1809 10th St. # 400
Plano TX 75074

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TEST REPORT

Report Number: **101178721DAL-001**
Project Number: **G101178721**

Report Issue Date: **May 20th, 2013**

Product Name: **GT-0 2.4GHz BLE Battery Powered GPS Tracking Device**
FCCID: **OWA00GT0**
ICID: **10540A-00GT0**
Standards: **CFR47 FCC Part 15 Subpart C 15.247:2013**
RSS 210*Issue 8 December 2010

Tested by:
Intertek Testing Services NA, Inc.
1809 10th ST #400
Plano, TX 75074

Client:
Geoforce, Inc.
750 Canyon Drive
Suite 140
Coppell, TX 75019

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EMC Engineer

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Transmitter Staff Engineer

TABLE OF CONTENTS

1 Introduction and Conclusion

The tests indicated in section 2 were performed on the product constructed as described in section 3. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test method, a list of the actual test equipment used, documentation photos, results and raw data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complied with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

The INTERTEK-Dallas is located at 1809 10th St. # 400, Plano TX 75074. The radiated emission test site is a 3-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters. The test site is listed with the FCC under registration number 485103. The test site is listed with Industry Canada under site number IC 6018A-1.

2 Test Summary

Page	Test full name	FCC Reference	IC Reference	Result
6	Peak Conducted Power	§ 15.247(b)(3)(4)	RSS-210 (A8.4)	Pass
8	Occupied Bandwidth	§ 15.247(a)(2)	RSS-210 (A8.2), RSS-GEN (4.6.1)	Pass
18	Power Spectral Density and Conducted Spurious Emissions	§ 15.247(e)	RSS-210 (A8.5)	Pass
20	Duty Cycle Determination	FCC 15A - 15.35(c)	RSS-210 (4.5)	Pass
26	Radiated Spurious Emissions (Transmitter) 15.205 in restricted bands, all others <-30dBc	§ 15.247(c)/15.209	RSS-210 (2.2)	Pass
36	Radiated Spurious Emissions (Receiver) see note 1	§ 15.109	RSS-Gen (6.1)	N/A (1)
33	AC Power Line Conducted Emissions	§ 15.107, § 15.207	RSS-Gen (7.2.4)	N/A (2)

Note 1: Receivers operating above 960 MHz are exempt from FCC and IC evaluation
Note 2: This device is powered by 4 AA Batteries.

Description of Equipment under Test

Equipment Under Test	
Manufacturer	Geoforce
Model Number	GT-0
Serial Number	23005032
FCC Identifier	OWA00GT0
IC Identifier	10540A-00GT0
Receive Date	May 13, 2013
Test Start Date	May 13, 2013
Test End Date	May 17, 2013
Device Received Condition	Good
Test Sample Type	Pre-production Prototype
Frequency Band	2402-2480MHz
Mode(s) of Operation	Transmit
Modulation Type	GFSK
Maximum Output Power	-25.46dBm
Test Channels	2402 , 2440, 2480
Antenna Type (15.203)	Client OEM 0dBi +/- 0.5
Operating Voltage	DC Battery-powered

Description of Equipment Under Test
The GT-0 is a 2.4GHz BLE Battery Powered GPS Tracking Device, used for asset remote management.

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	For Peak Power and Radiated Emissions testing EUT was operating in a constant transmit, modulated mode.
2	For all other testing EUT was operated in modulated mode as dictated by the FCC 15.247/RSS210
3	The EUT continuously transmitted at manufacturer's production power level pre-set.
4	The EUT was tuned to a low, middle, and high channel to perform power, occupied bandwidth, and spurious/harmonic tests.

Note: The Geoforce GT-0 was tested to and found to be in compliance with FCC 15.247and IC RSS-210 issue 8.

System setup including cable interconnection details, support equipment and simplified block diagram

2.1 EUT Block Diagram:

The test sample was tested in stand alone mode and was not connected to any support equipment during the evaluation.

2.2 Cables:

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
Production Cable	6”	Yes	no	pcb	antenna

2.3 Support Equipment:

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

3 Peak Conducted Power

3.1 Test Limits

§ 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.

3.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247). The peak output power was measured using the channel power function of the spectrum analyzer.

3.3 Test Equipment Used:

Description	Manufacturer	Model	Serial Number	Cal Date	Cal Due
EMI Receiver rated: 10KHz-7GHz	R & S	ESI 7	100044	04/15/2013	04/15/2014

3.4 Results:

Project #	Date	Rule	Distance	Antenna	RBW	VBW	Detector
G101178721	05/15/2013	15.247	N/A	Direct	1MHz	3 MHz	Peak

Conducted-Transmitting

Frequency (MHz)	Recorded Level (dBm)	Cable Loss (dB)	Corrected Level (dBm)	Limit (dBm)	Margin (dB)
2402	-25.56	0.10	-25.46	30	-55.46
2451	-25.91	0.10	-25.81	30	-55.81
2480	-26.67	0.10	-26.57	30	-56.57

Results: Pass

4 Occupied Bandwidth

4.1 Test Limits

§ 15.247(a)(2): Occupied bandwidth measurements were performed on the EUT to determine compliance with FCC 15.247(a)(2) and RSS-210.For digital modulation systems, the minimum 6dB bandwidth shall be at least 500kHz.

4.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247).
The occupied bandwidth was measured with a spectrum analyzer directly connected to the EUT while the EUT was operating in continuous transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency. Display line and marker delta functions were used to measure the occupied bandwidth of the EUT. Measurements were made at three frequencies.

The 20dB bandwidth must be measured and reported for the FCC and for IC.

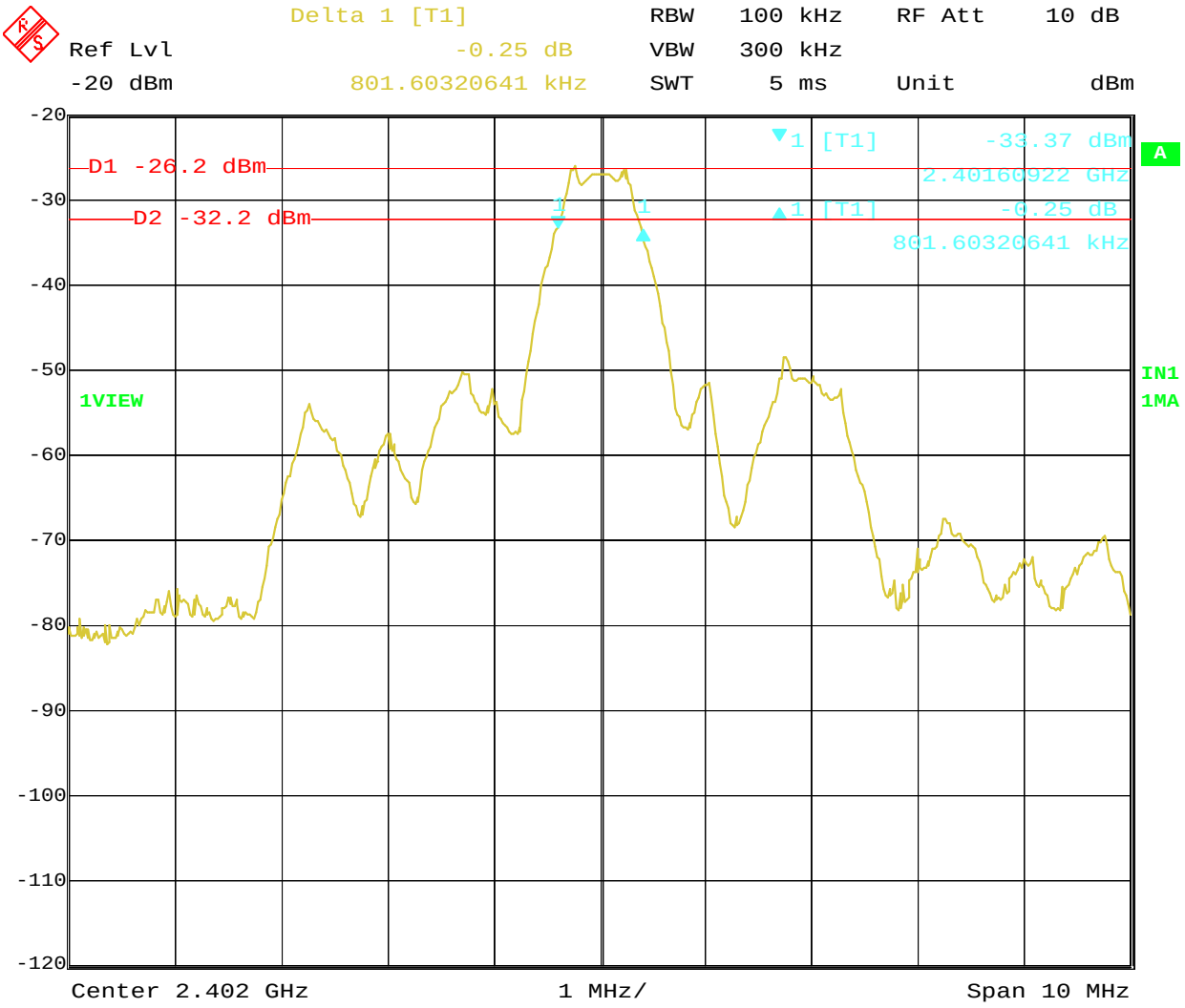
4.3 Test Equipment Used:

Description	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
EMI Receiver	Rhode & Schwarz	ESI 7	100044	04/15/2013	04/15/2014

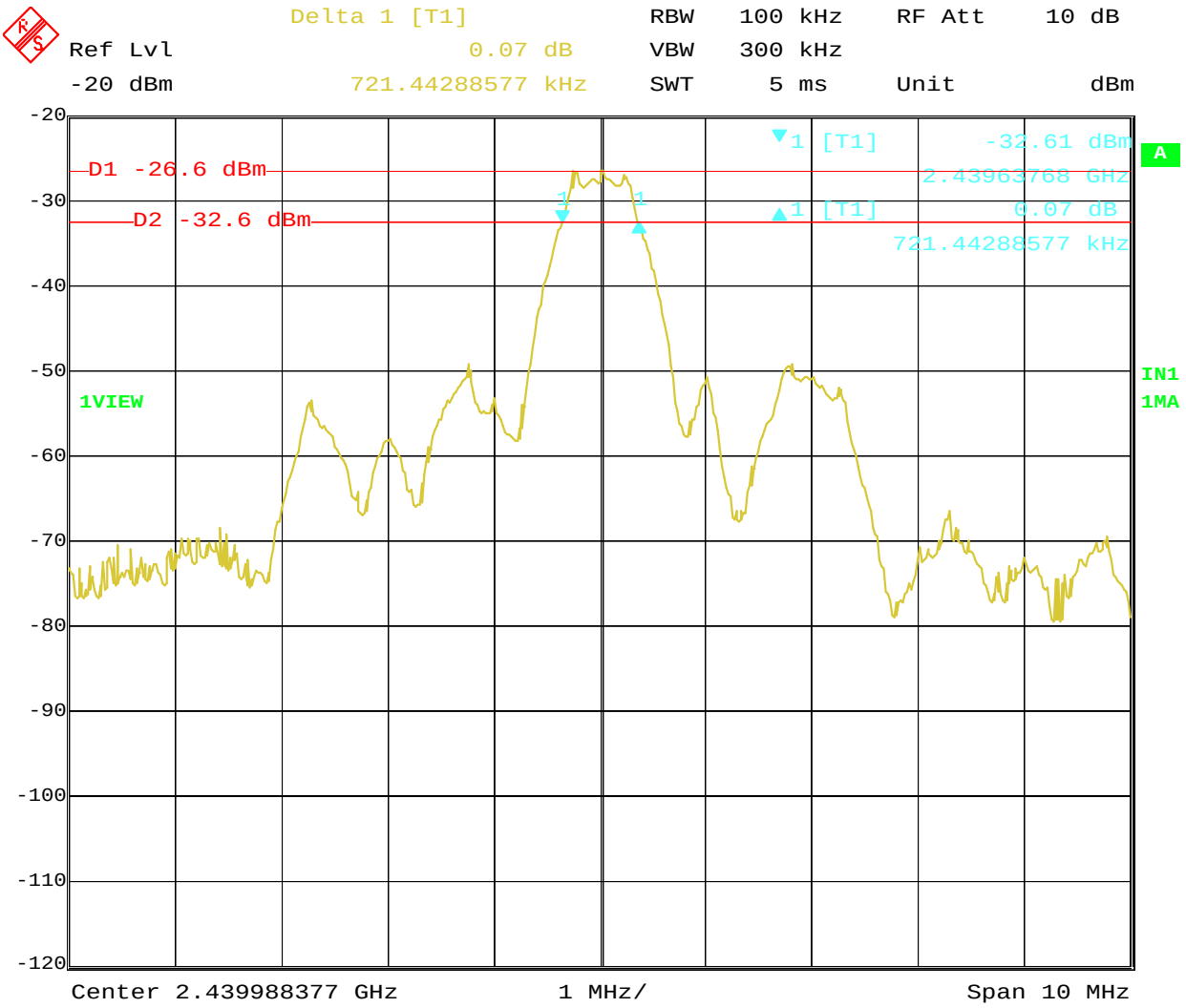
4.4 Results:

Mode	Channel Number	Frequency (MHz)	Bandwidth (KHz)	Result
6 dB BW	Low	2402	801.6	Pass
6 dB BW	Mid	2451	721.44	Pass
6 dB BW	High	2480	721.44	Pass
20 dB BW	Low	2402	1282.5	Pass
20 dB BW	Mid	2451	1302.6	Pass
20 dB BW	High	2480	1282.5	Pass

