7.4 CONDUCTED SPURIOUS EMISSION

LIMITS

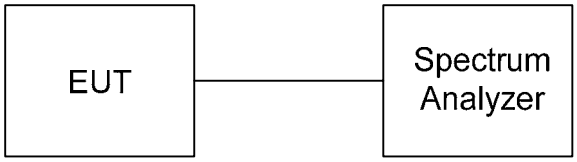
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. 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)).

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29, 2012
Spectrum Analyzer	FSU	200789	---	SEP. 29, 2012

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

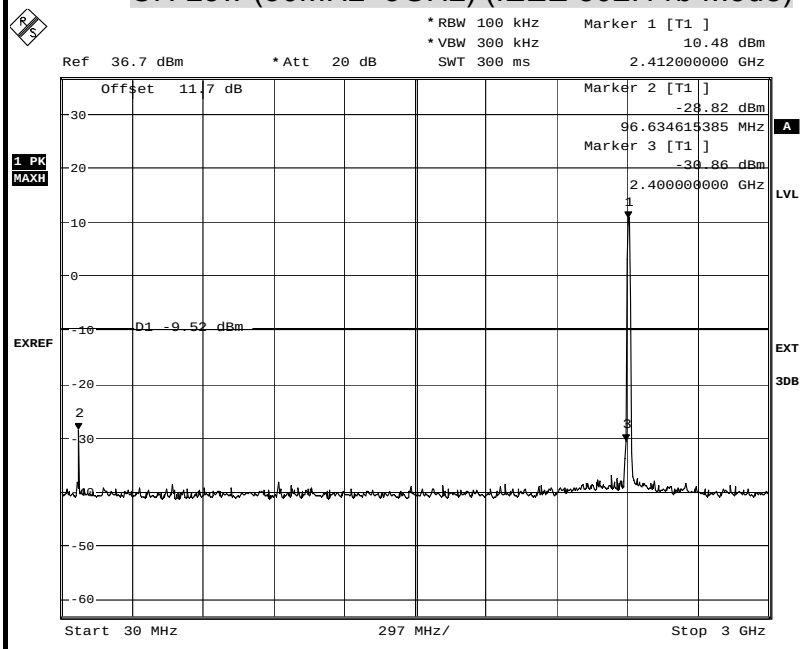
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 5.0 GHz band.

TEST RESULTS

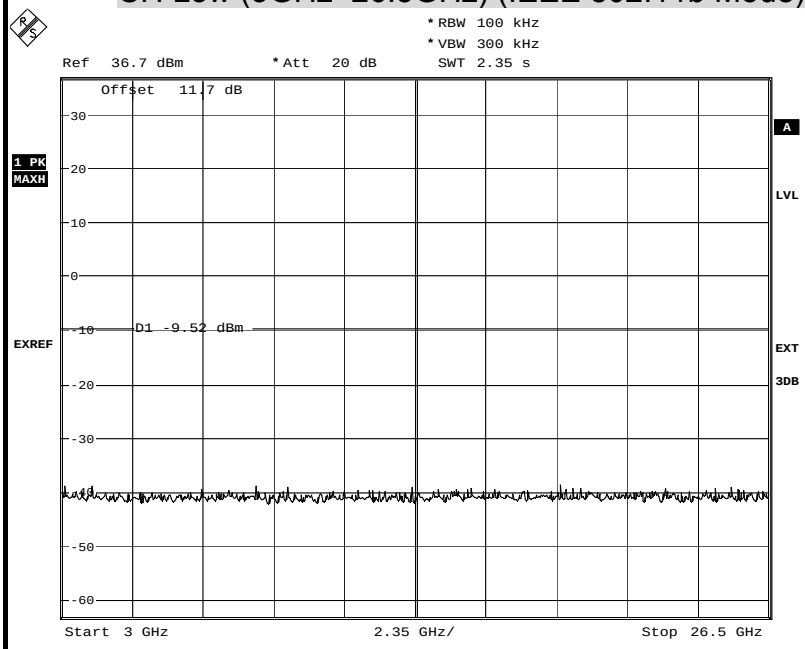
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11b MODE-2.4G)

CH Low (30MHz~3GHz) (IEEE 802.11b Mode)



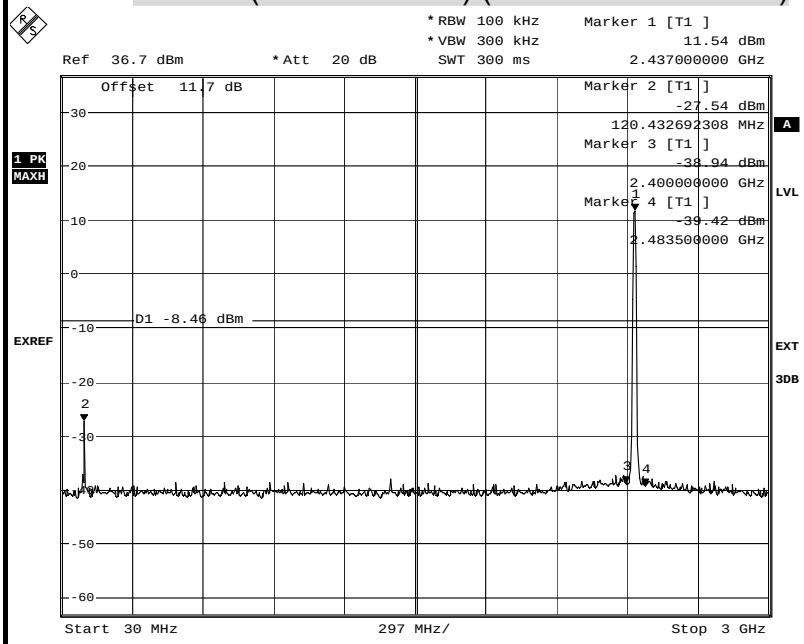
Date: 30.JUL.2012 21:34:47

CH Low (3GHz~26.5GHz) (IEEE 802.11b Mode)



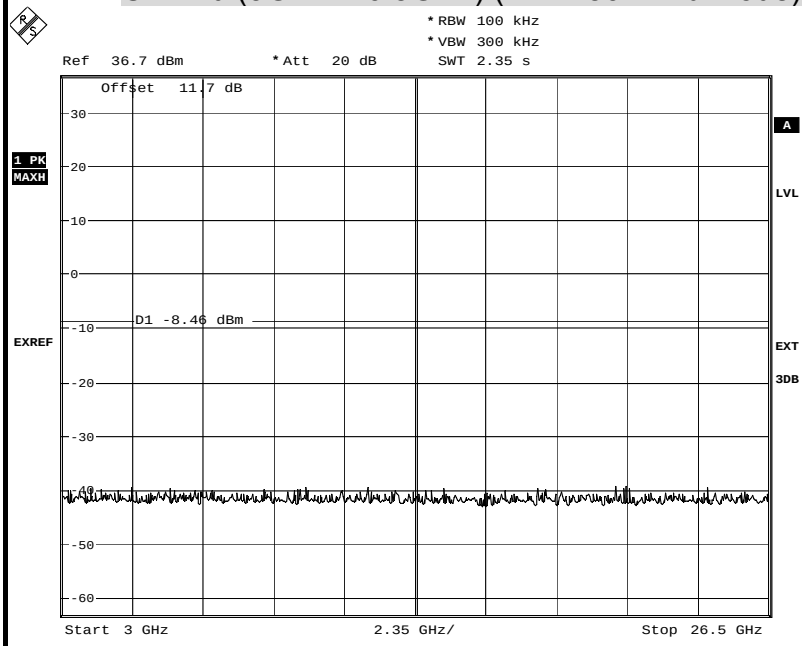
Date: 30.JUL.2012 21:35:29

CH Mid (30MHz~3GHz) (IEEE 802.11b Mode)



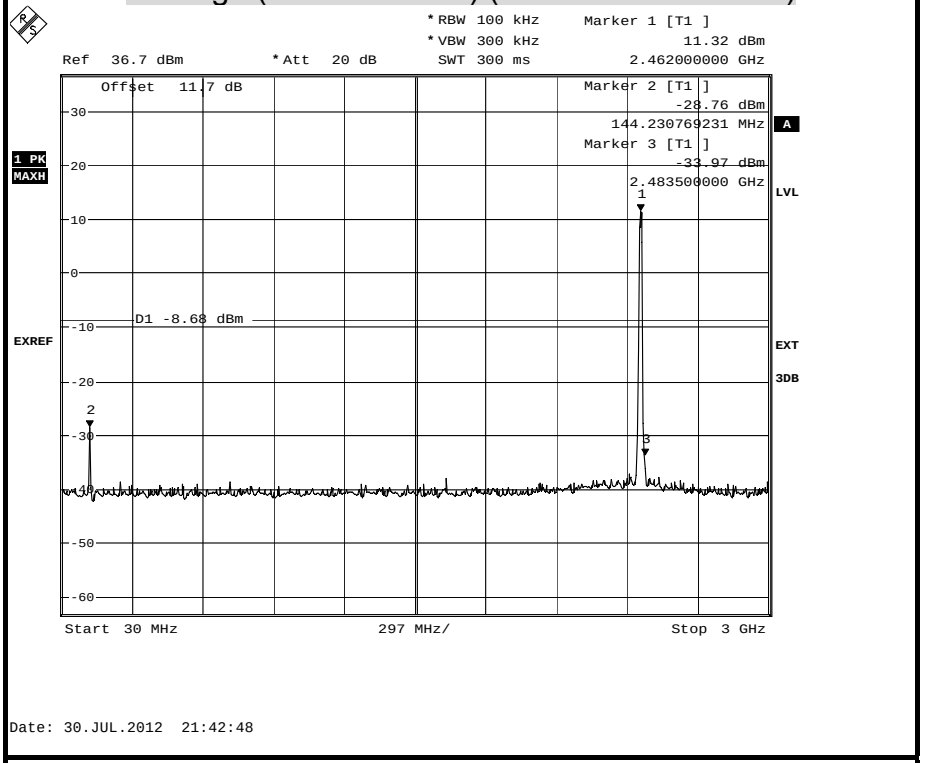
Date: 30.JUL.2012 21:41:00

CH Mid (3GHz~26.5GHz) (IEEE 802.11b Mode)

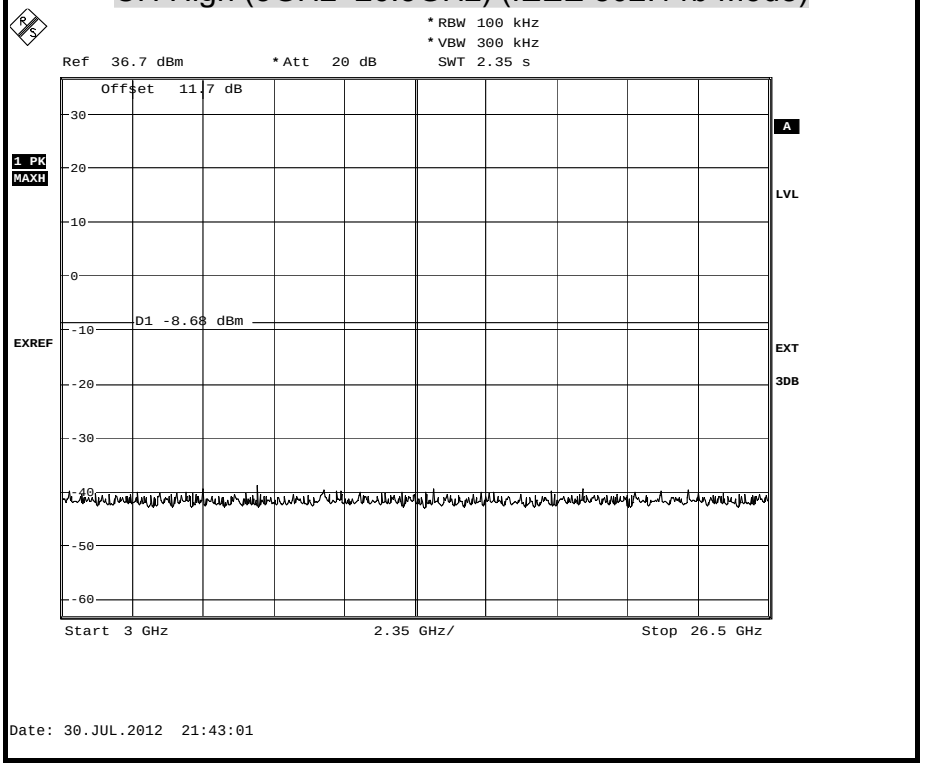


Date: 30.JUL.2012 21:41:18

CH High (30MHz~3GHz) (IEEE 802.11b Mode)

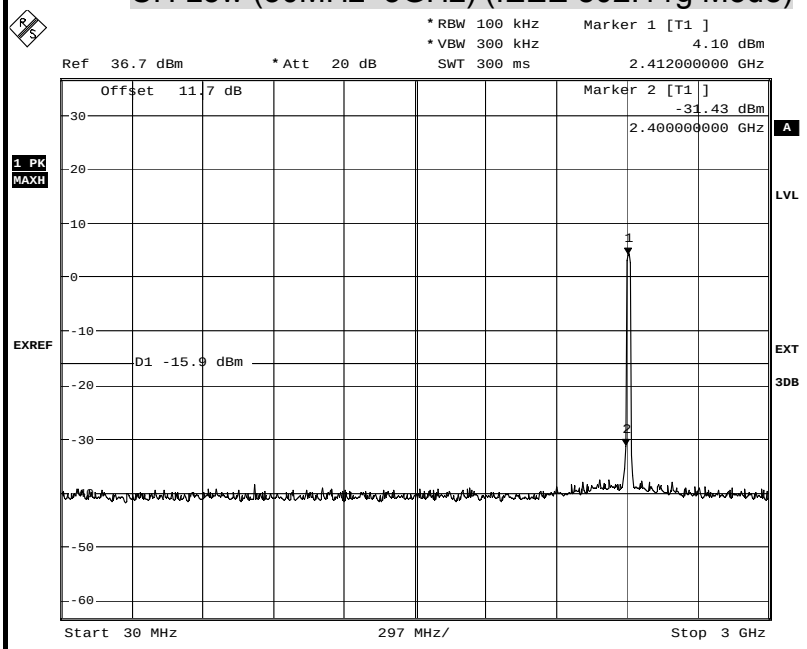


CH High (3GHz~26.5GHz) (IEEE 802.11b Mode)



