EMC
TEST REPORT

Report No. : **TS13060019-EME**
Model No. : **T647**
Issued Date : **Jul. 22, 2013**

Applicant:	**Kobo Inc.** **135 Liberty Street, Suite 101 Toronto, Ontario, M6K1A7** **Canada**
Test Method/ Standard:	**FCC Part 15 Subpart C Section §15.205、§15.207、§15.209、§15.247, and ANSI C63.4/2003.**
Test By:	**Intertek Testing Services Taiwan Ltd.** **No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,** **Shiang-Shan District, Hsinchu City, Taiwan**

Testing Laboratory
0597

The test report was prepared by:

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These measurements were taken by:

Arthur Tsai/ Engineer

The test report was reviewed by:

Name Jimmy Yang
Title Engineer

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1. Summary of Test Data

Test/Requirement Description	Applicable Rule	Result
Minimum 6 dB Bandwidth	15.247(a)(2)	Pass
Maximum Output Power	15.247(b)	Pass
Power Spectral Density	15.247(e)	Pass
RF Antenna Conducted Spurious	15.247(d)	Pass
Radiated Spurious Emission	15.247(d), 15.205, 15.209	Pass
Emission on the Band Edge	15.247(d)	Pass
AC Power Line Conducted Emission	15.207	Pass

2. General Information

Identification of the EUT

Product:	Tablet
Model No.:	T647
FCC ID.:	ZJLKOBOT647
Frequency Range:	2412MHz ~ 2462MHz
Channel Number:	11 channels
Access scheme:	DSSS, OFDM
Rated Power:	1. DC 3.7 V from battery 2. DC 5.35 V from adapter
Power Cord:	N/A
Sample Received:	Jun. 03, 2013
Test Date(s):	Jun.28, 2013 ~ Jul. 18, 2013
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

Description of EUT

The EUT is a Tablet (WiFi), and was defined as information technology equipment.

For more detail features, please refer to User's manual as file name “Installation guide.pdf”

Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain	: 1.79 dBi max
Antenna Type	: Chip antenna
Connector Type	: N/A

Adapter information

The EUT will be supplied with a power supply from below list:

No.	Brand	Model no.	Specification
Adapter	Kobo	PSAI10R-050Q	I/P: 100-240Vac, 50-60Hz, 0.3A O/P: 5.35 Vdc, 2.0 A

Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Data cable
Notebook PC	DELL	ECL089	E5420	USB shielded cable 1 meter × 1

Operation mode

The EUT is supplied with DC 3.7 V from battery for all test items except for conducted emission test.

The EUT is supplied with DC 5.35 V from adapter (Test voltage: 120VAC, 60Hz) for conducted emission test.

The EUT executes test by “MS-DOS” and key-in commands provided by Wistron.

With individual verifying, the maximum output power was found at 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode and 6.5 Mbps data rate for 802.11n HT20 mod. The final tests were executed under these conditions and recorded in this report individually.

802.11b ch6 chain0

Data rate (Mbps)	PK (dBm)	AV (dBm)
1	19.65	16.43
2	19.51	16.31
5.5	19.44	16.22
11	19.23	16.04

802.11g ch6 chain0

Data rate (Mbps)	PK (dBm)	AV (dBm)
6	21.89	14.55
9	21.77	14.42
12	21.61	14.31
18	21.55	14.26
24	21.42	14.15
36	21.31	14.05
48	21.22	13.93
54	21.12	13.78

802.11n HT20 ch6 chain0

Data rate (Mbps)	PK (dBm)	AV (dBm)
6.5	21.03	13.6
13	20.91	13.44
19.5	20.83	13.36
26	20.71	13.24
39	20.64	13.14
52	20.51	13.02
58.5	20.44	12.94
65	20.31	12.84

3. Maximum 6 dB Bandwidth

Name of Test	Maximum 6 dB Bandwidth
Base Standard	FCC 15.247 (a)(2)

Test Result: Complies

Measurement Data: See Table 1 & plots below

Method of Measurement:

Reference FCC document: KDB558074

A portion of the transmitted signal is coupled to a Spectrum Analyzer with a resolution bandwidth of at least 1 % of the bandwidth of the transmitted signal. The resolution bandwidth is chosen so as not to reduce the peak level of the measured waveform. The appropriate bandwidth mask is applied to the output waveform to verify compliance.

Test Diagram:

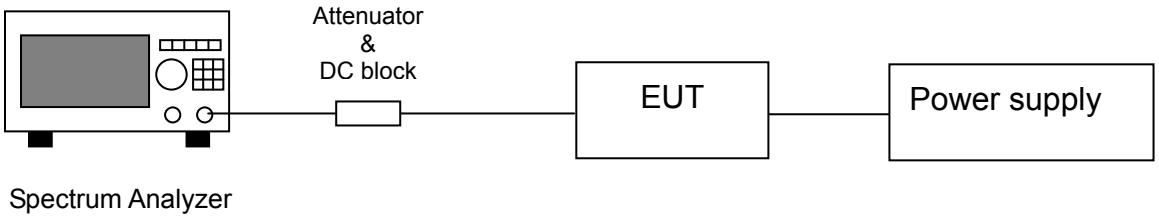
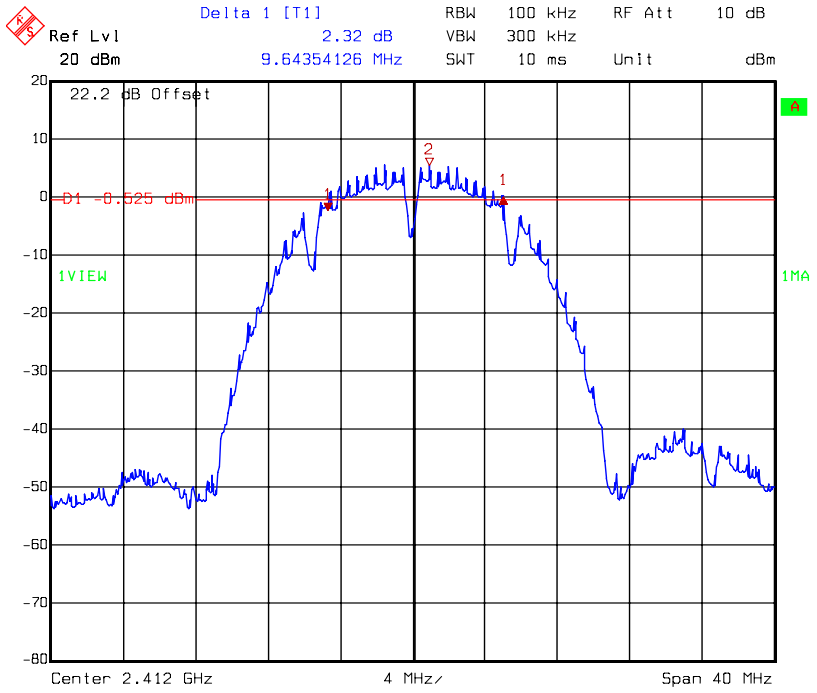


Table1. Maximum 6 dB Bandwidth

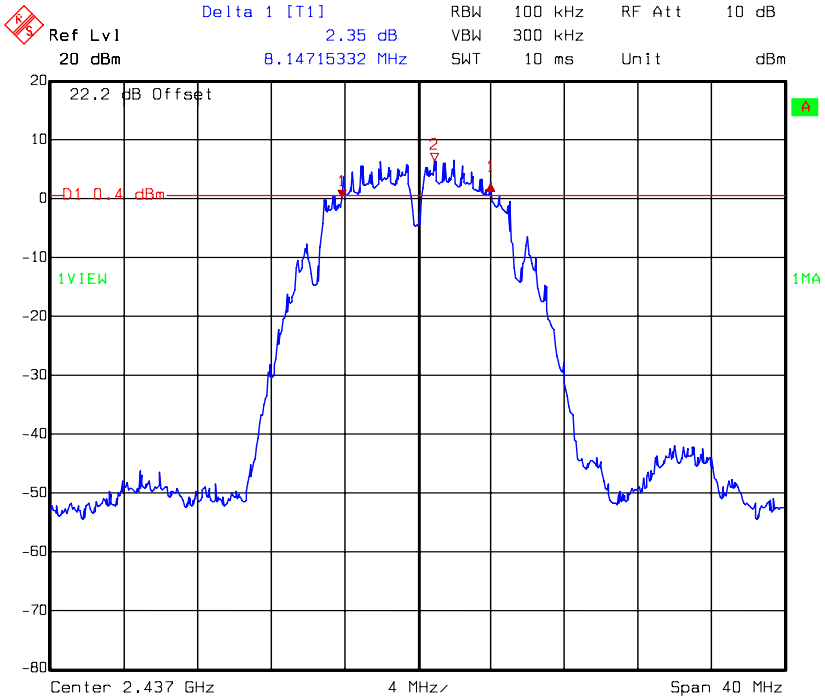
Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Min. Limit (MHz)	Pass/Fail
802.11b	1	2412	9.64	0.5	Pass
	6	2437	8.14	0.5	Pass
	11	2462	9.10	0.5	Pass
802.11g	1	2412	16.45	0.5	Pass
	6	2437	16.44	0.5	Pass
	11	2462	16.45	0.5	Pass
802.11n HT20	1	2412	17.708	0.5	Pass
	6	2437	17.714	0.5	Pass
	11	2462	17.695	0.5	Pass

6 dB Bandwidth @ 802.11b mode channel 1



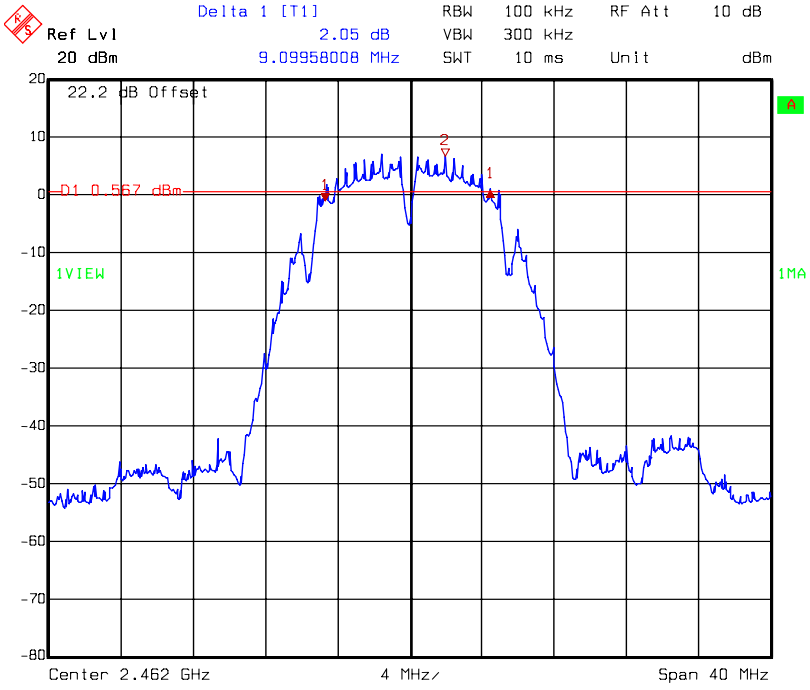
Title: 6dB Occupied Bandwidth (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch01_2412
Date: 05.JUL.2013 16:37:19

6 dB Bandwidth @ 802.11b mode channel 6



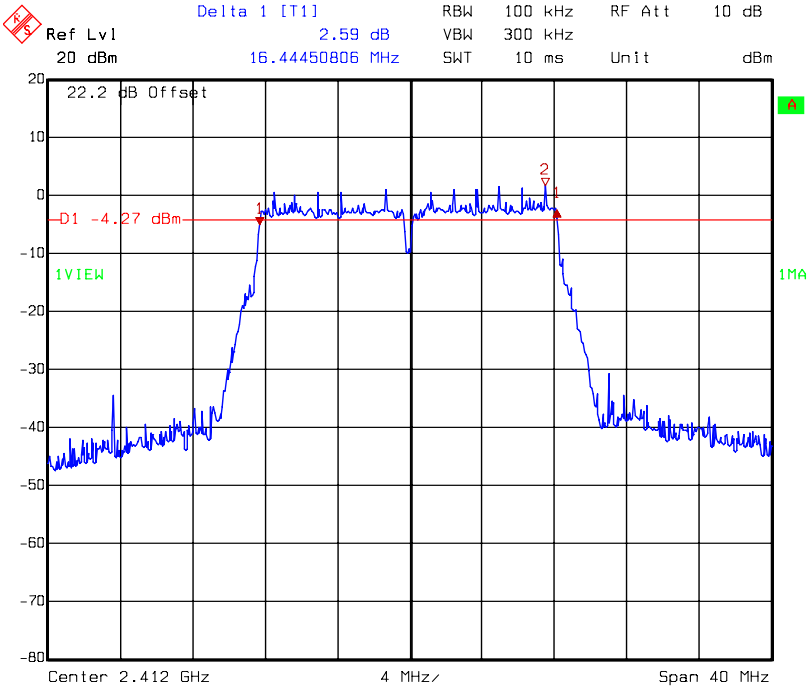
Title: 6dB Occupied Bandwidth (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch06_2437
Date: 05.JUL.2013 16:39:24

6 dB Bandwidth @ 802.11b mode channel 11



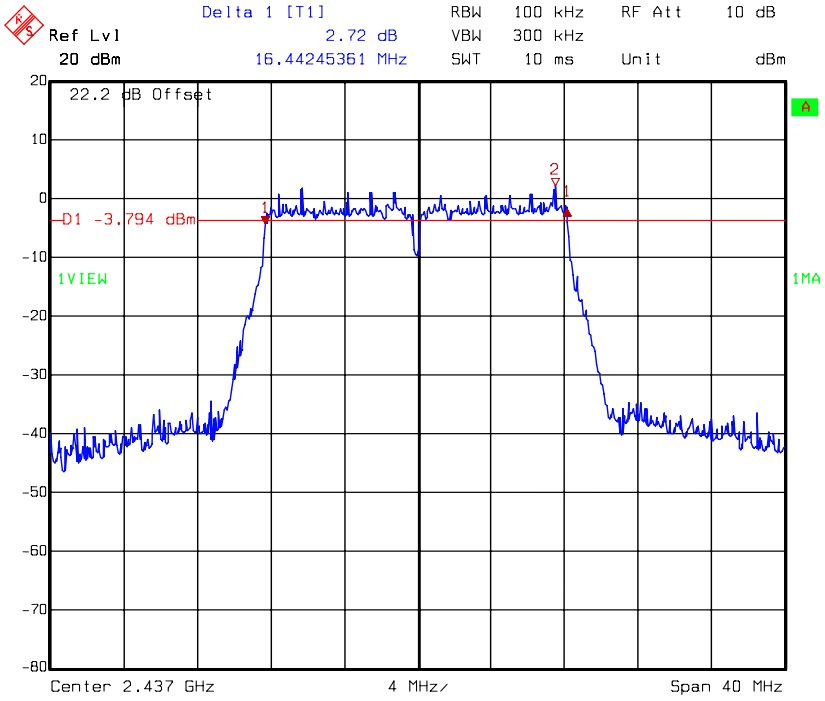
Title: 6dB Occupied Bandwidth (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch11_2462
Date: 05.JUL.2013 16:41:26