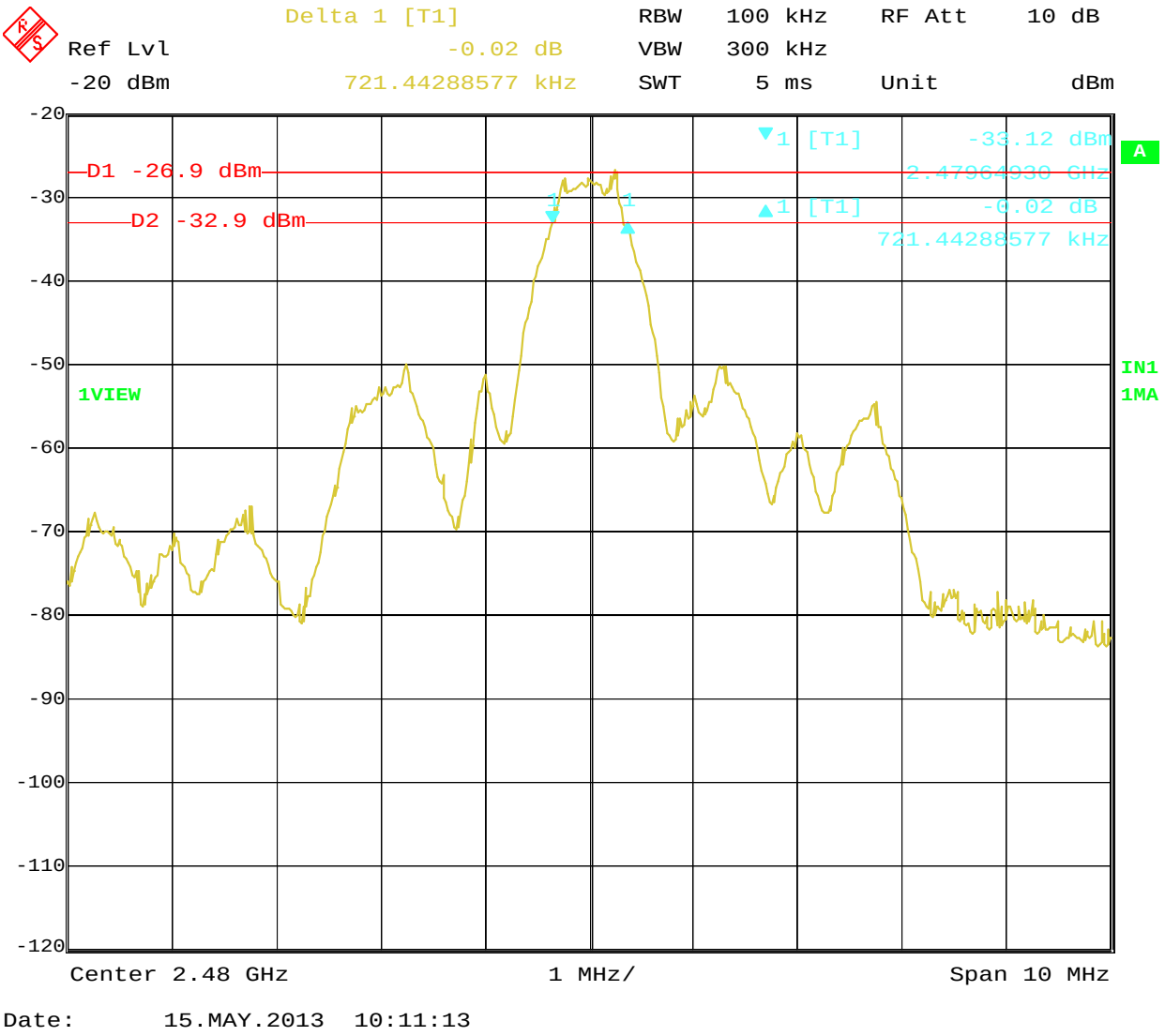
Results: Pass



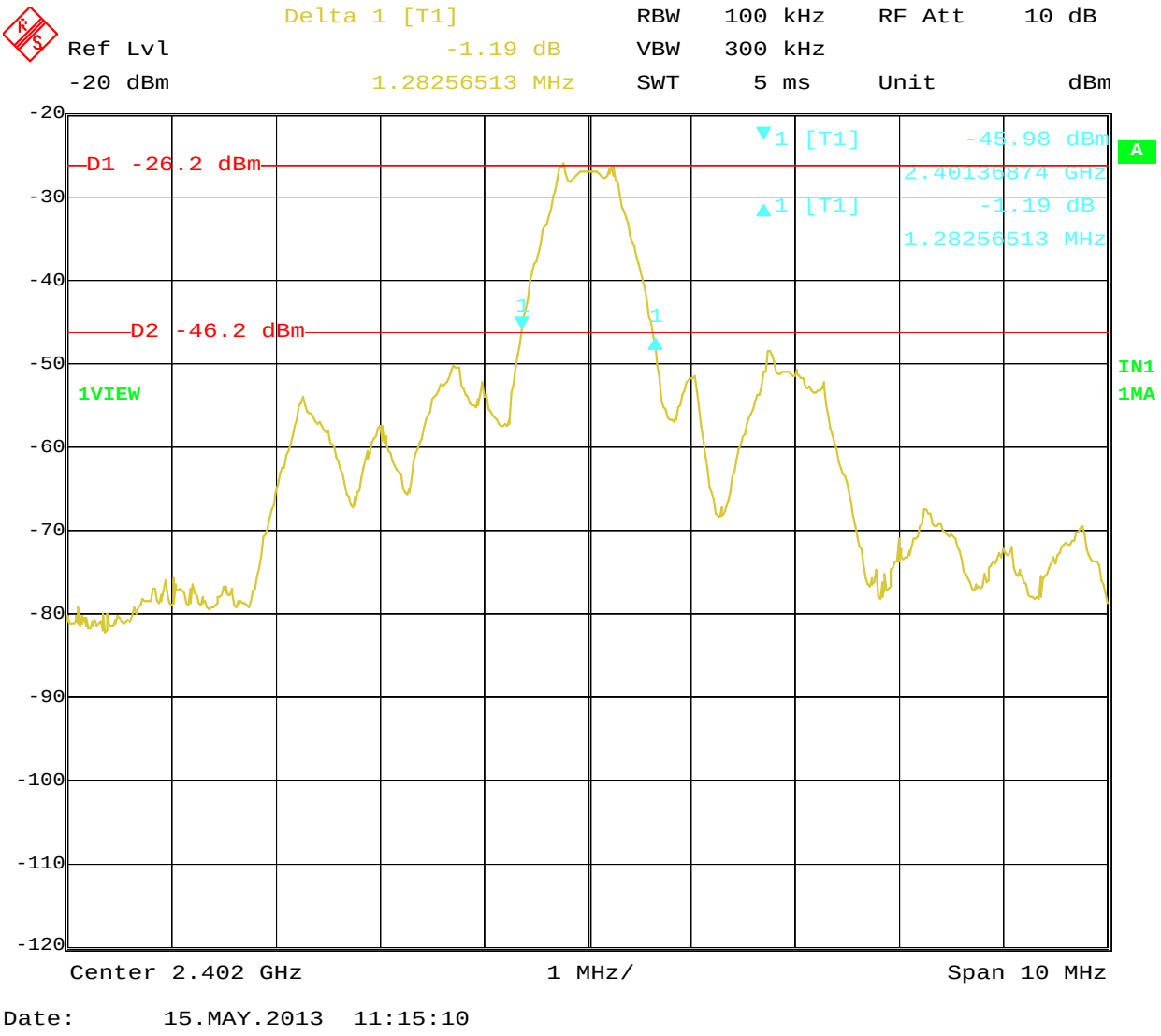
6dB Bandwidth Plot (Low Channel)



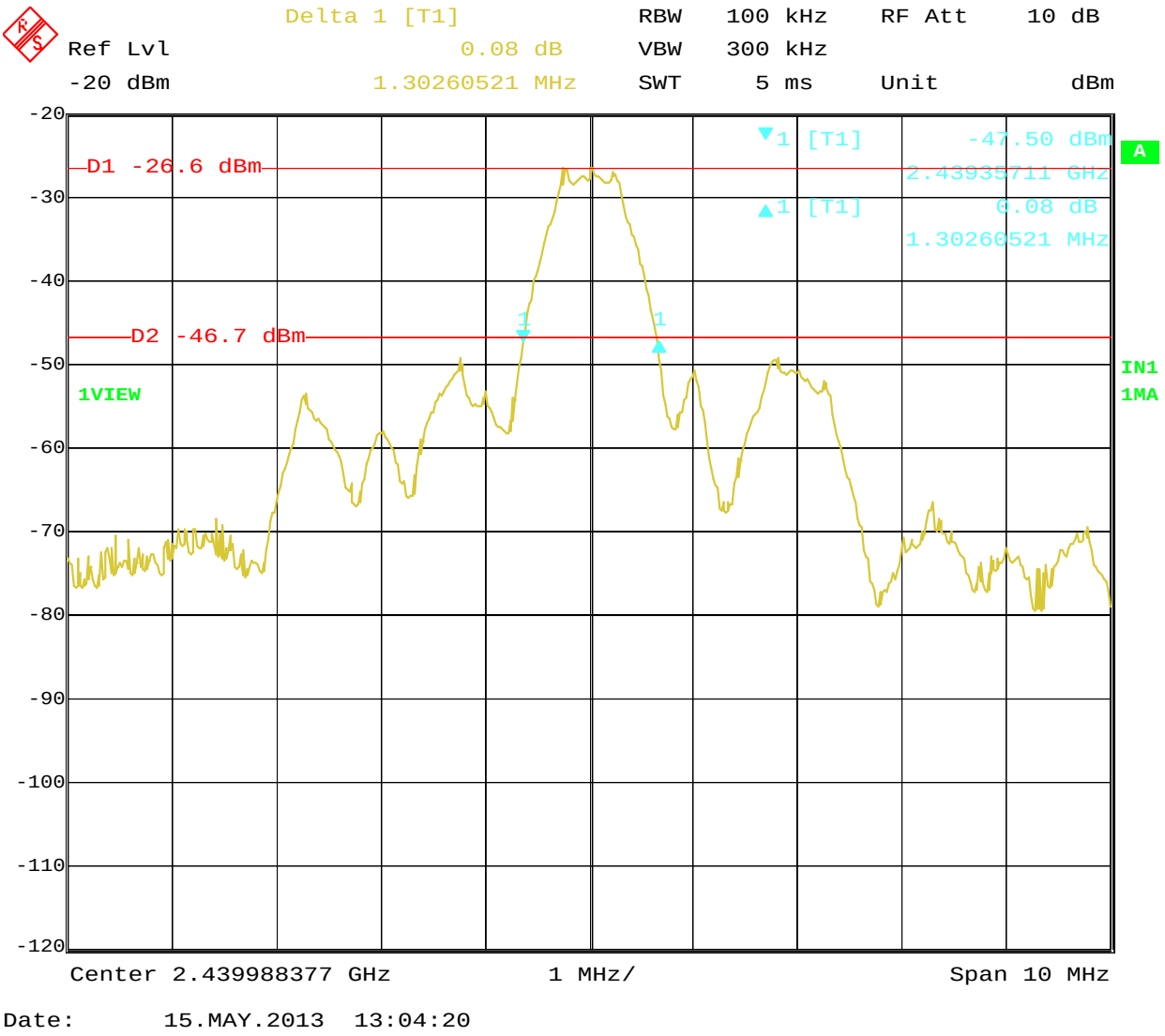
6dB Bandwidth Plot (Mid Channel)



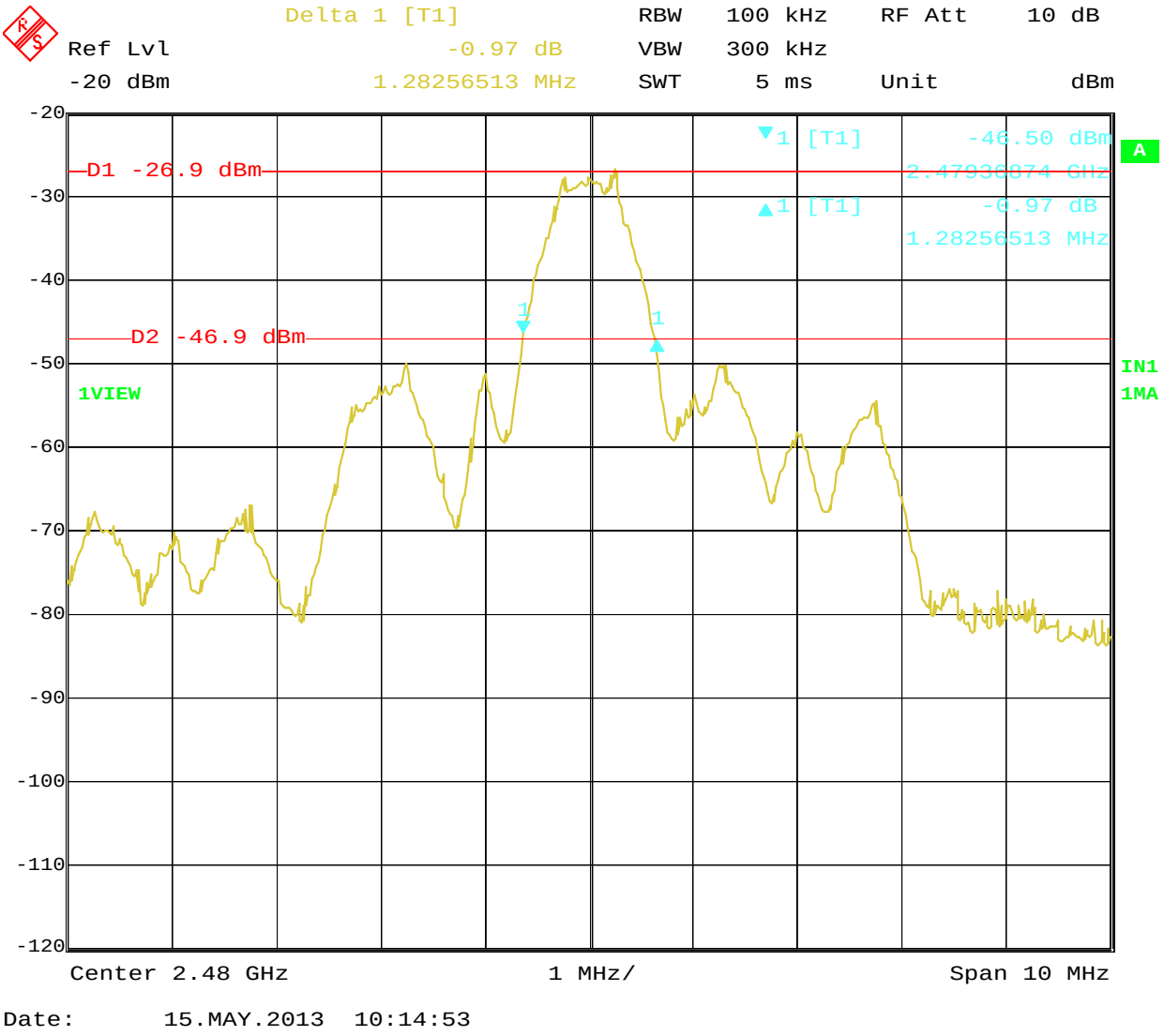
6dB Bandwidth Plot (High Channel)



20dB Bandwidth Plot (Low Channel)



20dB Bandwidth Plot (Mid Channel)



20dB Bandwidth Plot (High Channel)

5 Power Spectral Density/Conducted Spurious Emissions

5.1 Test Limits

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.

5.2 Test Procedure Conducted Spurious Emissions

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)
Peak spurious measurements were made in the frequency range of 30 MHz to a minimum of the 10th harmonic range while the EUT was tuned to the low middle and highest channels. The EUT was directly connected to a spectrum analyzer with a calibrated measurement cable.

From 30 MHz to 26GHz the RBW/VBW of the Spectrum Analyzer was 100KHz/300Khz.

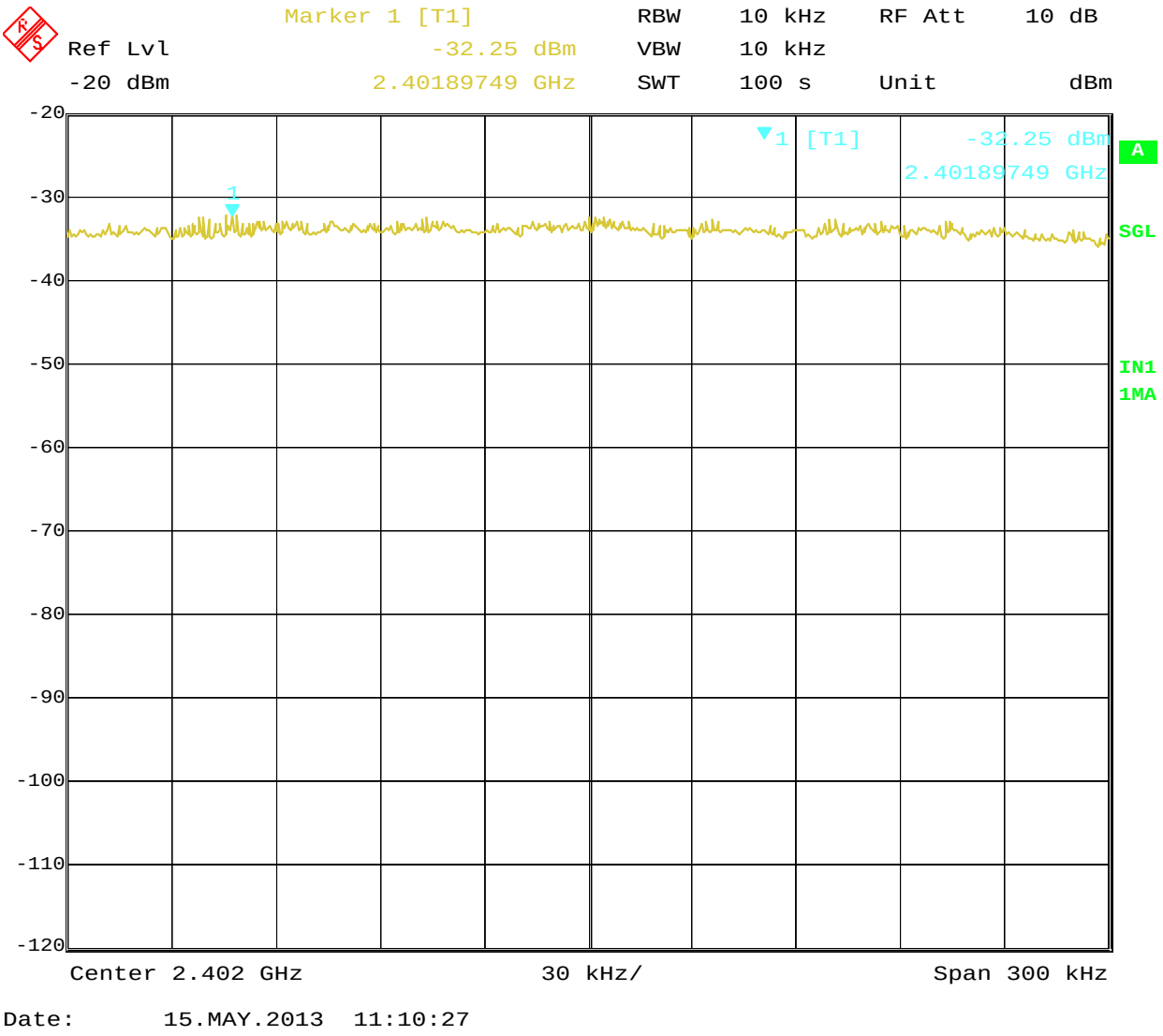
5.3 Test Equipment Used:

Description	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
EMI Receiver	Rhode & Schwarz	ESI 7	100044	04/15/2013	04/15/2014
EMI Receiver	Agilent	E7405A	US40240235	06/10/2012	06/10/2013
Conducted Spur TILE profile	Intertek	1130-008	Ver. 10	VBU	VBU

