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TEST REPORT

Report Number:	**101941214LEX-003**
Project Number:	**G101941214**
Report Issue Date:	**3/10/15**
Product Name:	**Qollector Activity Monitor**
Model Number:	**Qollector2**
Standards:	**Title 47 CFR Part 15 Subpart C and RSS-247 Issue 1**
FCCID:	**C9O-QOLL1**
Industry Canada ID:	**10161A-QOLL1**

Tested by:
Intertek Testing Services NA, Inc.
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Lexington, KY 40510

Client:
SRAM
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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-Lexington is located at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-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 2042M-1.

2 Test Summary

Page	Test full name	FCC Reference	IC Reference	Result
6	Peak Conducted Power	§ 15.247(b)(3)(4)	RSS-247 (5.4)	Pass
8	Occupied Bandwidth	§ 15.247(a)(2)	RSS-247 (5.2)	Pass
13	Conducted Spurious Emissions	§ 15.247(d)	RSS-247 (5.5)	Pass
15	Power Spectral Density	§ 15.247(e)	RSS-247 (5.2)	Pass
17	Radiated Spurious Emissions (Transmitter)	§ 15.247(d), § 15.209, and § 15.205	RSS-247 (5.5)	Pass
22	Radiated Spurious Emissions (Receiver)	§ 15.109	RSS-Gen (6.1)	Pass
---	Conducted Voltage Emissions on the AC Mains Terminals	§ 15.107, § 15.207	RSS-Gen (7.2.4)	NA
25	Antenna Requirement per FCC Part 15.203	§ 15.203	RSS-Gen (7.1.2)	Pass

3 Description of Equipment Under Test

Equipment Under Test	
Manufacturer	SRAM
Model Number	Qollector2
Serial Number	Not Labeled
Receive Date	12/17/14
Test Start Date	12/17/14
Test End Date	12/31/14
Device Received Condition	Good
Test Sample Type	Production
Frequency Band	2402MHz – 2480MHz
Mode(s) of Operation	ANT+
Modulation Type	GFSK
Transmission Control	Test Commands
Test Channels	2, 40, 80 (2402, 2440, 2480 MHz)
Antenna Type (15.203)	Internal
Power Supply	Battery Powered

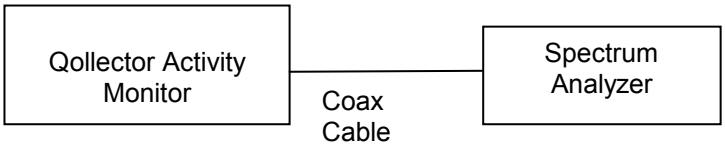
Description of Equipment Under Test
Activity monitor

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmitting ANT+ Signal on low mid or high channels
2	Receive / idle mode

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

3.2 EUT Block Diagram:



3.3 Cables:

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
USB Cable	6ft	Yes	Yes	EUT	USB-AC Power Adapter

3.4 Support Equipment:

No support equipment was used during this evaluation.

4 Peak Conducted Power

4.1 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.

4.2 Test Procedure

ANSI C63.10: 2013 and KDB Publication No. 558074 D01 v03r03: 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.

4.3 Test Equipment Used:

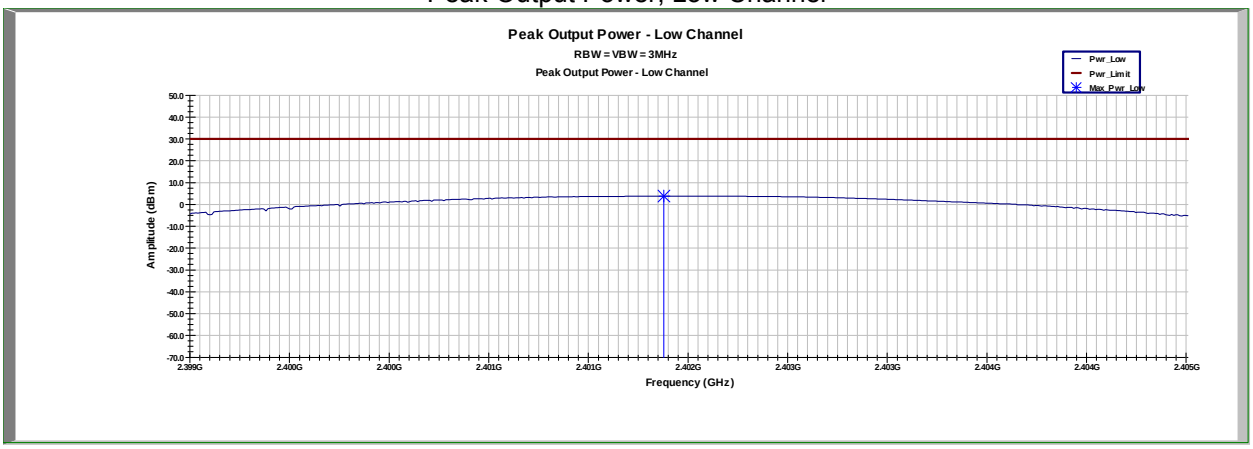
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	8/22/2014	8/22/2015

4.4 Results:

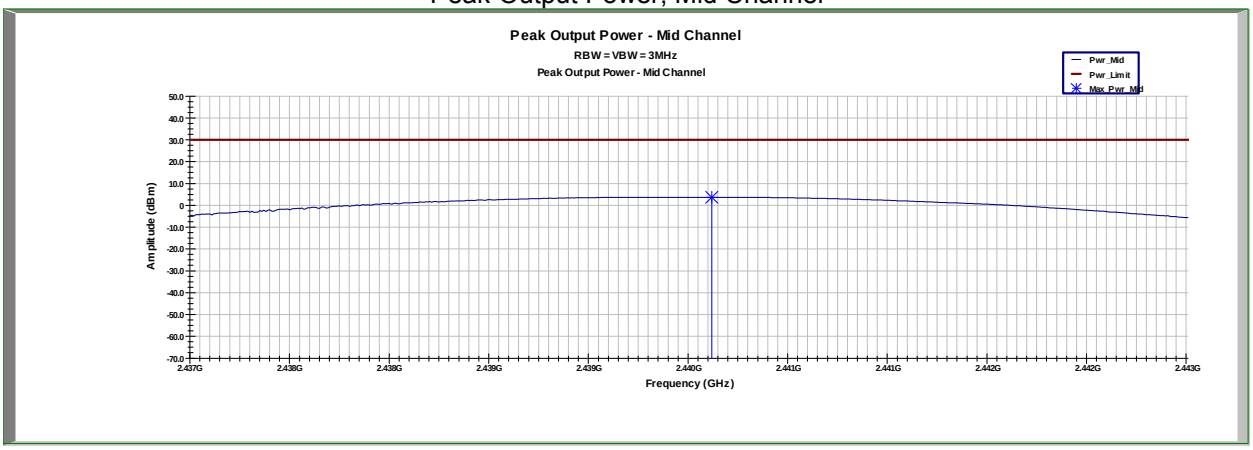
The peak output power measurements were all below the 30dBm limit. The antenna gain was calculated to be -3dBi based on a field strength measurement of the fundamental signal.