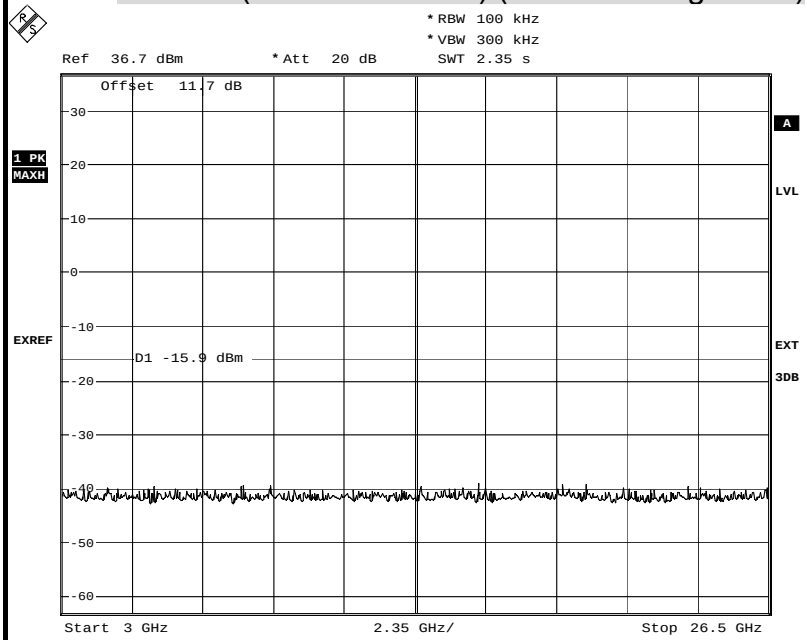
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11g MODE-2.4G)

CH Low (30MHz~3GHz) (IEEE 802.11g Mode)



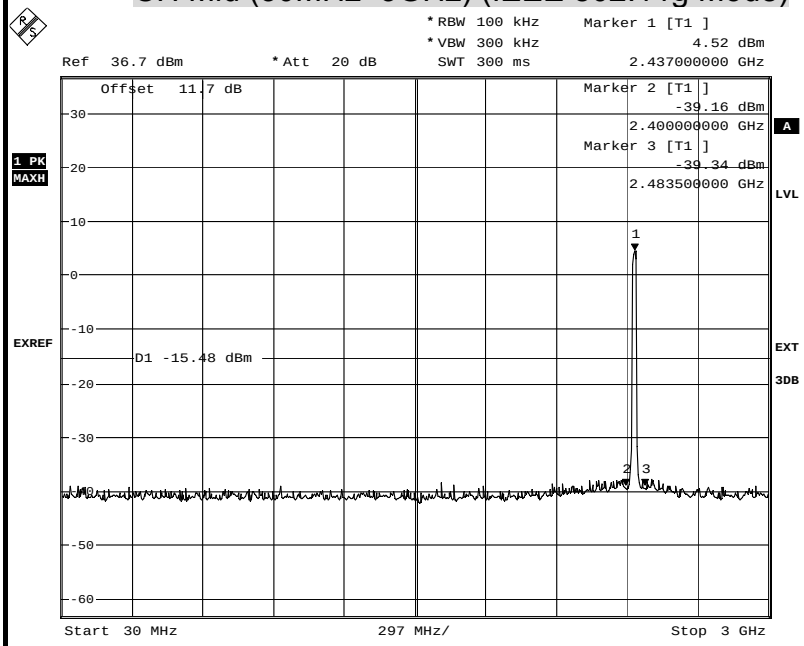
Date: 30.JUL.2012 21:44:04

CH Low (3GHz~26.5GHz) (IEEE 802.11g Mode)



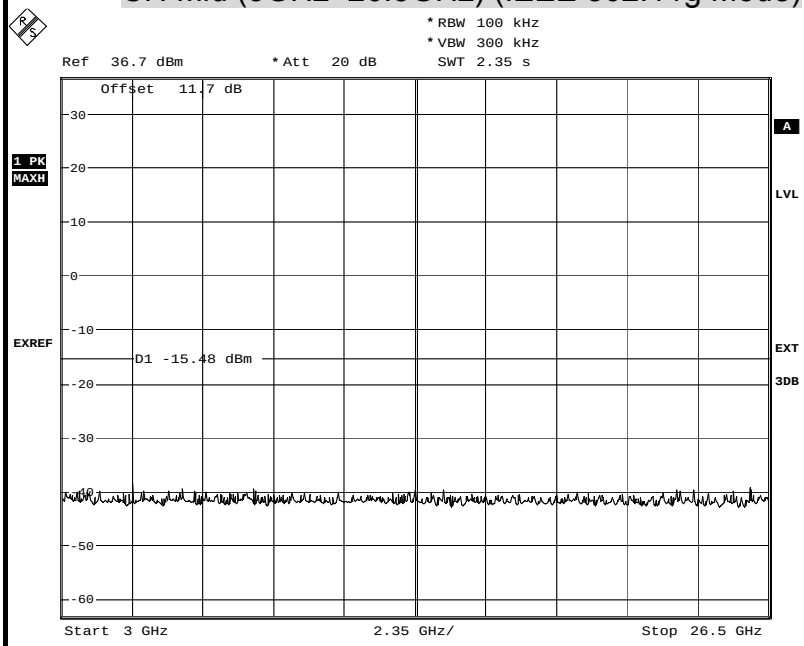
Date: 30.JUL.2012 21:44:19

CH Mid (30MHz~3GHz) (IEEE 802.11g Mode)



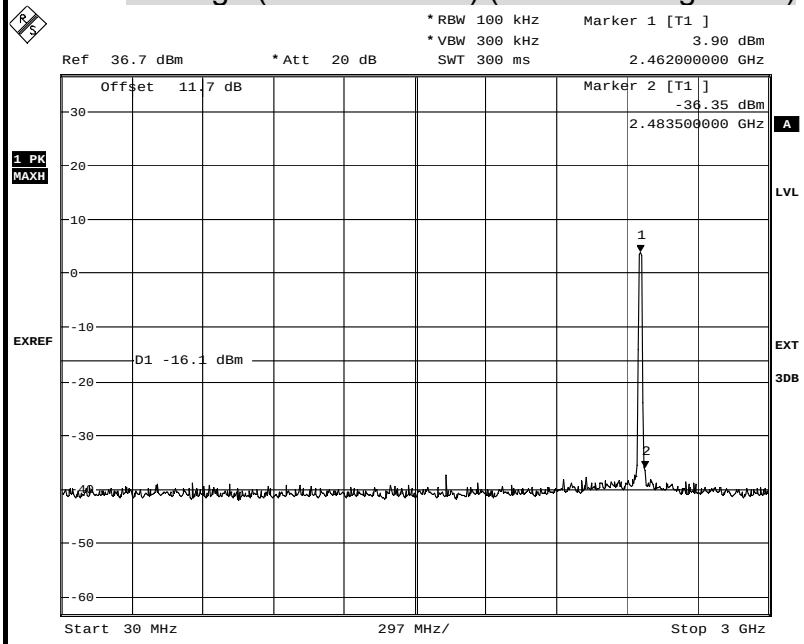
Date: 30.JUL.2012 21:45:08

CH Mid (3GHz~26.5GHz) (IEEE 802.11g Mode)



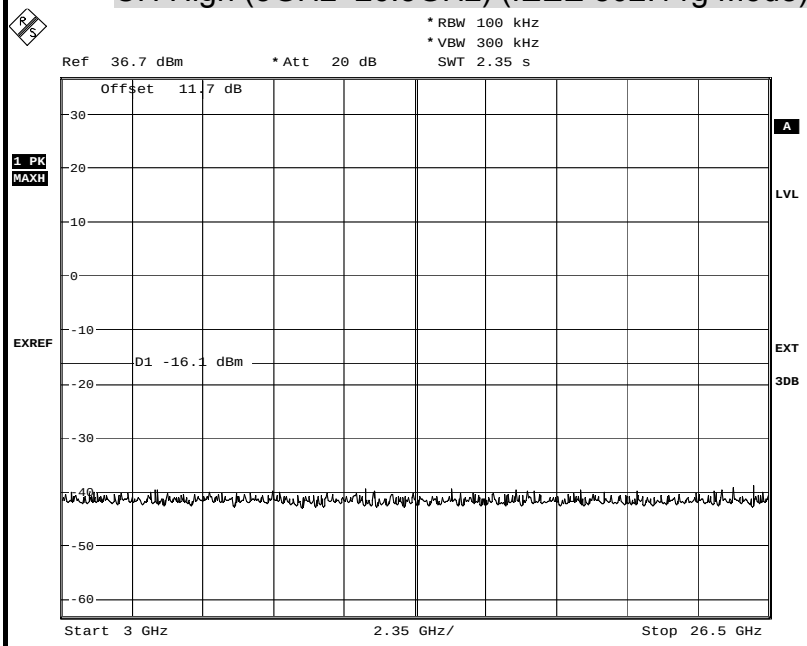
Date: 30.JUL.2012 21:45:22

CH High (30MHz~3GHz) (IEEE 802.11g Mode)



Date: 30.JUL.2012 21:46:15

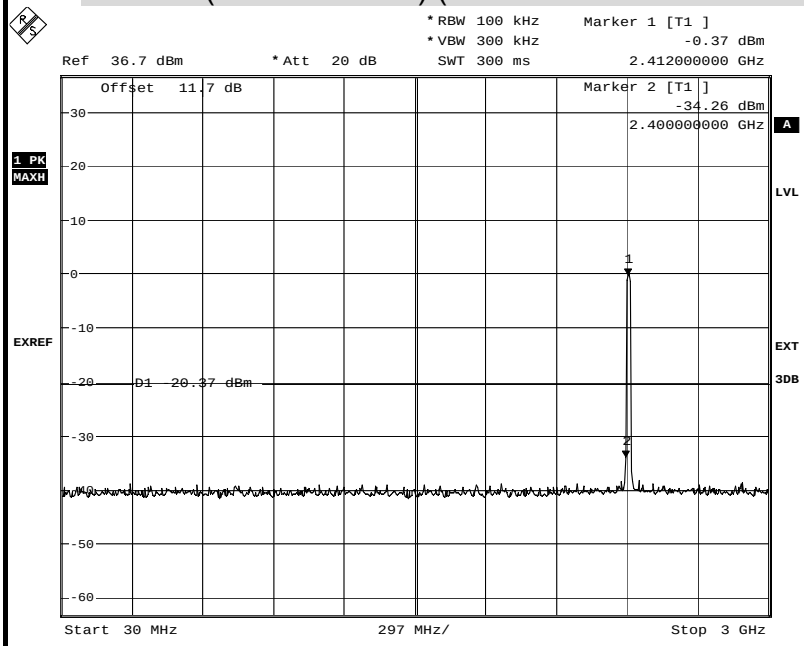
CH High (3GHz~26.5GHz) (IEEE 802.11g Mode)



Date: 30.JUL.2012 21:46:37

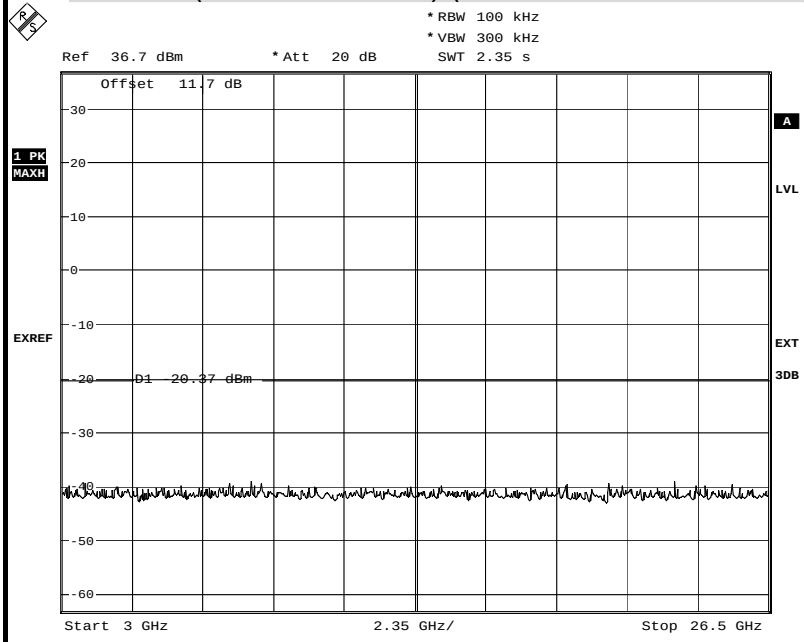
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11n HT20 MODE-2.4G / Chain 0)

CH Low (30MHz~3GHz) (IEEE 802.11n HT20 Mode)