6 dB Bandwidth @ 802.11g mode channel 1



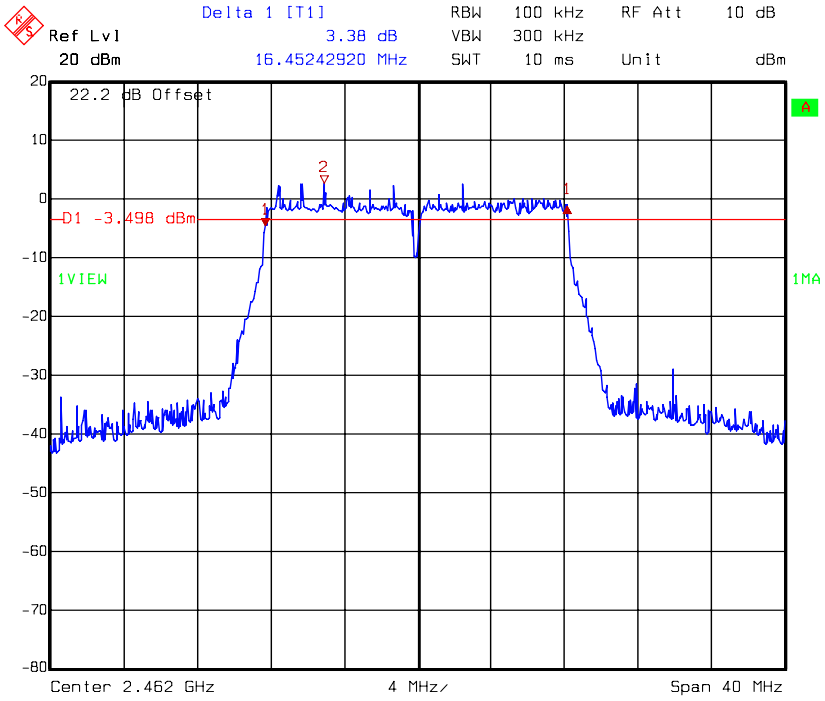
Title: 6dB Occupied Bandwidth (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch01_2412
Date: 05.JUL.2013 16:45:47

6 dB Bandwidth @ 802.11g mode channel 6



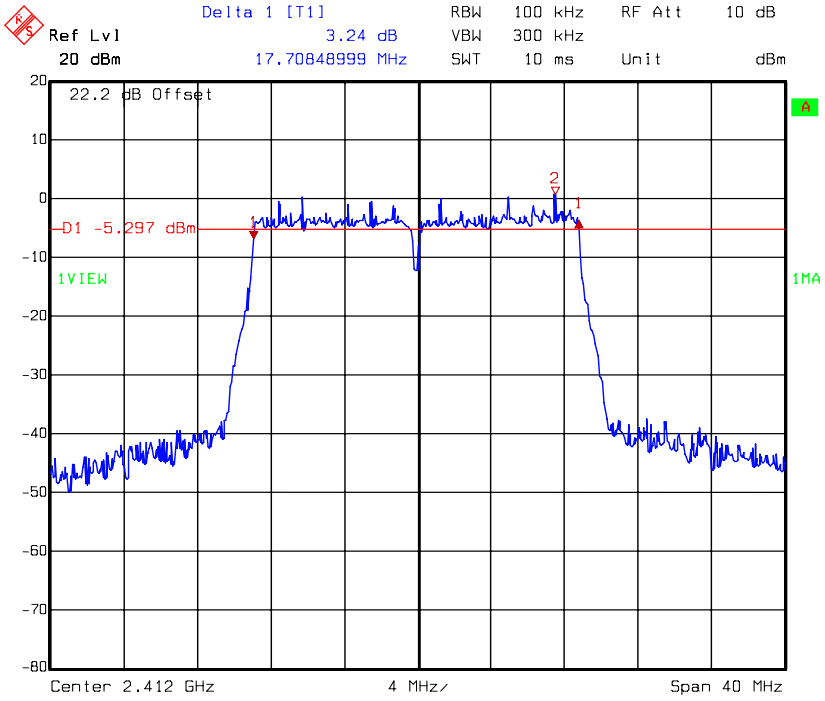
Title: 6dB Occupied Bandwidth (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch06_2437
Date: 05.JUL.2013 16:48:21

6 dB Bandwidth @ 802.11g mode channel 11



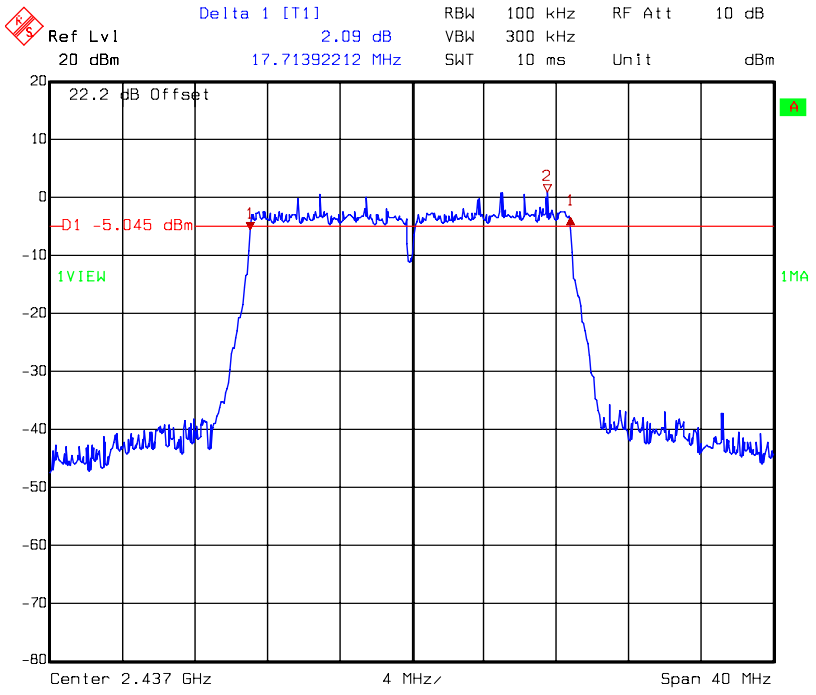
Title: 6dB Occupied Bandwidth (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch11_2462
Date: 05.JUL.2013 16:50:29

6 dB Bandwidth @ 802.11n HT20 mode channel 1



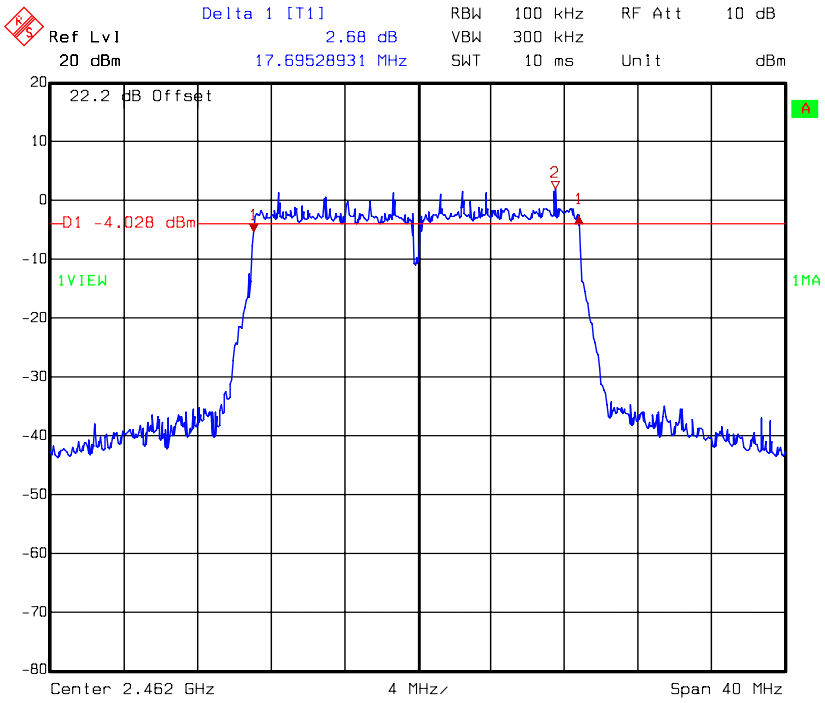
Title: 6dB Occupied Bandwidth (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch01_2412
Date: 05.JUL.2013 16:53:36

6 dB Bandwidth @ 802.11n HT20 mode channel 6



Title: 6dB Occupied Bandwidth (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch06_2437
Date: 05.JUL.2013 16:55:48

6 dB Bandwidth @ 802.11n HT20 mode channel 11



Title: 6dB Occupied Bandwidth (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch11_2462
Date: 05.JUL.2013 16:57:54

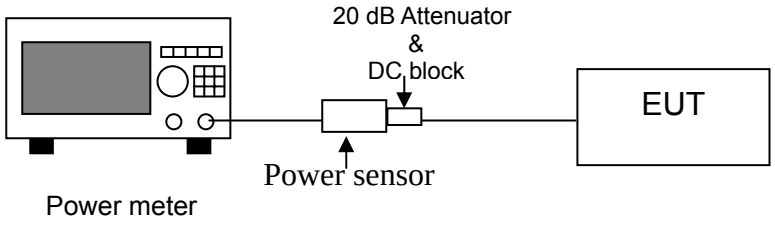
4. Maximum Output Power

Name of Test	Maximum output power
Base Standard	FCC 15.247(b)

Measurement Uncertainty: ±0.392 dB (k=2)
Test Result: Complies
Measurement Data: See Table below

Method of Measurement:
Reference FCC document: KDB558074
The power output was measured on the EUT using a 50 ohm SMA Cable connected to peak power meter via power sensor. Connect 20 dB attenuator and DC block at the input port of the power sensor. Measure conducted transmit power of at each antenna port ,besides another ports were terminated by 50 ohm and sum these power in linear power units,Power output was measured with the maximum rated input level.

Test Diagram:



Note 1: §15.247 (b) (4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note 2: §15.247 (b) (4) (ii) Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Table 3. Maximum output power

Mode	Channel	Frequency (MHz)	Conducted Peak Output Power		Limit	Margin
			(dBm)	(mW)	(dBm)	(dB)
802.11b	1	2412	17.87	61.24	30	-12.13
	6	2437	19.65	92.26	30	-10.35
	11	2462	19.82	95.94	30	-10.18
802.11g	1	2412	21.68	147.23	30	-8.32
	6	2437	21.89	154.53	30	-8.11
	11	2462	20.44	110.66	30	-9.56
802.11n HT20	1	2412	20.69	117.22	30	-9.31
	6	2437	21.03	126.77	30	-8.97
	11	2462	21.28	134.28	30	-8.72

5. Power Spectral Density

Name of Test	Power Spectral Density
Base Standard	FCC 15.247(e)

Test Result: Complies

Measurement Data: See Table & plots below

Method of Measurement:

Reference FCC document: KDB558074

The power spectrum density was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer. Locate and zoom in on emission peak(s) within the passband. Set RBW = 3 kHz, VBW >RBW, sweep= 500s. The peak level measured must be no greater than + 8 dBm. Power spectrum density was read directly and cable loss (1 dB)/external attenuator (20 dB) correction was added to the reading to obtain power at the EUT antenna terminals.

Test Diagram:

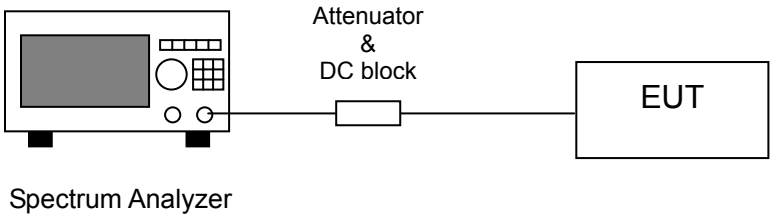
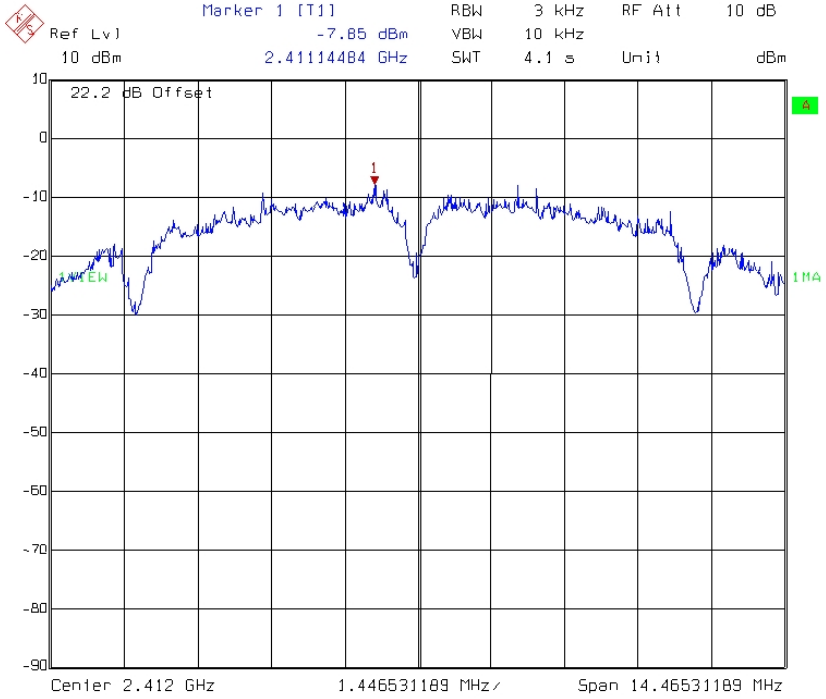


Table 4. Power Spectral Density

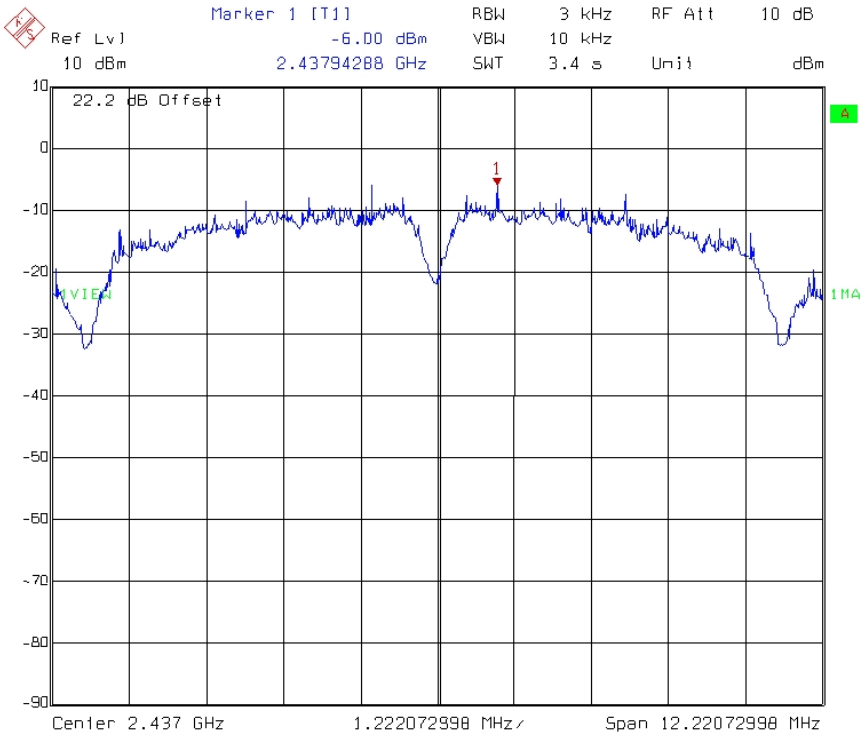
Mode	Channel	Frequency (MHz)	Power spectrum density (dBm)	Limit (dBm)
802.11b	1	2412	-7.85	8
	6	2437	-6.004	8
	11	2462	-7.083	8
802.11g	1	2412	-12.809	8
	6	2437	-13.266	8
	11	2462	-12.538	8
802.11n HT20	1	2412	-14.141	8
	6	2437	-13.046	8
	11	2462	-12.859	8

