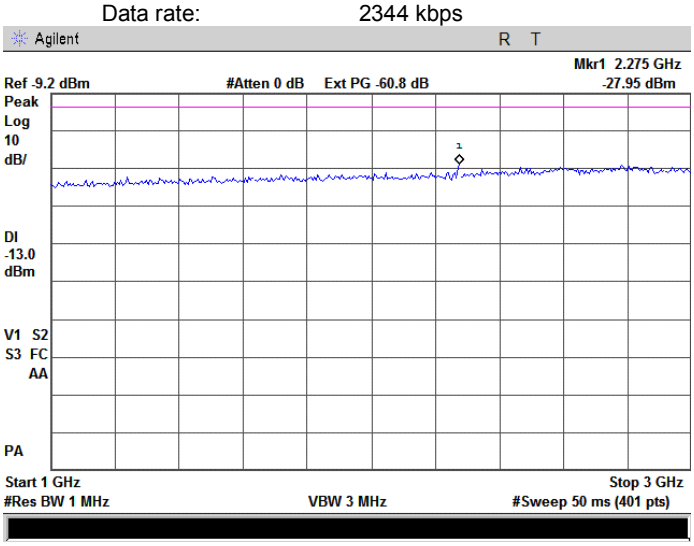
Frequency range: 1000 – 3000 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

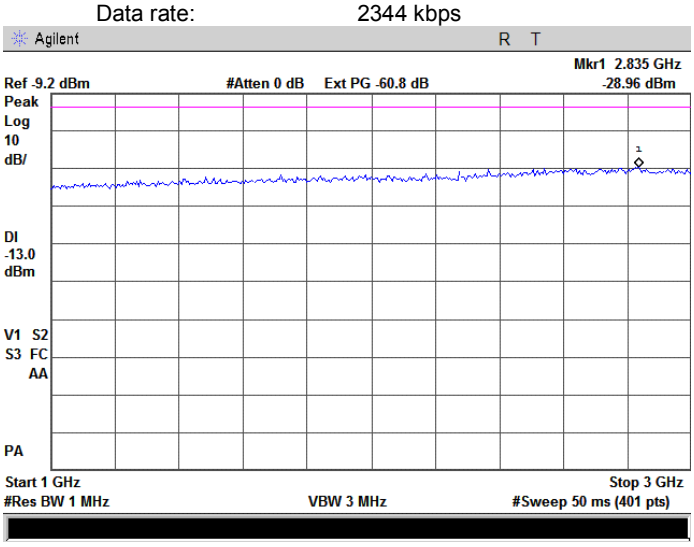
Plot 7.3.29 Spurious emission measurements at RF antenna connector, mid channel

Frequency range: 1000 – 3000 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Plot 7.3.30 Spurious emission measurements at RF antenna connector, high channel

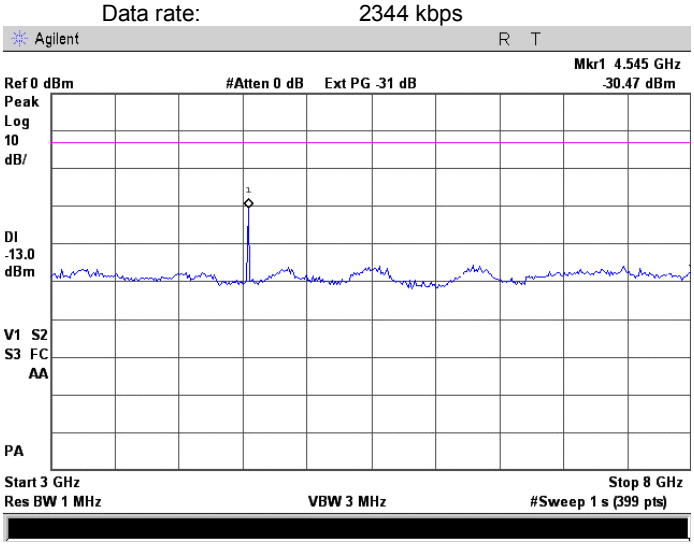
Frequency range: 1000 – 3000 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

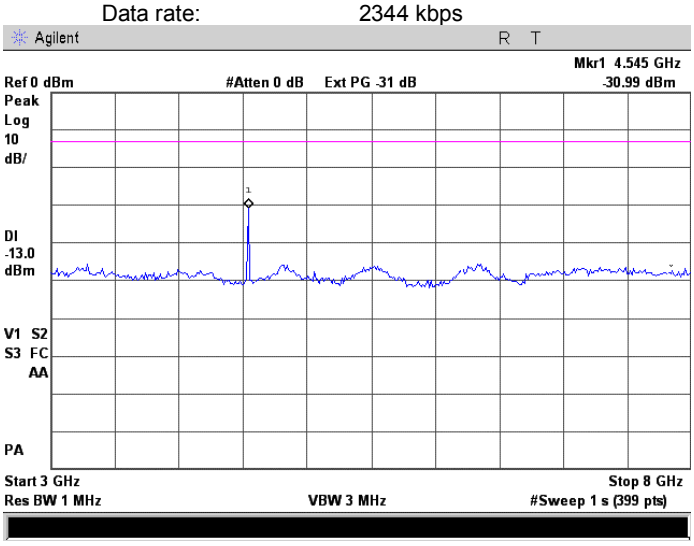
Plot 7.3.31 Spurious emission measurements at RF antenna connector, low channel

Frequency range: 3000 – 8000 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Plot 7.3.32 Spurious emission measurements at RF antenna connector, mid channel

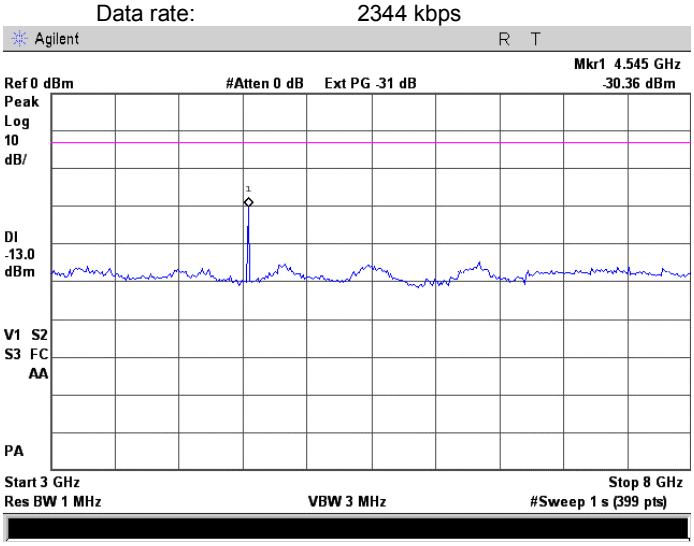
Frequency range: 3000 – 8000 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

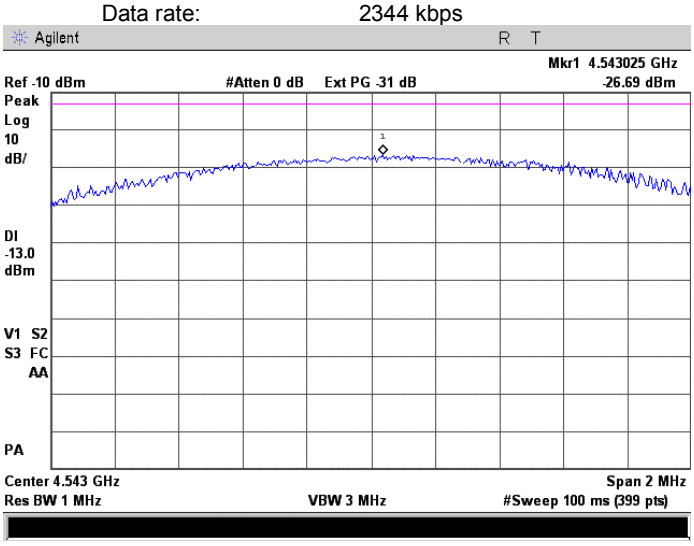
Plot 7.3.33 Spurious emission measurements at RF antenna connector, high channel

Frequency range: 3000 – 8000 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Plot 7.3.34 Spurious emission measurements at RF antenna connector, the 6th harmonic of the low channel

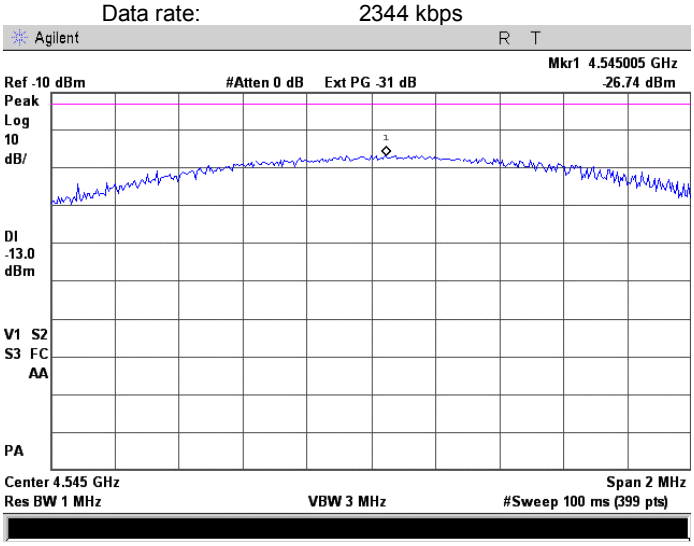
Carrier frequency: 757.17 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Test specification:	Section 27.53(c)(1), Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/06/2008		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

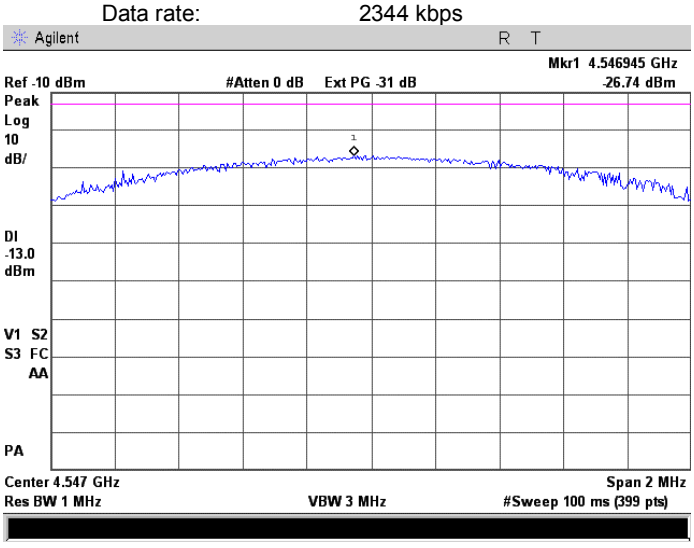
Plot 7.3.35 Spurious emission measurements at RF antenna connector, the 6th harmonic of the Mid channel

Carrier frequency: 757.5 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Plot 7.3.36 Spurious emission measurements at RF antenna connector, the 6th harmonic of the High channel

Carrier frequency: 757.83 MHz
Modulation: 256QAM
Data rate: 2344 kbps



Test specification:	Section 27.53(c)(3), Spurious emissions at RF antenna connector in 763-775 MHz and 793 – 805 MHz		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date:	4/09/2008		
Temperature: 24 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 VAC
Remarks:			

7.4 Spurious emissions at RF antenna connector test in 763-775 MHz and 793 – 805 MHz

7.4.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Spurious emission limits

Frequency, MHz*	Attenuation below carrier, dBc	Spurious emissions, dBm
763 – 775 MHz	76+10logP*	-46
793 – 805 MHz	76+10logP*	-46

* - P is transmitter output power in Watts.

7.4.2 Test procedure

7.4.2.1 The EUT was set up as shown in Figure 7.4.1, energized and its proper operation was checked.

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

7.4.2.3 The spurious emission was measured with spectrum analyzer as provided in Table 7.4.2 and associated plots.

Figure 7.4.1 Occupied bandwidth test setup

Test specification:	**Section 27.53(c)(3), Spurious emissions at RF antenna connector in 763-775 MHz and 793 – 805 MHz**		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date:	4/09/2008		
Temperature: 24 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 VAC
Remarks: 245 kHz CBW			

Table 7.4.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
INVESTIGATED FREQUENCY RANGE: 763 – 775 MHz, 793 – 805 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 64 QAM (the worst case in spectral power density mean)
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
EUT POWER SETTINGS 44 dBmV

Frequency, MHz	Bit rate, kbps	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low channel						
763.06	1245	10	-51.17	-46.00	-5.17	Pass
799.50	1245	10	-66.33	-46.00	-20.33	Pass
High channel						
763.46	1245	10	-50.33	-46.00	-4.33	Pass
793.70	1245	10	-66.33	-46.00	-20.33	Pass

*****- Margin = Spurious emission – specification limit.

Reference numbers of test equipment used

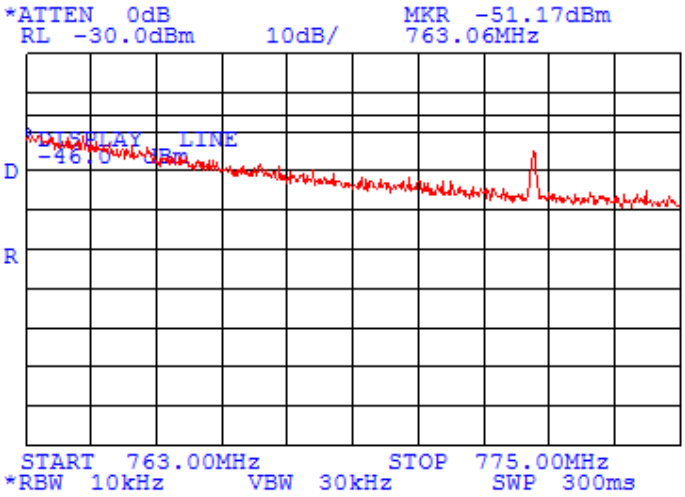
HL 1424	HL 1876	HL 2883	HL 2951	HL 3437			

Full description is given in Appendix A.

Test specification:	**Section 27.53(c)(3), Spurious emissions at RF antenna connector in 763-775 MHz and 793 – 805 MHz**		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date:	4/09/2008		
Temperature: 24 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 VAC
Remarks: 245 kHz CBW			

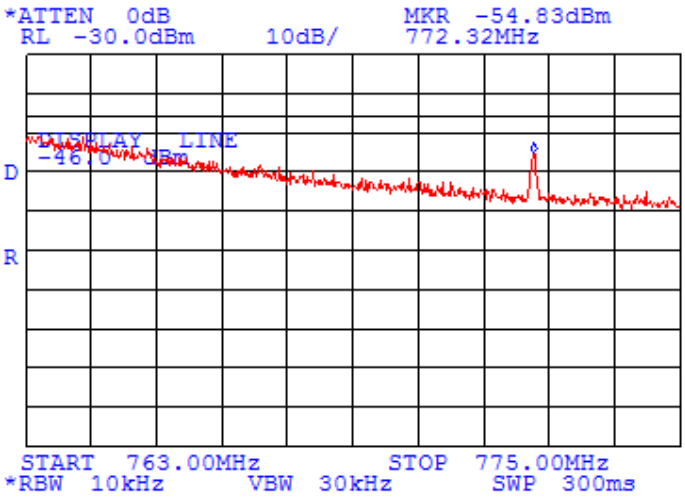
Plot 7.4.1 Spurious emission test results at low frequency

Frequency range 763 – 775 MHz
Bit rate: 1245 kbps
Modulation: 64 QAM



Plot 7.4.2 Spurious emission test results at low frequency

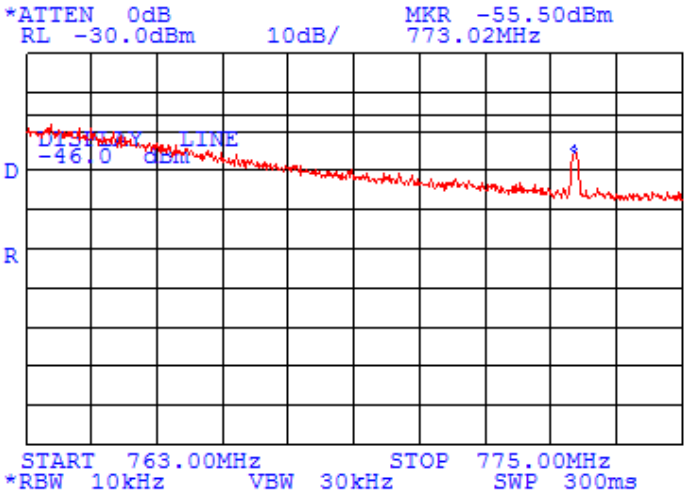
Frequency range 763 – 775 MHz
Bit rate: 1245 kbps
Modulation: 64 QAM



Test specification:	Section 27.53(c)(3), Spurious emissions at RF antenna connector in 763-775 MHz and 793 – 805 MHz		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date:	4/09/2008		
Temperature: 24 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 VAC
Remarks: 245 kHz CBW			

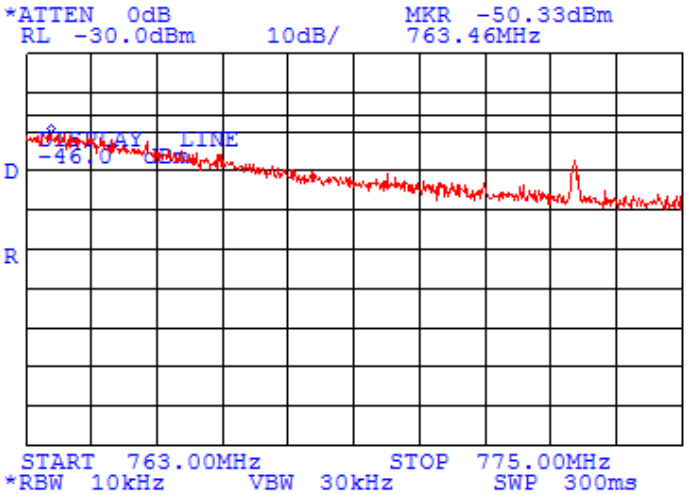
Plot 7.4.3 Spurious emission test results at high frequency

Frequency range 763 – 775 MHz
Bit rate: 1245 kbps
Modulation: 64 QAM



Plot 7.4.4 Spurious emission test results at high frequency

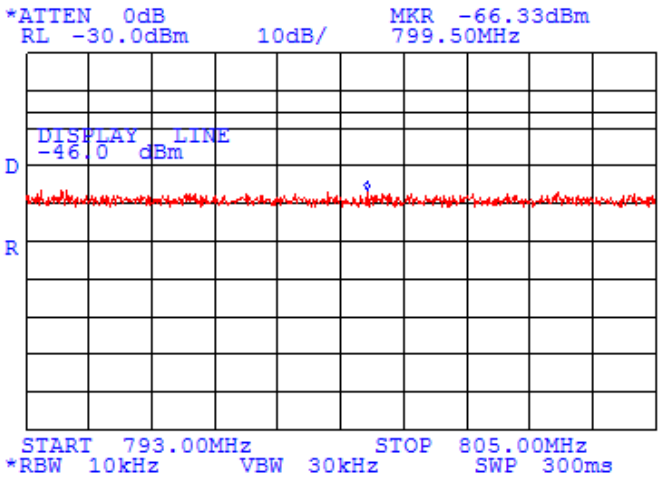
Frequency range 763 – 775 MHz
Bit rate: 1245 kbps
Modulation: 64 QAM



Test specification:	Section 27.53(c)(3), Spurious emissions at RF antenna connector in 763-775 MHz and 793 – 805 MHz		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date:	4/09/2008		
Temperature: 24 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 VAC
Remarks: 245 kHz CBW			

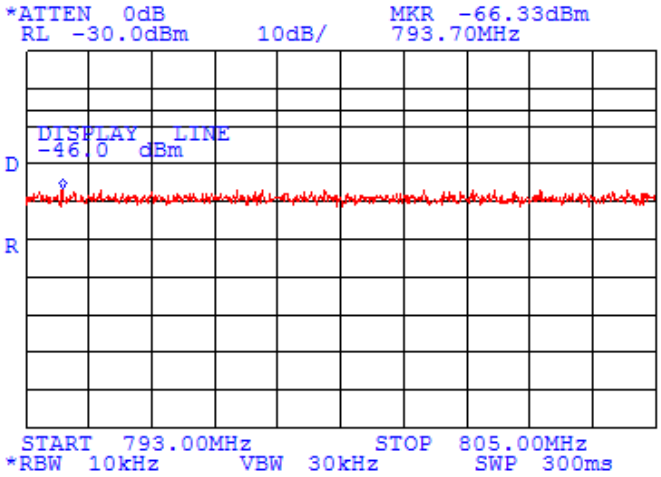
Plot 7.4.5 Spurious emission test results at low frequency

Frequency range 793 – 805 MHz
Bit rate: 1245 kbps
Modulation: 64 QAM



Plot 7.4.6 Spurious emission test results at high frequency

Frequency range 793 – 805 MHz
Bit rate: 1245 kbps
Modulation: 64 QAM



Test specification:	**Section 27.53(c)(3), Spurious emissions at RF antenna connector in 763-775 MHz and 793 – 805 MHz**		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date:	4/09/2008		
Temperature: 24 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 VAC
Remarks: 330 kHz CBW			

Table 7.4.3 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
INVESTIGATED FREQUENCY RANGE: 763 – 775 MHz, 793 – 805 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATION: 64 QAM (the worst case in spectral power density mean)
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
EUT POWER SETTINGS 45 dBmV

Frequency, MHz	Bit rate, kbps	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Low channel						
763 – 775	1668	10	-51.49	-46.00	-5.49	Pass
793 - 805	1668	10	-56.62	-46.00	-10.62	Pass
High channel						
763 – 775	1668	10	-52.15	-46.00	-6.15	Pass
793 - 805	1668	10	-56.10	-46.00	-10.10	Pass

*****- Margin = Spurious emission – specification limit.

Reference numbers of test equipment used

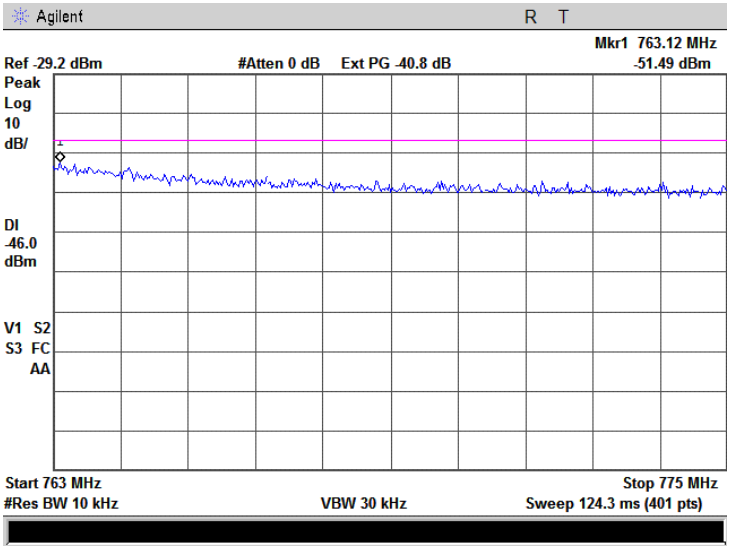
HL 1876	HL 2883	HL 2909	HL 3175	HL 3180			

Full description is given in Appendix A.

Test specification:	Section 27.53(c)(3), Spurious emissions at RF antenna connector in 763-775 MHz and 793 – 805 MHz		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

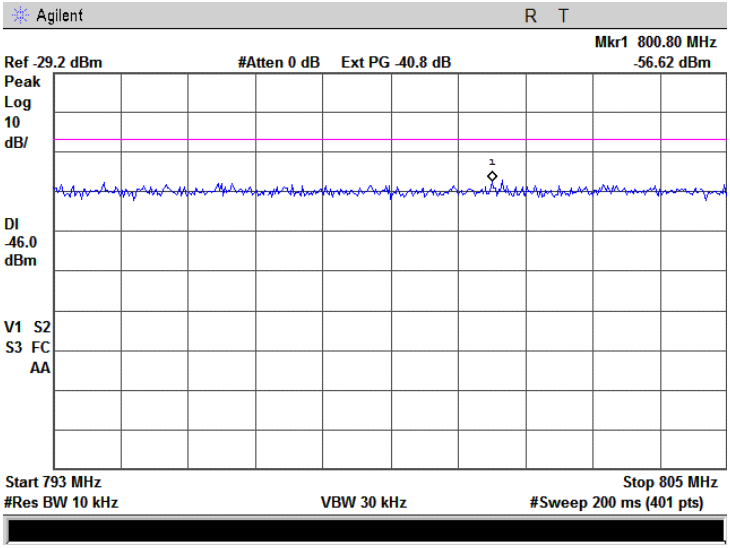
Plot 7.4.7 Spurious emission test results at low frequency

Frequency range 763 – 775 MHz
Bit rate: 1668 kbps
Modulation: 64 QAM



Plot 7.4.8 Spurious emission test results at low frequency

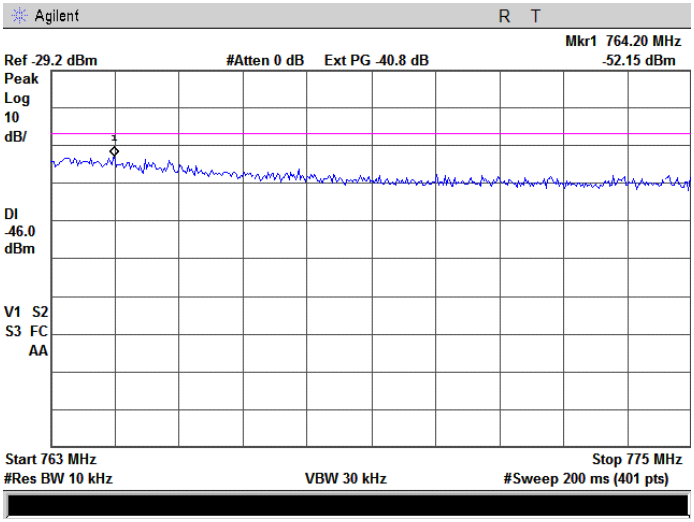
Frequency range 793 – 805 MHz
Bit rate: 1668 kbps
Modulation: 64 QAM



Test specification:	Section 27.53(c)(3), Spurious emissions at RF antenna connector in 763-775 MHz and 793 – 805 MHz		
Test procedure:	47 CFR, Sections 2.1047, 2.1051, TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

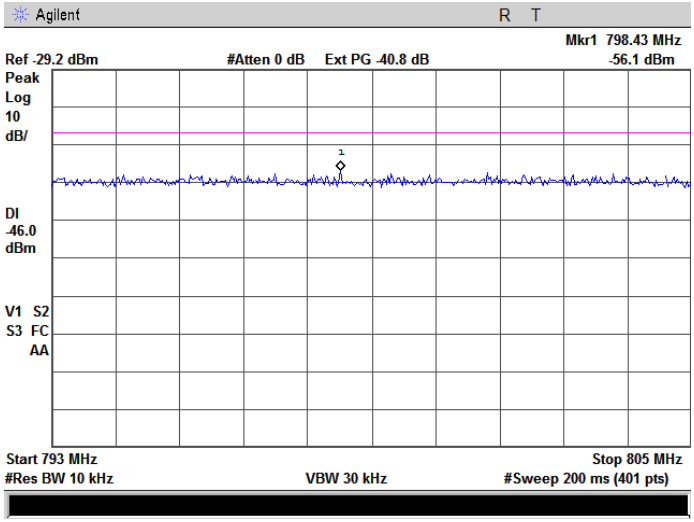
Plot 7.4.9 Spurious emission test results at high frequency

Frequency range 763 – 775 MHz
Bit rate: 1668 kbps
Modulation: 64 QAM



Plot 7.4.10 Spurious emission test results at high frequency

Frequency range 793 – 805 MHz
Bit rate: 1668 kbps
Modulation: 64 QAM



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 ºC	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks:			

7.5 Band edge emissions at RF antenna connector test

7.5.1 General

This test was performed to measure band edge emissions at RF antenna connector. Specification test limits are given in Table 7.5.1.