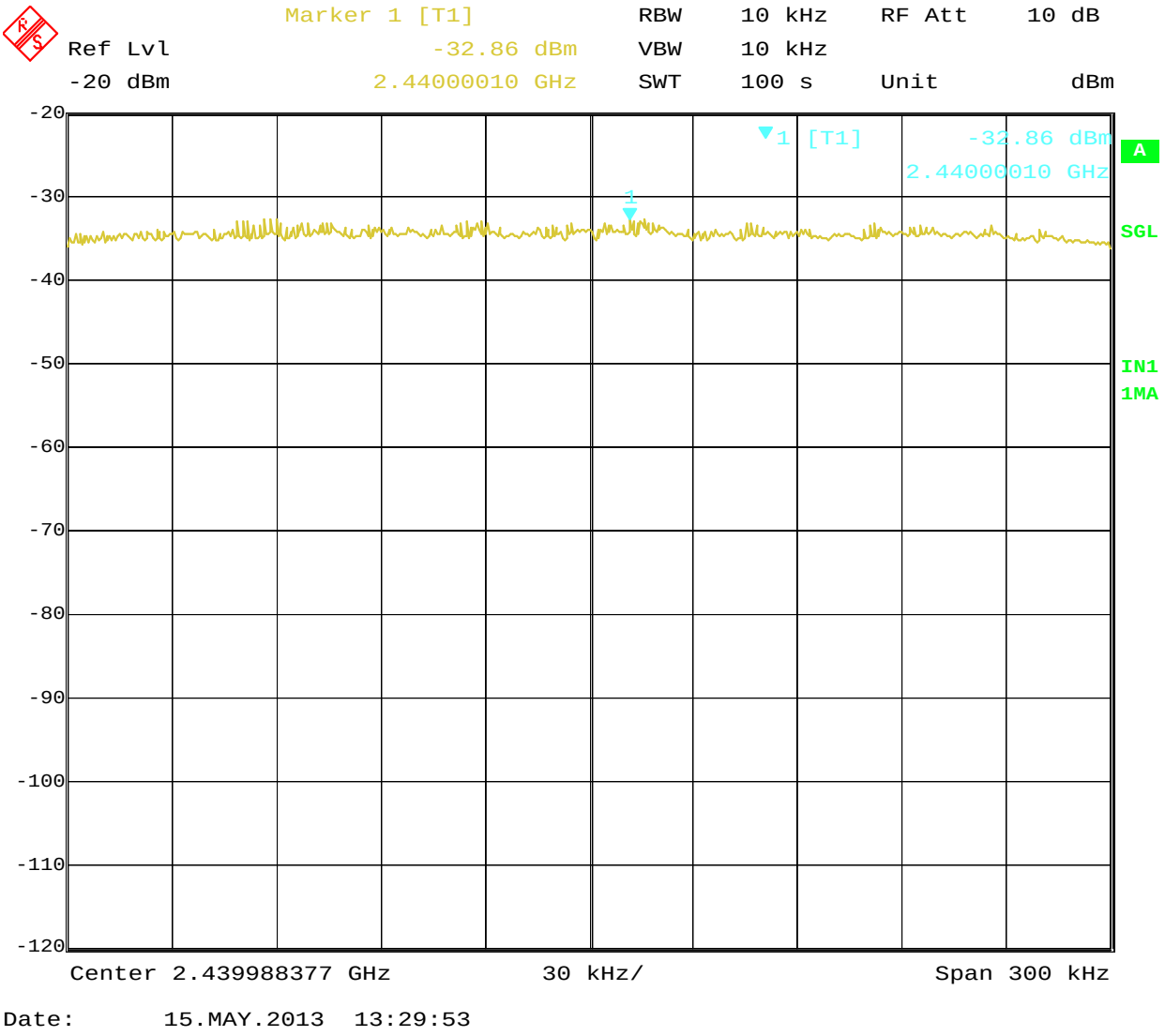
5.4 Results:

The following plots show that there are no conducted spurious emissions exceeding the 20dB down criteria.

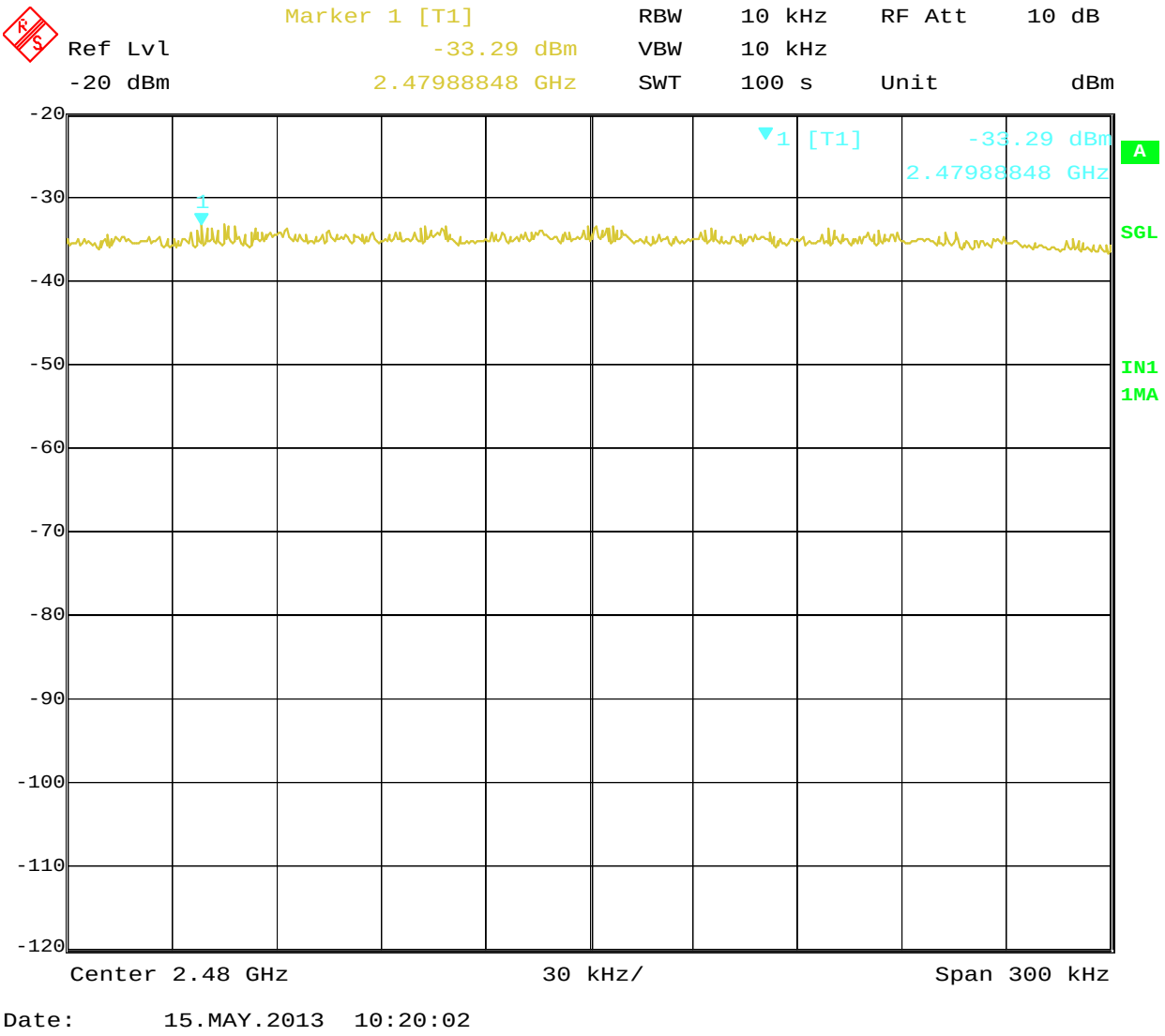
Results: Pass



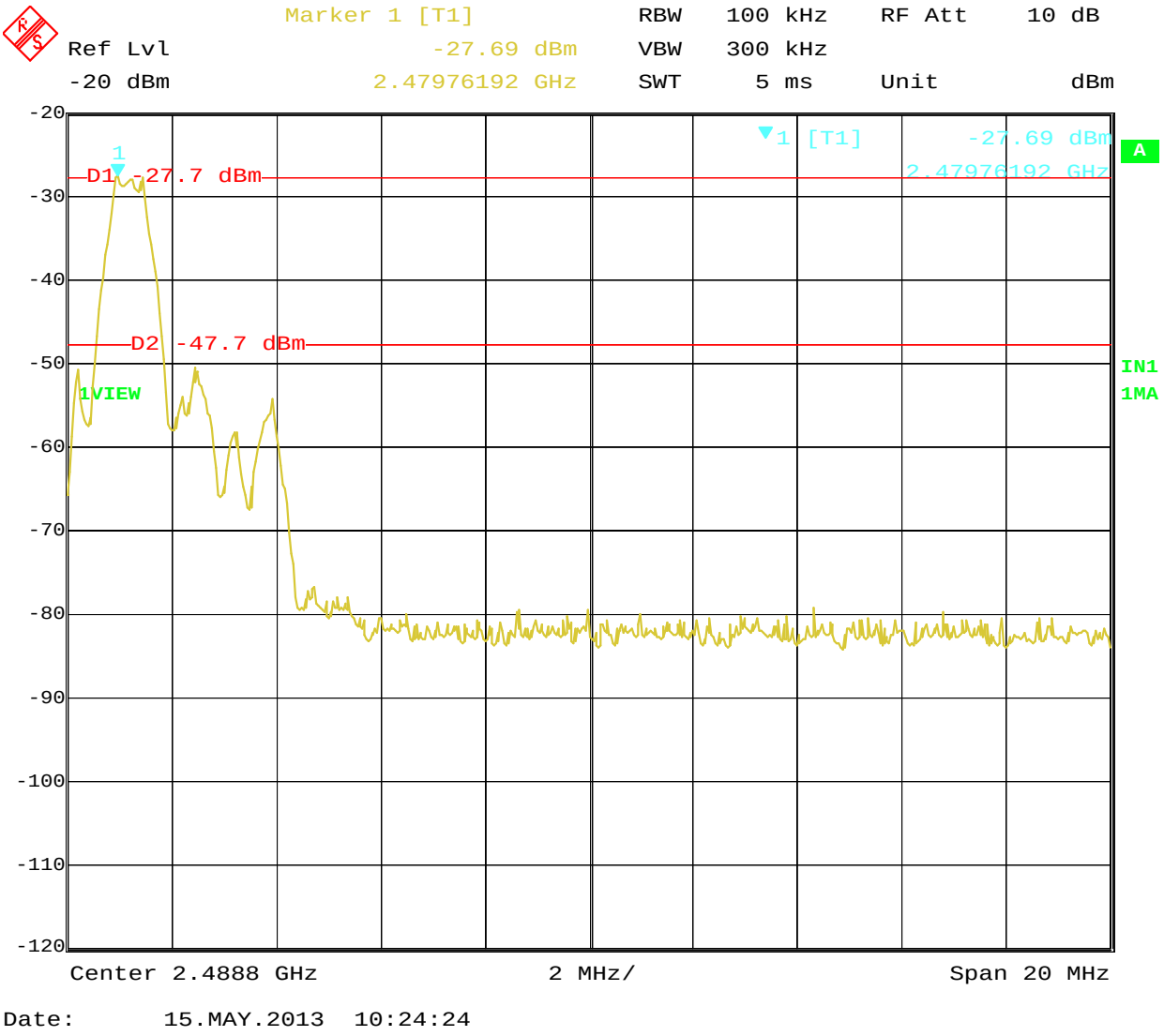
Spectral Density Lo Channel.



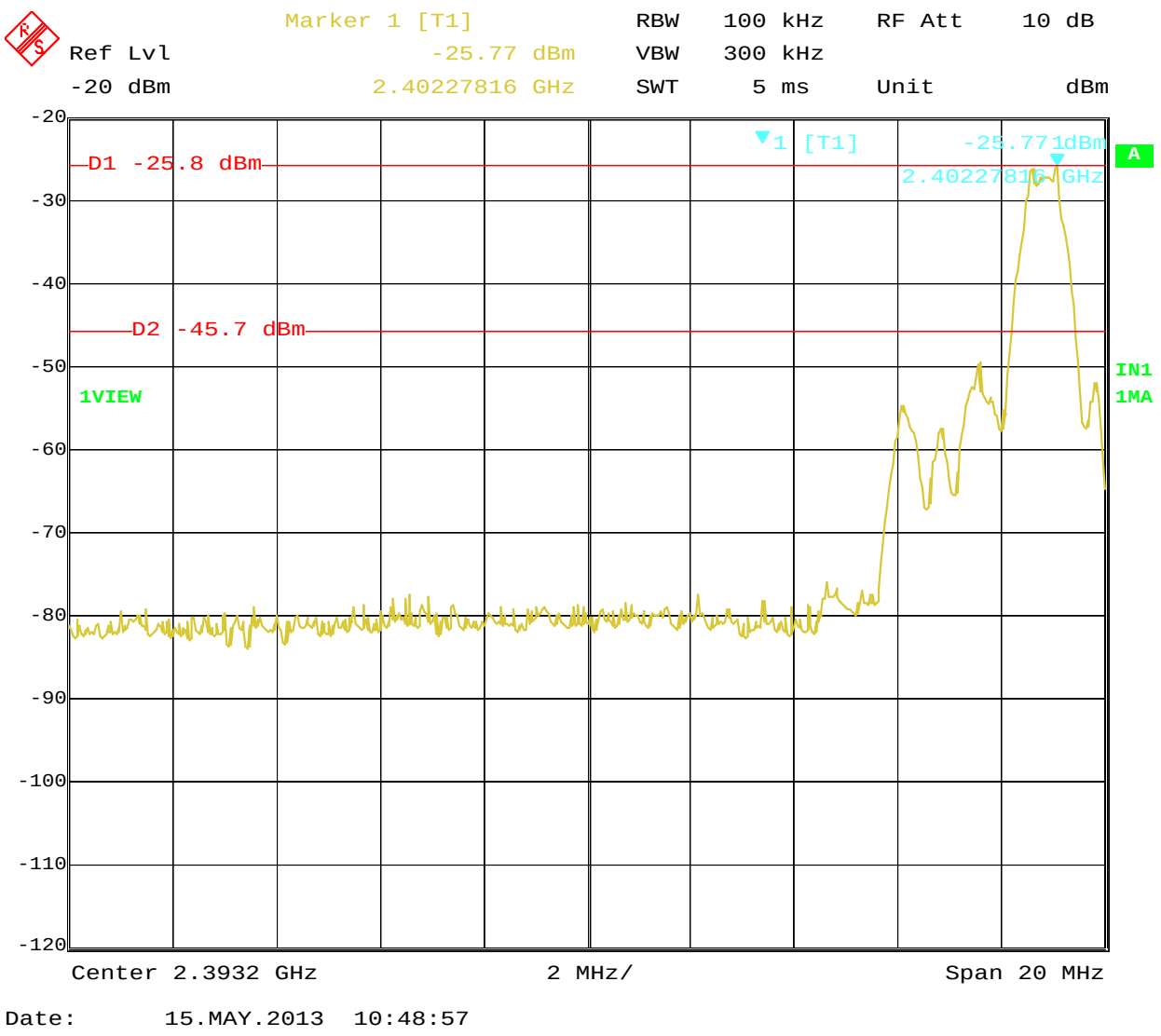
Spectral Density Mid Channel.



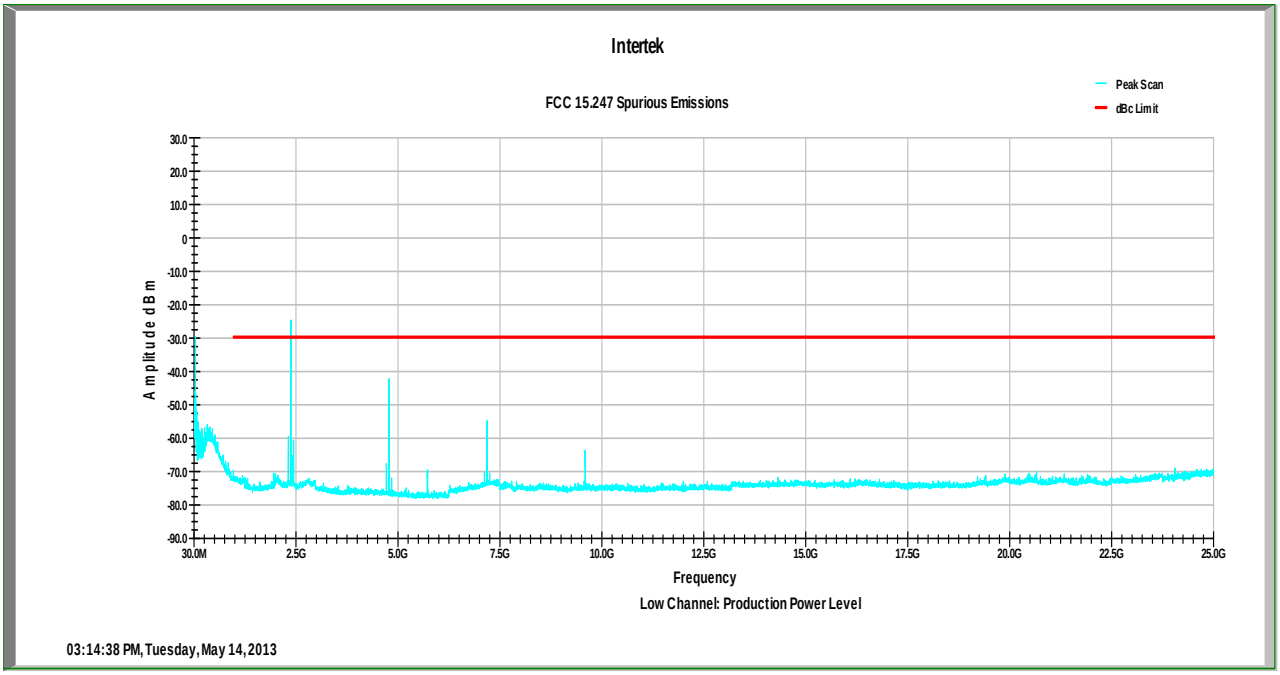
Spectral Density High Channel.