Power Spectral Density @ 802.11b mode channel 1



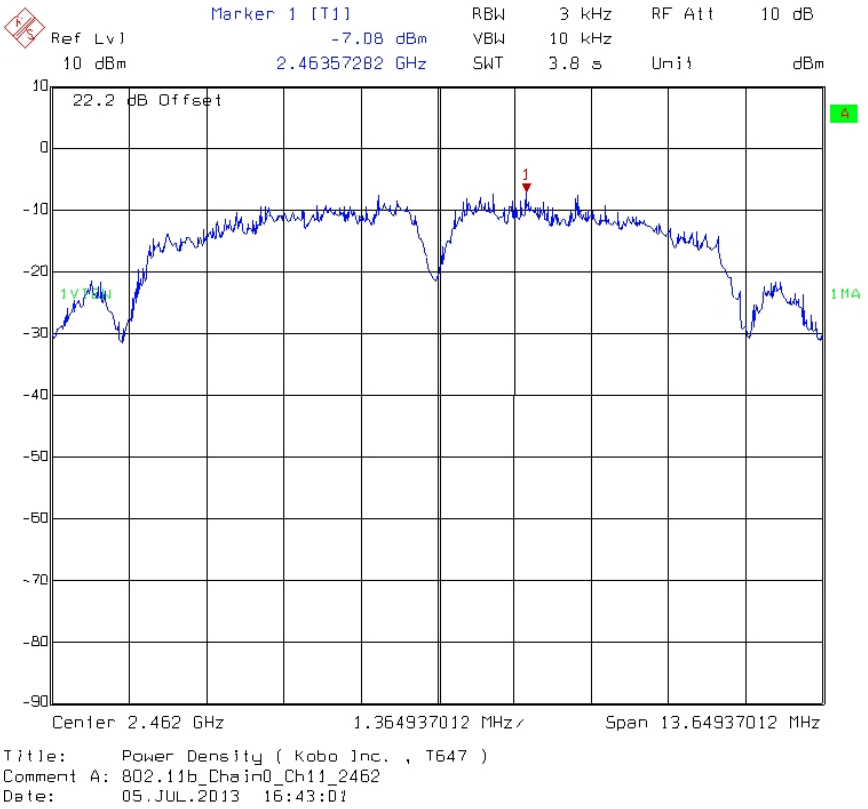
Title: Power Density (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch01_2412
Date: 05.JUL.2013 16:38:54

Power Spectral Density @ 802.11b mode channel 6



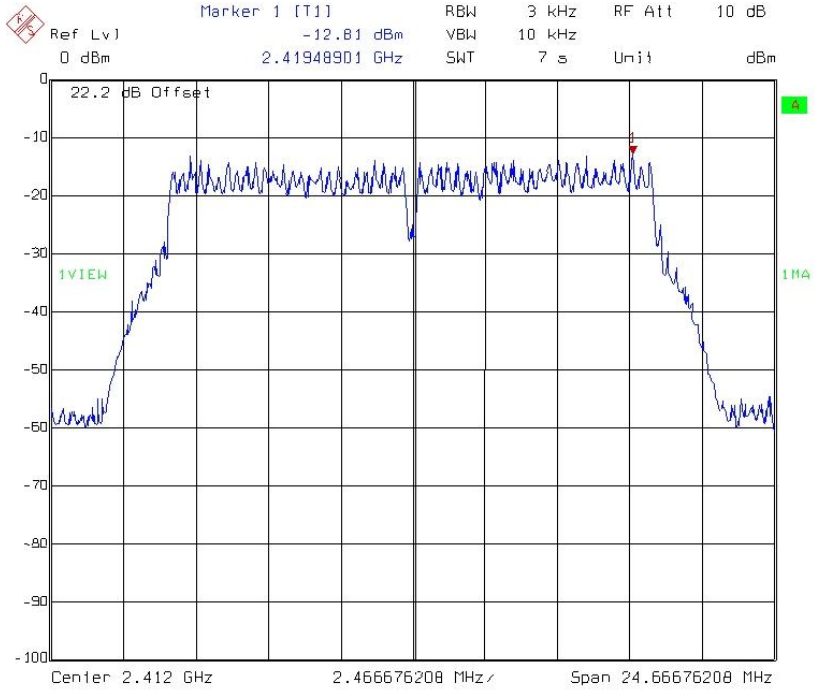
Title: Power Density (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch06_2437
Date: 05.JUL.2013 16:40:59

Power Spectral Density @ 802.11b mode channel 11



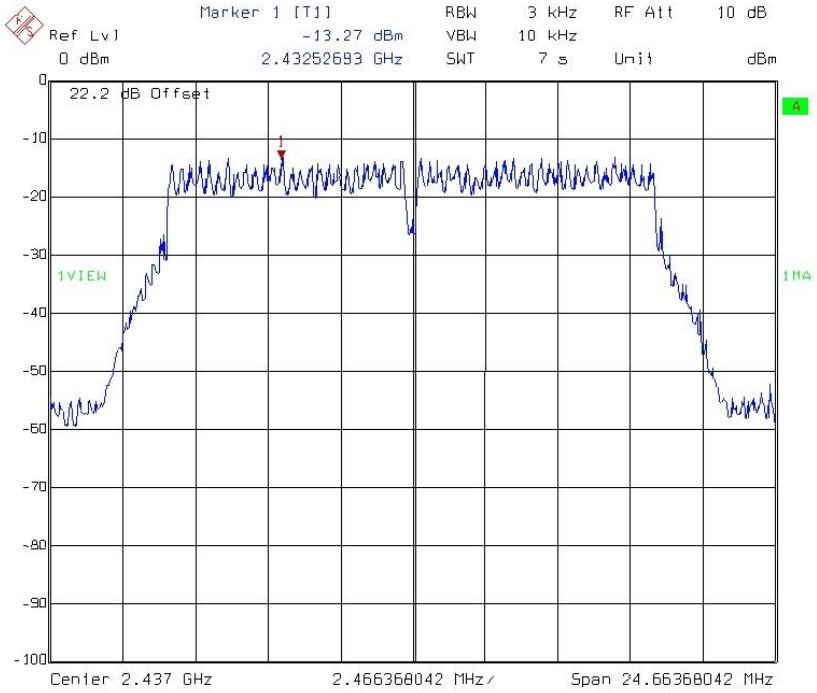
Title: Power Density (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch11_2462
Date: 05.JUL.2013 16:43:01

Power Spectral Density @ 802.11g mode channel 1



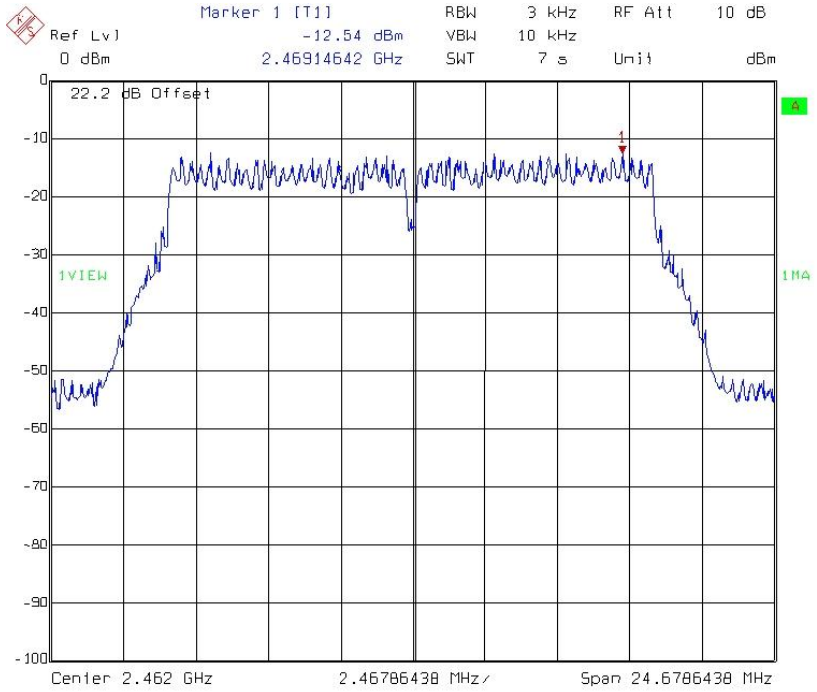
Title: Power Density (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch01_2412
Date: 05.JUL.2013 16:47:22

Power Spectral Density @ 802.11g mode channel 6



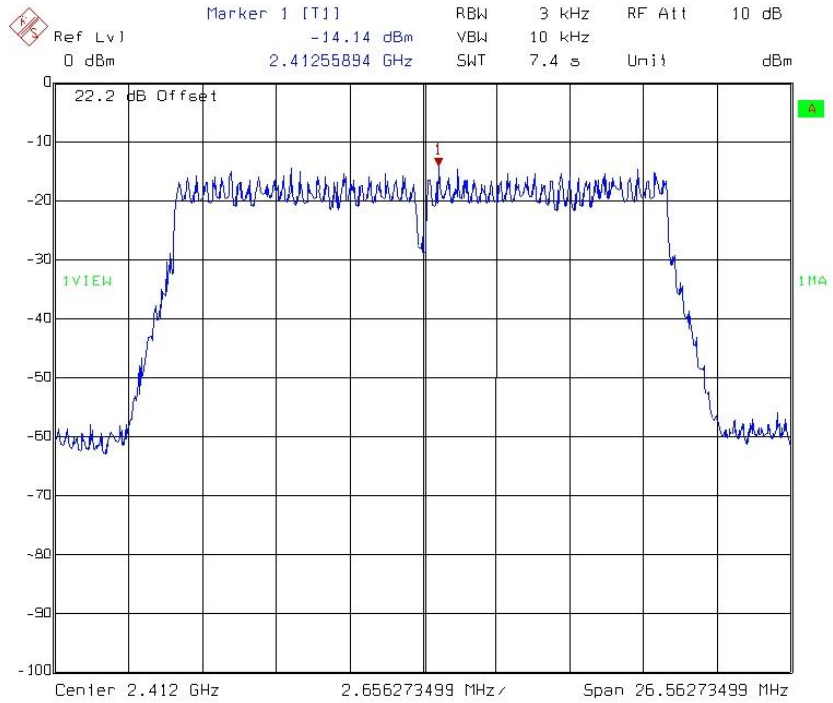
Title: Power Density (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch06_2437
Date: 05.JUL.2013 16:49:56

Power Spectral Density @ 802.11g mode channel 11



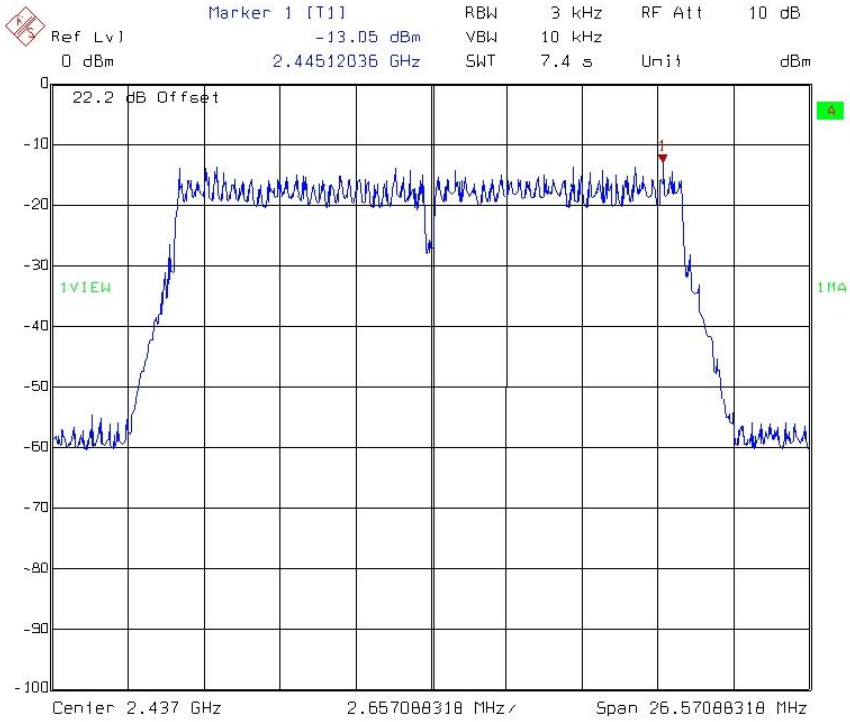
Title: Power Density (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch11_2462
Date: 05.JUL.2013 16:52:03

Power Spectral Density @ 802.11n HT20 mode channel 1



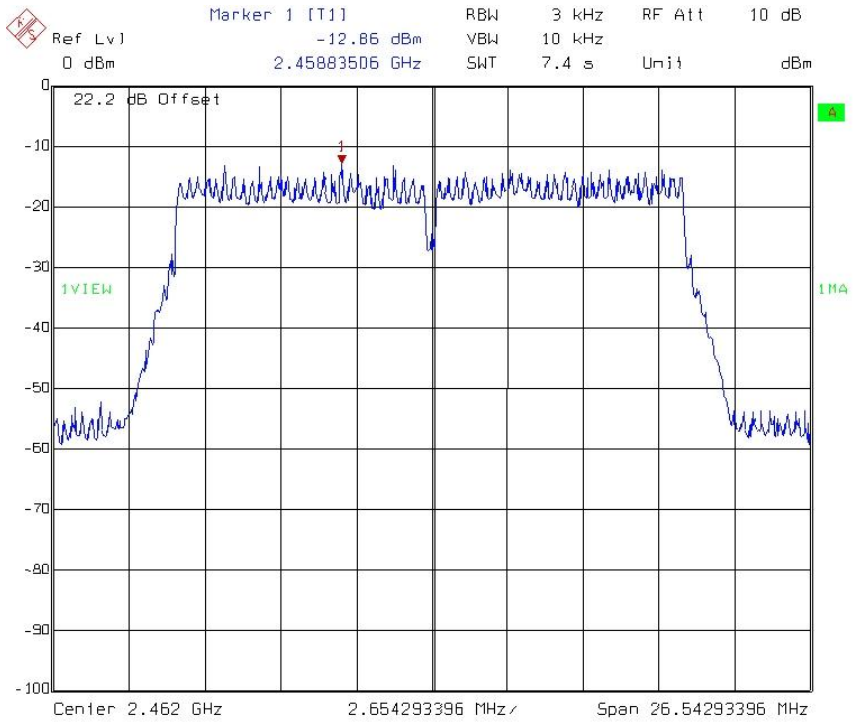
Title: Power Density (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch01_2412
Date: 05.JUL.2013 16:55:17

Power Spectral Density @ 802.11n HT20 mode channel 6



Title: Power Density (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch06_2437
Date: 05.JUL.2013 16:57:22

Power Spectral Density @ 802.11n HT20 mode channel 11



6. RF Antenna conducted Spurious

Name of Test	RF Antenna Conducted Spurious
Base Standard	FCC 15.247(d)

Test Result: Complies

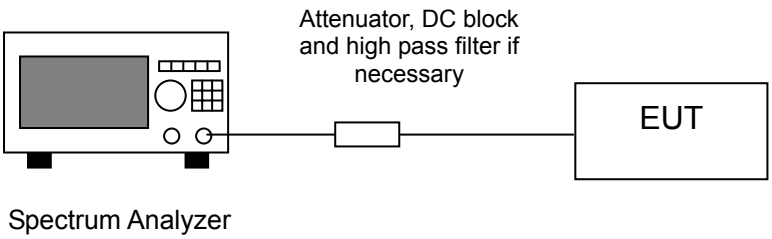
Measurement Data: See plots below

Method of Measurement:

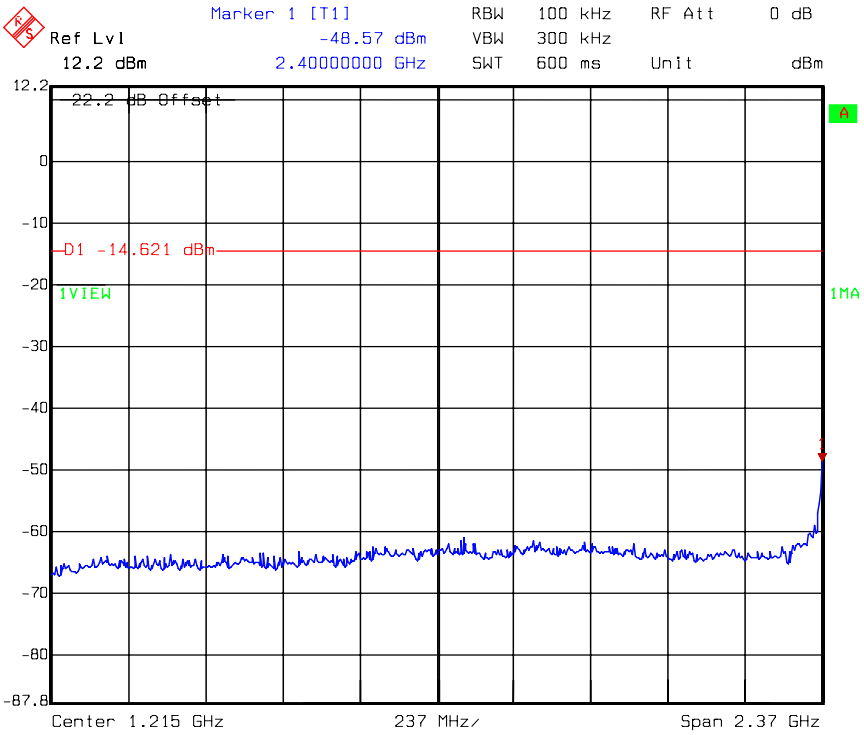
Reference FCC document: KDB558074

The measurements were performed from 30 MHz to 25 GHz RF antenna conducted per FCC 15.247 (d) was measured from the EUT antenna port using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz. Harmonics and spurious noise must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