Table 7.5.1 Spurious emission limits for 245 kHz CBW

Frequency, MHz*	Attenuation below carrier, dBc	Spurious emissions, dBm	Measurement technique
756.9 – 757.0 and 758.0 – 758.1	43+10logP*	-13	RBW=3kHz; VBW=10kHz; Sample detector, 100 power averaging; correction factor
756.8 – 756.9 and 758.1 – 758.2	43+10logP*	-13	Channel power across 100 kHz; Sample detector, 100 power averaging
756.2 – 756.8 and 758.2 – 758.8	43+10logP*	-13	RBW=10kHz; VBW=30kHz; Sample detector, 100 power averaging; correction factor

Table 7.5.2 Spurious emission limits for 330 kHz CBW

Frequency, MHz*	Attenuation below carrier, dBc	Spurious emissions, dBm	Measurement technique
756.9 – 757.0 and 758.0 – 758.1	43+10logP*	-13	RBW=3kHz; VBW=10kHz; Sample detector, 100 power averaging; correction factor
756.8 – 756.9 and 758.1 – 758.2	43+10logP*	-13	Channel power across 100 kHz; Sample detector, 100 power averaging
756.6 – 756.8 and 758.2 – 758.4	43+10logP*	-13	RBW=10kHz; VBW=30kHz; Sample detector, 100 power averaging; correction factor

* - P is transmitter output power in Watts.

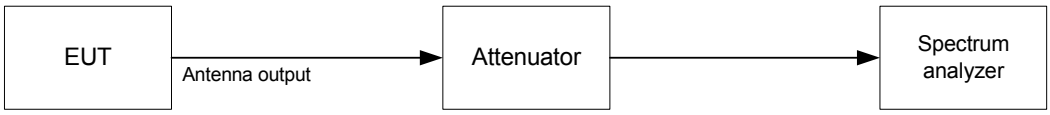
7.5.2 Test procedure

7.5.2.1 The EUT was set up as shown in Figure 7.5.1, energized and its proper operation was checked.

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

7.5.2.3 The spurious emission was measured with spectrum analyzer as provided in the associated plots.

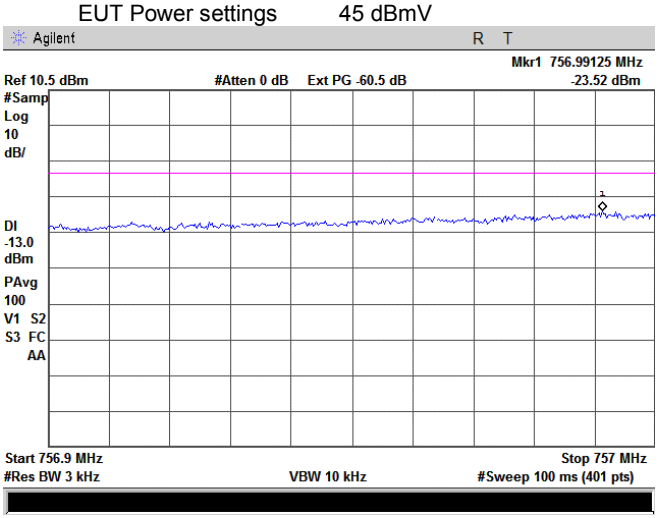
Figure 7.5.1 Spurious emission test setup



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.1 Spurious emissions at RF antenna connector, low channel band edge measurements

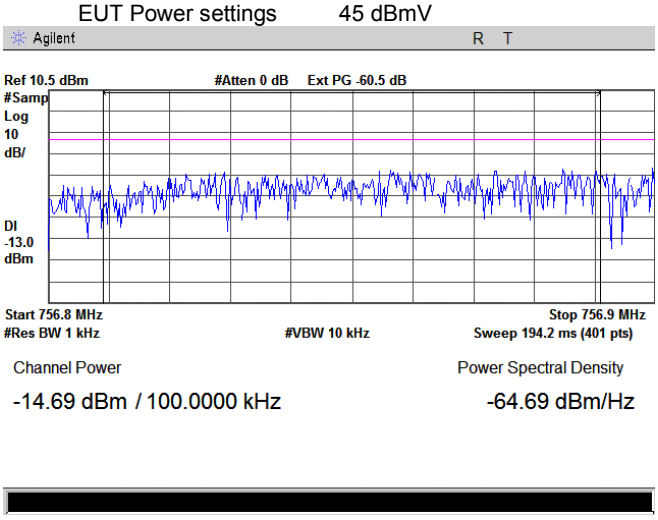
Frequency:	757.1325 MHz
Band edge:	756.9 – 757.0 MHz
Modulation:	QPSK
Bit rate:	433 kbps
EUT Power settings	45 dBmV



Note: test result = SA reading + Correction factor = -23.52 dBm + 10 dB = -13.52 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.2 Spurious emissions at RF antenna connector, low channel band edge measurements

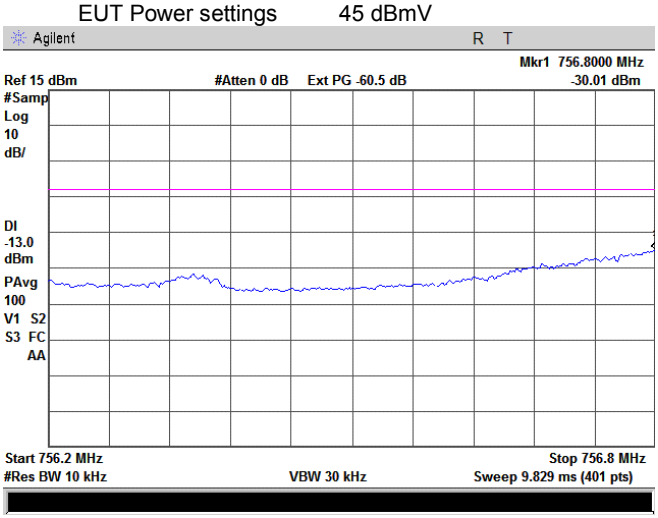
Frequency:	757.1325 MHz
Band edge:	756.8 – 756.9 MHz
Modulation:	QPSK
Bit rate:	433 kbps
EUT Power settings	45 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.3 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.1325 MHz
Band edge:	756.2 – 756.8 MHz
Modulation:	QPSK
Bit rate:	433 kbps
EUT Power settings	45 dBmV

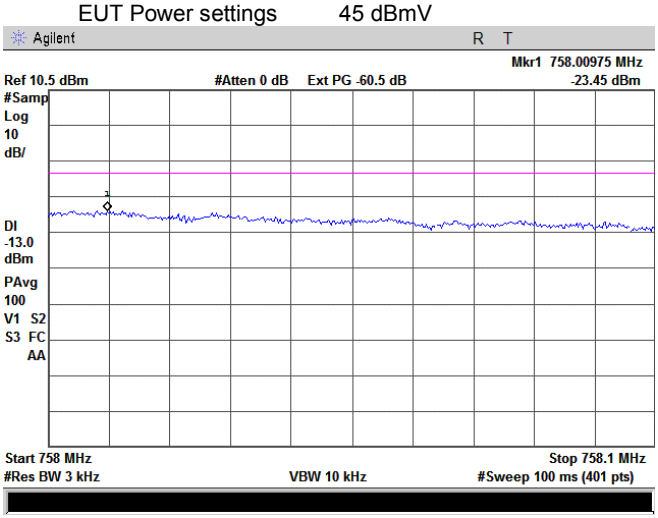


Note: test result = SA reading + Correction factor = = -30.01 dBm + 10 dB = -20.01 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.4 Spurious emissions at RF antenna connector, high channel band edge measurements

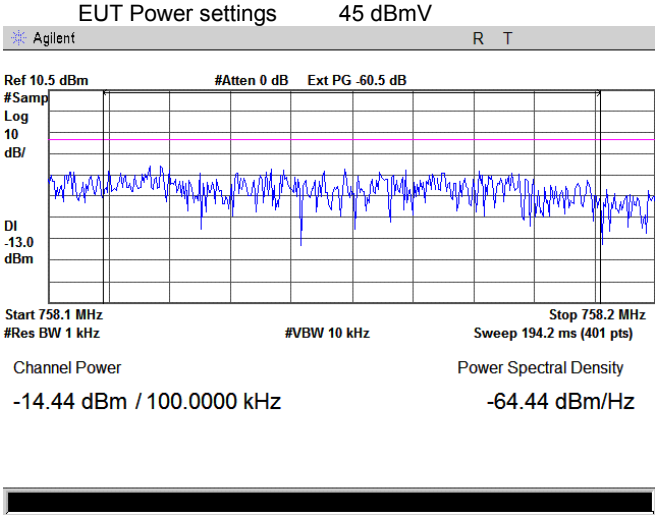
Frequency:	757.8675 MHz
Band edge:	758.0 – 758.1 MHz
Modulation:	QPSK
Bit rate:	433 kbps
EUT Power settings	45 dBmV



Note: test result = SA reading + Correction factor = -23.45 dBm + 10 dB = -13.45 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 1.7.5.5 Spurious emissions at RF antenna connector, high channel band edge measurements

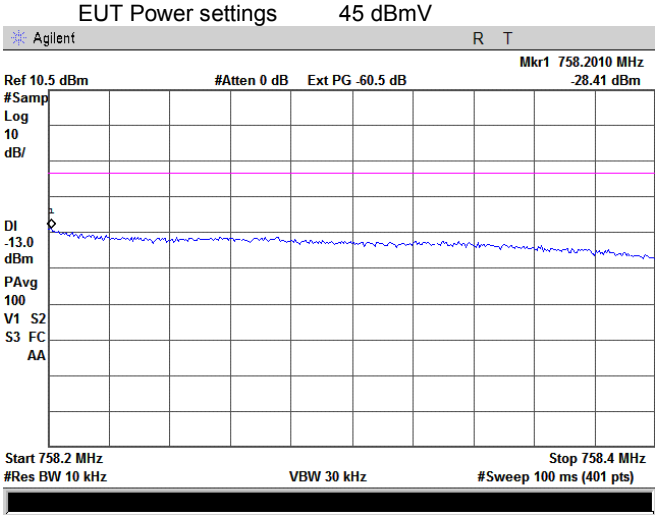
Frequency:	757.8675 MHz
Band edge:	758.1 – 758.2 MHz
Modulation:	QPSK
Bit rate:	433 kbps
EUT Power settings	45 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.6 Spurious emissions at RF antenna connector, high channel band edge measurements

Frequency:	757.8675 MHz
Band edge:	758.2 – 758.8 MHz
Modulation:	QPSK
Bit rate:	433 kbps
EUT Power settings	45 dBmV

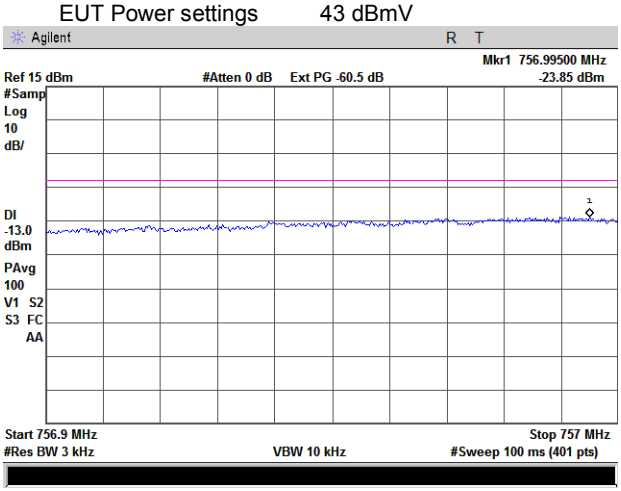


Note: test result = SA reading + Correction factor = -28.41 dBm + 10 dB = -18.41 dBm
Correction factor = 10*log(100kHz/10kHz) = 10dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.7 Spurious emissions at RF antenna connector, low channel band edge measurements

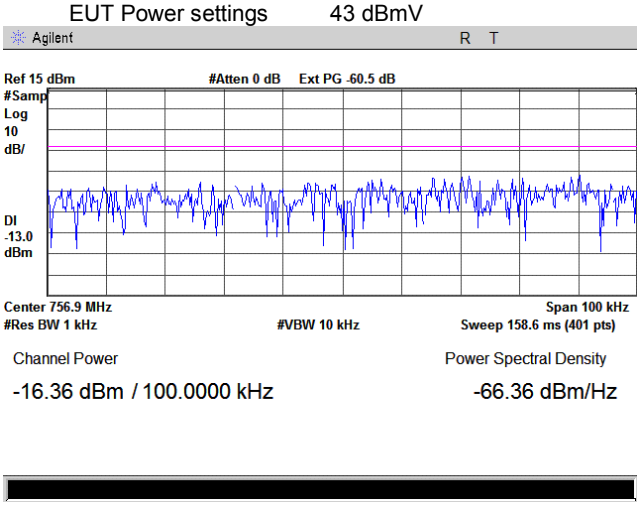
Frequency:	757.1325 MHz
Band edge:	756.9 – 757.0 MHz
Modulation:	16QAM
Bit rate:	867 kbps
EUT Power settings	43 dBmV



Note: test result = SA reading + Correction factor = -23.85 dBm + 10 dB = -13.85 dBm
Correction factor = 10*log(30kHz/3kHz) = 10dB

Plot 7.5.8 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.1325 MHz
Band edge:	756.8 – 756.9 MHz
Modulation:	16QAM
Bit rate:	867 kbps
EUT Power settings	43 dBmV

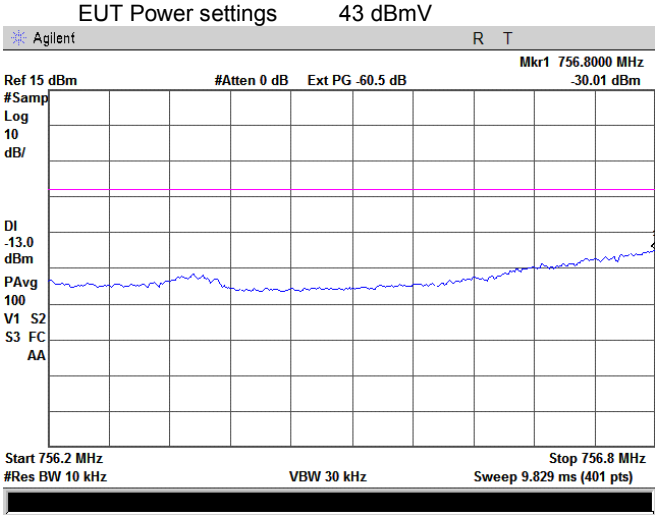


NOTE: The correct SA settings (not displayed due to the SA limitations):
start frequency is 756.8 MHz, stop frequency – 756.9 MHz.

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.9 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.1325 MHz
Band edge:	756.2 – 756.8 MHz
Modulation:	16QAM
Bit rate:	867 kbps
EUT Power settings	43 dBmV

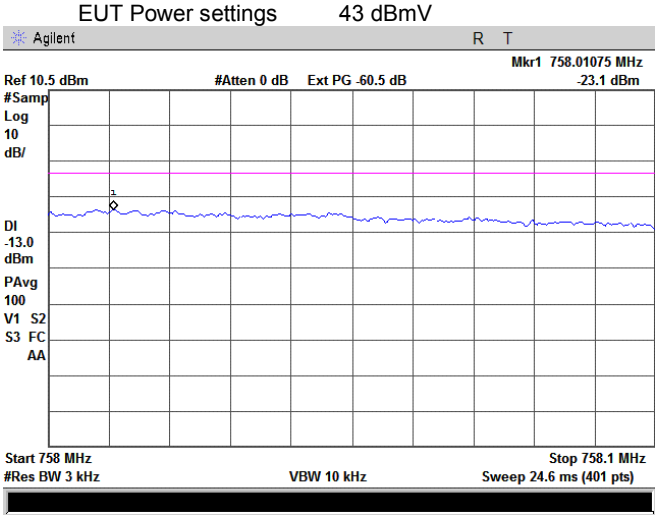


Note: test result = SA reading + Correction factor = -30.01 dBm + 10 dB = -20.01 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.10 Spurious emissions at RF antenna connector, high channel band edge measurements

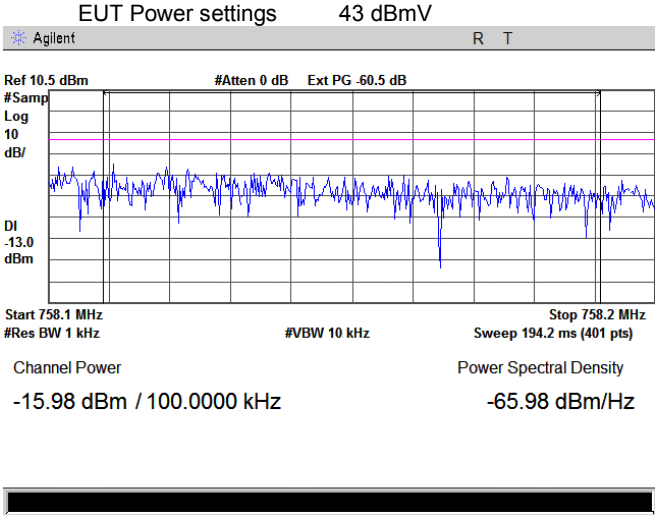
Frequency:	757.8675 MHz
Band edge:	758.0 – 758.1 MHz
Modulation:	16QAM
Bit rate:	867 kbps
EUT Power settings	43 dBmV



Note: test result = SA reading + Correction factor = -23.10 dBm + 10 dB = -13.10 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.11 Spurious emissions at RF antenna connector, high channel band edge measurements

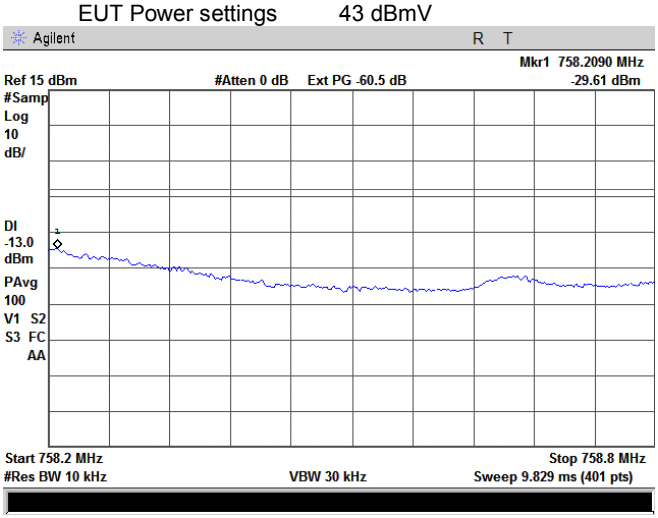
Frequency:	757.8675 MHz
Band edge:	758.1 – 758.2 MHz
Modulation:	16QAM
Bit rate:	867 kbps
EUT Power settings	43 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.12 Spurious emissions at RF antenna connector, high channel band edge measurements

Frequency:	757.8675 MHz
Band edge:	758.2 – 758.8 MHz
Modulation:	16QAM
Bit rate:	867 kbps
EUT Power settings	43 dBmV

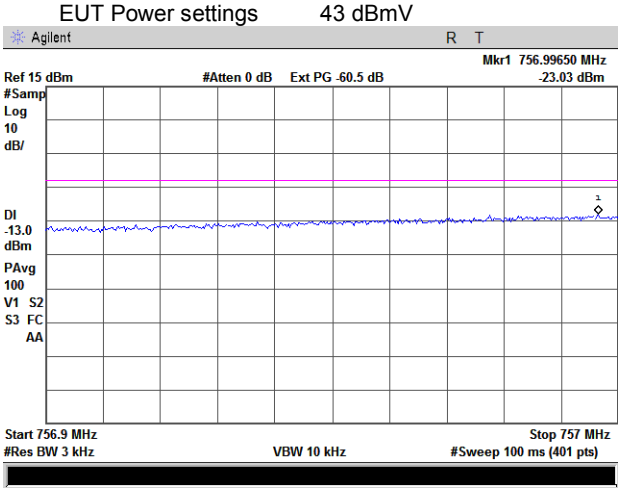


Note: test result = SA reading + Correction factor = -29.61 dBm + 10 dB = -19.61 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.13 Spurious emissions at RF antenna connector, low channel band edge measurements

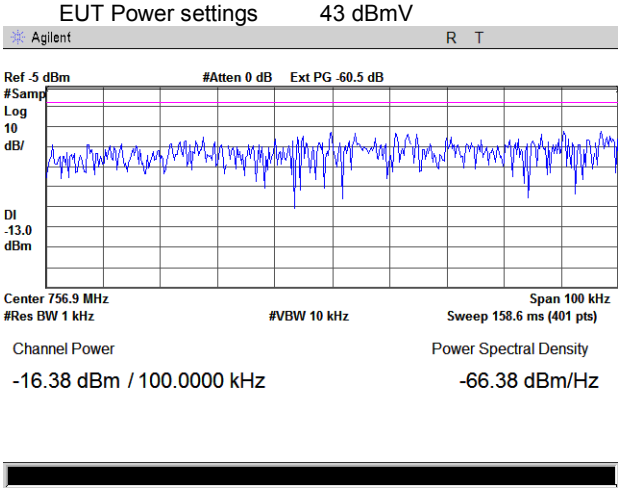
Frequency:	757.1325 MHz
Band edge:	756.9 – 757.0 MHz
Modulation:	64QAM
Bit rate:	1245 kbps
EUT Power settings	43 dBmV



Note: test result = SA reading + Correction factor = -23.03 dBm + 10 dB = -13.03 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.14 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.1325 MHz
Band edge:	756.8 – 756.9 MHz
Modulation:	64QAM
Bit rate:	1245 kbps
EUT Power settings	43 dBmV

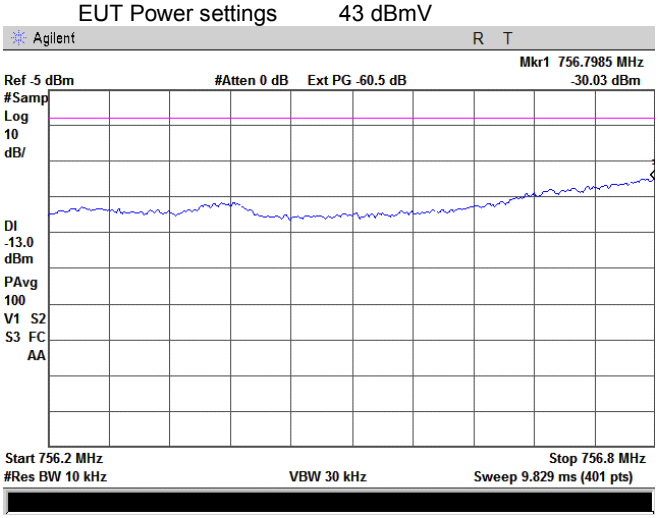


NOTE: The correct SA settings (not displayed due to the SA limitations):
start frequency is 756.8 MHz, stop frequency – 756.9 MHz.