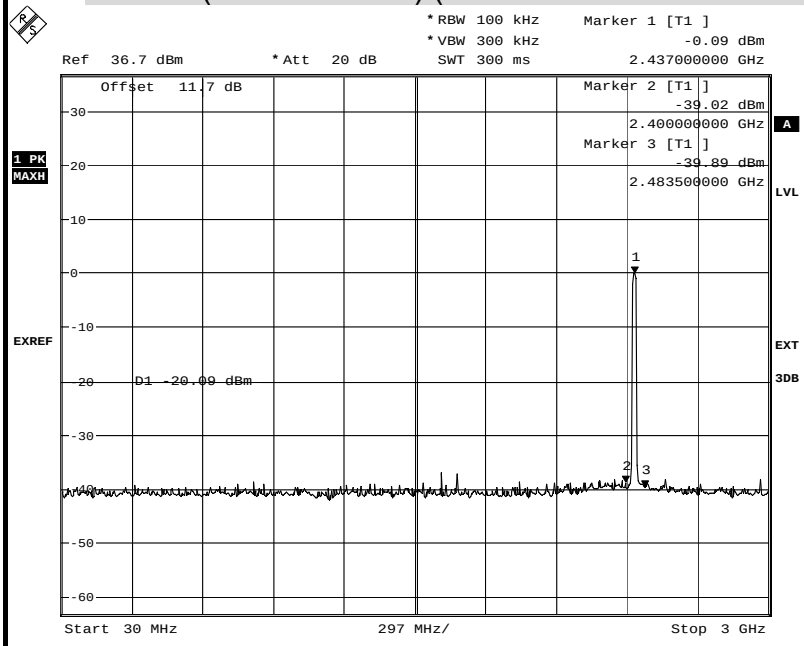
Date: 30.JUL.2012 21:49:47

CH Low (3GHz~26.5GHz) (IEEE 802.11n HT20 Mode)



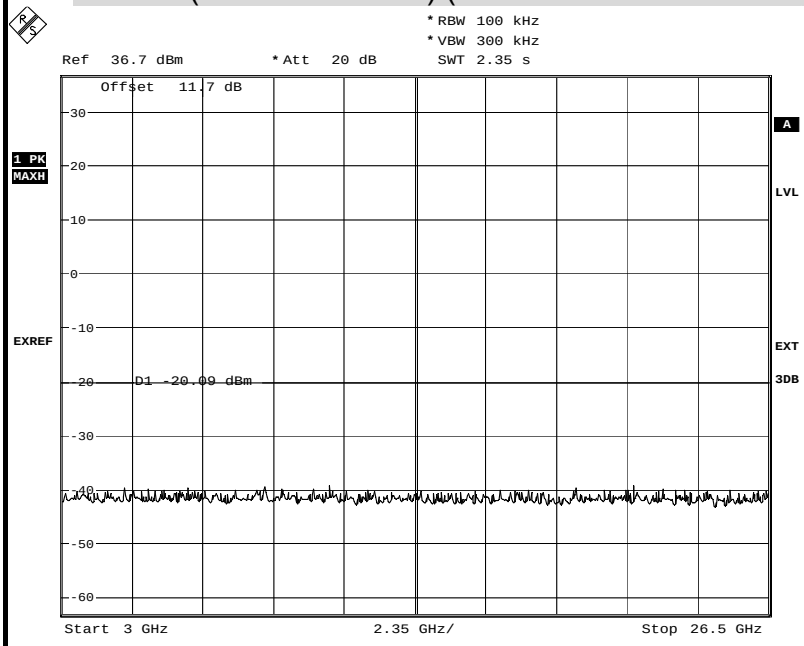
Date: 30.JUL.2012 21:50:02

CH Mid (30MHz~3GHz) (IEEE 802.11n HT20 Mode)



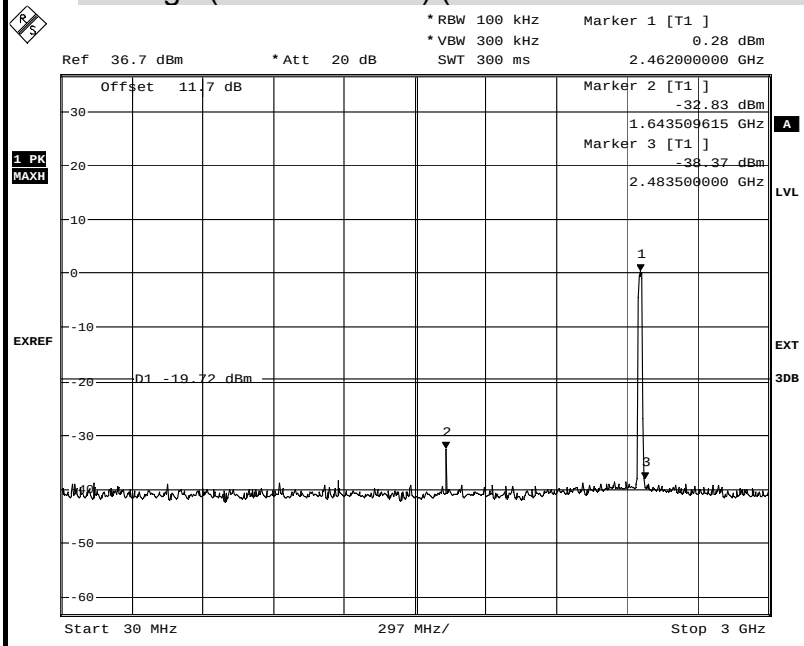
Date: 30.JUL.2012 21:51:14

CH Mid (3GHz~26.5GHz) (IEEE 802.11n HT20 Mode)



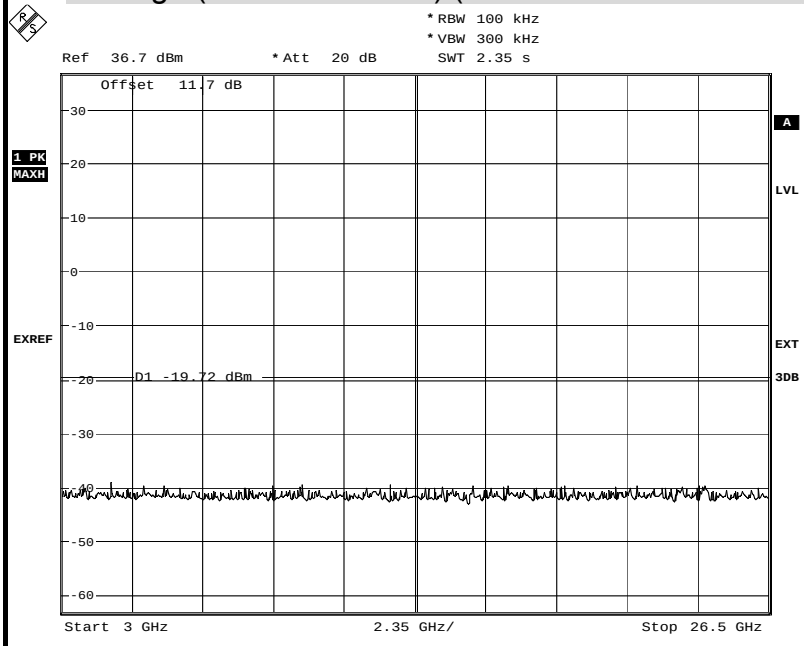
Date: 30.JUL.2012 21:51:30

CH High (30MHz~3GHz) (IEEE 802.11n HT20 Mode)



Date: 30.JUL.2012 21:52:56

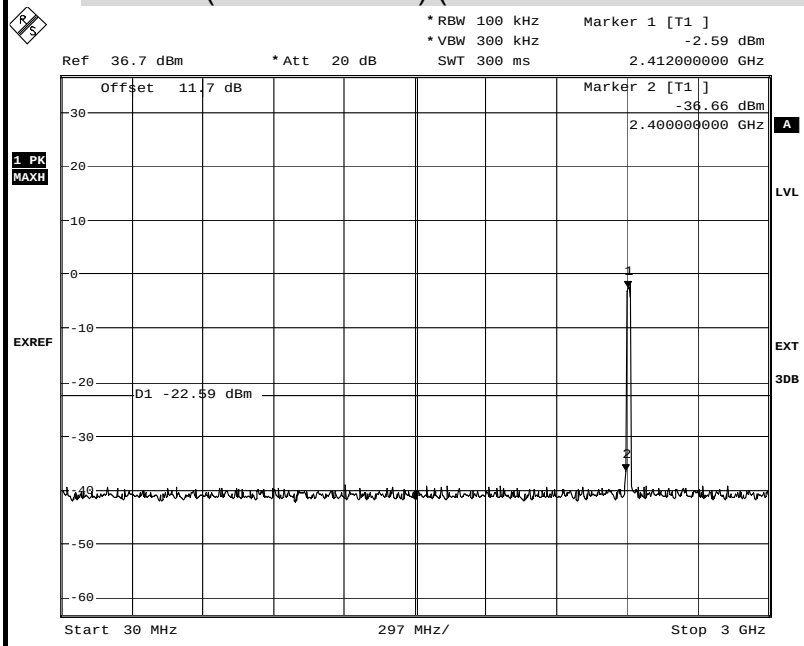
CH High (3GHz~26.5GHz) (IEEE 802.11n HT20 Mode)



Date: 30.JUL.2012 21:53:15

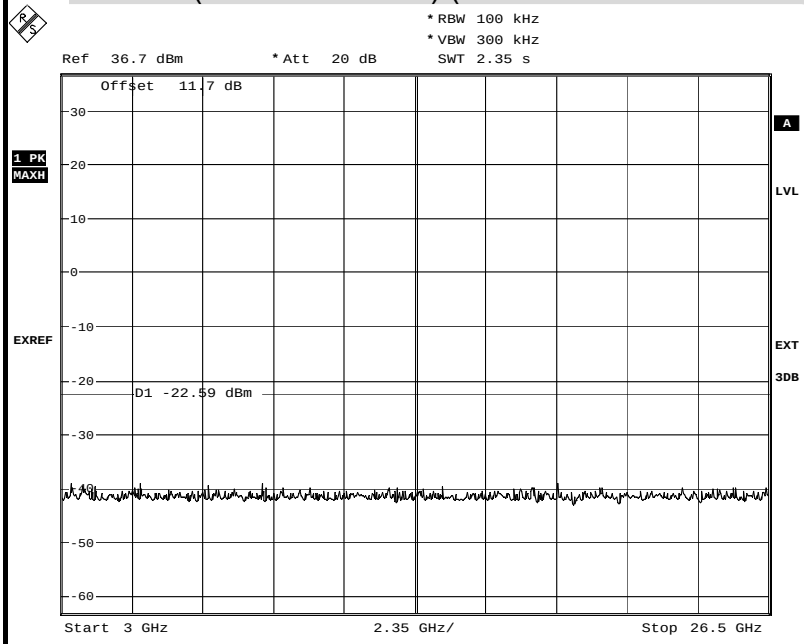
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11n HT20 MODE-2.4G / Chain 1)

CH Low (30MHz~3GHz) (IEEE 802.11n HT20 Mode)



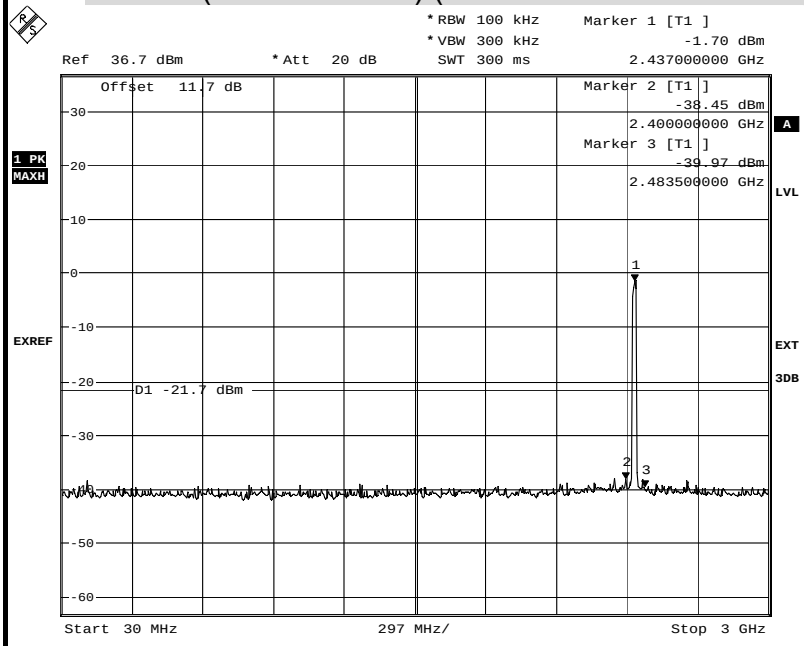
Date: 30.JUL.2012 22:07:30

CH Low (3GHz~26.5GHz) (IEEE 802.11n HT20 Mode)



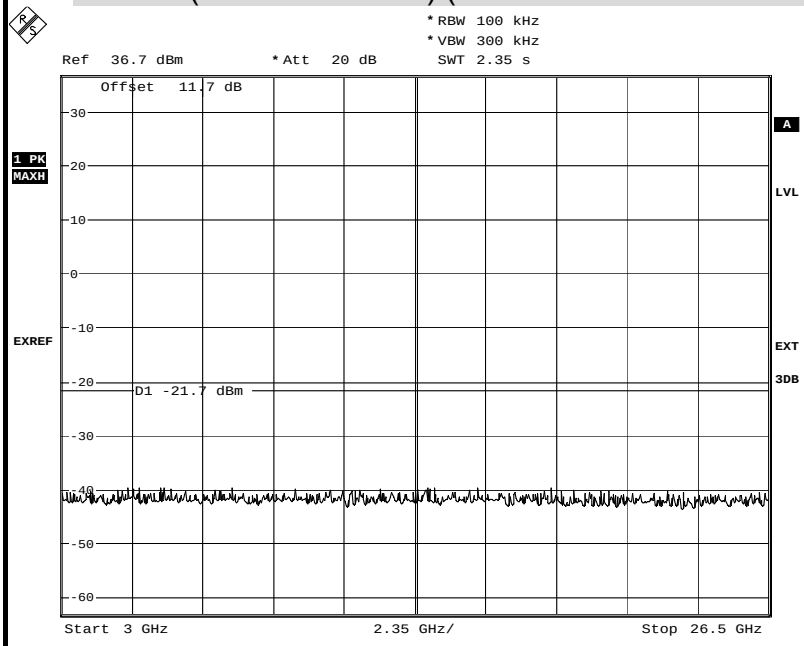
Date: 30.JUL.2012 22:08:18

CH Mid (30MHz~3GHz) (IEEE 802.11n HT20 Mode)