Test Diagram:

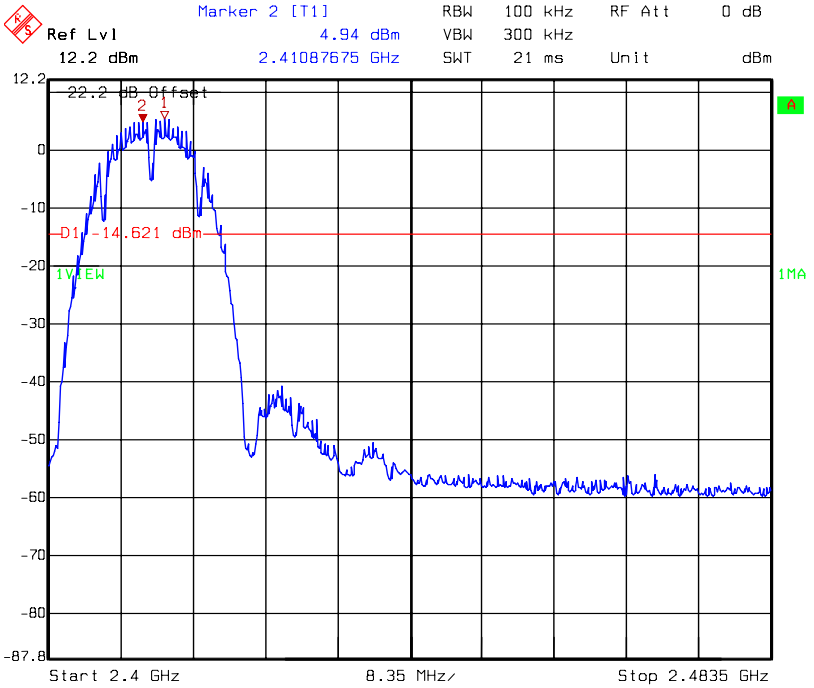


conducted spurious @ 802.11b mode channel 1 (1 of 3)



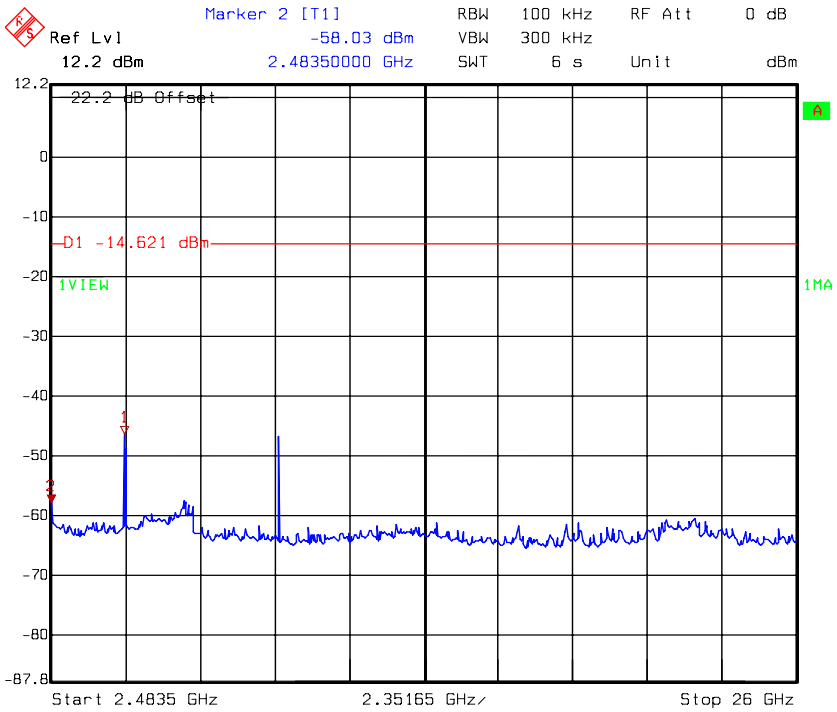
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch01_2412
Date: 05.JUL.2013 16:38:03

conducted spurious @ 802.11b mode channel 1 (2 of 3)



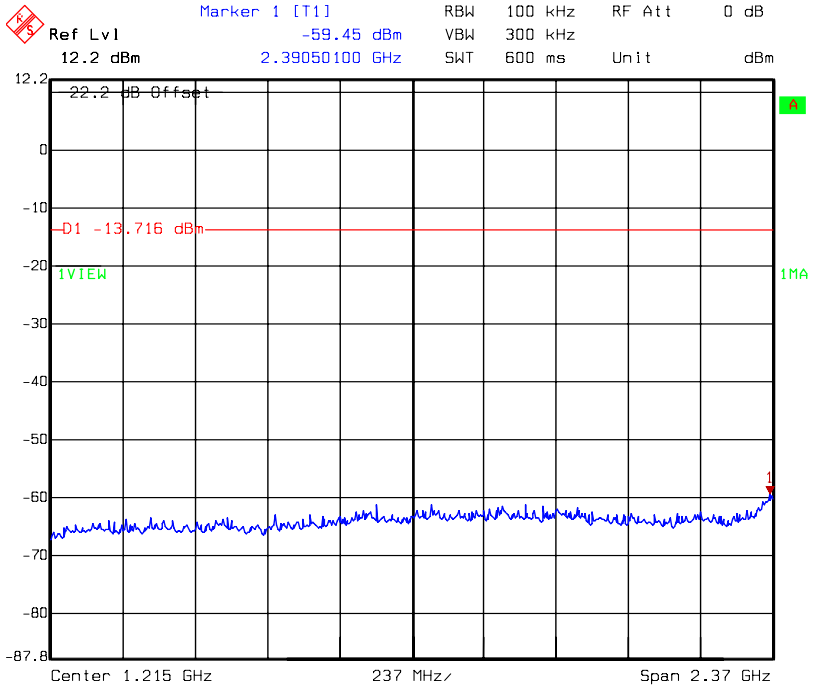
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch01_2412
Date: 05.JUL.2013 16:38:12

conducted spurious @ 802.11b mode channel 1 (3 of 3)



Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch01_2412
Date: 05.JUL.2013 16:38:27

conducted spurious @ 802.11b mode channel 6 (1 of 3)



Title: Conducted Spurious (Kobo Inc. , T647)
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Date: 05.JUL.2013 16:40:08

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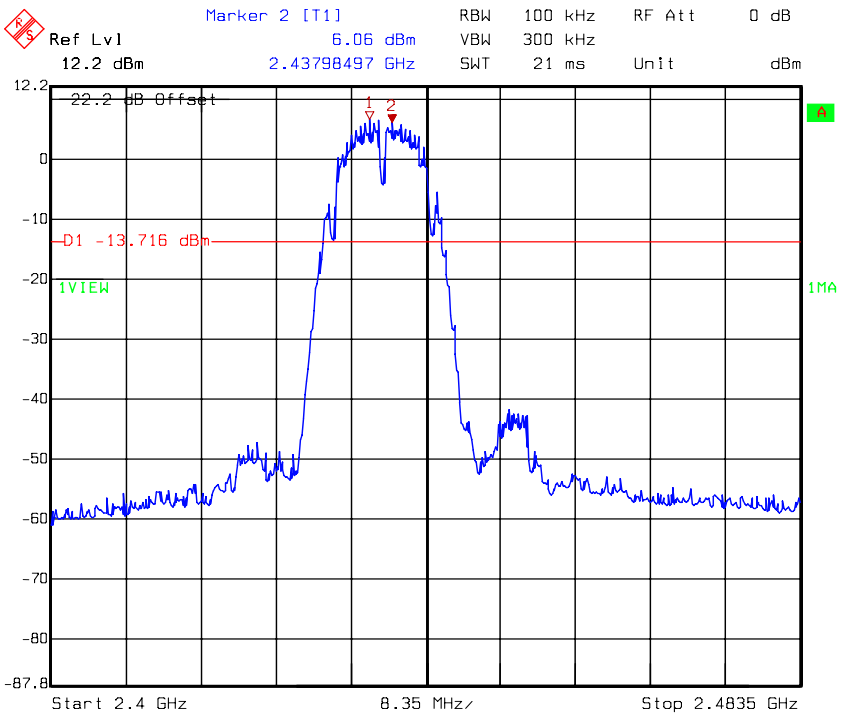
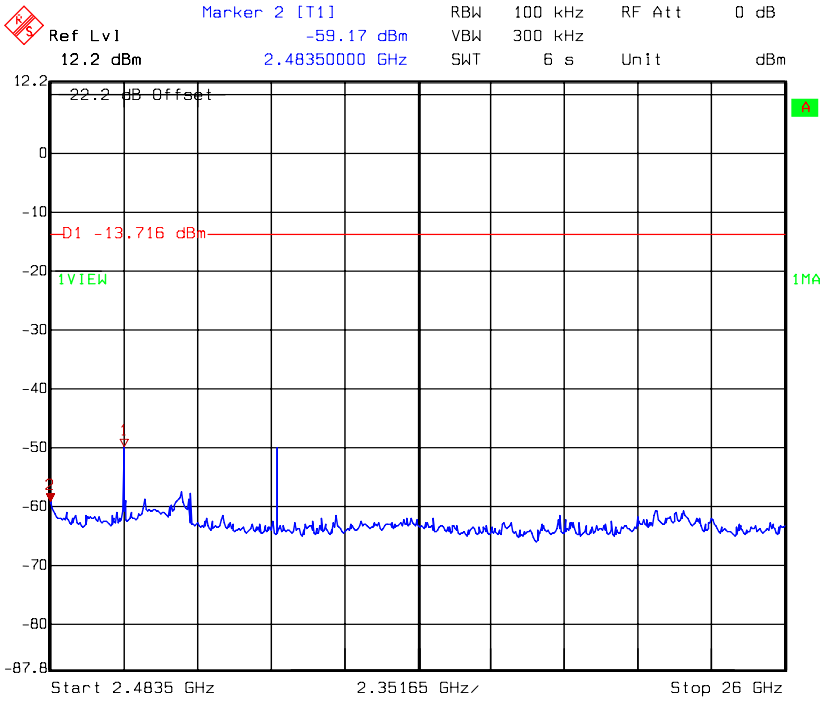


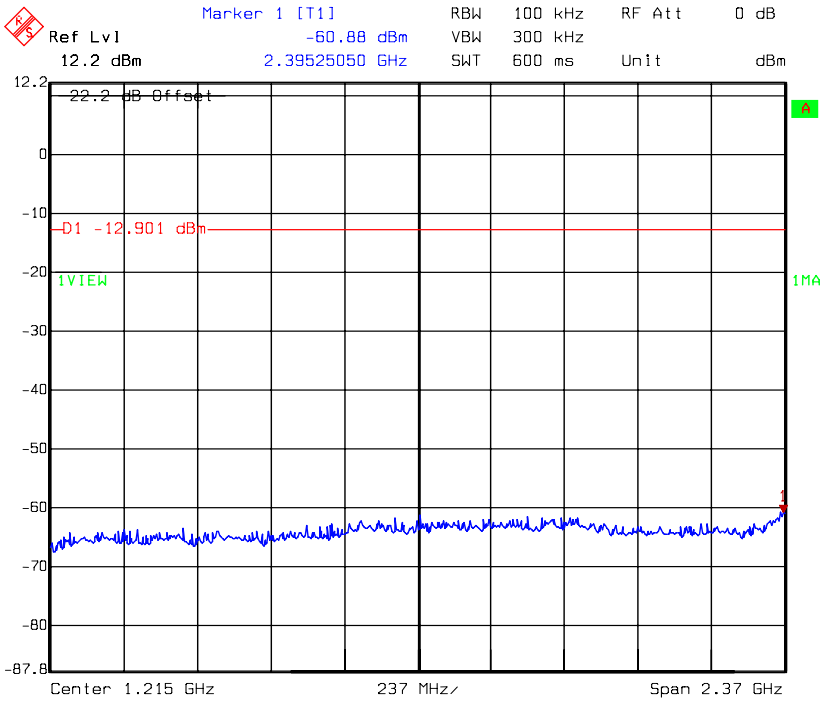
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch06_2437
Date: 05.JUL.2013 16:40:17

conducted spurious @ 802.11b mode channel 6 (3 of 3)



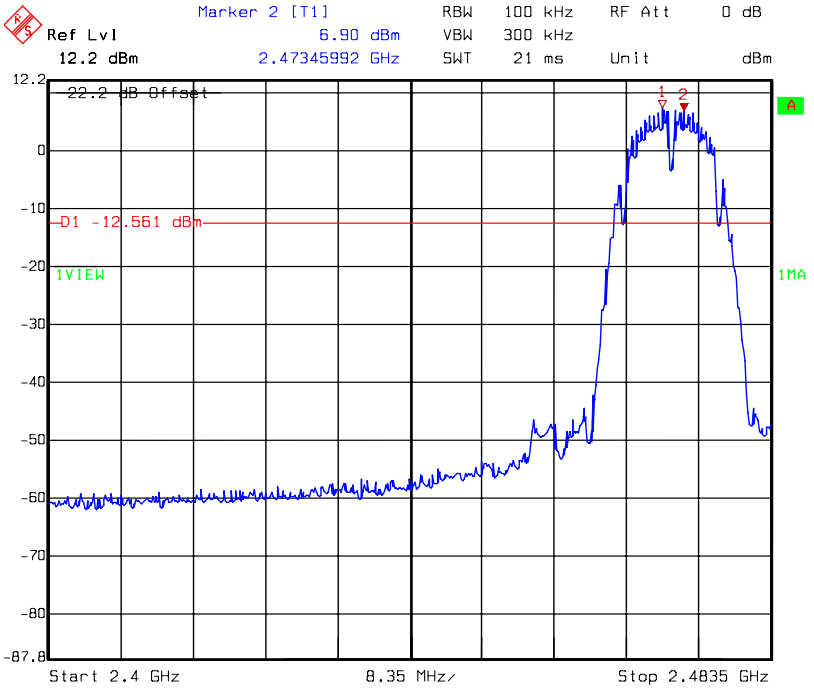
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch06_2437
Date: 05.JUL.2013 16:40:32

conducted spurious @ 802.11b mode channel 11 (1 of 3)



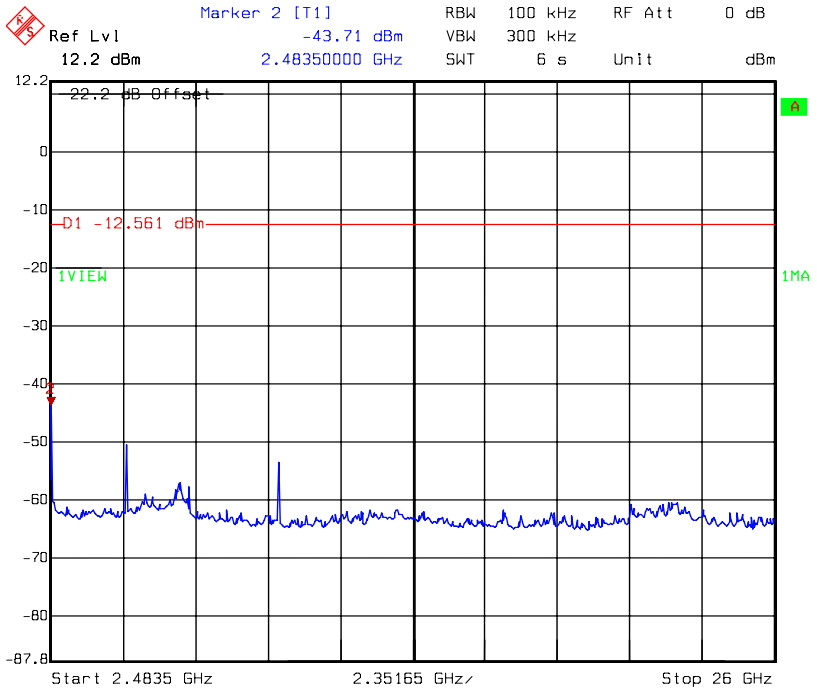
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch11_2462
Date: 05.JUL.2013 16:42:10

conducted spurious @ 802.11b mode channel 11 (2 of 3)