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.15 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.1325 MHz
Band edge:	756.2 – 756.8 MHz
Modulation:	64QAM
Bit rate:	1245 kbps
EUT Power settings	43 dBmV

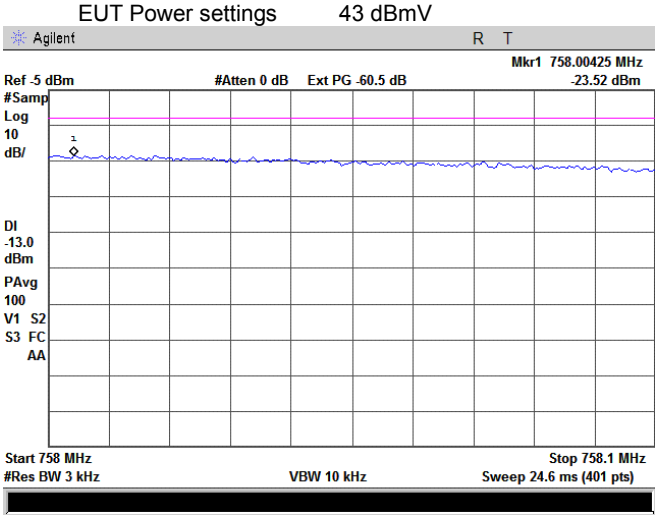


Note: test result = SA reading + Correction factor = -30.03 dBm + 10 dB = -20.03 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.16 Spurious emissions at RF antenna connector, high channel band edge measurements

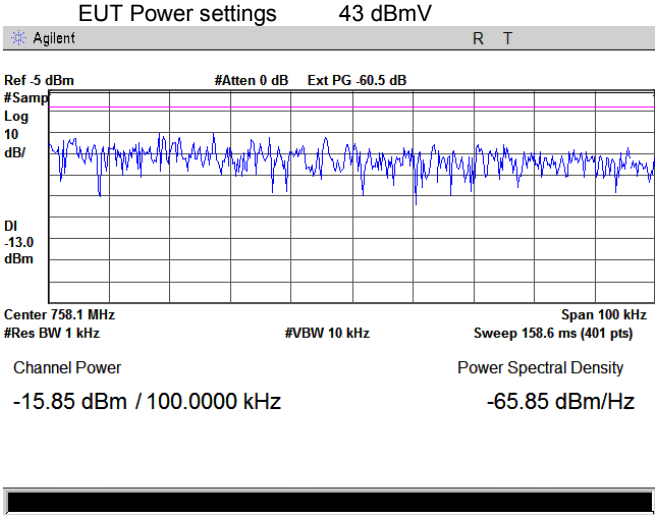
Frequency:	757.8675 MHz
Band edge:	758.0 – 758.1 MHz
Modulation:	64QAM
Bit rate:	1245 kbps
EUT Power settings	43 dBmV



Note: test result = SA reading + Correction factor = -23.52 dBm + 10 dB = -13.52 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.17 Spurious emissions at RF antenna connector, high channel band edge measurements

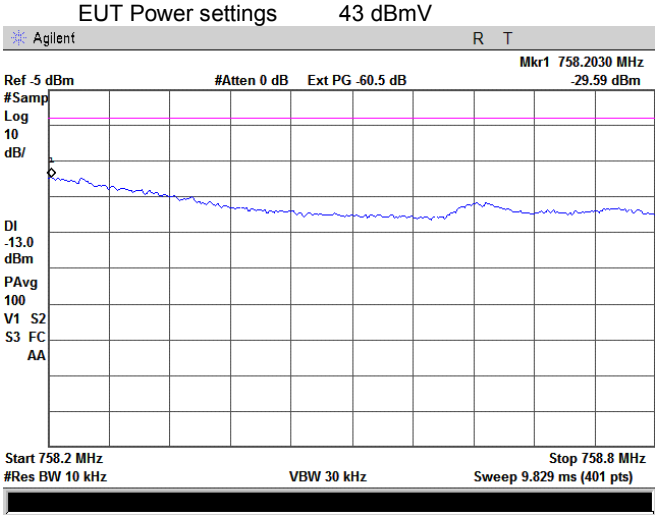
Frequency:	757.8675 MHz
Band edge:	758.1 – 758.2 MHz
Modulation:	64QAM
Bit rate:	1245 kbps
EUT Power settings	43 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.18 Spurious emissions at RF antenna connector, high channel band edge measurements

Frequency:	757.8675 MHz
Band edge:	758.2 – 758.8 MHz
Modulation:	64QAM
Bit rate:	1245 kbps
EUT Power settings	43 dBmV

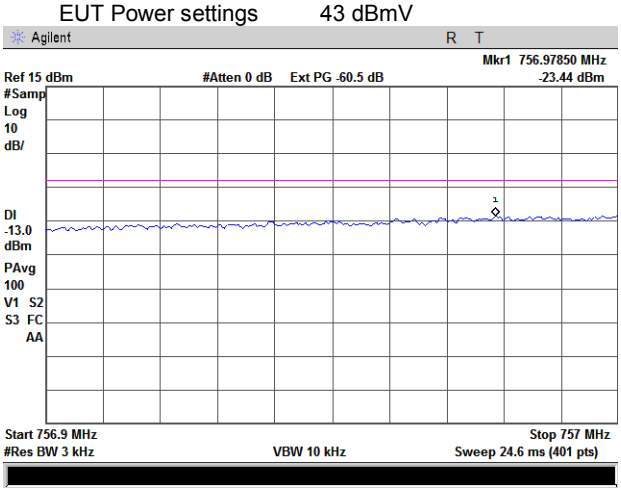


Note: test result = SA reading + Correction factor = -29.59 dBm + 10 dB = -19.59 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.19 Spurious emissions at RF antenna connector, low channel band edge measurements

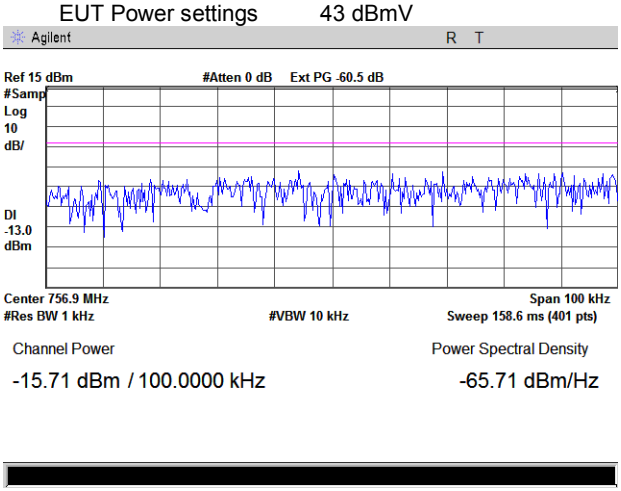
Frequency:	757.1325 MHz
Band edge:	756.9 – 757.0 MHz
Modulation:	256QAM
Bit rate:	2195 kbps
EUT Power settings	43 dBmV



Note: test result = SA reading + Correction factor = -23.44 dBm + 10 dB = -13.44 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.20 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.1325 MHz
Band edge:	756.8 – 756.9 MHz
Modulation:	256QAM
Bit rate:	2195 kbps
EUT Power settings	43 dBmV

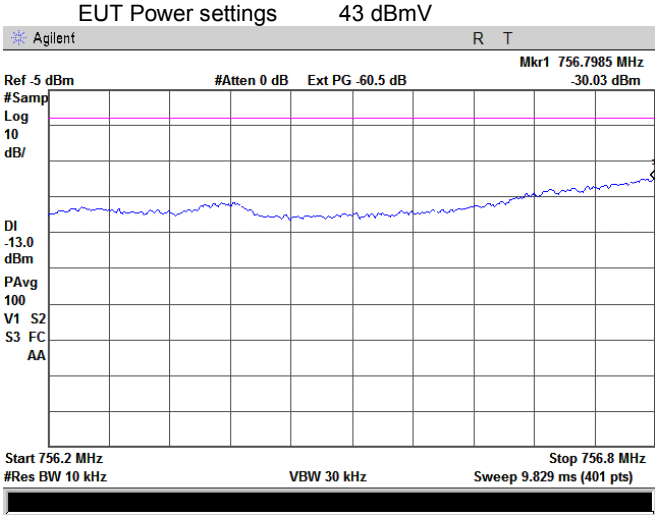


NOTE: The correct SA settings (not displayed due to the SA limitations):
start frequency is 756.8 MHz, stop frequency – 756.9 MHz.

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.21 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.1325 MHz
Band edge:	756.2 – 756.8 MHz
Modulation:	256QAM
Bit rate:	2195 kbps
EUT Power settings	43 dBmV

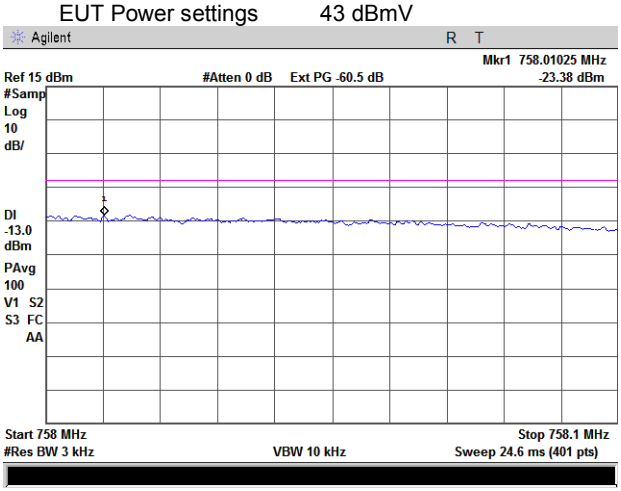


Note: test result = SA reading + Correction factor = -30.03 dBm + 10 dB = -20.03 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.22 Spurious emissions at RF antenna connector, high channel band edge measurements

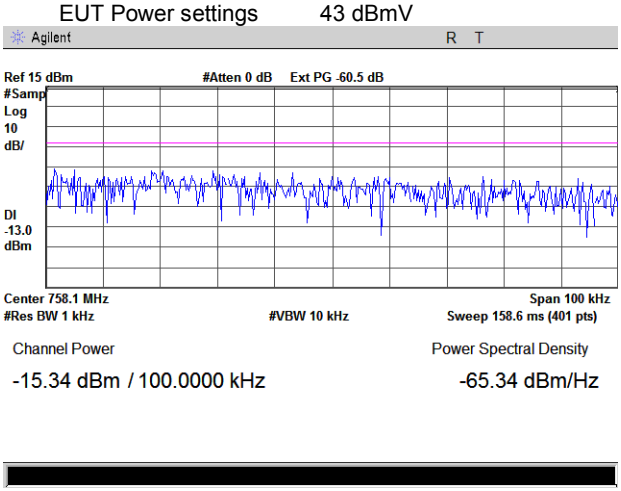
Frequency:	757.8675 MHz
Band edge:	758.0 – 758.1 MHz
Modulation:	256QAM
Bit rate:	2195 kbps
EUT Power settings	43 dBmV



Note: test result = SA reading + Correction factor = -23.38 dBm + 10 dB = -13.38 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.23 Spurious emissions at RF antenna connector, high channel band edge measurements

Frequency:	757.8675 MHz
Band edge:	758.1 – 758.2 MHz
Modulation:	256QAM
Bit rate:	2195 kbps
EUT Power settings	43 dBmV

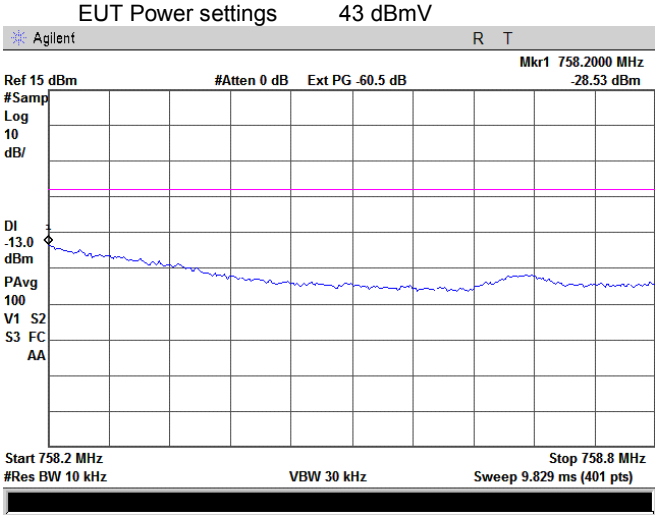


NOTE: The correct SA settings (not displayed due to the SA limitations):
start frequency is 758.1 MHz, stop frequency – 758.2 MHz.

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Plot 7.5.24 Spurious emissions at RF antenna connector, high channel band edge measurements

Frequency:	757.8675 MHz
Band edge:	758.2 – 758.8 MHz
Modulation:	256QAM
Bit rate:	2195 kbps
EUT Power settings	43 dBmV

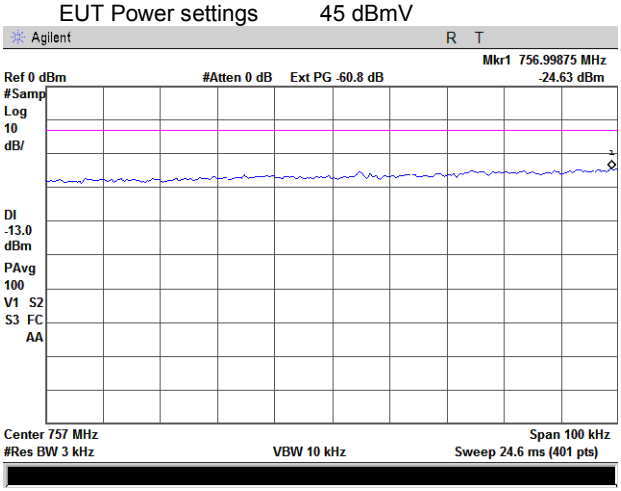


Note: test result = SA reading + Correction factor = -28.53 dBm + 10 dB = -18.53 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.25 Spurious emissions at RF antenna connector, low channel band edge measurements

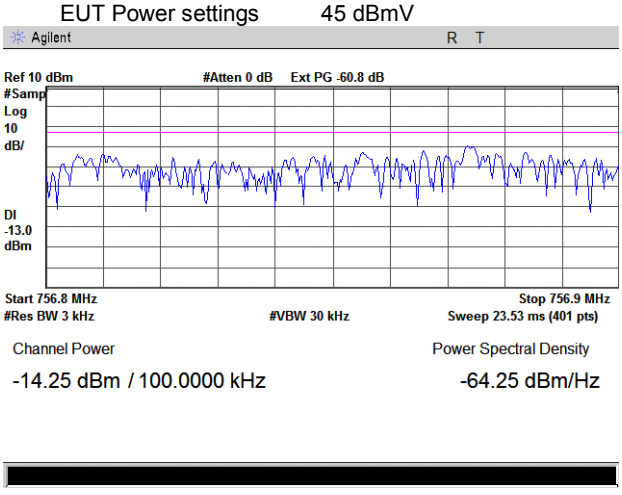
Frequency:	757.17 MHz
Band edge:	756.9 – 757.0 MHz
Modulation:	QPSK
Bit rate:	583 kbps
EUT Power settings	45 dBmV



Test result = SA reading + Correction factor = -24.63 dBm + 10 dB = -14.63 dBm,
Correction factor = 10*log(30kHz/3kHz) = 10 dB
NOTE: The correct SA settings (not displayed due to the SA limitations):
start frequency is 756.9 MHz, stop frequency – 757.0 MHz.

Plot 7.5.26 Spurious emissions at RF antenna connector, low channel band edge measurements

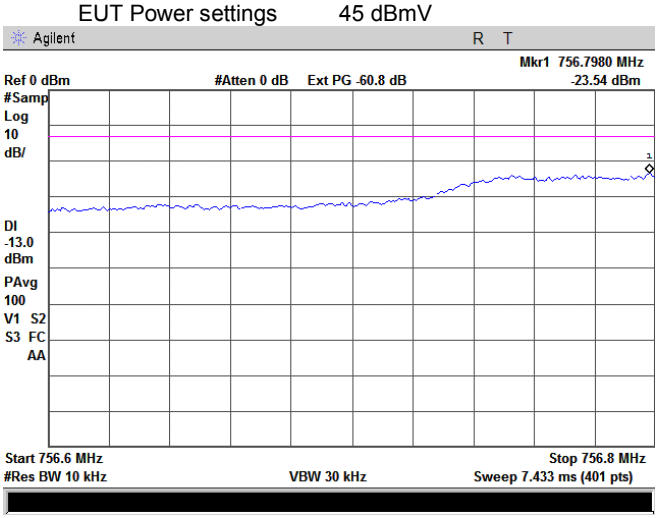
Frequency:	757.17 MHz
Band edge:	756.8 – 756.9 MHz
Modulation:	QPSK
Bit rate:	583 kbps
EUT Power settings	45 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.27 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.17 MHz
Band edge:	756.6 – 756.8 MHz
Modulation:	QPSK
Bit rate:	583 kbps
EUT Power settings	45 dBmV

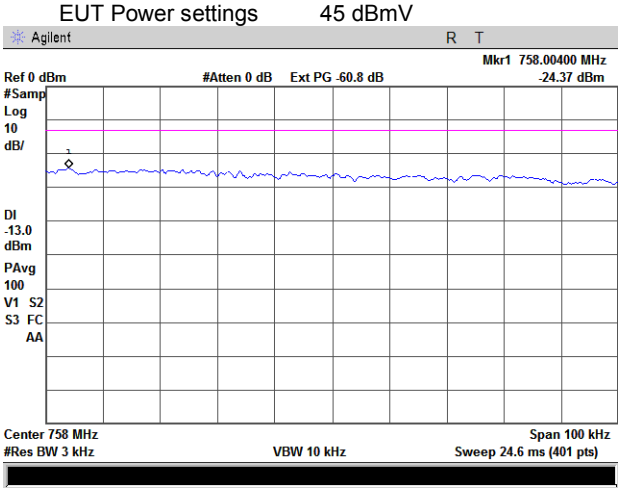


Note: test result = SA reading + Correction factor = -23.54 dBm + 10 dB = -13.54dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.28 Spurious emissions at RF antenna connector, high channel band edge measurements

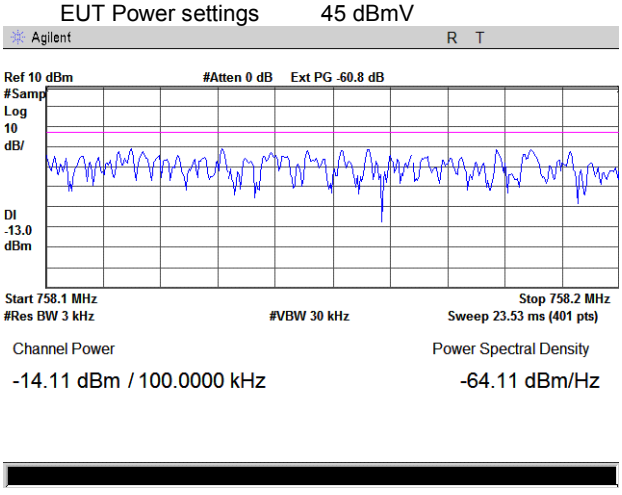
Frequency:	757.83 MHz
Band edge:	758.0 – 758.1 MHz
Modulation:	QPSK
Bit rate:	583 kbps
EUT Power settings	45 dBmV



Test result = SA reading + Correction factor = -24.37 dBm + 10 dB = -13.37 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB
NOTE: The correct SA settings (not displayed due to the SA limitations):
start frequency is 758.0 MHz, stop frequency – 758.1 MHz.

Plot 7.5.29 Spurious emissions at RF antenna connector, high channel band edge measurements

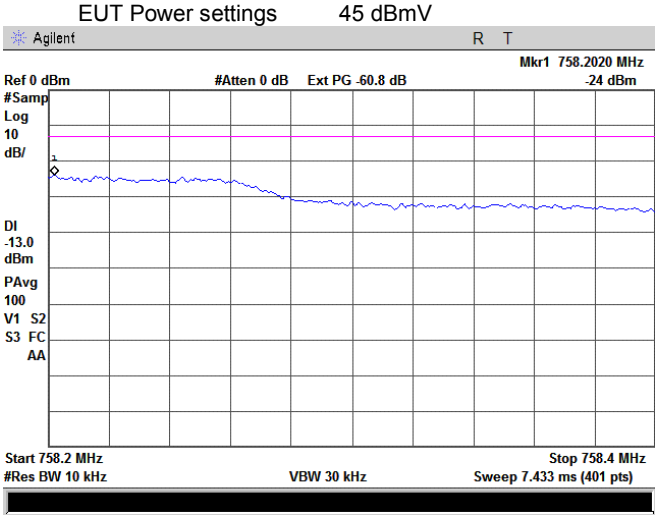
Frequency:	757.83 MHz
Band edge:	758.1 – 758.2 MHz
Modulation:	QPSK
Bit rate:	583 kbps
EUT Power settings	45 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.30 Spurious emissions at RF antenna connector, high channel band edge measurements

Frequency:	757.83 MHz
Band edge:	758.2 – 758.4 MHz
Modulation:	QPSK
Bit rate:	583 kbps
EUT Power settings	45 dBmV

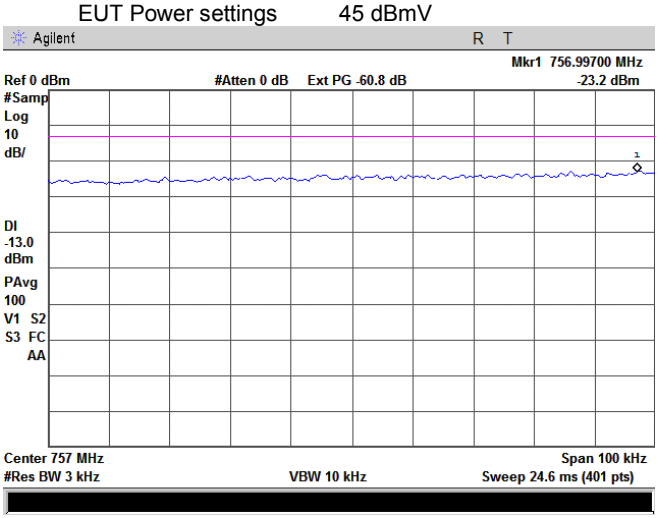


Note: test result = SA reading + Correction factor = -24.0 dBm + 10 dB = -13.0 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.31 Spurious emissions at RF antenna connector, low channel band edge measurements

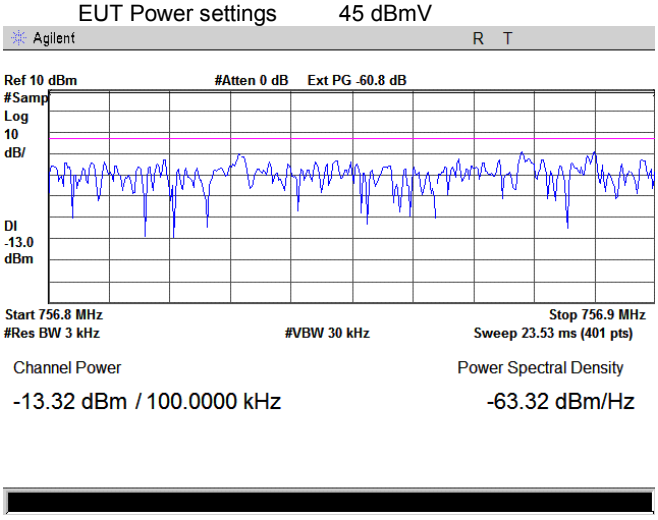
Frequency:	757.17 MHz
Band edge:	756.9 – 757.0 MHz
Modulation:	16QAM
Bit rate:	1166 kbps
EUT Power settings	45 dBmV



Note: test result = SA reading + Correction factor = -23.20 dBm + 10 dB = -13.20 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.32 emissions at RF antenna connector, low channel band edge measurements

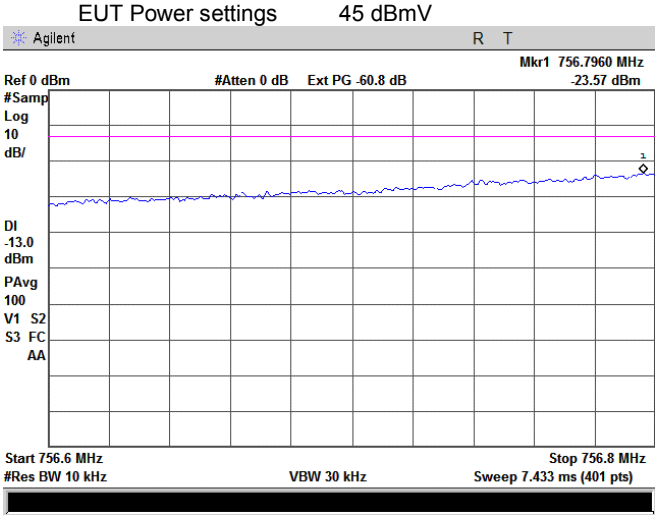
Frequency:	757.17 MHz
Band edge:	756.8 – 756.9 MHz
Modulation:	16QAM
Bit rate:	1166 kbps
EUT Power settings	45 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.33 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.17 MHz
Band edge:	756.6 – 756.8 MHz
Modulation:	16QAM
Bit rate:	1166 kbps
EUT Power settings	45 dBmV

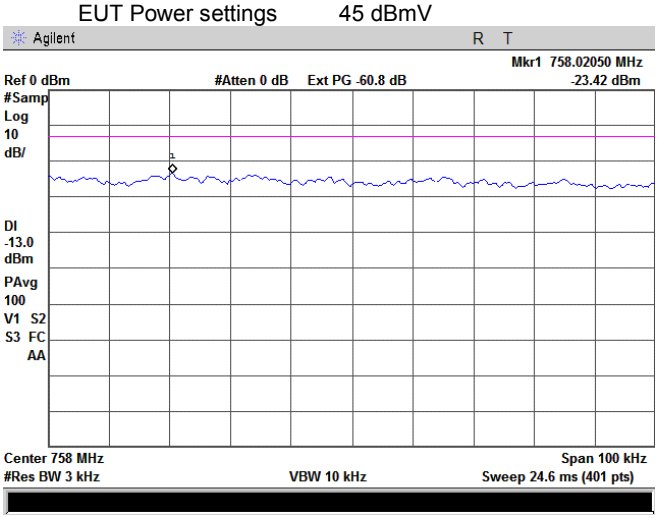


Note: test result = SA reading + Correction factor = -23.57 dBm + 10 dB = -13.57 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.34 Spurious emissions at RF antenna connector, high channel band edge measurements

