ENGINEERING TEST REPORT

Bluetooth Audio Module
Model: WBT1010
FCC ID: WUO-WBT1010

Applicant:

Sonavox Canada Inc.
81 Zenway Blvd. Unit # 25
Woodbridge, Ontario
Canada L4H 0S5

In Accordance With

Federal Communications Commission (FCC)
Part 15, Subpart C, Section 15.247
Digital Modulation Systems (DTS) Operating in 2400 – 2483.5 MHz Band

UltraTech's File No.: BAS-129F15C247

This Test report is Issued under the Authority of Tri M. Luu Vice President of Engineering UltraTech Group of Labs Date: March 5, 2013	
Report Prepared by: Dan Huynh Issued Date: March 5, 2013	Tested by: Mr. Hung Trinh Test Dates: Jan. 18 – Mar. 5, 2013

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C, Section 15.247
Title:	Code of Federal Regulations (CFR), Title 47 – Telecommunication, Part 15 – Radio Frequency Devices
Purpose of Test:	Equipment Certification for Digital Modulation Systems (DTS) Transmitter Operating in the Frequency Band 2400-2483.5 MHz.
Test Procedures:	▪ ANSI C63.4 ▪ ANSI C63.10 ▪ FCC, KDB Publication No. 558074 D01
Environmental Classification:	[x] Commercial, industrial or business environment [x] Residential environment

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
47 CFR Parts 0-19	2012	Code of Federal Regulations (CFR), Title 47 – Telecommunication
ANSI C63.4	2009	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 C63.10	2009	American National Standard for Testing Unlicensed Wireless Devices
CISPR 22 & EN 55022	2008-09, Edition 6.0 2006	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
CISPR 16-1-1 +A1 +A2	2006 2006 2007	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-1-2 +A1 +A2	2003 2004 2006	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Conducted disturbances
FCC, KDB Publication No. 558074 D01 DTS Meas Guidance v02	2012	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	Sonavox Canada Inc.
Address:	81 Zenway Blvd. Unit # 25 Woodbridge, Ontario Canada L4H 0S5
Contact Person:	Mr Joe Riggi Phone #: 905-265-2060 Fax #: 905-265-1853 Email Address: jriggi@sonavox.com

MANUFACTURER	
Name:	Sonavox Canada Inc.
Address:	81 Zenway Blvd. Unit # 25 Woodbridge, Ontario Canada L4H 0S5
Contact Person:	Mr Joe Riggi Phone #: 905-265-2060 Fax #: 905-265-1853 Email Address: jriggi@sonavox.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	Sonavox Canada Inc.
Product Name:	Bluetooth Audio Module
Model Name or Number:	WBT1010
Serial Number:	Test Sample
Type of Equipment:	Digital Transmission System (DTS)
Input Power Supply Type:	External DC Power Supply
Primary User Functions of EUT:	Bluetooth audio interface

2.3. EUT'S TECHNICAL SPECIFICATIONS

Transmitter	
Equipment Type:	▪ Portable ▪ Mobile ▪ Base Station (fixed use)
Intended Operating Environment:	▪ Commercial, industrial or business environment ▪ Residential environment
Power Supply Requirement:	5 VDC
RF Output Power Rating:	8.68 dBm
Operating Frequency Range:	2402 – 2480 MHz
RF Output Impedance:	50 Ω
Channel Spacing:	2 MHz
Duty Cycle:	100%
Modulation Type:	GFSK
Oscillator Frequency(ies):	26.000 MHz
Antenna Connector Types:	Integral

2.4. ASSOCIATED ANTENNA DESCRIPTIONS

Manufacturer:	Johanson Technology
Type:	Chip antenna
Model:	2450AT43B100
Frequency Range:	2.400 – 2.500 GHz
Impedance:	50 Ohm
Gain (dBi):	1.3 (max)

2.5. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	DC Supply & I/O Port	1	Pin Header	No cable, direct connection

2.6. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

Ancillary Equipment # 1	
Description:	Test Jig
Brand name:	Sonavox Canada Inc.
Model Name or Number:	N/A
Connected to EUT's Port:	I/O Port

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power Input Source:	5 VDC

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The transmitter was operated in a continuous transmission mode with the carrier modulated as specified in the Test Data.
Special Test Software:	Special software provided by the Applicant to operate the EUT at each channel frequency continuously and in the range of typical modes of operation.
Special Hardware Used:	Test Jig
Transmitter Test Antenna:	The EUT is tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment as described with the test results.

Transmitter Test Signals	
Frequency Band(s):	2402 – 2480 MHz
Frequency(ies) Tested: (Near lowest, near middle & near highest frequencies in the frequency range of operation.)	2402, 2440 and 2480 MHz
RF Power Output: (measured maximum output power at antenna terminals)	7.38 mW (conducted)
Normal Test Modulation:	GFSK
Modulating Signal Source:	Internal

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(H).

- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 91038) and Industry Canada office (Industry Canada File No.: 2049A-3). Expiry Date: 2014-04-04.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.203	Antenna requirements	Yes
15.207(a)	AC Power Line Conducted Emissions	Yes
15.247(a)(2)	6 dB Bandwidth	Yes
15.247(b)(3)	Peak Conducted Output Power - DTS	Yes
15.247(d)	Band-Edge and RF Conducted Spurious Emissions at the Transmitter Antenna Terminal	Yes
15.247(d), 15.209 & 15.205	Transmitter Spurious Radiated Emissions	Yes
15.247(e)	Power Spectral Density	Yes
15.247(i), 1.1307, 1.1310, 2.1091, 2.1093	RF Exposure	Yes

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

EXHIBIT 5. TEST DATA

5.1. POWER LINE CONDUCTED EMISSIONS [§15.207(a)]

5.1.1. Limit(s)

The equipment shall meet the limits of the following table:

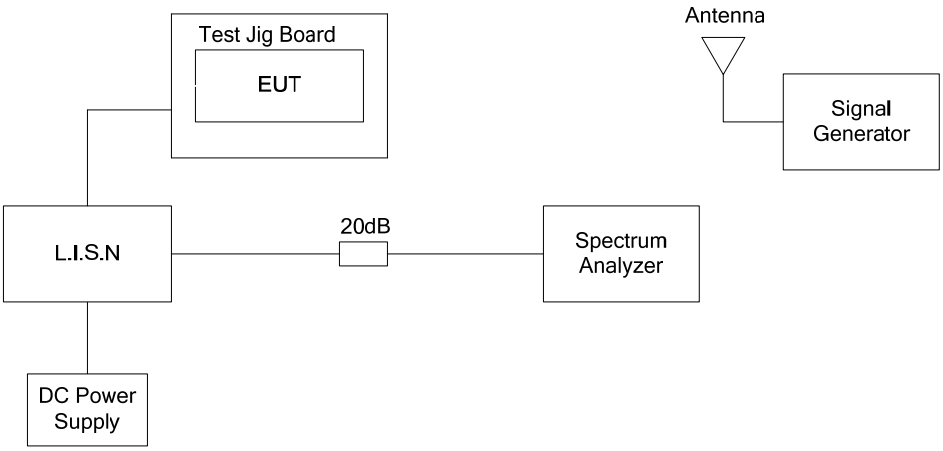
Frequency of emission (MHz)	Conducted Limits (dBμV)	
	Quasi-peak	Average
0.15–0.5 .....……..	66 to 56*	56 to 46*
0.5–5 .....……..	56	46
5-30 ……..	60 ...……..	50