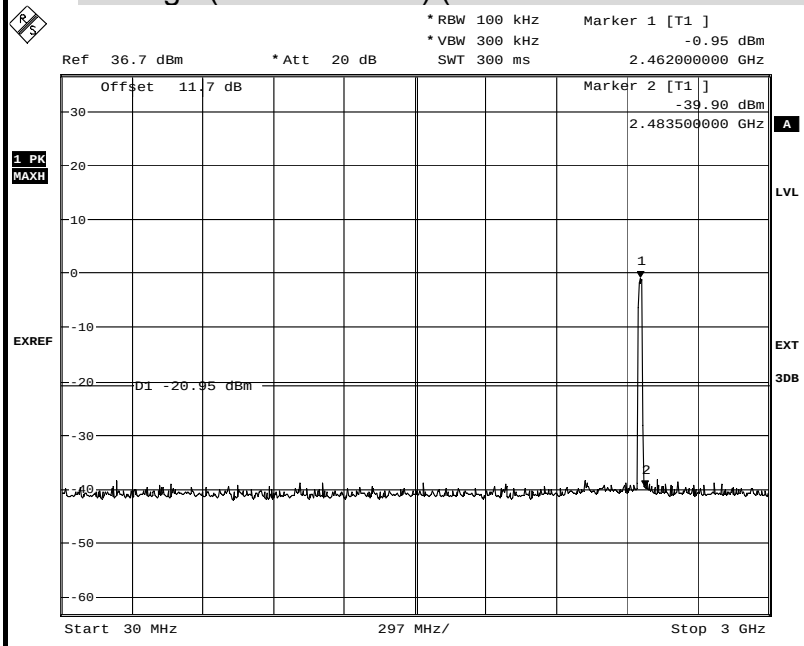
Date: 30.JUL.2012 22:09:13

CH Mid (3GHz~26.5GHz) (IEEE 802.11n HT20 Mode)



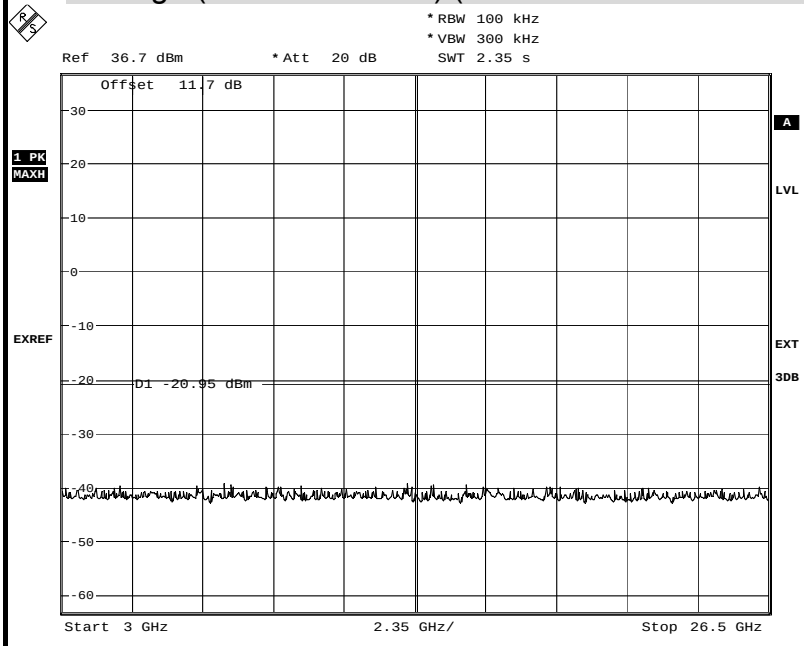
Date: 30.JUL.2012 22:09:23

CH High (30MHz~3GHz) (IEEE 802.11n HT20 Mode)



Date: 30.JUL.2012 22:10:21

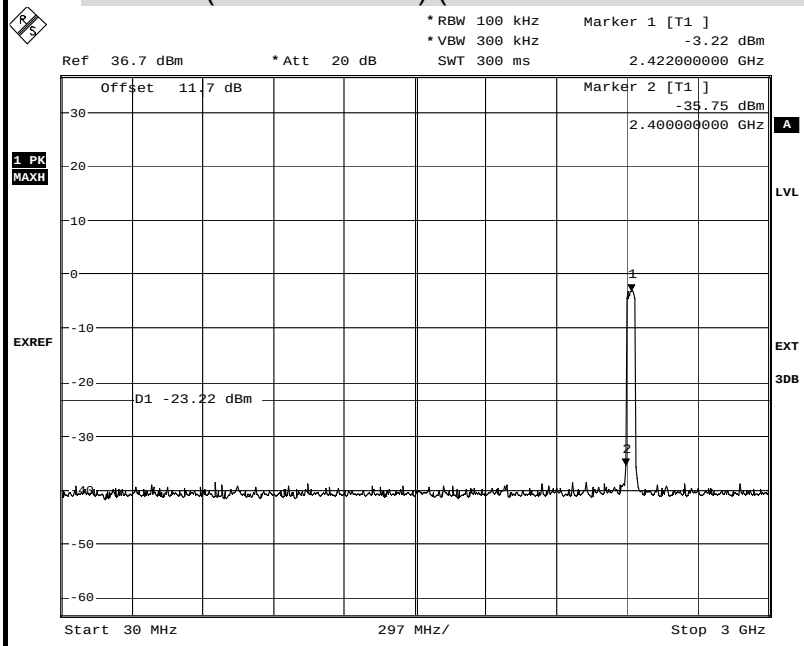
CH High (3GHz~26.5GHz) (IEEE 802.11n HT20 Mode)



Date: 30.JUL.2012 22:10:36

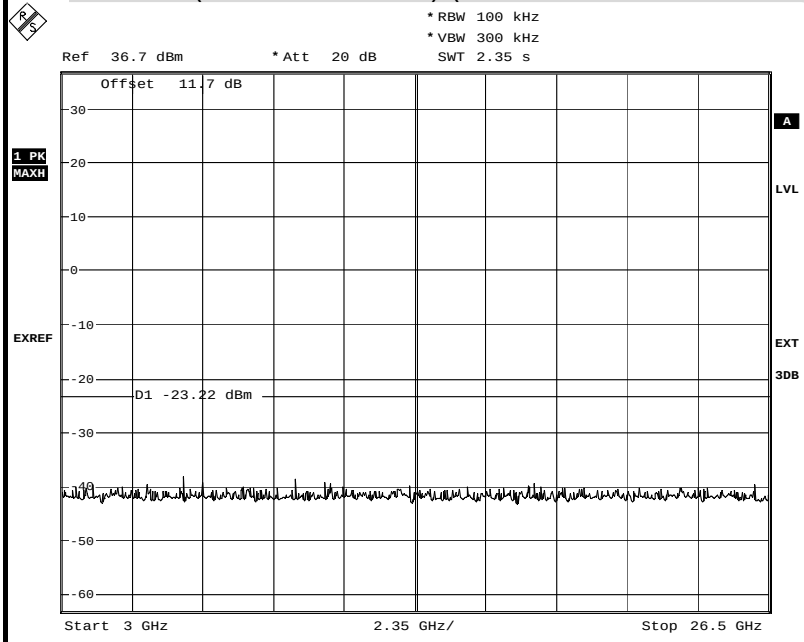
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11n HT40 MODE-2.4G / Chain 0)

CH Low (30MHz~3GHz) (IEEE 802.11n HT40 Mode)



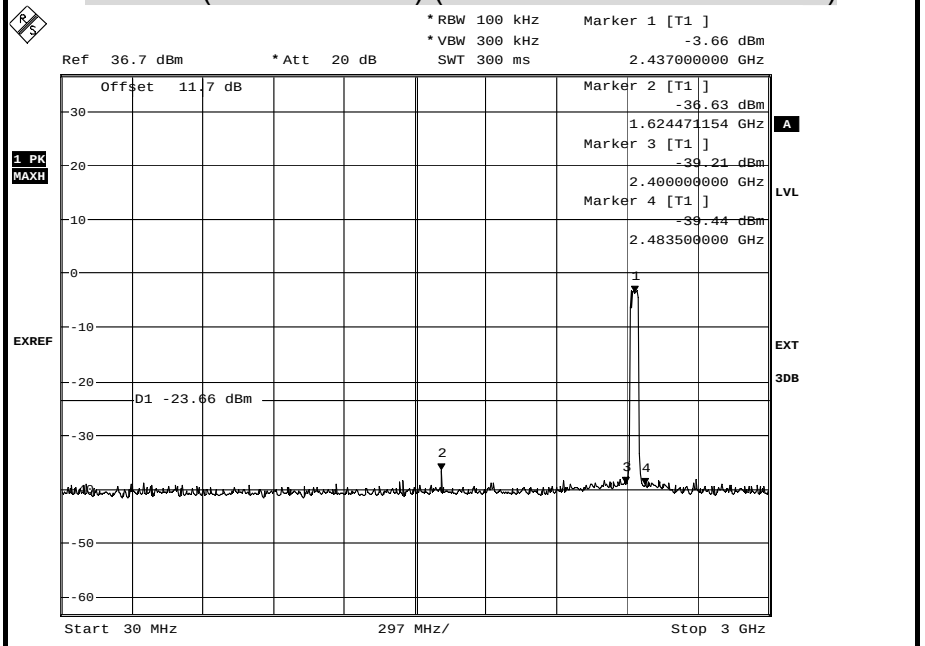
Date: 30.JUL.2012 21:54:23

CH Low (3GHz~26.5GHz) (IEEE 802.11n HT40 Mode)



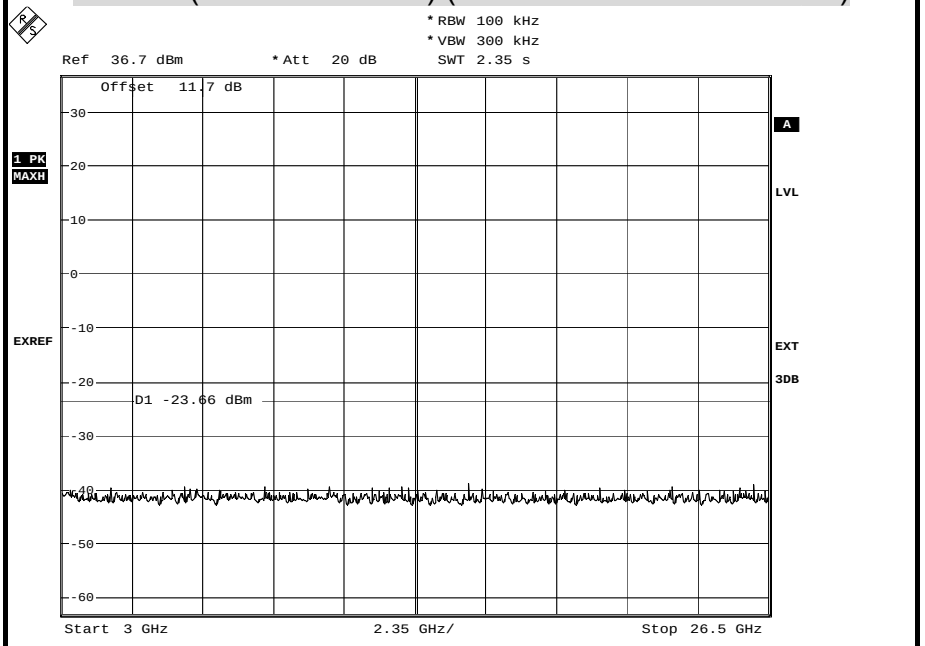
Date: 30.JUL.2012 21:54:39

CH Mid (30MHz~3GHz) (IEEE 802.11n HT40 Mode)



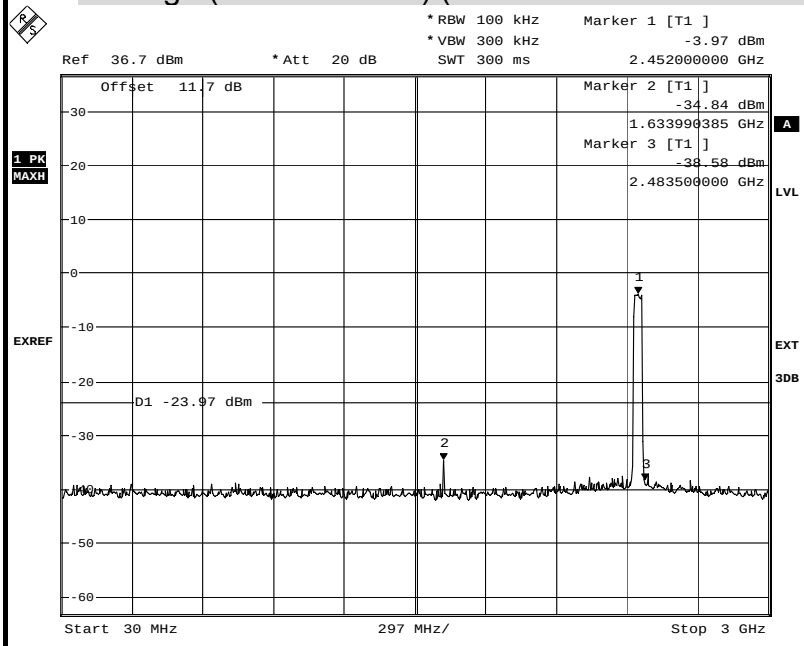
Date: 30.JUL.2012 21:56:06

CH Mid (3GHz~26.5GHz) (IEEE 802.11n HT40 Mode)