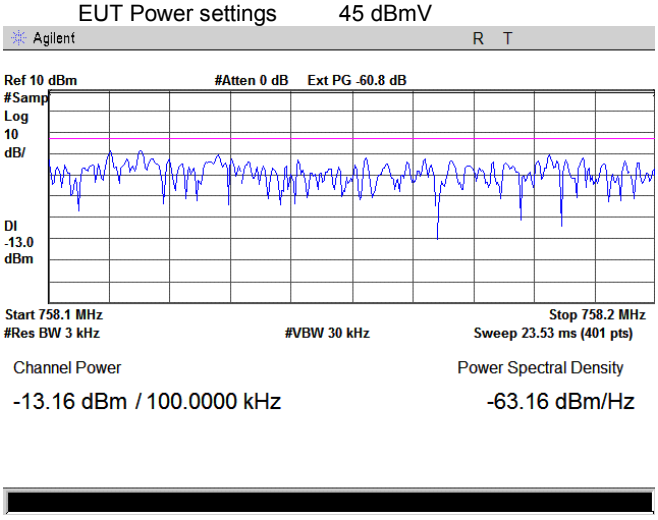
Frequency:	757.83 MHz
Band edge:	758.0 – 758.1 MHz
Modulation:	16QAM
Bit rate:	1166 kbps
EUT Power settings	45 dBmV



Note: test result = SA reading + Correction factor = -23.42 dBm + 10 dB = -13.43 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.35 Spurious emissions at RF antenna connector, high channel band edge measurements

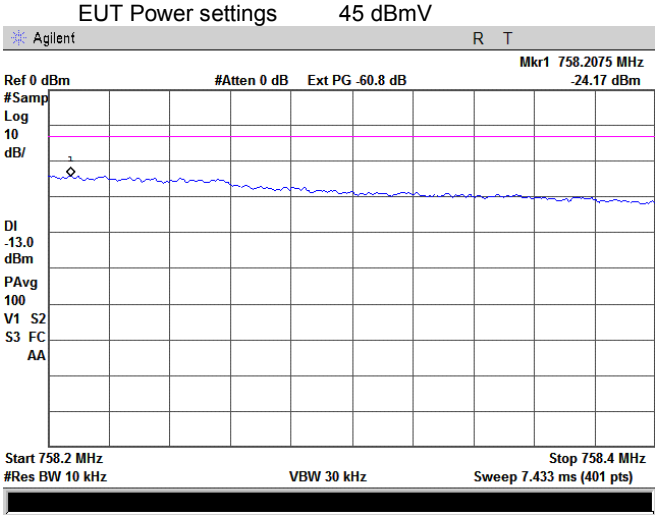
Frequency:	757.83 MHz
Band edge:	758.1 – 758.2 MHz
Modulation:	16QAM
Bit rate:	1166 kbps
EUT Power settings	45 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.36 Spurious emissions at RF antenna connector, high channel band edge measurements

Frequency:	757.83 MHz
Band edge:	758.2 – 758.4 MHz
Modulation:	16QAM
Bit rate:	1166 kbps
EUT Power settings	45 dBmV

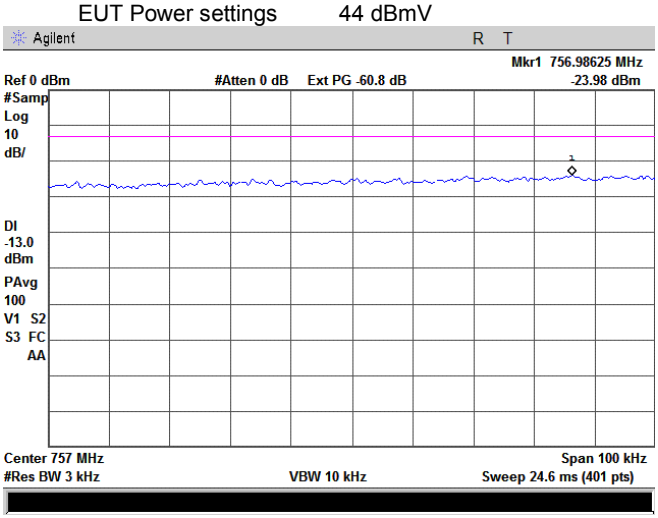


Note: test result = SA reading + Correction factor = -24.17 dBm + 10 dB = -14.17 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.37 Spurious emissions at RF antenna connector, low channel band edge measurements

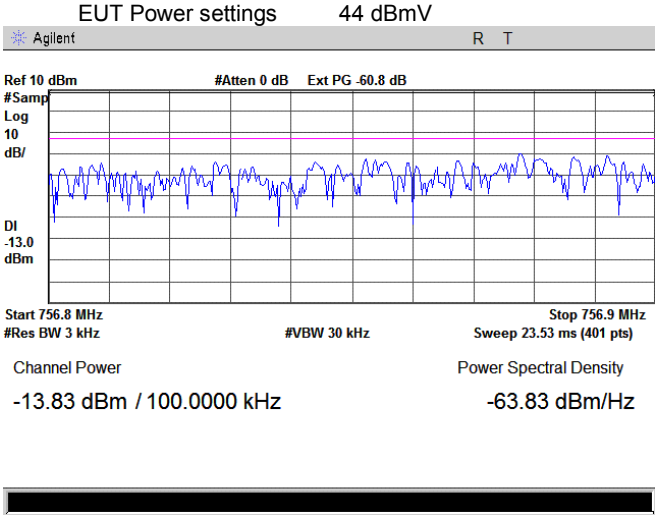
Frequency:	757.17 MHz
Band edge:	756.9 – 757.0 MHz
Modulation:	64QAM
Bit rate:	1668 kbps
EUT Power settings	44 dBmV



Note: test result = SA reading + Correction factor = -23.98 dBm + 10 dB = -13.98 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.38 Spurious emissions at RF antenna connector, low channel band edge measurements

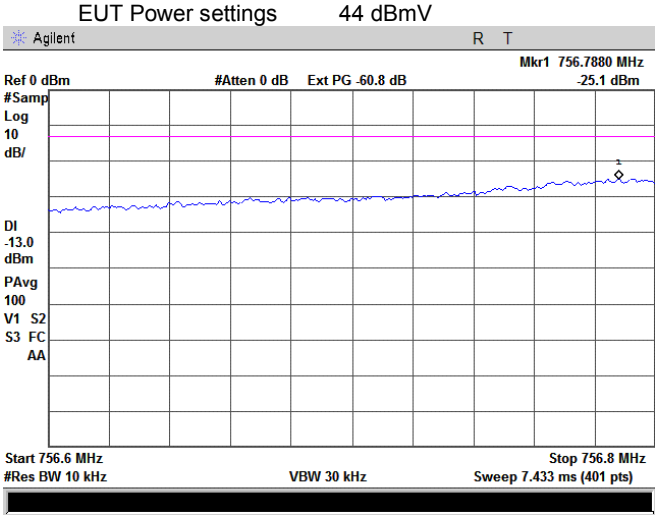
Frequency:	757.17 MHz
Band edge:	756.8 – 756.9 MHz
Modulation:	64QAM
Bit rate:	1668 kbps
EUT Power settings	44 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.39 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.17 MHz
Band edge:	756.6 – 756.8 MHz
Modulation:	64QAM
Bit rate:	1668 kbps
EUT Power settings	44 dBmV

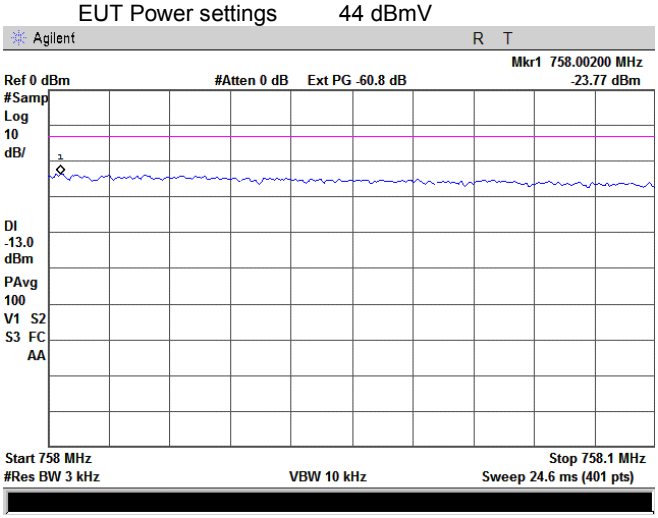


Note: test result = SA reading + Correction factor = -25.10 dBm + 10 dB= -15.10 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.40 Spurious emissions at RF antenna connector, high channel band edge measurements

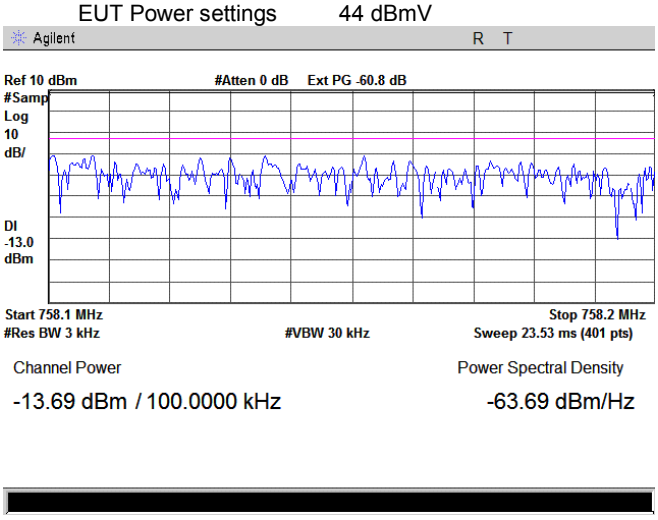
Frequency:	757.83 MHz
Band edge:	758.0 – 758.1 MHz
Modulation:	64QAM
Bit rate:	1668 kbps
EUT Power settings	44 dBmV



Note: test result = SA reading + Correction factor = -23.77 dBm + 10 dB = -13.77 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.41 Spurious emissions at RF antenna connector, high channel band edge measurements

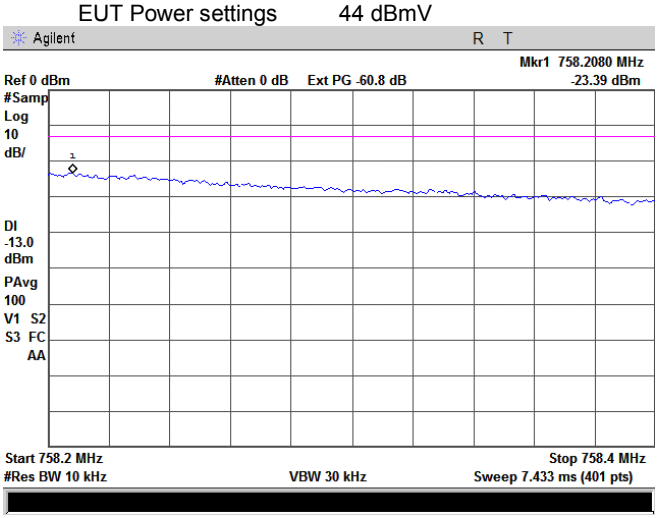
Frequency:	757.83 MHz
Band edge:	758.1 – 758.2 MHz
Modulation:	64QAM
Bit rate:	1668 kbps
EUT Power settings	44 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.42 Spurious emissions at RF antenna connector, high channel band edge measurements

Frequency:	757.83 MHz
Band edge:	758.2 – 758.4 MHz
Modulation:	64QAM
Bit rate:	1668 kbps
EUT Power settings	44 dBmV

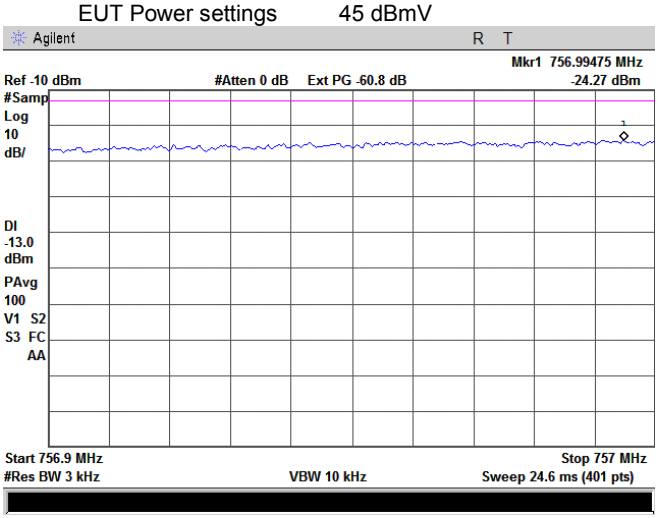


Note: test result = SA reading + Correction factor = -23.39 dBm + 10 dB = -13.39 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.43 Spurious emissions at RF antenna connector, low channel band edge measurements

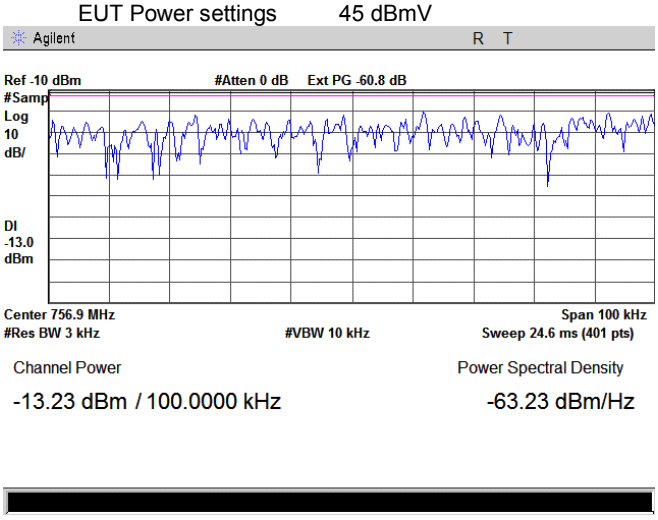
Frequency:	757.17 MHz
Band edge:	756.9 – 757.0 MHz
Modulation:	256QAM
Bit rate:	2344 kbps
EUT Power settings	45 dBmV



Note: test result = SA reading + Correction factor = -24.27 dBm + 10 dB = -14.27 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.44 Spurious emissions at RF antenna connector, low channel band edge measurements

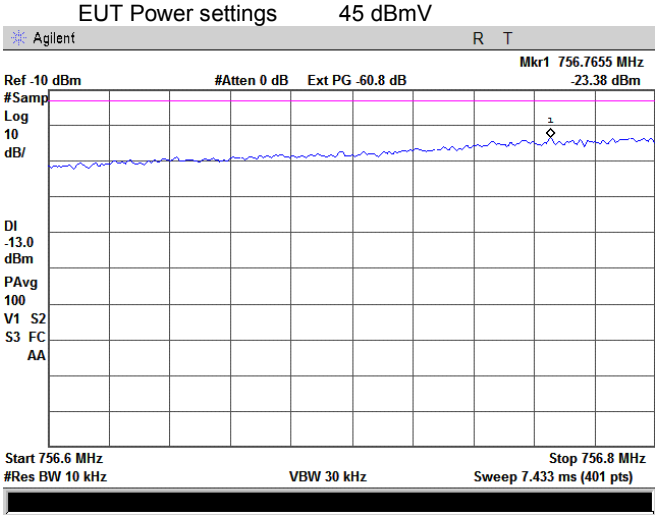
Frequency:	757.17 MHz
Band edge:	756.8 – 756.9 MHz
Modulation:	256QAM
Bit rate:	2344 kbps
EUT Power settings	45 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.45 Spurious emissions at RF antenna connector, low channel band edge measurements

Frequency:	757.17 MHz
Band edge:	756.6 – 756.8 MHz
Modulation:	256QAM
Bit rate:	2344 kbps
EUT Power settings	45 dBmV

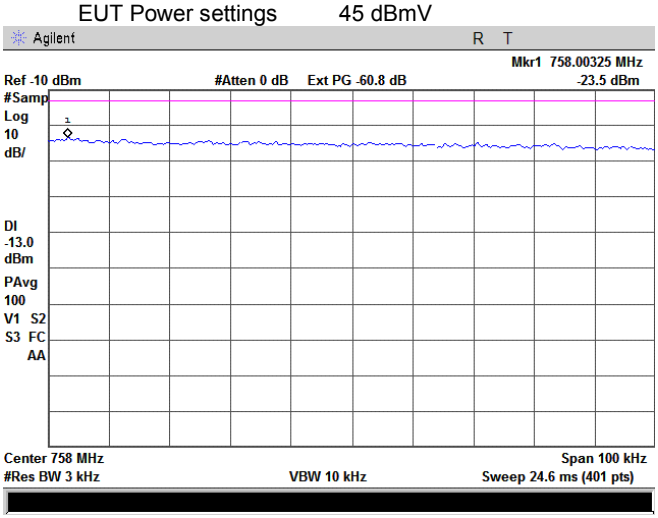


Note: test result = SA reading + Correction factor = -23.38 dBm + 10 dB= -13.38 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.46 Spurious emissions at RF antenna connector, high channel band edge measurements

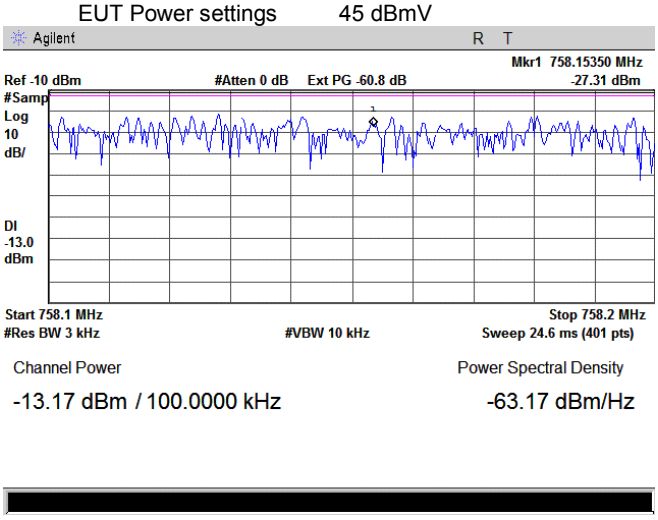
Frequency:	757.83 MHz
Band edge:	758.0 – 758.1 MHz
Modulation:	256QAM
Bit rate:	2344 kbps
EUT Power settings	45 dBmV



Note: test result = SA reading + Correction factor = -23.5 dBm + 10 dB = -13.5 dBm
Correction factor = 10*log(30kHz/3kHz) = 10 dB

Plot 7.5.47 Spurious emissions at RF antenna connector, high channel band edge measurements

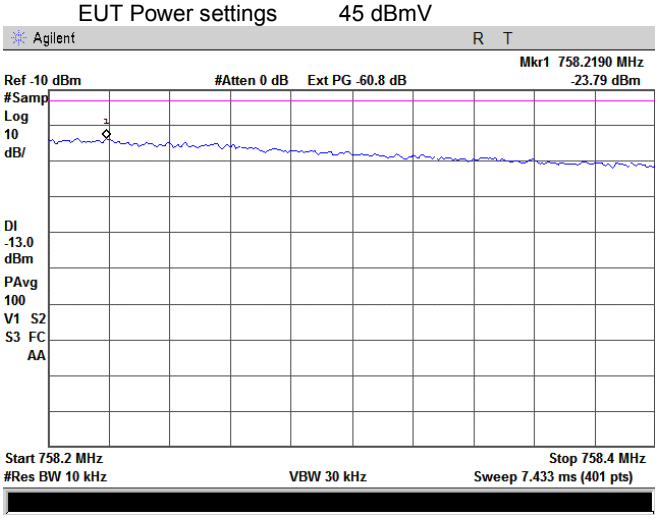
Frequency:	757.83 MHz
Band edge:	758.1 – 758.2 MHz
Modulation:	256QAM
Bit rate:	2344 kbps
EUT Power settings	45 dBmV



Test specification:	Section 27.53(c)(3), Band edge emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1047, 2.1051		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Plot 7.5.48 Spurious emissions at RF antenna connector, high channel band edge measurements

Frequency:	757.83 MHz
Band edge:	758.2 – 758.4 MHz
Modulation:	256QAM
Bit rate:	2344 kbps
EUT Power settings	45 dBmV



Note: test result = SA reading + Correction factor = -23.79 dBm + 10 dB = -13.79 dBm
Correction factor = 10*log(100kHz/10kHz) = 10 dB

Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

7.6 Radiated spurious emission measurements

7.6.1 General

This test was performed to measure radiated spurious emissions from the EUT enclosure with antenna connector terminated with 50 Ohm dummy load. Specification test limits are given in Table 7.6.1.

Table 7.6.1 Radiated spurious emission test limits

Frequency, MHz*	Attenuation below carrier dBc	Spurious emissions, dBm	Equivalent field strength limit @ 3m, dB(µV/m)**
0.009 – 10th harmonic	43+10logP*	-13	84.4

* - P is transmitter output power in Watts.
** - Equivalent field strength limit was calculated from maximum allowed ERP of spurious as follows: E=sqrt(30×P×1.64)/r, where P is ERP in Watts, 1.64 is numeric gain of ideal dipole and r is antenna to EUT distance in meters.

7.6.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz range

7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and the EUT performance was checked.

7.6.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna was rotated around its vertical axis.

7.6.2.3 The test results were recorded in Table 7.6.2 and shown in the associated plots.

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

7.6.3.1 The EUT was set up as shown in Figure 7.6.2, energized and the EUT performance was checked.

7.6.3.2 The specified frequency range was investigated with antennas connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.

7.6.3.3 The worst test results with respect to the limits were recorded in Table 7.6.2 and shown in the associated plots.

7.6.4 Test procedure for substitution ERP measurements of spurious

7.6.4.1 The test equipment was set up as shown in Figure 7.6.3 and energized.

7.6.4.2 RF signal generator was set to the frequency of investigated spurious emission and the RF output level was preliminary adjusted to produce the same field strength as it was measured from the EUT.

7.6.4.3 The test antenna height was swept from 1 to 4 m to find maximum emission from substitution antenna and RF signal generator output was fine adjusted to produce the same field strength as it was measured from the EUT.

7.6.4.4 The above procedure was performed in both, horizontal and vertical, polarizations of the test and substitution antennas.

7.6.4.5 The EIRP of spurious emissions was calculated as a sum of signal generator output power in dBm and antenna gain in dBd reduced by cable loss in dB.