*Decreases linearly with the logarithm of the frequency

5.1.2. Method of Measurements

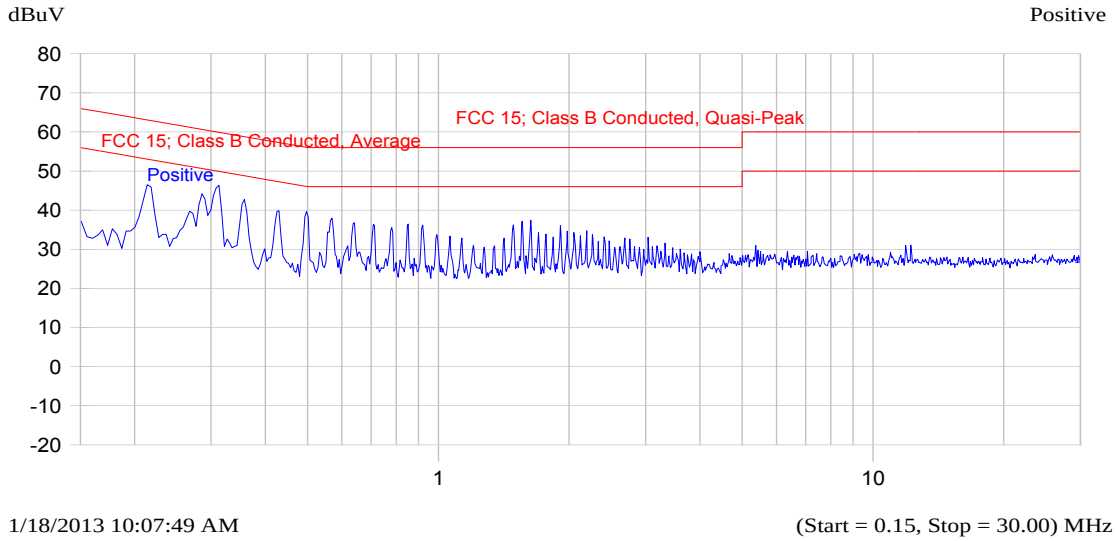
ANSI C63.4-2009

5.1.3. Test Arrangement



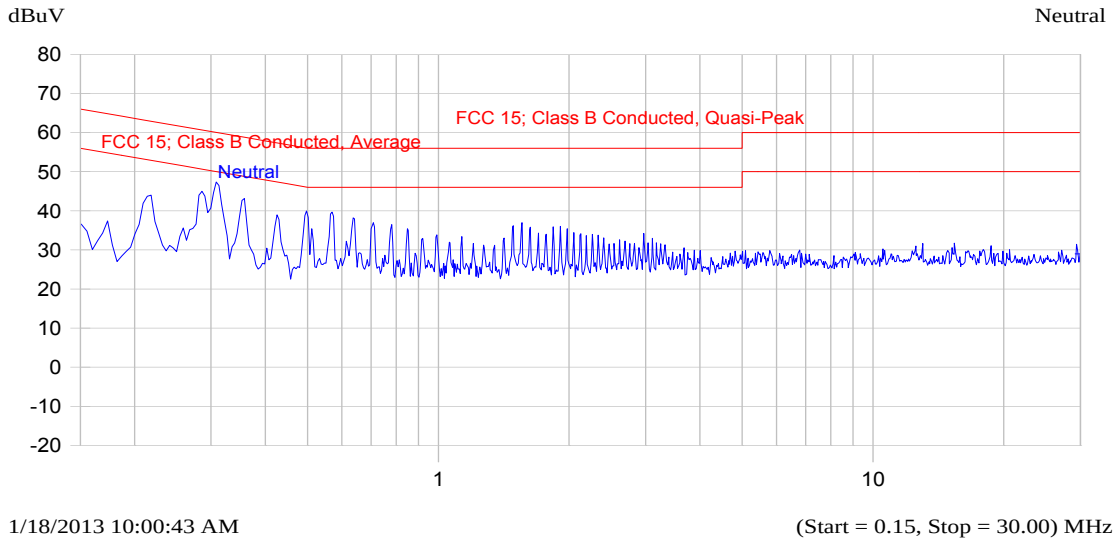
5.1.4. Test Data

Plot 5.1.4.1. Power Line Conducted Emissions, Tx Mode, Line Voltage: 5VDC, Line Tested: Positive



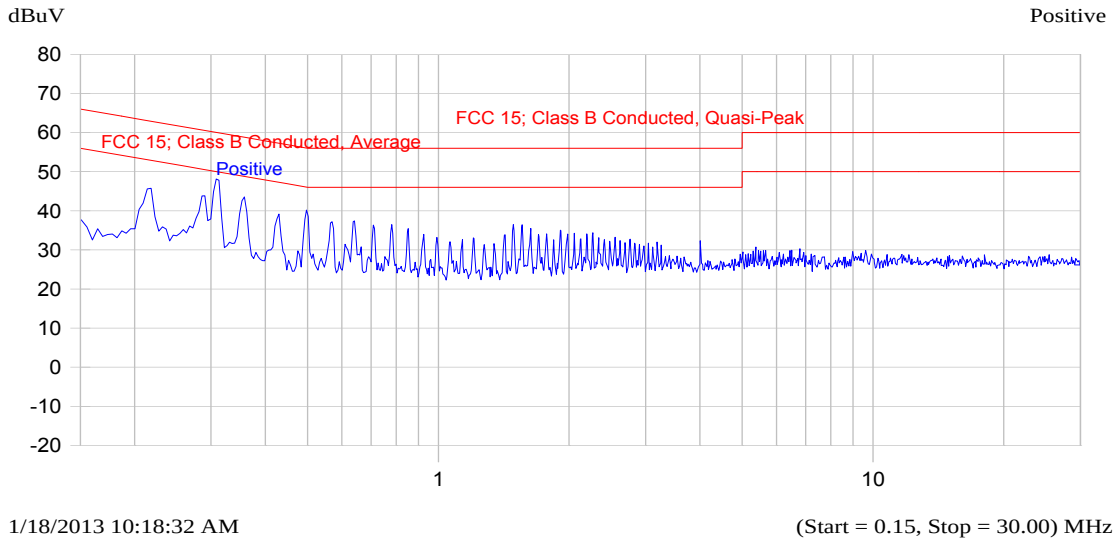
Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.213	46.1	43.5	-20.6	41.9	-12.2	Positive
0.306	48.8	46.9	-14.6	43.9	-7.5	Positive
0.495	41.8	38.8	-17.3	38.0	-8.1	Positive
1.628	36.6	33.9	-22.1	31.8	-14.2	Positive

Plot 5.1.4.2. Power Line Conducted Emissions, Tx Mode, Line Voltage: 5VDC, Line Tested: Negative



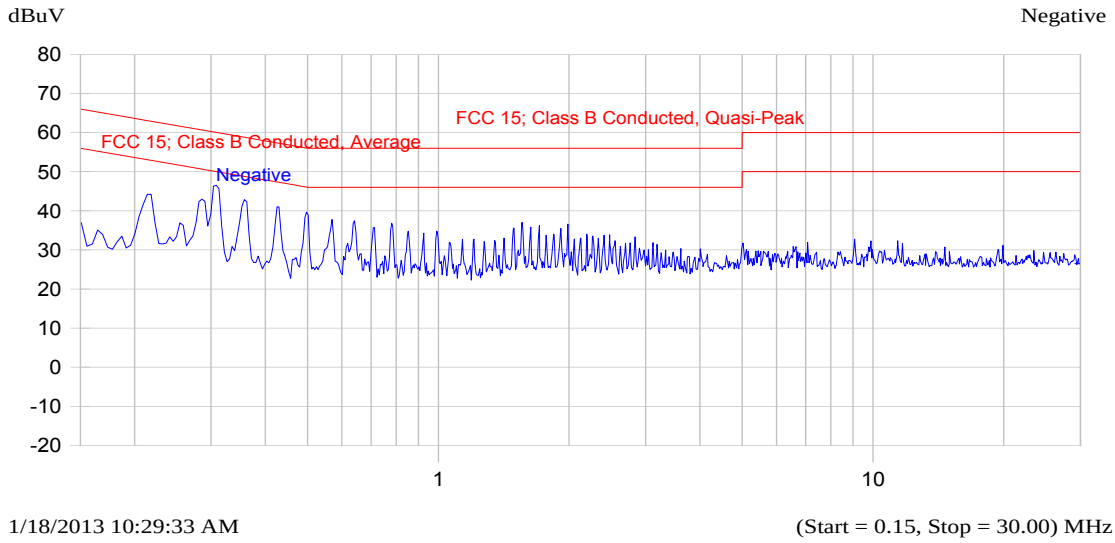
Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.306	48.8	47.6	-13.8	44.8	-6.7	Neutral
0.566	40.7	37.0	-19.0	34.2	-11.8	Neutral
1.555	38.6	36.0	-20.0	34.4	-11.6	Neutral

Plot 5.1.4.3. Power Line Conducted Emissions, Rx Mode, Line Voltage: 5VDC, Line Tested: Positive



Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.307	48.5	46.6	-14.9	43.9	-7.6	Positive
0.495	42.3	39.0	-17.2	38.1	-8.0	Positive
1.556	38.7	36.0	-20.0	34.8	-11.2	Positive

Plot 5.1.4.4. Power Line Conducted Emissions, Rx Mode, Line Voltage: 5VDC, Line Tested: Negative



Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.306	48.2	46.8	-14.7	44.1	-7.4	Negative
0.493	42.4	37.7	-18.5	36.0	-10.2	Negative
1.559	39.1	35.6	-20.4	33.1	-12.9	Negative

5.2. OCCUPIED BANDWIDTH [§ 15.247(a)(2)]

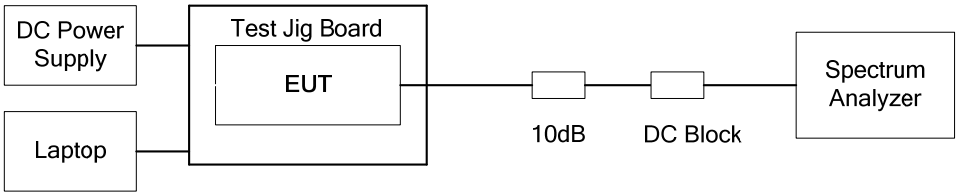
5.2.1. Limit(s)

The minimum 6 dB bandwidth shall be at least 500 kHz.

5.2.2. Method of Measurements

KDB Publication No. 558074 D01 DTS Meas Guidance v02, Section 7.1 Option 1 DTS (6dB) Channel Bandwidth.

5.2.3. Test Arrangement

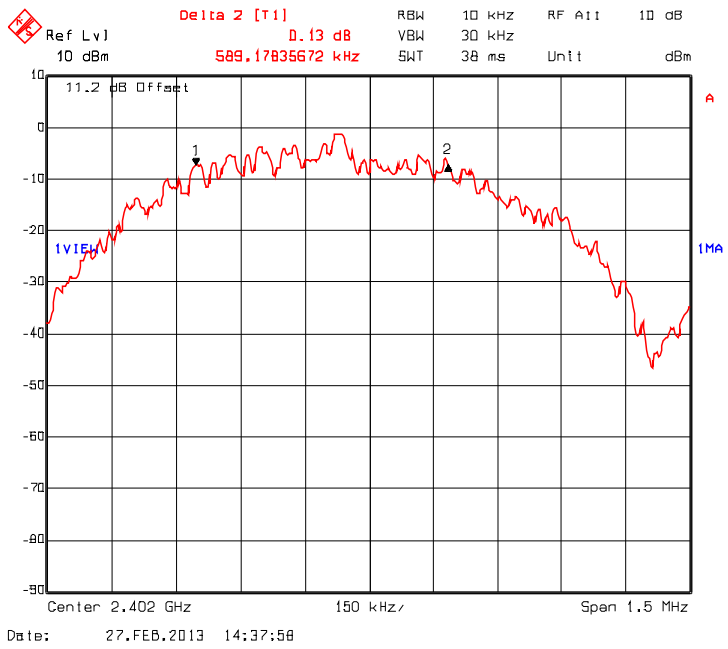


5.2.4. Test Data

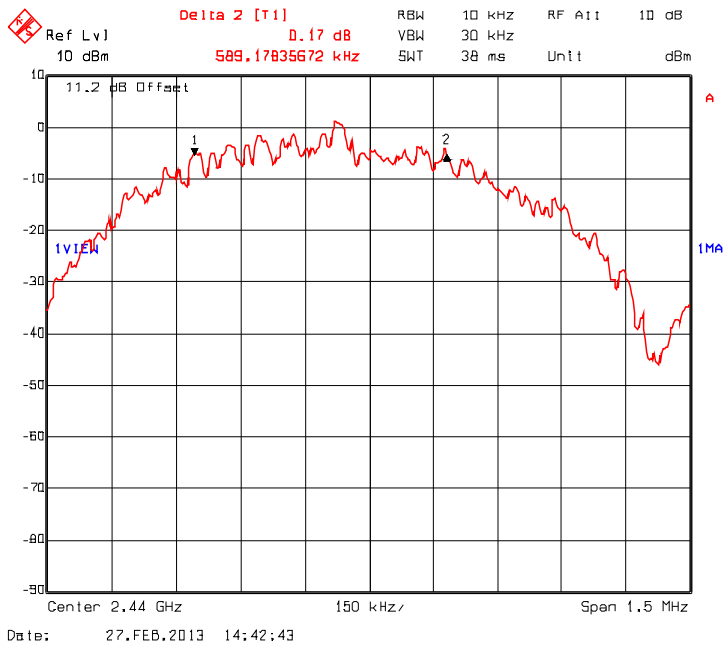
Frequency (MHz)	6 dB Bandwidth (kHz)	99% Occupied Bandwidth (MHz)	6 dB Bandwidth Limit (kHz)
2402	589.18	1.02	500
2440	589.18	1.02	500
2480	595.19	1.01	500

See the following plots for detailed measurements.