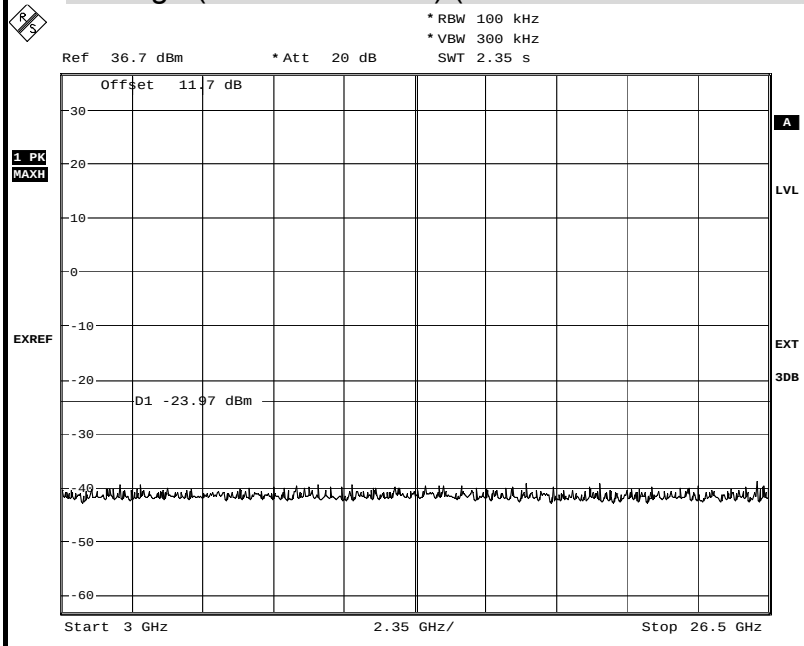
Date: 30.JUL.2012 21:56:20

CH High (30MHz~3GHz) (IEEE 802.11n HT40 Mode)



Date: 30.JUL.2012 21:57:10

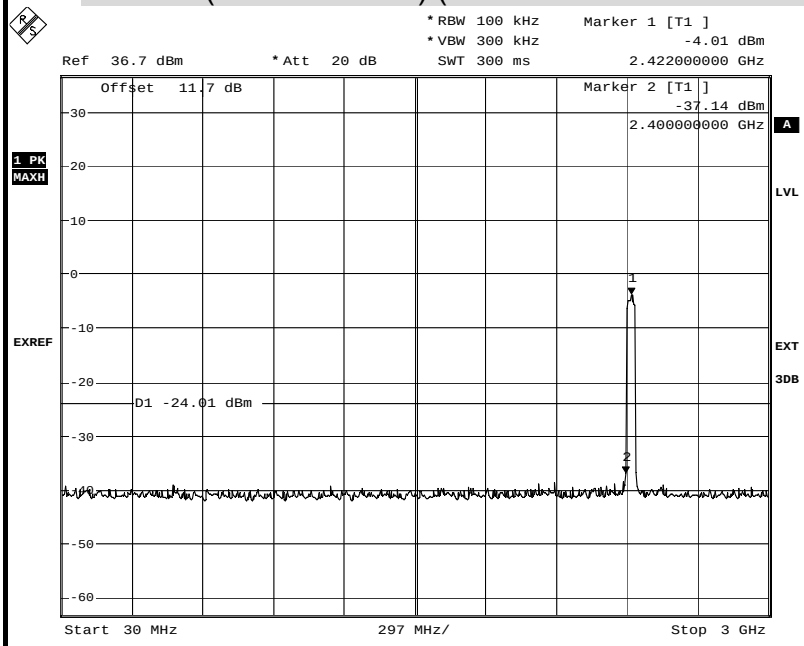
CH High (3GHz~26.5GHz) (IEEE 802.11n HT40 Mode)



Date: 30.JUL.2012 21:57:23

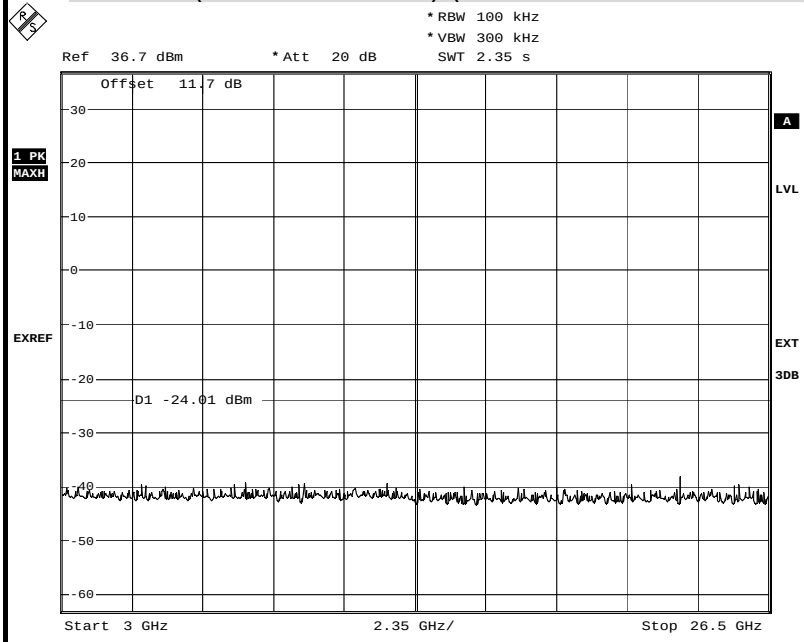
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11n HT40 MODE-2.4G / Chain 1)

CH Low (30MHz~3GHz) (IEEE 802.11n HT40 Mode)



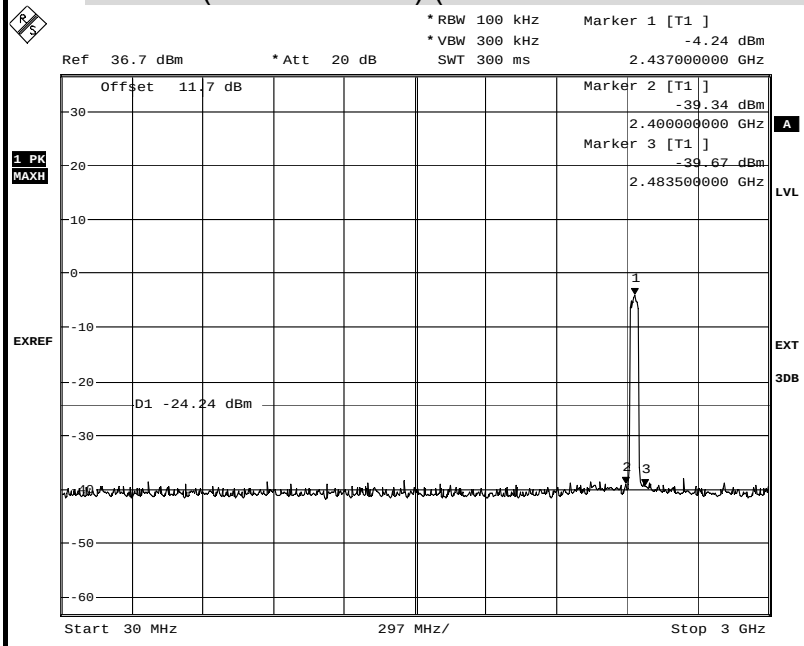
Date: 30.JUL.2012 22:11:53

CH Low (3GHz~26.5GHz) (IEEE 802.11n HT40 Mode)



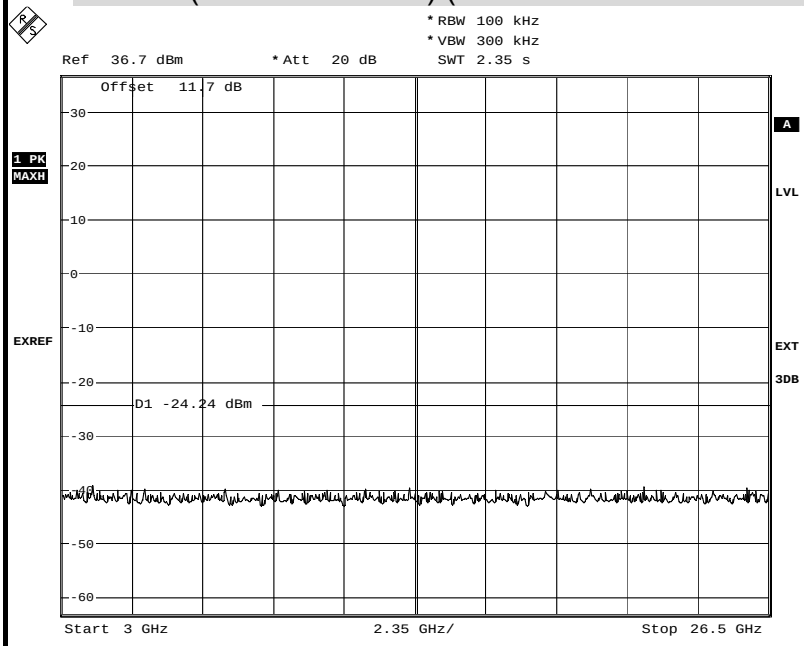
Date: 30.JUL.2012 22:12:05

CH Mid (30MHz~3GHz) (IEEE 802.11n HT40 Mode)



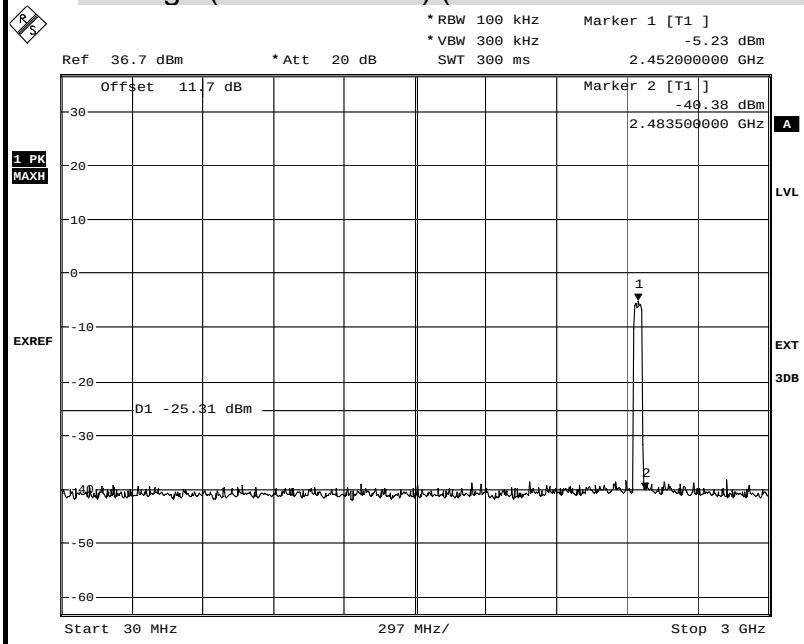
Date: 30.JUL.2012 22:13:04

CH Mid (3GHz~26.5GHz) (IEEE 802.11n HT40 Mode)



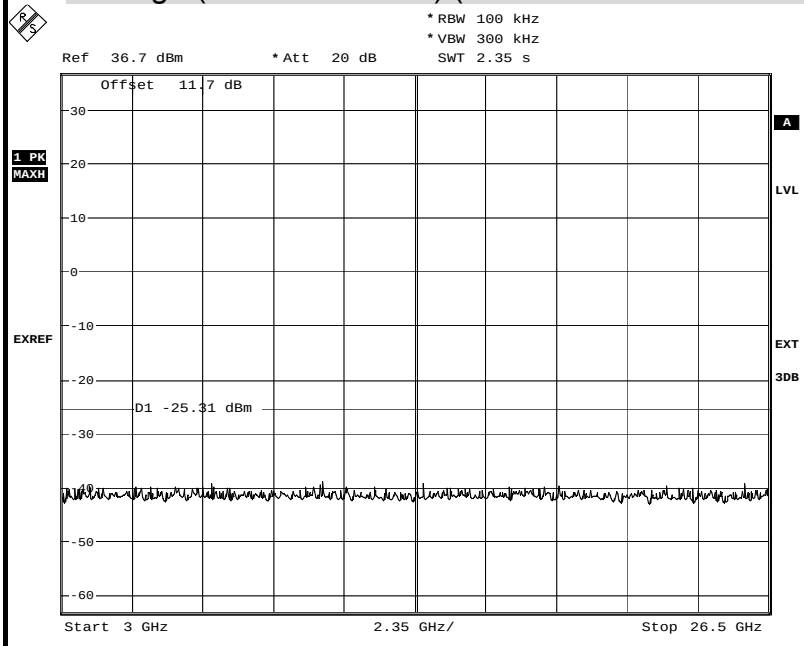
Date: 30.JUL.2012 22:13:18

CH High (30MHz~3GHz) (IEEE 802.11n HT40 Mode)