7.6.4.6 The above procedure was repeated at the rest of investigated frequencies.

7.6.4.7 The worst test results (the lowest margins) were recorded in Table 7.6.3 and shown in the associated plots.

Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

Figure 7.6.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz range

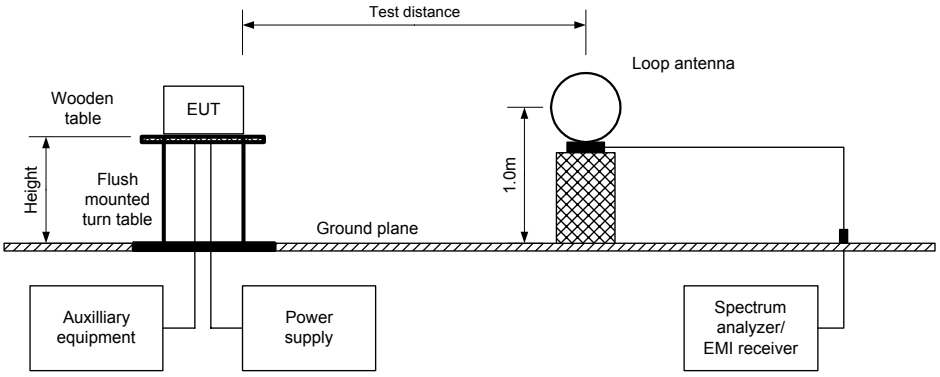
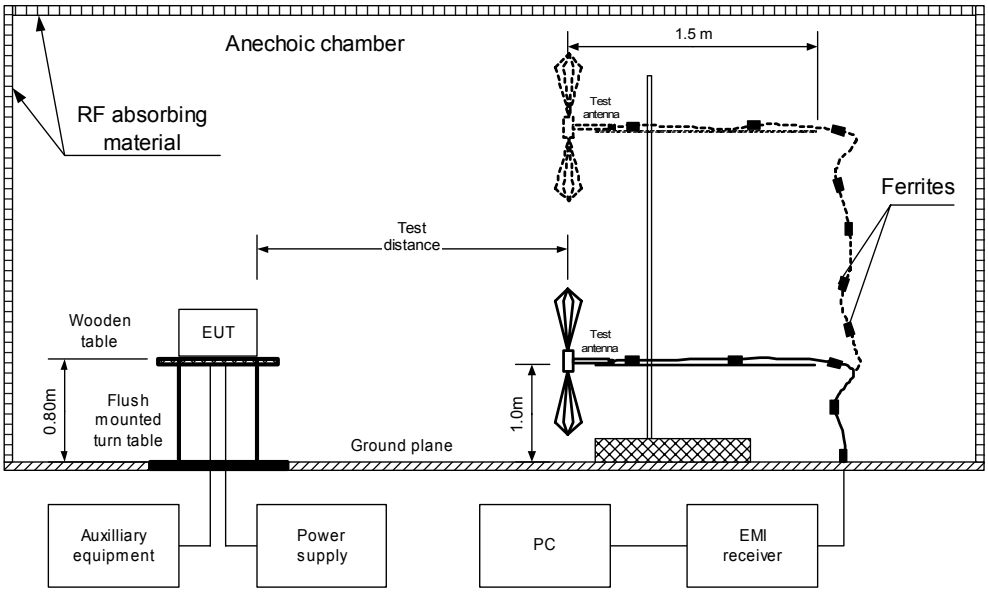
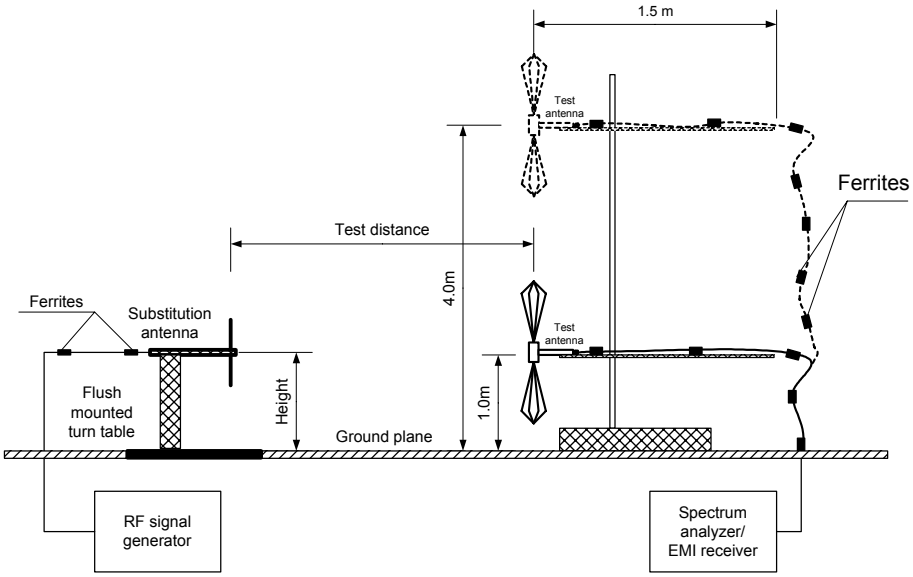


Figure 7.6.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

Figure 7.6.3 Setup for substitution ERP measurements of spurious



Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

Table 7.6.2 Spurious emission field strength test results

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
TEST DISTANCE: 3 m
EUT HEIGHT: 0.8 m
INVESTIGATED FREQUENCY RANGE: 0.009 – 8000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
Biconilog (30 MHz – 1000 MHz)
Double ridged guide (above 1000 MHz)
CHANNEL BANDWIDTH 330 kHz (as the worst case in the peak power test)
MODULATION: 256QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: 44 dBmV

Frequency, MHz	Antenna polarization	RBW, kHz	Field strength, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*	Verdict
Low carrier frequency						
1514.2250	Horizontal	1000	65.77	84.4	-18.63	Pass
2271.4100	Horizontal	1000	69.11	84.4	-15.29	Pass
3028.5875	Vertical	1000	85.02	84.4	0.62	Pass
3432.9750	Vertical	1000	72.03	84.4	-12.37	Pass
5149.3675	Vertical	1000	80.10	84.4	-4.30	Pass
5489.9800	Vertical	1000	73.40	84.4	-11.00	Pass
High carrier frequency						
1515.7375	Horizontal	1000	64.13	84.4	-20.27	Pass
2272.4720	Horizontal	1000	68.8	84.4	-15.60	Pass
3031.6250	Vertical	1000	84.62	84.4	0.22	Pass
3432.9750	Vertical	1000	71.02	84.4	-13.38	Pass
5149.5050	Vertical	1000	80.00	84.4	-4.40	Pass
5489.9850	Vertical	1000	73.40	84.4	-11.00	Pass

*****- Margin = Field strength of spurious – calculated field strength limit.

Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

Table 7.6.3 Substitution ERP of spurious test results

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
SUBSTITUTION ANTENNA HEIGHT: 0.8 m
DETECTOR USED: Peak
VIDEO BANDWIDTH: > Resolution bandwidth
SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)
Double ridged guide (above 1000 MHz)

Frequency MHz	Field strength dB(µV/m	RBW, kHz	Antenna polarizatio	RF generato output, dBm	Ant gain dBd	Cable oss, dE	ERP, dBm	Spurious emissions, dBm	Margin dB*	Verdict
Low carrier frequency										
1515.0225	71.37	1000	Horizontal	-33.06	6.16	2.13	-29.03	-13.00	-16.03	Pass
2271.4100	69.11	1000	Horizontal	-38.00	9.04	1.01	-29.97	-13.00	-16.97	Pass
3028.5875	85.02	1000	Vertical	-19.60	9.03	1.17	-15.40	-13.00	-2.40	Pass
3432.9750	72.04	1000	Vertical	-36.00	9.07	1.26	-28.19	-13.00	-15.19	Pass
5149.3675	80.10	1000	Vertical	-24.03	8.49	3.90	-19.44	-13.00	-6.44	Pass
5489.9800	73.40	1000	Vertical	-30.89	8.34	4.07	-26.62	-13.00	-13.62	Pass
High carrier frequency										
1515.0225	69.38	1000	Horizontal	-35.05	6.16	2.13	-31.02	-13.00	-18.02	Pass
2272.4720	68.80	1000	Horizontal	-38.40	9.04	1.01	-30.37	-13.00	-17.37	Pass
3031.6250	84.62	1000	Vertical	-23.62	9.04	1.17	-15.75	-13.00	-2.75	Pass
3432.9750	71.02	1000	Vertical	-37.00	9.07	1.26	-29.19	-13.00	-16.19	Pass
5149.5050	80.00	1000	Vertical	-24.13	8.49	3.90	-19.54	-13.00	-6.54	Pass
5489.9850	73.40	1000	Vertical	-30.89	8.34	4.07	-26.62	-13.00	-13.62	Pass

*- Margin = Spurious emission – specification limit.

Reference numbers of test equipment used

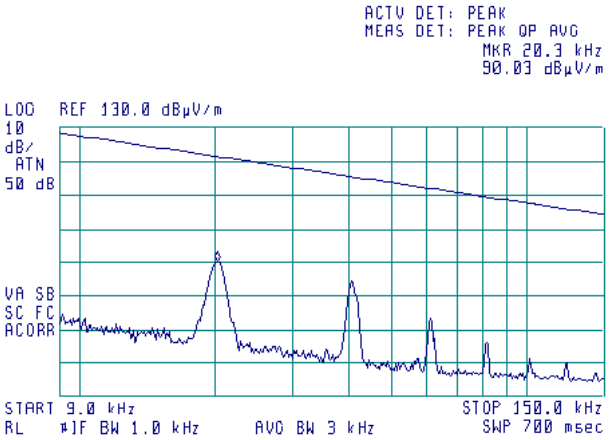
HL 0287	HL 0446	HL 0521	HL 0589	HL 0604	HL 0661	HL 1004	HL 1947
HL 2432	HL 2780	HL 2870	HL 3207				

Full description is given in Appendix A.

Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

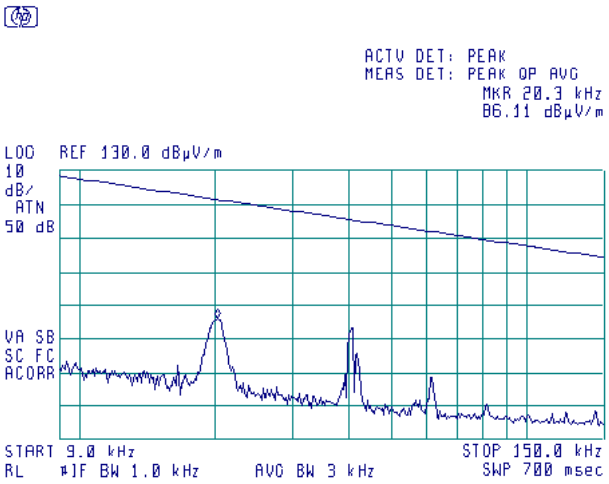
Plot 7.6.1 Radiated emission measurements in 9 - 150 kHz range

TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical
TEST DISTANCE:	3 m
MODULATION:	64QAM



Plot 7.6.2 Radiated emission measurements in 9 - 150 kHz range

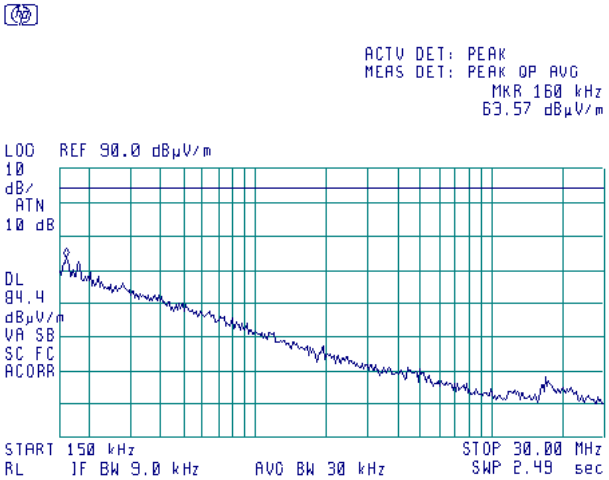
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical
TEST DISTANCE:	3 m
MODULATION:	64QAM



Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

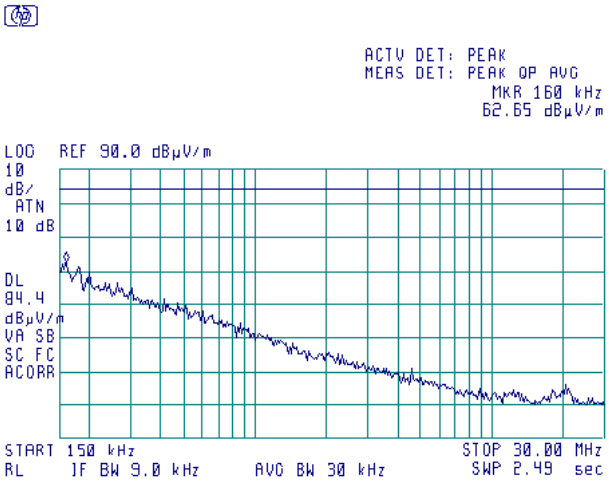
Plot 7.6.3 Radiated emission measurements in 0.15 - 30 MHz range

TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical
TEST DISTANCE:	3 m
MODULATION:	64QAM



Plot 7.6.4 Radiated emission measurements in 0.15 - 30 MHz range

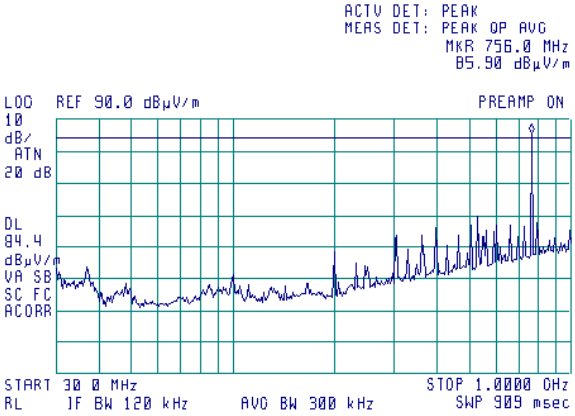
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical
TEST DISTANCE:	3 m
MODULATION:	64QAM



Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

Plot 7.6.5 Radiated emission measurements in 30 - 1000 MHz range

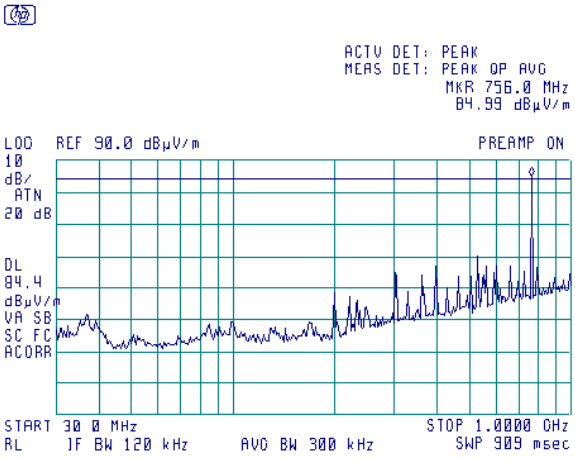
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m
MODULATION:	64QAM



Note: 757.17MHz – intentional radiation of RF module

Plot 7.6.6 Radiated emission measurements in 30 - 1000 MHz range

TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m
MODULATION:	64QAM

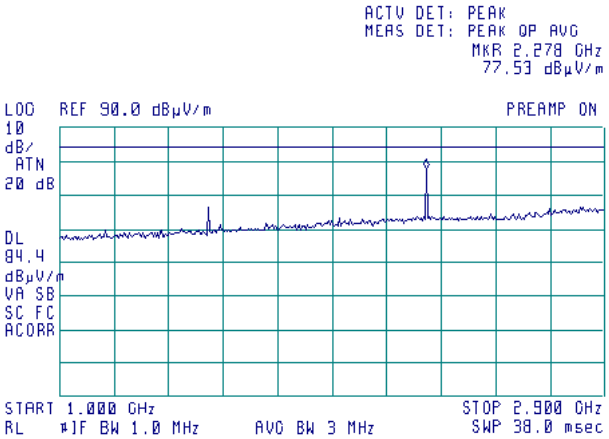


Note: 757.83 MHz – intentional radiation of RF module

Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

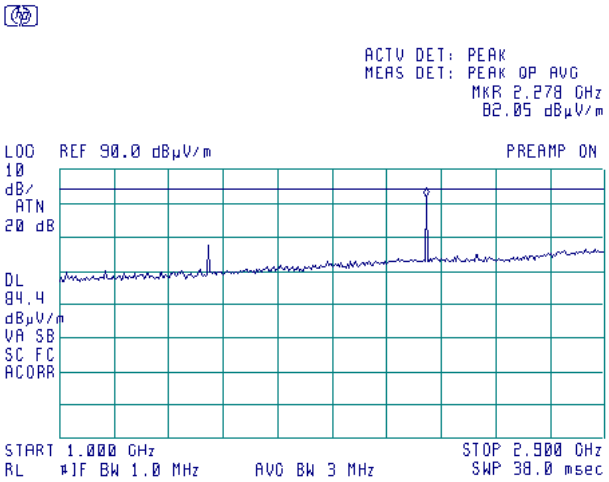
Plot 7.6.7 Radiated emission measurements in 1 – 2.9 GHz range

TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m
MODULATION:	64QAM



Plot 7.6.8 Radiated emission measurements in 1 – 2.9 GHz range

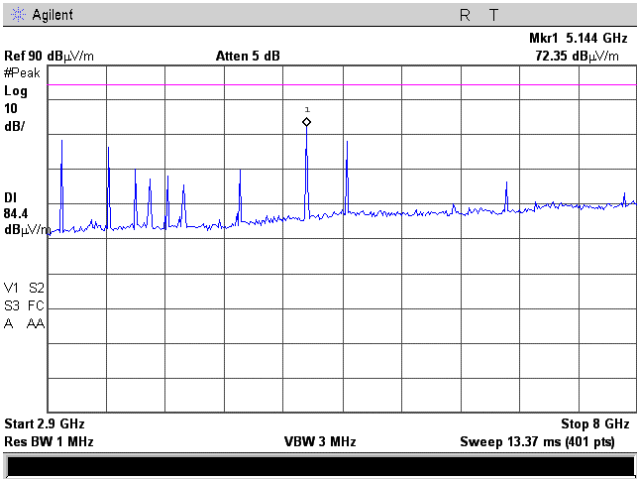
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m
MODULATION:	64QAM



Test specification:	Section 27.53(c)(2), Radiated spurious emissions		
Test procedure:	47 CFR, Section 2.1053, TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

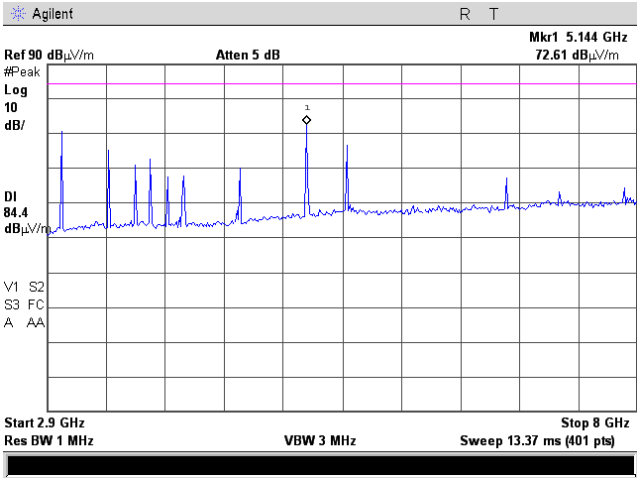
Plot 7.6.9 Radiated emission measurements in 2.9 – 8.0 GHz range

TEST SITE: Anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m
MODULATION: 64QAM



Plot 7.6.10 Radiated emission measurements in 2.9 – 8.0 GHz range

TEST SITE: Anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m
MODULATION: 64QAM



Test specification:	Section 27.53(f), Radiated emissions in the 1559-1610 MHz band		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

7.7 Radiated spurious emission measurements in 1559-1610 MHz band

7.7.1 General

This test was performed to measure radiated spurious emissions from the EUT enclosure with antenna. Specification test limits are given in Table 7.7.1.

Table 7.7.1 Radiated spurious emission test limits

Frequency, MHz	Type of signal	EIRP of spurious emissions, dBW/MHz	Spurious emissions, dBm	Equivalent field strengtl limit @ 3m, dB(µV/m)
1559 - 1610	Wideband	-70	-40	55.23
	Discrete or less than 700 Hz BW	-80	-50	45.23

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

7.7.2.1 The EUT was set up as shown in Figure 7.7.1, energized and the EUT performance was checked.

7.7.2.2 The specified frequency range was investigated with antennas connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.

7.7.2.3 The worst test results with respect to the limits were recorded in Table 7.7.2 and shown in the associated plots.

7.7.3 Test procedure for substitution EIRP measurements of spurious

7.7.3.1 The test equipment was set up as shown in Figure 7.7.2 and energized.

7.7.3.2 RF signal generator was set to the frequency of investigated spurious emission and the RF output level was preliminary adjusted to produce the same field strength as it was measured from the EUT.

7.7.3.3 The test antenna height was swept from 1 to 4 m to find maximum emission from substitution antenna and RF signal generator output was fine adjusted to produce the same field strength as it was measured from the EUT.

7.7.3.4 The above procedure was performed in both, horizontal and vertical, polarizations of the test and substitution antennas.

7.7.3.5 The EIRP of spurious emissions was calculated as a sum of signal generator output power in dBm and antenna gain in dBi reduced by cable loss in dB.

7.7.3.6 The above procedure was repeated at the rest of investigated frequencies.

7.7.3.7 The worst test results (the lowest margins) were recorded in Table 7.7.3 and shown in the associated plots.

Test specification:	Section 27.53(f), Radiated emissions in the 1559-1610 MHz band		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

Figure 7.7.1 Setup for spurious emission field strength measurements

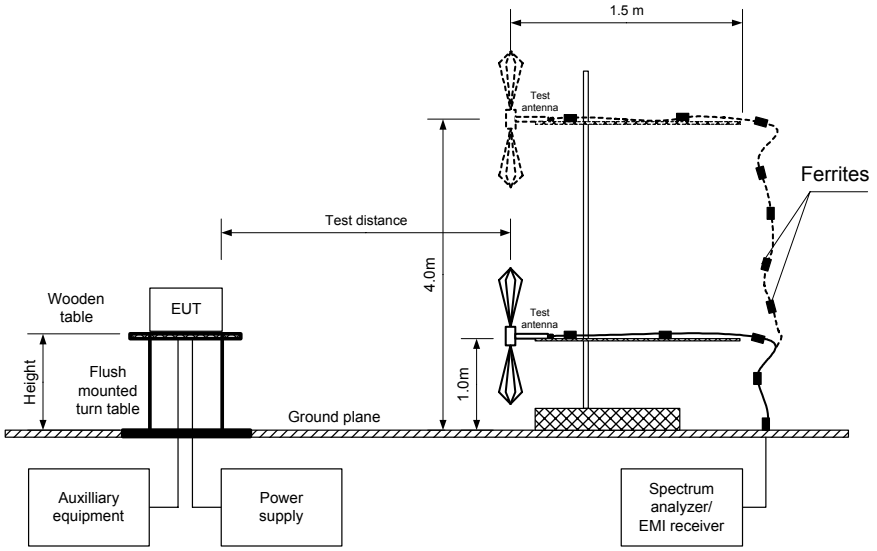
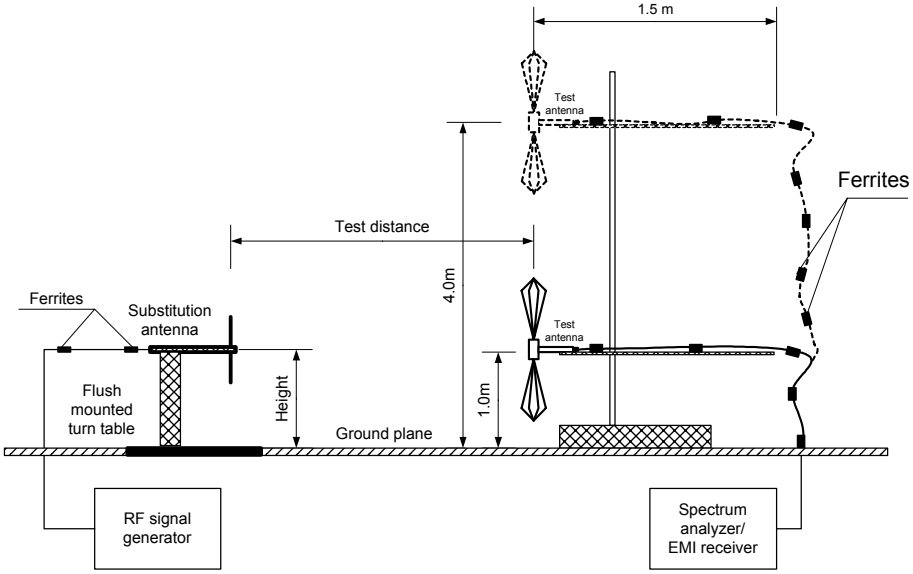


Figure 7.7.2 Setup for substitution EIRP measurements of spurious



Test specification:	Section 27.53(f), Radiated emissions in the 1559-1610 MHz band		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

Table 7.7.2 Spurious emission field strength test

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
TEST SITE: Semi Anechoic Chamber
TEST DISTANCE: 3 m
EUT HEIGHT: 0.8 m
INVESTIGATED FREQUENCY RANGE: 1559 – 1610 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
TEST ANTENNA TYPE: Double ridged guide
MODULATION: 64QAM
CHANNL BANDWIDTH 245 kHz
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Antenna polarization	RBW, kHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	Verdict
Low carrier frequency						
1593.04	Vertical	1000	49.09	55.23	-6.14	Pass
Mid carrier frequency						
1594.82	Vertical	1000	46.23	55.23	-9.00	Pass
High carrier frequency						
1596.23	Vertical	1000	46.87	55.23	-8.64	Pass

*- Margin = Field strength of spurious – calculated field strength limit.
**- For wideband signals emissions in the band 746-763 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP)

Table 7.7.3 Substitution EIRP of spurious test results

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
TEST SITE: OATS
TEST DISTANCE: 3 m
SUBSTITUTION ANTENNA HEIGHT: 0.8 m
DETECTOR USED: Peak
VIDEO BANDWIDTH: > Resolution bandwidth
SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)
Double ridged guide (above 1000 MHz)

Frequency MHz	Field strength dB(μV/m	RBW, kHz	Antenna polarizatio	RF generato output, dBm	Ant gain dBi	Cable oss, dE	ERP, dBm	Spurious emissions, dBm	Margin dB*	Verdict
Low carrier frequency										
1593.04	49.09	1000	Vertical	-56.5	8.45	0.87	-49.31	-40.00	-9.31	Pass
Mid carrier frequency										
1594.82	46.23	1000	Vertical	-55.1	8.47	0.87	-49.43	-40.00	-9.43	Pass
High carrier frequency										
1596.23	46.87	1000	Vertical	-55.4	8.47	0.87	-49.15	-40.00	-9.15	Pass

*- Margin = Calculated EIRP – spurious emissions limit

Reference numbers of test equipment used

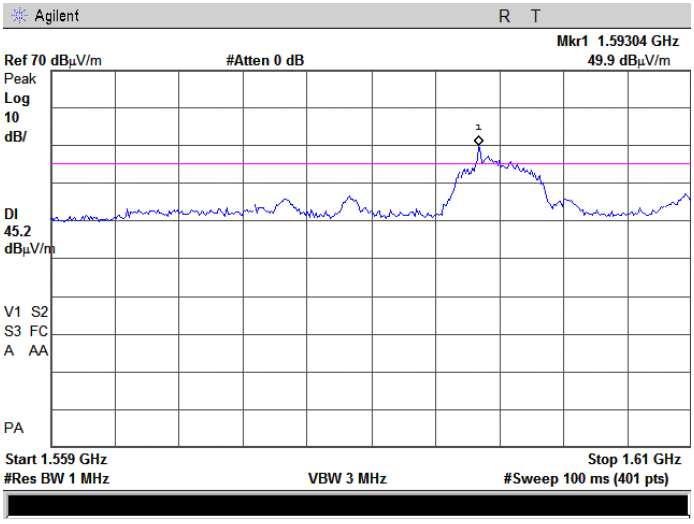
HL 0554	HL 0661	HL 1984	HL 2432	HL 2499	HL 2909	HL 2910	

Full description is given in Appendix A.