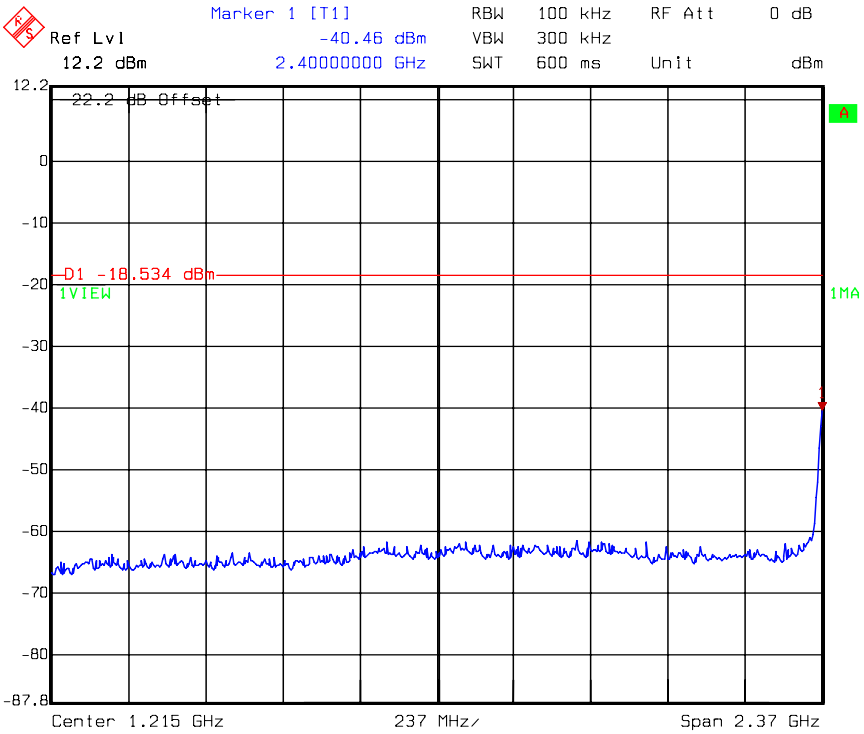
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch13_2472
Date: 05.JUL.2013 15:42:34

conducted spurious @ 802.11b mode channel 11 (3 of 3)



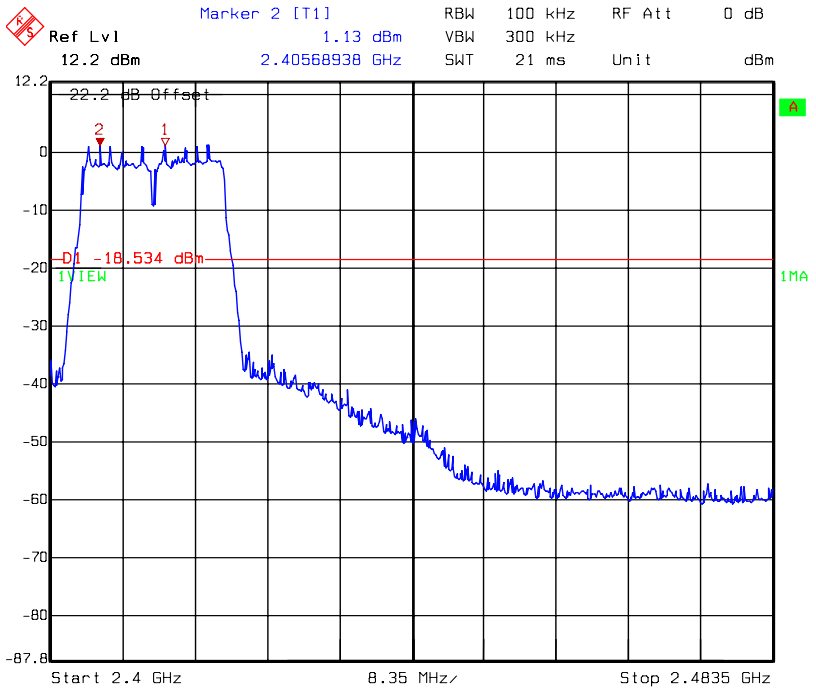
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11b_Chain0_Ch13_2472
Date: 05.JUL.2013 15:42:50

conducted spurious @ 802.11g mode channel 1 (1 of 3)



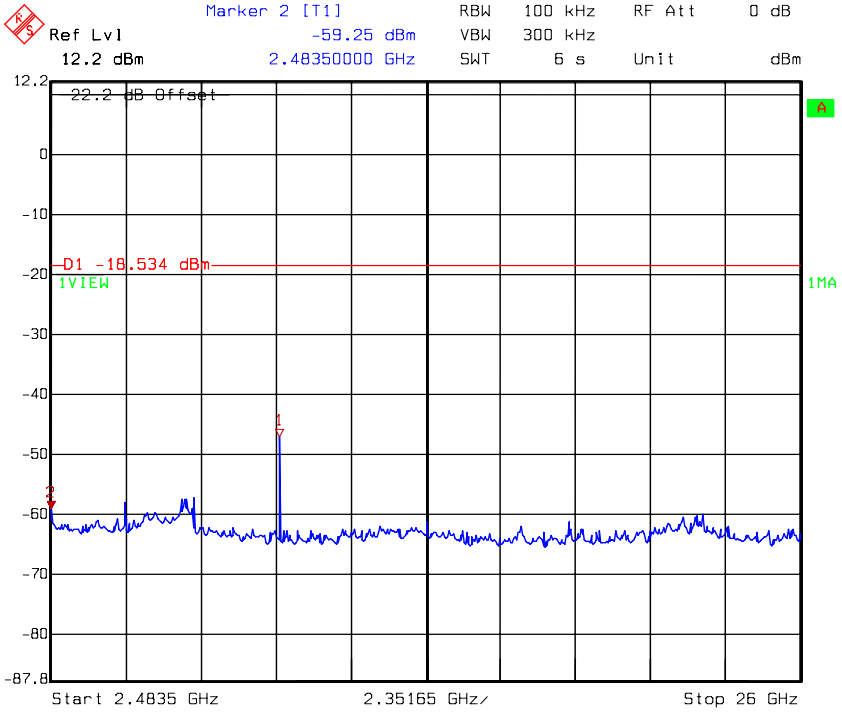
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch01_2412
Date: 05.JUL.2013 16:46:31

conducted spurious @ 802.11g mode channel 1 (2 of 3)



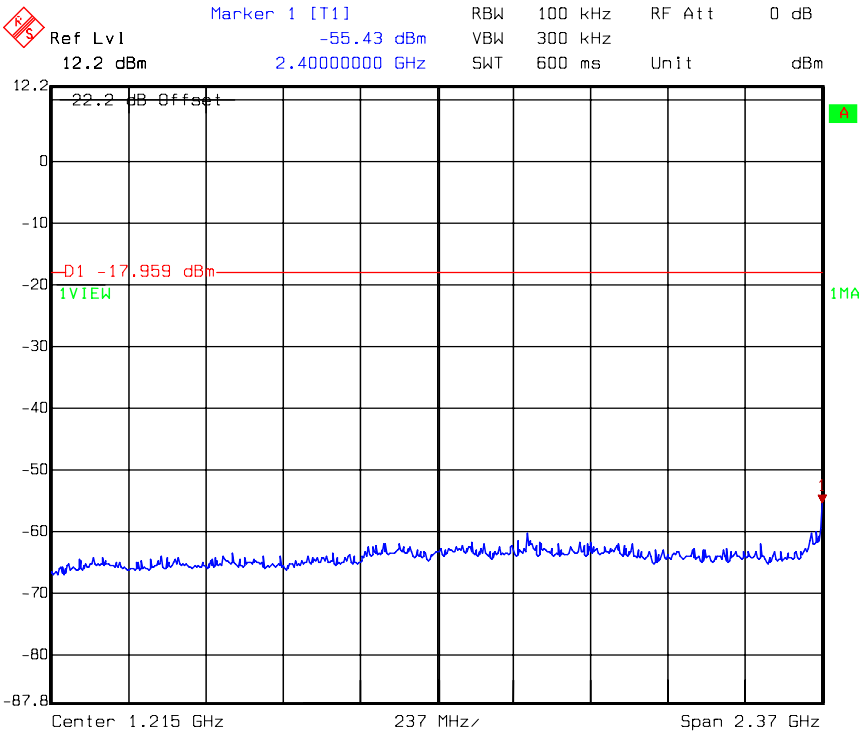
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch01_2412
Date: 05.JUL.2013 16:46:40

conducted spurious @ 802.11g mode channel 1 (3 of 3)



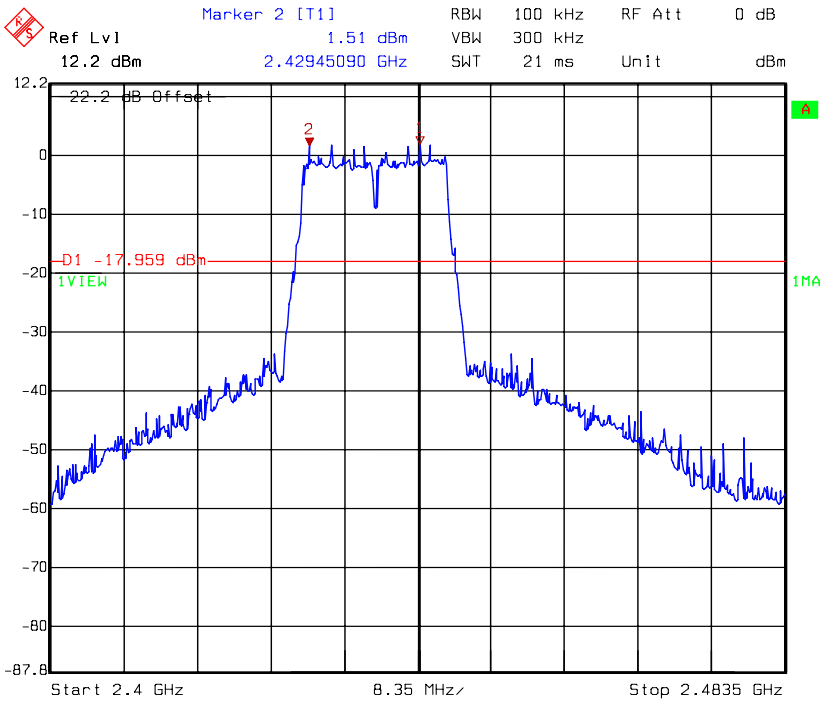
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch01_2412
Date: 05.JUL.2013 16:46:56

conducted spurious @ 802.11g mode channel 6 (1 of 3)



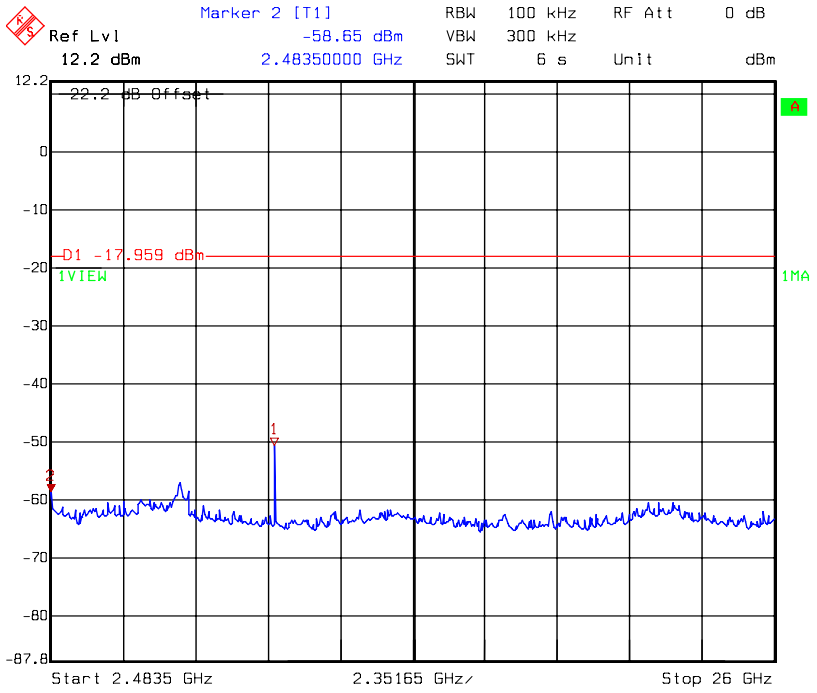
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch06_2437
Date: 05.JUL.2013 16:49:05

conducted spurious @ 802.11g mode channel 6 (2 of 3)



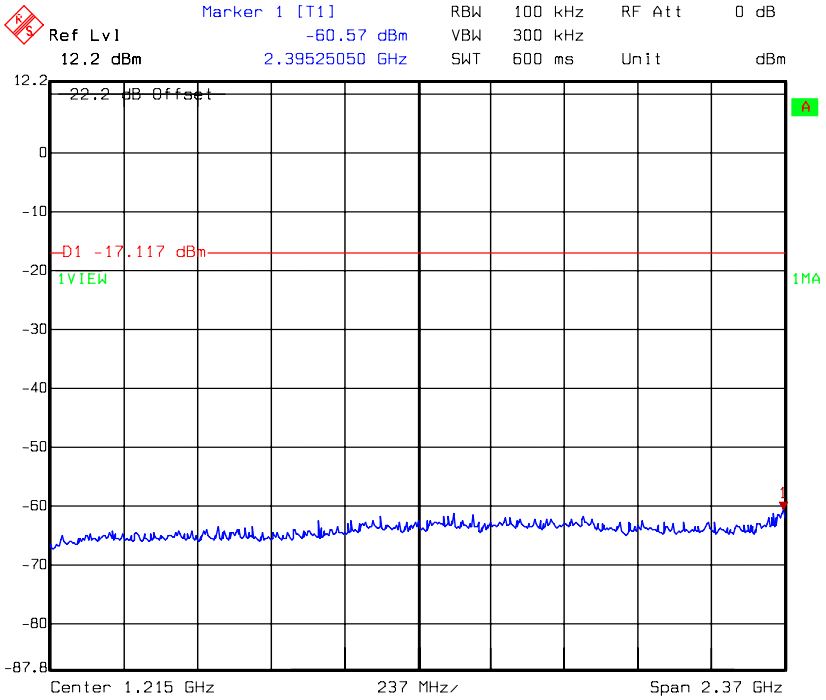
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch06_2437
Date: 05.JUL.2013 16:49:14

conducted spurious @ 802.11g mode channel 6 (3 of 3)