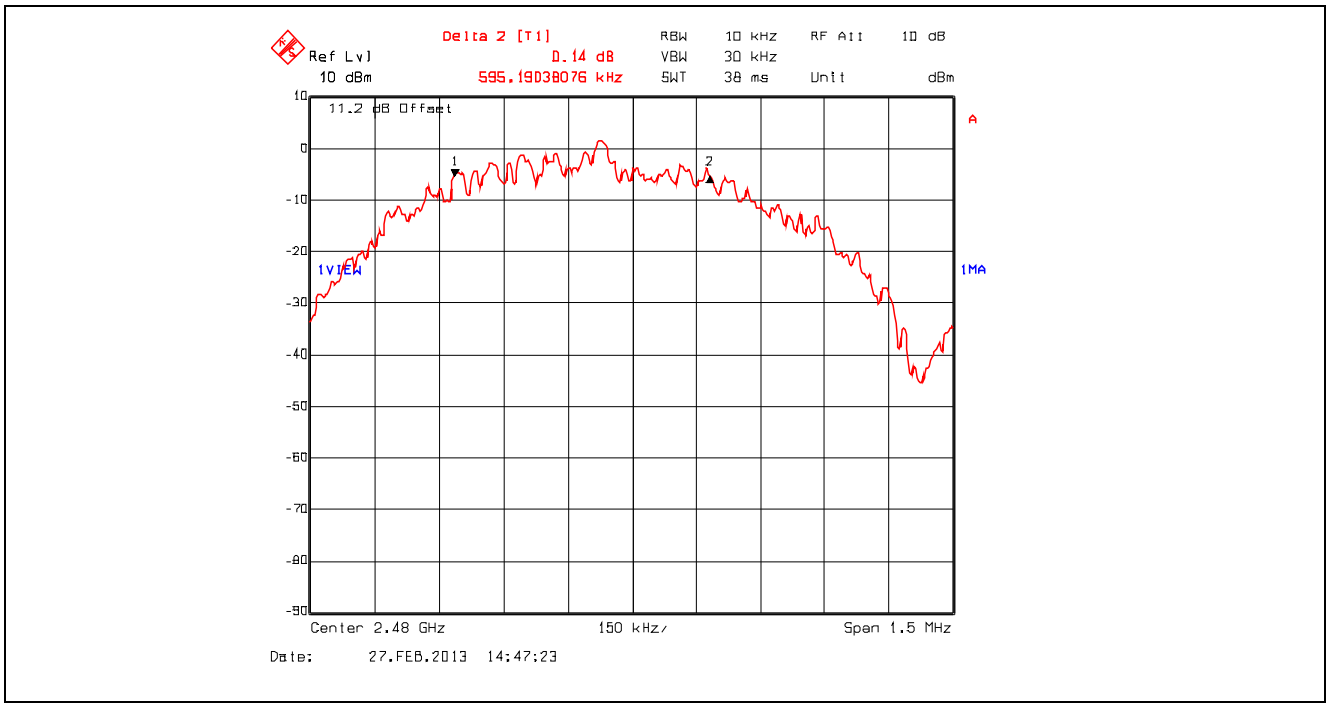
Plot 5.2.4.1. 6 dB Bandwidth, 2402 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



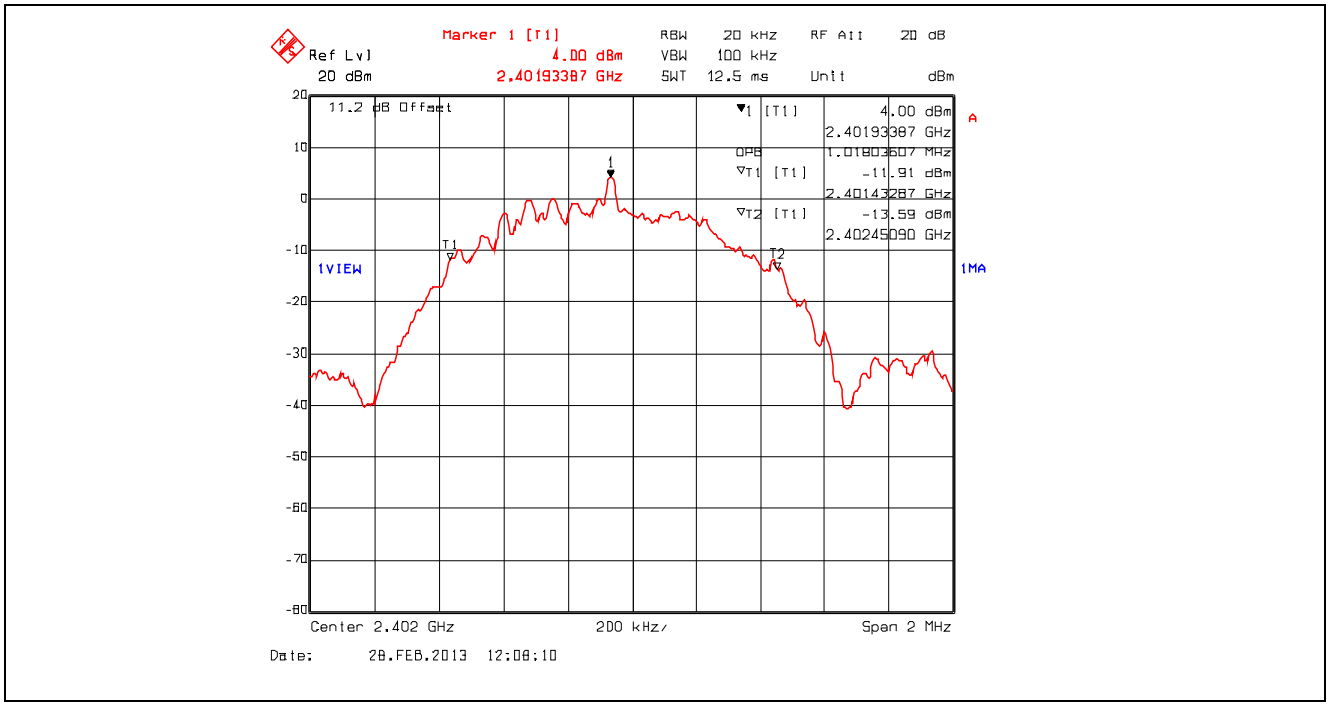
Plot 5.2.4.2. 6 dB Bandwidth, 2440 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



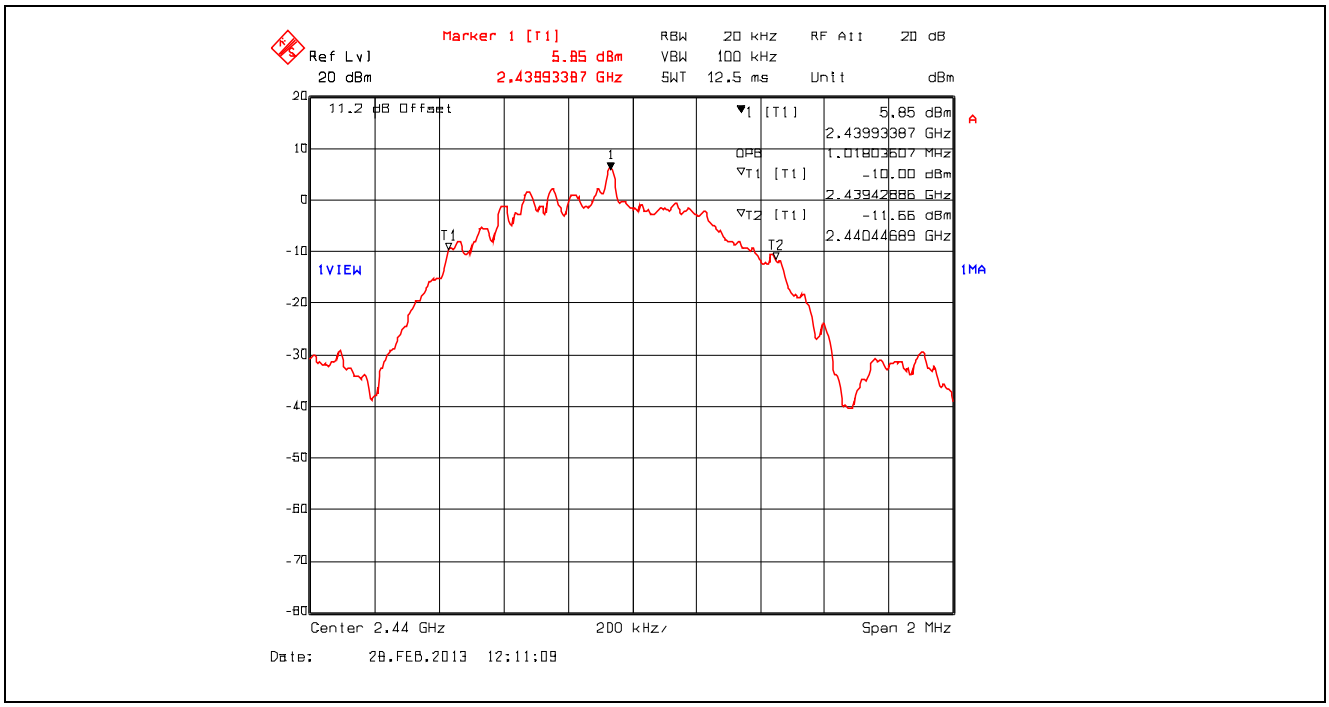
Plot 5.2.4.3. 6 dB Bandwidth, 2480 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