Test specification:	Section 27.53(f), Radiated emissions in the 1559-1610 MHz band		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24ºC	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

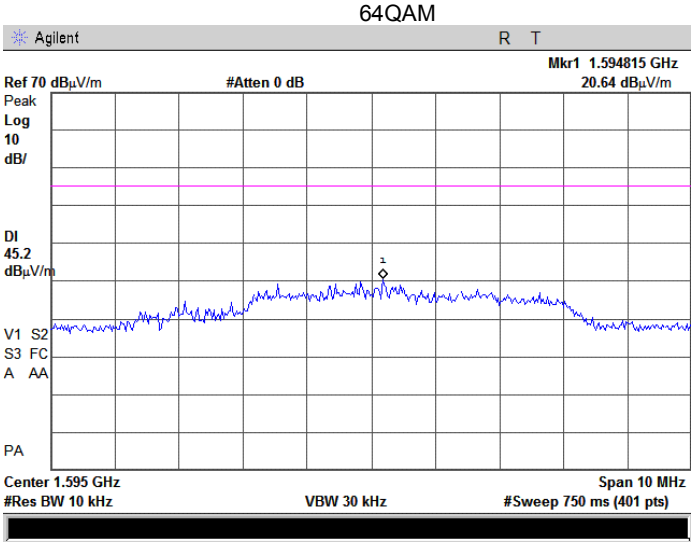
Plot 7.7.1 Radiated emission measurements in 1559 - 1610 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m
MODULATION: 64QAM



Plot 7.7.2 Signal bandwidth measurements

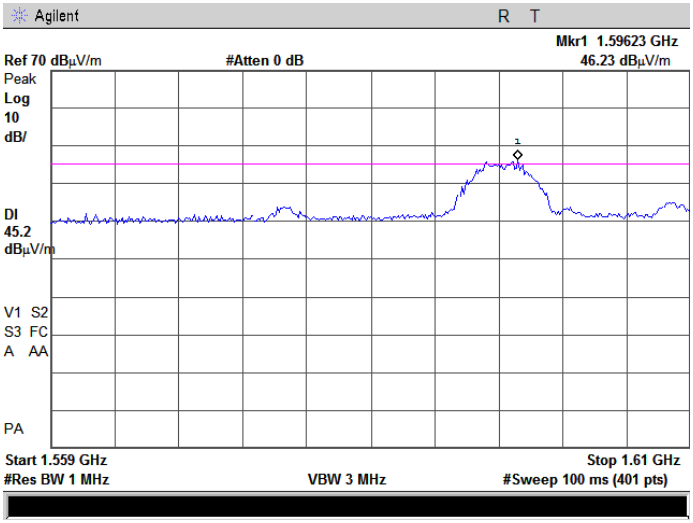
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
MODULATION: 64QAM



Test specification:	Section 27.53(f), Radiated emissions in the 1559-1610 MHz band		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24°C	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

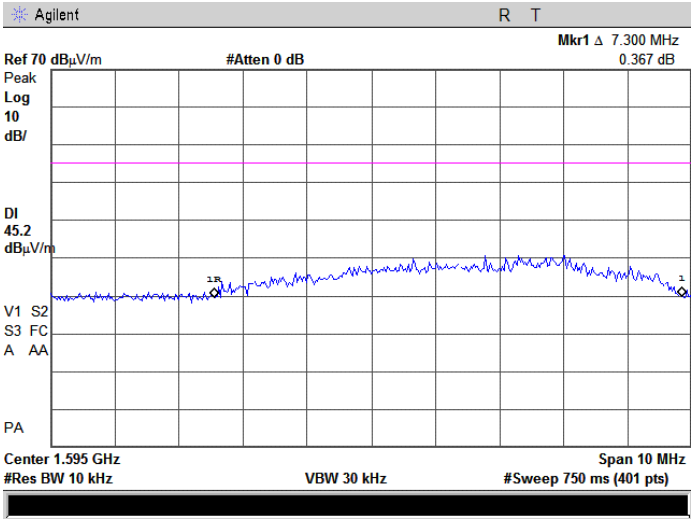
Plot 7.7.3 Radiated emission measurements in 1559 - 1610 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m
MODULATION: 64QAM



Plot 7.7.4 Signal bandwidth measurements

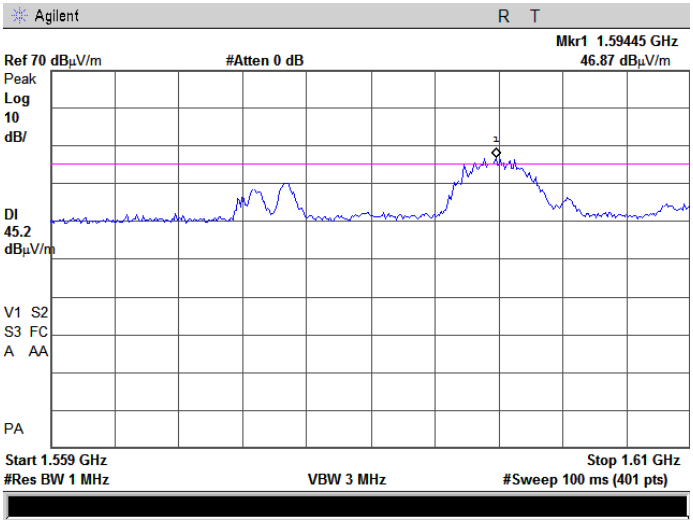
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
MODULATION: 64QAM



Test specification:	Section 27.53(f), Radiated emissions in the 1559-1610 MHz band		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date:	4/10/2008		
Temperature: 24°C	Air Pressure: 1013 hPa	Relative Humidity: 34%	Power Supply: 120 VAC
Remarks:			

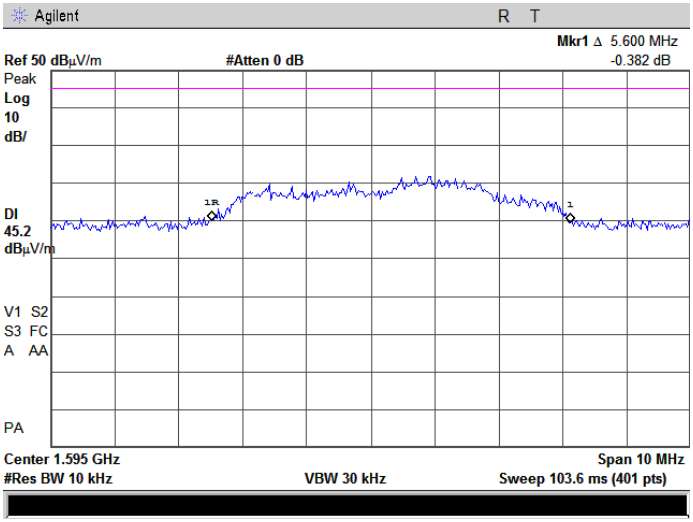
Plot 7.7.5 Radiated emission measurements in 1559 - 1610 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m
MODULATION: 64QAM



Plot 7.7.6 Signal bandwidth measurements

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
MODULATION: 64QAM



Test specification:	Section 27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055, TIA/EIA-603-C, Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date:	11/29/2007		
Temperature: 22 ºC	Air Pressure: 1011 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

7.8 Frequency stability test

7.8.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.8.1. The test results are provided in Tables 7.7.2, 7.7.3 and shown in the associated plots.

Table 7.8.1 Frequency stability limits

Assigned frequency, MHz	Maximum allowed frequency displacement
757.0 – 758.0	26 dBc points including frequency tolerance shall remain within the assigned band

7.8.2 Test procedure

7.8.2.1 The EUT was set up as shown in Figure 7.8.1, energized and its proper operation was checked.

7.8.2.2 The EUT power was turned off. Temperature within test chamber was set to +30˚C and a period of time sufficient to stabilize all of the oscillator circuit components was allowed.

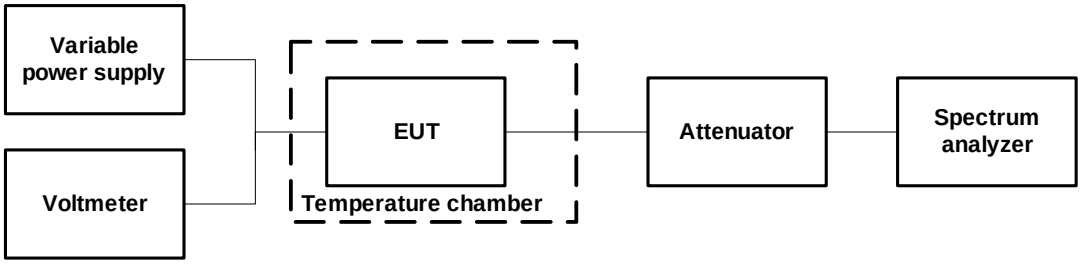
7.8.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.

7.8.2.4 The above procedure was repeated at 0˚C and at the lowest test temperature.

7.8.2.5 The EUT was powered on and carrier frequency was measured at start up moment and at the end of stabilization period at the rest of test temperatures and voltages. The EUT was powered off.

7.8.2.6 Frequency displacement was calculated as provided in Table 7.8.2 and Table 7.8.3.

Figure 7.8.1 Frequency stability test setup



Test specification:	**Section 27.54, Frequency stability**		
Test procedure:	47 CFR, Section 2.1055, TIA/EIA-603-C, Section 2.2.2		
Test mode:	Compliance	**Verdict:**	PASS
Date:	11/29/2007		
Temperature: 22 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 40 %	**Power Supply:** 120 VAC
Remarks:			

Table 7.8.2 Frequency stability test results

ASSIGNED FREQUENCY RANGE: 757.0 – 758.0 MHz
NOMINAL POWER VOLTAGE: 120 VAC (102 VAC - 138 VAC)
TEMPERATURE STABILIZATION PERIOD: 20 min
POWER DURING TEMPERATURE TRANSITION: Off
RESOLUTION BANDWIDTH: 300 Hz
VIDEO BANDWIDTH: 300 Hz
FREQUENCY SPAN: 10.0 kHz
SPECTRUM ANALYZER MODE: Counter
MODULATION: Unmodulated

T, ºC	Voltage, V	Frequency, MHz							Max frequency drift, Hz	
		Start up	1st min	2nd min	3rd min	4th min	5th min	10th min	Positive	Negative
Low frequency, 757.17 MHz										
-30	nominal	No Transmission	NA	NA	NA	NA	NA	No Transmission	0	0
-20	nominal	No Transmission	NA	NA	NA	NA	NA	No Transmission	0	0
-10	nominal	No Transmission	NA	NA	NA	NA	NA	No Transmission	0	0
0	nominal	757.179297	757.179298	757.179300	757.179300	757.179303	757.179304	757.179305	4254	0
10	nominal	757.177368	NA	NA	NA	NA	NA	757.177386	2335	0
20	15%	757.175087	NA	NA	NA	NA	NA	757.175068	36	0
20	nominal	757.175051	NA	NA	NA	NA	NA	757.175093	42	0
20	-15%	757.175032	NA	NA	NA	NA	NA	757.175127	76	0
30	nominal	757.172589	757.172582	757.172575	757.172572	757.172569	757.172566	757.172556	0	2495
40	nominal	757.169998	NA	NA	NA	NA	NA	757.169982	0	5069
50	nominal	757.167991	NA	NA	NA	NA	NA	757.167973	0	7078
High frequency, 757.837 5MHz										
-30	nominal	No Transmission	NA	NA	NA	NA	NA	No Transmission	0	0
-20	nominal	No Transmission	NA	NA	NA	NA	NA	No Transmission	0	0
-10	nominal	No Transmission	NA	NA	NA	NA	NA	No Transmission	0	0
0	nominal	757.839280	757.839283	757.839287	757.839289	757.839292	757.839293	757.839297	4154	0
10	nominal	757.837383	NA	NA	NA	NA	NA	757.837381	2238	0
20	15%	757.835108	NA	NA	NA	NA	NA	757.835093	0	50
20	nominal	757.835143	NA	NA	NA	NA	NA	757.835119	0	24
20	-15%	757.835128	NA	NA	NA	NA	NA	757.835110	0	33
30	nominal	757.832782	757.832740	757.832713	757.832678	757.832655	757.832635	757.832610	0	2533
40	nominal	757.829982	NA	NA	NA	NA	NA	757.829975	0	5168
50	nominal	757.828066	NA	NA	NA	NA	NA	757.828003	0	7140

* - Reference frequency

Test specification:	Section 27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055, TIA/EIA-603-C, Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date:	11/29/2007		
Temperature: 22 ºC	Air Pressure: 1011 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

Table 7.8.3 Transmitter operating range including frequency drift

Assigned frequency band, MHz	Measured 26 dBc point, MHz	Frequency drift, Hz		26 dBc point including frequency tolerance, MHz	Verdict
		Negative	Positive		
QPSK					
Low frequency					
757.0 – 758.0	757.020000 – 757.326250	7078	4254	757.012922 - 757.330504	Pass
High frequency					
757.0 – 758.0	757.681250 – 757.986250	7140	4154	757.012922 - 757.330504	Pass
16QAM					
Low frequency					
757.0 – 758.0	757.020000 – 757.327500	7078	4254	757.012922 - 757.331754	Pass
High frequency					
757.0 – 758.0	757.680000 – 757.983750	7140	4154	757.672860 - 757.987904	Pass
64QAM					
Low frequency					
757.0 – 758.0	757.025000 – 757.320000	7078	4254	757.017922 - 757.324254	Pass
High frequency					
757.0 – 758.0	757.685000 – 757.980000	7140	4154	757.677860 - 757.984154	Pass
256QAM					
Low frequency					
757.0 – 758.0	757.022500 – 757.325000	7078	4254	757.015422 - 757.329254	Pass
High frequency					
757.0 – 758.0	757.682500 – 757.985000	7140	4154	757.675360 - 757.989154	Pass

Reference numbers of test equipment used

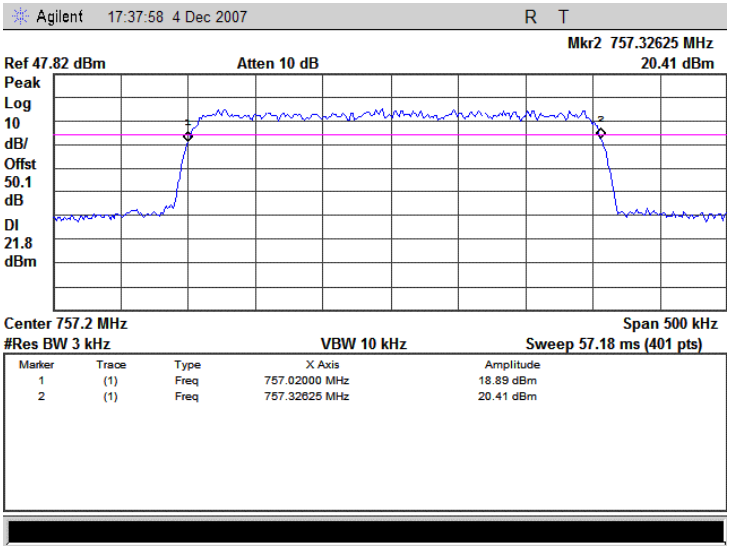
HL 2780	HL 2781						

Full description is given in Appendix A.

Test specification:	Section 27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055, TIA/EIA-603-C, Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date:	11/29/2007		
Temperature: 22 °C	Air Pressure: 1011 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

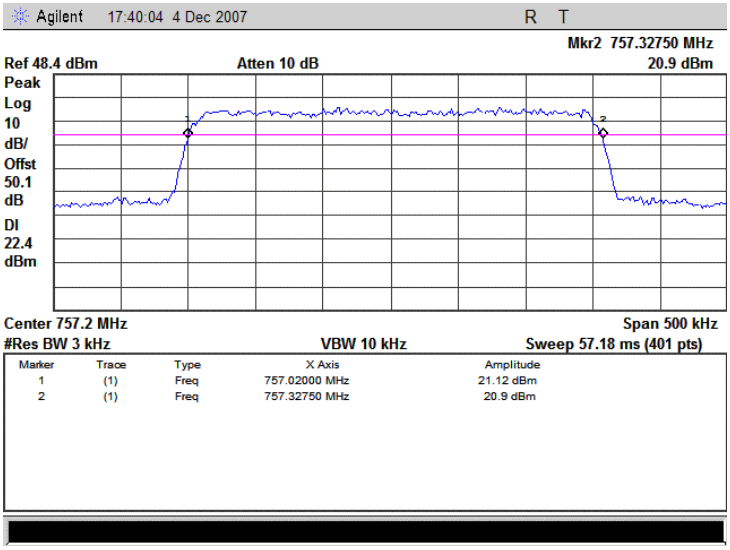
Plot 7.8.1 Band edge emission at low frequency, QPSK

Band edge: Left
Channel Bandwidth: 330 kHz



Plot 7.8.2 Band edge emission at low frequency, 16QAM

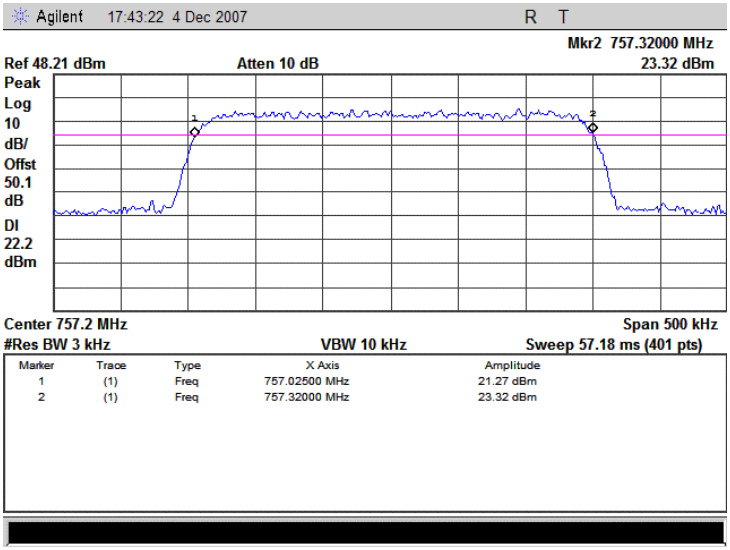
Band edge: Left
Channel Bandwidth: 330 kHz



Test specification:	Section 27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055, TIA/EIA-603-C, Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date:	11/29/2007		
Temperature: 22 °C	Air Pressure: 1011 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

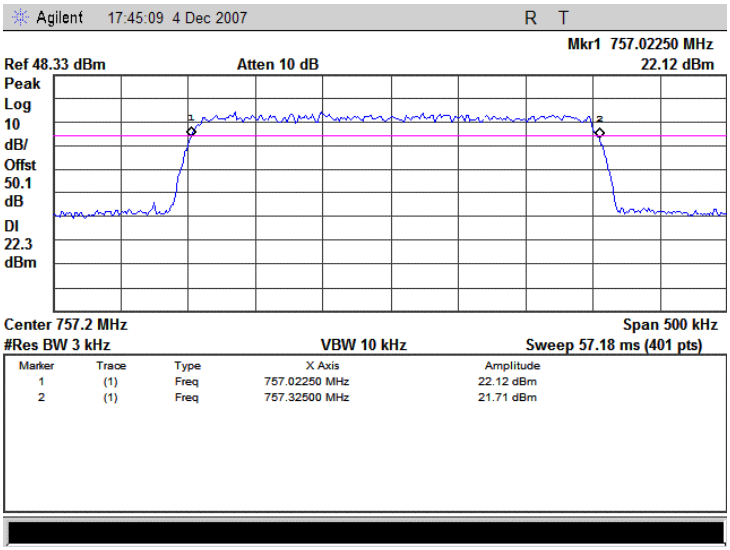
Plot 7.8.3 Band edge emission at low frequency, 64QAM

Band edge: Left
Channel Bandwidth: 330 kHz



Plot 7.8.4 Band edge emission at low frequency, 256QAM

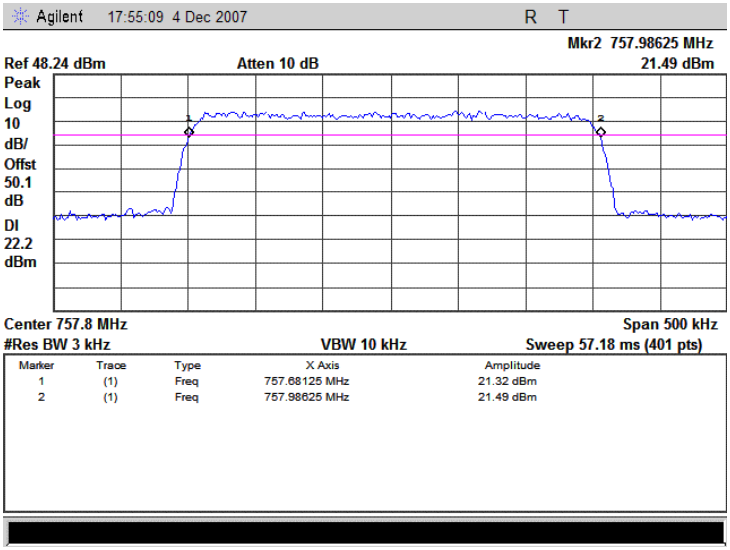
Band edge: Left
Channel Bandwidth: 330 kHz



Test specification:	Section 27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055, TIA/EIA-603-C, Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date:	11/29/2007		
Temperature: 22 °C	Air Pressure: 1011 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

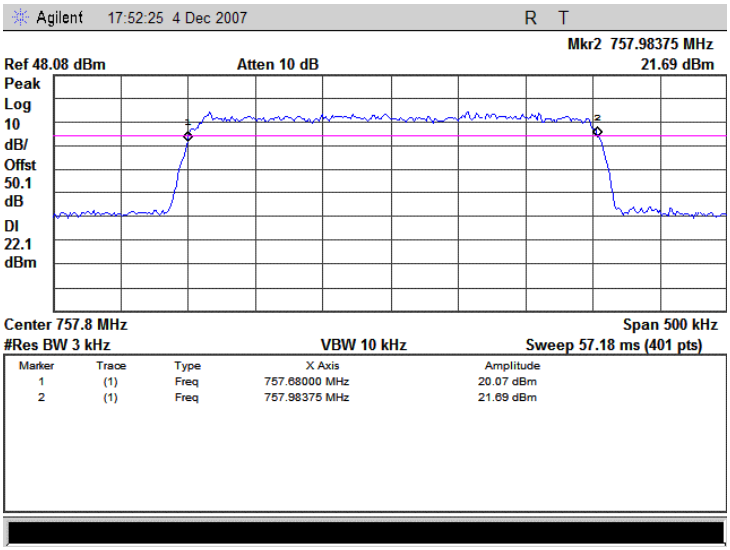
Plot 7.8.5 Band edge emission at high frequency, QPSK

Band edge: Right
Channel Bandwidth: 330 kHz



Plot 7.8.6 Band edge emission at high frequency, 16QAM

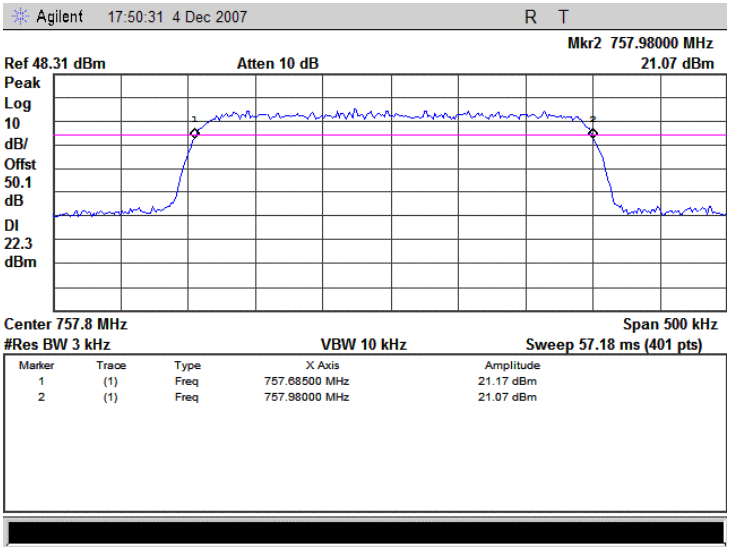
Band edge: Right
Channel Bandwidth: 330 kHz



Test specification:	Section 27.54, Frequency stability		
Test procedure:	47 CFR, Section 2.1055, TIA/EIA-603-C, Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date:	11/29/2007		
Temperature: 22 °C	Air Pressure: 1011 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

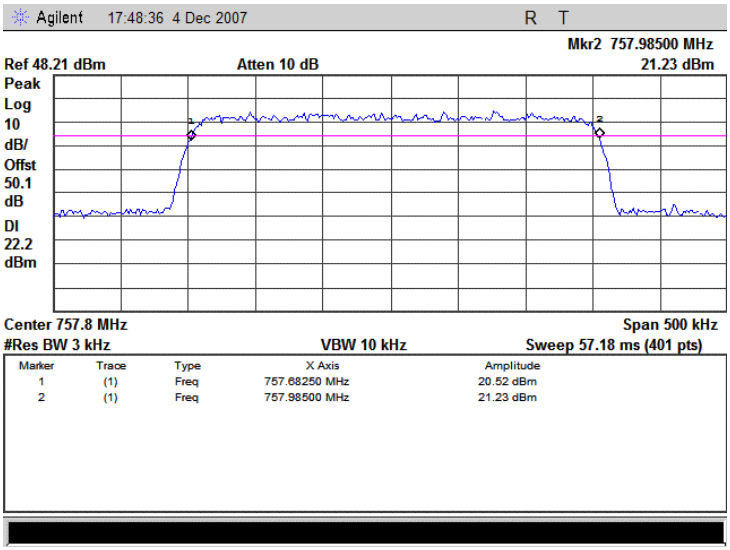
Plot 7.8.7 Band edge emission at high frequency, 64QAM

Band edge: Right
Channel Bandwidth: 330 kHz



Plot 7.8.8 Band edge emission at high frequency, 256QAM

Band edge: Right
Channel Bandwidth: 330 kHz



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 ºC	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks:			

7.9 Occupied bandwidth test

7.9.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.9.1.

Table 7.9.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc
757.0 – 758.0	26

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

7.9.2 Test procedure

7.9.2.1 The EUT was set up as shown in Figure 7.9.1, energized and its proper operation was checked.

7.9.2.2 The EUT was set to transmit unmodulated carrier and reference peak power level was measured.

7.9.2.3 The EUT was set to transmit modulated carrier.

7.9.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.9.2, Table 7.9.3 and associated plots.