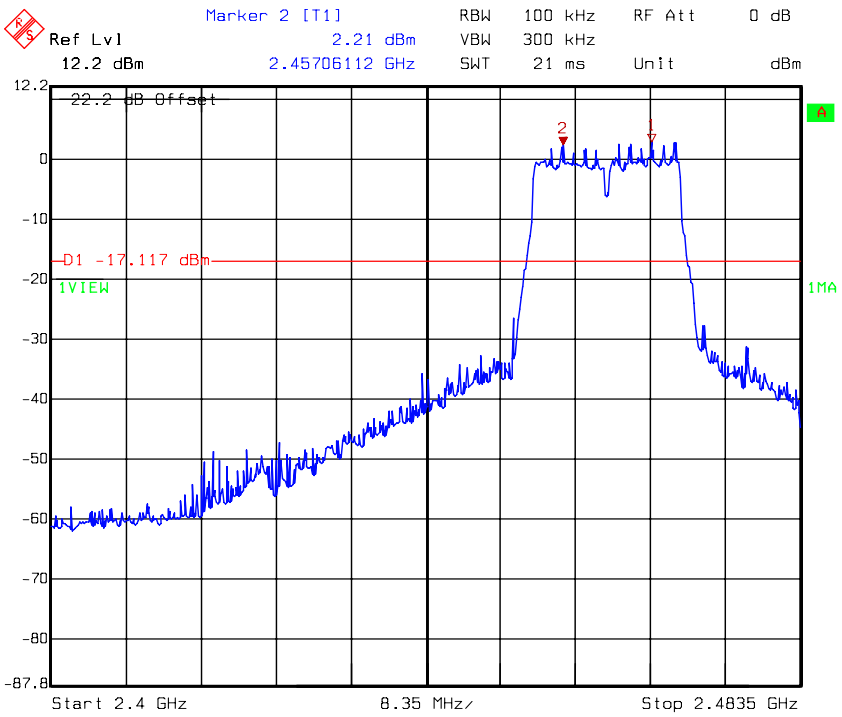
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch06_2437
Date: 05.JUL.2013 16:49:30

conducted spurious @ 802.11g mode channel 11 (1 of 3)



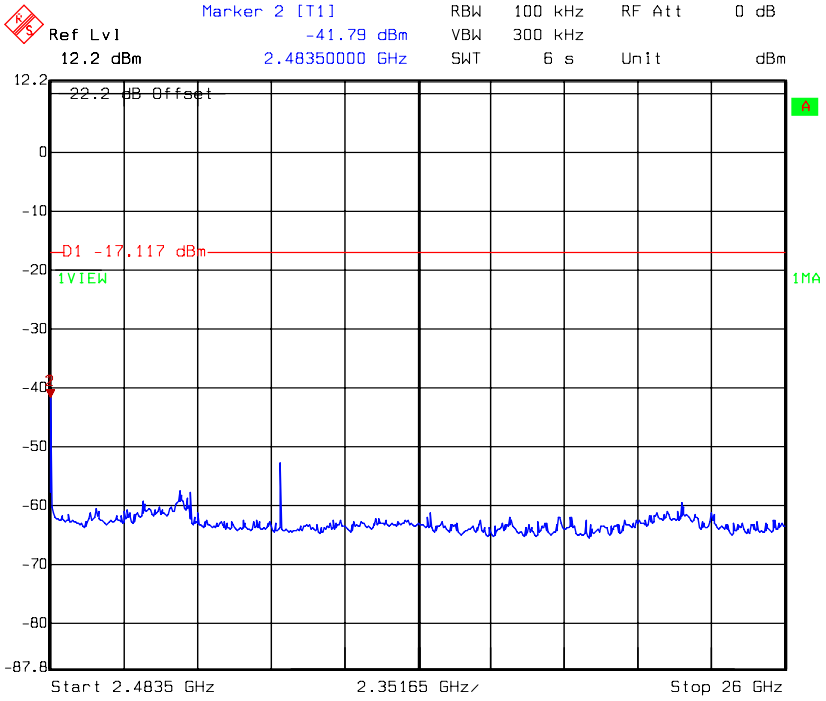
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch11_2462
Date: 05.JUL.2013 16:51:12

conducted spurious @ 802.11g mode channel 11 (2 of 3)



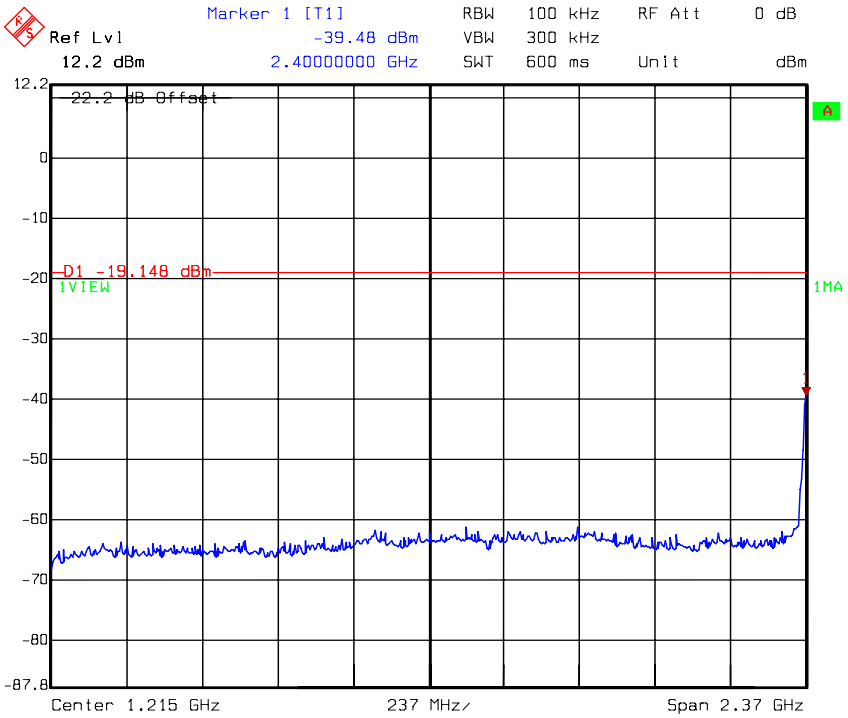
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch11_2462
Date: 05.JUL.2013 16:51:22

conducted spurious @ 802.11g mode channel 11 (3 of 3)



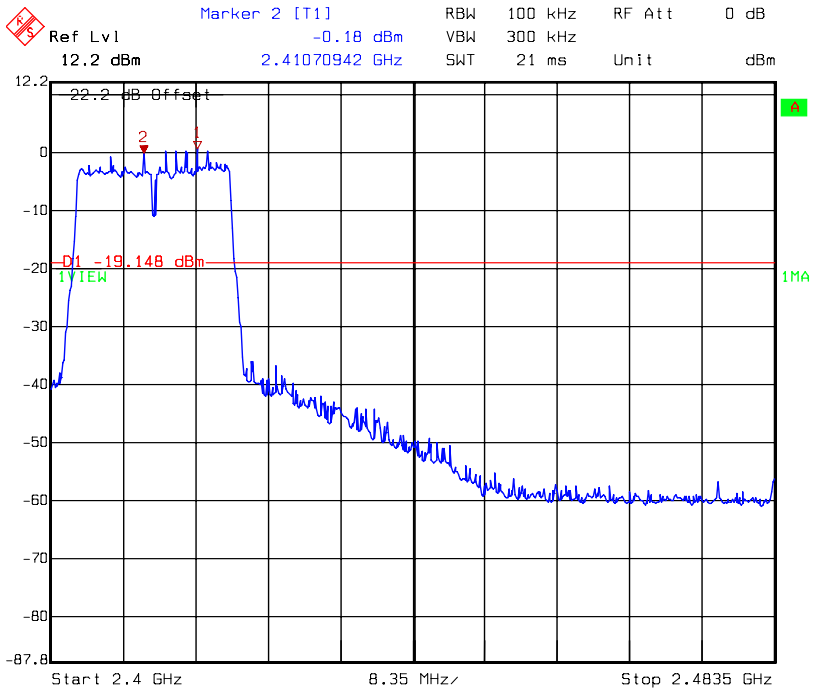
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11g_Chain0_Ch11_2462
Date: 05.JUL.2013 16:51:37

conducted spurious @ 802.11n HT20 mode channel 1 (1 of 3)



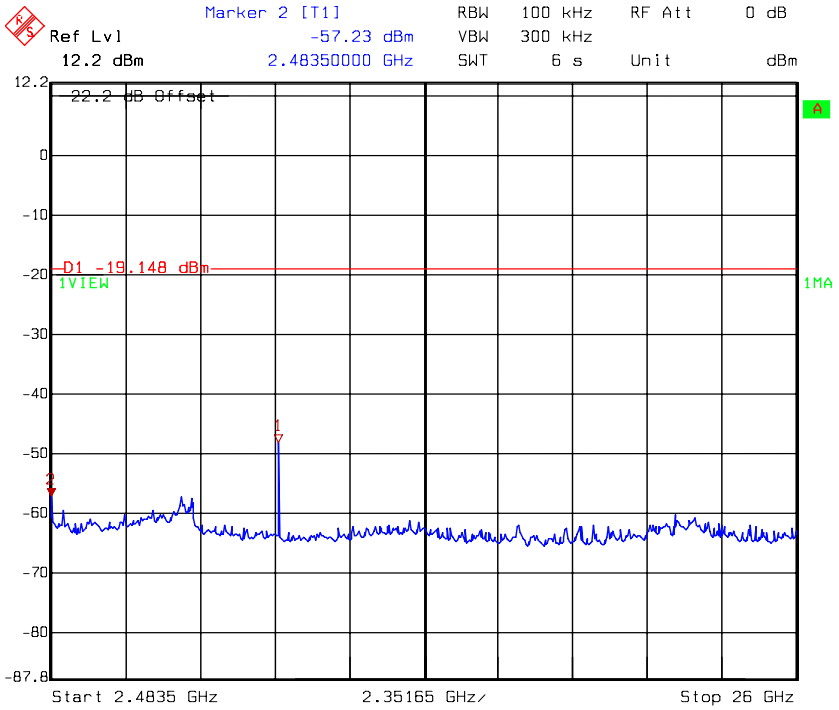
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch01_2412
Date: 05.JUL.2013 16:54:20

conducted spurious @ 802.11n HT20 mode channel 1 (2 of 3)

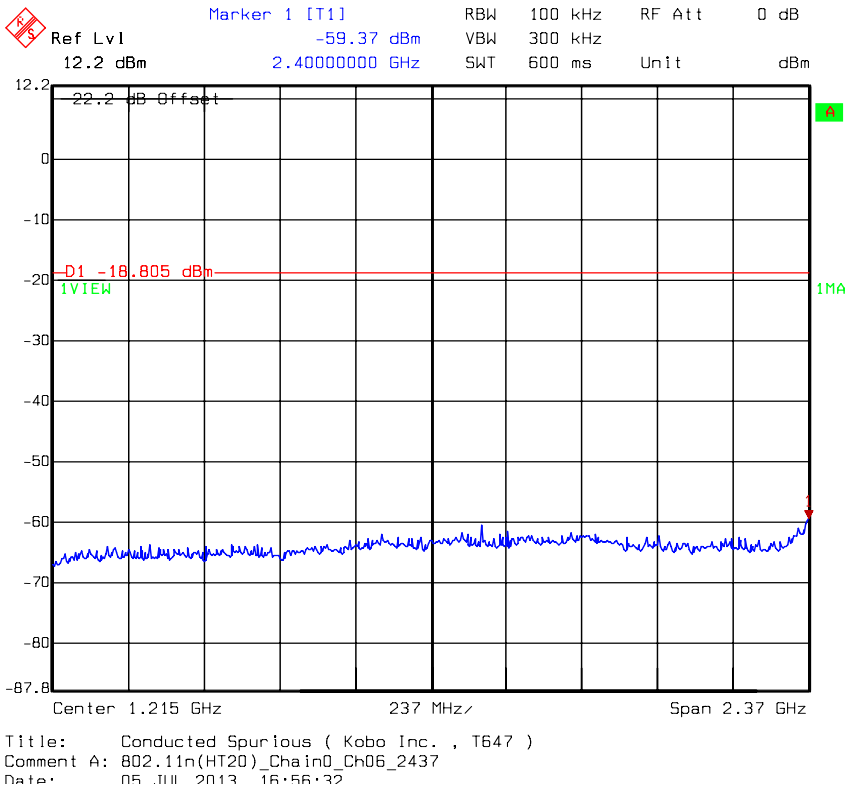


Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch01_2412
Date: 05.JUL.2013 16:54:29

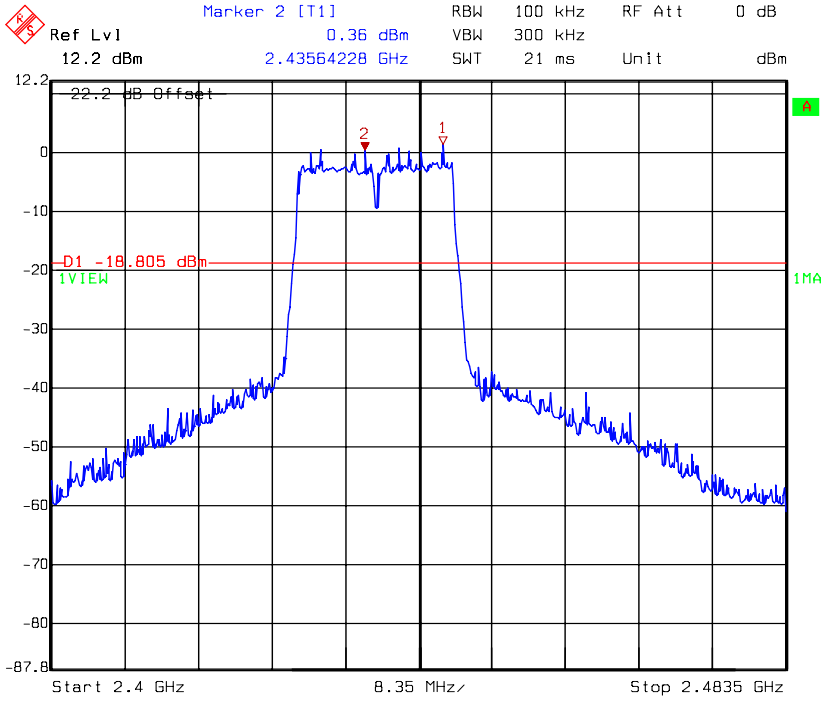
conducted spurious @ 802.11n HT20 mode channel 1 (3 of 3)



conducted spurious @ 802.11n HT20 mode channel 6 (1 of 3)

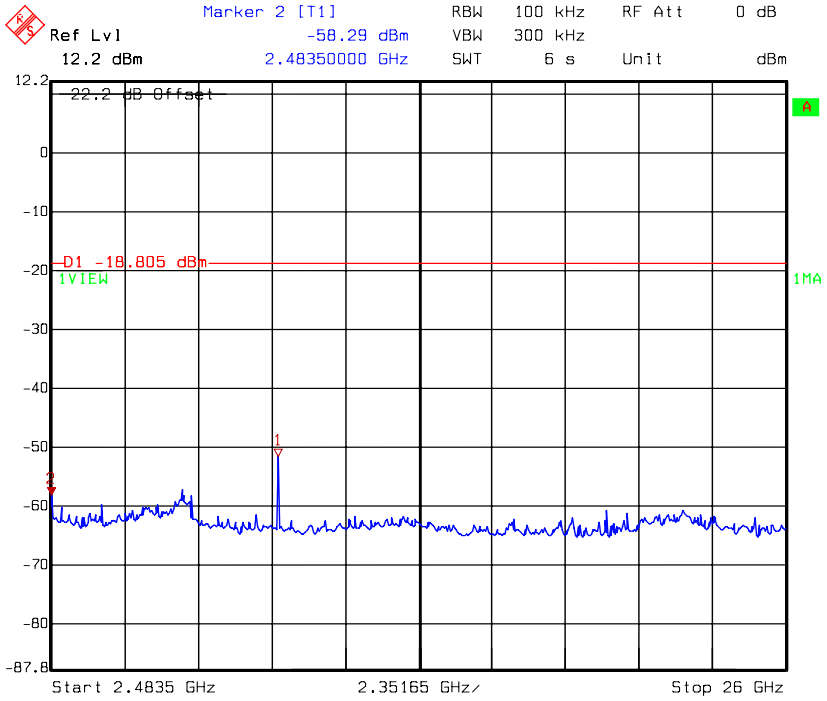


conducted spurious @ 802.11n HT20 mode channel 6 (2 of 3)