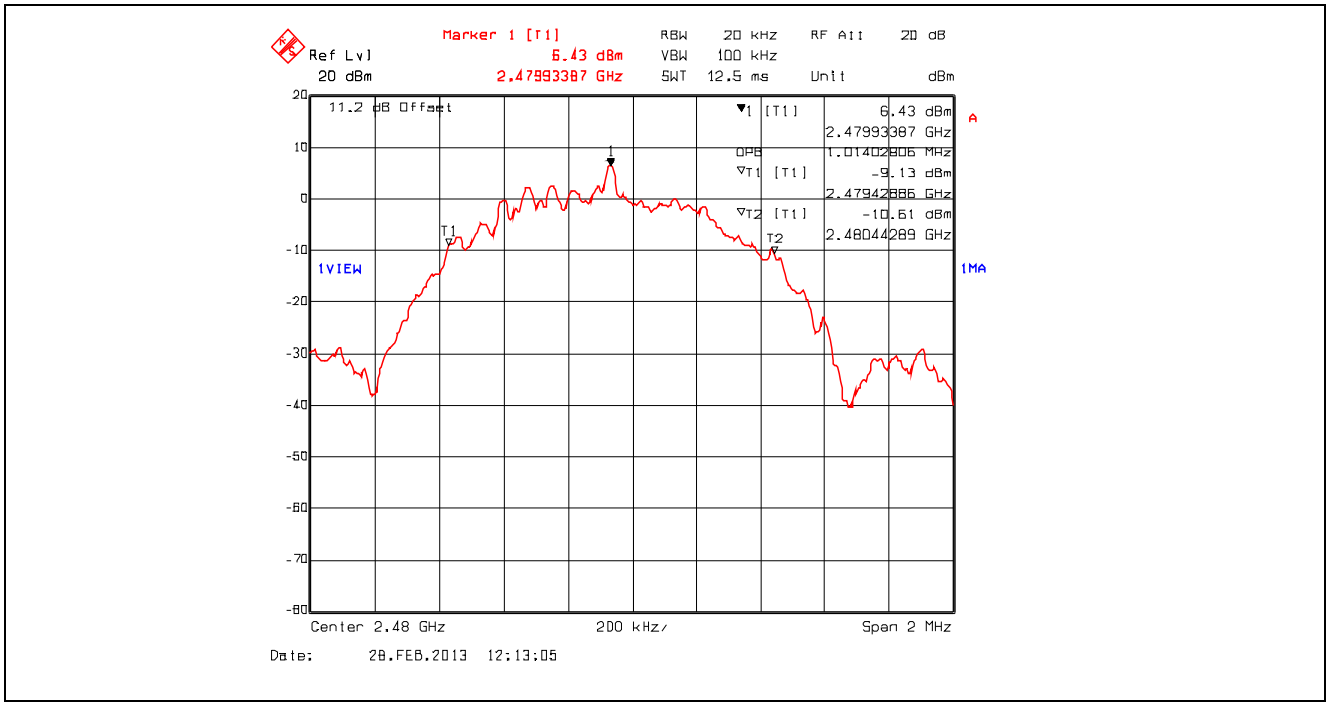
Plot 5.2.4.4. 99% Occupied Bandwidth, 2402 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



Plot 5.2.4.5. 99% Occupied Bandwidth, 2440 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



Plot 5.2.4.6. 99% Occupied Bandwidth, 2480 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



5.3. PEAK CONDUCTED OUTPUT POWER - DTS [§ 15.247(b)(3)]

5.3.1. Limit(s)

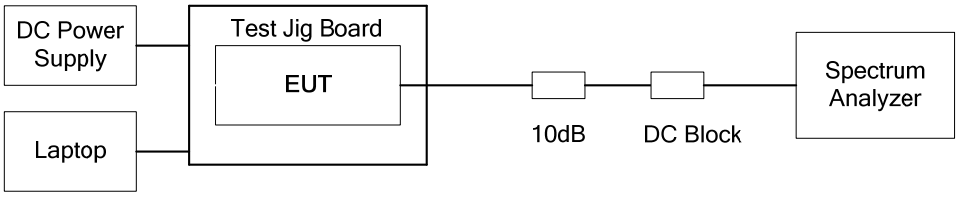
§ 15.247(b)(3): For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling 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.

§15.247(b)(4): The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.3.2. Method of Measurements & Test Arrangement

KDB Publication No. 558074 D01 DTS Meas Guidance v02, Section 8.1.1 Option 1.

5.3.3. Test Arrangement

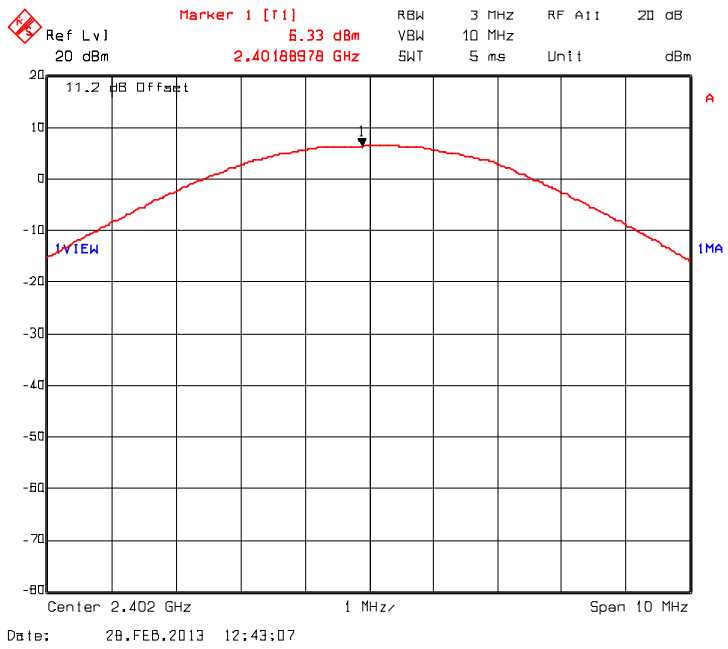


5.3.4. Test Data

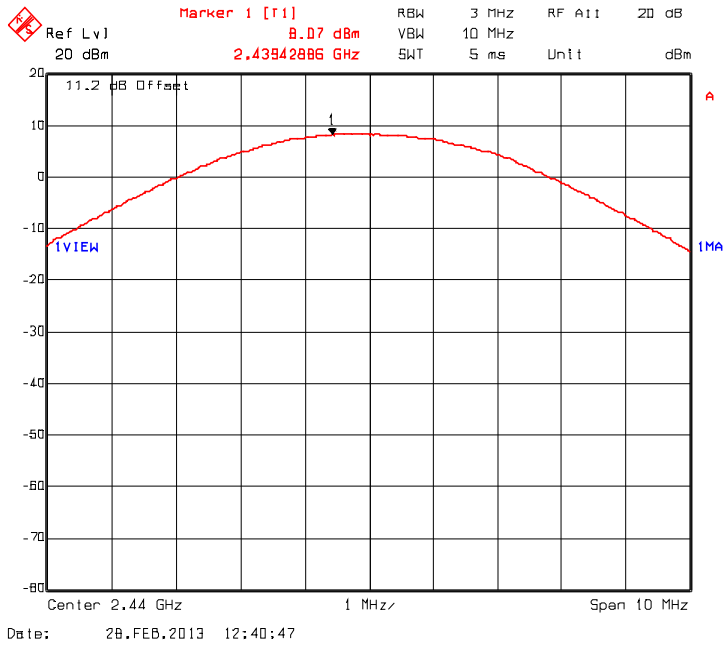
Frequency (MHz)	Peak Output Power at Antenna Terminal (dBm)	Calculated EIRP (dBm)	Peak Output Power Limit (dBm)	EIRP Limit (dBm)
2402	6.33	7.63	21	36
2440	8.07	9.37	21	36
2480	8.68	9.98	21	36

Notes:
1. The EIRP shall be calculated based on the transmitter maximum antenna gain (G_{dBi}), cable loss (CL_{dB}) and peak output power at antenna terminal (P_{dBm}). Calculated EIRP = $P_{dBm} + G_{dBi} - CL_{dB}$
2. EUT uses a maximum antenna gain of 1.3 dBi.

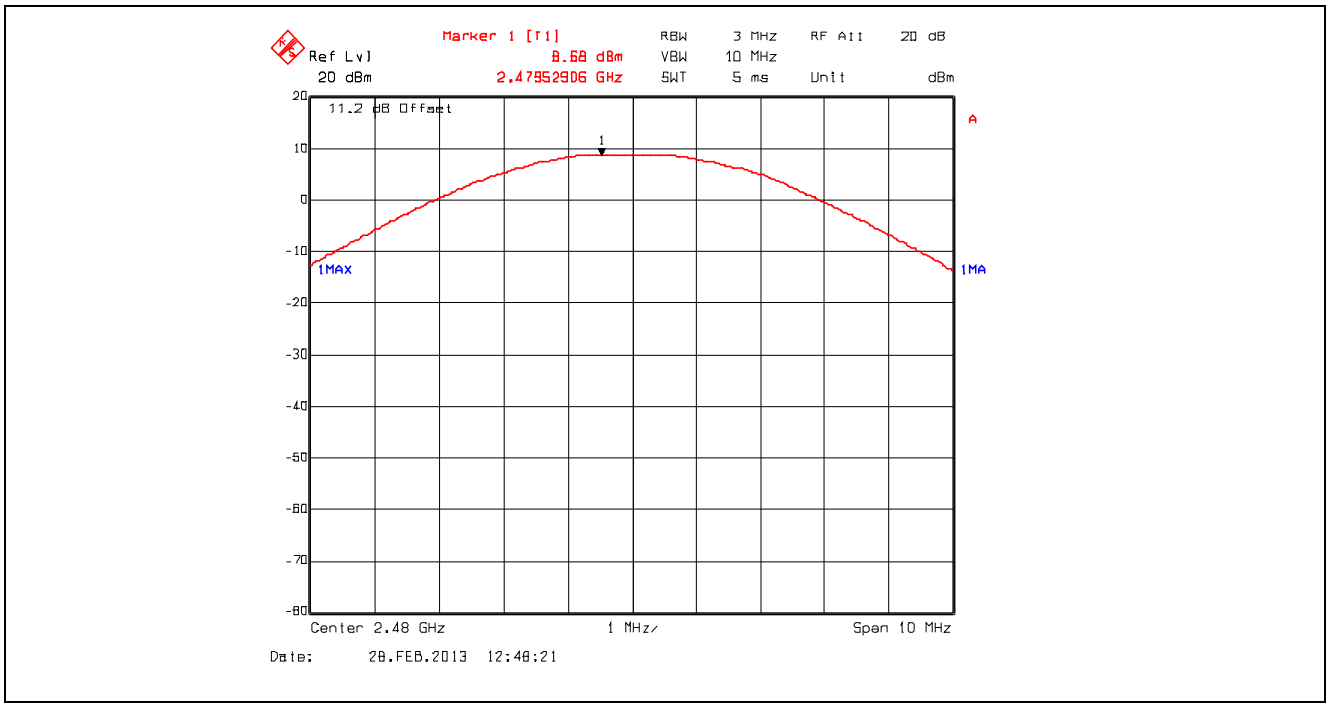
Plot 5.3.4.1. Peak Conducted Output Power, 2402 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



Plot 5.3.4.2. Peak Conducted Output Power, 2440 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



Plot 5.3.4.3. Peak Conducted Output Power, 2480 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



5.4. TRANSMITTER BAND-EDGE & SPURIOUS CONDUCTED EMISSIONS [§ 15.247(d)]

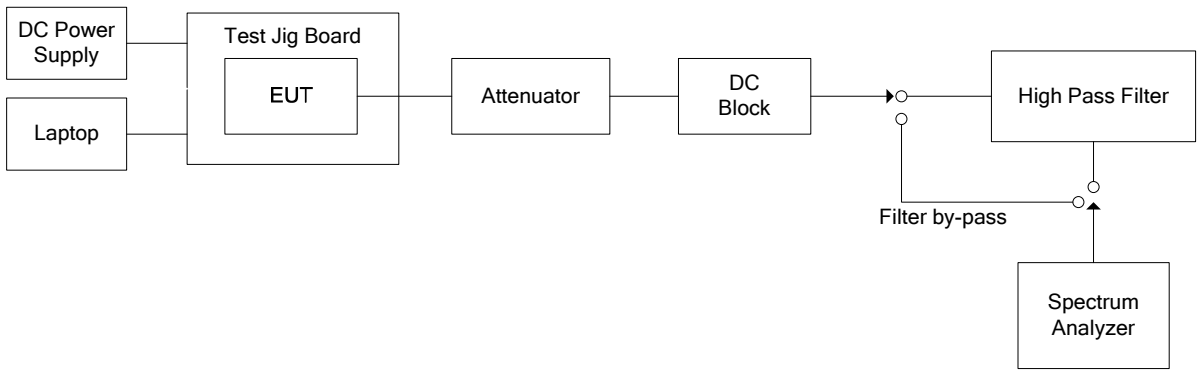
5.4.1. Limit(s)

§ 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.

5.4.2. Method of Measurements

KDB Publication No. 558074 D01 DTS Meas Guidance v02, Section 10.2.5 Band-Edge Measurements and ANSI C63.10

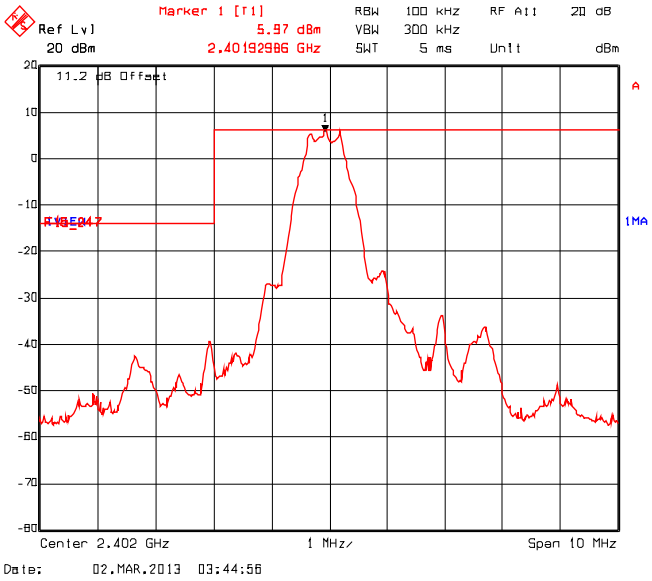
5.4.3. Test Arrangement



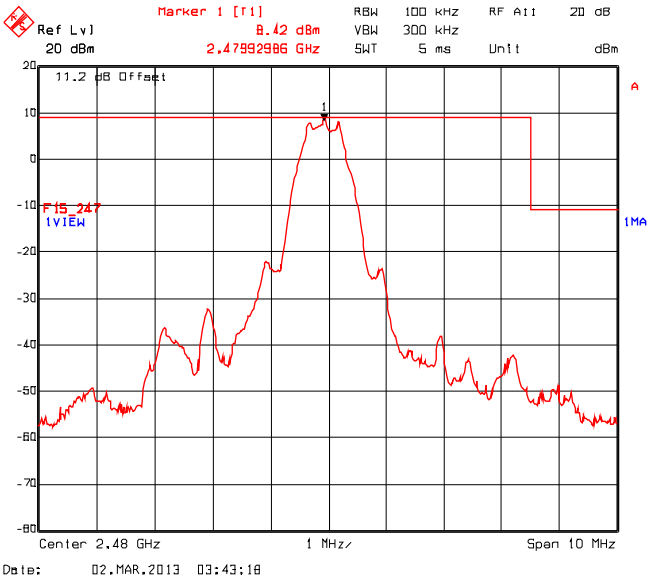
5.4.4. Test Data

5.4.4.1. Band-Edge RF Conducted Emissions

Plot 5.4.4.1.1. Band-Edge RF Conducted Emissions, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
Low End of Frequency Band, 2402 MHz



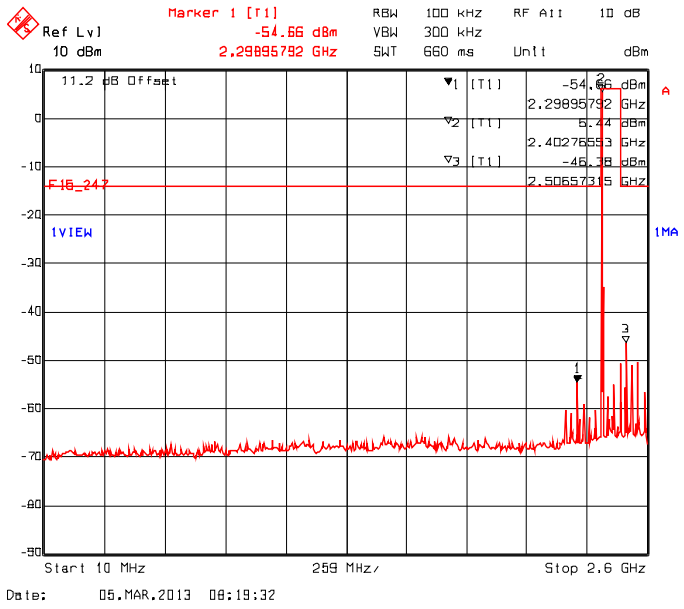
Plot 5.4.4.1.2. Band-Edge RF Conducted Emissions, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
High End of Frequency Band, 2480 MHz



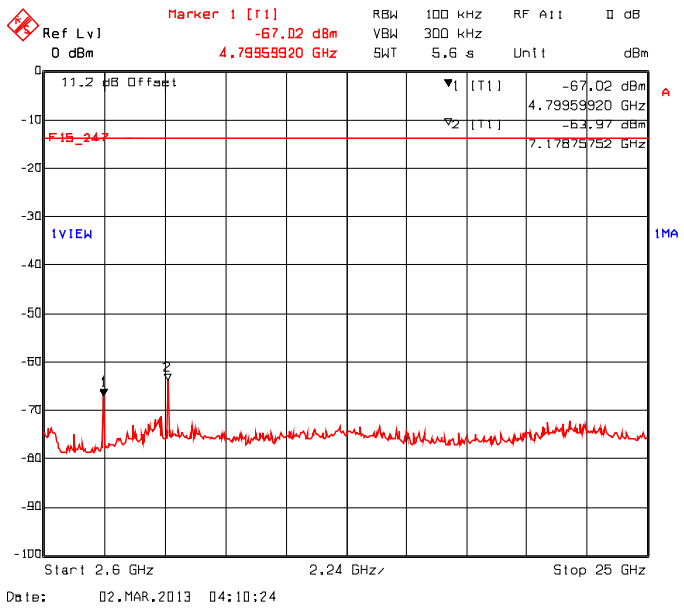
5.4.4.2. Spurious RF Conducted Emissions

Remark: The following test results are the worst-case measurements.

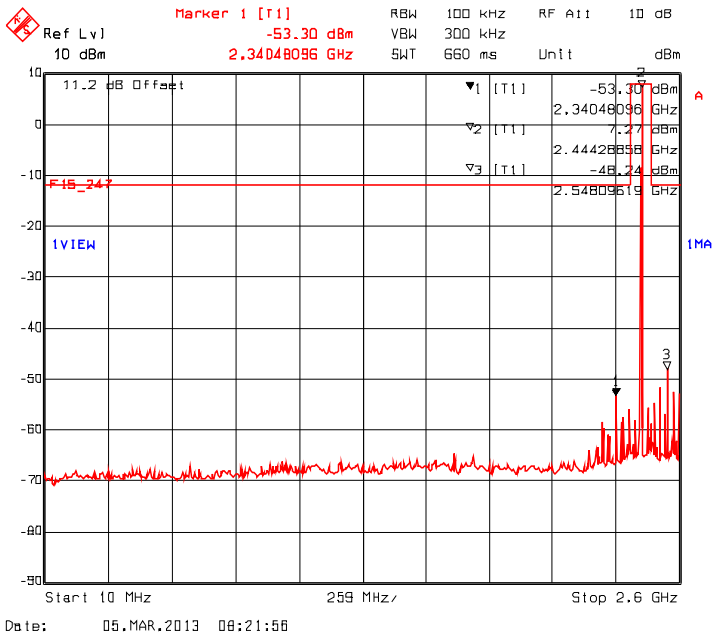
Plot 5.4.4.2.1. Spurious RF Conducted Emissions, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
2402 MHz, 10 MHz - 2.6 GHz



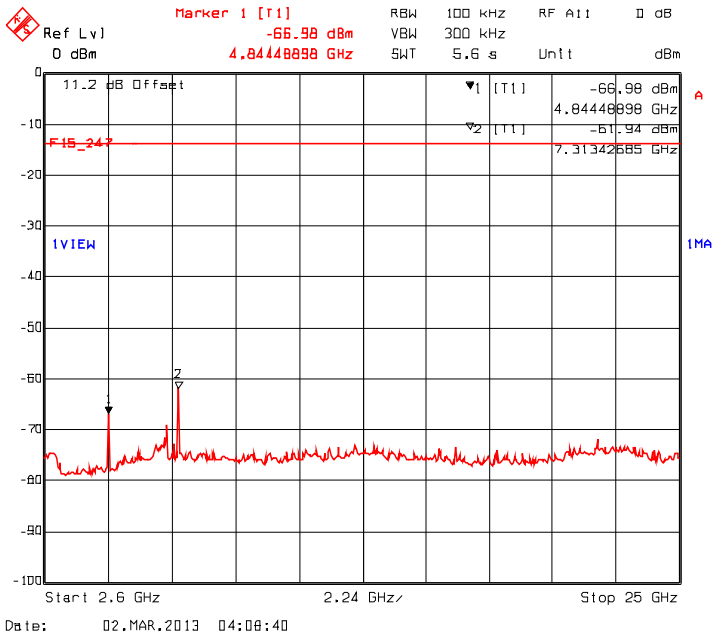
Plot 5.4.4.2.2. Spurious RF Conducted Emissions, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
2402 MHz, 2.6 GHz – 25 GHz



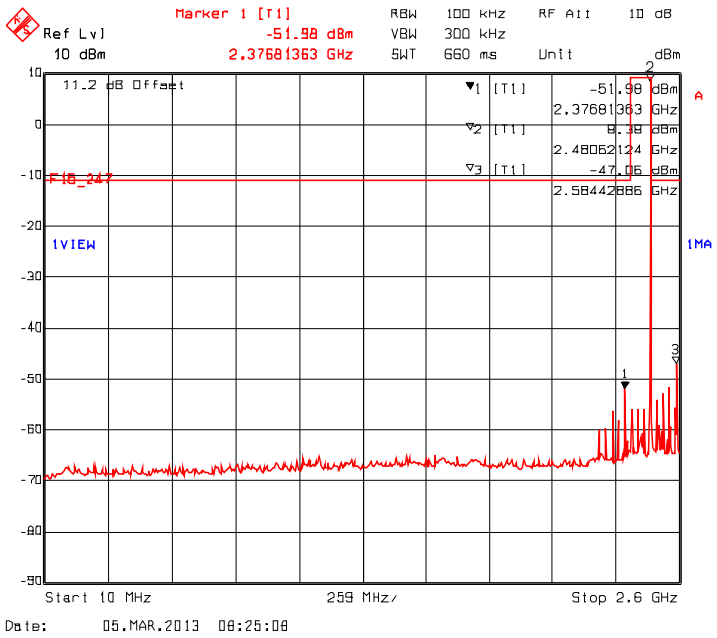
Plot 5.4.4.2.3. Spurious RF Conducted Emissions, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
2440 MHz, 10 MHz - 2.6 GHz



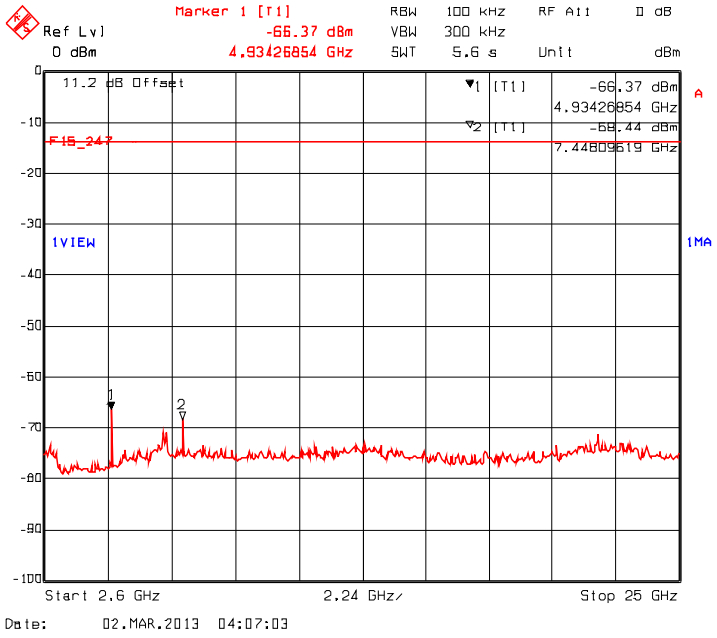
Plot 5.4.4.2.4. Spurious RF Conducted Emissions, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
2440 MHz, 2.6 GHz – 25 GHz



Plot 5.4.4.2.5. Spurious RF Conducted Emissions, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
2480 MHz, 10 MHz - 2.6 GHz



Plot 5.4.4.2.6. Spurious RF Conducted Emissions, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
2480 MHz, 2.6 GHz – 25 GHz



5.5. TRANSMITTER SPURIOUS RADIATED EMISSIONS AT 3 METERS [§§ 15.247(d), 15.209 & 15.205]

5.5.1. Limit(s)

§ 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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Section 15.205(a) - Restricted Bands of Operation

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	([2])
13.36–13.41.			

[1] Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.
[2] Above 38.6

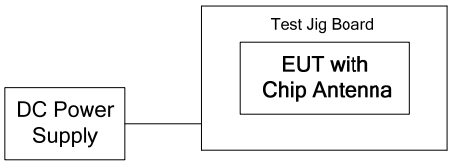
Section 15.209(a) - Field Strength Limits within Restricted Frequency Bands

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

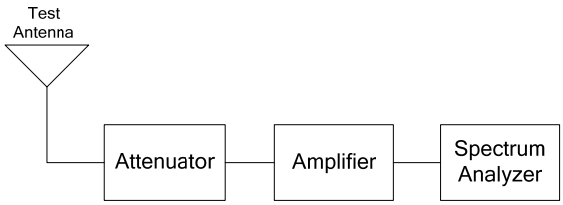
Method of Measurements

ANSI C63.10 and ANSI 63.4 procedures.

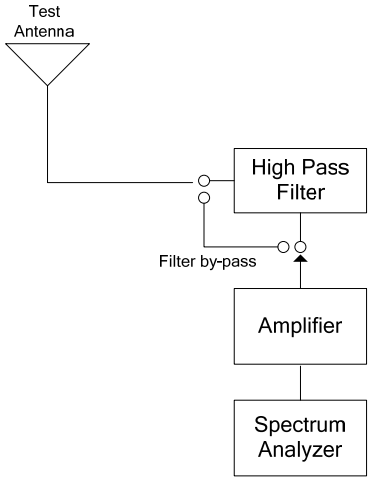
5.5.2. Test Arrangement



For Band-Edge



For Spurious and Harmonics



5.5.3. Test Data

Remark(s):

- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- EUT shall be tested in three orthogonal positions.
- The following test results are the worst-case measurements, derived from exploratory tests.

5.5.3.1. Spurious Radiated Emissions

Fundamental Frequency:	2402 MHz
Operating Mode:	Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
Frequency Test Range:	30 MHz – 25 GHz

Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
2402	101.39	--	V	--	--	--	--
2402	100.12	--	H	--	--	--	--
4804	53.82	42.31	V	54.0	81.4	-11.7	Pass*
4804	54.29	42.00	H	54.0	81.4	-12.0	Pass*
All other spurious emissions and harmonics are more than 20 dB below the applicable limit.							

*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

Fundamental Frequency:	2440 MHz
Operating Mode:	Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
Frequency Test Range:	30 MHz – 25 GHz

Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
2440	104.71	--	V	--	--	--	--
2440	104.80	--	H	--	--	--	--
4880	53.54	42.34	V	54.0	84.8	-11.7	Pass*
4880	54.09	43.23	H	54.0	84.8	-10.8	Pass*
7320	55.68	43.33	V	54.0	84.8	-10.7	Pass*
7320	58.99	46.25	H	54.0	84.8	-7.8	Pass*
All other spurious emissions and harmonics are more than 20 dB below the applicable limit.							

*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

Fundamental Frequency:	2480 MHz
Operating Mode:	Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)
Frequency Test Range:	30 MHz – 25 GHz

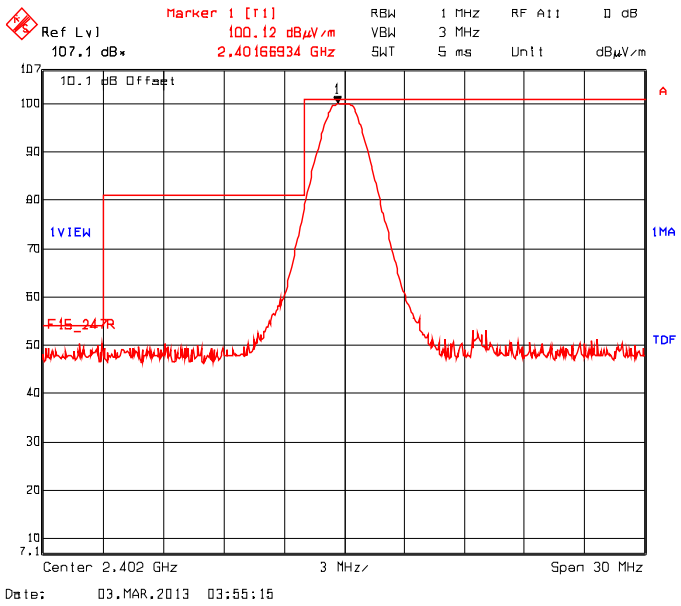
Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
2480	104.12	--	V	--	--	--	--
2480	104.11	--	H	--	--	--	--
4960	53.01	41.82	V	54.0	84.1	-12.2	Pass*
4960	52.85	41.77	H	54.0	84.1	-12.2	Pass*
7440	56.27	43.00	V	54.0	84.1	-11.0	Pass*
7440	57.96	45.31	H	54.0	84.1	-8.7	Pass*

All other spurious emissions and harmonics are more than 20 dB below the applicable limit.

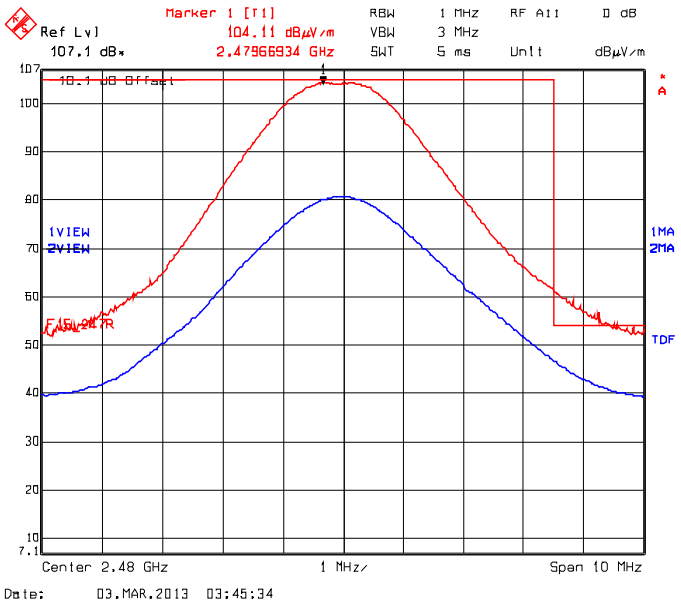
*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

5.5.3.2. Band-Edge RF Radiated Emissions

Plot 5.5.3.2.1. Band-Edge RF Radiated Emissions at 3 m, Horizontal Polarization
Low End of Frequency Band, 2402 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)

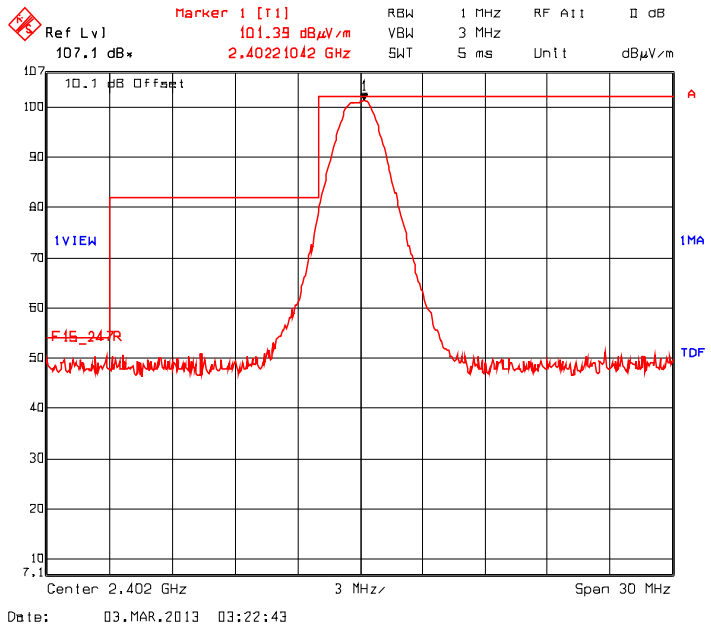


Plot 5.5.3.2.2. Band-Edge RF Radiated Emissions at 3 m, Horizontal Polarization
High End of Frequency Band, 2480 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)

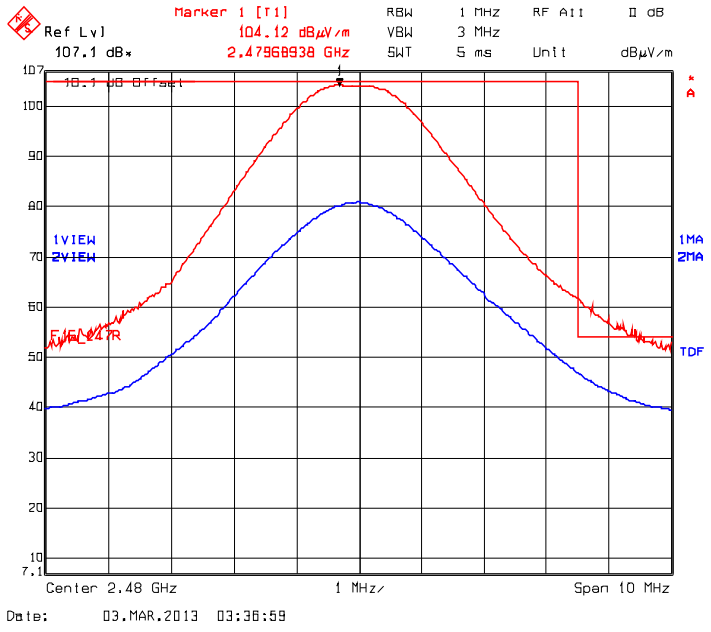


Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 1 MHz, VBW = 10 Hz

Plot 5.5.3.2.3. Band-Edge RF Radiated Emissions at 3 m, Vertical Polarization
Low End of Frequency Band, 2402 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



Plot 5.5.3.2.4. Band-Edge RF Radiated Emissions at 3 m, Vertical Polarization
High End of Frequency Band, 2480 MHz, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 1 MHz, VBW = 10 Hz

5.6. POWER SPECTRAL DENSITY [§ 15.247(e)]

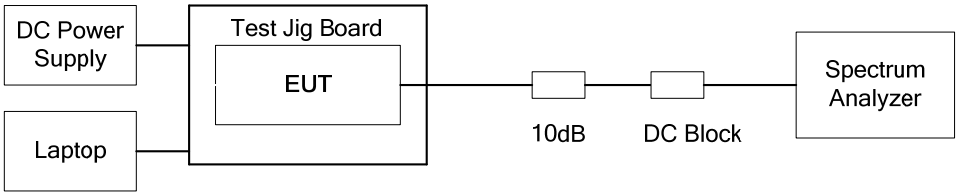
5.6.1. Limit(s)

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.

5.6.2. Method of Measurements

KDB Publication No. 558074 D01 DTS Meas Guidance v02, Section 9.1 Option 1.