Figure 7.9.1 Occupied bandwidth test setup

Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

Table 7.9.2 Occupied bandwidth test results for 245 kHz channel bandwidth

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 3 kHz
VIDEO BANDWIDTH: 10 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATING SIGNAL: PRBS

Carrier frequency, MHz	Occupied bandwidth, kHz
Bit rate: 433 kbps /Modulation: QPSK	
757.1325	227.0
757.3775	227.0
757.8675	226.5
Bit rate: 867 kbps / Modulation: 16QAM	
757.1325	226.5
757.3775	227.0
757.8675	227.5
rate: 1245 kbps /Modulation: 64QAM	
757.1325	220.0
757.3775	218.0
757.8675	218.0
Bit rate: 2195 kbps / Modulation: 256QAM	
757.1325	227.5
757.3775	228.0
757.8675	228.5

Reference numbers of test equipment used

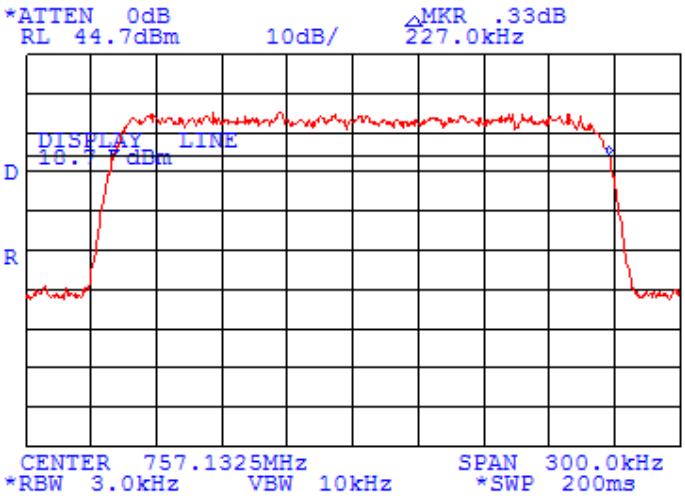
HL 1876	HL 2780	HL 2871	HL 3175	HL 3181			

Full description is given in Appendix A.

Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

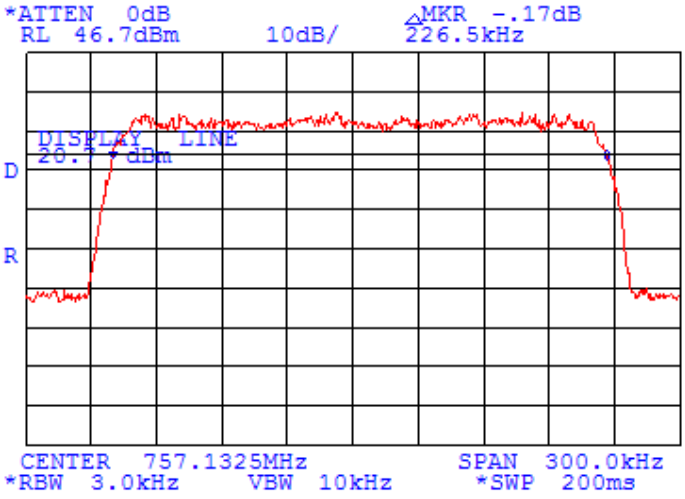
Plot 7.9.1 Occupied bandwidth test results at low frequency

Bit rate: 433 kbps
Modulation: QPSK



Plot 7.9.2 Occupied bandwidth test results at low frequency

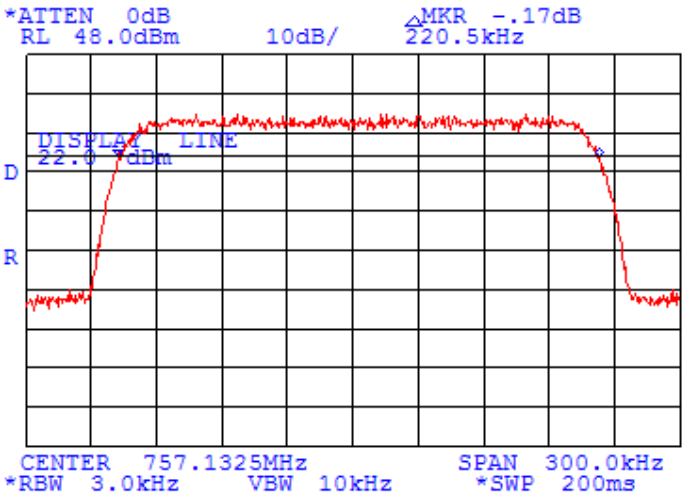
Bit rate: 867 kbps
Modulation: 16QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

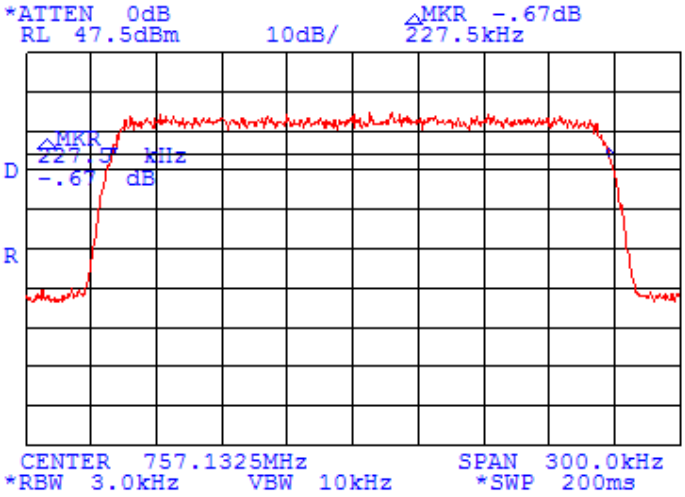
Plot 7.9.3 Occupied bandwidth test results at low frequency

Bit rate: 1245 kbps
Modulation: 64QAM



Plot 7.9.4 Occupied bandwidth test results at low frequency

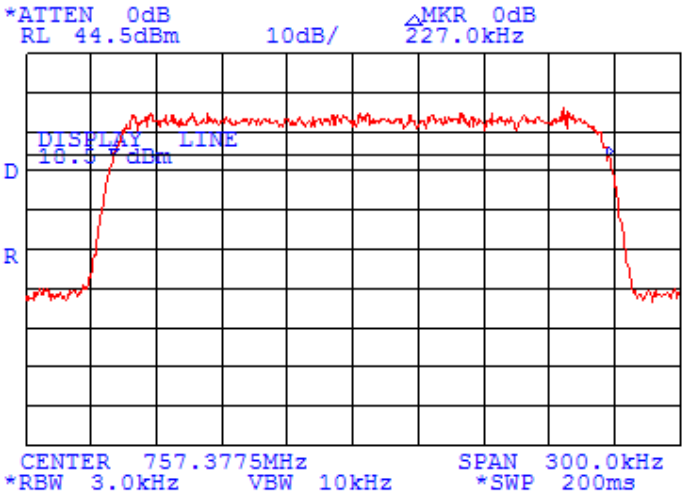
Bit rate: 2195 kbps
Modulation: 256QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

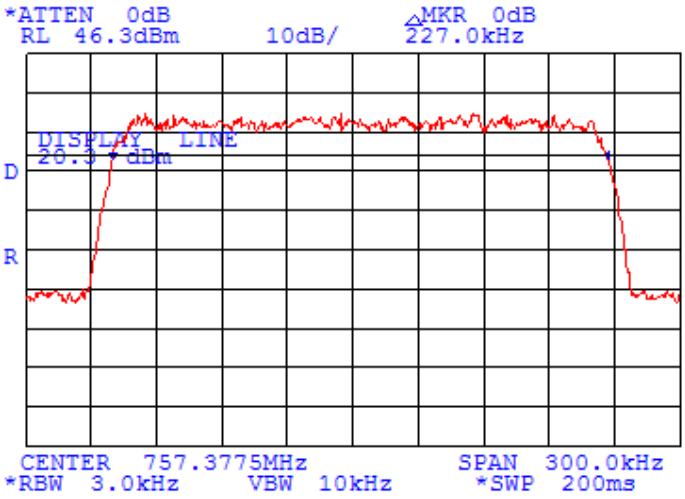
Plot 7.9.5 Occupied bandwidth test results at mid frequency

Bit rate: 433 kbps
Modulation: QPSK



Plot 7.9.6 Occupied bandwidth test results at mid frequency

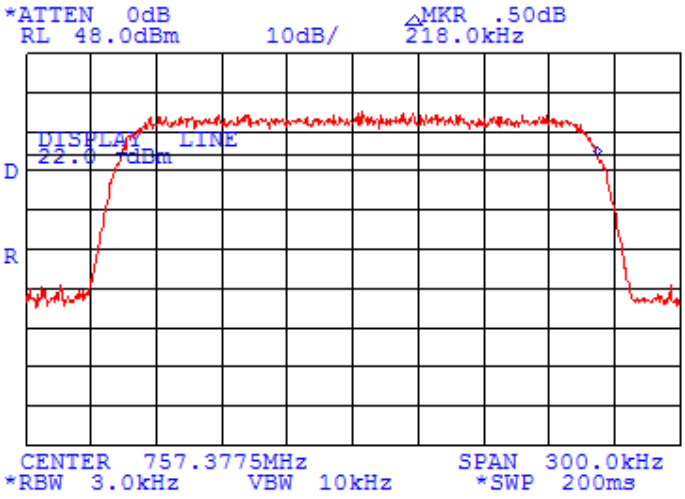
Bit rate: 867 kbps
Modulation: 16QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

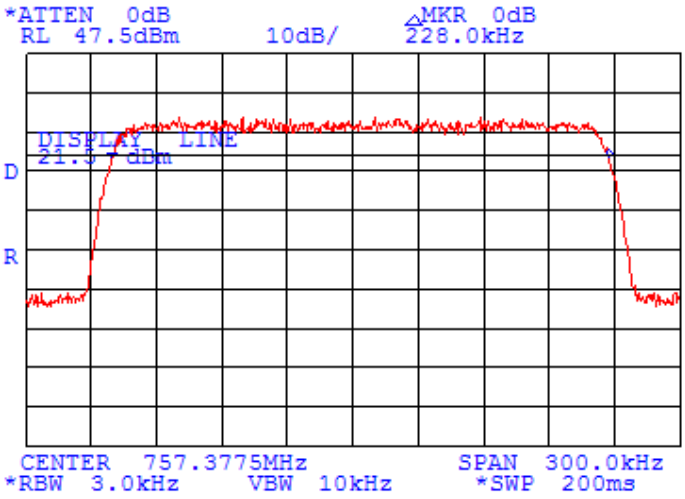
Plot 7.9.7 Occupied bandwidth test results at mid frequency

Bit rate: 1245 kbps
Modulation: 64QAM



Plot 7.9.8 Occupied bandwidth test results at mid frequency

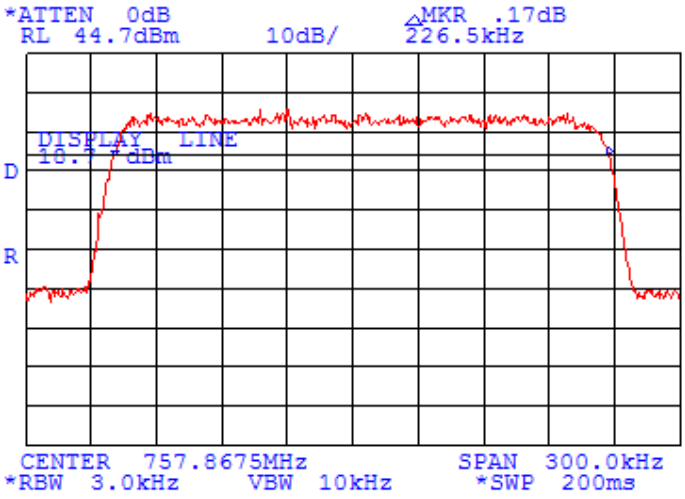
Bit rate: 2195 kbps
Modulation: 256QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

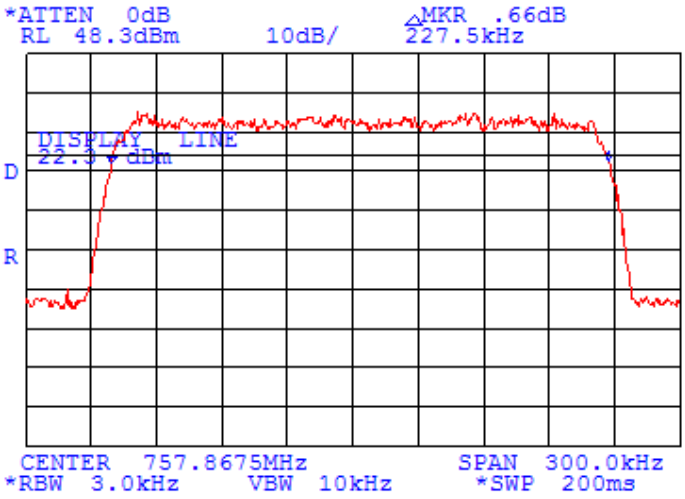
Plot 7.9.9 Occupied bandwidth test results at high frequency

Bit rate: 433 kbps
Modulation: QPSK



Plot 7.9.10 Occupied bandwidth test results at high frequency

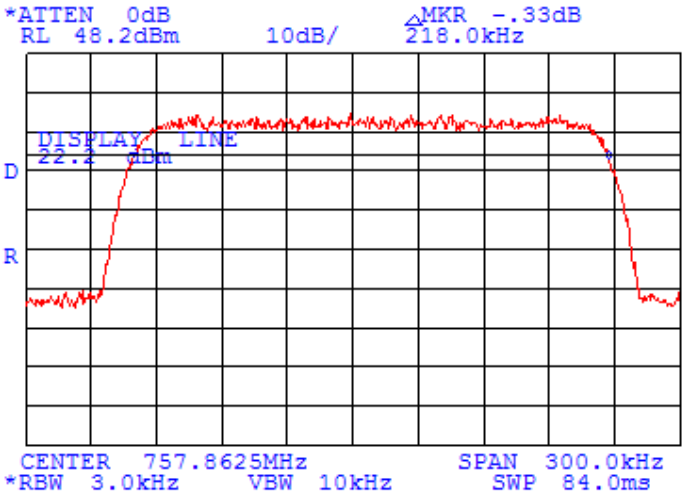
Bit rate: 867 kbps
Modulation: 16QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 245 kHz CBW			

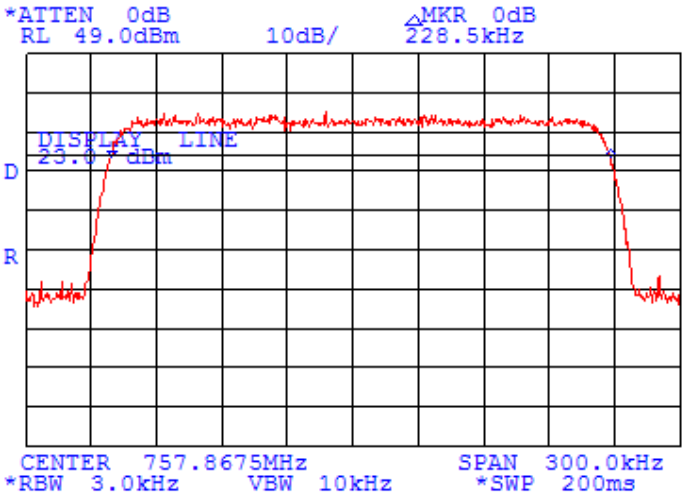
Plot 7.9.11 Occupied bandwidth test results at high frequency

Bit rate: 1245 kbps
Modulation: 64QAM



Plot 7.9.12 Occupied bandwidth test results at high frequency

Bit rate: 2195 kbps
Modulation: 256QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

Table 7.9.3 Occupied bandwidth test results for 330 kHz channel bandwidth

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 3 kHz
VIDEO BANDWIDTH: 10 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATING SIGNAL: PRBS

Carrier frequency, MHz	Occupied bandwidth, kHz
Bit rate: 583 kbps /Modulation: QPSK	
757.17	304.7
757.50	305.3
757.83	306.0
Bit rate: 1166 kbps / Modulation: 16QAM	
757.17	302.7
757.50	304.0
757.83	304.0
rate: 1668 kbps /Modulation: 64QAM	
757.17	292.0
757.50	294.7
757.83	294.0
Bit rate: 2344 kbps / Modulation: 256QAM	
757.17	304.7
757.50	308.0
757.83	306.7

Reference numbers of test equipment used

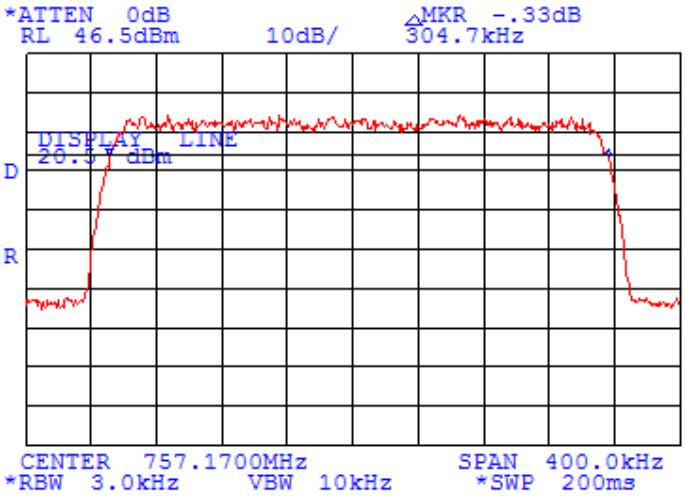
HL 1424	HL 1876	HL 2951	HL 2883	HL 3180	HL 3440		

Full description is given in Appendix A.

Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

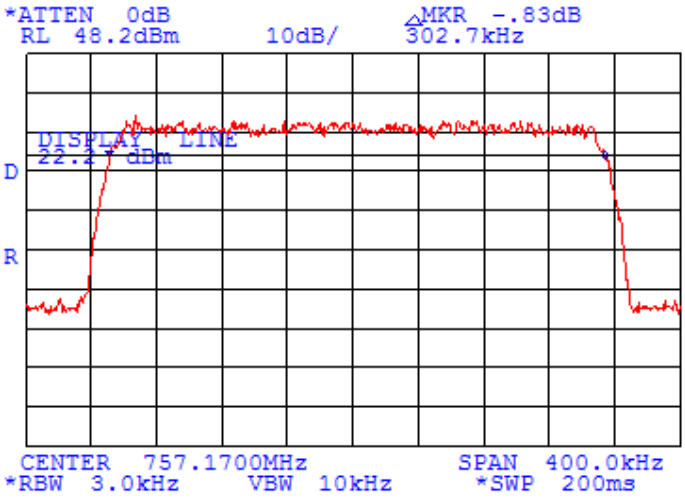
Plot 7.9.13 Occupied bandwidth test results at low frequency

Bit rate: 583 kbps
Modulation: QPSK



Plot 7.9.14 Occupied bandwidth test results at low frequency

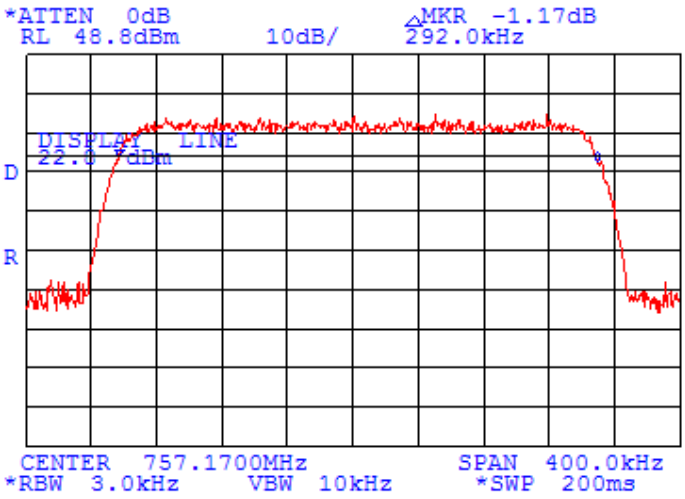
Bit rate: 1166 kbps
Modulation: 16QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

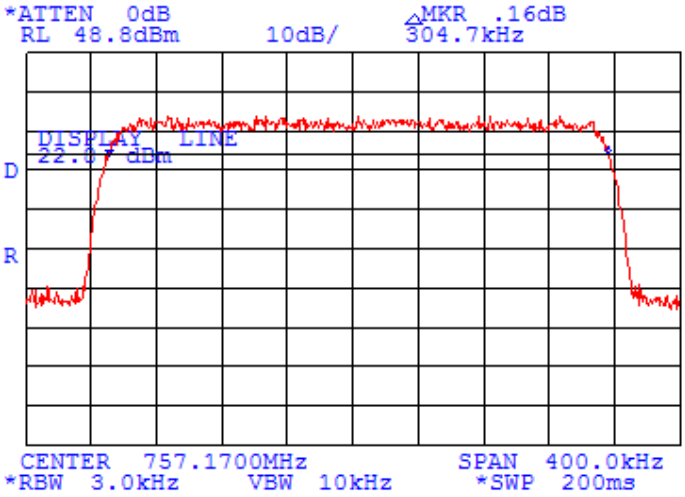
Plot 7.9.15 Occupied bandwidth test results at low frequency

Bit rate: 1668 kbps
Modulation: 64QAM



Plot 7.9.16 Occupied bandwidth test results at low frequency

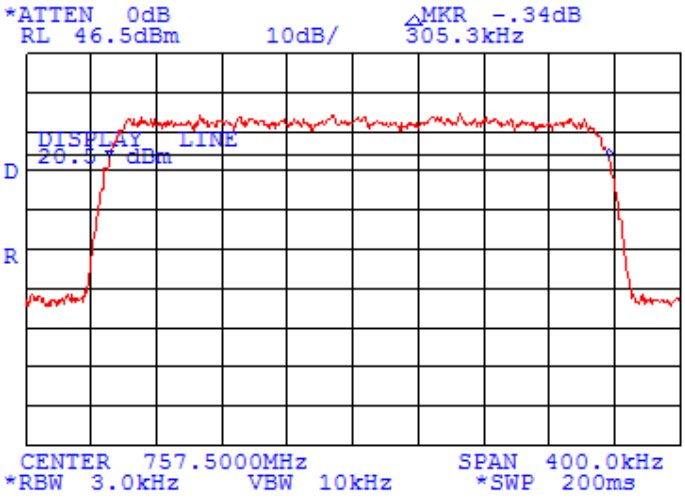
Bit rate: 2344 kbps
Modulation: 256QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

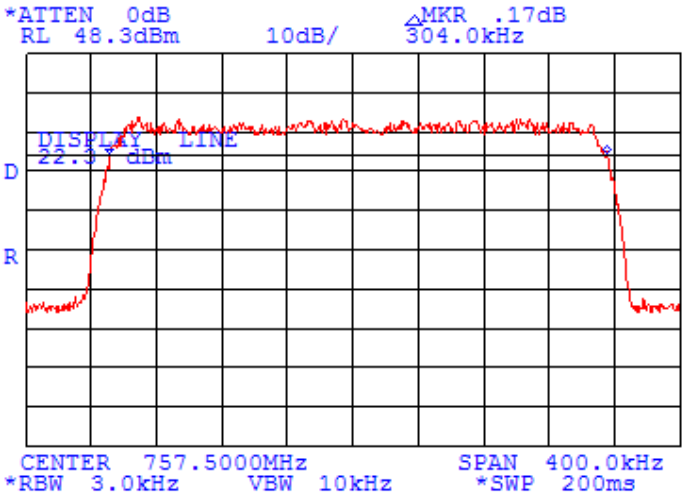
Plot 7.9.17 Occupied bandwidth test results at mid frequency

Bit rate: 583 kbps
Modulation: QPSK



Plot 7.9.18 Occupied bandwidth test results at mid frequency

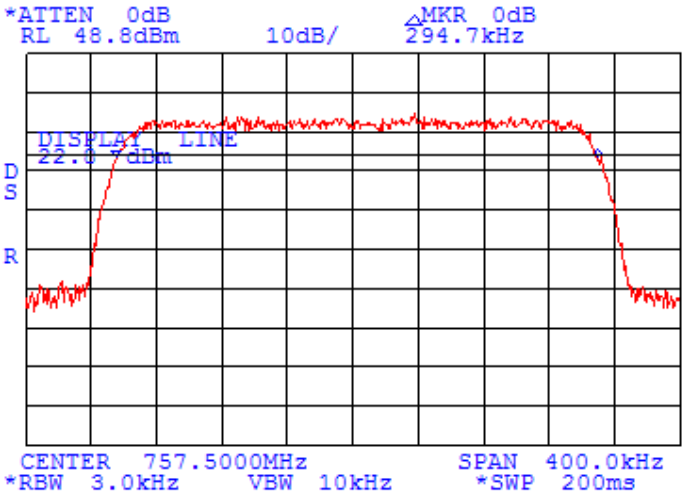
Bit rate: 1166 kbps
Modulation: 16QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

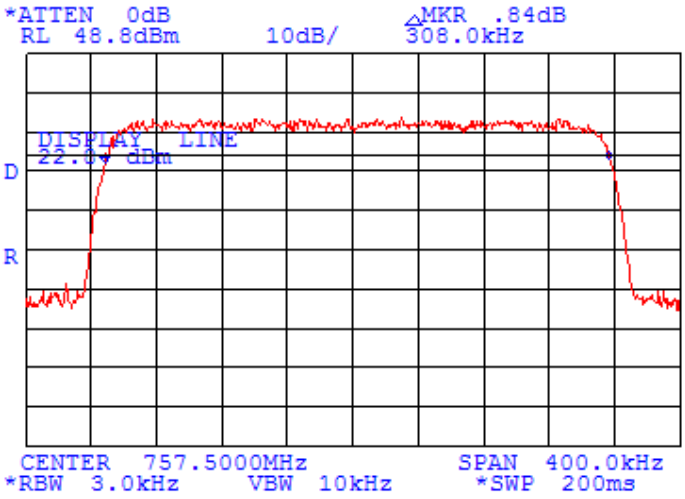
Plot 7.9.19 Occupied bandwidth test results at mid frequency