Mode	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Result
ANT+	2402	3.81	30	Pass
ANT+	2440	3.7	30	Pass
ANT+	2480	3.61	30	Pass

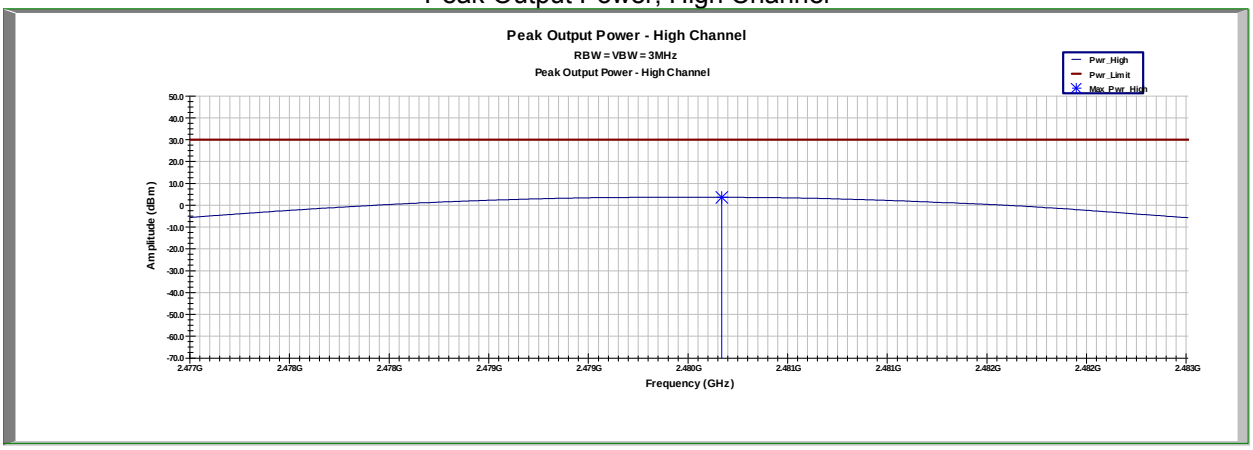
Peak Output Power, Low Channel



Peak Output Power, Mid Channel



Peak Output Power, High Channel



5 Occupied Bandwidth

5.1 Test Limits

§ 15.247(a)(2): For digital modulation systems, the minimum 6dB bandwidth shall be at least 500kHz.

5.2 Test Procedure

ANSI C63.10: 2013 and KDB Publication No. 558074 D01 v03r03: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

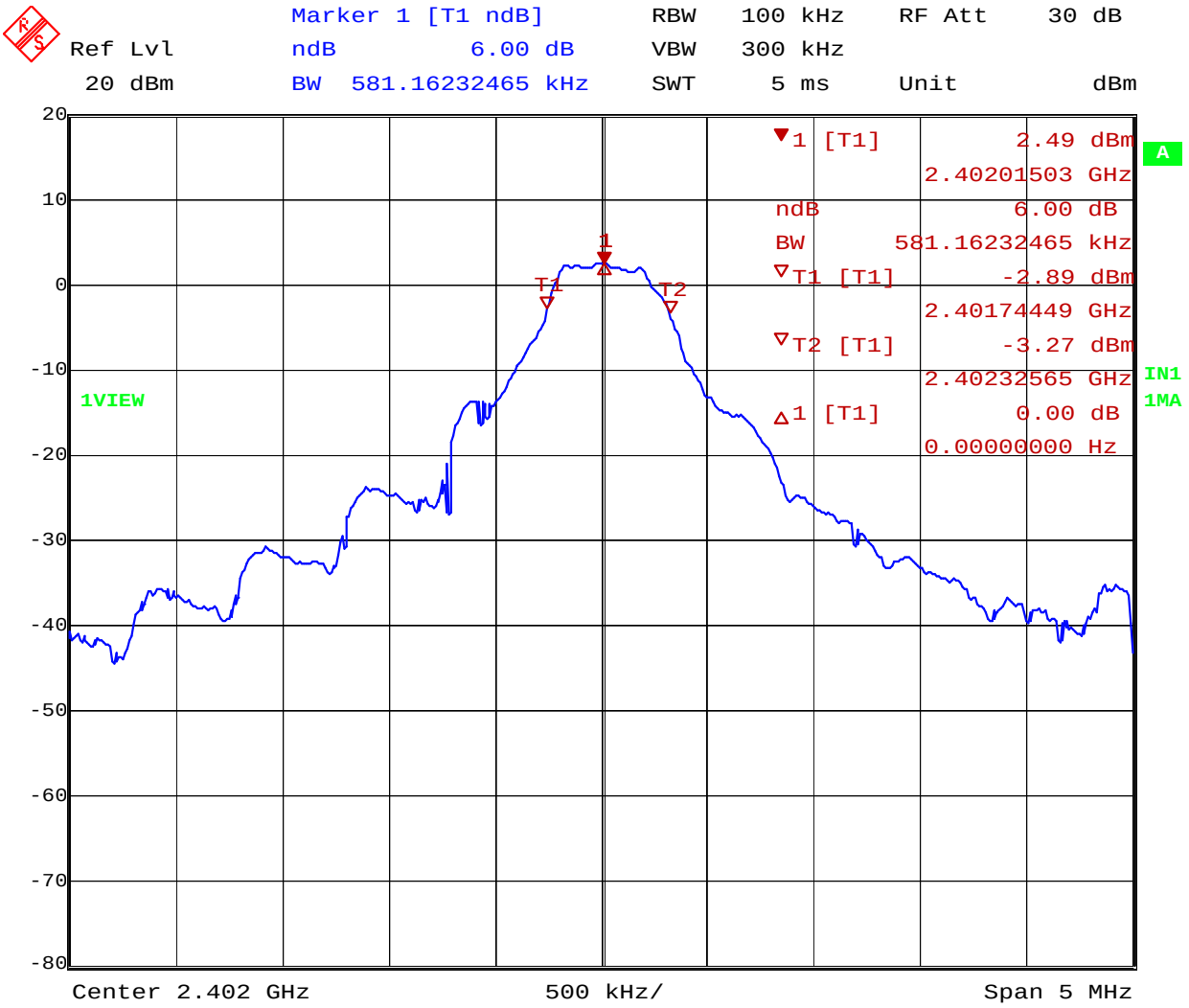
5.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	8/22/2014	8/22/2015