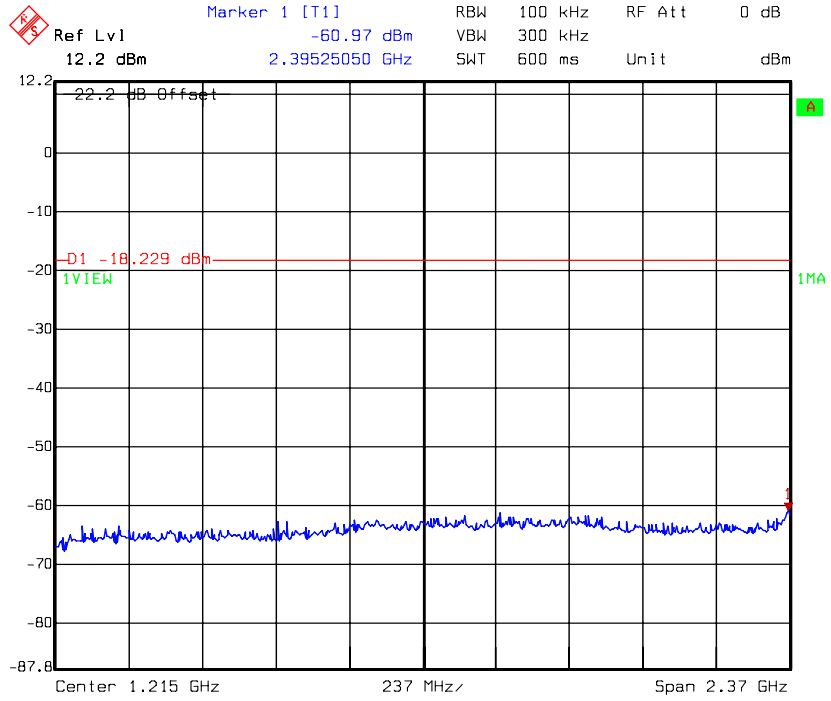
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch06_2437
Date: 05.JUL.2013 16:56:41

conducted spurious @ 802.11n HT20 mode channel 6 (3 of 3)



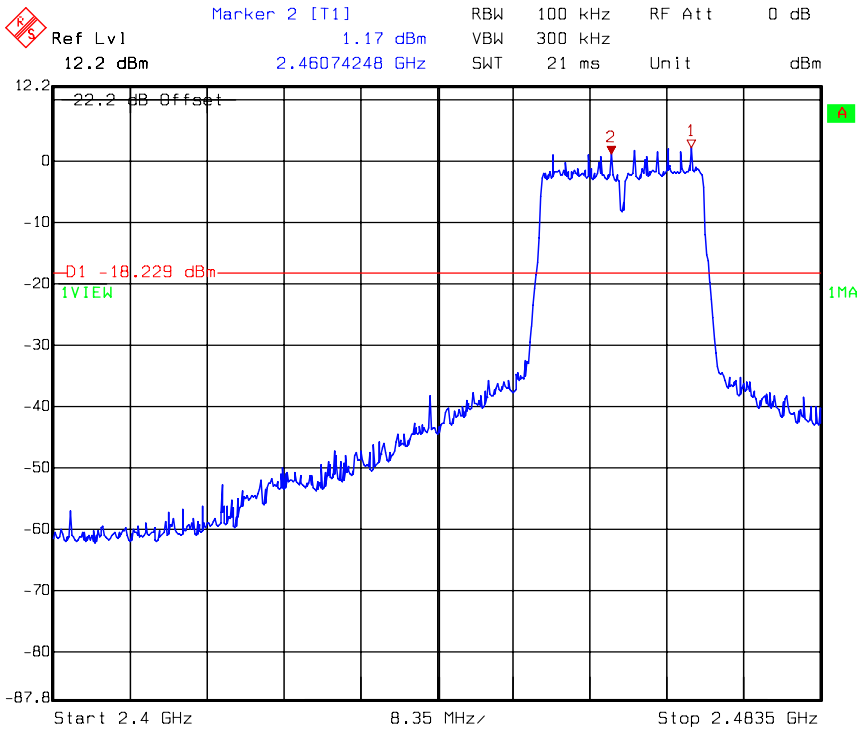
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch06_2437
Date: 05.JUL.2013 16:56:56

conducted spurious @ 802.11n HT20 mode channel 11 (1 of 3)



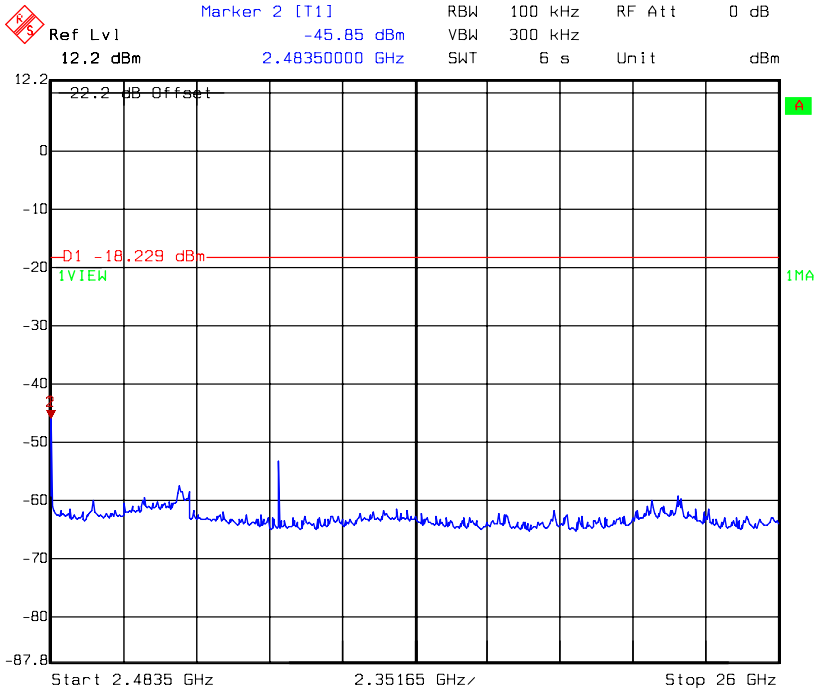
Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch11_2462
Date: 05.JUL.2013 16:58:38

conducted spurious @ 802.11n HT20 mode channel 11 (2 of 3)



Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch11_2462
Date: 05.JUL.2013 16:58:47

conducted spurious @ 802.11n HT20 mode channel 11 (3 of 3)



Title: Conducted Spurious (Kobo Inc. , T647)
Comment A: 802.11n(HT20)_Chain0_Ch11_2462
Date: 05.JUL.2013 16:59:02

7. Radiated Spurious Emission

Name of Test	Radiated Spurious Emission
Base Standard	FCC 15.247(d), 15.209, 15.205, 15.33(a)

Test Result: Complies
Measurement Data: See Tables below

Method of Measurement:
Reference FCC document: KDB558074, ANSI C63.4

The signal is maximized through rotation and placement in the three orthogonal axes. According to §15.33(a), the spectrum shall be investigated from the lowest radio frequency signal generated in the device, to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Spectrum Analyzer Resolution Bandwidth is 100kHz or greater for frequencies 30MHz to 1GHz, 1MHz – for frequencies above 1GHz.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter. The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent 3 meters reading using inverse scaling with distance.

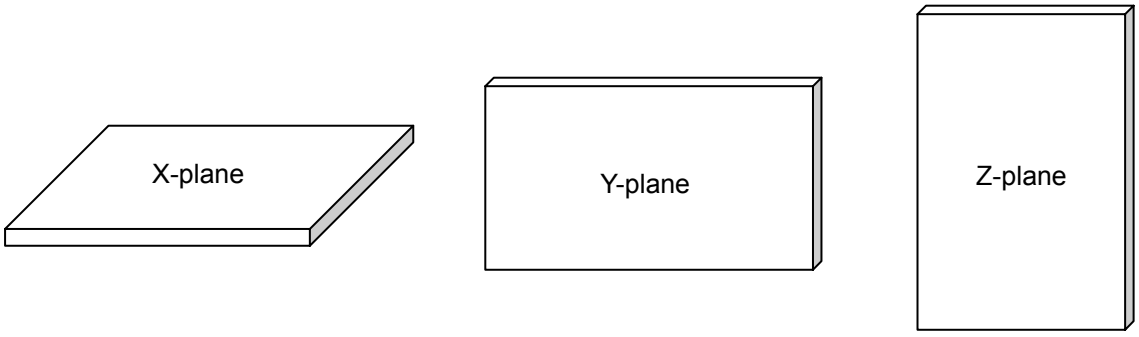
The EUT configuration please refer to the “Spurious set-up photo.pdf”.

According to §15.33(a), the spectrum shall be investigated from the lowest radio frequency signal generated in the device, to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Spectrum Analyzer Resolution Bandwidth is 100kHz or greater for frequencies 30MHz to 1GHz, 1MHz – for frequencies above 1GHz.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent 3 meter reading using inverse scaling with distance.

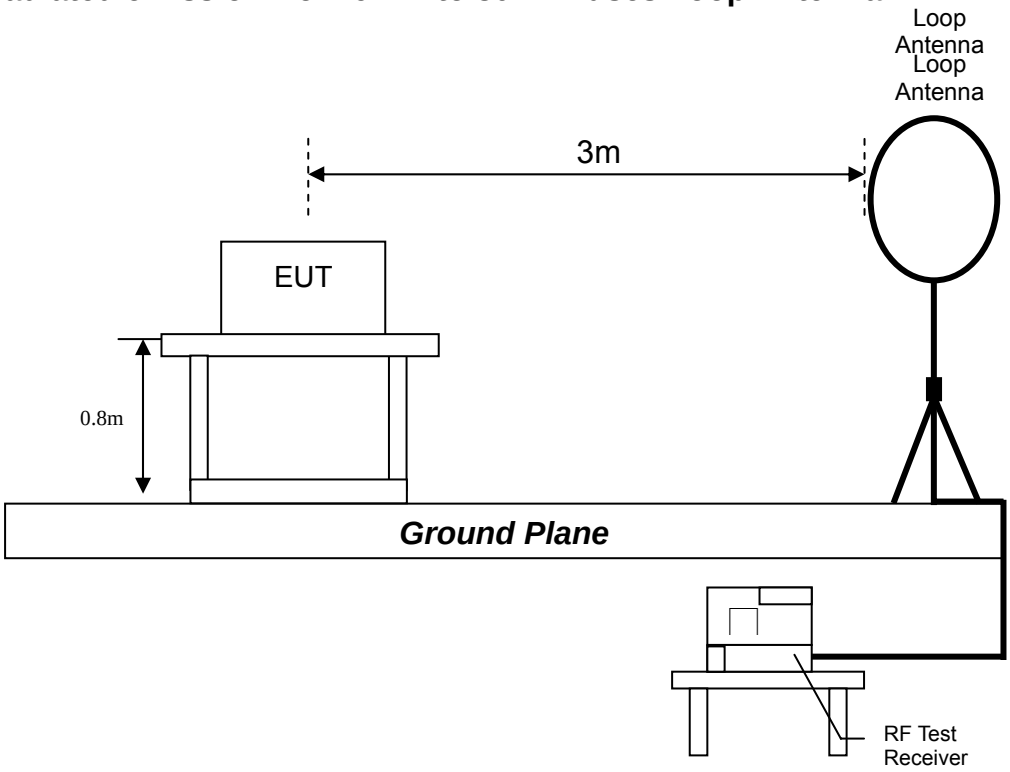
The signal is maximized through rotation and placement in the three orthogonal axes.



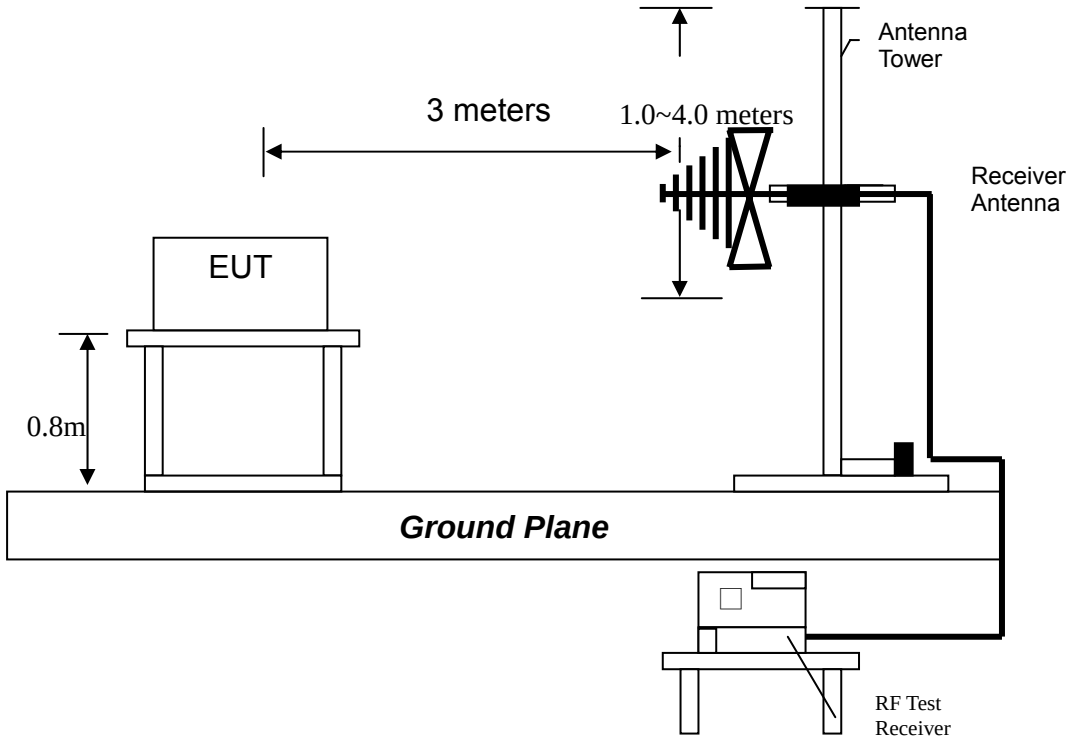
After verifying three axes, we found the maximum electromagnetic field was occurred at X-plane configuration. The final test data was executed under this configuration.

Test Diagram:

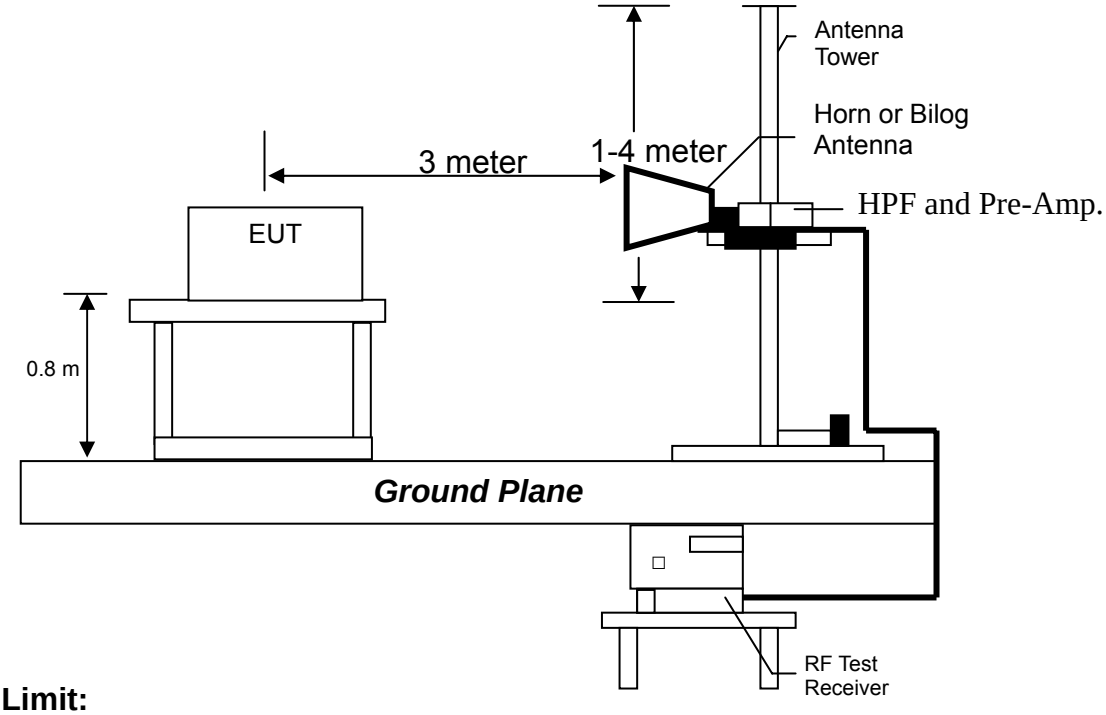
Radiated emission from 9kHz to 30MHz uses Loop Antenna:



Radiated emission from 30MHz to 1GHz uses Bilog Antenna:



Radiated emission above 1GHz uses Horn Antenna:



Emission Limit:

The spurious Emission shall test through the 10th harmonic. 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).