Date: 30.JUL.2012 22:14:03

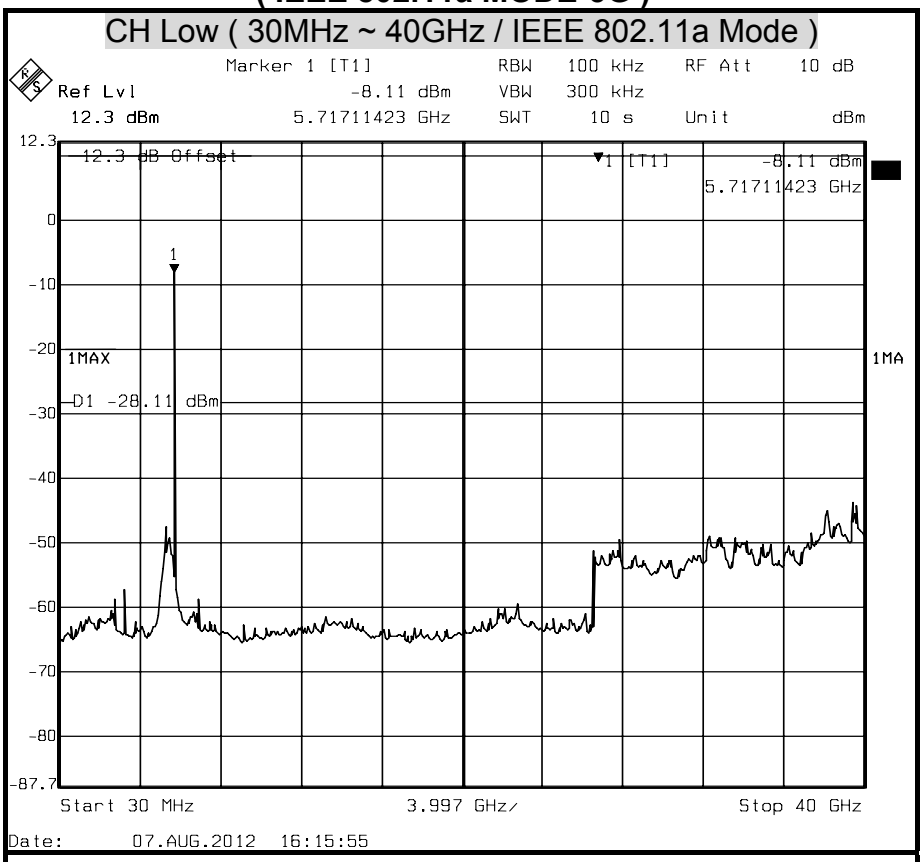
CH High (3GHz~26.5GHz) (IEEE 802.11n HT40 Mode)



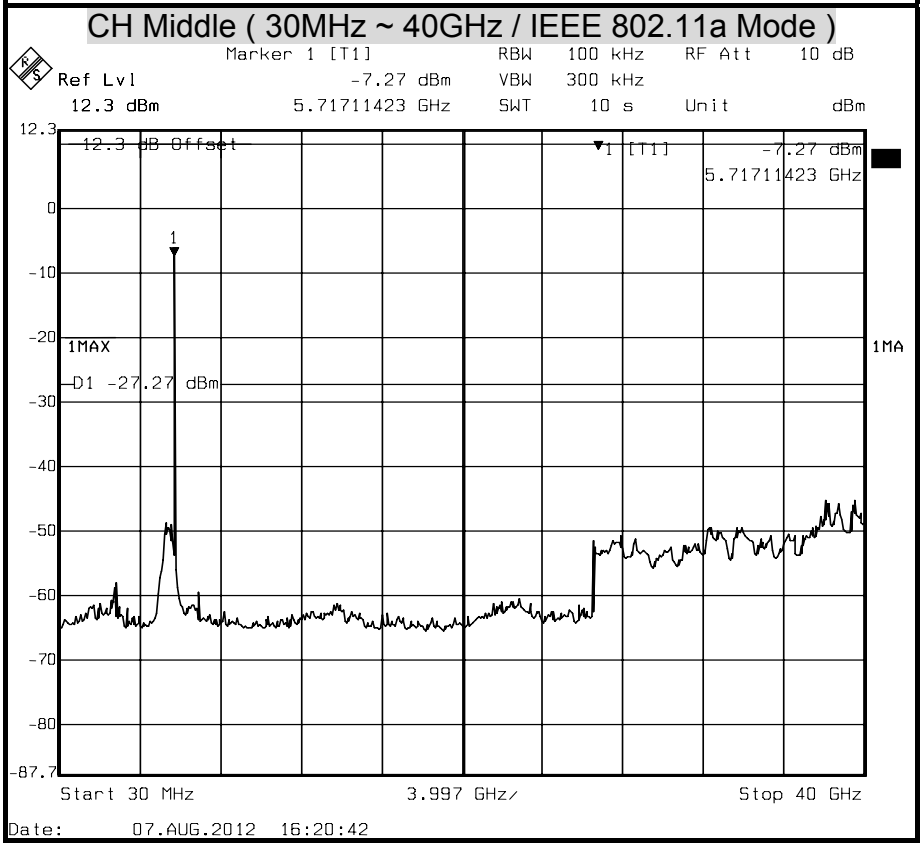
Date: 30.JUL.2012 22:14:18

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11a MODE-5G)

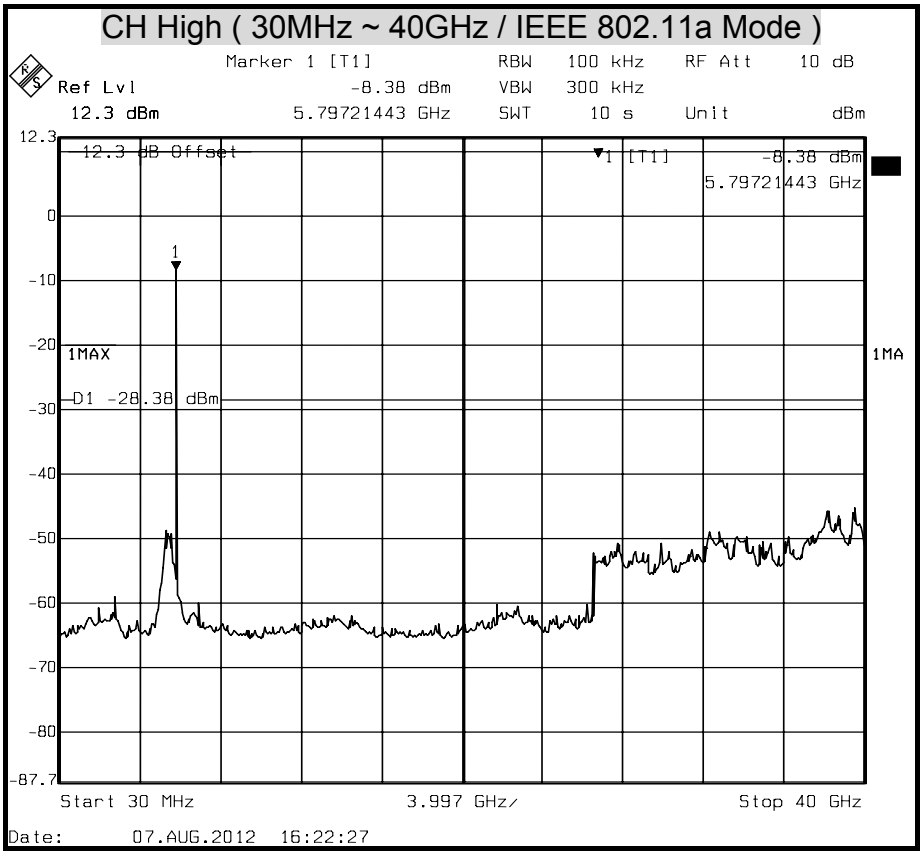
CH Low (30MHz ~ 40GHz / IEEE 802.11a Mode)



CH Middle (30MHz ~ 40GHz / IEEE 802.11a Mode)

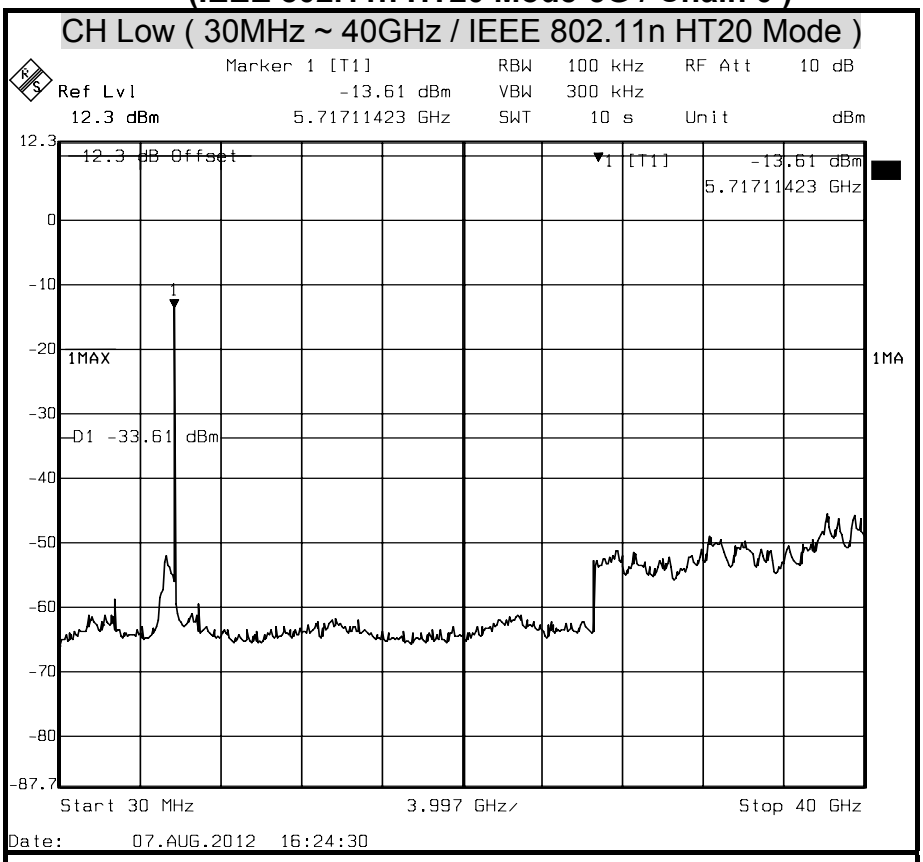


CH High (30MHz ~ 40GHz / IEEE 802.11a Mode)

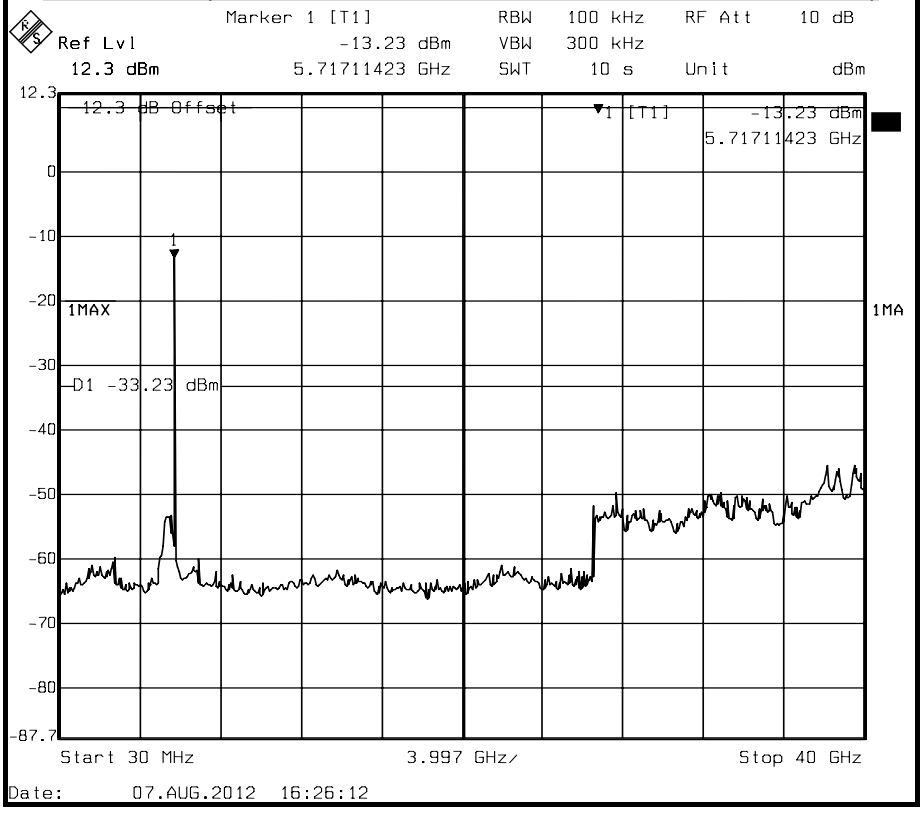


OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11n HT20 Mode-5G / Chain 0)

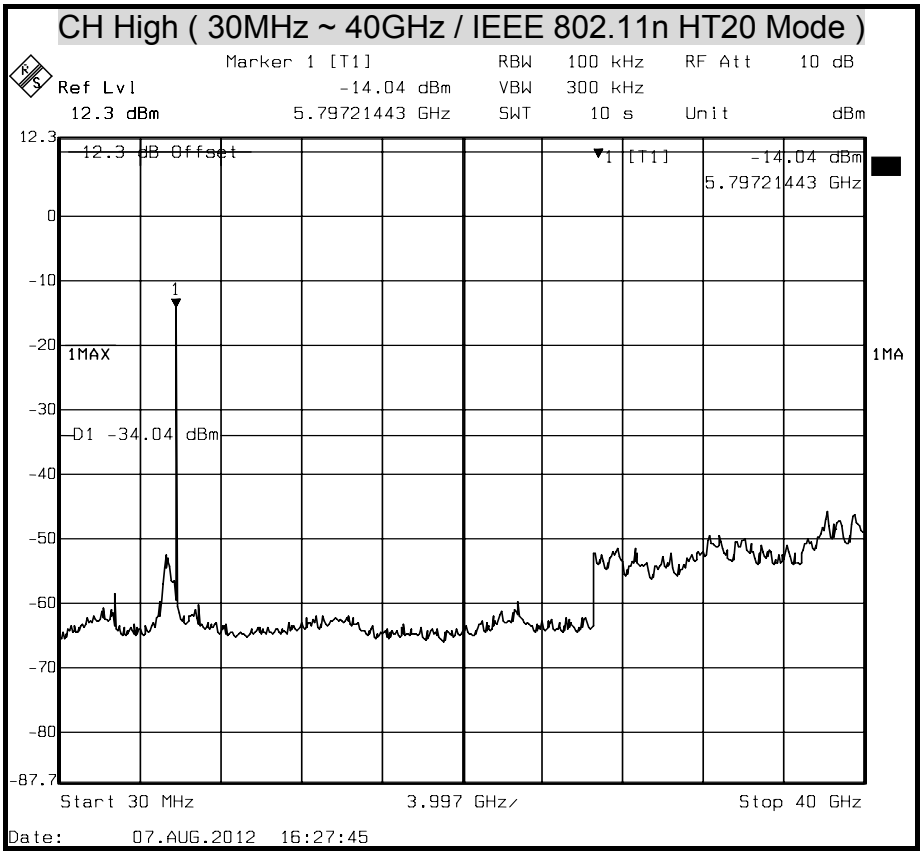
CH Low (30MHz ~ 40GHz / IEEE 802.11n HT20 Mode)