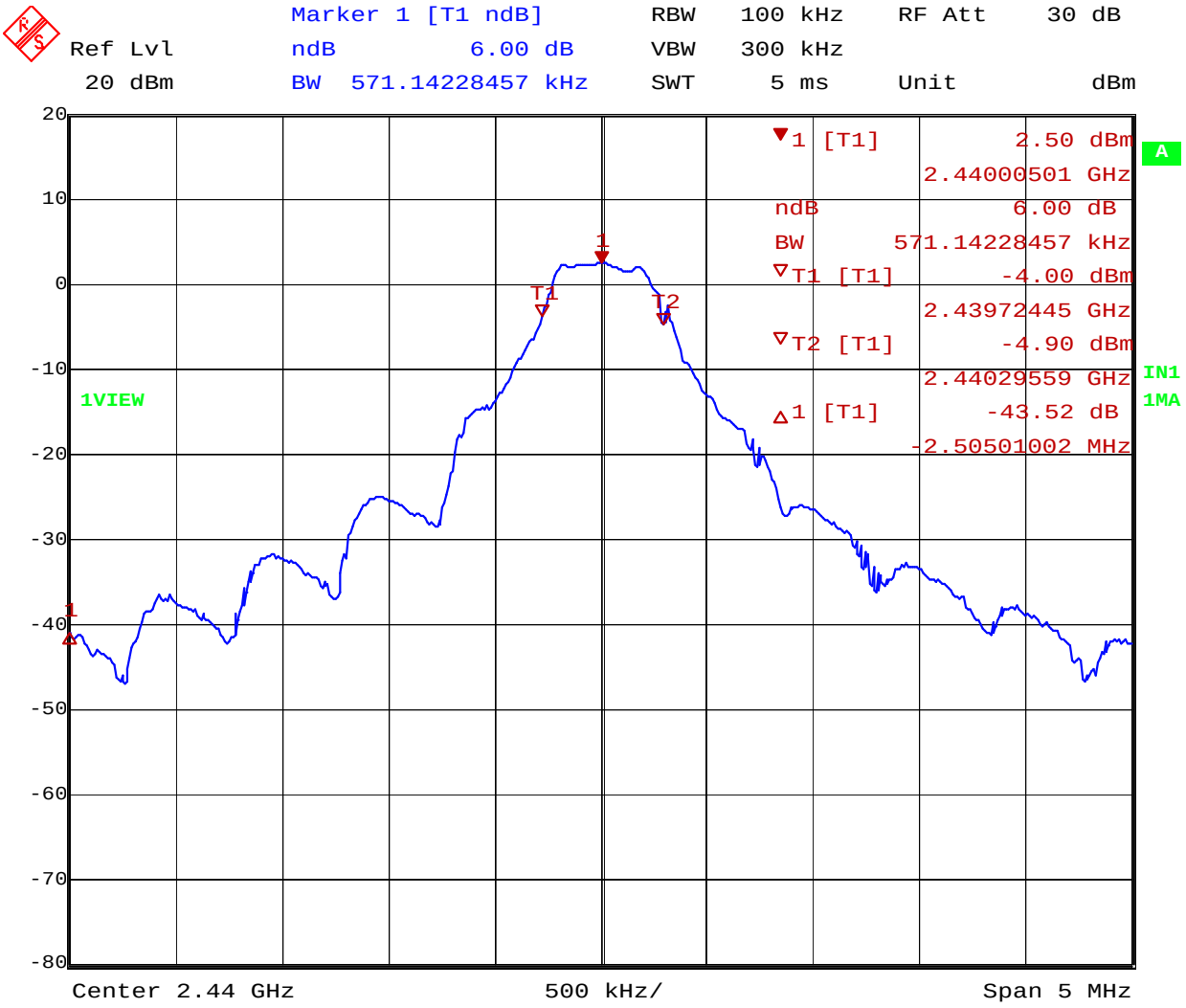
5.4 Results:

Mode	Channel Number	Frequency (MHz)	6dB Bandwidth	99% Power Bandwidth	Result
ANT+	0	2402	581.16 kHz	---	Pass
ANT+	40	2440	571.14 kHz	961.9 kHz	Pass
ANT+	80	2480	551.10 kHz	---	Pass