Frequency (MHz)	Field Strength (microvolts/meter)
0.009~0.490	2400/F(kHz)
0.490~1.705	2400/F(kHz)
1.705~30	30
30-88	100
88-216	150
216-960	200
Above 960	500

Remark:
1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under802.11b, 802.11g and 802.11n HT20 continuously transmitting mode. The worst case occurred at 802.11b Tx channel 1.

EUT : T647
Worst Case : 802.11b Tx at channel 1

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	49.40	QP	12.84	17.73	30.57	40.00	-9.43
V	163.86	QP	15.70	14.44	30.14	43.50	-13.36
V	485.90	QP	18.43	18.20	36.62	46.00	-9.38
V	689.60	QP	22.33	17.31	39.63	46.00	-6.37
V	895.24	QP	24.35	17.70	42.04	46.00	-3.96
V	957.32	QP	25.34	16.44	41.77	46.00	-4.23
H	43.58	QP	14.20	16.48	30.68	40.00	-9.32
H	150.28	QP	13.60	16.79	30.39	43.50	-13.11
H	672.14	QP	21.52	17.67	39.18	46.00	-6.82
H	774.96	QP	23.02	18.70	41.72	46.00	-4.28
H	914.64	QP	24.59	18.53	43.11	46.00	-2.89
H	935.98	QP	25.33	17.60	42.93	46.00	-3.07

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

Note: The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Measurement results: frequency above 1GHz

EUT : T647
Test Condition : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4824	PK	V	35.1	38.54	35.62	39.06	54	-14.94
4824	PK	H	35.1	38.54	35.02	38.46	54	-15.54

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : T647
Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4874	PK	V	35.1	38.54	34.34	37.78	54	-16.22
4874	PK	H	35.1	38.54	35.07	38.51	54	-15.49

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : T647
Test Condition : 802.11b Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4924	PK	V	35.1	38.54	34.96	38.40	54	-15.60
4924	PK	H	35.1	38.54	33.40	36.84	54	-17.16

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : T647
Test Condition : 802.11g Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4824	PK	V	35.1	38.54	35.61	39.05	54	-14.95
4824	PK	H	35.1	38.54	34.60	38.04	54	-15.96

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : T647
Test Condition : 802.11g Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4874	PK	V	35.1	38.54	34.56	38.00	54	-16.00
4874	PK	H	35.1	38.54	34.60	38.04	54	-15.96

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : T647
Test Condition : 802.11g Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4924	PK	V	35.1	38.54	35.28	38.72	54	-15.28
4924	PK	H	35.1	38.54	35.03	38.47	54	-15.53

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : T647
Test Condition : 802.11n HT20 Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4824	PK	V	35.1	38.54	36.17	39.61	54	-14.39
4824	PK	H	35.1	38.54	35.86	39.30	54	-14.70

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : T647
Test Condition : 802.11n HT20 Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4874	PK	V	35.1	38.54	34.78	38.22	54	-15.78
4874	PK	H	35.1	38.54	34.82	38.26	54	-15.74

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : T647
Test Condition : 802.11n HT20 Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4924	PK	H	35.1	38.54	34.97	38.41	54	-15.59
4924	PK	H	35.1	38.54	36.89	40.33	54	-13.67

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

8. Emission on Band Edge

Name of Test	Emission Band Edge
Base Standard	FCC 15.247(d)

Test Result: Complies

Measurement Data: See Tables & plots below

Method of Measurement:

Reference FCC document: KDB558074, ANSI C63.4

The frequency range from 30 MHz to 1000 MHz using Bilog Antenna.
The frequency range over 1 GHz using Horn Antenna.

Radiated emissions were invested cover the frequency range from 30 MHz to 1000 MHz using a receiver RBW of 120 kHz record QP reading, and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz and 10 Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1 MHz RBW/VBW) recorded also on the report.

Test Mode: 802.11b Chain 0

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Restricted band (MHz)
2337.14	PK	V	38.01	31.60	64.81	58.40	74	-15.60	2310~2390
2337.14	AV	V	38.01	31.60	52.26	45.85	54	-8.15	
2412.00	PK	V	38.03	31.95	109.67	103.60	-	103.60	-
2412.00	AV	V	38.03	31.95	104.71	98.64	-	98.64	-
2462.00	PK	V	38.04	32.19	111.22	105.37	-	105.37	-
2462.00	AV	V	38.04	32.19	106.37	100.52	-	100.52	-
2483.50	PK	V	38.05	32.29	65.70	59.95	74	-14.05	2483.5~2500
2483.50	AV	V	38.05	32.29	51.37	45.62	54	-8.38	

Test Mode: 802.11g Chain 0

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Restricted band (MHz)
2389.81	PK	V	38.02	31.85	72.93	66.76	74	-7.24	2310~2390
2389.81	AV	V	38.02	31.85	52.68	46.51	54	-7.49	
2412.00	PK	V	38.03	31.95	110.30	104.23	-	104.23	-
2412.00	AV	V	38.03	31.95	97.66	91.59	-	91.59	-
2462.00	PK	V	38.04	32.19	111.13	105.28	-	105.28	-
2462.00	AV	V	38.04	32.19	98.52	92.67	-	92.67	-
2483.50	PK	V	38.05	32.29	78.95	73.20	74	-0.80	2483.5~2500
2483.50	AV	V	38.05	32.29	56.80	51.05	54	-2.95	

Test Mode: 802.11n Chain 0 (HT20)

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Restricted band (MHz)
2389.81	PK	H	38.02	31.85	68.40	62.23	74	-11.77	2310~2390
2389.81	AV	H	38.02	31.85	52.39	46.22	54	-7.78	
2412.00	PK	H	38.03	31.95	109.28	103.21	-	103.21	-
2412.00	AV	H	38.03	31.95	96.53	90.46	-	90.46	-
2462.00	PK	H	38.04	32.19	110.23	104.38	-	104.38	-
2462.00	AV	H	38.04	32.19	97.32	91.47	-	91.47	-
2483.50	PK	H	38.05	32.29	77.18	71.43	74	-2.57	2483.5~2500
2483.50	AV	H	38.05	32.29	55.74	49.99	54	-4.01	

9. AC power line conducted emission

Name of Test	AC power line conducted emission
Base Standard	FCC 15.207

Test Result: Complies

Measurement Data: See Tables & plots below

Method of Measurement:

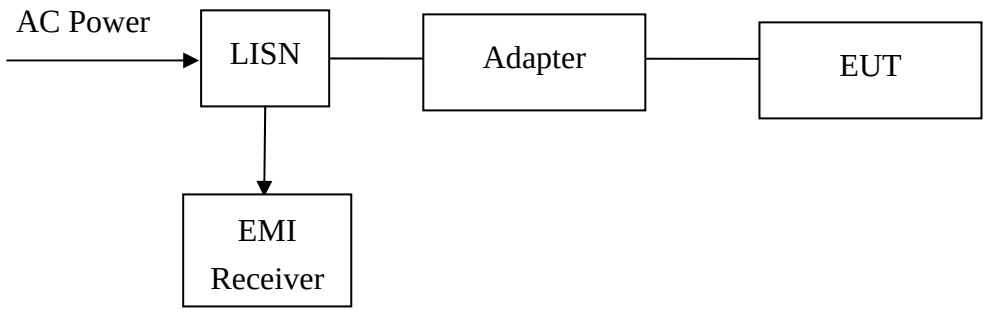
Reference FCC document: KDB558074, ANSI C63.4

The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm/ 50 uH coupling impedance with 50 ohm termination.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/2003 on conducted measurement.
The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

The EUT configuration please refer to the “Conducted set-up photo.pdf”.

Test Diagram:



Emission Limit:

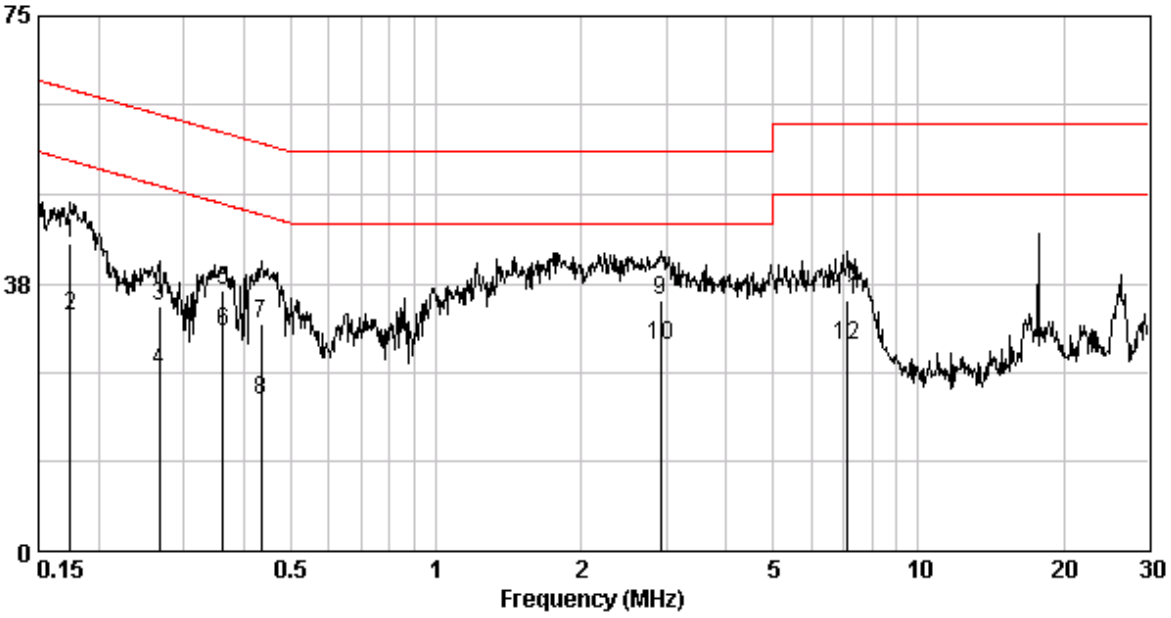
Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

Phase: Line
Model No.: T647
Operating mode: Adapter mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.175	0.13	43.13	64.72	32.95	54.72	-21.59	-21.77
0.267	0.15	34.43	61.20	25.17	51.20	-26.78	-26.04
0.361	0.16	36.48	58.69	30.74	48.69	-22.22	-17.96
0.435	0.16	31.90	57.15	21.19	47.15	-25.25	-25.96
2.915	0.31	35.16	56.00	28.98	46.00	-20.84	-17.02
7.137	0.51	35.14	60.00	28.86	50.00	-24.87	-21.15

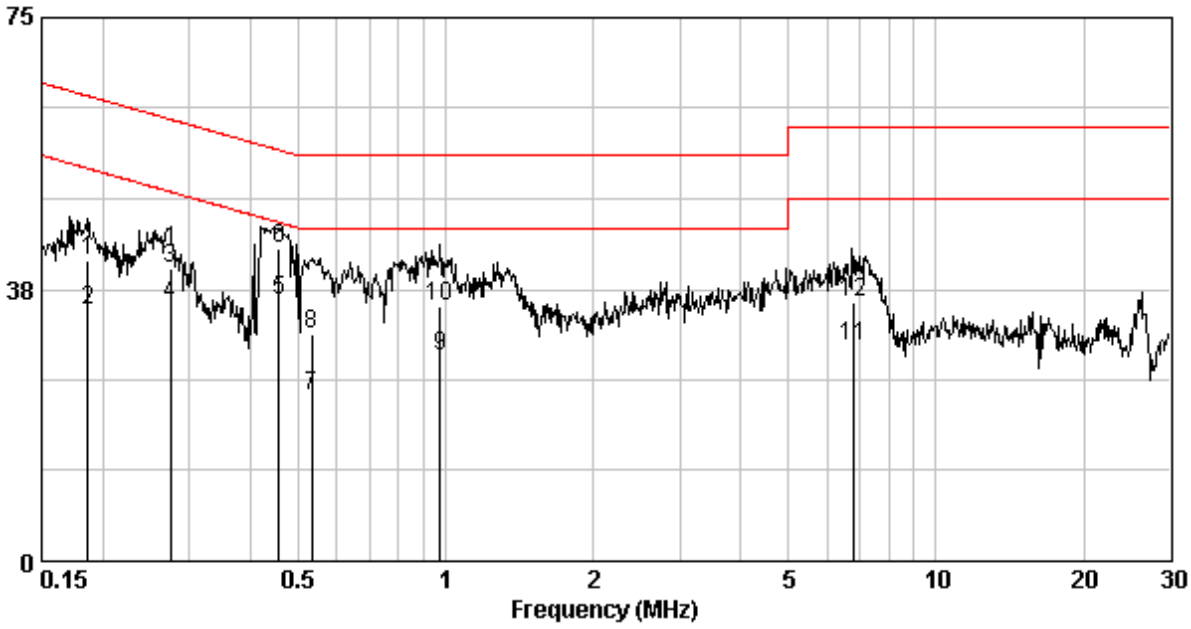
Remark:
1. Corr. Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase: Neutral
Model No.: T647
Operating mode: Adapter mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.186	0.10	41.48	64.20	34.50	54.20	-22.71	-19.69
0.274	0.11	40.46	60.98	35.36	50.98	-20.52	-15.62
0.456	0.13	43.14	56.76	36.13	46.76	-13.62	-10.63
0.532	0.13	31.25	56.00	22.72	46.00	-24.75	-23.28
0.974	0.16	35.28	56.00	28.23	46.00	-20.72	-17.77
6.805	0.41	35.72	60.00	29.81	50.00	-24.28	-20.19

Remark:
1. Corr. Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Appendix A: Test Equipment List

Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100018	2012/11/30	2013/11/29
Spectrum Analyzer	Rohde&schwarz	FSP30	100137	2013/06/21	2014/06/21
Spectrum Analyzer	Rohde&schwarz	FSEK30	100186	2013/01/23	2014/01/23
Horn Antenna (1-18G)	Schwarzbeck	BBHA 9120 D	9120D-456	2012/09/03	2014/09/03
Horn Antenna (14-42G)	SHWARZBECK	BBHA 9170	BBHA9170159	2012/09/05	2014/09/05
Broadband Antenna	SCHWARZBECK	VULB 9168	9168-172	2011/07/26	2013/07/25
Loop Antenna	RolfHeine	LA-285	02/10033	2012/03/20	2014/03/20
Pre-Amplifier	MITEQ	AFS44-00102650--42-10P-44	1495287	2011/10/27	2013/10/26
Pre-Amplifier	MITEQ	JS4-26004000--27-8A	828825	2012/09/18	2014/09/18
Power Meter	Anritsu	ML2495A	0844001	2012/10/09	2013/10/09
Power Senor	Anritsu	MA2411B	0738452	2012/10/09	2013/10/09
Temperature&Humidity Test Chamber	TERCHY	MHU-225LRU (SA)	950838	2013/06/14	2014/06/14
Two-Line -V-Network	Rohde&schwarz	ESH3-Z5	825562/003	2012/10/29	2013/10/29
Two-Line V-Network	Rohde&schwarz	ESH3-Z5	838979/014	2012/10/29	2013/10/29

Measurement Uncertainty:
Measurement uncertainty was calculated in accordance with TR 100 028-1.

Parameter	Uncertainty		
Radiated Emission	Below 1 GHz	Vertical	3.90 dB
		Horizontal	3.86 dB
	Above 1 GHz	Vertical	5.74 dB
		Horizontal	5.55 dB
Conducted Emission	2.08 dB		

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of *k*=2.