Band Edge Hi Channel

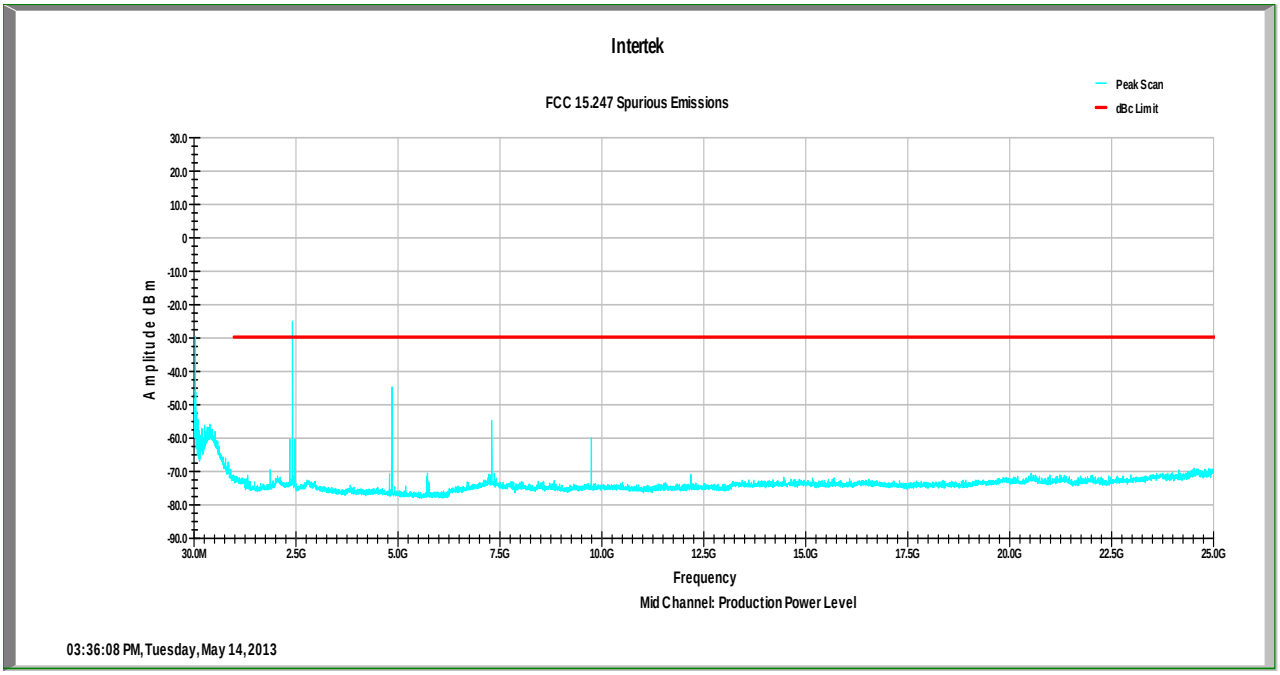


Band Edge Lo Channel

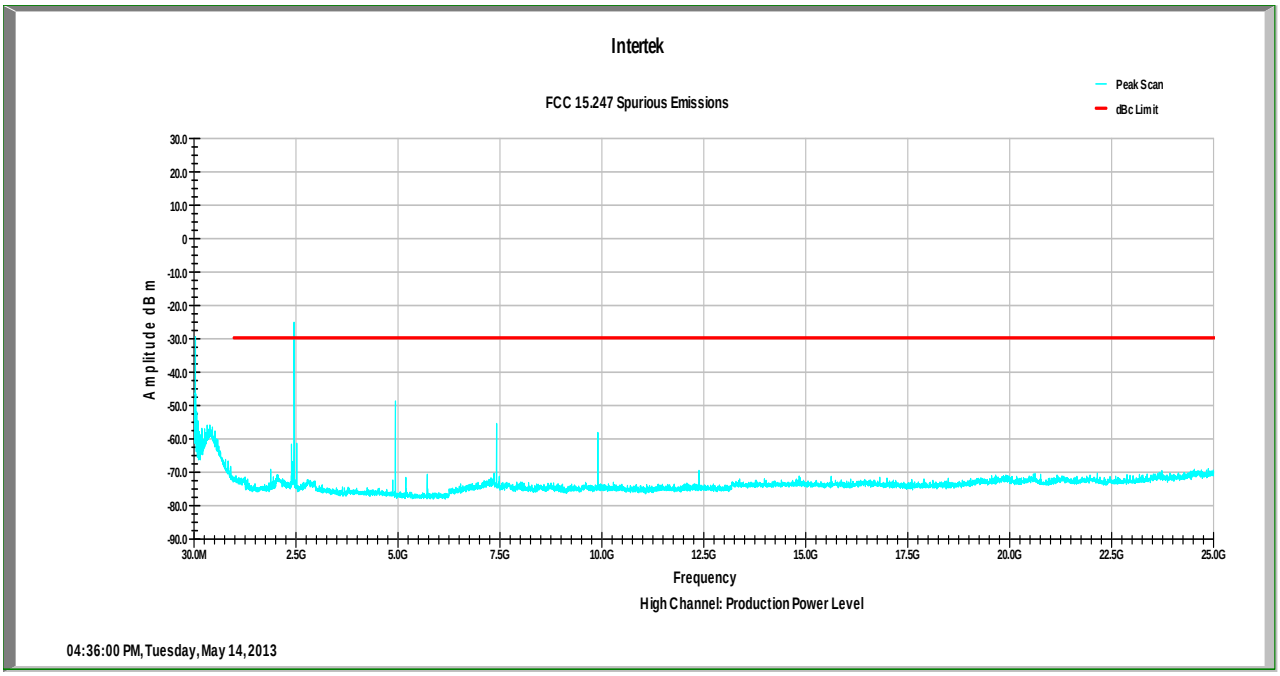


Conducted Spurious Emissions Low Channel

Note that at ~4800 MHz, the peak conducted power in dBm adjusted for the antenna gain of 0 dBi and the maximum ground reflection factor of 0 dB above 1 GHz meets the average field strength limits when adjusted to a 3m distance using path loss as referenced in KDB558074V03r01 section 12.2.2



Conducted Spurious Emissions Mid Channel



Conducted Spurious Emissions High Channel

5.5 Duty Cycle Determination (FCC 15A - 15.35(c))

5.6 Method:

From 47 CFR Part 15, Subpart A (15.35(c)) and RSS-GEN Section 4.5

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

Determine the period of the pulse train, T, in mSec and record the results. T is defined as the time from the beginning of one pulse train to the beginning of the next pulse train.

Count the number of different types of pulses, N and record the results.

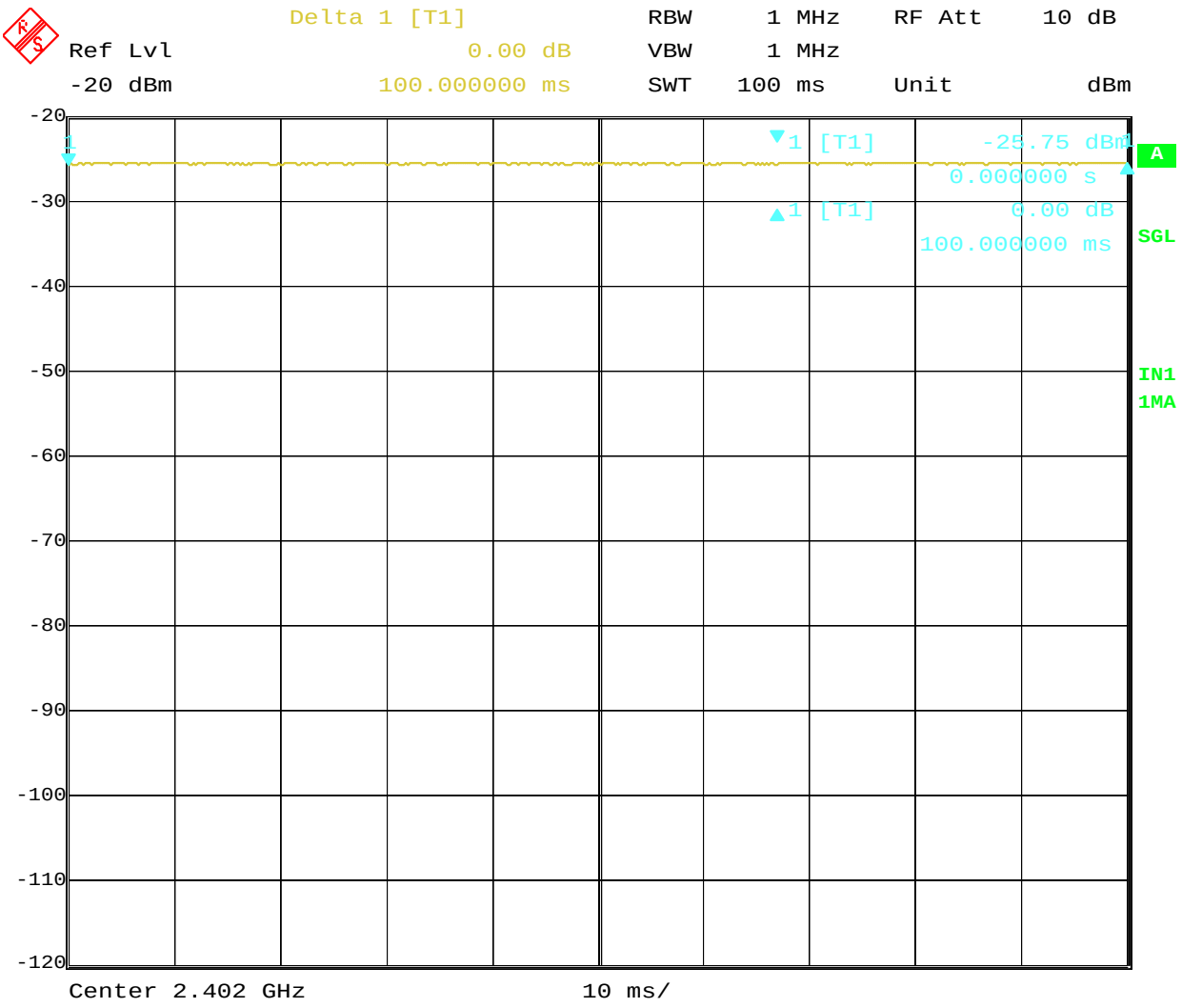
For each of the different types of pulses, count the number of occurrences within one pulse train.

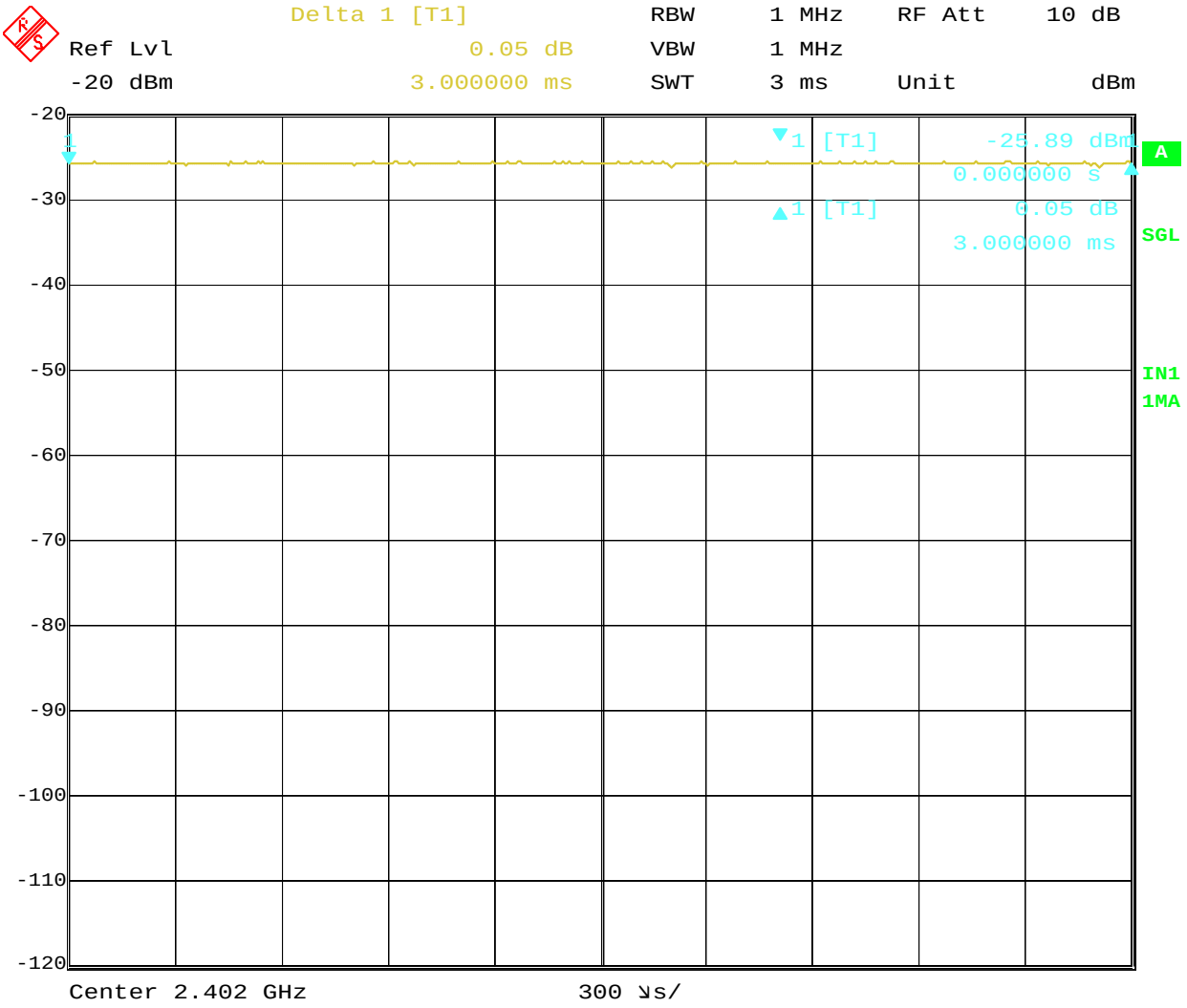
Use the Duty Cycle Correction Factor, DCCF, from the results table and use it to adjust the field strength measurements recorded for radiated emissions.

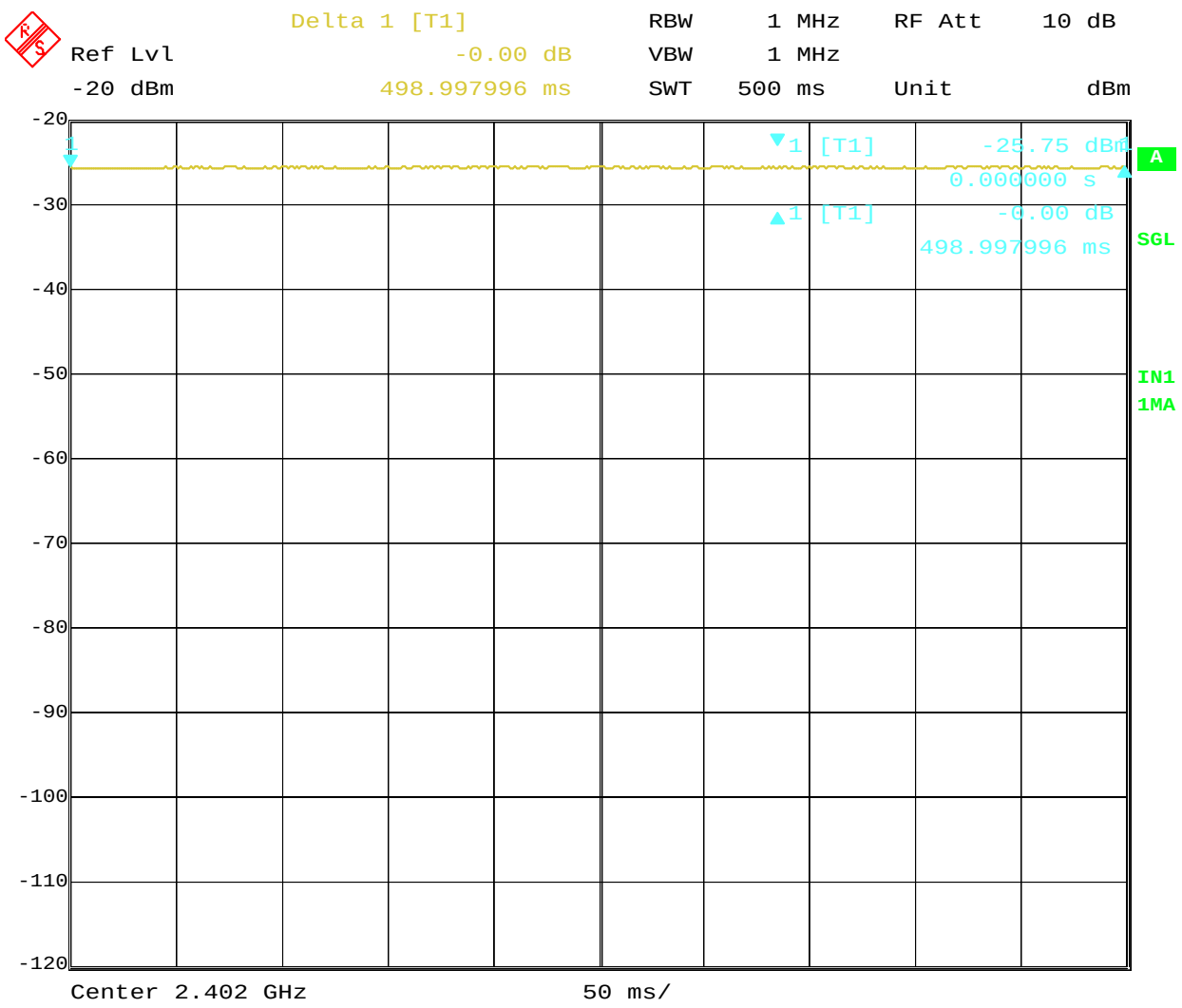
5.7 Test Equipment Used:

Description	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
EMI Receiver	Rhode & Schwarz	ESI	100044	04/15/2013	04/15/2014

5.8 Plots:


Delta 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl 0.00 dB
VBW 1 MHz
-20 dBm 100.000000 ms
SWT 100 ms
Unit dBm
1 [T1] -25.75 dBm
0.000000 s
1 [T1] 0.00 dB
100.000000 ms
A
SGL
IN1
1MA
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.402 GHz
10 ms/
Date: 15.MAY.2013 10:57:58


Delta 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl 0.05 dB
VBW 1 MHz
-20 dBm 3.000000 ms
SWT 3 ms
Unit dBm
1 [T1] -25.89 dBm
0.000000 s
1 [T1] 0.05 dB
3.000000 ms
A
SGL
IN1
1MA
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.402 GHz
300 µs/
Date: 15.MAY.2013 10:59:30


Delta 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl
-0.00 dB
VBW 1 MHz
-20 dBm
498.997996 ms
SWT 500 ms
Unit dBm
1 [T1]
-25.75 dBm
0.000000 s
1 [T1]
-0.00 dB
498.997996 ms
A
SGL
IN1
1MA
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.402 GHz
50 ms/
Date: 15.MAY.2013 11:01:51

Duration of Pulse Train, T (mSec):	100
Averaging Interval, A_I (mSec):	100
Number of different Pulses, N:	1

	Number ($\#P_x$)	Pulse Width, mSec (PW_x)	Product ($\#P_x$)*(PW_x)
Pulse Width 1	1	100	100
Pulse Width 2			
Pulse Width 3			
Pulse Width 4			
Pulse Width 5			
Pulse Width 6			
Pulse Width 7			
Pulse Width 8			
Pulse Width 9			
Pulse Width 10			

Duty Cycle:	1
Duty Cycle Correction Factor, dB:	0.0

$$T_{on} = (PW_1 * \#P)_1 + (PW_{2*} \#P_2) + \cdots + (PW_n * \#P_n)$$

$$DutyCycle = T_{on} \div A_I$$

$$DCCF = 20 * Log_{10}(DutyCycle)$$

6 Radiated Spurious Emissions (Transmitter)

6.1 Test Limits

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

Part 15.205(a): Restricted Bands of Operations

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

Part 15.209(a): Field Strength Limits for Restricted Bands of Operation

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

6.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

6.3 Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculations are listed below:

Formula:
FS = RA + AF + CF

FS = Field Strength in dBμV/m
RA = Receiver Amplitude in dBμV
AF = Antenna Factor in dB
CF = Cable Attenuation Factor in dB (Including preamplifier and filter attenuation)

Example Calculation:

RA = 19.48 dBμV
AF = 18.52 dB
CF = 0.78 dB

FS = 19.48 + 18.52 + 0.78 = 38.78 dBμV/m
Level in μV/m = Common Antilogarithm [(38.78 dBμV/m)/20] = 86.89 μV/m

6.4 Test Equipment Used:

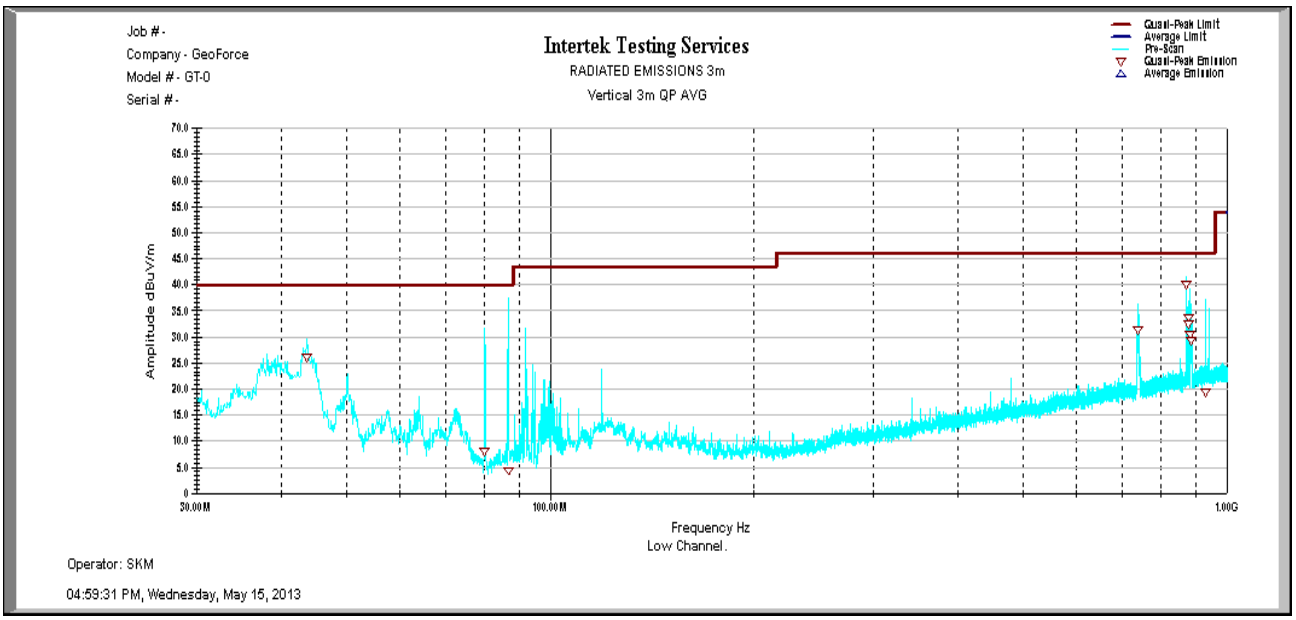
Description	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Temp. Humidity & Pressure Recorder	Omega	OM-CP-PRHTemp2000	N10673	07/20/2012	07/20/2013
EMI Receiver	Rhode & Schwarz	ESI 7	100044	04/15/2013	04/15/2014
Bi-ConiLog Antenna	Chase	CBL6112B	2726	08/28/2012	08/28/2013
10KHz to 1GHz Preamp	Com-Power	PAM-103	441031	06/05/2012	06/05/2013
Coaxial RF Cable	Insulated Wire Inc	SPS-2303-720-SPS	804	07/19/2012	07/19/2013
Coaxial RF Cable	Insulated Wire Inc	SPS-2303-4250-SPS	805	07/19/2012	07/19/2013
EMI Receiver	Agilent	E7405A	US40240235	06/10/2012	06/10/2013
Horn Antenna 700MHz-18GHz	A H Systems	SAS-571	787	04/15/2013	04/15/2014
RF Pre-amplifier 1 to 18GHz	Miteq	AMF-5D-00501800-28-1	1469795	06/05/2012	06/05/2013
Horn Antenna 18GHz to 40Ghz	A H Systems	SAS-574	570	07/17/2012	07/17/2013
RF Pre-amplifier 18 to 26GHz	Miteq	AMF-6F18002650-20-10	1467280	10/10/2012	10/10/2013
Radiated Emissions TILE profile	Intertek	1130-002	Ver 10	VBU	VBU

6.5 Results:

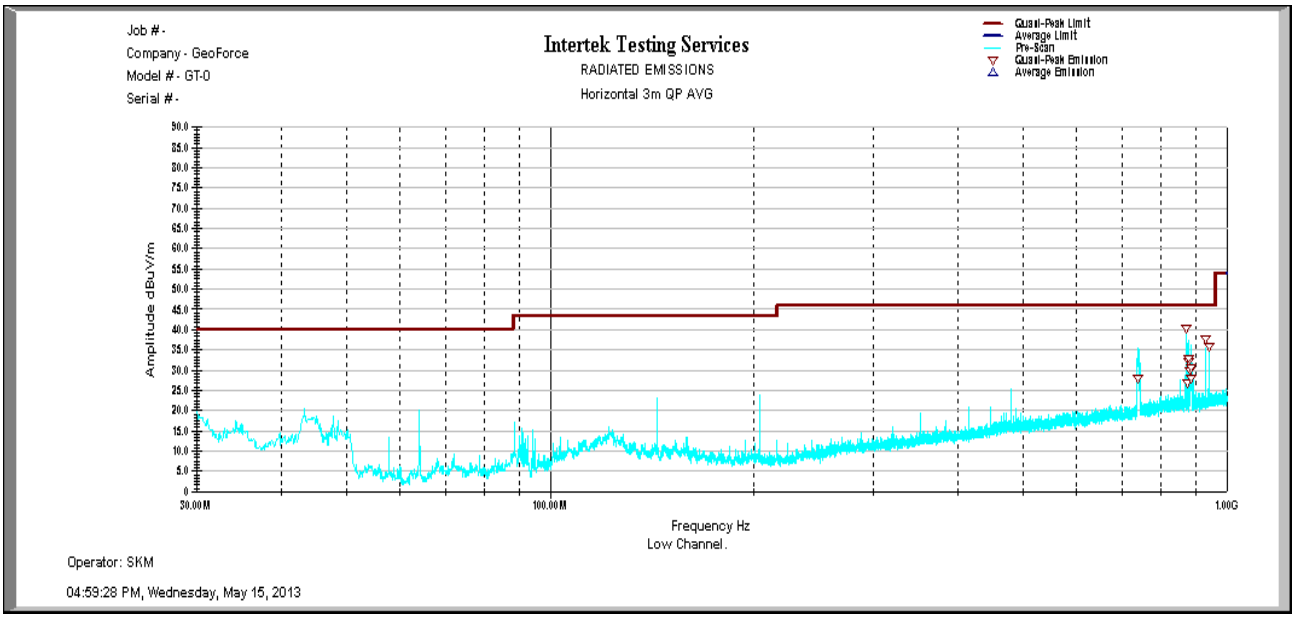
All spurious emissions were attenuated by at least 20dB below the level of the fundamental as required by Part 15.247(d). Additionally, all emissions falling within restricted bands of operation and at the band edges were found to be below the limit specified in Part 15.209(a) and 15.205(a). The spurious emissions listed in the following tables are the worst case emissions.

Worst Case Spurious Measurements

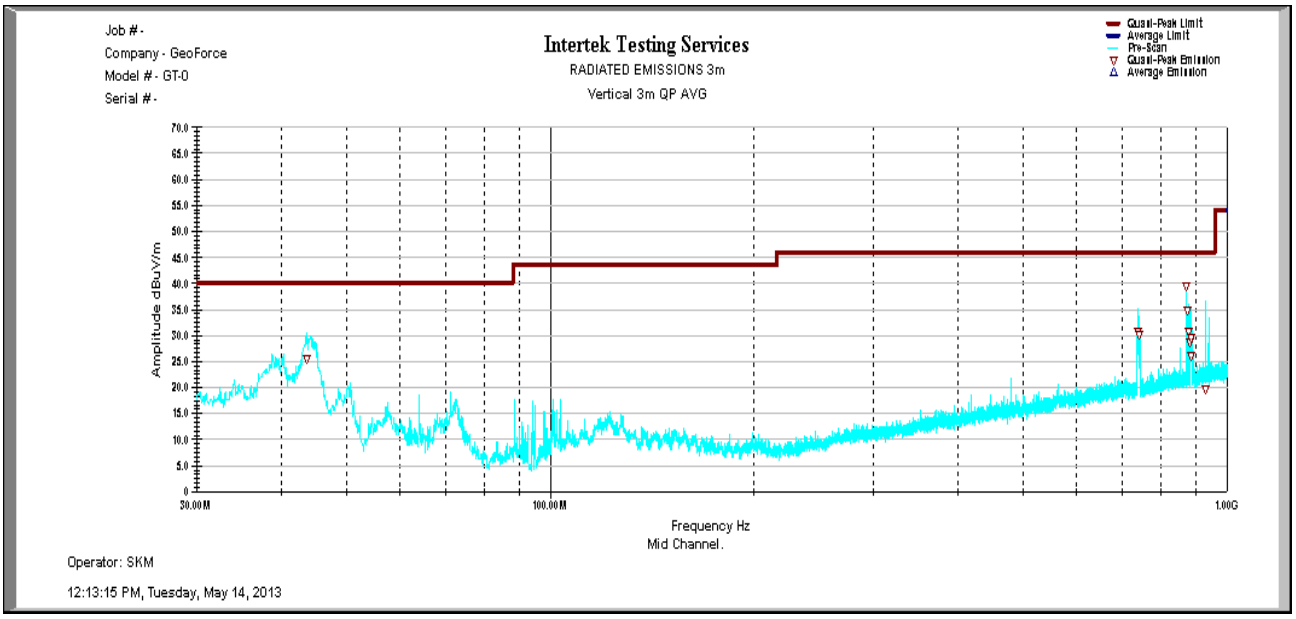
*Emissions were investigated through 3 orthogonal axis to determine the worst case.



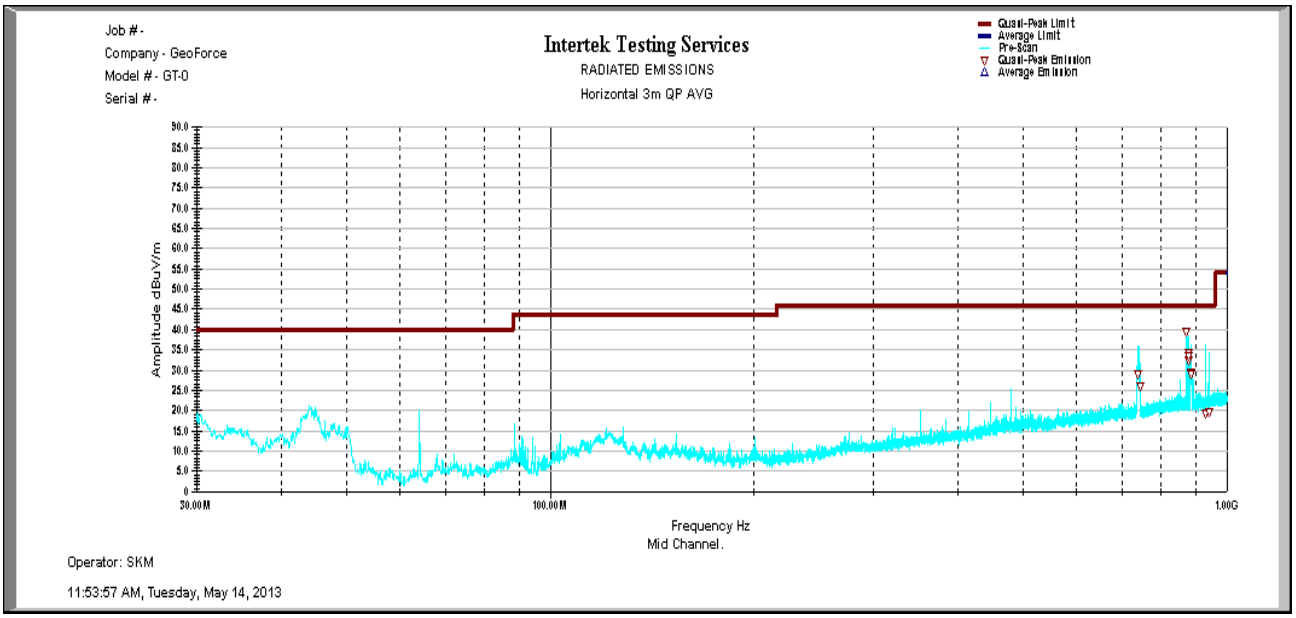
30 to 1000MHz Scan, Vertical Antenna Position, Low Ch.



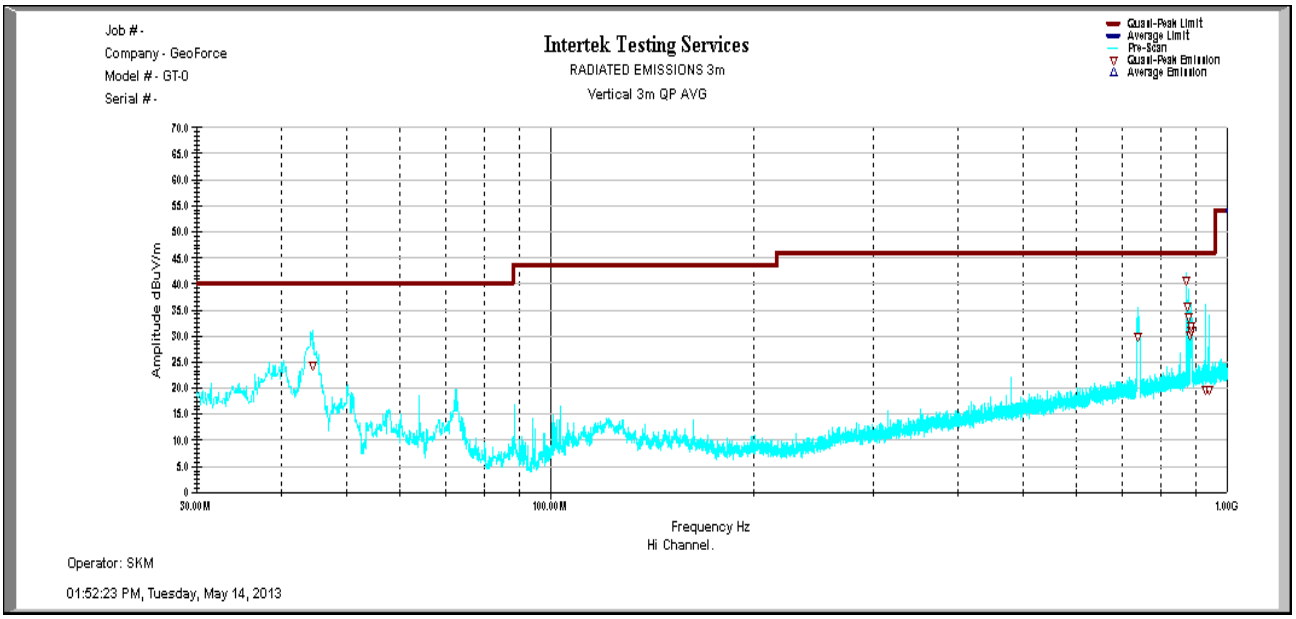
30 to 1000MHz Scan, Horizontal Antenna Position, Low Ch.



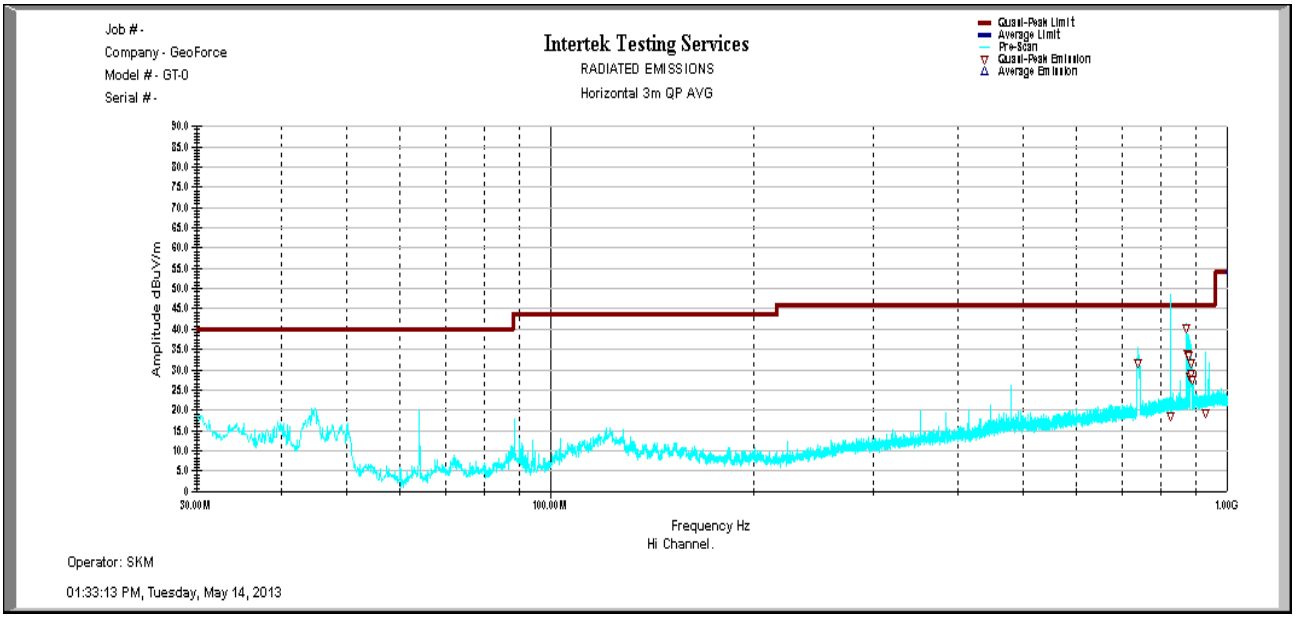
30 to 1000MHz Scan, Vertical Antenna Position, Mid Ch.



30 to 1000MHz Scan, Horizontal Antenna Position, Mid Ch.



30 to 1000MHz Scan, Vertical Antenna Position, High Ch.



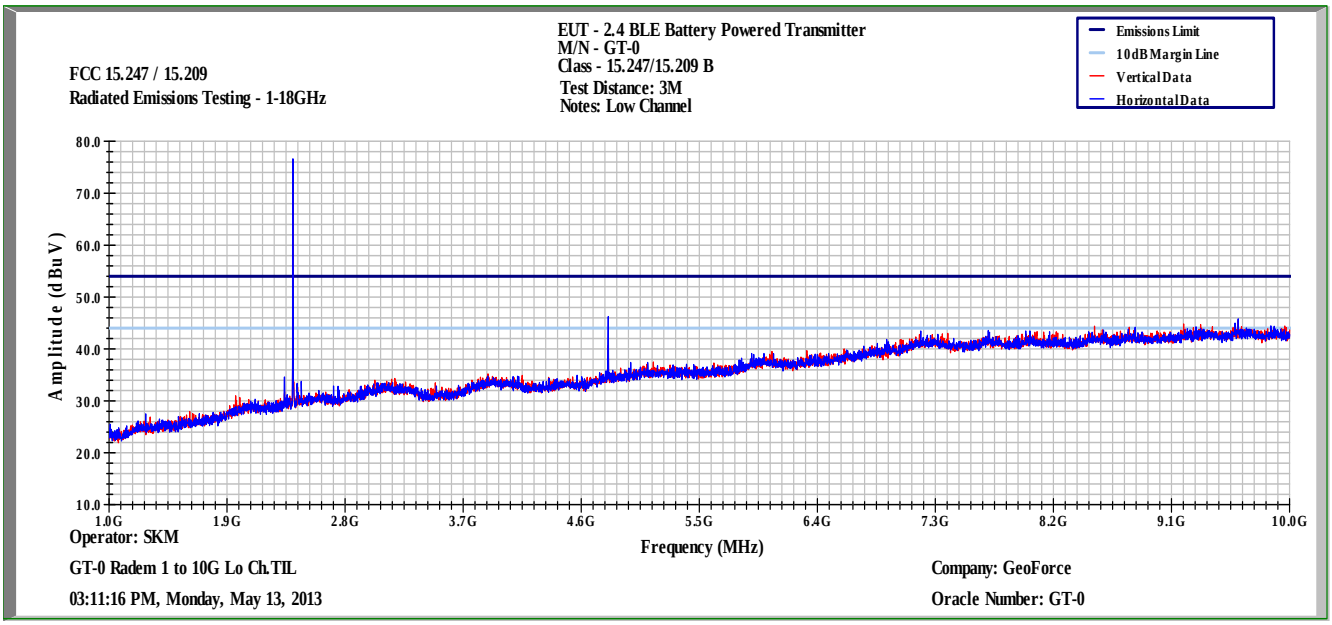
30 to 1000MHz Scan, Horizontal Antenna Position, High Ch.

6.6 Data Sheet: 30 to 1000MHz Radiated Scans

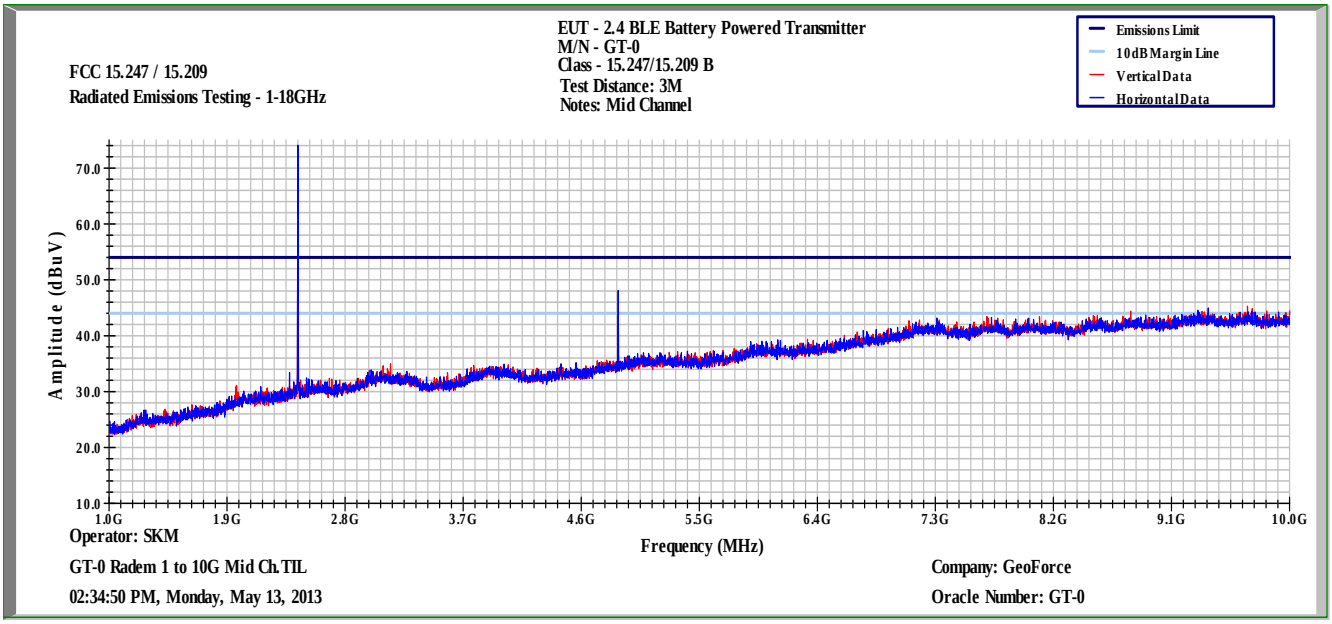
Polarity H/V	Frequency MHz	Height cm	Azimuth	QP Reading (dBuV/m)	Antenna Factor	Preamp Factor	Cable Factor	QP Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Low Channel										
H	739.53	118	215	36.941	20.991	34.402	4.511	28.041	46.021	-17.98
H	870.24	236	170	46.99	22.395	34.049	4.929	40.265	46.021	-5.756
H	876.27	310	304	38.887	22.3	34.027	4.949	32.109	46.021	-13.911
H	877.45	184	30	39.445	22.3	34.025	4.953	32.673	46.021	-13.348
H	929.67	138	74	43.568	22.793	33.871	5.09	37.58	46.021	-8.441
H	940.88	118	331	41.545	22.9	33.826	5.112	35.731	46.021	-10.29
V	739.14	332	209	40.141	20.883	34.403	4.511	31.231	46.021	-14.789
V	870.2	234	99	46.84	22.3	34.049	4.929	40.115	46.021	-5.906
V	876.24	152	283	39.289	22.3	34.028	4.949	32.511	46.021	-13.51
V	877.25	294	301	40.585	22.3	34.026	4.953	33.813	46.021	-12.208
V	881.73	191	25	37.204	22.3	34.013	4.964	30.456	46.021	-15.565
V	883.91	332	40	35.938	22.3	34.004	4.967	29.202	46.021	-16.819
Mid Channel										
H	870.26	248	53	46.24	22.395	34.049	4.929	39.515	46.021	-6.506
H	876.24	116	79	41.224	22.3	34.028	4.949	34.446	46.021	-11.575
H	877.38	217	164	39.194	22.3	34.025	4.953	32.422	46.021	-13.598
H	879.16	355	58	40.463	22.3	34.022	4.959	33.7	46.021	-12.32
H	884.31	238	193	36.076	22.3	34.003	4.968	29.341	46.021	-16.679
H	885.29	264	11	35.984	22.3	33.999	4.97	29.255	46.021	-16.766
V	43.69	152	125	48.275	11.017	35.484	1.086	25.525	40	-14.475
V	739.41	289	259	39.613	20.888	34.402	4.511	30.71	46.021	-15.311
V	740.59	312	32	39.179	20.9	34.399	4.515	30.295	46.021	-15.726
V	870.27	314	190	46.069	22.3	34.049	4.929	39.343	46.021	-6.677
V	875.95	234	62	41.521	22.3	34.028	4.948	34.741	46.021	-11.28
V	877	152	327	37.421	22.3	34.026	4.952	30.647	46.021	-15.373
High Channel										
HH	739.32	260	168	40.666	20.986	34.403	4.511	31.761	46.021	-14.26
H	870.27	147	194	47.201	22.395	34.049	4.929	40.475	46.021	-5.545
H	875.81	187	257	40.799	22.3	34.028	4.948	34.019	46.021	-12.002
H	877.55	183	303	40.49	22.3	34.025	4.954	33.719	46.021	-12.302
H	883.9	163	54	35.681	22.3	34.004	4.967	28.944	46.021	-17.077
H	885.75	167	79	38.362	22.3	33.999	4.972	31.635	46.021	-14.386
V	44.45	152	101	47.48	10.62	35.499	1.1	24.257	40	-15.743
V	870.19	332	170	47.511	22.3	34.049	4.929	40.787	46.021	-5.234
V	875.65	172	152	42.496	22.3	34.029	4.947	35.715	46.021	-10.306
V	877.37	240	30	40.545	22.3	34.025	4.953	33.772	46.021	-12.248
V	885.62	306	146	38.671	22.312	33.999	4.971	31.943	46.021	-14.077

Results: Pass

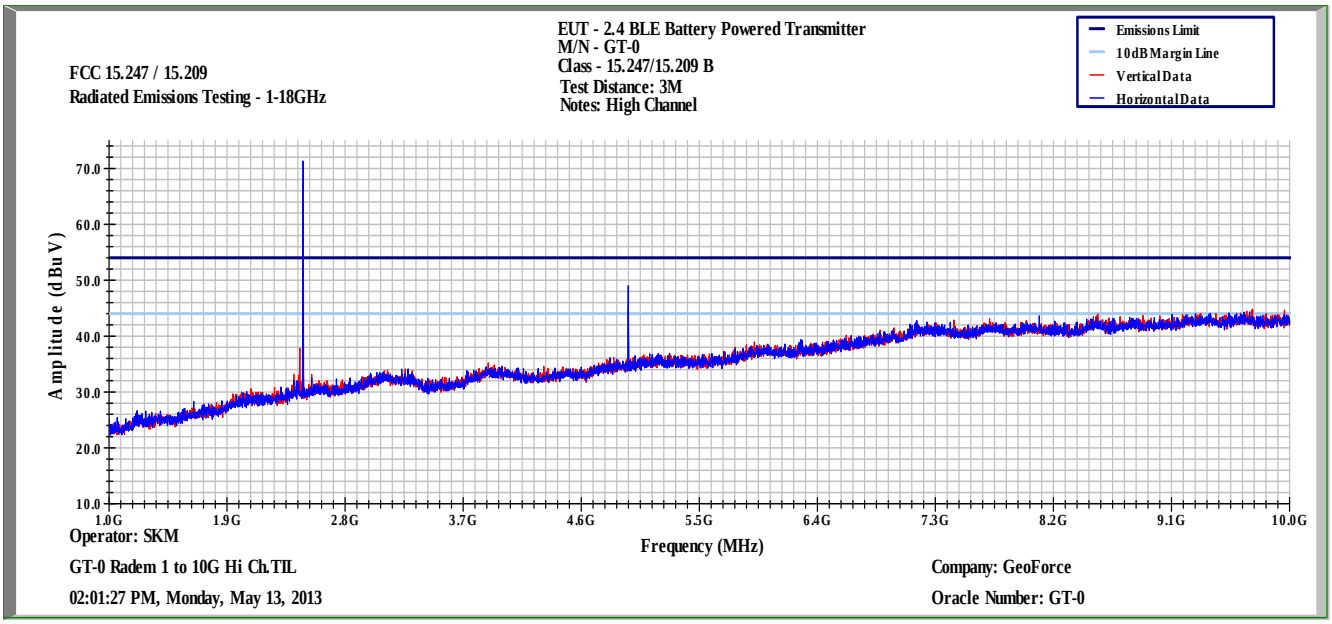
Note: From 1 to 10 GHz testing was completed at 3 transmit frequencies to determine compliance. EUT was measured at 3m distance.



Low Channel, 1 to 10GHz Scan Plot

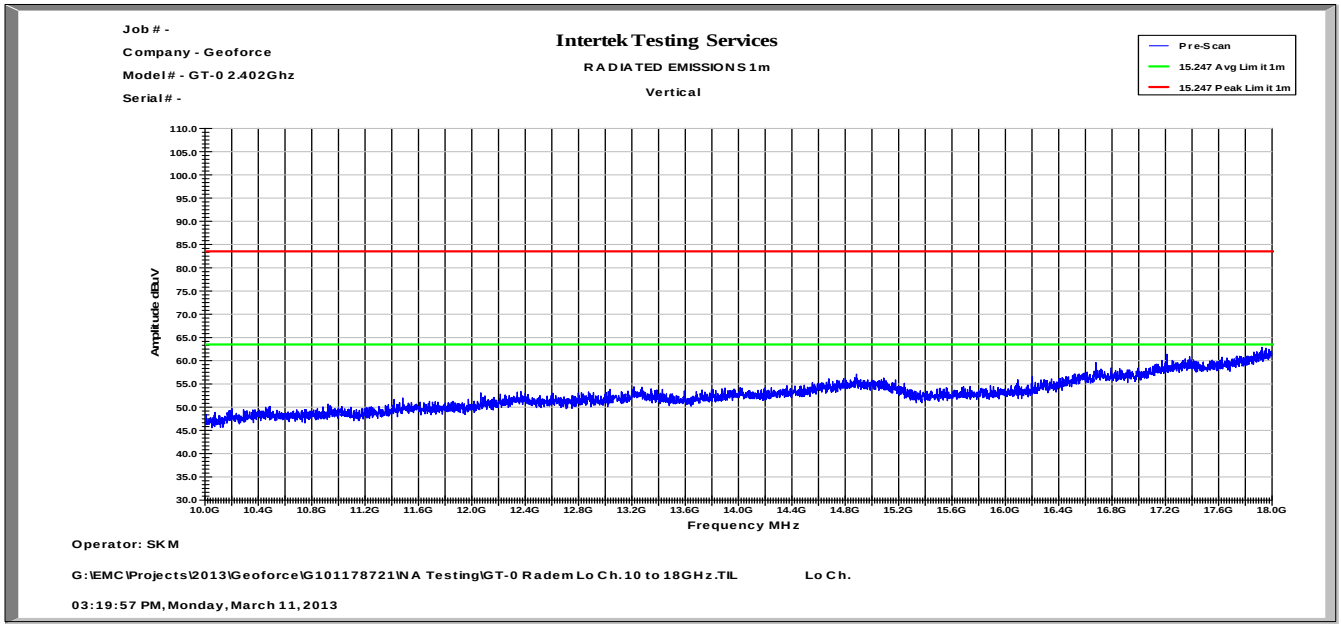


Mid Channel, 1 to 10GHz Scan Plot

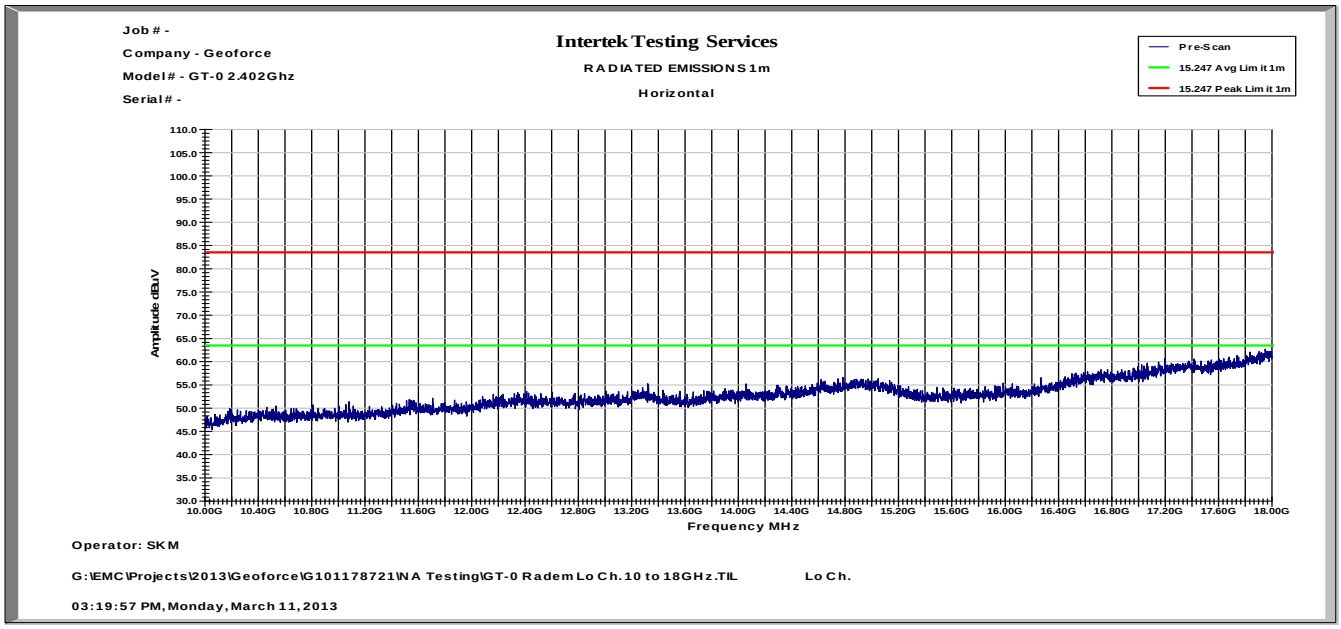


High Channel, 1 to 10GHz Scan Plot

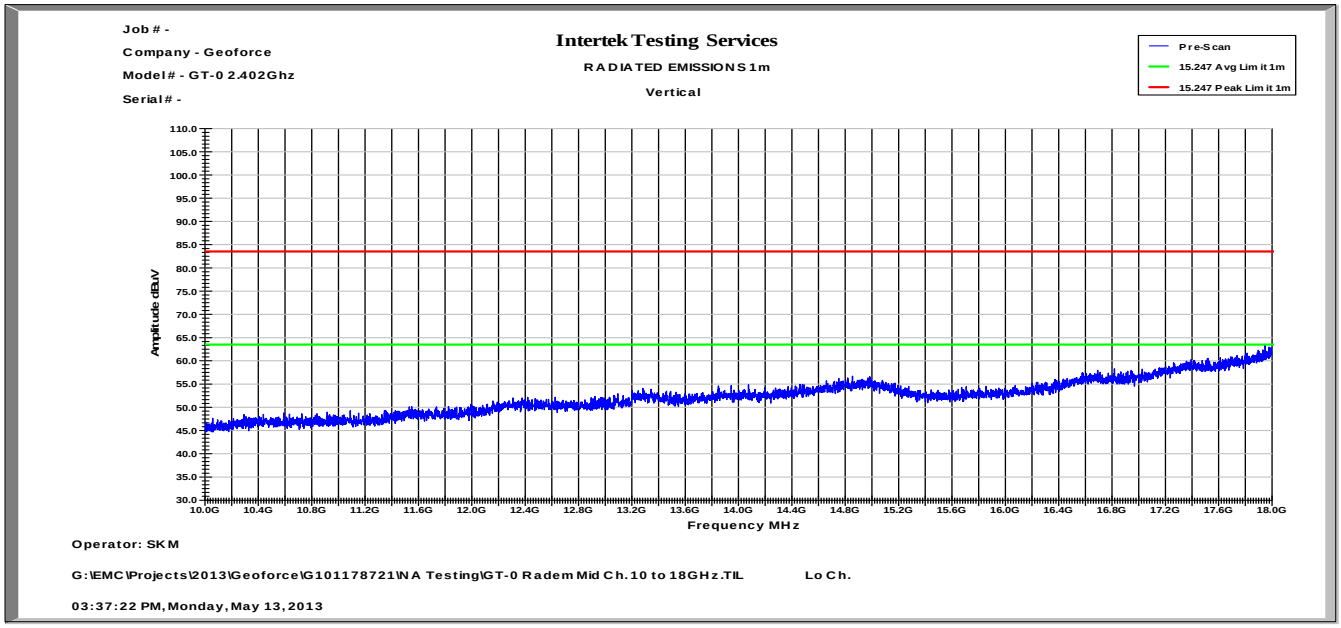
Note: From 10 to 26.5 GHz testing was completed at 3 transmit frequencies to determine compliance. EUT was measured at 1m distance.



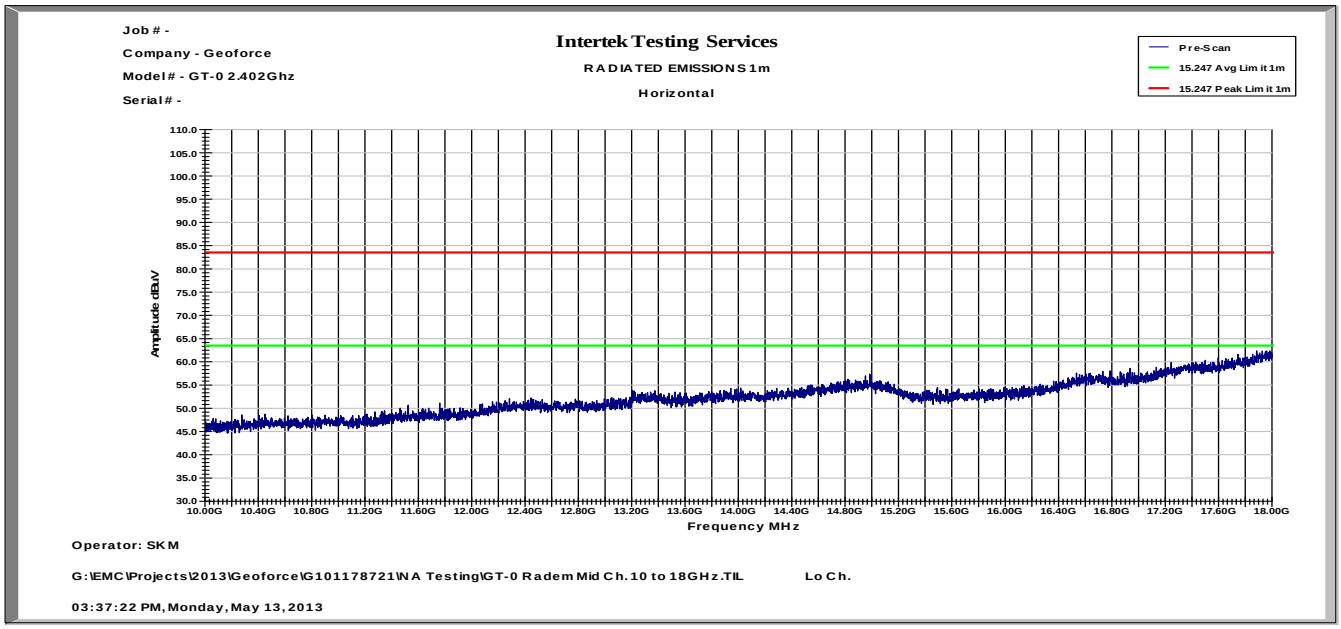
Low Channel, 10 to 18GHz Vertical Antenna Scan Plot



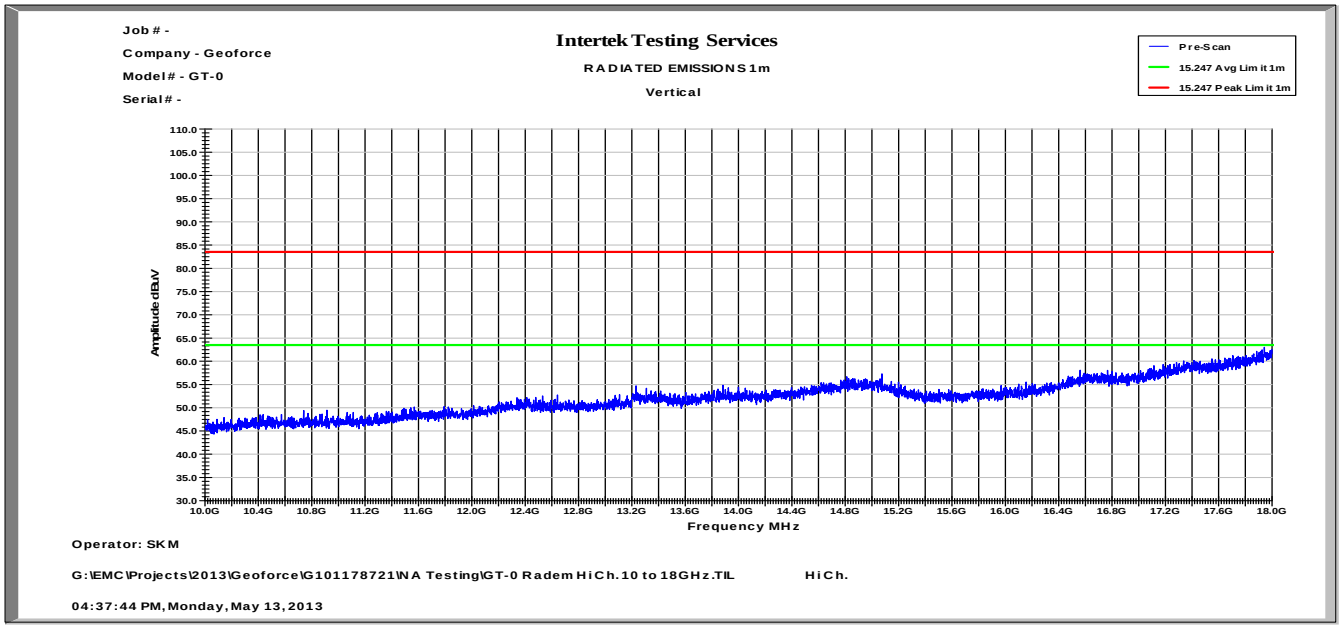
Low Channel, 10 to 18GHz Horizontal Antenna Scan Plot



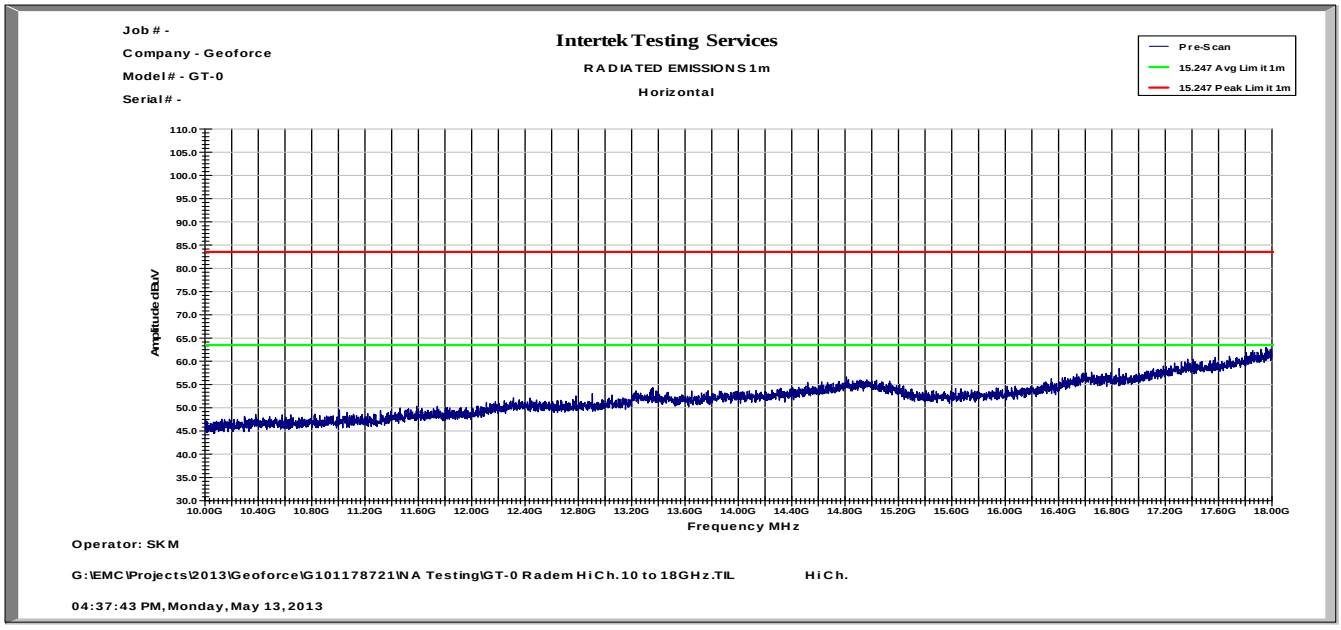
Mid Channel, 10 to 18GHz Vertical Antenna Scan Plot



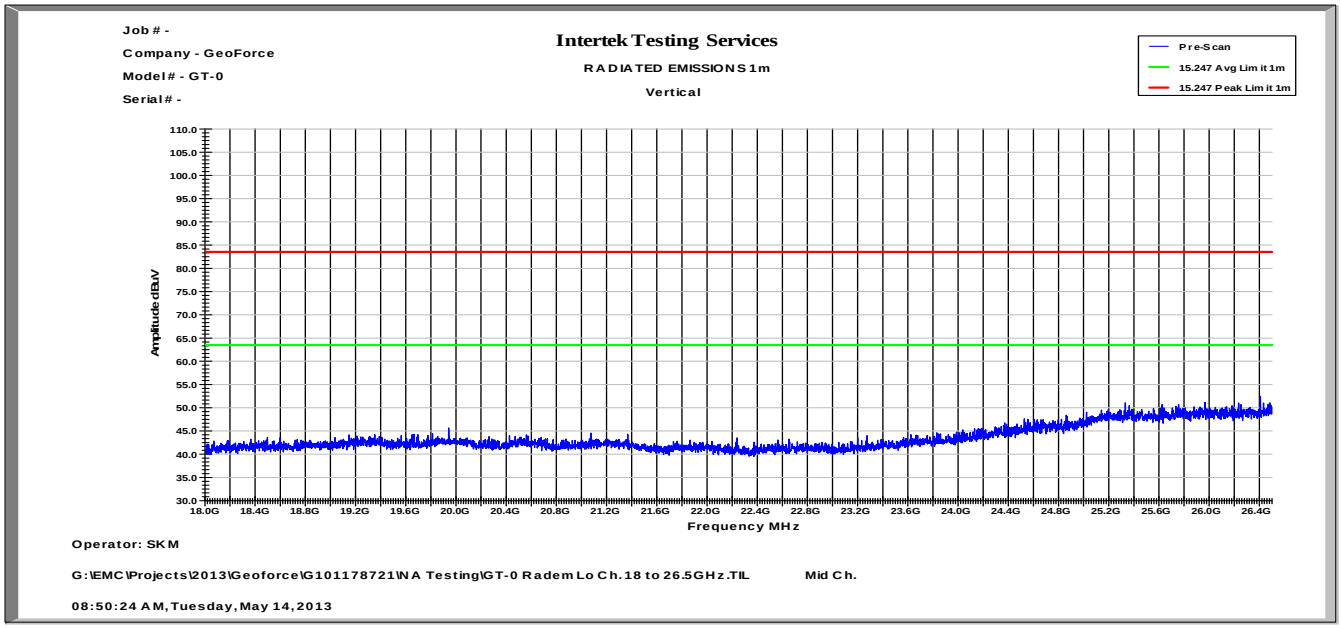
Mid Channel, 10 to 18GHz Horizontal Antenna Scan Plot