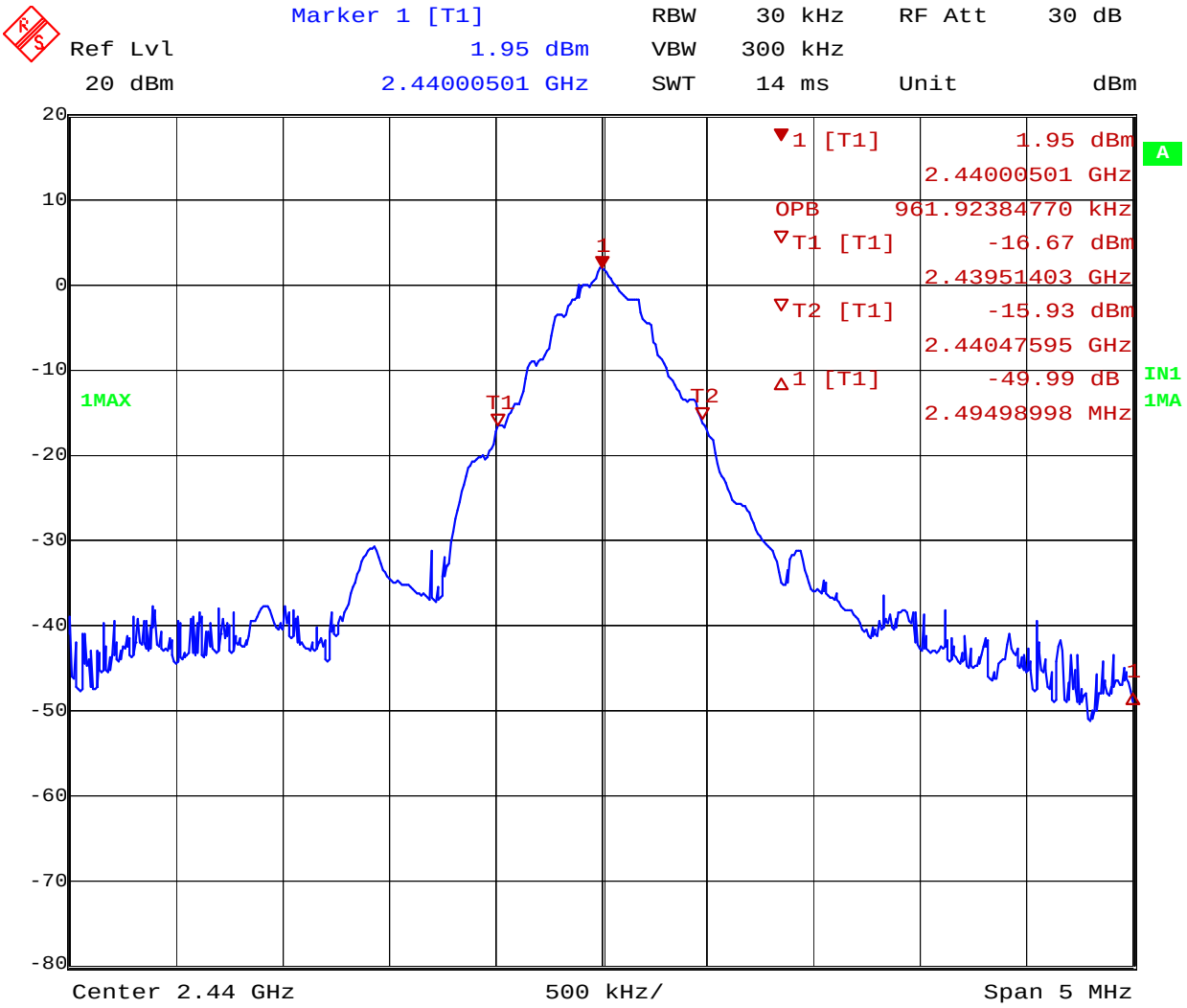
6dB Bandwidth, Low Channel



6dB Bandwidth, Middle Channel

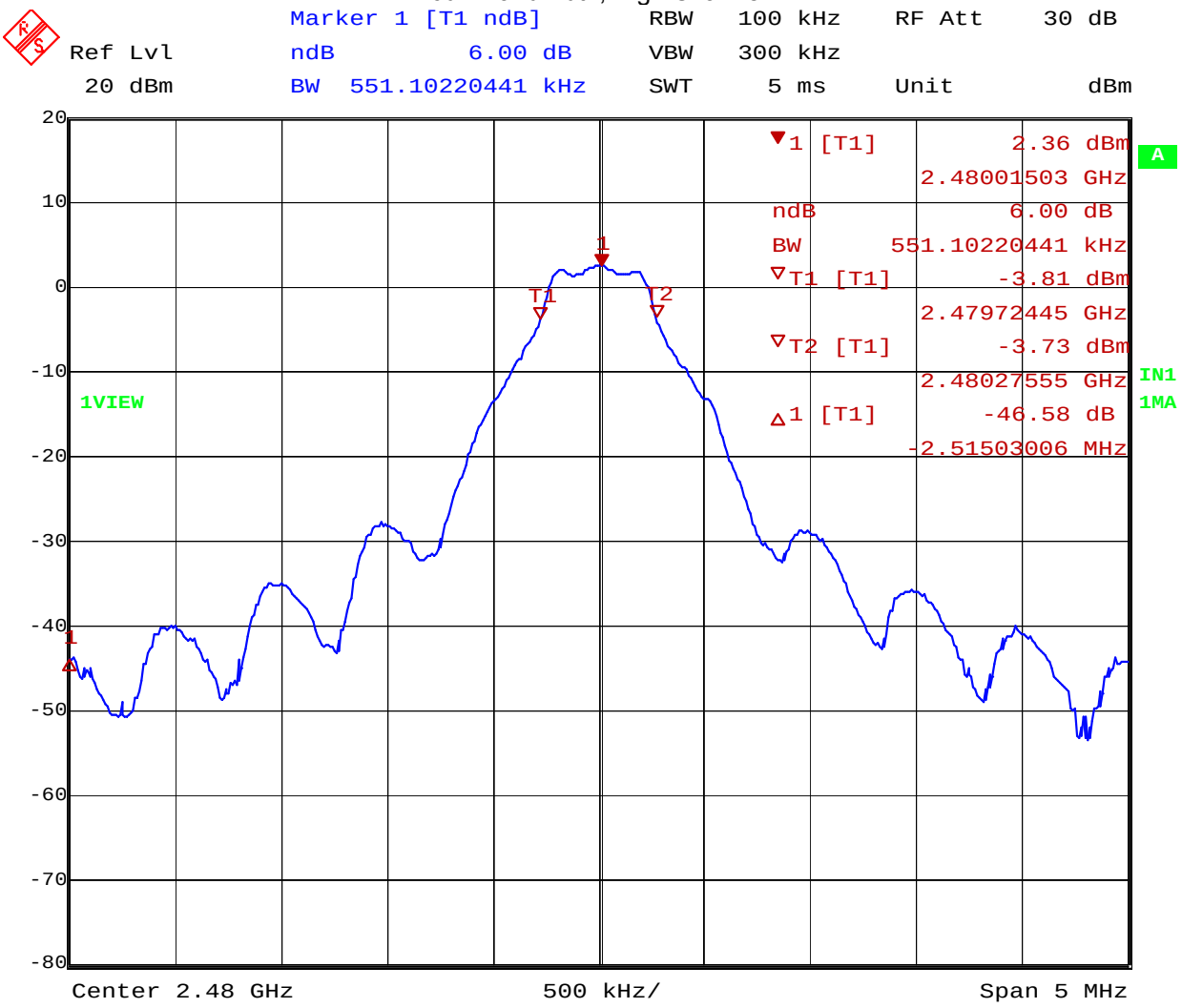


99% Bandwidth, Middle Channel



Date: 19.DEC.2014 13:23:24

6dB Bandwidth, High Channel



6 Conducted Spurious Emissions

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.

6.2 Test Procedure

ANSI C63.10: 2013 and KDB Publication No. 558074 D01 v03r03: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

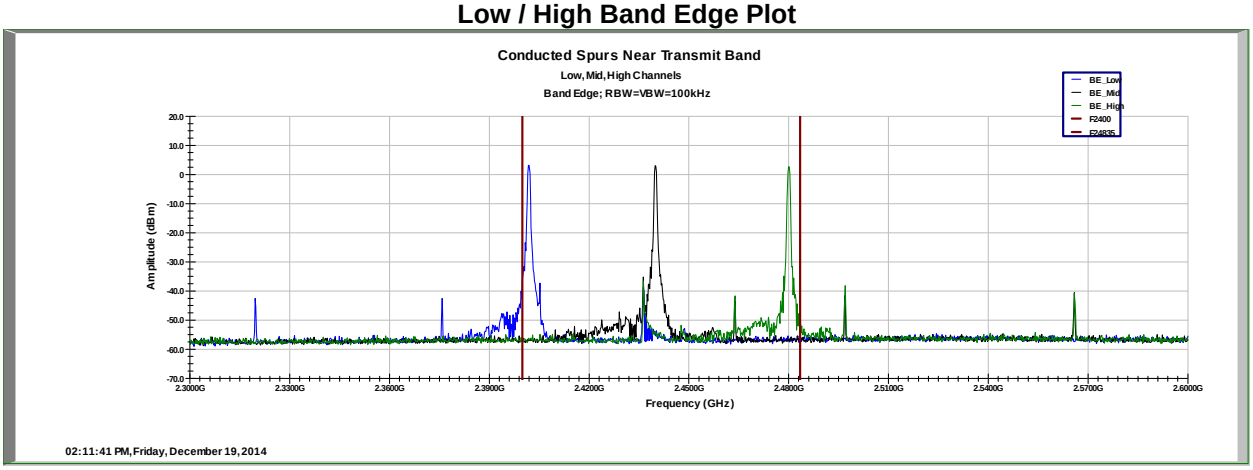
6.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	8/22/2014	8/22/2015

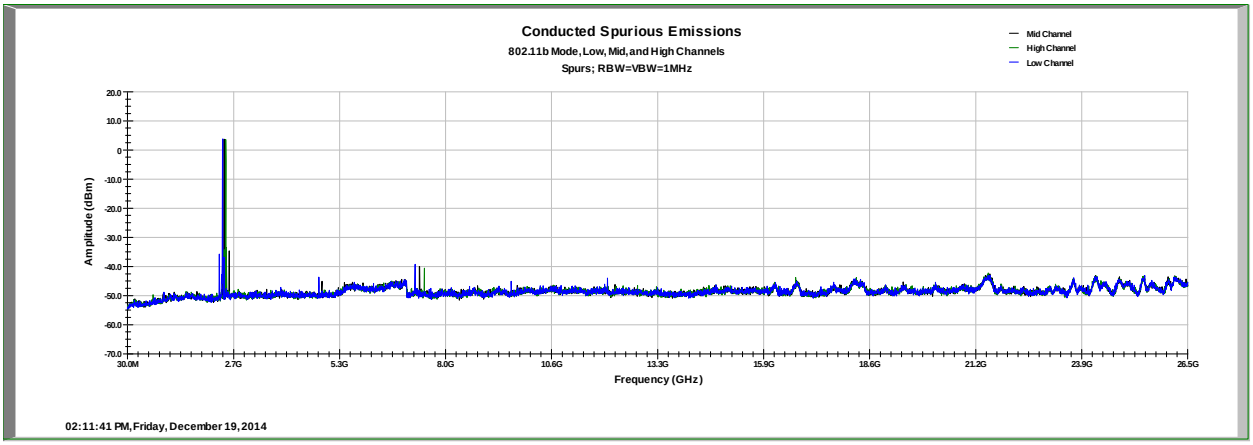
6.4 Results:

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

Low / High Band Edge Plot



Conducted Spurious Emissions, Low, Mid, and High Channel



7 Power Spectral Density

7.1 Test Limits

§ 15.247(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.

7.2 Test Procedure

ANSI C63.10: 2013 and KDB Publication No. 558074 D01 v03r03: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

7.3 Test Equipment Used:

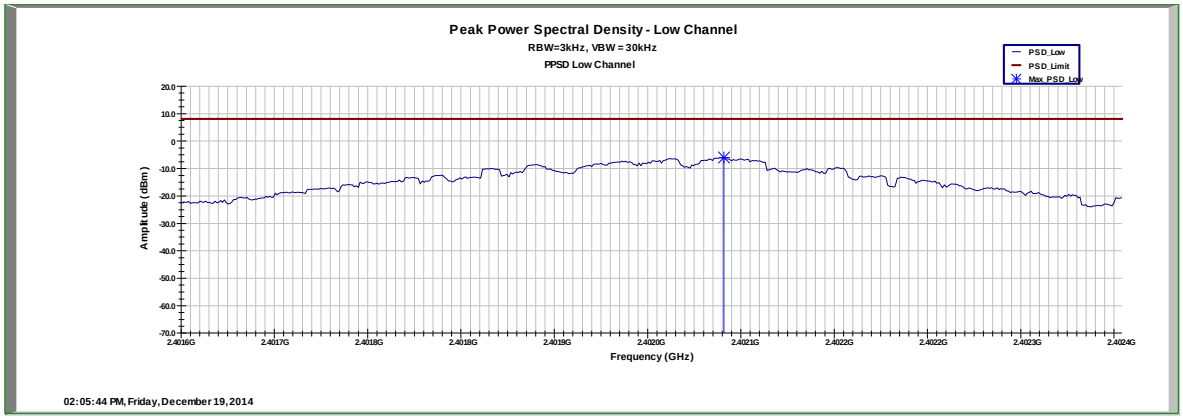
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	8/22/2014	8/22/2015

7.4 Results:

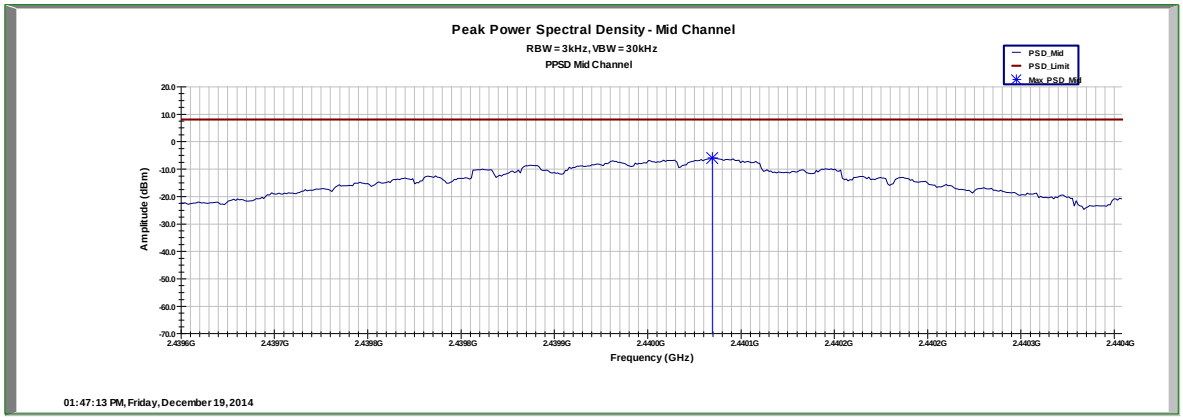
*PSD Option 1 Method

Mode	Channel Number	Frequency (MHz)	PSD in 3kHz BW (dBm)	Limit (dBm)	Result
ANT+	0	2402	-6.04	8.0	Pass
ANT+	19	2440	-5.99	8.0	Pass
ANT+	39	2480	-6.10	8.0	Pass