Bit rate: 1668 kbps
Modulation: 64QAM



Plot 7.9.20 Occupied bandwidth test results at mid frequency

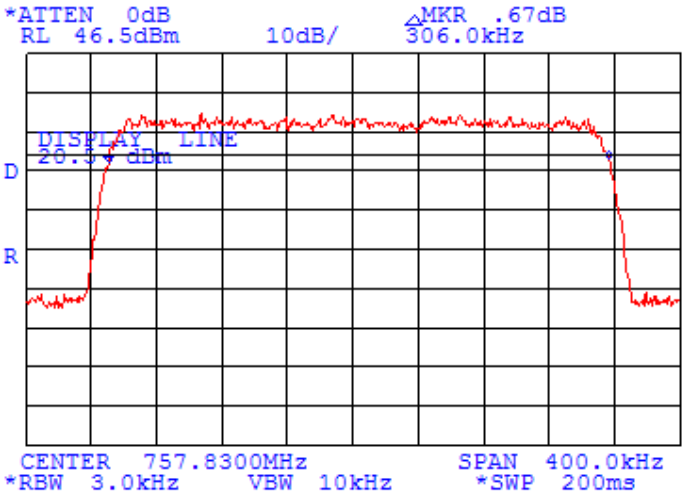
Bit rate: 2344 kbps
Modulation: 256QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

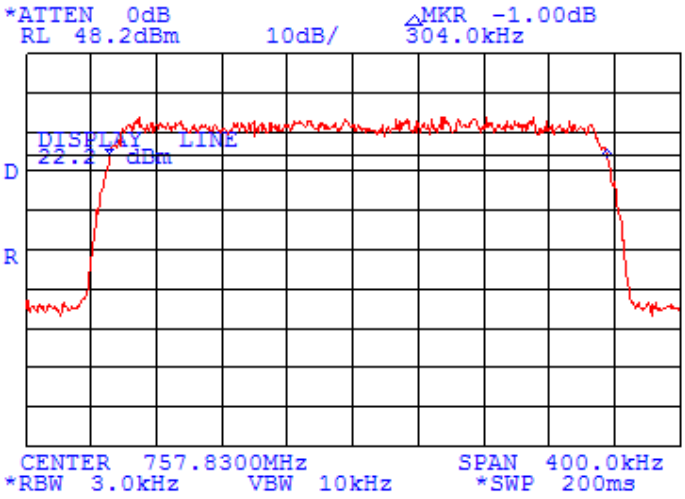
Plot 7.9.21 Occupied bandwidth test results at high frequency

Bit rate: 583 kbps
Modulation: QPSK



Plot 7.9.22 Occupied bandwidth test results at high frequency

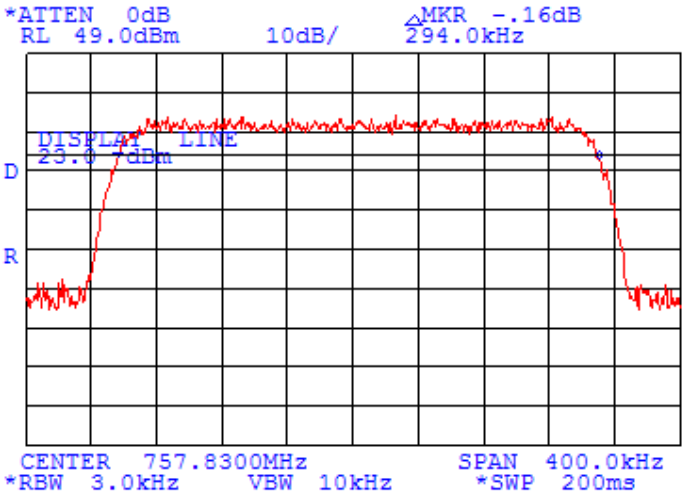
Bit rate: 1166 kbps
Modulation: 16QAM



Test specification:	Section 2.1049, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	4/09/2008		
Temperature: 24 °C	Air Pressure: 1012 hPa	Relative Humidity: 45 %	Power Supply: 120 VAC
Remarks: 330 kHz CBW			

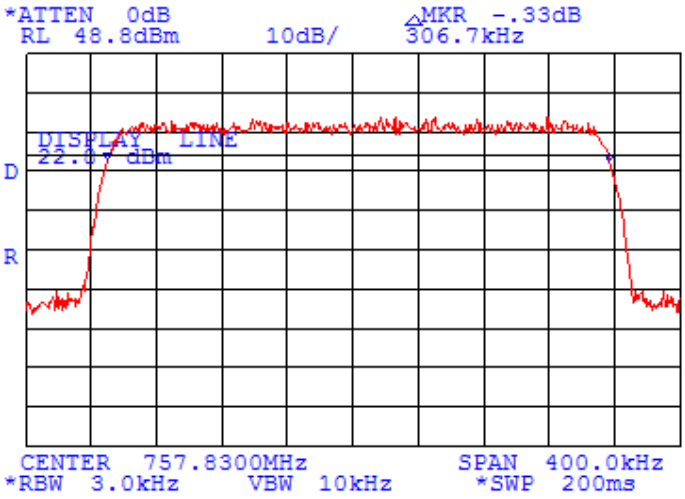
Plot 7.9.23 Occupied bandwidth test results at high frequency

Bit rate: 1668 kbps
Modulation: 64QAM



Plot 7.9.24 Occupied bandwidth test results at high frequency

Bit rate: 2344 kbps
Modulation: 256QAM



8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0287	Turntable, Motorized Diameter, 2 m (OATS)	HL	TMD-2	042	11-Nov-07	11-Nov-08
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	28-Jun-07	28-Jun-08
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard Co	8546A	3617A 00319, 3448A002 53	28-Aug-07	28-Aug-08
0554	Amplifier, 2-18 GHz RF	Miteq	AFD4	104300	28-Feb-08	28-Feb-09
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m, 6.5 GHz	HL	GORE-3	176	01-Jan-08	01-Jan-09
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	10-Jan-08	10-Jan-09
0613	Sensor Electric Field 10 kHz-1.0 GHz, 1-300 V/m (probe), w/charger	Amplifier Research	FP2000	18677	07-Dec-07	07-Dec-08
0661	Generator Swept Signal, 10 MHz to 40 GHz, + 10 dBm	HP	83640B	3614A002 66	23-Sep-07	23-Sep-08
1004	Cable Coaxial, ANDREW PSWJ4 , 6m, 6.5 GHz	HL	ANDREW -6	163	02-Dec-07	02-Dec-08
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies	8564EC	3946A002 19	28-Aug-07	28-Aug-08
1629	Isotropic Field Monitor	Amplifier Research	FM2000	23308	07-Dec-07	07-Dec-08
1876	Attenuator, 50 Ohm, 100 W, 20 dB	Bird	8343-200	2200	05-Feb-08	05-Feb-09
1947	Cable 18GHz, 6.5 m, blue	Rhophase Microwave Limited	NPS-1803A-6500-NPS	T4974	05-Oct-07	05-Oct-08
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	03-Mar-08	03-Mar-09
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	03-Mar-08	03-Mar-09
2499	Quadruplexer 1-12 GHz (1-2 GHz; 2-4GHz;4-8 GHz; 8-12GHz)	Elettronica S.p.A. - Roma	UE 84	D/00239	08-Feb-07	08-Feb-09
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	11-Jun-07	11-Jun-08
2781	EMC analyzer measurement software	Agilent Technologies	E7415A		01-Jan-08	01-Jan-09
2870	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	2870	01-Jan-08	01-Jan-09
2871	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-8155-00	2871	11-Feb-08	11-Feb-09
2883	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC-MNFN-3.0	211539 003	11-Feb-08	11-Feb-09
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	07-May-07	07-May-08
2910	Cable 18 GHz, 3 m, SMA-SMA	Gore	NA	989370	05-Oct-07	05-Oct-08
2951	Cable, RF, 18 GHz, 0.9 m, SMA-SMA	Gore	10020014	NA	05-Oct-07	05-Oct-08
3175	Attenuator, N-type, 10 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N10W5+	0708	07-May-07	07-May-08
3180	Attenuator, N-type, 20 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N20W5+	0651	07-May-07	07-May-08
3181	Attenuator, N-type, 20 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N20W5+	0651	07-May-07	07-May-08
3207	Cable 40GHz, 1.2 m	Gore	GOR245	05118337	17-Jun-07	17-Jun-08

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
3385	Microwave Cable Assembly, 26.5 GHz, 1.0 m, N type/N type	Suhner Sucoflex	104EA	3385	12-Feb-08	12-Feb-09
3437	Precision Fixed Attenuator, 50 Ohm, 5 W, 10 dB, DC to 18 GHz	Mini-Circuits	BW-S10W5+	NA	09-Mar-08	09-Mar-09
3440	Precision Fixed Attenuator, 50 Ohm, 5 W, 20 dB, DC to 18 GHz	Mini-Circuits	BW-S20W5+	NA	09-Mar-08	09-Mar-09

9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Transmitter tests	
Carrier power conducted at antenna connector	± 1.7 dB
Carrier power radiated (substitution method)	± 4.5 dB
Occupied bandwidth	±8%
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
Spurious emissions radiated 30 MHz – 40 GHz (substitution method)	± 4.5 dB
Frequency stability	± 168 Hz (0.56 ppm)

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) and by Industry Canada for electromagnetic emissions (file numbers IC 2186-1 for OATS and IC 2186-2 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), 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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11 APPENDIX D Specification references

47CFR part 27: 2007	Miscellaneous wireless communications services
47CFR part 1: 2006	Practice and procedure
47CFR part 2: 2006	Frequency allocations and radio treaty matters; general rules and regulations
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.
ANSI/TIA/EIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

12 APPENDIX E Test equipment correction factors

Antenna Factor
Active Loop Antenna
EMC Test Systems, model 6502, serial number 2857, HL 0446

Frequency, MHz	Magnetic Antenna Factor, dB(S/m)	Electric Antenna Factor, dB(1/m)
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	9.7
0.750	-41.9	9.6
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.1
4.000	-41.4	10.1
5.000	-41.5	10.0
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(S/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μA/m).
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

Biconilog antenna EMCO, model 3141, serial number 1011, HL 0604

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

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
EMC Test Systems, model 3115, serial no: 9911-5964, HL 1984

Frequency, MHz	Antenna gain, dBi	Antenna factor. dB(1/m)
1000.0	5.8	24.5
1500.0	9.0	24.8
2000.0	8.6	27.7
2500.0	9.5	28.7
3000.0	8.9	30.8
3500.0	8.2	32.9
4000.0	9.6	32.7
4500.0	11.2	32.1
5000.0	10.6	33.6
5500.0	9.8	35.3
6000.0	10.1	35.7
6500.0	10.7	35.8
7000.0	10.9	36.2
7500.0	10.5	37.2
8000.0	11.1	37.2
8500.0	10.8	38.1
9000.0	10.7	38.6
9500.0	11.5	38.3
10000.0	11.8	38.4
10500.0	12.3	38.3
11000.0	12.3	38.8
11500.0	11.5	39.9
12000.0	12.2	39.6
12500.0	12.6	39.5
13000.0	12.0	40.5
13500.0	11.7	41.1
14000.0	11.7	41.5
14500.0	12.7	40.8
15000.0	14.2	39.5
15500.0	16.0	38.1
16000.0	16.2	38.1
16500.0	14.5	40.1
17000.0	12.2	42.6
17500.0	9.7	45.4
18000.0	6.6	48.7

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

Cable loss
Cable coaxial, GORE A2P01POL118, 2.3 m, model GORE-3, serial number 176, HL 0589
+ Cable coaxial, ANDREW PSWJ4, 6 m, model: ANDREW-6, serial number 163, HL 1004

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	30	0.33	≤ 6.5	±0.12
2	50	0.40		
3	100	0.57		
4	300	0.97		
5	500	1.25		
6	800	1.59		
7	1000	1.81		
8	1200	1.97		
9	1400	2.15		
10	1600	2.28		
11	1800	2.43		
12	2000	2.61		
13	2200	2.75		
14	2400	2.89		
15	2600	2.97		
16	2800	3.21	≤ 6.5	±0.12
17	3000	3.32		
18	3300	3.47		
19	3600	3.62		
20	3900	3.84		
21	4200	3.92		±0.17
22	4500	4.07		
23	4800	4.36		
24	5100	4.62		
25	5400	4.78		
26	5700	5.16		
27	6000	5.67		
28	6500	5.99		

Cable loss
Cable 18 GHz, 6.5 m, blue, model NPS-1803A-6500-NPS, serial number T4974, HL 1947

Frequency, GHz	Insertion loss, dB
0.03	0.30
0.05	0.38
0.10	0.53
0.20	0.74
0.30	0.91
0.40	1.05
0.50	1.18
0.60	1.29
0.70	1.40
0.80	1.50
0.90	1.59
1.00	1.68
1.10	1.77
1.20	1.86
1.30	1.94
1.40	2.01
1.50	2.08
1.60	2.16
1.70	2.22
1.80	2.29
1.90	2.36
2.00	2.42
2.10	2.48
2.20	2.54
2.30	2.60
2.40	2.66
2.50	2.71
2.60	2.77
2.70	2.83
2.80	2.89
2.90	2.95
3.10	3.06
3.30	3.17
3.50	3.28
3.70	3.39
3.90	3.51
4.10	3.62
4.30	3.76
4.50	3.87
4.70	4.01
4.90	4.10
5.10	4.21
5.30	4.31
5.50	4.43
5.70	4.56
5.90	4.71

Frequency, GHz	Insertion loss, dB
6.10	4.87
6.30	4.95
6.50	4.94
6.70	4.88
6.90	4.87
7.10	4.83
7.30	4.85
7.50	4.86
7.70	4.91
7.90	4.96
8.10	5.03
8.30	5.08
8.50	5.13
8.70	5.21
8.90	5.22
9.10	5.34
9.30	5.35
9.50	5.52
9.70	5.51
9.90	5.66
10.10	5.70
10.30	5.78
10.50	5.79
10.70	5.82
10.90	5.86
11.10	5.94
11.30	6.06
11.50	6.21
11.70	6.44
11.90	6.61
12.10	6.76
12.40	6.68
13.00	6.66
13.50	6.81
14.00	6.90
14.50	6.90
15.00	6.97
15.50	7.17
16.00	7.28
16.50	7.27
17.00	7.38
17.50	7.68
18.00	7.92

Cable loss
Cable coaxial, Huber-Suhner, 18 GHz, 6.4 m, SMA - SMA, model 198-9155-00, HL 2870

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.09	5750	2.49	12000	3.71
30	0.17	6000	2.53	12250	3.81
100	0.32	6250	2.58	12500	3.84
250	0.49	6500	2.64	12750	3.88
500	0.70	6750	2.69	13000	3.92
750	0.86	7000	2.75	13250	3.96
1000	1.00	7250	2.80	13500	3.98
1250	1.11	7500	2.87	13750	4.01
1500	1.23	7750	2.93	14000	4.03
1750	1.34	8000	2.94	14250	4.09
2000	1.41	8250	3.00	14500	4.08
2250	1.51	8500	3.04	14750	4.10
2500	1.59	8750	3.08	15000	4.15
2750	1.68	9000	3.14	15250	4.22
3000	1.76	9250	3.16	15500	4.31
3250	1.83	9500	3.22	15750	4.42
3500	1.91	9750	3.26	16000	4.48
3750	1.97	10000	3.36	16250	4.54
4000	2.05	10250	3.41	16500	4.56
4250	2.11	10500	3.46	16750	4.57
4500	2.18	10750	3.50	17000	4.59
4750	2.24	11000	3.54	17250	4.66
5000	2.30	11250	3.58	17500	4.70
5250	2.36	11500	3.63	17750	4.76
5500	2.43	11750	3.66	18000	4.72

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

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	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 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, Gore, 18 GHz, 3m, SMA-SMA, S/N 989370
HL 2910

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.07	5750	2.97	12000	5.05
30	0.19	6000	2.91	12250	4.44
100	0.36	6250	3.23	12500	4.82
250	0.53	6500	3.42	12750	5.22
500	0.77	6750	3.17	13000	5.02
750	0.94	7000	3.56	13250	5.00
1000	1.10	7250	3.77	13500	5.09
1250	1.19	7500	3.48	13750	4.70
1500	1.35	7750	3.81	14000	5.03
1750	1.51	8000	3.82	14250	5.17
2000	1.57	8250	3.62	14500	4.92
2250	1.69	8500	3.95	14750	4.91
2500	1.76	8750	4.00	15000	5.03
2750	1.83	9000	3.80	15250	4.93
3000	2.02	9250	4.09	15500	5.28
3250	2.17	9500	4.12	15750	5.60
3500	2.13	9750	4.11	16000	5.16
3750	2.23	10000	4.36	16250	5.45
4000	2.40	10250	4.75	16500	5.78
4250	2.31	10500	4.61	16750	5.47
4500	2.52	10750	4.26	17000	5.21
4750	2.77	11000	4.62	17250	5.53
5000	2.82	11250	4.55	17500	5.53
5250	2.77	11500	4.59	17750	5.71
5500	3.04	11750	5.20	18000	5.77

Cable loss
Cable coaxial, Gore, 18 GHz, 0.9 m, SMA-SMA, S/N 10020014
HL 2951

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.07	5750	0.77	12000	1.23
30	0.06	6000	0.78	12250	1.25
100	0.09	6250	0.81	12500	1.26
250	0.15	6500	0.83	12750	1.26
500	0.21	6750	0.84	13000	1.30
750	0.27	7000	0.85	13250	1.30
1000	0.31	7250	0.88	13500	1.30
1250	0.36	7500	0.88	13750	1.29
1500	0.38	7750	0.93	14000	1.23
1750	0.42	8000	0.92	14250	1.32
2000	0.44	8250	0.94	14500	1.27
2250	0.47	8500	0.99	14750	1.27
2500	0.50	8750	0.97	15000	1.34
2750	0.52	9000	1.01	15250	1.36
3000	0.54	9250	1.05	15500	1.35
3250	0.57	9500	1.08	15750	1.36
3500	0.58	9750	1.10	16000	1.43
3750	0.61	10000	1.09	16250	1.38
4000	0.63	10250	1.09	16500	1.42
4250	0.66	10500	1.07	16750	1.49
4500	0.68	10750	1.10	17000	1.53
4750	0.70	11000	1.09	17250	1.59
5000	0.71	11250	1.09	17500	1.65
5250	0.74	11500	1.13	17750	1.82
5500	0.77	11750	1.12	18000	2.09

Cable loss
Cable coaxial, GORE-TEX, GOR245, 40 GHz, 1.2 m, SMA-SMA, S/N 05118337
HL 3207

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	0.17	5000	1.54	10200	2.26	15500	2.77	31500	4.07
30	0.14	5100	1.54	10300	2.26	15600	2.78	32000	4.03
50	0.16	5200	1.56	10400	2.24	15700	2.81	32500	3.93
100	0.22	5300	1.59	10500	2.23	15800	2.81	33000	4.00
200	0.30	5400	1.60	10600	2.25	15900	2.84	33500	4.09
300	0.38	5500	1.61	10700	2.31	16000	2.91	34000	4.08
400	0.44	5600	1.63	10800	2.34	16100	2.92	34500	4.13
500	0.48	5700	1.66	10900	2.38	16200	2.88	35000	4.15
600	0.54	5800	1.68	11000	2.38	16300	2.90	35500	4.18
700	0.58	5900	1.68	11100	2.38	16400	2.93	36000	4.22
800	0.62	6000	1.71	11200	2.37	16500	2.92	36500	4.25
900	0.65	6100	1.71	11300	2.38	16600	2.97	37000	4.26
1000	0.69	6200	1.73	11400	2.40	16700	3.02	37500	4.40
1100	0.73	6300	1.75	11500	2.41	16800	3.02	38000	4.40
1200	0.76	6400	1.76	11600	2.44	16900	3.01	38500	4.52
1300	0.78	6500	1.78	11700	2.44	17000	3.04	39000	4.54
1400	0.81	6600	1.77	11800	2.44	17100	3.08	39500	4.36
1500	0.85	6700	1.79	11900	2.45	17200	3.05	40000	4.48
1600	0.87	6800	1.80	12000	2.46	17300	3.06		
1700	0.90	6900	1.83	12100	2.45	17400	3.06		
1800	0.93	7000	1.84	12200	2.45	17500	3.07		
1900	0.96	7100	1.86	12300	2.48	17600	3.08		
2000	0.95	7200	1.88	12400	2.49	17700	3.09		
2100	0.98	7300	1.86	12500	2.51	17800	3.12		
2200	1.00	7400	1.87	12600	2.53	17900	3.09		
2300	1.02	7500	1.90	12700	2.51	18000	3.08		
2400	1.04	7600	1.91	12800	2.52	18500	3.11		
2500	1.06	7700	1.95	12900	2.54	19000	3.14		
2600	1.08	7800	1.98	13000	2.56	19500	3.20		
2700	1.11	7900	1.99	13100	2.56	20000	3.24		
2800	1.14	8000	1.98	13200	2.59	20500	3.31		
2900	1.15	8100	1.98	13300	2.59	21000	3.38		
3000	1.17	8200	2.00	13400	2.60	21500	3.44		
3100	1.19	8300	2.01	13500	2.65	22000	3.45		
3200	1.20	8400	2.05	13600	2.71	22500	3.45		
3300	1.24	8500	2.07	13700	2.71	23000	3.47		
3400	1.26	8600	2.08	13800	2.69	23500	3.47		
3500	1.27	8700	2.09	13900	2.67	24000	3.54		
3600	1.28	8800	2.09	14000	2.68	24500	3.62		
3700	1.32	8900	2.10	14100	2.68	25000	3.73		
3800	1.32	9000	2.12	14200	2.74	25500	3.77		
3900	1.35	9100	2.12	14300	2.77	26000	3.71		
4000	1.36	9200	2.15	14400	2.80	26500	3.73		
4100	1.39	9300	2.13	14600	2.74	27000	3.73		
4200	1.40	9400	2.16	14700	2.73	27500	3.78		
4300	1.41	9500	2.17	14800	2.75	28000	3.81		
4400	1.43	9600	2.17	14900	2.75	28500	3.81		
4500	1.47	9700	2.18	15000	2.77	29000	3.80		
4600	1.46	9800	2.16	15100	2.76	29500	3.81		
4700	1.49	9900	2.17	15200	2.76	30000	3.89		
4800	1.50	10000	2.20	15300	2.77	30500	4.03		
4900	1.52	10100	2.22	15400	2.79	31000	4.01		

Cable loss
Cable coaxial, Microwave Cable Assembly, 104EA, 26.5 GHz, 1.0 m
Suhner Sucoflex, HL 3885

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.04	5000	0.62	10200	0.92	15500	1.16
30	0.06	5100	0.64	10300	0.94	15600	1.19
50	0.07	5200	0.67	10400	0.94	15700	1.18
100	0.09	5300	0.70	10500	0.91	15800	1.20
200	0.12	5400	0.71	10600	1.00	15900	1.20
300	0.16	5500	0.72	10700	0.88	16000	1.18
400	0.18	5600	0.75	10800	0.90	16100	1.19
500	0.19	5700	0.74	10900	0.90	16200	1.17
600	0.19	5800	0.74	11000	0.88	16300	1.18
700	0.23	5900	0.82	11100	0.93	16400	1.19
800	0.27	6000	0.83	11200	0.94	16500	1.18
900	0.26	6100	0.86	11300	1.00	16600	1.15
1000	0.27	6200	0.85	11400	0.98	16700	1.15
1100	0.28	6300	0.78	11500	0.92	16800	1.14
1200	0.32	6400	0.78	11600	0.93	16900	1.16
1300	0.28	6500	0.77	11700	1.01	17000	1.18
1400	0.32	6600	0.85	11800	1.00	17100	1.21
1500	0.32	6700	0.85	11900	1.01	17200	1.20
1600	0.34	6800	0.89	12000	0.98	17300	1.20
1700	0.35	6900	0.85	12100	1.03	17400	1.24
1800	0.36	7000	0.80	12200	1.04	17500	1.22
1900	0.42	7100	0.79	12300	1.08	17600	1.20
2000	0.36	7200	0.81	12400	1.09	17700	1.19
2100	0.37	7300	0.84	12500	1.03	17800	1.20
2200	0.40	7400	0.87	12600	1.02	17900	1.21
2300	0.41	7500	0.89	12700	1.04	18000	1.22
2400	0.43	7600	0.87	12800	1.04	18500	1.05
2500	0.43	7700	0.89	12900	1.04	19000	1.68
2600	0.44	7800	0.86	13000	1.07	19500	0.82
2700	0.46	7900	0.86	13100	1.08	20000	1.58
2800	0.46	8000	0.91	13200	1.11	20500	1.00
2900	0.47	8100	0.93	13300	1.14	21000	1.45
3000	0.48	8200	0.97	13400	1.15	21500	1.33
3100	0.48	8300	0.91	13500	1.14	22000	1.24
3200	0.49	8400	0.92	13600	1.12	22500	1.03
3300	0.50	8500	0.84	13700	1.13	23000	1.61
3400	0.51	8600	0.85	13800	1.13	23500	0.60
3500	0.54	8700	0.89	13900	1.17	24000	1.97
3600	0.57	8800	0.95	14000	1.14	24500	1.32
3700	0.55	8900	0.90	14100	1.15	25000	1.85
3800	0.55	9000	0.89	14200	1.13	25500	-0.24
3900	0.56	9100	0.87	14300	1.15	26000	0.68
4000	0.56	9200	0.87	14400	1.13	26500	0.86
4100	0.58	9300	0.85	14600	1.12		
4200	0.59	9400	0.86	14700	1.15		
4300	0.60	9500	0.87	14800	1.18		
4400	0.63	9600	0.89	14900	1.20		
4500	0.62	9700	0.87	15000	1.16		
4600	0.63	9800	0.89	15100	1.17		
4700	0.63	9900	0.91	15200	1.15		
4800	0.62	10000	0.89	15300	1.17		
4900	0.61	10100	0.88	15400	1.16		

13 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μV)	decibel referred to one microvolt
dB(μV/m)	decibel referred to one microvolt per meter
dB(μA)	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
ITE	information technology equipment
k	kilo
kHz	kilohertz
LISN	line impedance stabilization network
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μs	microsecond
NA	not applicable
OATS	open area test site
Ω	Ohm
QP	quasi-peak
PCB	printed circuit board
PM	pulse modulation
PS	power supply
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt