Nemko USA, Inc.
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Certification Test Report:	2007 128454 Thuraya FCC
Project number:	8454-1
Equipment Under Test (EUT):	Broadband Satellite IP Modem
Model:	Hughes 9103
FCC ID:	K3YHNS9103
In Accordance With:	FCC Part 15 Subpart C, 15.247
For:	HUGHES NETWORK SYSTEMS 9605 SCRANTON ROAD, SUITE 500 SAN DIEGO, CA 92121
Tested By:	Nemko USA Inc. 11696 Sorrento Valley Road, Suite F San Diego, CA 92121
Authorized By:	*FR Fleury* FR Fleury, Manager
Date:	DECEMBER 20, 2007
Total Number of Pages:	49

Report Release History:

REVISION	DATE	COMMENTS
-	December 20, 2007	Prepared By: Alan Laudani
-	December 20, 2007	Initial Release: F. Fleury

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY:

Date: December 20, 2007

Alan Laudani, EMC Test Engineer

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CERTIFICATION

The compatibility testing and this report have been prepared by Nemko USA, Inc., an independent electromagnetic compatibility consulting and test laboratory.

The testing and test methods were accomplished in accordance FCC 15.247

I certify the data evaluation and equipment configuration herein to be a true and accurate representation of the sample's immunity and emission characteristics, as of the test date(s), and for the design of the test sample utilized to compile this report.

Alan A. Laudani
EMC Test Engineer

1. ADMINISTRATIVE DATA

1.1. Administrative Data

CLIENT:	HUGHES NETWORK SYSTEMS 9605 SCRANTON ROAD, SUITE 500 SAN DIEGO, CA 92121
CONTACT: E-Mail:	Dave Couchman dcouchma@hns.com
DATE (S) OF TEST:	July 9, 2007 to July 12, 2007
EQUIPMENT UNDER TEST (EUT):	Broadband Satellite IP Modem
Model:	Hughes 9103
Condition Upon Receipt	Suitable for Test
TEST SPECIFICATION	FCC Part 15 Subpart C, 15.247

2. SYSTEM CONFIGURATION

2.1. System Components and Power Cables

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Broadband Satellite IP Modem	Hughes Network Systems Model: Hughes 9103 Serial #: 38	1.5m, unshielded, 12 VDC coaxial lead from Battery Charger
EUT –Battery Charger	Hughes Network Systems Model: LT-6104D Serial #: NA	18 AWG, 2-wire, IEC connector 100-240 Vac 50/60 Hz
Support Laptop computer	Compaq Computer Corp. Model: PP2040 Serial #: N6X P106X420VC12X6L	1.5m, unshielded, 12 VDC coaxial lead from Battery Charger
Laptop – AC Adapter	Compaq Computer Corp. Model: PPP009L PA-1650-02C Part #: 239429-001	1.5m, unshielded, 18 AWG, 3-wire, IEC connector

2.2. Device Interconnection and I/O Cables

CONNECTION	I/O CABLE
EUT to Laptop	Ethernet, 10ft, unshielded

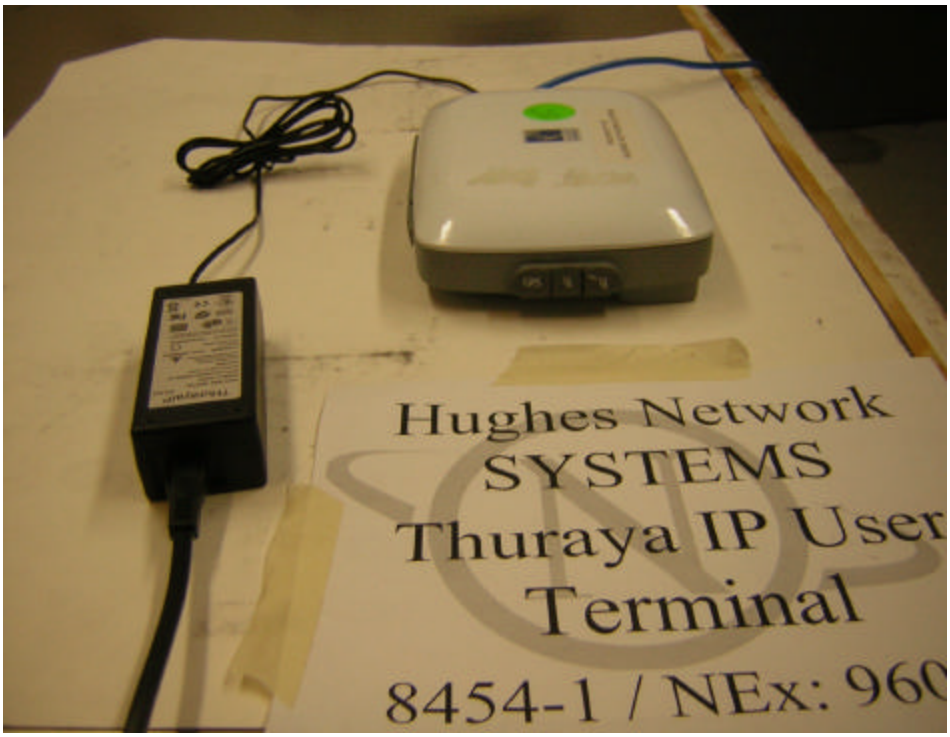
2.3. Description and Method of Exercising the EUT

The Hughes 9103 is a Broadband Satellite IP Modem. The Hughes 9103 comprises a FCC Part 25 Transmitter in the frequency range 1626.5 MHz to 1660.5 MHz and a FCC Part 15.247 DTS Wireless LAN in the frequency range of 2412 MHz to 2462 MHz. The internal battery is Li-ion rated at 7.2v, 6600mAh. The EUT may transmit while the battery charger is installed and it was in that configuration for all RF tests to keep the battery at fully charged condition. An Ethernet connection allows for frequency changes during RF testing of the Part 25 device and Part 15.247 WLAN. Both the Part 25 and Part 15.247 radios continue to transmit without the Ethernet connection.

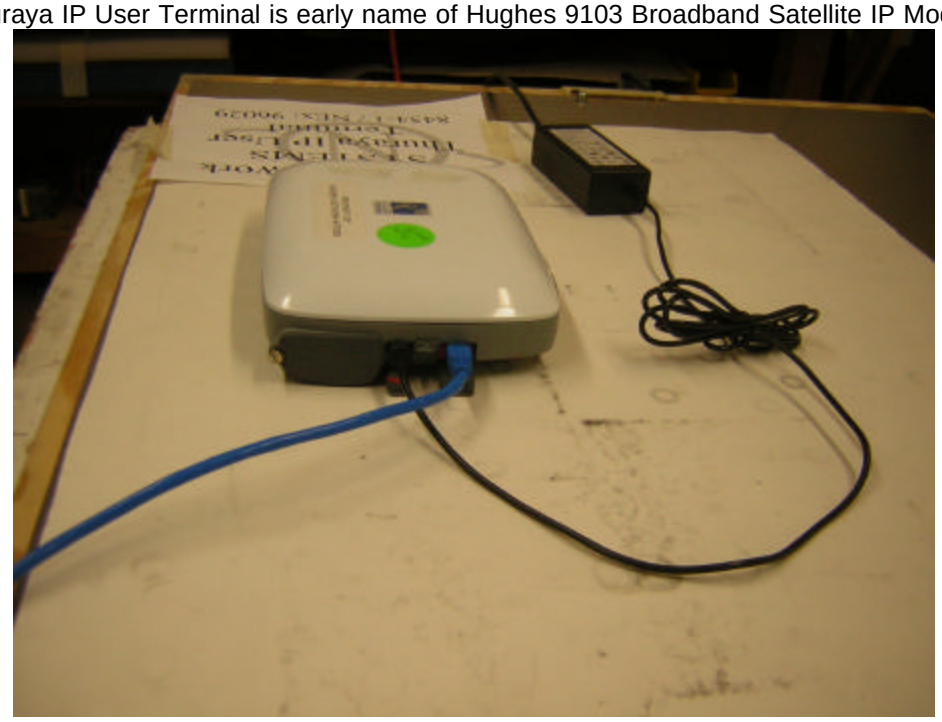
2.4. Design Modifications for Compliance

No design modifications were made to the EUT during testing.

Photograph 1. EUT Front and Rear

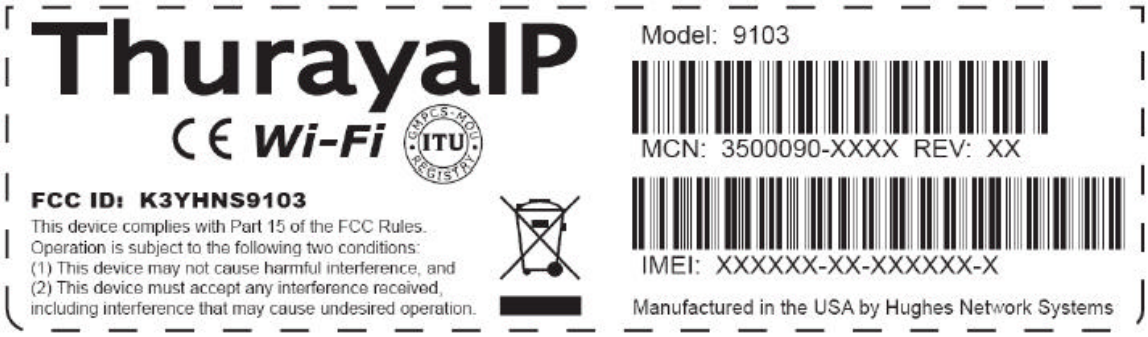


Thuraya IP User Terminal is early name of Hughes 9103 Broadband Satellite IP Modem



2.5. Product Identification

ThurayaIP - Chassis Label



2.6. Technical Specifications of the EUT

Manufacturer:	HUGHES NETWORK SYSTEMS
Apparatus Assessed:	Hughes 9103 Broadband Satellite IP Modem
Operating Frequency:	2412 MHz to 2462 MHz in the 2400 to 2483.5 MHz Band
EIRP	21.2 dBm or 0.132 W
Conducted Output Power:	16.2 dBm
Modulation:	Digital
Antenna Data:	Gain 5 dBi, Antenna, WLAN DSL+ UT
Antenna Connector:	None , antennal within body of EUT
Power Source:	Li-ion Battery rated at 7.2v, 6600mAh Battery Charger: 100-240 Vac 50/60 Hz
Date Received in Laboratory:	November 5, 2007
Specifications:	FCC Part 15 Subpart C, 15.247
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None

3. Description of Testing Methods

3.1. Test Methods

All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15; Subpart C. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and IC.

3.2. Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.247
Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz bands.

3.3. Deviations From Laboratory Test Procedures

No deviations from Laboratory Test Procedure

3.4. Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15.6 – 23.3 ^{o}C
Humidity range	:	26 - 65 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 1% of rated voltages

3.5. Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
110	Antenna, LPA	Electrometrics	LPA-25	1217	12/18/06	12/18/07
115	Antenna, Bicon	EMCO	3104	3020	8/28/07	8/28/08
128	Antenna, Bicon	EMCO	3104	2882	12/10/06	12/10/07
317	Preamp	HP	8449A	2749A00167	2/9/07	2/09/08
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	6/20/07	6/20/08
877	Antenna, DRG.7-18GHz	AH Systems	SAS-571	688	7/10/07	7/10/08
898	EMI Receiver	HP	8546A	3625A00348	1/18/07	1/18/08
899	EMI Filter	HP	85460A	3448A00288	1/18/07	1/18/08
NA	Transformer 0-250 VAC	Shanghai	TDGC	NA	NCR	NCR
814	Mulitmeter	Fluke	111	78130063	9/4/2007	09/04/08
625	Antenna, DRG18-40GHz	EMCO	3116	2325	NCR	NCR
836	Signal Generator	Agilent	E8254A	US41140229	12/4/2007	12/04/08
838	Preamp, 18-26 GHz	Spacek Labs	SLKa-35-4	3m13	Verified	12/20/07

OATS: IC Site #: 2040B-1; RN#: 90579

4. Observations

4.1. Modifications Performed During Assessment

No modifications were performed during assessment.

4.2. Record Of Technical Judgements

No technical judgements were made during the assessment.

4.3. EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4. Test Deleted

No Tests were deleted from this assessment.

4.5. Additional Observations

There were no additional observations made during this assessment.

5. Results Summary

This section contains the following:

Test Results

The column headed “Required” indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant
Y Yes: Mandatory i.e. the apparatus shall conform to these test.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

5.1. Test Results

Part 15C	Test Description	Required	Result
15.247(b)(3)	Maximum peak output power of systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands	Y	Pass
15.209 (a)	Radiated Emissions within Restricted Bands	Y	Pass
15.247(a)(2)	Minimum 6dB RF Bandwidth	Y	Pass
15.247 (d)	Out-of-band Emissions	Y	Pass
15.247(e)	Power Spectral Density for Digitally Modulated Devices	Y	Pass
15.207	Transmitter and Receiver AC Power Lines Conducted Emission Limit	Y	Pass
Part 15B	Receiver Spurious Emissions	Y	Pass

Appendix A:

6. Test Results

6.1. Conductive Maximum peak output power

15.247 (b)(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

The EUT complies to Maximum Peak Output Power, see tables below.

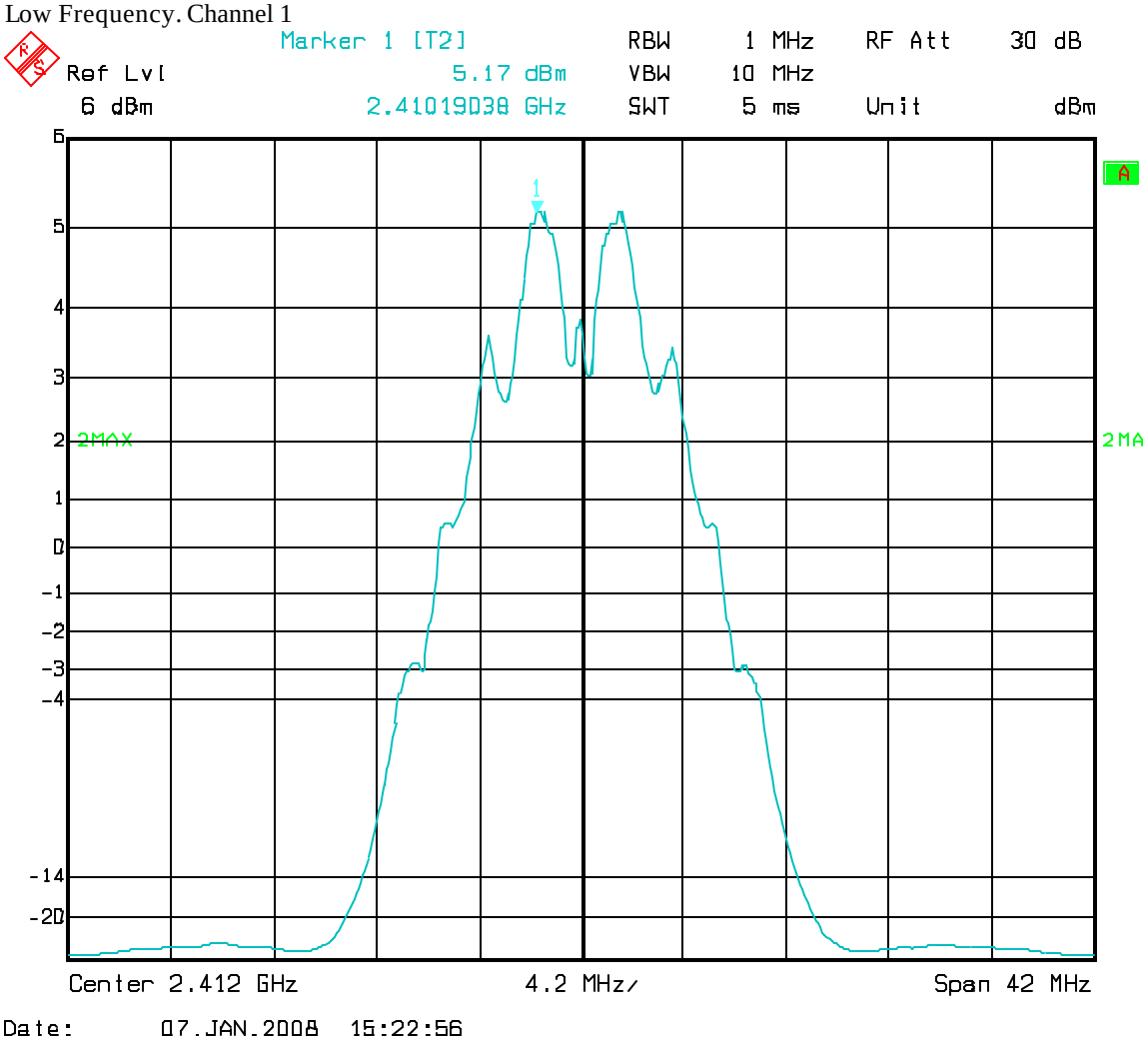
Using Method #3 of the Measurement of Digital Transmission Systems Operating Under Section 15.247 of March 23, 2005, measurements were taken at RBW of 1 MHz and VBW of 10 MHz and corrected for bandwidth.

BW Correction Factor = 10 log (BW/RBW)

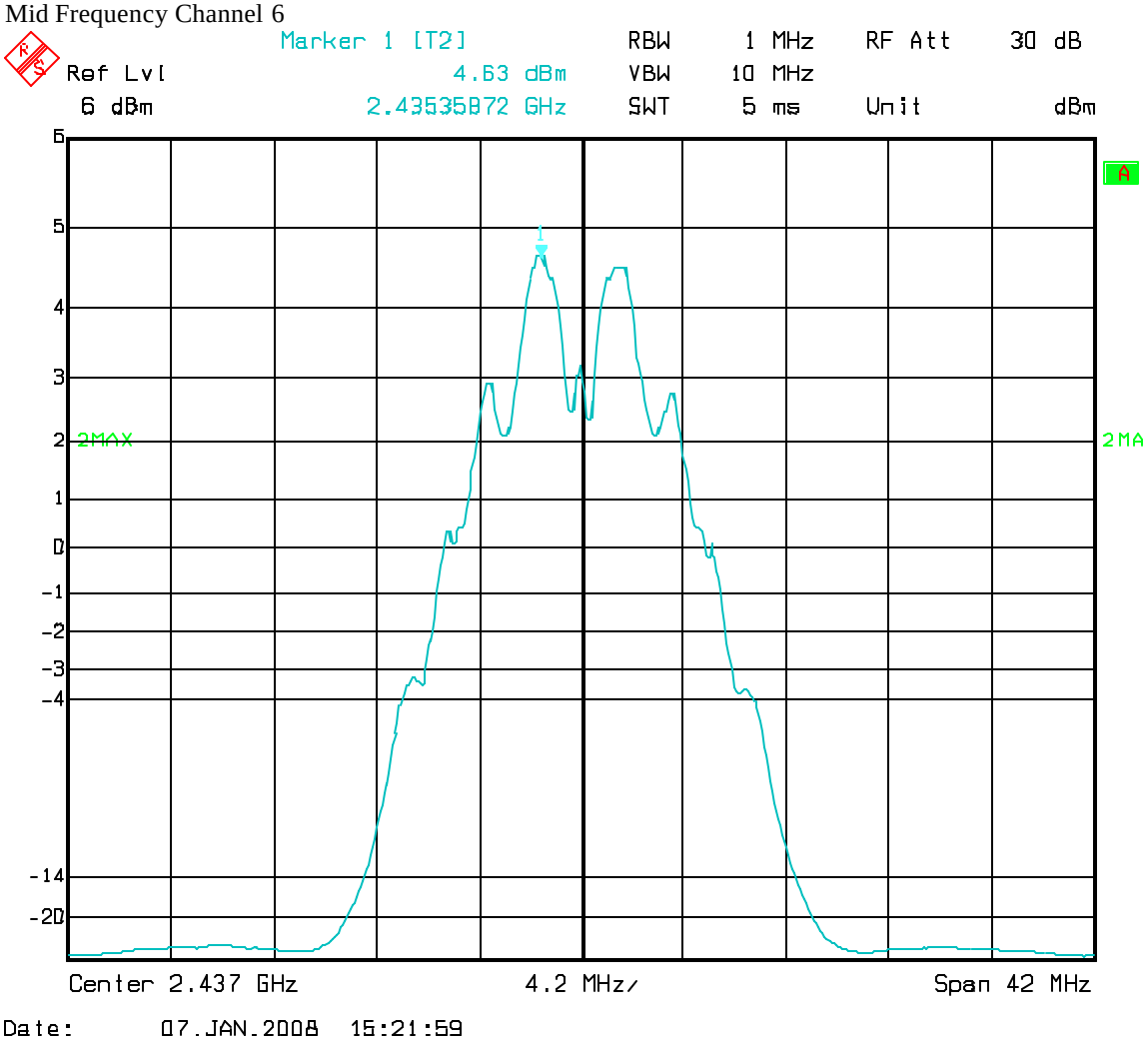
POWER LEVEL SUMMARY

Frequency	BW	BW Correction Factor	RF Power Measured dBm	Cable Loss dB	RF Power Corrected for BW
Low (2412 MHz)	11.2 MHz	10.5 dB	5.17	0.5	16.2 dBm
Mid (2437 MHz)	12.6 MHz	11.0 dB	4.63	0.5	16.1 dBm
High (2462 MHz)	12.3 MHz	10.9 dB	3.93	0.5	15.3 dBm

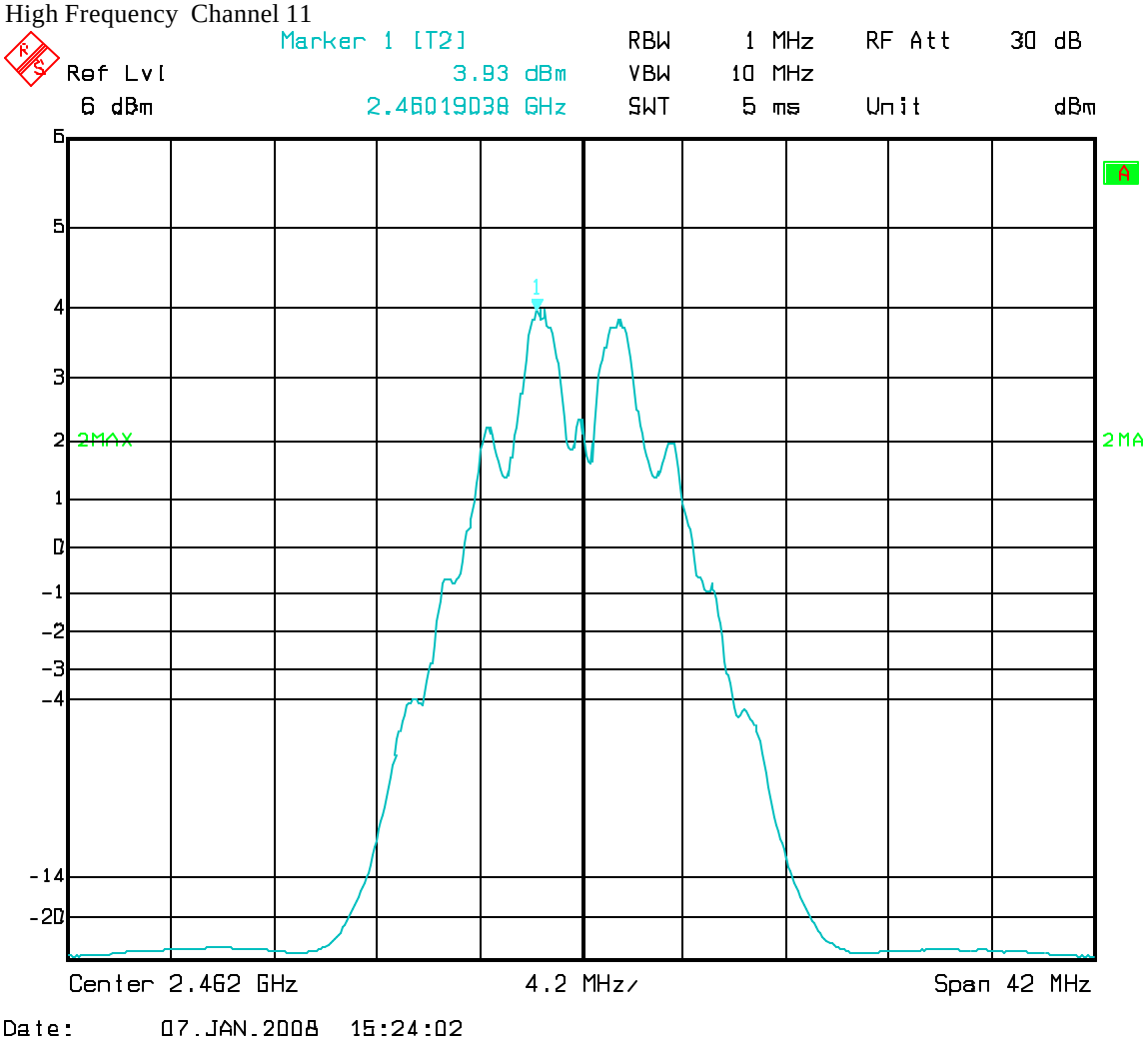
Low Frequency. Channel 1



Mid Frequency Channel 6



High Frequency Channel 11



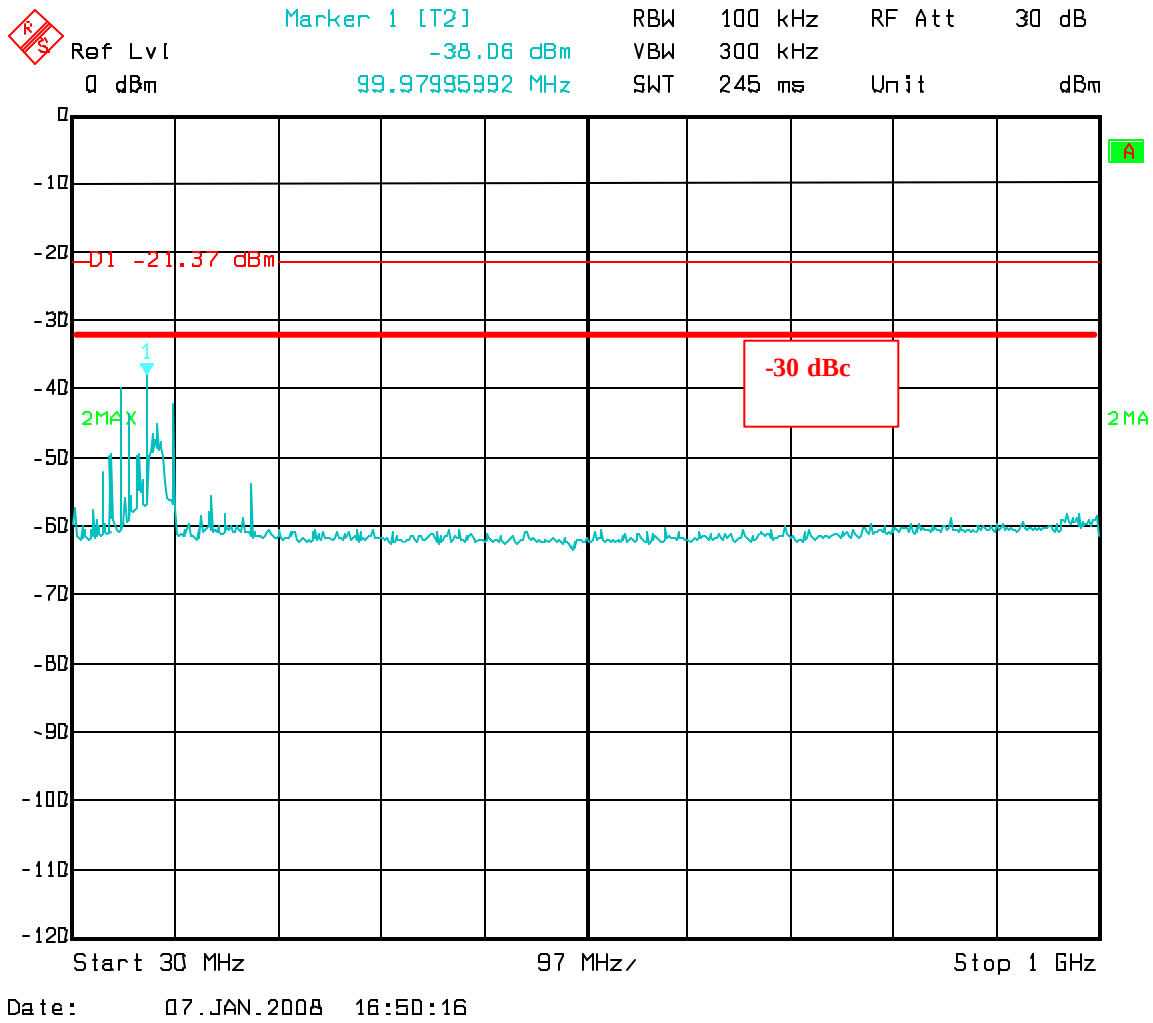
6.2. Out-of-band Emissions / Radiated Emissions within Restricted Bands

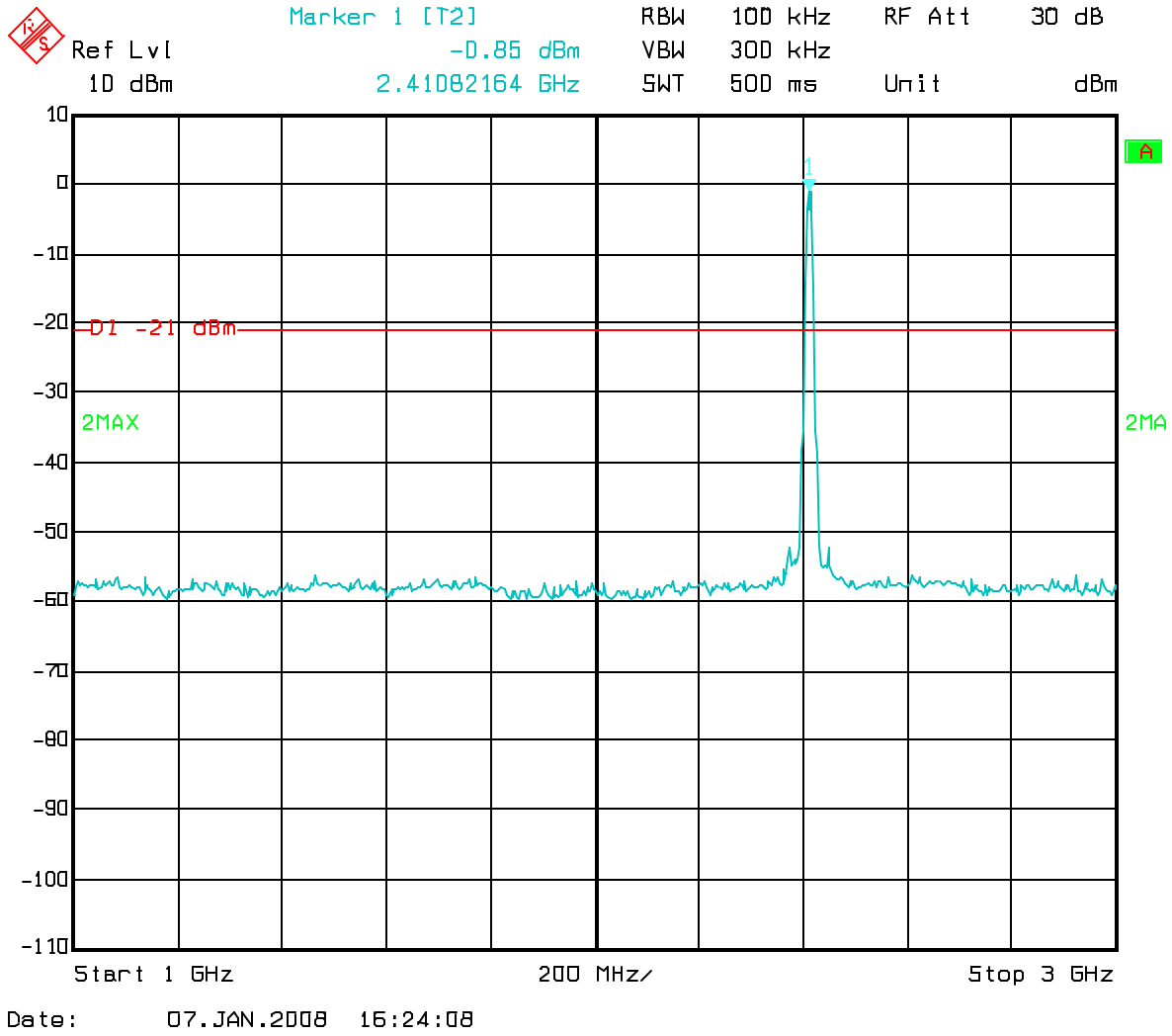
Clause 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band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

The EUT complies to Out-of-band Emissions / Radiated Emissions within Restricted Bands, see tables below.

Conductive Spurious Emissions

Channel 1

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2.41082164 GHz
RBW 100 kHz
VBW 300 kHz
SWT 500 ms
RF Att 30 dB
Unit dBm
Ref Lvl
10 dBm
D1 -21 dBm
2MAX
2MA
Start 1 GHz
200 MHz/
Stop 3 GHz
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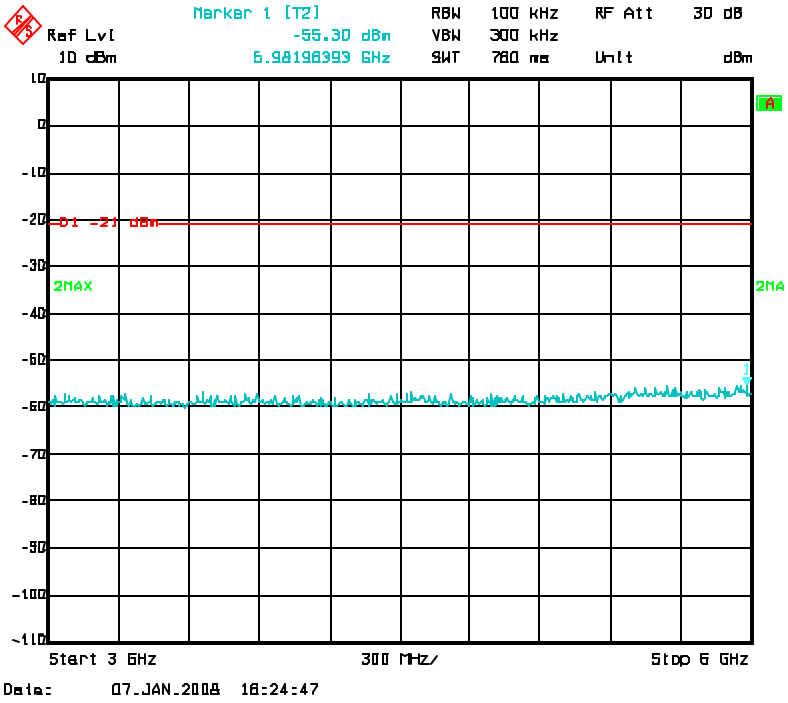
Marker 1 [T2]
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RF Att 30 dB
Ref Lvl
-55.30 dBm
VBW 300 kHz
10 dBm
5.981986393 GHz
SWT 780 ms
Unit dBm
D1 -21 dBm
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2MA
Start 3 GHz
300 MHz/
Stop 6 GHz
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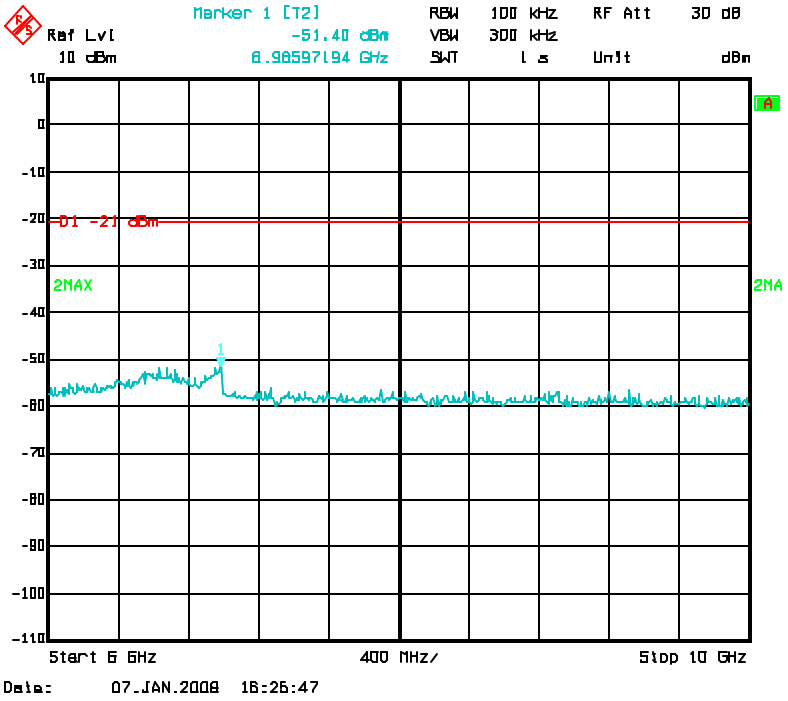
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RF Att 30 dB
Ref Lvl
-51.40 dBm
VBW 300 kHz
10 dBm
8.985971194 GHz
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Unit dBm
D1 -21 dBm
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2MA
Start 6 GHz
400 MHz/
Stop 10 GHz
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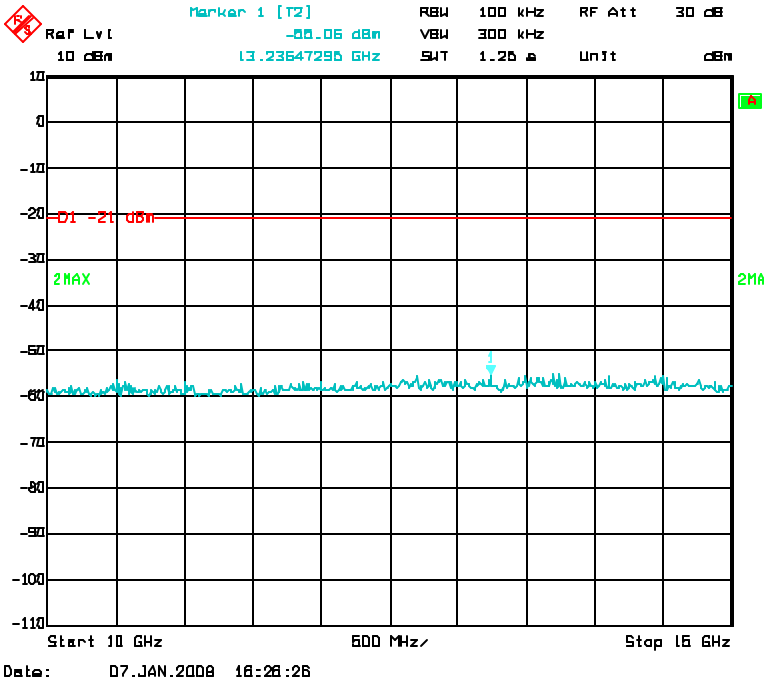
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VBW 300 kHz
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Unit dBm
Ref Lvl
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2MA
Start 10 GHz
500 MHz/
Stop 15 GHz
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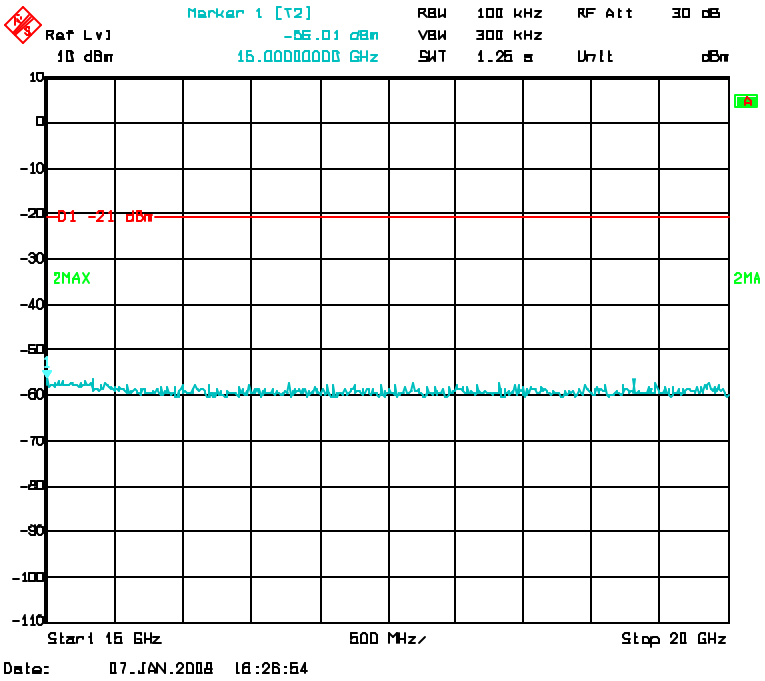
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15.00000000 GHz
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VBW 300 kHz
SWT 1.25 s
RF Att 30 dB
Unit dBm
Ref Lvl
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D1 -21 dBm
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2MA
Start 15 GHz
500 MHz/
Stop 20 GHz
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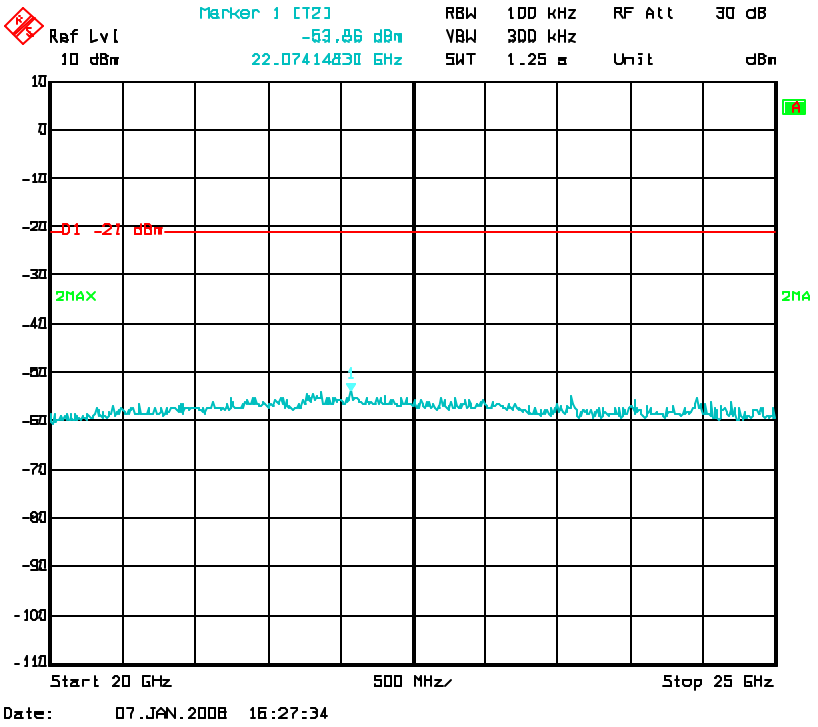
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22.07414830 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1.25 s
RF Att 30 dB
Unit dBm
Ref Lvl
10 dBm
D1 -21 dBm
2MAX
2MA
Start 20 GHz
500 MHz/
Stop 25 GHz
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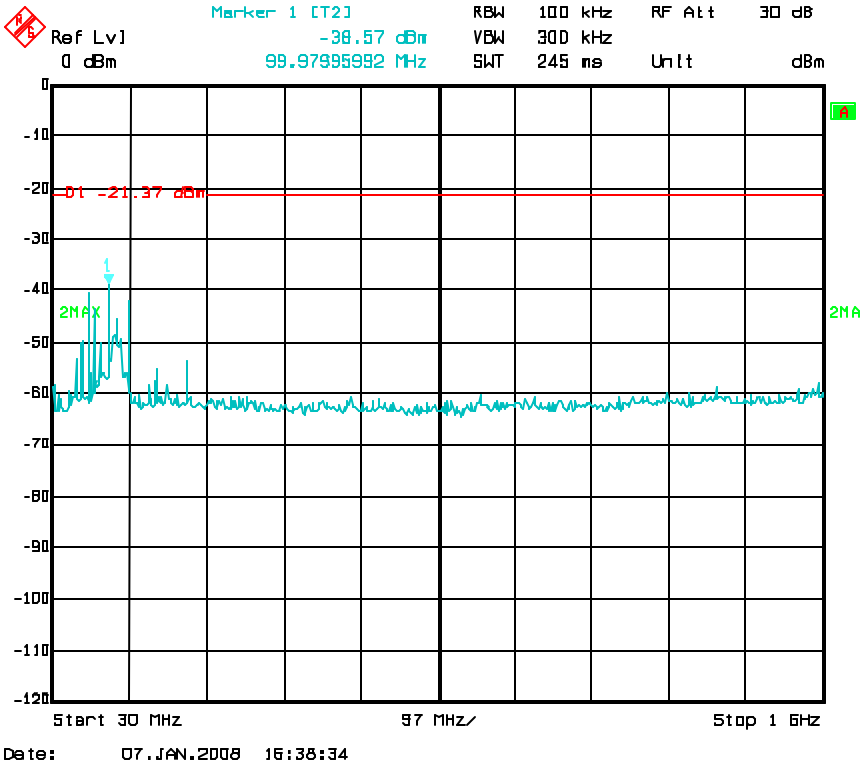
Channel 6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99.97995992 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
Ref Lvl
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D1 -21.37 dBm
2MAX
2MA
Start 30 MHz
97 MHz/
Stop 1 GHz
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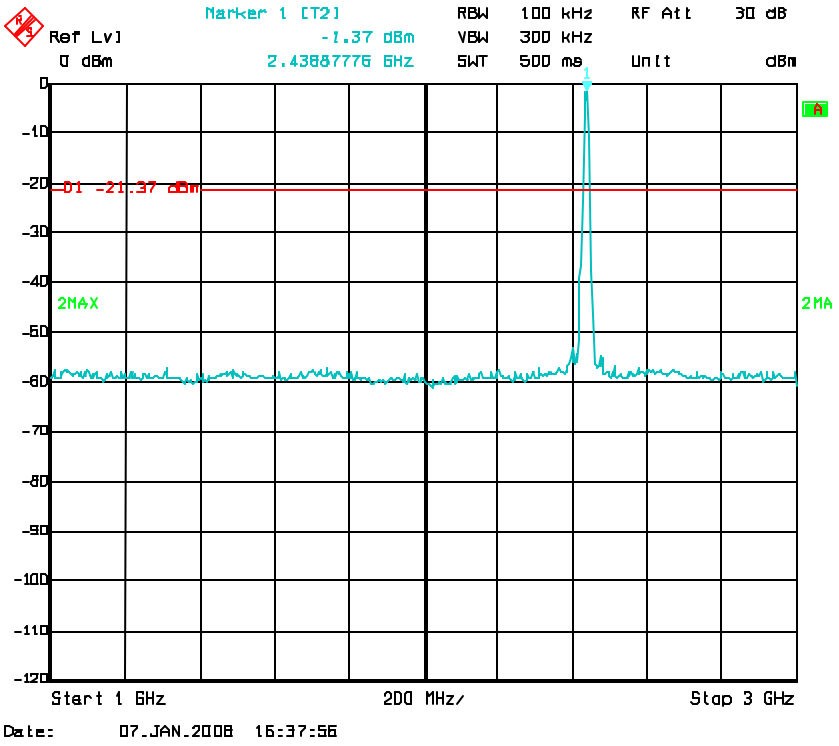
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RBW 100 kHz
RF Att 30 dB
Ref Lvl
-1.37 dBm
VBW 300 kHz
0 dBm
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Unit dBm
D1 -21.37 dBm
2MAX
2MA
Start 1 GHz
200 MHz/
Stop 3 GHz
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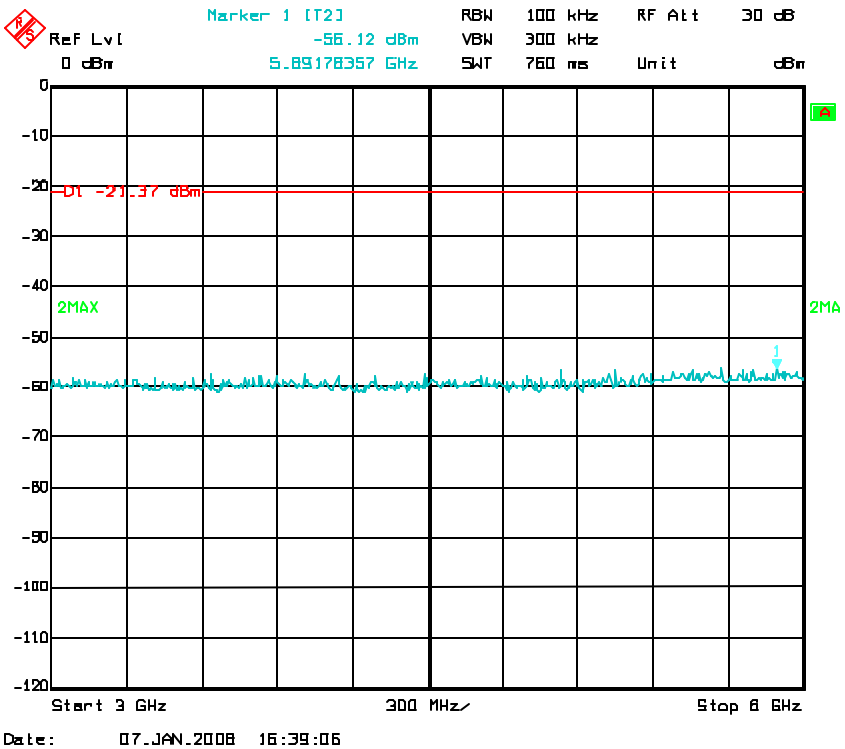
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RF Att 30 dB
Ref Lvl
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VBW 300 kHz
0 dBm
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SWT 760 ms
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2MA
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300 MHz/
Stop 6 GHz
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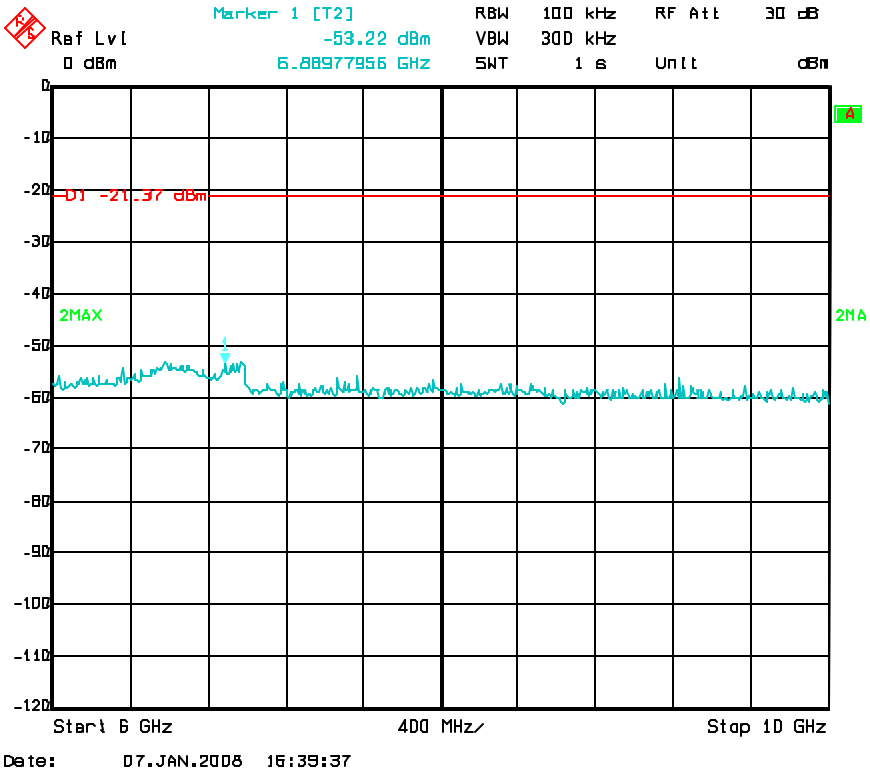
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VBW 300 kHz
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2MA
Start 6 GHz
400 MHz/
Stop 10 GHz
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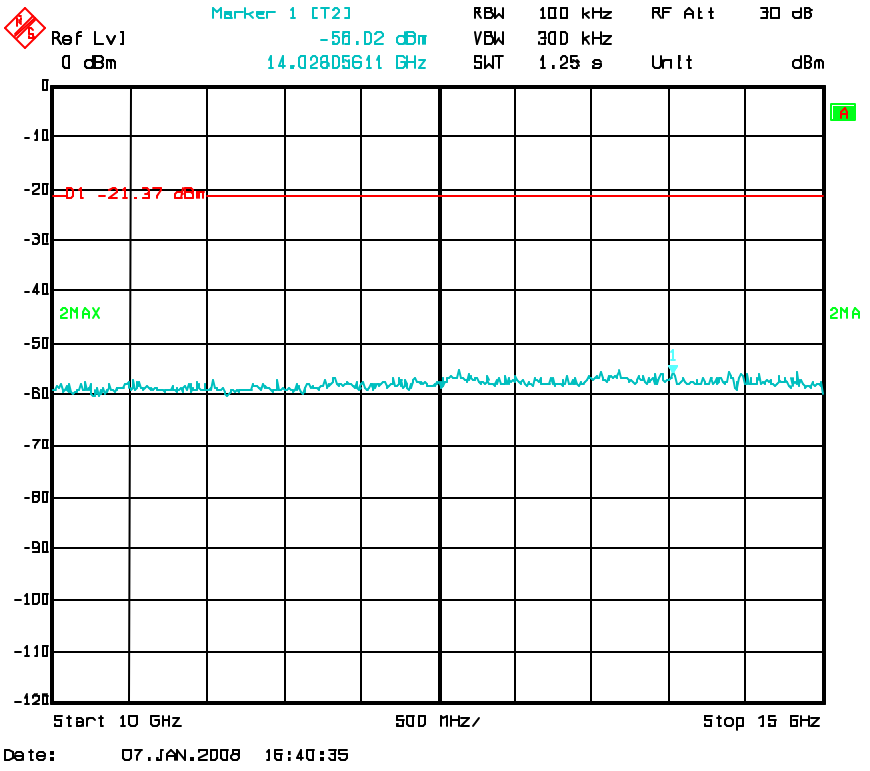
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Unit dBm
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2MA
Start 10 GHz
500 MHz/
Stop 15 GHz
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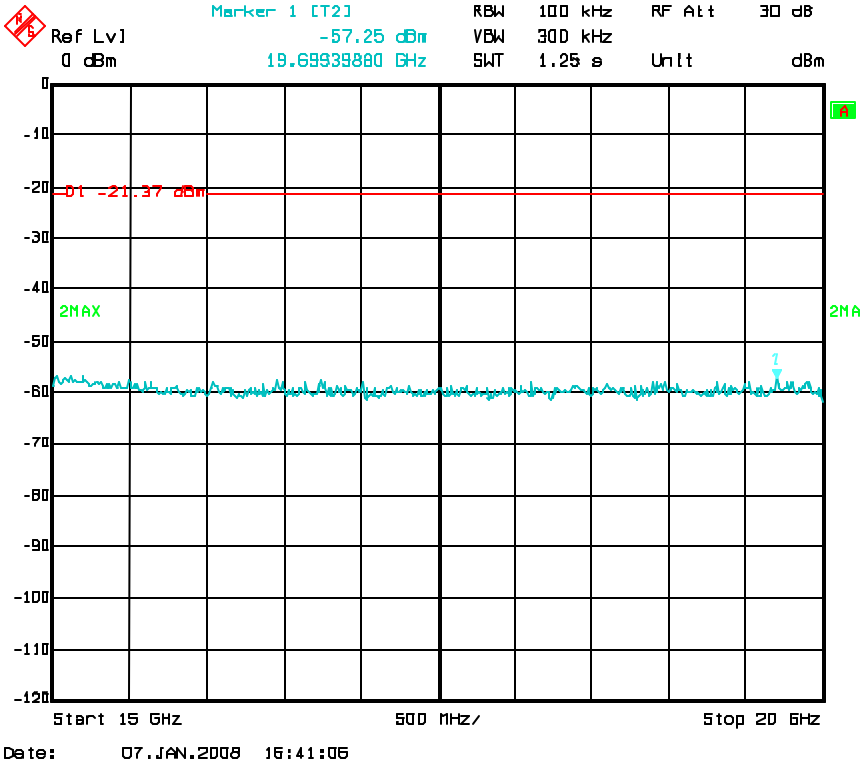
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VBW 300 kHz
SWT 1.25 s
RF Att 30 dB
Unit dBm
Ref Lvl
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2MAX
2MA
Start 15 GHz
500 MHz/
Stop 20 GHz
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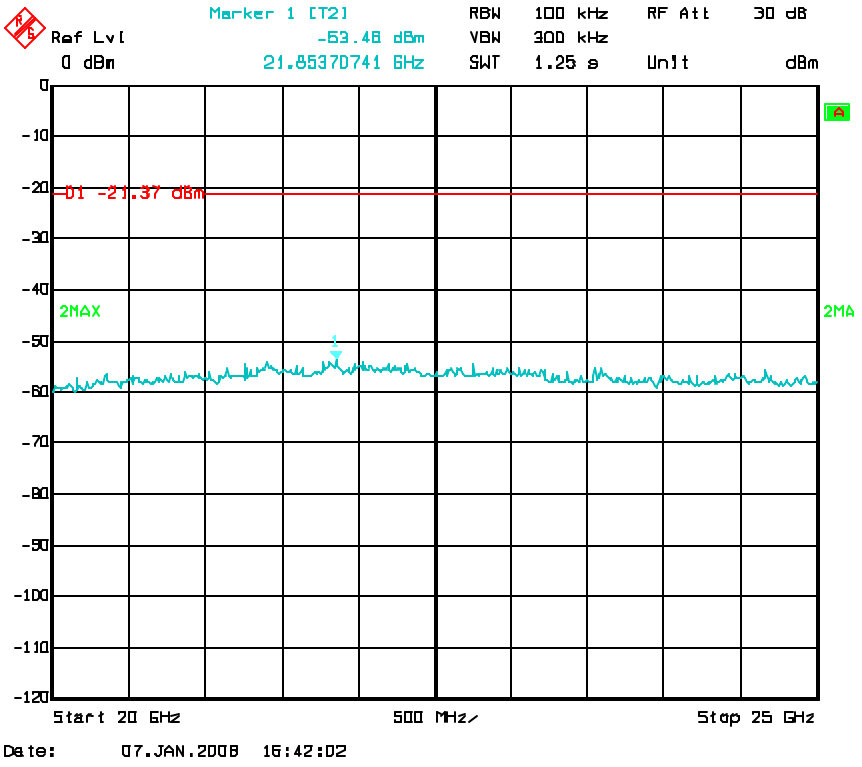
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VBW 300 kHz
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Unit dBm
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500 MHz/
Stop 25 GHz
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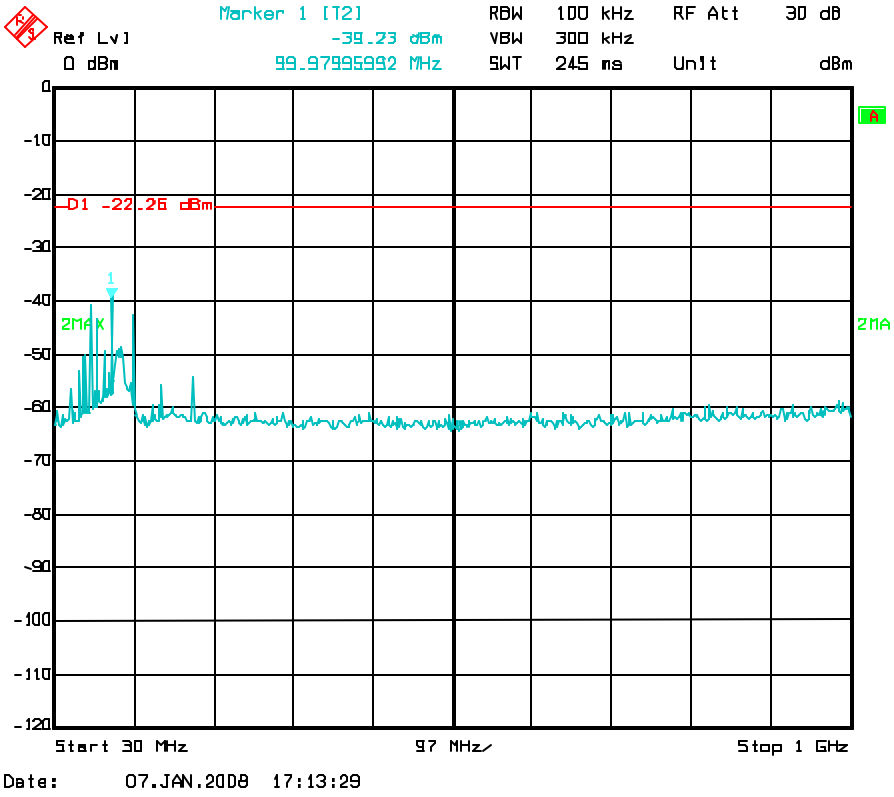
Channel 11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RBW 100 kHz
VBW 300 kHz
SWT 245 ms
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Unit dBm
Ref Lvl
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2MA
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97 MHz/
Stop 1 GHz
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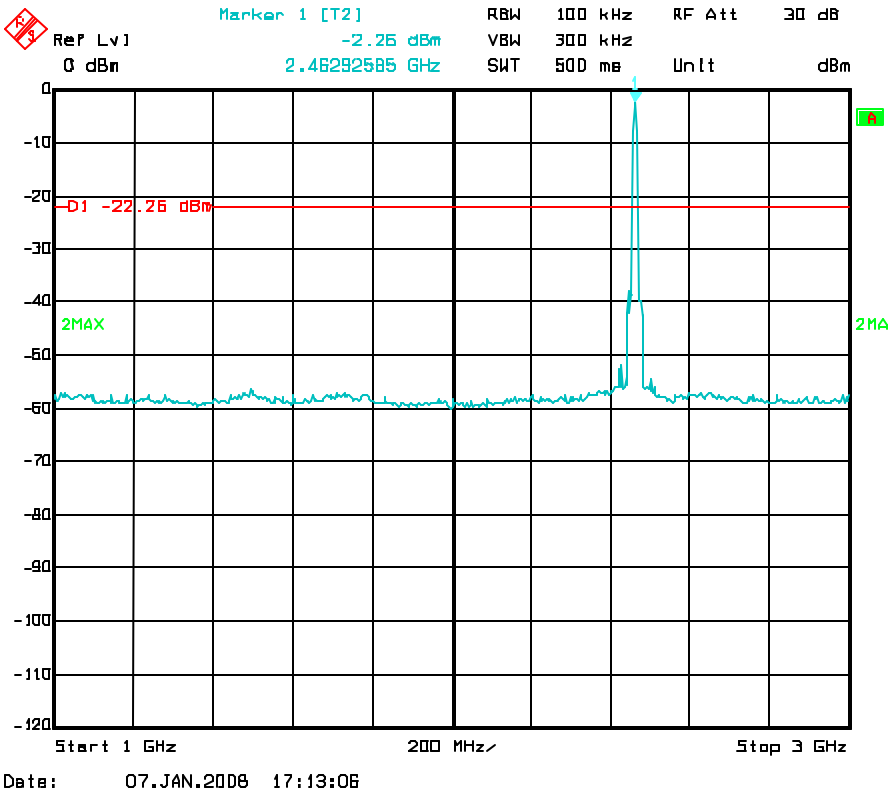
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RBW 100 kHz
VBW 300 kHz
SWT 500 ms
RF Att 30 dB
Unit dBm
Ref Lvl
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D1 -22.26 dBm
2MAX
2MA
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200 MHz/
Stop 3 GHz
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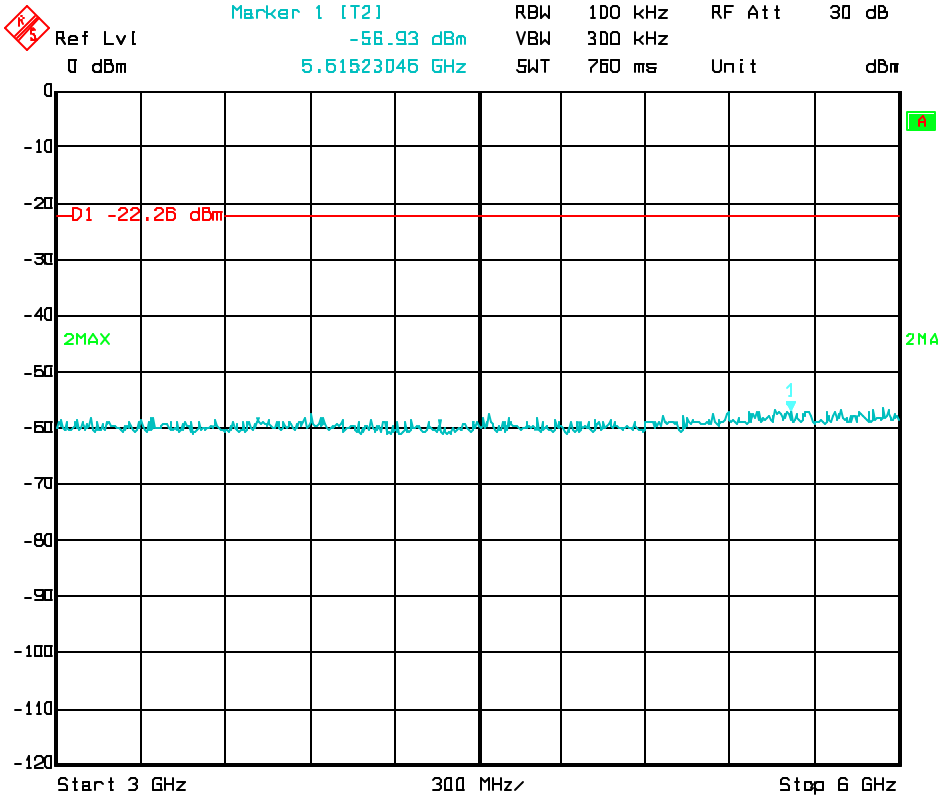

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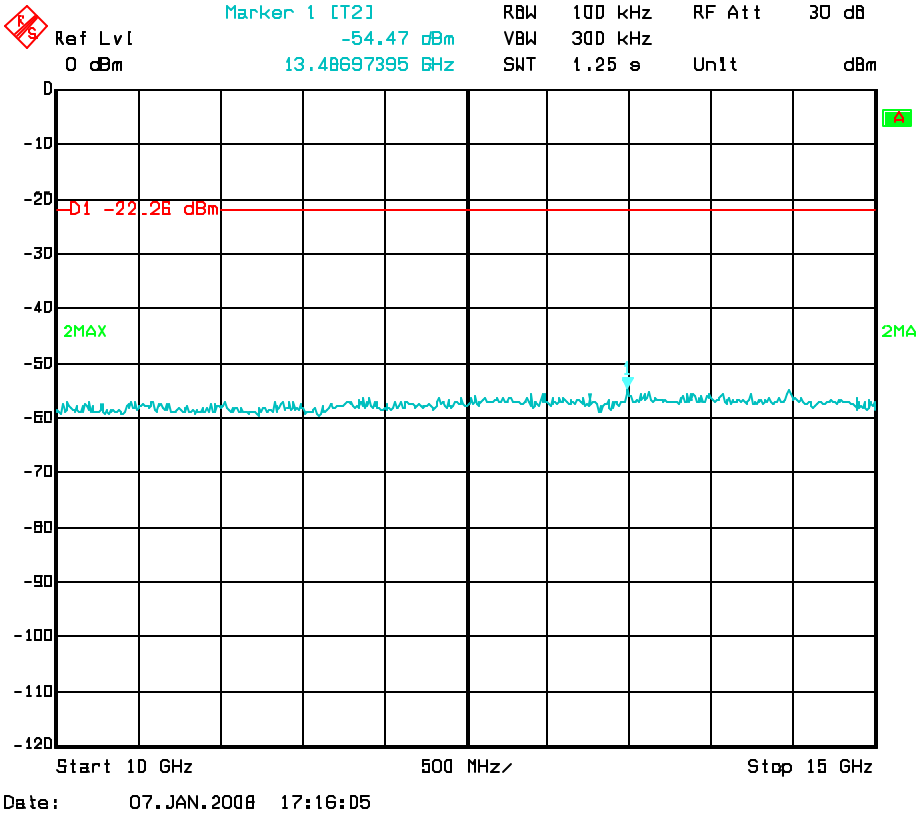

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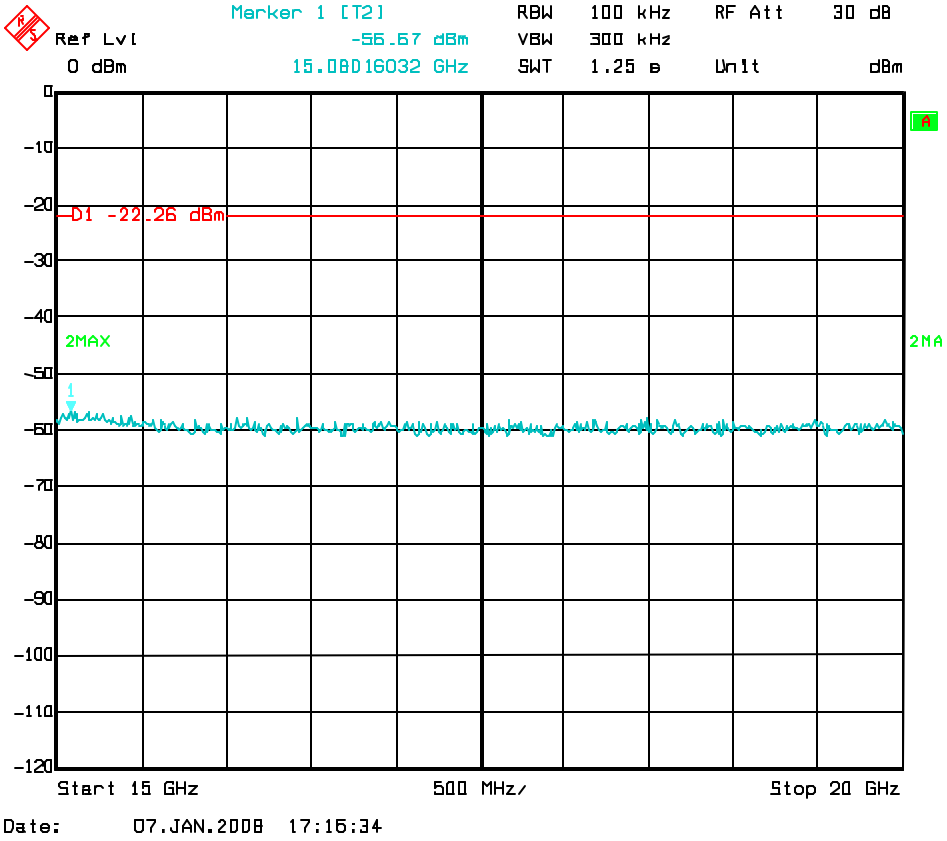
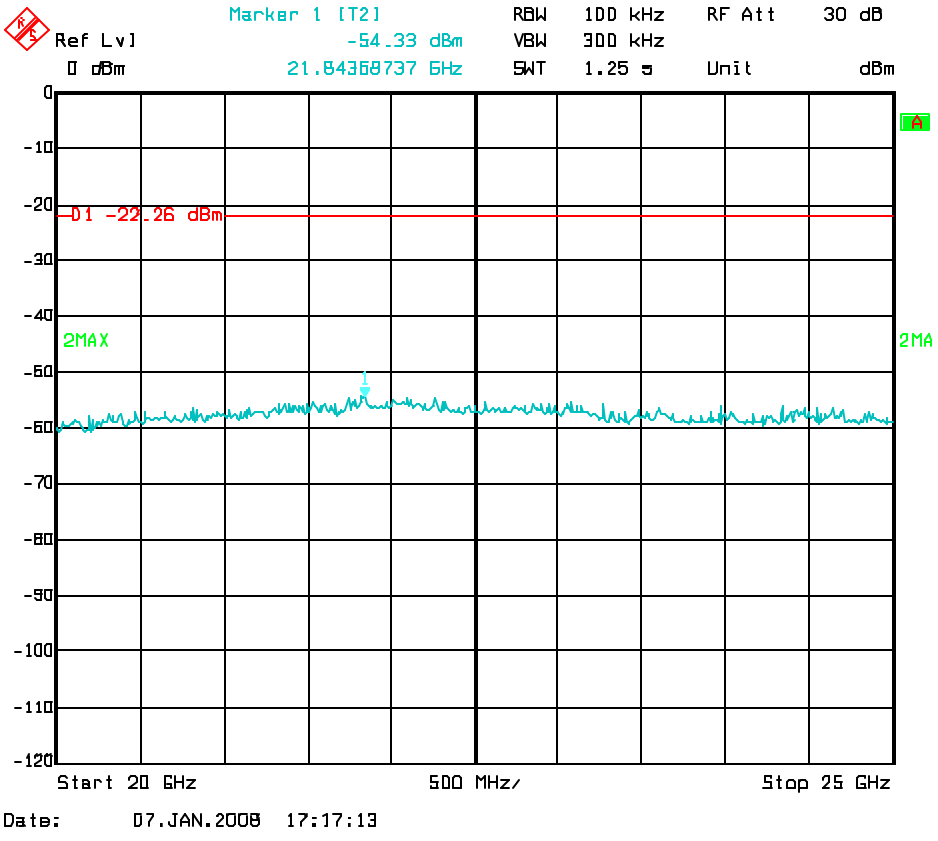

Marker 1 [T2]
-56.67 dBm
15.08016032 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1.25 s
RF Att 30 dB
Unit dBm
Ref Lvl
0 dBm
D1 -22.26 dBm
2MAX
2MA
Start 15 GHz
500 MHz/
Stop 20 GHz
Date: 07.JAN.2008 17:16:34


Marker 1 [T2]
-54.33 dBm
21.84368737 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1.25 s
RF Att 30 dB
Unit dBm
Ref Lvl
0 dBm
D1 -22.26 dBm
2MAX
2MA
Start 20 GHz
500 MHz/
Stop 25 GHz
Date: 07.JAN.2008 17:17:13

6.3. Bandedge Measurements

The EUT complies with Bandedge Measurements, see table and plots below.

Test conditions:

The emission spectrum was searched from 30MHz to the 10th Harmonic, 248350 MHz.

The EUT's battery was kept fully charged during testing by use of a battery charger, removal of which did not change output level. Varying the input voltage of 120 Vac to the battery charger by ±15% by use of a transformer whose input was 208 Vac 60 Hz did not change the output power level of the transmitter

The EUT was manipulated through the three orthogonal axes, the EUT was found to transmit the most power when placed on its feet.

The Ethernet port was populated with a 10 ft Cat-5 Ethernet cable. Termination with a typical laptop computer did not change either the maximum peak output power emissions nor the spurious emissions relevant to the WLAN radio. The GPS antenna port was not connected as the GPS radio is not as yet integrated into the EUT. Transmitting of the Low, Mid and High channels of the satellite uplink radio with the internal satellite antenna did not change the spurious emissions relevant to the WLAN radio.

The Limit of 1 Watt is equal to 125.3 dBuV/m at 3 meters.

The spectrum analyzer was set to maximum RBW for the fundamental frequencies only. The spectrum analyzer's average detector was used to show compliance with bandedge measurements.

The EUT complies.

Math: Corrected Reading = Max of Vertical or Horizontal measured + Antenna Factor + Cable Loss – preamplifier (not used for fundamental frequencies).
CR/SL Dif = Limit – Corrected Reading. Pass if result is negative.
109.1 = 73.7 + 29.5 + 5.9 – (0)
The Band Edge emissions measures were the emissions resulting from the WLAN radio at the Lowest and Highest frequencies transmitting with digital modulation on.

Radiated Emissions Data

Job # :	8454-1-EMC	Date :	12-4-07	Page	1 of 1
NEX #:	96029	Time :	1:00 PM		
		Staff :	AAL		
Client Name :	Hughes Network Sysems			EUT Voltage :	12 VDC
EUT Name :	Broadband Satellite IP Modem			EUT Frequency :	
EUT Model # :	Hughes 9103			Phase:	1
EUT Serial # :				NOATS	
EUT Config. :	Transmit WLAN			SOATS	X
				Distance	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	128	Temp. (°C) :	22		
Log Ant.#:	110	Humidity (%) :	36		
DRG Ant. #	877	Spec An.#:	835		
Dipole Ant.#:	NA	Spec An. Display #:	835		
Cable LF#:	SOATS				
Cable HF#:	40FT				
Preamp LF#:	NA				
Preamp HF#	317				

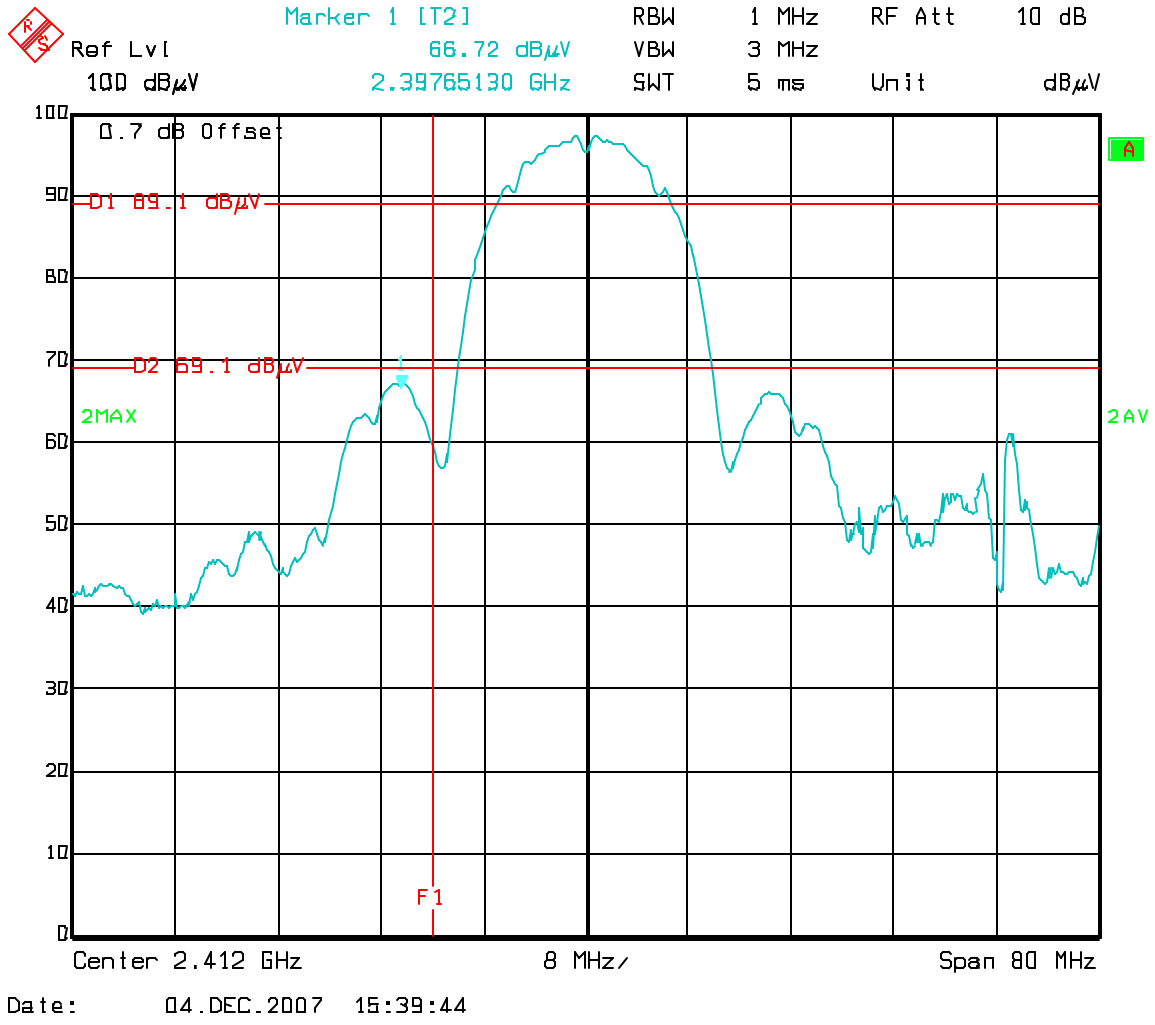
Peak	RBW: 1 MHz	Video Bandwidth 3 MHz
Average	RBW: 1 MHz	Video Bandwidth 10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading dBuV/m **Vertical**	Meter Reading dBuV/m **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading dBuV/m	Corrected Reading dBuV/m	Spec. limit dBuV/m	CR/SL Diff. (dB)	Pass Fail	Comment
2412.0	73.7	58.7	P		1.0	73.70	109.1	125.3	-16.2	Pass	10 MHz RBW & VBW
2437.0	76.3	62.9	P		1.0	76.30	111.7	125.3	-13.6	Pass	10 MHz RBW & VBW
2462.0	75.3	60.1	P		1.0	75.30	110.7	125.3	-14.6	Pass	10 MHz RBW & VBW
											band egde
2397.1	71.3	55.4	P		1.0	71.3	72.0	89.1	-17.1	Pass	
2397.6	66.7	47.5	A		1.0	66.7	67.4	69.1	-1.7	Pass	
2483.5	51.9	49.9	P		1.0	51.9	53.7	74.0	-20.2	Pass	
2483.5	47.6	44.9	A		1.0	47.6	49.4	54.0	-4.5	Pass	

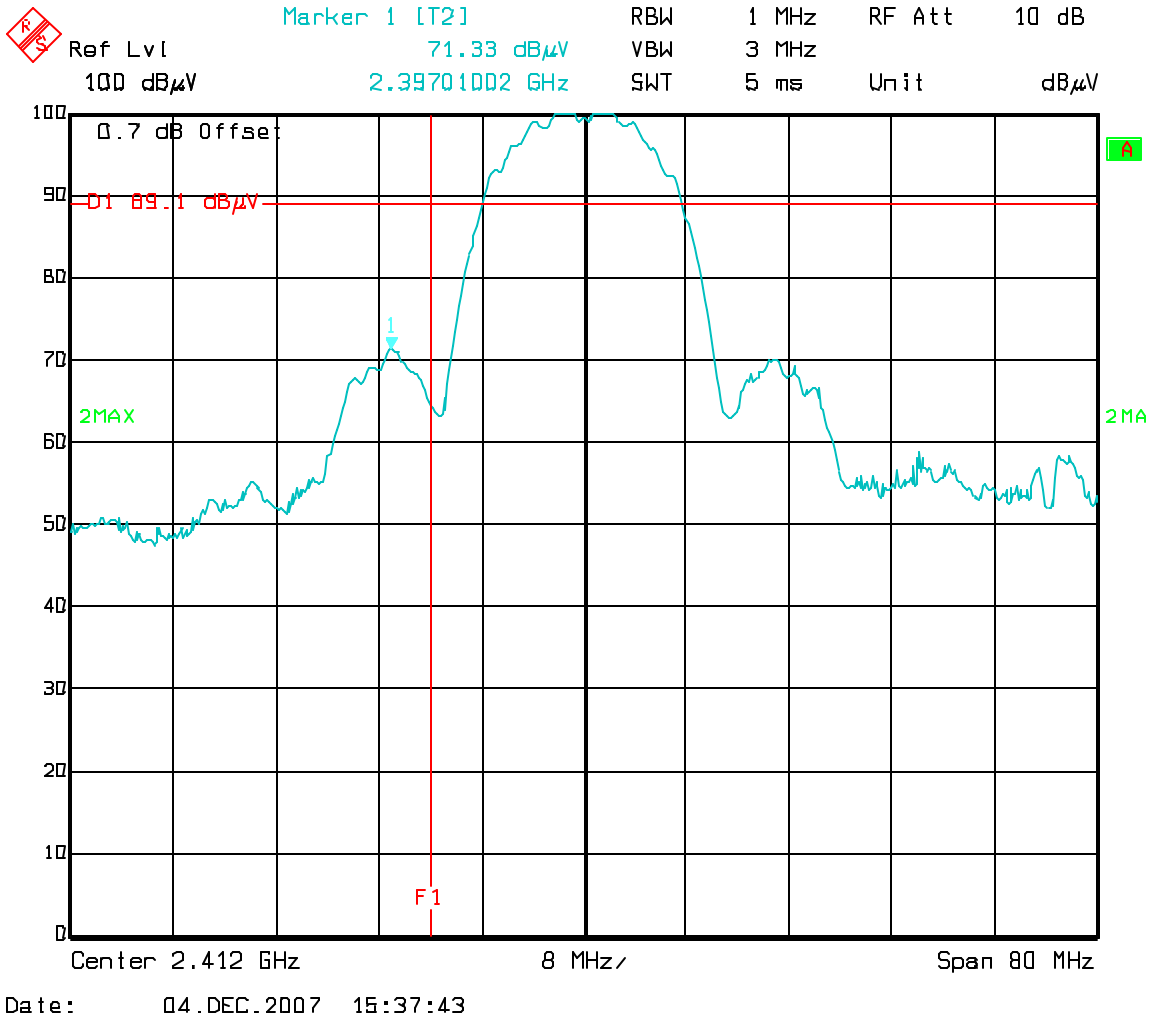
Low Channel 2412 MHz

Frequency line is 2400MHz
Limit is 40 dBc
Marker is Average Detector Measurement.



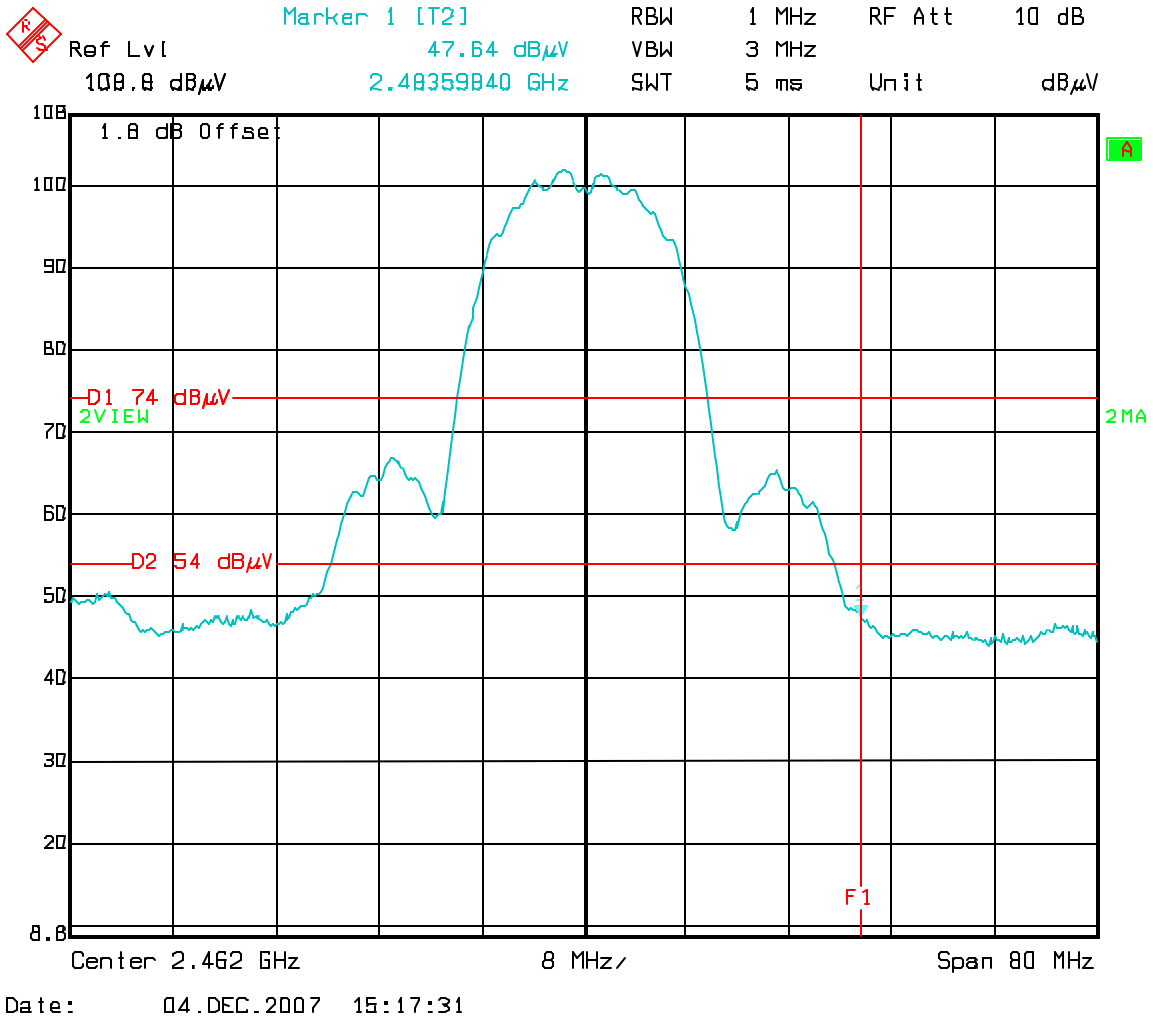
Low Channel 2412 MHz

Frequency line is 2400MHz
Limit is 20 dBc.
Marker is Peak Detector Measurement.



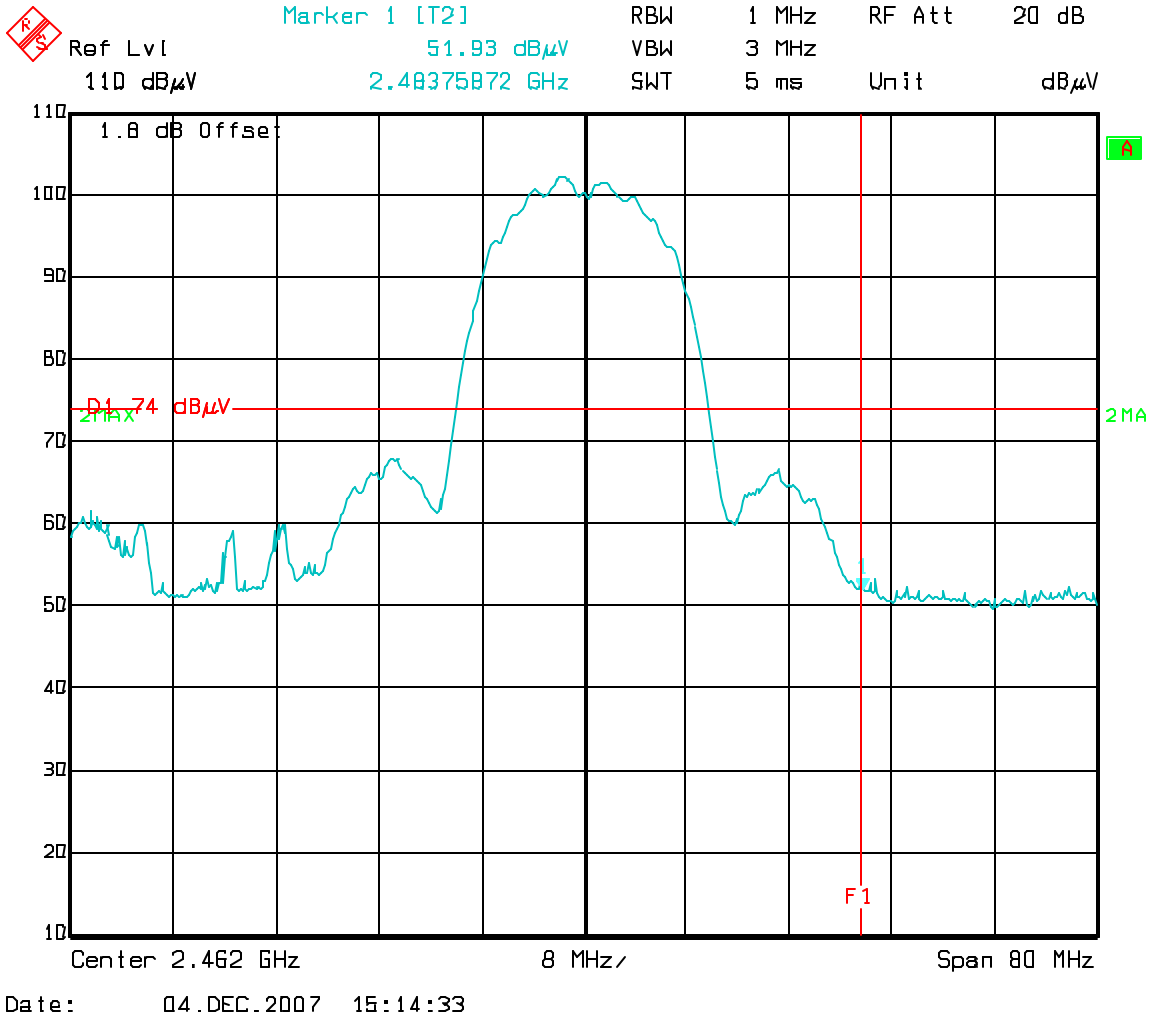
High Channel 2462 MHz

Frequency line is 2483.5 MHz
Marker is Average Detector Measurement.



High Channel 2462 MHz

Frequency line is 2483.5 MHz
Marker is Peak Detector Measurement.



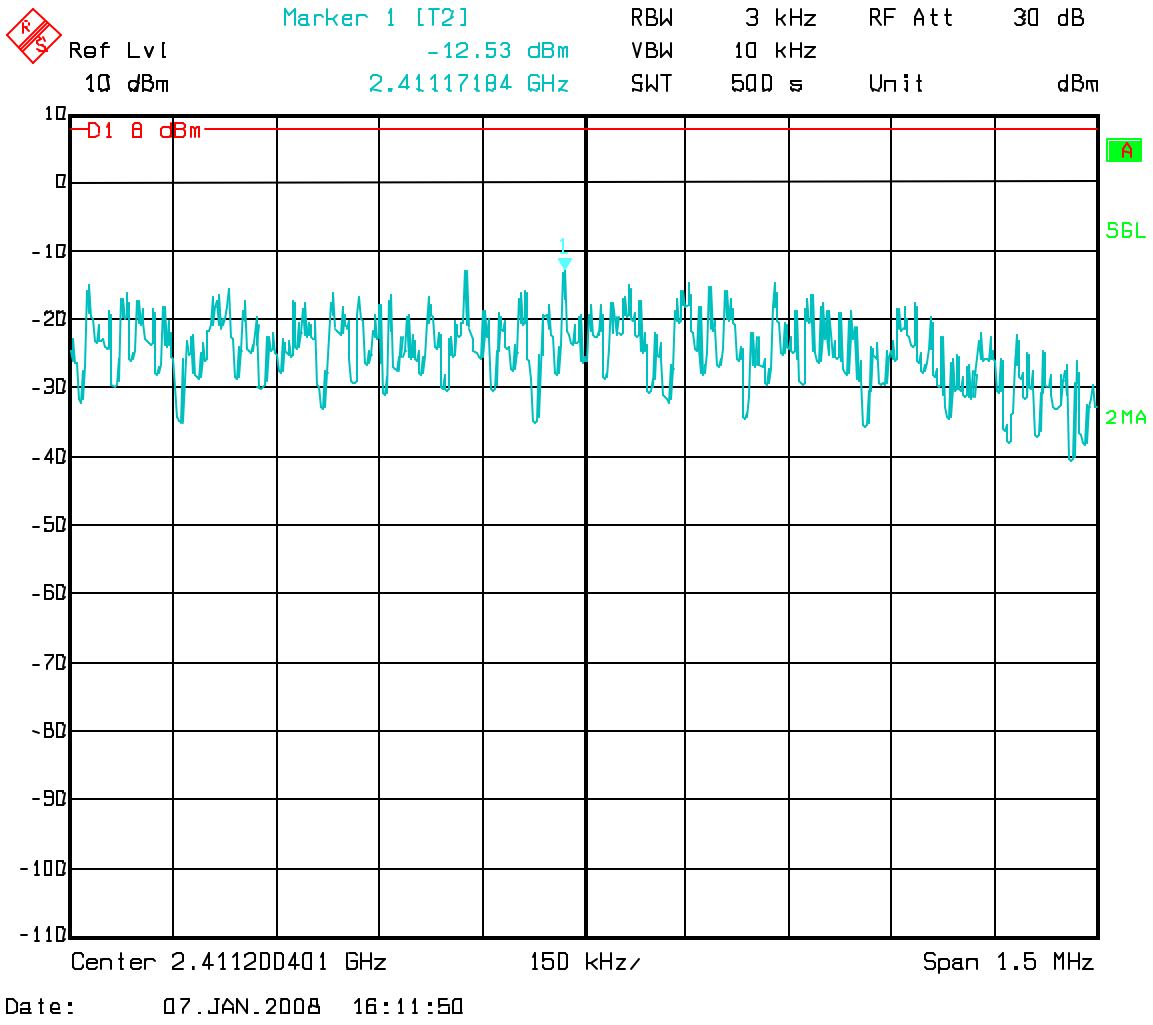
6.4. Power Spectral Density

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

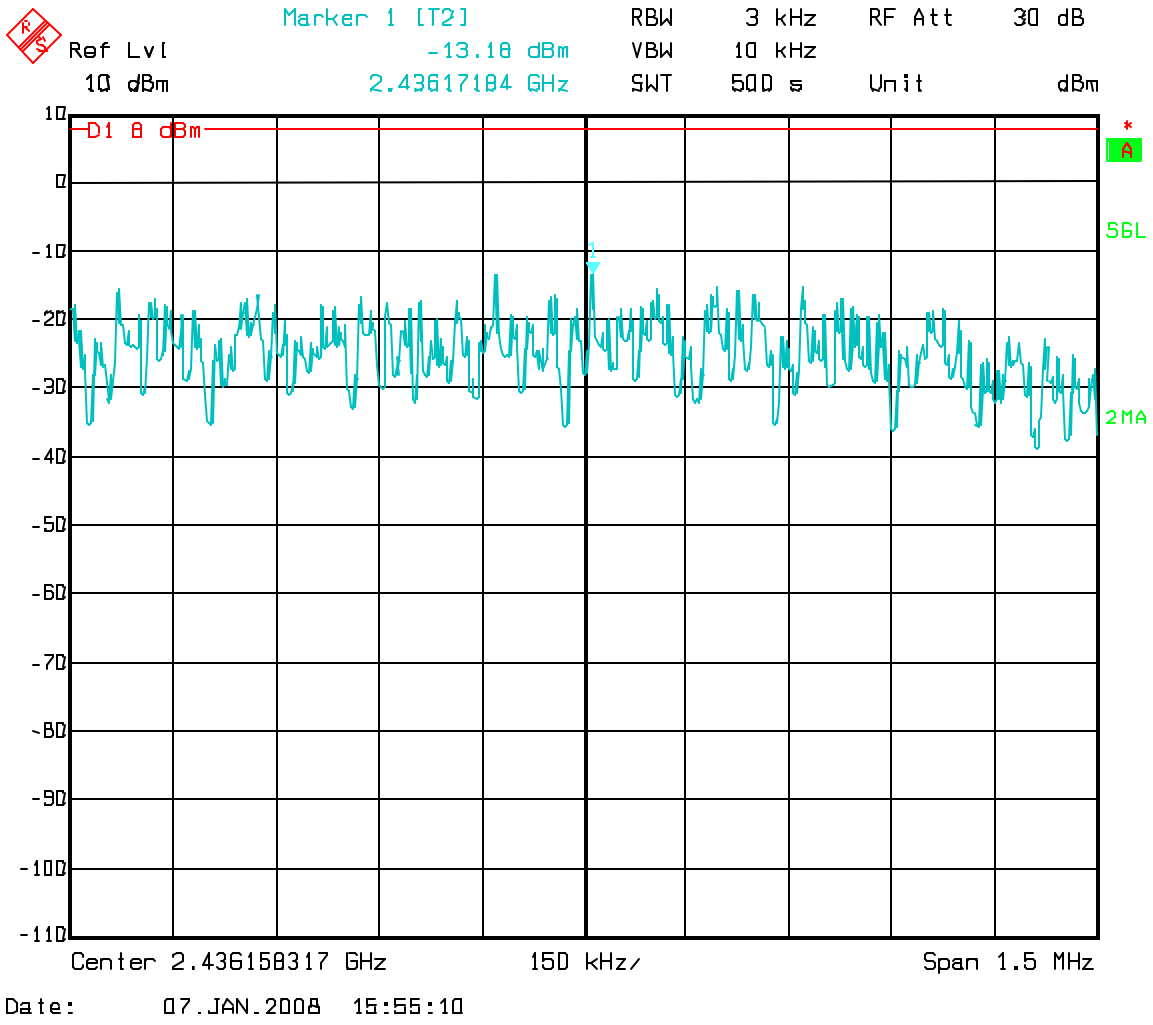
Measurement of Digital Transmission Systems Operating under Section 15.247
March 23, 2005 Option 1.

Channel Frequency (MHz)	RF Power Level dBm	Cable Loss dB	Power Spectral Density	Maximum Limit (dBm)
2412	-12.5	0.5	-12.0	8
2437	-13.1	0.5	-13.6	8
2462	-14.0	0.5	-13.5	8

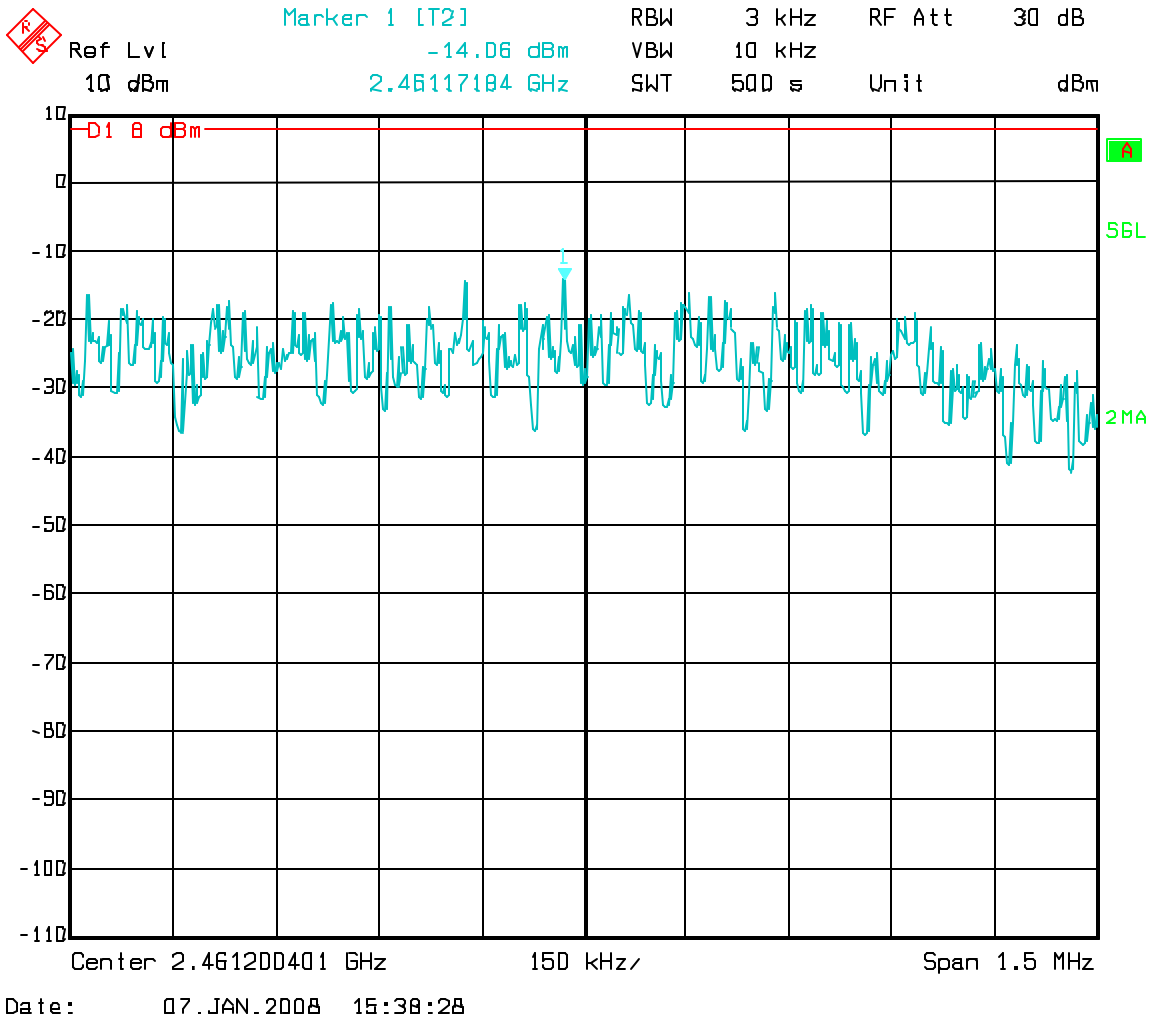
Channel 1


Marker 1 [T2]
-12.53 dBm
2.41117184 GHz
RBW 3 kHz
VBW 10 kHz
SWT 500 s
RF Att 30 dB
Unit dBm
Ref Lvl
10 dBm
D1 8 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
A
SGL
2MA
Center 2.411200401 GHz
150 kHz/
Span 1.5 MHz
Date: 07.JAN.2008 16:11:50

Channel 6


Marker 1 [T2]
-13.18 dBm
2.43617184 GHz
RBW 3 kHz
VBW 10 kHz
SWT 500 s
RF Att 30 dB
Unit dBm
Ref Lvl
10 dBm
D1 8 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
SGL
2MA
Center 2.436158317 GHz
150 kHz/
Span 1.5 MHz
Date: 07.JAN.2008 15:55:10

Channel 11


Marker 1 [T2]
-14.06 dBm
2.46117184 GHz
RBW 3 kHz
VBW 10 kHz
SWT 500 s
RF Att 30 dB
Unit dBm
Ref Lvl
10 dBm
D1 8 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
A
SGL
2MA
Center 2.4612000401 GHz
150 kHz/
Span 1.5 MHz
Date: 07.JAN.2008 15:38:28

6.5. Minimum 6dB RF Bandwidth

(a)(2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

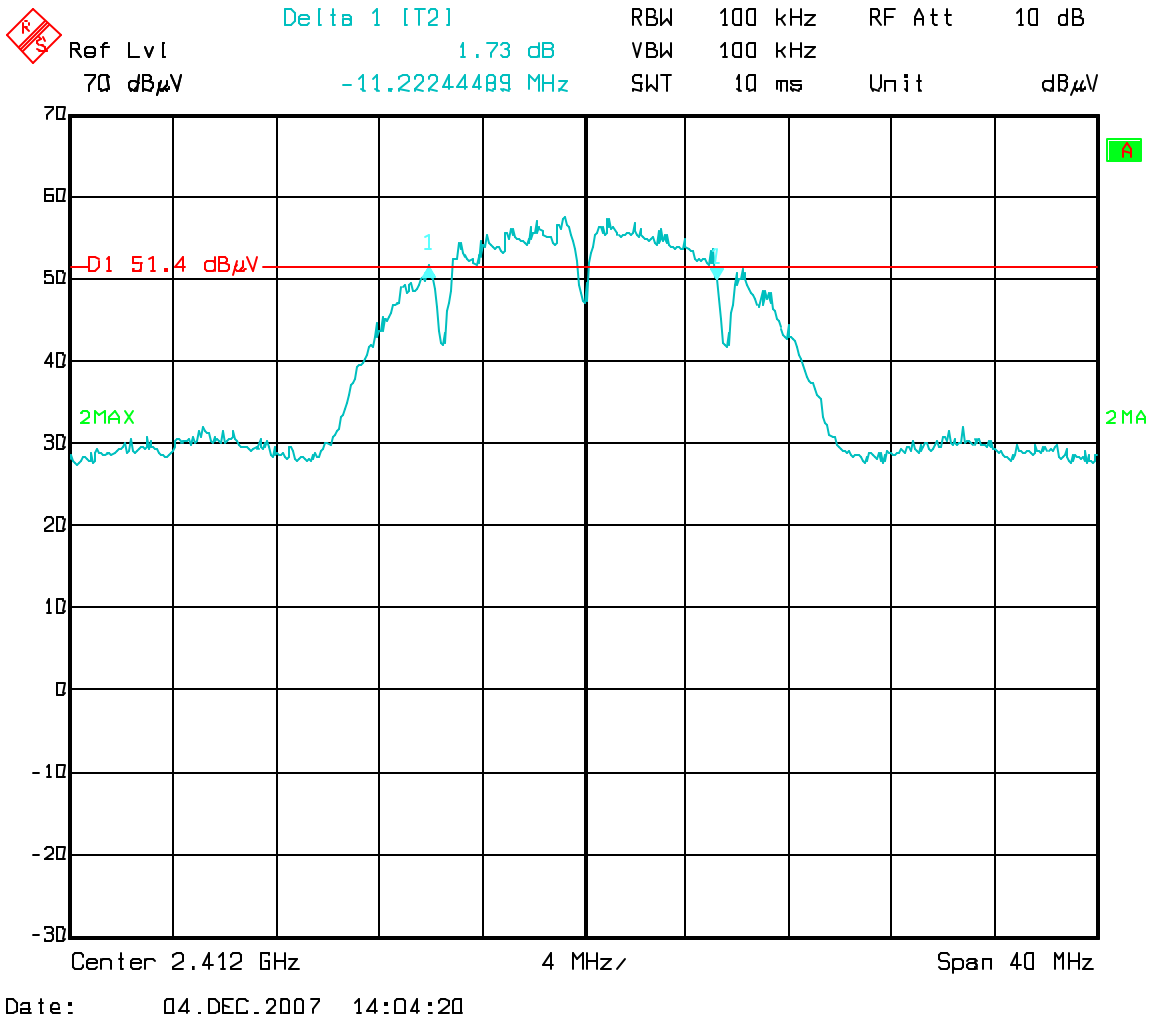
A8.2 (a) The minimum 6 dB bandwidth shall be at least 500 kHz.

6dB Bandwidth:

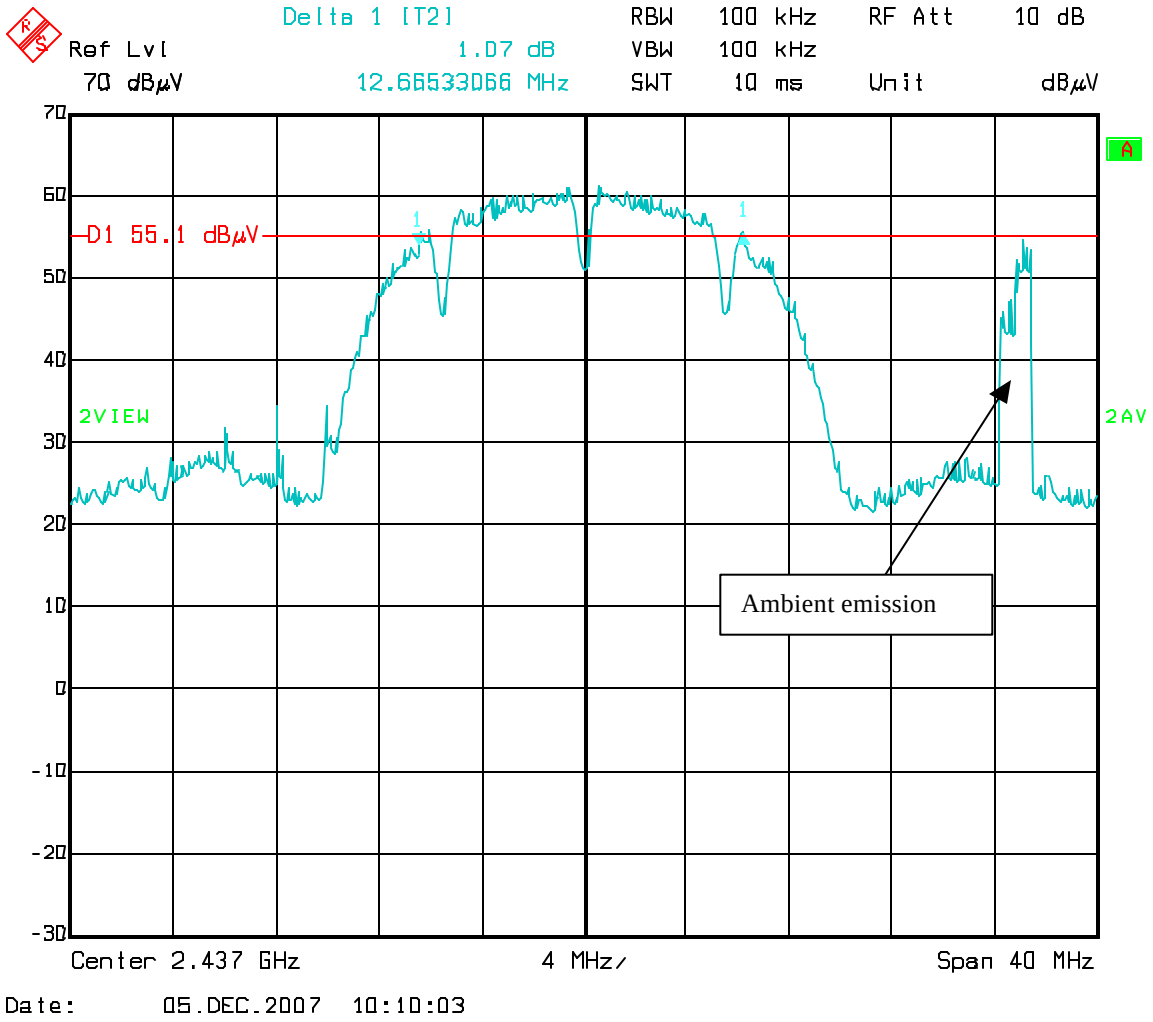
The EUT was measured at 3 meters. The spectrum analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer's center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

Channel Range	6 dB Bandwidth
Low (2412 MHz)	11.2 MHz
Mid (2437 MHz)	12.6 MHz
High (2462 MHz)	12.3 MHz

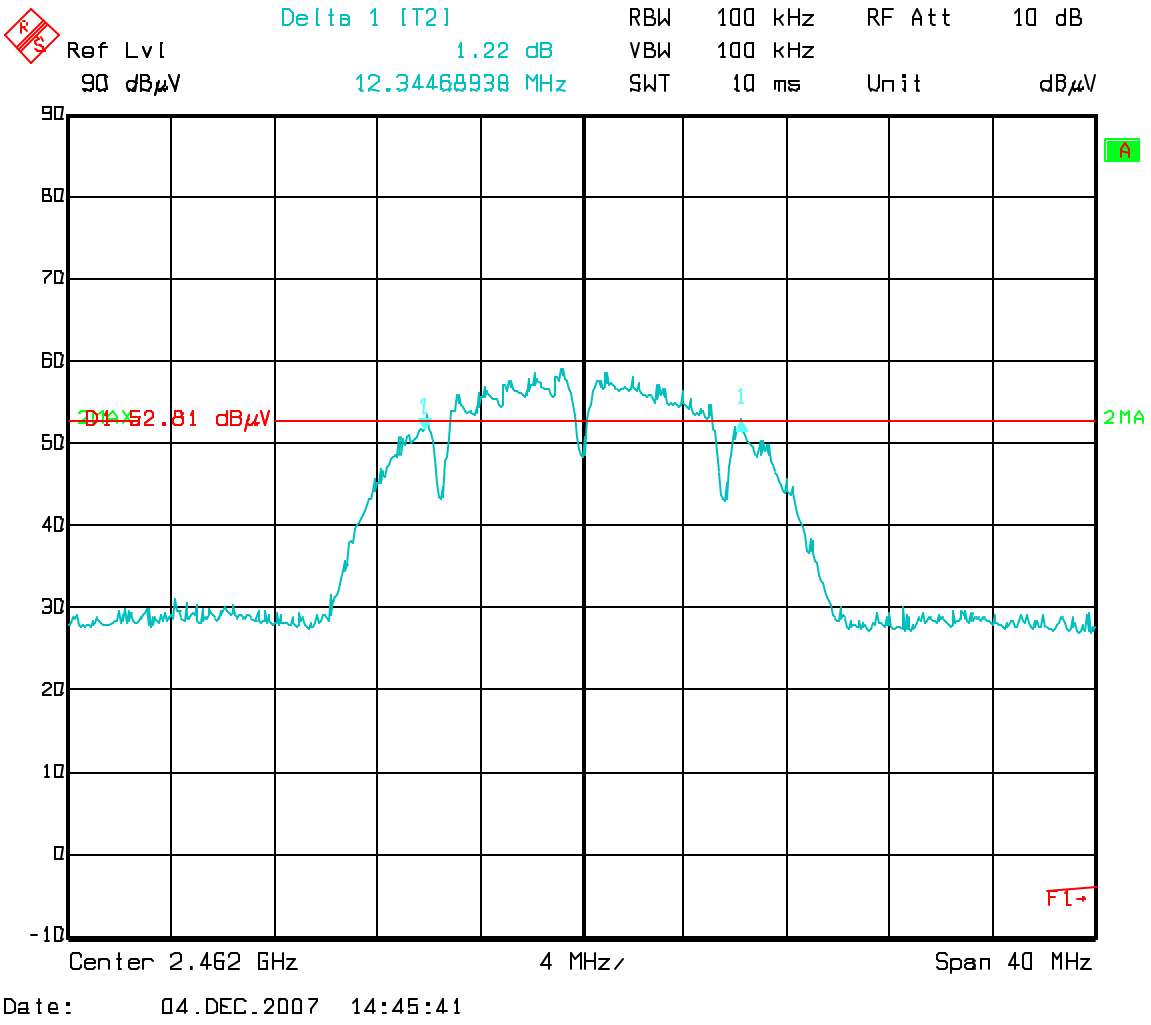
Low Channel


Delta 1 [T2]
1.73 dB
-11.22244489 MHz
RBW 100 kHz
VBW 100 kHz
SWT 10 ms
RF Att 10 dB
Unit dBµV
Ref Lvl
70 dBµV
D1 51.4 dBµV
2MAX
2MA
A
Center 2.412 GHz
4 MHz/
Span 40 MHz
Date: 04.DEC.2007 14:04:20

Mid Channel


Delta 1 [T2]
1.07 dB
12.66533066 MHz
RBW 100 kHz
VBW 100 kHz
SWT 10 ms
RF Att 10 dB
Unit dBµV
Ref Lvl
70 dBµV
D1 55.1 dBµV
2VIEW
2AV
A
Ambient emission
Center 2.437 GHz
4 MHz/
Span 40 MHz
Date: 05.DEC.2007 10:10:03

High Channel



6.6. Receiver Spurious Emissions

The EUT does not have a stand alone "receive" mode, instead it transmits/receives continuously as a Wireless Local Area Network. A laptop computer with a WLAN card was used to "PING" the WLAN address of the EUT and the following emissions were observed. The battery charger was used to keep the battery at full charge during the test. The emission spectrum was searched from 30MHz to the 10th Harmonic, 248350 MHz. Non-WLAN emissions only are recorded as the EUT's WLAN emissions could not be discriminated from the Laptop's WLAN card.

Radiated Emissions Data

Job # :	8454-1-EMC	Date :	12/4/2007	Page 1 of 1	
NEX #:	96029	Time :	10:30 AM		
		Staff :	AAL		
Client Name :	Hughes Network Sysems			EUT Voltage :	120
EUT Name :	IP User Terminal			EUT Frequency :	60
EUT Model # :	Thuraya			Phase:	1
EUT Serial # :				NOATS	X
EUT Config. :	Ping and Transmit Mid Frequency 2437 MHz			SOATS	
				Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	115	Temp. (°C) :	20		
Log Ant.#:	110	Humidity (%) :	59		
DRG Ant. #	NA	Spec An.#:	898		
Dipole Ant.#:	NA	Spec An. Display #:	898		
Cable LF#:	SOATS	QP #:	898		
Cable HF#:	NA	PreSelect#:	899		
Preamp LF#:	NA				
Preamp HF#	NA				

Quasi-Peak	RBW: 120 kHz
	Video Bandwidth 300 kHz
Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz
Average	RBW: 1 MHz
	Video Bandwidth 10 Hz

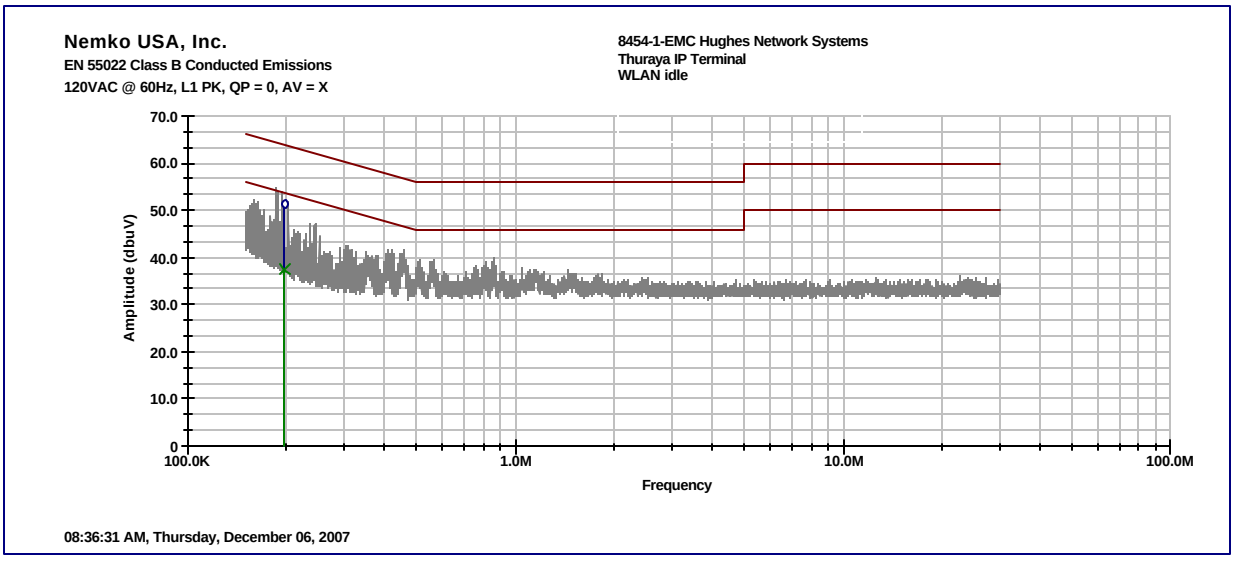
Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.

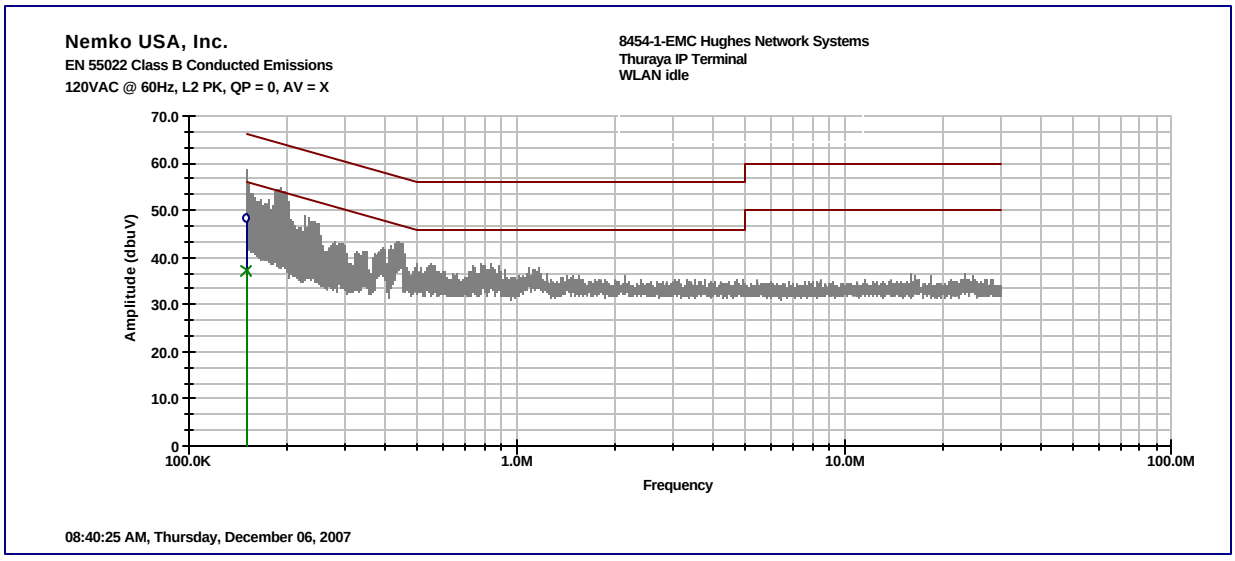
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBuV)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
36.3	20.1	13.2	Q	B	1.0	20.1	31.2	40.0	-8.8	Pass	
47.9	23.3	19.7	Q	B	1.0	23.3	33.6	40.0	-6.4	Pass	
57.4	22.6	20.2	Q	B	1.0	22.6	34.4	40.0	-5.6	Pass	
65.4	22.4	21.8	Q	B	1.0	22.4	33.3	40.0	-6.7	Pass	
116.0	16.6	16.3	Q	B	1.0	16.6	30.6	43.5	-12.9	Pass	
138.5	15.1	14.5	Q	B	1.0	15.1	28.5	43.5	-15.0	Pass	
164.2	13.3	12.2	Q	B	1.0	13.3	30.2	43.5	-13.3	Pass	
200.0	20.4	16.6	Q	B	1.0	20.4	33.5	43.5	-10.0	Pass	
216.4	12.2	11.4	Q	B	1.0	12.2	24.8	46.0	-21.2	Pass	
236.3	13.9	11.9	Q	B	1.0	13.9	26.3	46.0	-19.7	Pass	
279.1	11.4	11.9	Q	B	1.0	11.9	26.7	46.0	-19.3	Pass	
618.8	11.9	11.2	Q	B	1.0	11.9	33.3	46.0	-12.7	Pass	

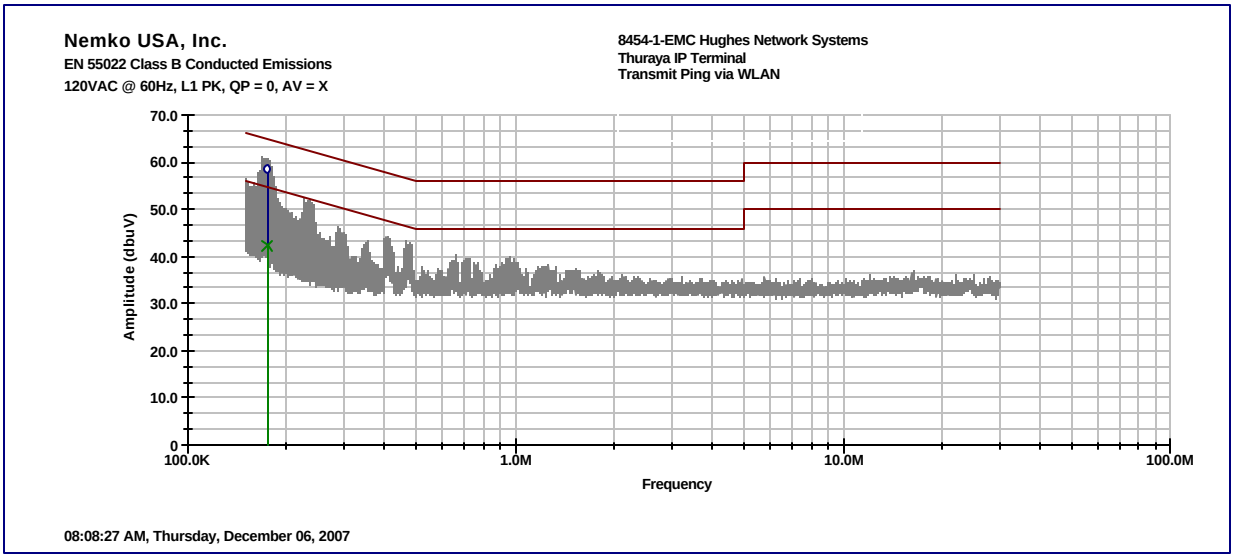
6.7. Conducted Emissions for the Battery Charger

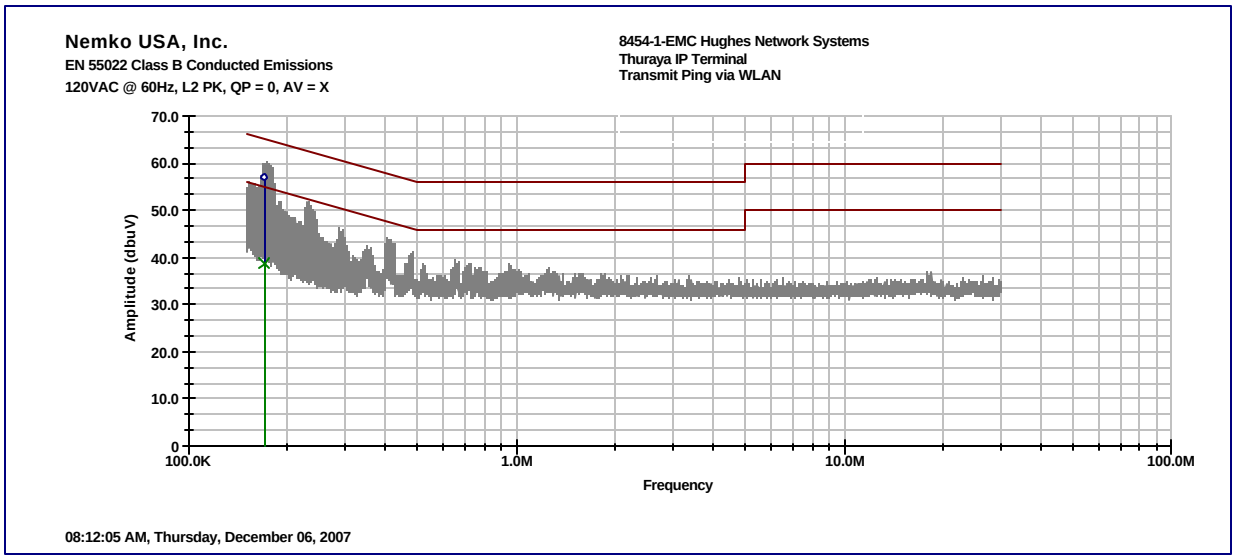
Client	Hughes Network Systems	Temperature	72	deg F
Quote #:	8454-1-EMC	Relative Humidity	55	%
EUT Name	Broadband Satellite IP Modem	Barometric Pressure	30.12	Hg
EUT Model	Hughes 9103	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107	Date	11-7-07	
	Part 15 Radio Stand-By			





Client	Hughes Network Systems	Temperature	72	deg F
Quote #:	8454-1-EMC	Relative Humidity	55	%
EUT Name	Broadband Satellite IP Modem	Barometric Pressure	30.12	Hg
EUT Model	Hughes 9103	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107	Date	11-7-07	
	Part 15 Radio Transmitting			





Conducted Emissions Test Equipment						
Client	Hughes Network Systems		EUT Name	Broadband Satellite IP Modem		
Quote #:	8454-1-EMC		EUT Model	Hughes 9103		
Device Type	*Model #*		*Asset #*	*Used*	*Cal Done*	*Cal Due*
Filter / Limiter						
High Pass Filter, Solar	7801-5.0		564	X	7/9/2007	07/09/08
High Pass Filter, Solar	8310-1.0		559			
Transient Limiter, HP	11947A		682	X	9/5/2007	09/05/08
Transducer						
V-Network LISN, Solar	9348-50-R-24-BNC		384	X	8/28/2007	08/28/08
Spectrum Analyzer / Receiver						
Quasi-Peak Adapter, HP Spectrum Analyzer Display, HP Spectrum Analyzer, HP	85650A 85662A 8568B		676 675 674	X	3/13/2007	03/13/08

Appendix B

7.1 Radiated Measurement Threshold

Radiated Emissions Data

Job # :	8454-1-EMC	Date :	12-20-07	Page 1 of 1	
NEX #:	96029	Time :	6:00 PM		
		Staff :	AAL		
Client Name :	Hughes Network Sysems			EUT Voltage :	
EUT Name :				EUT Frequency :	
EUT Model # :				Phase:	
EUT Serial # :				NOATS	
EUT Config. :				SOATS	X
				Distance	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	128	Temp. (°C) :	22		
Log Ant.#:	110	Humidity (%) :	36		
DRG Ant. #	877	Spec An.#:	835		
DRG Ant. #	625	Spec An. Display #:	835		
Cable LF#:1	SOATS				
Cable HF#:2	40FT				
Preamp LF#:	NA				
Preamp HF#	317				
Preamp HF#2	838				

Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz
Average	RBW: 1 MHz
	Video Bandwidth 10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.

Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading dBuV/m **Vertical**	Meter Reading dBuV/m **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading dBuV/m	Corrected Reading dBuV/m	Spec. limit dBuV/m	CR/SL Diff. (dB)	Pass Fail	Comment
2412.0											
4824.0	44.1	44.0	P	-	1.0	44.1	50.4	74.0	-23.6	Pass	noise floor
7236.0	46.1	46.2	P	-	1.0	46.2	61.8	74.0	-12.2	Pass	noise floor
9648.0	44.6	44.7	P	-	1.0	44.7	64.1	74.0	-9.9	Pass	noise floor
12060.0	40.4	40.3	P	-	1.0	40.4	66.8	74.0	-7.2	Pass	noise floor
14472.0	36.4	36.3	P	-	1.0	36.4	67.7	74.0	-6.2	Pass	noise floor (reduced RBW)
16884.0	21.7	21.8	P	-	1.0	21.8	60.3	74.0	-13.7	Pass	noise floor (reduced RBW)
19296.0	44.5	44.4	P	-	1.0	44.5	57.3	74.0	-16.7	Pass	noise floor
21708.0	48.2	48.4	P	-	1.0	48.4	54.5	74.0	-19.5	Pass	noise floor
24120.0	46.3	46.5	P	-	1.0	46.5	53.7	74.0	-20.3	Pass	noise floor
2437.0											
4874.0	44.2	44.2	P	-	1.0	44.2	50.5	74.0	-23.5	Pass	noise floor
7311.0	46.3	46.3	P	-	1.0	46.3	62.1	74.0	-11.9	Pass	noise floor
9748.0	44.4	44.6	P	-	1.0	44.6	64.0	74.0	-10.0	Pass	noise floor
12185.0	40.6	40.5	P	-	1.0	40.6	67.4	74.0	-6.6	Pass	noise floor
14622.0	36.3	36.4	P	-	1.0	36.4	67.2	74.0	-6.8	Pass	noise floor (reduced RBW)
17059.0	21.7	12.9	P	-	1.0	21.7	60.2	74.0	-13.8	Pass	noise floor (reduced RBW)
19496.0	46.2	46.2	P	-	1.0	46.2	59.1	74.0	-14.9	Pass	noise floor
21933.0	48.1	48.1	P	-	1.0	48.1	54.1	74.0	-19.9	Pass	noise floor
24370.0	46.2	46.2	P	-	1.0	46.2	51.5	74.0	-22.5	Pass	noise floor
2462.0											
4924.0	43.9	44.3	P	-	1.0	44.3	51.1	74.0	-22.9	Pass	noise floor
7386.0	46.1	47.2	P	-	1.0	47.2	63.0	74.0	-11.0	Pass	noise floor
9848.0	44.8	44.6	P	-	1.0	44.8	64.2	74.0	-9.8	Pass	noise floor
12310.0	41.4	40.4	P	-	1.0	41.4	68.5	74.0	-5.5	Pass	noise floor
14772.0	36.4	36.4	P	-	1.0	36.4	66.9	74.0	-7.1	Pass	noise floor (reduced RBW)
17234.0	21.7	21.7	P	-	1.0	21.7	61.2	74.0	-12.8	Pass	noise floor (reduced RBW)
19696.0	46.3	46.3	P	-	1.0	46.3	59.3	74.0	-14.7	Pass	noise floor
22158.0	48.2	48.2	P	-	1.0	48.2	53.9	74.0	-20.1	Pass	noise floor
24620.0	46.3	46.3	P	-	1.0	46.3	49.6	74.0	-24.4	Pass	noise floor

Radiated Emissions Data

Job # : 8454-1-EMC
NEX #: 96029
Date : 12-20-07
Time : 6:00 PM
Staff : AAL
Page 1 of 1

Client Name : Hughes Network Sysems
EUT Name :
EUT Model # :
EUT Serial # :
EUT Config. :

EUT Voltage :
EUT Frequency :
Phase: 1
NOATS
SOATS X
Distance 3 m

Specification : CFR47 Part 15, Subpart B, Class B
Loop Ant. #: NA
Bicon Ant.#: 128
Log Ant.#: 110
DRG Ant. # 877
DRG Ant. # 625
Cable LF#:1 SOATS
Cable HF#:2 40FT
Preamp LF#: NA
Preamp HF# 317
Preamp HF#2 838

Temp. (°C) : 22
Humidity (%) : 36
Spec An.#: 835
Spec An. Display #: 835

Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz
Average	RBW: 1 MHz
	Video Bandwidth 10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading dBuV/m **Vertical**	Meter Reading dBuV/m **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading dBuV/m	Corrected Reading dBuV/m	Spec. limit dBuV/m	CR/SL Diff. (dB)	Pass Fail	Comment
2412.0											
4824.0	32.3	32.2	A	-	1.0	32.3	38.6	54.0	-15.4	Pass	noise floor
7236.0	30.7	30.6	A	-	1.0	30.7	46.3	54.0	-7.7	Pass	noise floor
9648.0	25.1	25.3	A	-	1.0	25.3	44.7	54.0	-9.3	Pass	noise floor (reduced RBW)
12060.0	21.9	21.8	A	-	1.0	21.9	48.3	54.0	-5.7	Pass	noise floor (reduced RBW)
14472.0	15.2	15.4	A	-	1.0	15.4	46.7	54.0	-7.2	Pass	noise floor (reduced RBW)
16884.0	8.4	8.7	A	-	1.0	8.7	47.2	54.0	-6.8	Pass	noise floor (reduced RBW)
19296.0	34.7	34.5	A	-	1.0	34.7	47.5	54.0	-6.5	Pass	noise floor
21708.0	37.3	36.9	A	-	1.0	37.3	43.4	54.0	-10.6	Pass	noise floor
24120.0	35.5	34.4	A	-	1.0	35.5	42.7	54.0	-11.3	Pass	noise floor
2437.0											
4874.0	32.3	32.3	A	-	1.0	32.3	38.6	54.0	-15.4	Pass	noise floor
7311.0	30.7	30.8	A	-	1.0	30.8	46.6	54.0	-7.4	Pass	noise floor
9748.0	25.1	25.0	A	-	1.0	25.1	44.5	54.0	-9.5	Pass	noise floor
12185.0	21.9	21.7	A	-	1.0	21.9	48.7	54.0	-5.3	Pass	noise floor (reduced RBW)
14622.0	15.2	15.4	A	-	1.0	15.4	46.2	54.0	-7.8	Pass	noise floor (reduced RBW)
17059.0	8.4	8.5	A	-	1.0	8.5	47.0	54.0	-7.0	Pass	noise floor (reduced RBW)
19496.0	34.4	34.3	A	-	1.0	34.4	47.3	54.0	-6.7	Pass	noise floor
21933.0	38.1	37.9	A	-	1.0	38.1	44.1	54.0	-9.9	Pass	noise floor
24370.0	35.9	35.1	A	-	1.0	35.9	41.2	54.0	-12.8	Pass	noise floor
2462.0											
4924.0	32.3	33.2	A	-	1.0	33.2	40.0	54.0	-14.0	Pass	noise floor
7386.0	30.7	30.9	A	-	1.0	30.9	46.7	54.0	-7.3	Pass	noise floor
9848.0	25.1	25.4	A	-	1.0	25.4	44.8	54.0	-9.2	Pass	noise floor
12310.0	21.9	21.7	A	-	1.0	21.9	49.0	54.0	-5.0	Pass	noise floor
14772.0	15.2	15.3	A	-	1.0	15.3	45.8	54.0	-8.2	Pass	noise floor (reduced RBW)
17234.0	8.4	8.4	A	-	1.0	8.4	47.9	54.0	-6.1	Pass	noise floor (reduced RBW)
19696.0	34.3	34.1	A	-	1.0	34.3	47.3	54.0	-6.7	Pass	noise floor
22158.0	38.1	38.6	A	-	1.0	38.6	44.3	54.0	-9.7	Pass	noise floor
24620.0	36.3	36.4	A	-	1.0	36.4	39.7	54.0	-14.3	Pass	noise floor