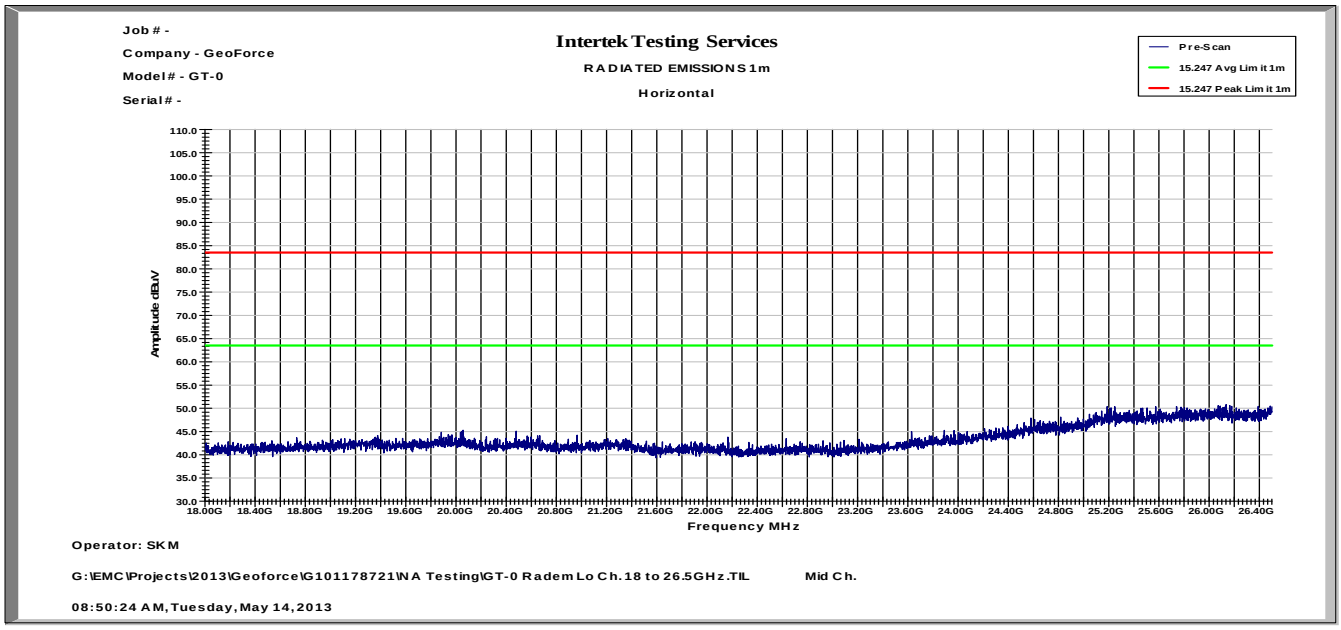
High Channel, 10 to 18GHz Vertical Antenna Scan Plot



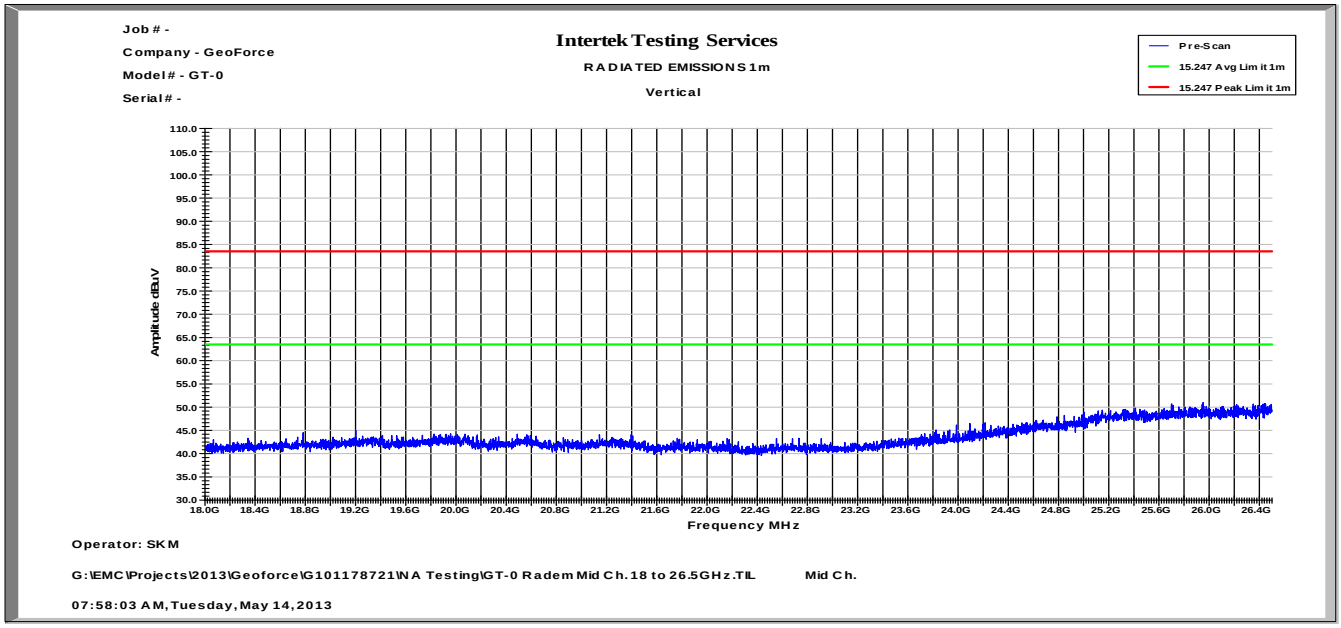
High Channel, 10 to 18GHz Horizontal Antenna Scan Plot



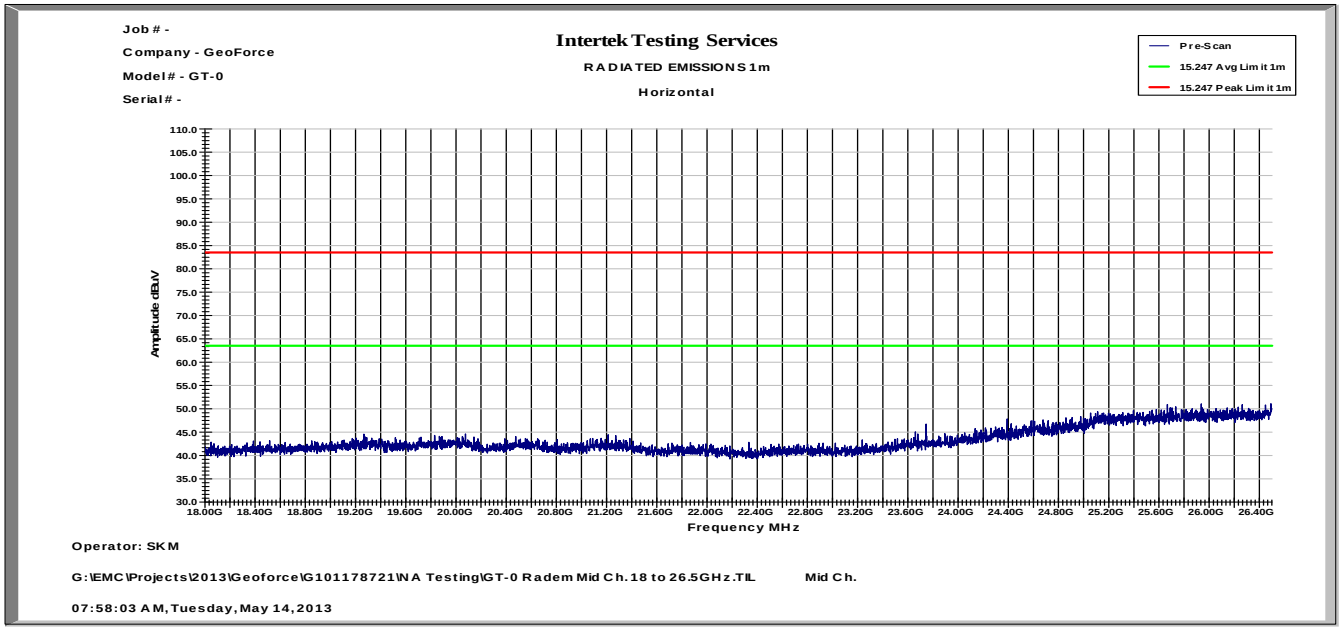
Low Channel, 18 to 26.5GHz Vertical Antenna Scan Plot



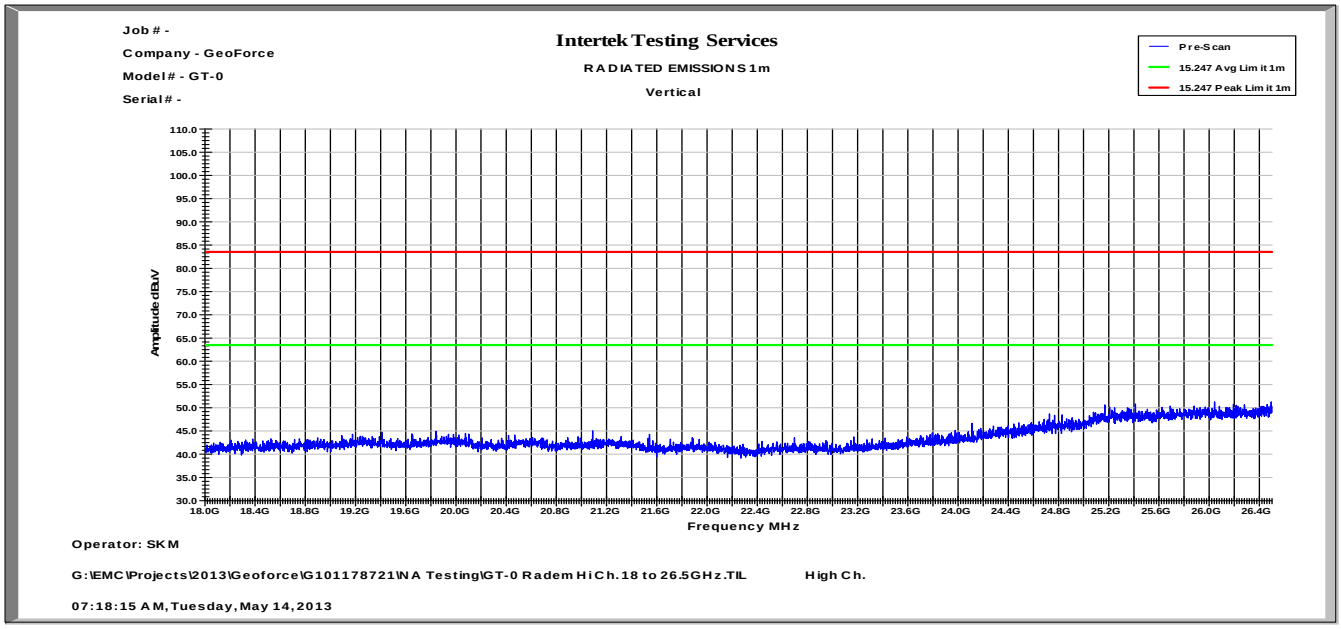
Low Channel, 18 to 26.5GHz Horizontal Antenna Scan Plot



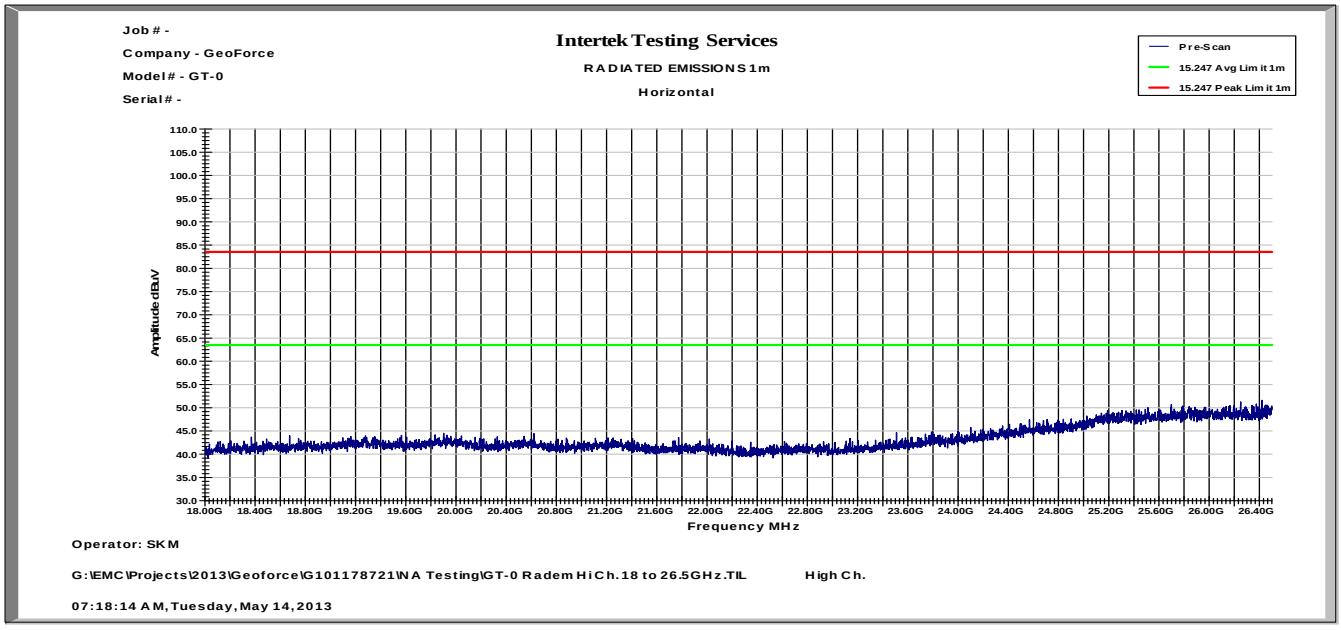
Mid Channel, 18 to 26.5GHz Vertical Antenna Scan Plot



Mid Channel, 18 to 26.5GHz Horizontal Antenna Scan Plot



High Channel, 18 to 26.5GHz Vertical Antenna Scan Plot



High Channel, 18 to 26.5GHz Horizontal Antenna Scan Plot

6.7 Data Sheet: 1 to 26.5GHz Radiated/Restricted Band Scans

Polarity H/V	Frequency MHz	Height cm	Azimuth	Raw Reading (dBuV/m)	Antenna Factor	Preamp Factor	Cable Factor	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Low Channel										
V	4802	314	337	53.023	23.356	38.513	5.334	43.2	74	-30.8
V	4802	314	337	50.923	23.356	38.513	5.334	41.1	54	-12.9
Mid Channel										
V	4880	108	112	44.905	29.393	37.982	9.084	45.4	74	-28.6
V	4880	108	112	42.705	29.393	37.982	9.084	43.2	54	-10.8
High Channel										
V	2483.5	112	25	33.607	29.220	39.250	8.223	31.8	74	-42.2
V	2483.5	112	25	29.607	29.220	39.250	8.223	27.8	54	-26.2
V	4960	100	127	36.343	35.262	39.415	14.01	46.2	74	-27.8
V	4960	100	127	33.543	35.262	39.415	14.01	43.4	54	-10.6
Low Channel										
H	4802	103	167	55.98	23.399	38.513	5.334	46.2	74	-27.8
H	4802	103	167	53.18	23.399	38.513	5.334	43.4	54	-10.6
Mid Channel										
H	4880	179	49	50.543	29.393	37.982	9.084	48.05	74	-25.95
H	4880	179	49	46.293	29.393	37.982	9.084	43.8	54	-10.2
High Channel										
H	2483.5	132	14	33.892	29.635	39.250	8.223	32.5	74	-41.5
H	2483.5	132	14	30.992	29.635	39.250	8.223	29.6	54	-24.4
H	4960	194	179	38.942	35.263	39.415	14.01	48.8	74	-25.2
H	4960	194	179	34.342	35.263	39.415	14.01	44.2	54	-9.8

Results: Pass

7 Radiated Spurious Emissions (Receiver)

Not Applicable: This device does not contain a separate receive function. The nature of this device is that it will only receive while transmitting. Therefore, the spurious emissions produced in transmit mode are the spurious emissions produced in receive mode. Receivers operating above 960 MHz are exempt.

8 AC Power Line Conducted Emissions

Not Applicable: EUT is a battery-powered device.

9 RF Exposure Evaluation

MPE Evaluation
The EUT is a wireless device used in an application, at least 20 cm from any body part of the user or nearby persons.

The maximum Peak EIRP calculated is -25.46 dBm or 0.0027 mW; therefore, to comply with RF Exposure Requirement, the MPE is calculated.

The Power Density can be calculated using the formula

$$S = EIRP/ 4\pi D_2$$

Where: S is Power Density in W/m_2
D is the distance from the antenna.

It is considered that 20 cm is the minimum distance that user can go closest to the EUT.
At 20 cm, S = 0.00001 W/m2, which is below the MPE Limit of 10 W/m2

10 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of k = 2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty	Notes
Radiated emissions, 30 to 1000 MHz	±3.9dB	
Radiated emissions, 1 to 18 GHz	±4.2dB	
Radiated emissions, 18 to 40 GHz	±4.3dB	
Power Port Conducted emissions, 150kHz to 30 MHz	±2.8dB	

11 Revision History

Revision Level	Date	Report Number	Notes
0	May 20, 2013	101178721DAL-001	Original Issue