5.6.3. Test Arrangement



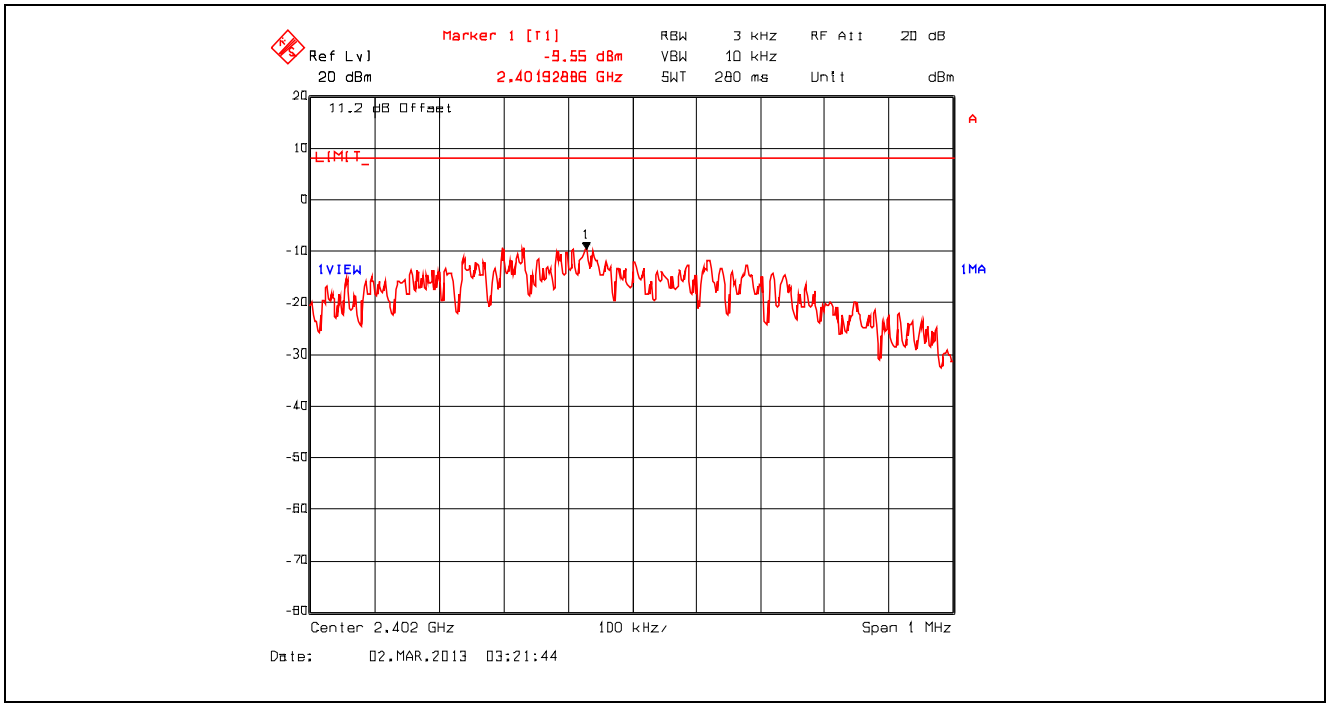
5.6.4. Test Data

Remark: Measurement method: Section 9.1 Option 1 Peak Power Spectral Density

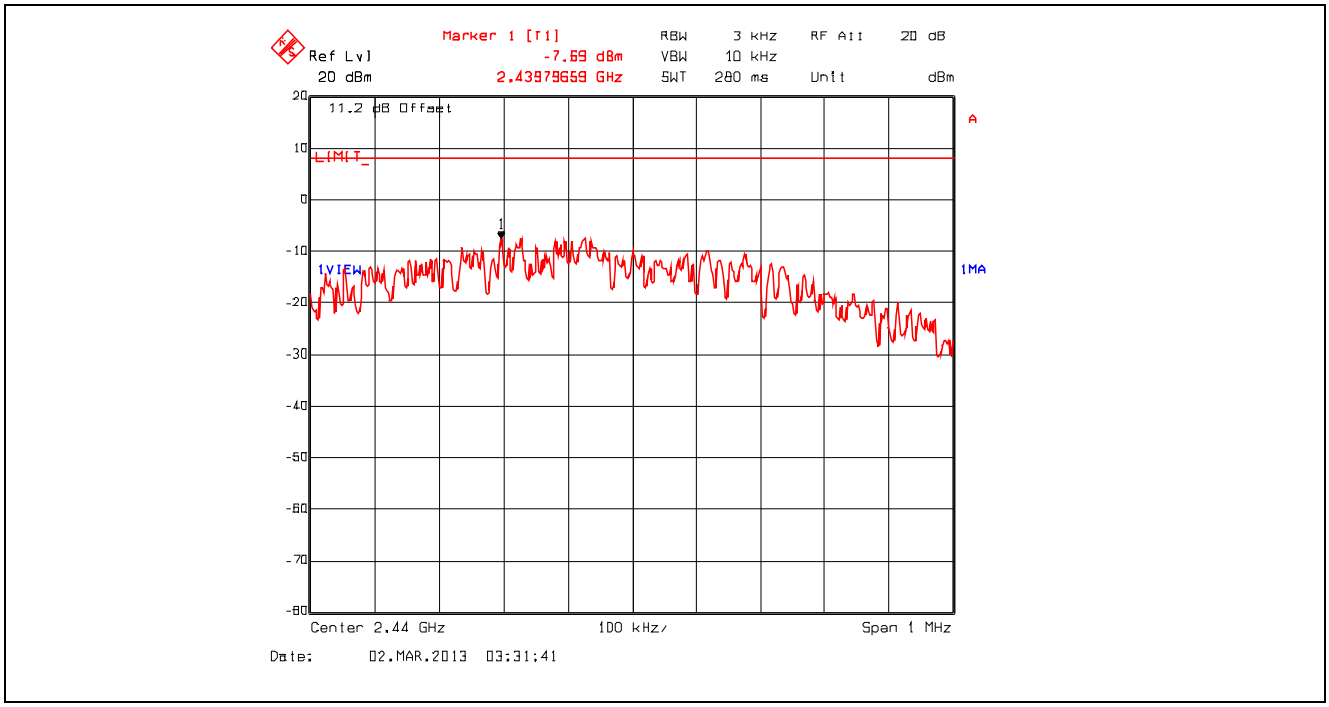
Frequency (MHz)	*PSD in 3 kHz BW (dBm)	Limit (dBm)	Margin (dB)
2412	-9.55	8	-17.55
2442	-7.69	8	-15.69
2462	-7.02	8	-15.02

*See the following plots for measurement details.

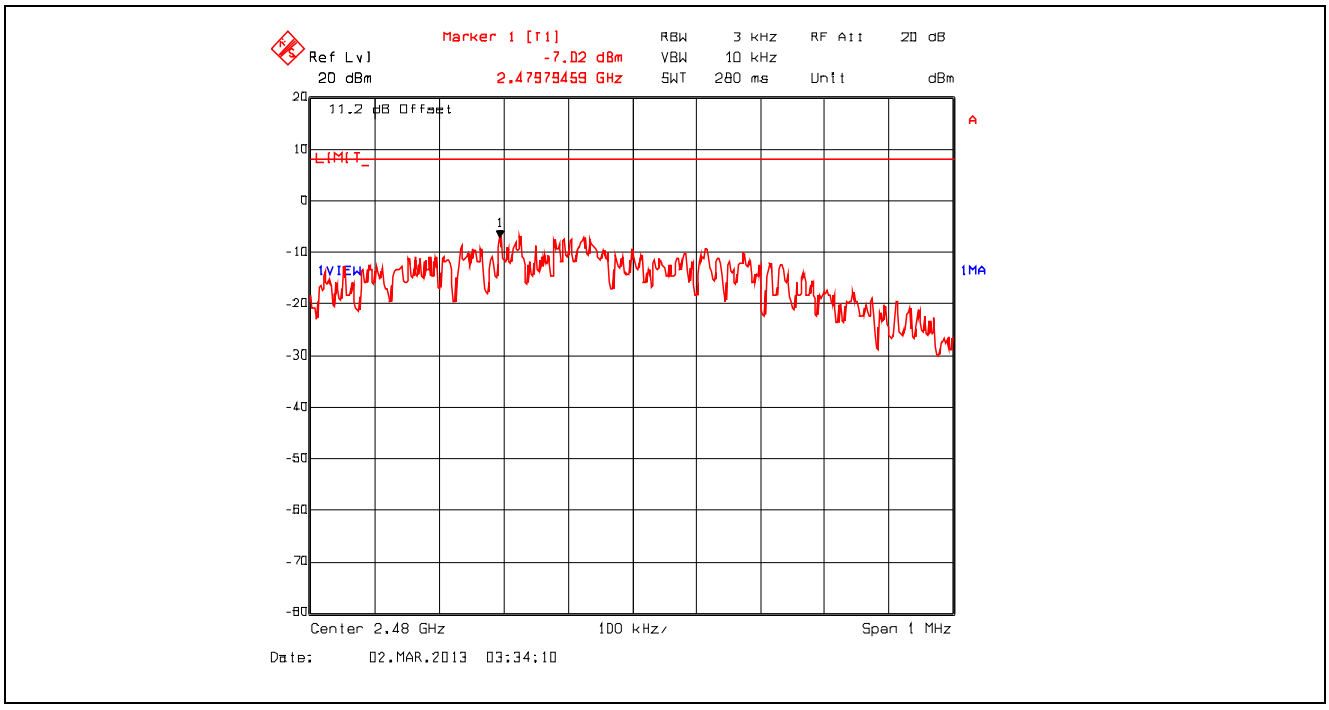
Plot 5.6.4.1. Power Spectral Density, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



Plot 5.6.4.2. Power Spectral Density, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



Plot 5.6.4.3. Power Spectral Density, Length 37 bytes, Bit pattern 0 (Pseudo-random bit sequence 9)



5.7. RF EXPOSURE REQUIRMENTS [§§ 15.247(i), & 2.1093]

Pursuant to KDB 447498 D01 Mobile Portable RF Exposure V04, Section (2)(a)(i) a device may be used in portable exposure conditions with no restrictions on host platforms when either the source-based time-averaged output power is ≤ 60/*f*(GHz) mW.

Output Power Limit for Portable Exposure Conditions = 60/f(GHz) mW = 60/2.48 mW = 24 mW

Maximum EUT Output Power Level = 9.95 mW EIRP

Conclusion: Complies with portable RF exposure conditions.

EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Cal. Due Date
Spectrum Analyzer	Agilent	E7401A	US40240432	9 kHz–1.5 GHz	01 May 2013
Attenuator	Pasternack	PE7010-20	-	DC–2 GHz	Cal. On use
L.I.S.N	EMCO	3825/2	8907-1531	10 kHz -100 MHz	05 Apr 2013
DC Power Supply	Tenma	72-7295	490300270	1 – 40 Vdc	Cal on use
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20Hz–40 GHz	02 Nov 2013
DC Block	Hewlett Packard	11742A	12460	0.045–26.5 GHz	Cal on use
Horn Antenna	ETS Lundgren	3115	6570	1 -18 GHz	02 Apr 2013
RF Amplifier	Hewlett Packard	84498	3008A00769	1 – 26.5 GHz	06 Aug 2013
Attenuator	Pasternack	PE7024-10	4	DC–26.5 GHz	Cal on use
Spectrum Analyzer	Rohde & Schwarz	ESU40	100033	20 Hz – 40 GHz	19 Mar 2013
RF Amplifier	AH System	PAM-0118	225	20 MHz – 18 GHz	16 Mar 2013
Biconi-Log Antenna	ETS Lindgren	3142B	1575	26 – 3000 MHz	04 May 2013
Horn Antenna	EMCO	3160-09	118385	18 – 26.5 GHz	30 July 2014
High Pass Filter	K & L	11SH10-4000/T12000	4	Cut off 2.4 GHz	Cal on use
Signal Generator	Hewlett Packard	8648C	3443U00391	100 kHz - 3200 Hz	3 Jan 2014

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

	Line Conducted Emission Measurement Uncertainty (150 kHz – 30 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{i=1}^{m} u_i^2(y)}$	**± 1.57**	**± 1.8**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 3.14**	**± 3.6**

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{i=1}^{m} u_i^2(y)}$	**± 2.15**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.30**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{i=1}^{m} u_i^2(y)}$	**± 2.39**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.78**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{i=1}^{m} u_i^2(y)}$	**± 1.87**	Under consideration
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 3.75**	Under consideration