CH Middle (30MHz ~ 40GHz / IEEE 802.11n HT20 Mode)

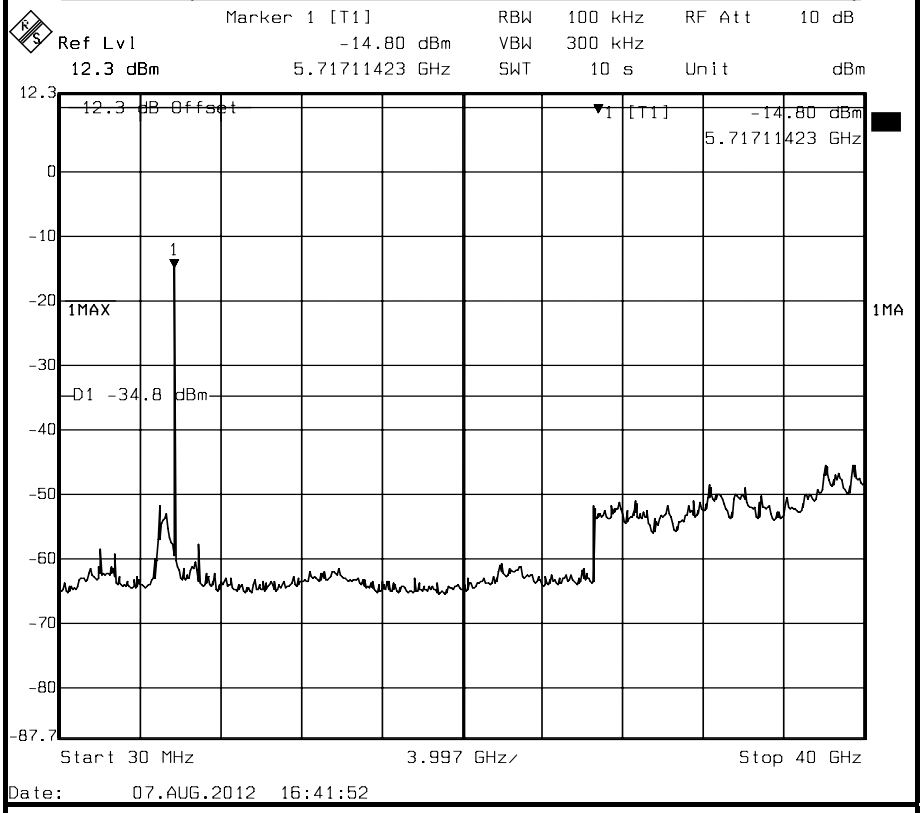


CH High (30MHz ~ 40GHz / IEEE 802.11n HT20 Mode)

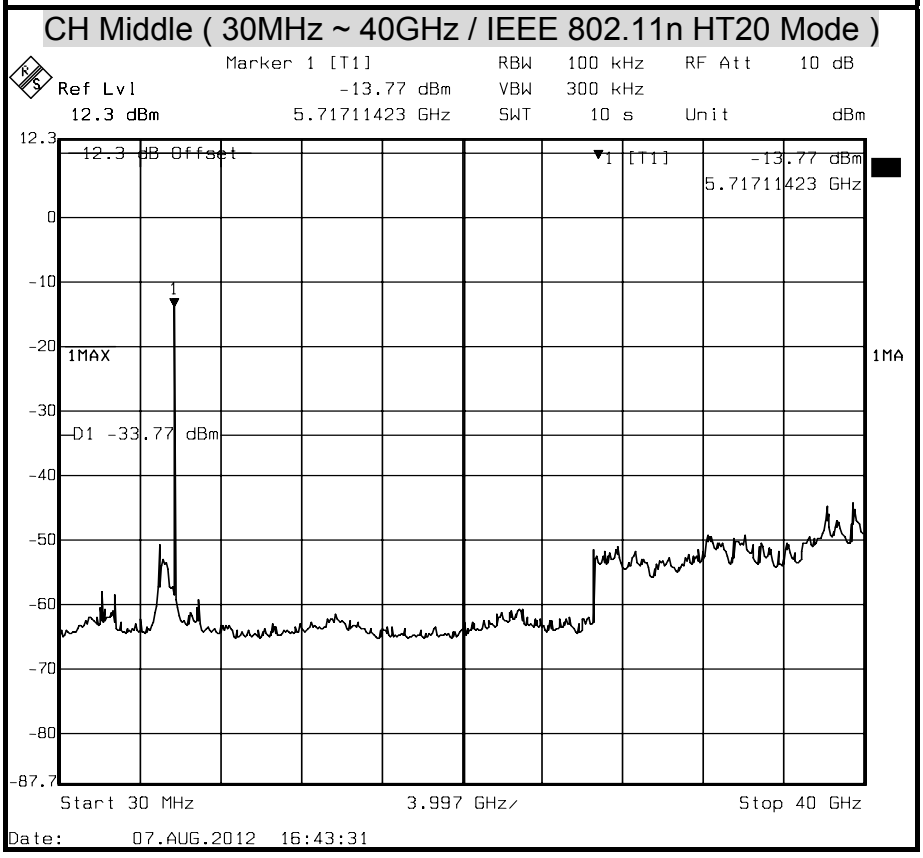


OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11n HT20 Mode-5G / Chain 1)

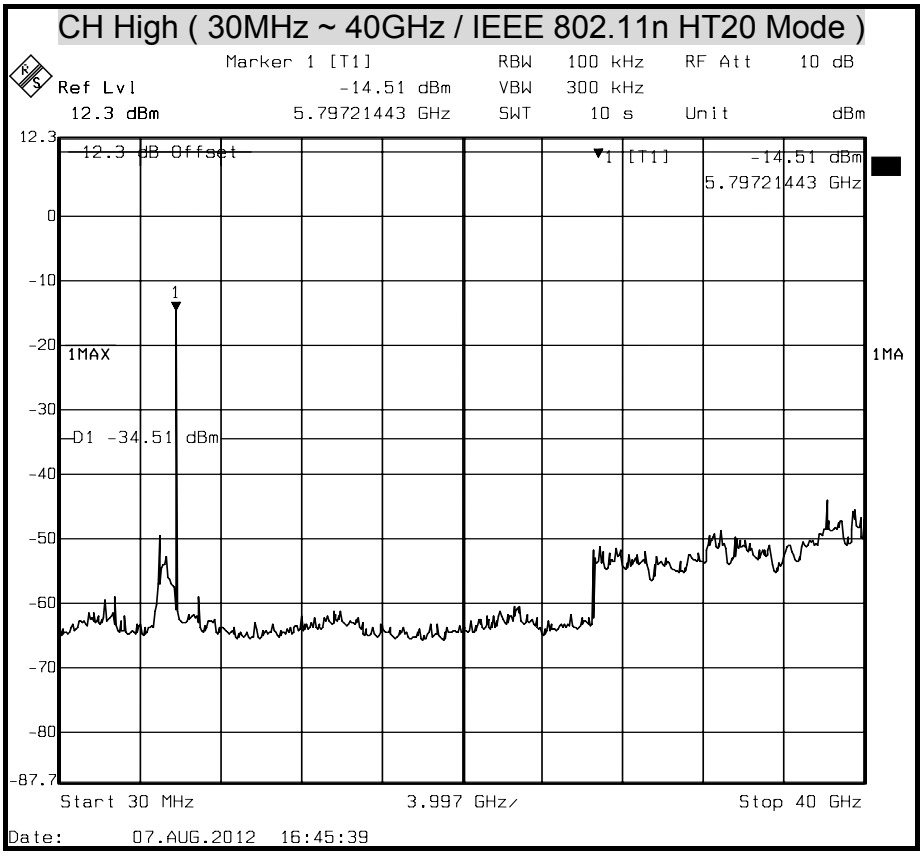
CH Low (30MHz ~ 40GHz / IEEE 802.11n HT20 Mode)



CH Middle (30MHz ~ 40GHz / IEEE 802.11n HT20 Mode)

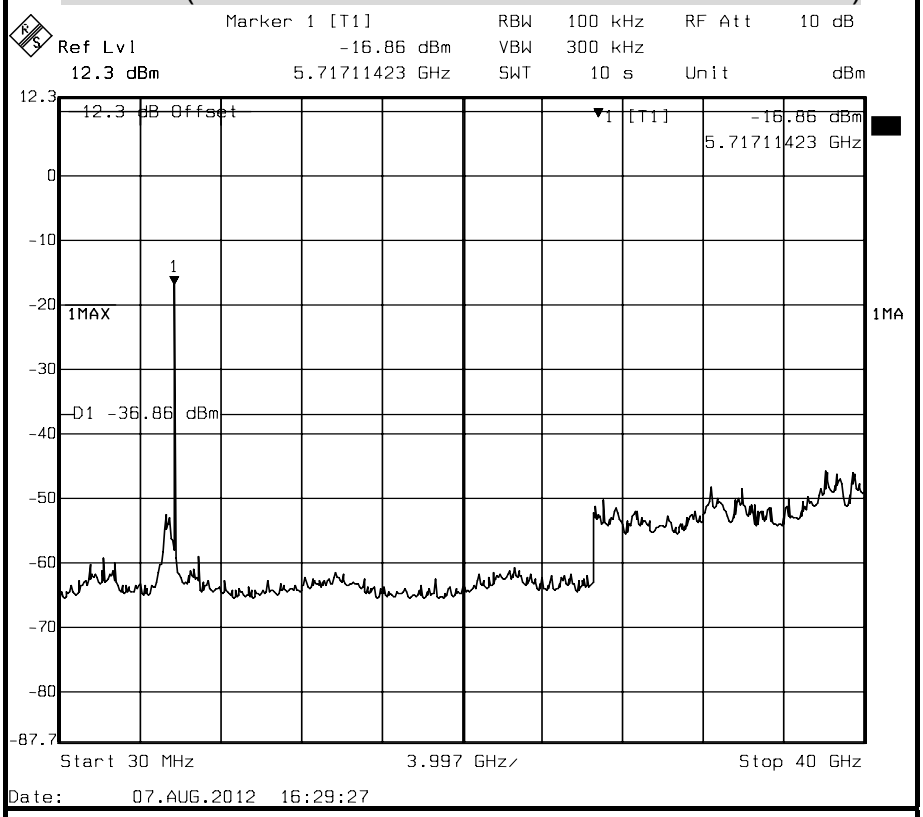


CH High (30MHz ~ 40GHz / IEEE 802.11n HT20 Mode)

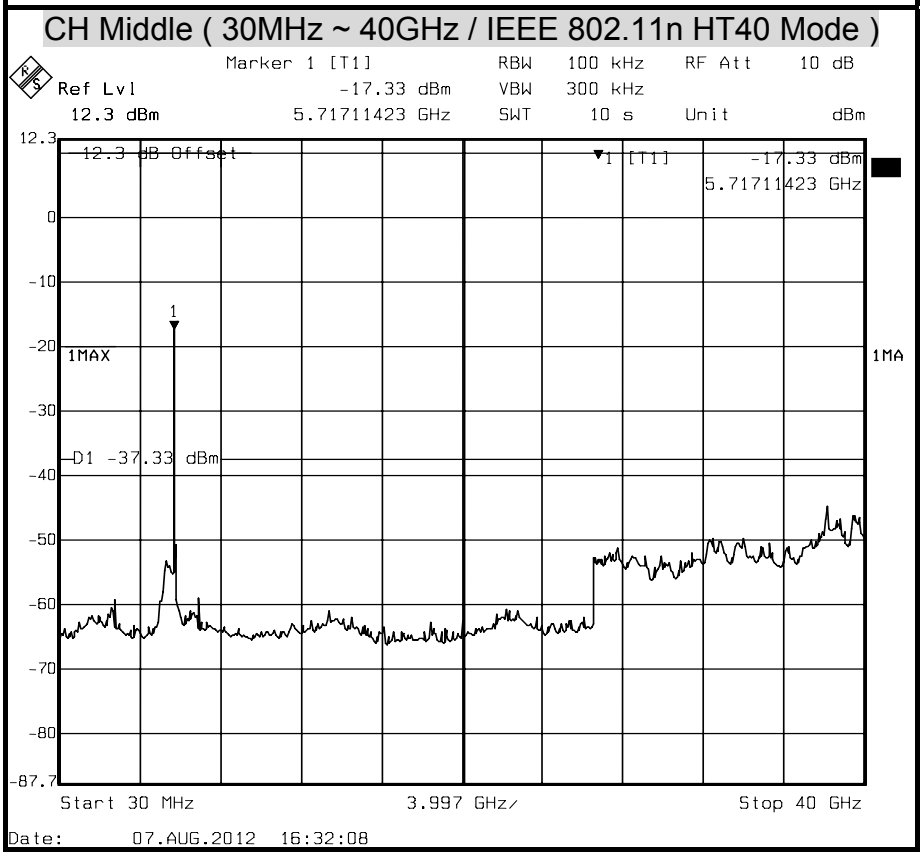


OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11n HT40 Mode-5G / Chain 0)