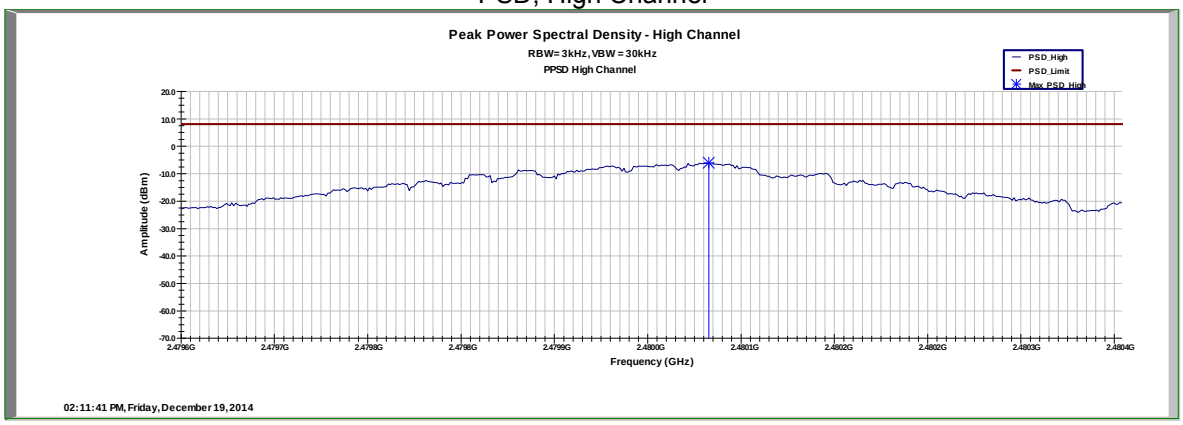
PSD Low Channel



PSD Middle Channel



PSD, High Channel



8 Radiated Spurious Emissions (Transmitter)

8.1 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

8.2 Test Procedure

ANSI C63.10: 2013 and KDB Publication No. 558074 D01 v03r03: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

8.3 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

8.4 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	1302.6005.40	Rohde & Schwarz	ESU40	9/11/2013	9/11/2014
Bilog Antenna	00051864	ETS	3142C	12/17/2013	12/17/2014
Horn Antenna	00154521	ETS	3117	10/10/2013	10/10/2014
Horn Antenna (18 – 26.5GHz)	LM8621	ETS	3160-09	10/9/2013	10/9/2014
Preamplifier	122005	Rohde&Schwarz	TS-PR18	9/19/2013	9/19/2014
Preamplifier	100050	Rohde&Schwarz	TS-PR26	9/19/2013	9/19/2014
System Controller	3957	Sunol Sciences	SC110V	Time of Use	Time of Use

8.5 Results:

The radiated spurious testing was conducted up to 10 times the fundamental frequency. 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). The spurious emissions listed in the following tables are the worst case emissions. Emissions not reported were at or below the measurement noise floor. The test sample was evaluated on three orthogonal axes since it could be used in any orientation.

Worst Case Spurious Emissions (Low Channel)

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2402.040000	---	91.86	---	---	1000.000	404.0	V	168.0	37.8
2402.040000	91.55	---	---	---	1000.000	404.0	V	168.0	37.8
2401.990000	96.07	---	---	---	1000.000	204.0	H	0.0	37.8
2401.990000	---	96.47	---	---	1000.000	204.0	H	0.0	37.8
2372.200000	51.60	---	54.00	-2.40	1000.000	204.0	V	0.0	37.7
2372.200000	---	61.93	74.00	-12.07	1000.000	204.0	V	0.0	37.7
2392.800000	---	60.10	74.00	-13.90	1000.000	410.0	V	328.0	37.7
2392.800000	51.21	---	54.00	-2.79	1000.000	410.0	V	328.0	37.7

Transmitting on 2402MHz, Fundamental and Low Band Edge

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4804.000000	---	45.76	74.00	-28.24	1000.000	338.0	H	125.0	7.5
4804.000000	40.59	---	54.00	-13.41	1000.000	338.0	H	125.0	7.5
7205.800000	51.89	---	54.00	-2.10	1000.000	231.0	H	215.0	10.4
7205.800000	---	55.55	74.00	-18.45	1000.000	231.0	H	215.0	10.4
7206.000000	52.49	---	54.00	-1.50	1000.000	230.0	H	220.0	10.4
7206.000000	---	55.38	74.00	-18.62	1000.000	230.0	H	220.0	10.4
9608.400000	34.26	---	54.00	-19.73	1000.000	408.0	V	282.0	13.6
9608.400000	---	43.49	74.00	-30.51	1000.000	408.0	V	282.0	13.6
12010.800000	---	47.67	74.00	-26.33	1000.000	365.0	V	123.0	17.4
12010.800000	40.49	---	54.00	-13.50	1000.000	365.0	V	123.0	17.4
14421.600000	---	45.06	74.00	-28.94	1000.000	327.0	V	238.0	16.9
14421.600000	36.56	---	54.00	-17.42	1000.000	327.0	V	238.0	16.9
16811.200000	41.46	---	54.00	-12.52	1000.000	298.0	H	322.0	21.5
16811.200000	---	50.35	74.00	-23.65	1000.000	298.0	H	322.0	21.5

Transmitting on 2402MHz

Worst Case Spurious Emissions (Middle Channel)

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2440.010000	---	95.78	---	---	1000.000	265.0	H	8.0	37.8
2440.010000	---	95.98	---	---	1000.000	405.0	V	125.0	37.8
2440.010000	95.39	---	---	---	1000.000	265.0	H	8.0	37.8
2440.010000	95.59	---	---	---	1000.000	405.0	V	125.0	37.8

Transmitting on 2440MHz, Fundamental Measurements

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4880.000000	37.65	---	54.00	-16.35	1000.000	355.0	H	129.0	7.4
4880.000000	---	42.49	74.00	-31.51	1000.000	355.0	H	129.0	7.4
7319.800000	50.74	---	54.00	-3.26	1000.000	401.0	V	312.0	10.5
7319.800000	---	54.93	74.00	-19.07	1000.000	401.0	V	312.0	10.5
7320.000000	---	55.37	74.00	-18.63	1000.000	330.0	V	314.0	10.5
7320.000000	51.84	---	54.00	-2.16	1000.000	330.0	V	314.0	10.5
9760.400000	---	43.63	74.00	-30.37	1000.000	403.0	H	256.0	13.7
9760.400000	34.43	---	54.00	-19.57	1000.000	403.0	H	256.0	13.7
12199.200000	37.91	---	54.00	-16.09	1000.000	410.0	H	141.0	17.2
12199.200000	---	47.99	74.00	-26.01	1000.000	410.0	H	141.0	17.2
12200.800000	37.30	---	54.00	-16.70	1000.000	408.0	H	152.0	17.2
12200.800000	---	46.36	74.00	-27.64	1000.000	408.0	H	152.0	17.2
14636.400000	36.62	---	54.00	-17.38	1000.000	211.0	H	189.0	17.3
14636.400000	---	45.61	74.00	-28.39	1000.000	211.0	H	189.0	17.3
14638.800000	36.25	---	54.00	-17.75	1000.000	262.0	H	218.0	17.3
14638.800000	---	44.92	74.00	-29.08	1000.000	262.0	H	218.0	17.3
17072.000000	40.24	---	54.00	-13.76	1000.000	386.0	H	308.0	21.3
17072.000000	---	49.82	74.00	-24.18	1000.000	386.0	H	308.0	21.3
17073.600000	---	48.53	74.00	-25.47	1000.000	410.0	V	162.0	21.3
17073.600000	40.38	---	54.00	-13.62	1000.000	410.0	V	162.0	21.3

Transmitting on 2440MHz

Worst Case Spurious Emissions (High Channel)

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.995000	91.83	---	---	---	1000.000	404.0	V	158.0	37.8
2479.995000	---	92.26	---	---	1000.000	404.0	V	158.0	37.8
2480.000000	95.85	---	---	---	1000.000	210.0	H	344.0	37.8
2480.000000	---	96.24	114.00	---	1000.000	210.0	H	344.0	37.8
2483.500000	---	63.69	74.00	-10.31	1000.000	404.0	V	160.0	37.8
2483.500000	52.62	---	54.00	-1.38	1000.000	404.0	V	160.0	37.8
2492.800000	52.71	---	54.00	-1.29	1000.000	118.0	H	-10.0	37.8
2492.800000	---	63.40	74.00	-10.60	1000.000	118.0	H	-10.0	37.8
2493.170000	---	64.20	74.00	-9.80	1000.000	118.0	H	-10.0	37.8
2493.170000	52.83	---	54.00	-1.17	1000.000	118.0	H	-10.0	37.8

Transmitting on 2480MHz, Fundamental and High Band Edge

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4960.000000	38.12	---	54.00	-15.88	1000.000	327.0	V	314.0	7.2
4960.000000	---	43.69	74.00	-30.31	1000.000	327.0	V	314.0	7.2
7439.800000	---	53.90	74.00	-20.10	1000.000	98.0	H	336.0	10.9
7439.800000	50.00	---	54.00	-4.00	1000.000	98.0	H	336.0	10.9
7440.000000	42.61	---	54.00	-11.39	1000.000	222.0	H	131.0	10.9
7440.000000	---	48.00	74.00	-26.00	1000.000	222.0	H	131.0	10.9
9919.200000	34.95	---	54.00	-19.05	1000.000	372.0	V	164.0	14.0
9919.200000	---	44.08	74.00	-29.92	1000.000	372.0	V	164.0	14.0
12399.200000	37.61	---	54.00	-16.39	1000.000	286.0	H	259.0	16.9
12399.200000	---	46.21	74.00	-27.79	1000.000	286.0	H	259.0	16.9
14881.200000	---	47.21	74.00	-26.79	1000.000	359.0	H	228.0	18.2
14881.200000	38.15	---	54.00	-15.85	1000.000	359.0	H	228.0	18.2
17356.800000	---	48.71	74.00	-25.29	1000.000	286.0	H	318.0	20.6
17356.800000	40.18	---	54.00	-13.82	1000.000	286.0	H	318.0	20.6

Transmitting on 2480MHz

9 Radiated Spurious Emissions (Receiver)

9.1 Test Limits

§ 15.109: Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/meter)	Field strength (dBuV/m)
30–88	100	40
88–216	150	43.5
216–960	200	46
Above 960	500	54

These limits are identical to those in RSS-GEN

9.2 Test Procedure

ANSI C63.10: 2013

9.3 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

9.4 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	1302.6005.40	Rohde & Schwarz	ESU40	9/11/2013	9/11/2014
Bilog Antenna	00051864	ETS	3142C	12/17/2013	12/17/2014
Horn Antenna	00154521	ETS	3117	10/10/2013	10/10/2014
Preamplifier	122005	Rohde&Schwarz	TS-PR18	9/19/2013	9/19/2014
System Controller	3957	Sunol Sciences	SC110V	Time of Use	Time of Use

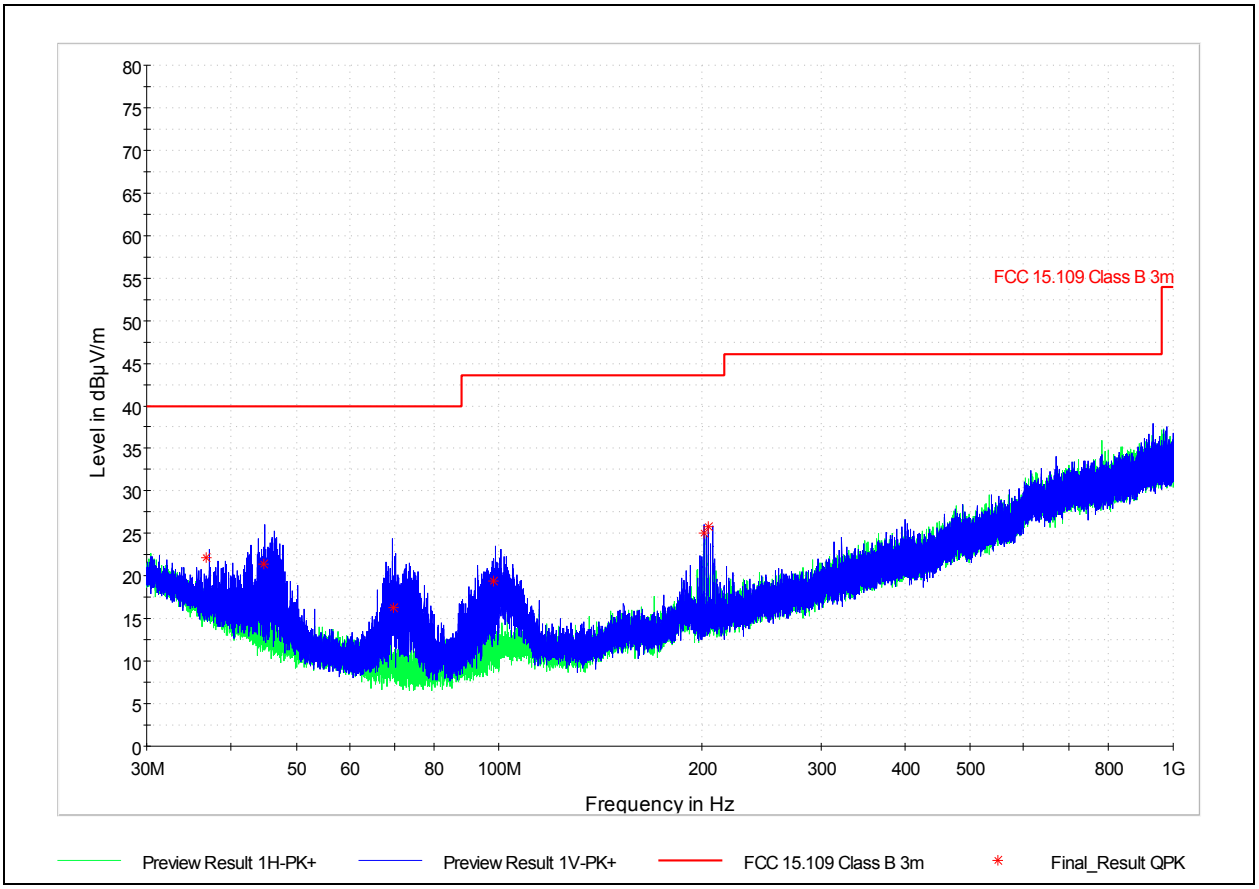
9.5 Results:

All spurious emissions with the test sample in receive mode were below the limits specified in Part 15.109 for a class B digital device and RSS-GEN Section 6.1.

9.6 Test Data (Bilog):

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.716000	22.22	40.00	-17.78	120.000	127.8	V	0.0	15.1
44.684000	21.43	40.00	-18.57	120.000	115.1	V	10.0	11.9
69.688000	16.33	40.00	-23.67	120.000	114.4	V	18.0	8.1
98.213000	19.42	43.52	-24.10	120.000	119.9	V	18.0	10.5
201.240000	25.04	43.52	-18.48	120.000	120.2	V	212.0	13.4
204.120000	25.80	43.52	-17.72	120.000	119.9	V	222.0	13.7

Deviations, Additions, or Exclusions: None

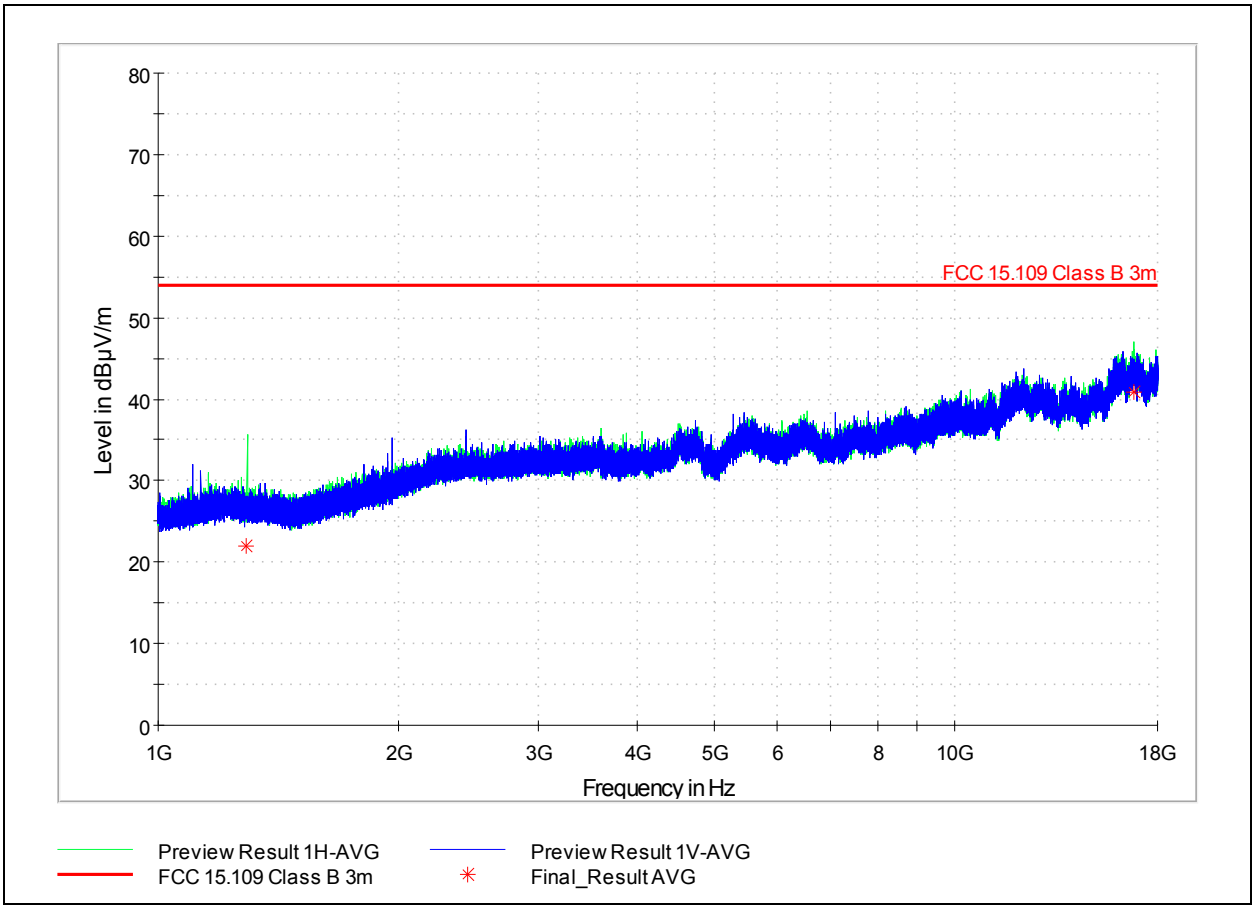


Bilog Prescan

9.7 Test Data (Horn):

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1289.400000	22.05	---	54.00	-31.95	1000.000	410.0	H	332.0	-1.2
1289.400000	---	31.94	---	---	1000.000	410.0	H	332.0	-1.2
16843.200000	40.84	---	53.98	-13.14	1000.000	403.0	H	271.0	21.6
16843.200000	---	49.03	---	---	1000.000	403.0	H	271.0	21.6

Deviations, Additions, or Exclusions: None



Horn Prescan

10 Antenna Requirement per FCC Part 15.203

10.1 Test Limits

§ 15.203: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

10.2 Results:

The sample tested met the antenna requirement. The antenna was permanently attached to the PCB.

11 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	

12 Revision History

Revision Level	Date	Report Number	Notes
0	3/10/15	101941214LEX-003	Original Issue