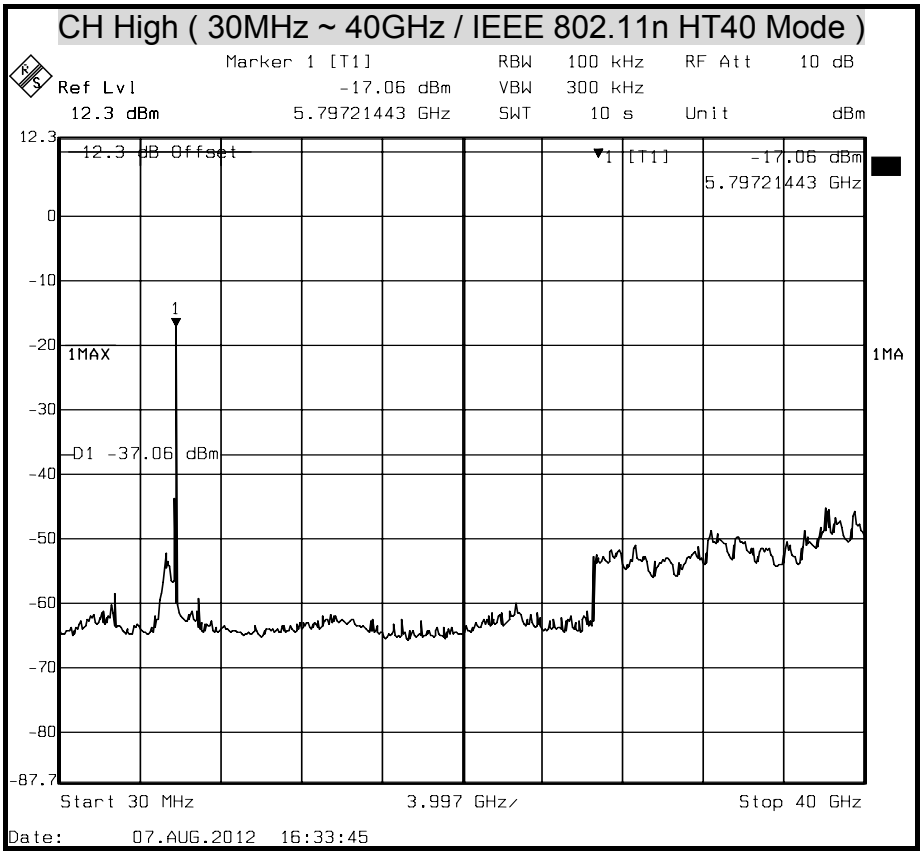
CH Low (30MHz ~ 40GHz / IEEE 802.11n HT40 Mode)



CH Middle (30MHz ~ 40GHz / IEEE 802.11n HT40 Mode)

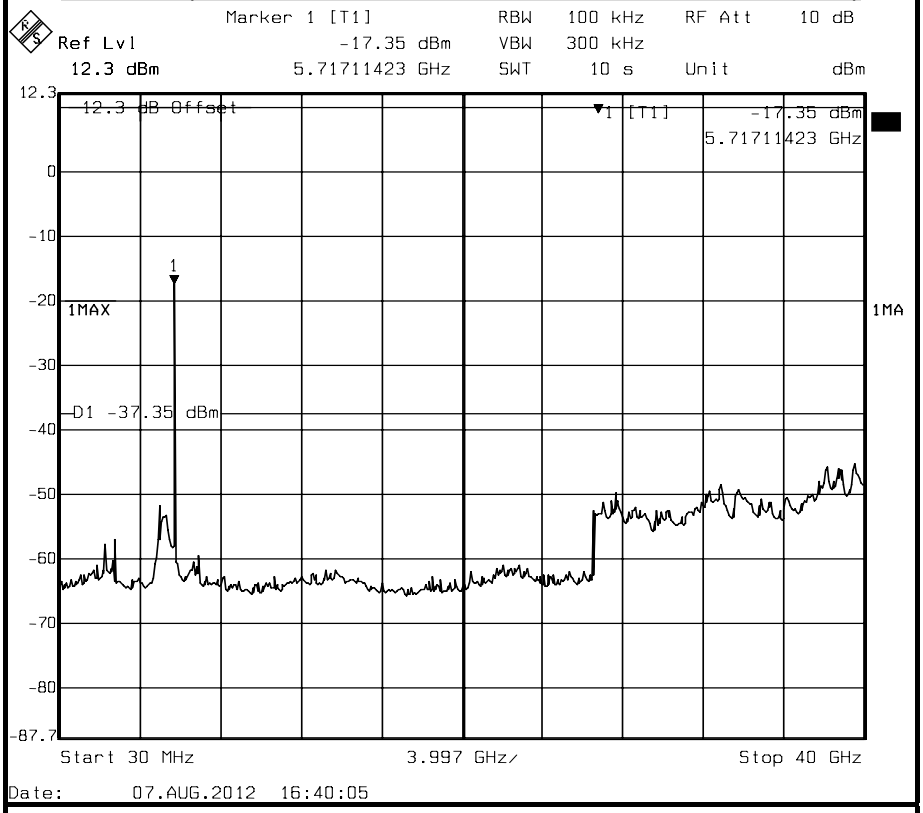


CH High (30MHz ~ 40GHz / IEEE 802.11n HT40 Mode)

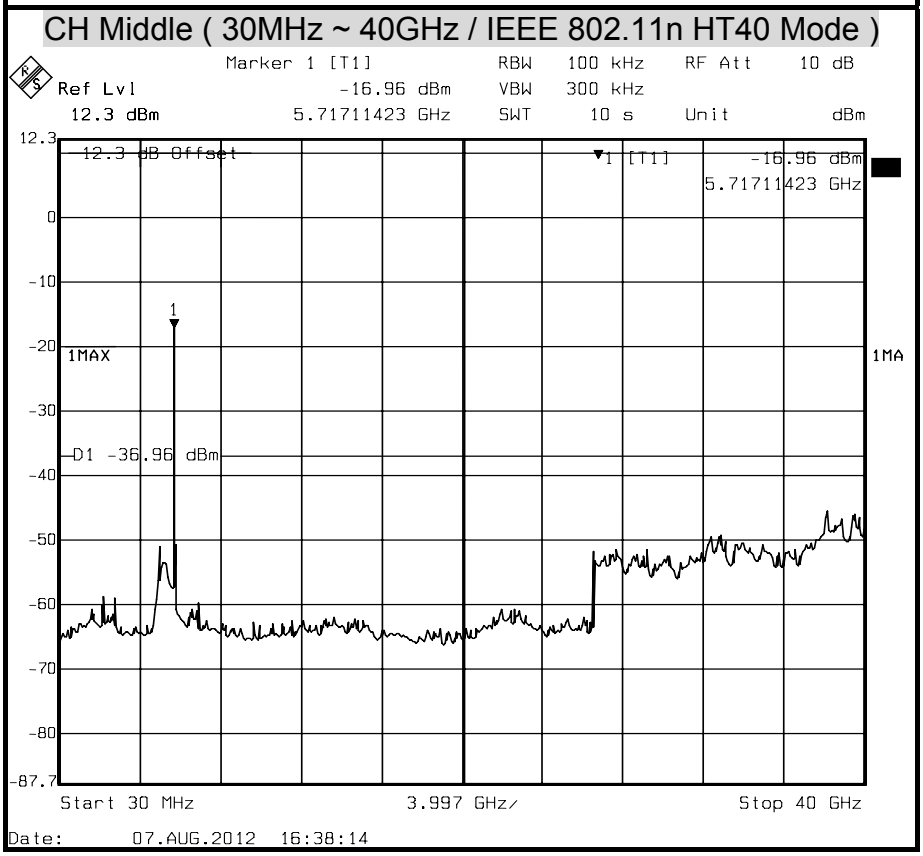


OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT
(IEEE 802.11n HT40 Mode-5G / Chain 1)

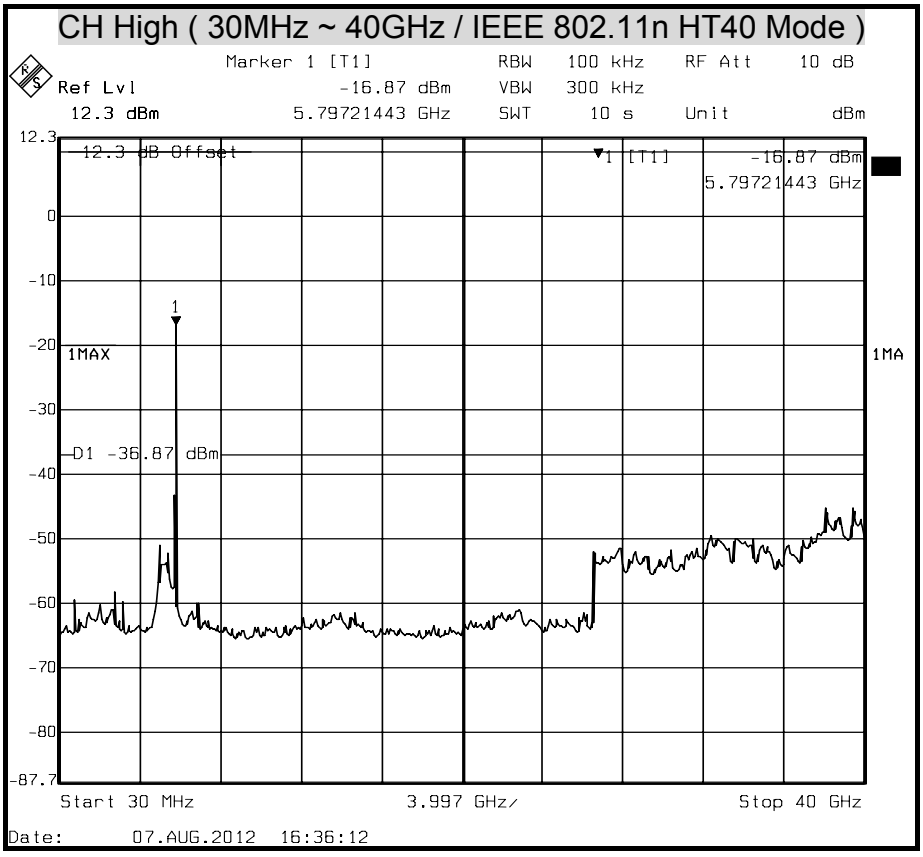
CH Low (30MHz ~ 40GHz / IEEE 802.11n HT40 Mode)



CH Middle (30MHz ~ 40GHz / IEEE 802.11n HT40 Mode)



CH High (30MHz ~ 40GHz / IEEE 802.11n HT40 Mode)



7.6 RADIATED EMISSION

LIMITS

(1) According to § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

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

(2) According to § 15.205 (b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

(3) According to § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/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

Remark: ***Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

(4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST EQUIPMENT

The following test equipments are utilized in making the measurements contained in this report.

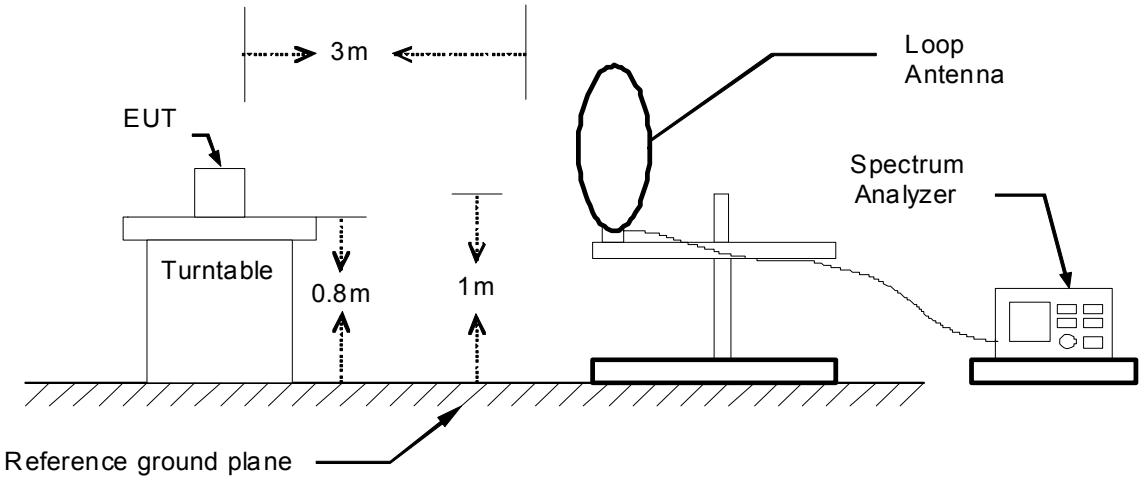
Open Area Test Site # 6				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
TYPE N COAXIAL CABLE	SUHNER	CHA9513	6	NOV. 15, 2012
BI-LOG Antenna	Sunol	JB1	A070506-2	OCT. 03, 2012
LOOP ANTENNA	EMCO	6502	8905-2356	JUN. 10, 2013
Pre-Amplifier	HP	8447F	2944A03817	NOV. 23, 2012
EMI Receiver	R&S	ESVS10	833206/012	MAY. 31, 2013
RF Cable	SUHNER	SUCOFLEX104PEA	20520/4PEA	NOV. 10, 2012
Horn Antenna	Com-Power	AH-118	071032	DEC. 04, 2012
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29, 2012
Spectrum Analyzer	FSU	200789	---	SEP. 29, 2012
Pre-Amplifier	MITEQ	AFS44-00108650-42-10P-44	1205908	NOV. 23, 2012
3116 Double Ridge Antenna (40G)	ETS-LINDGREN	EMCO-003	00078	NOV. 14, 2012
Turn Table	Yo Chen	001	----------	N.C.R.
Antenna Tower	AR	TP1000A	309874	N.C.R.
Controller	CT	SC101	----------	N.C.R.
RF Swicth	E-INSTRUMENT TELH LTD	ERS-180A	EC1204141	N.C.R
Power Meter	Anritsu	ML2487A	6K00003888	MAY. 30, 2013
Power Sensor	Anritsu	MA2491A	33265	MAY. 30, 2013
Temp./Humidity Chamber	K.SON	THS-M1	242	AUG. 09, 2013
Signal Generator	HP	8673C	2938A00663	SEP. 12, 2012
DC Power Source	LOKO	DSP-5050	L1507009282	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

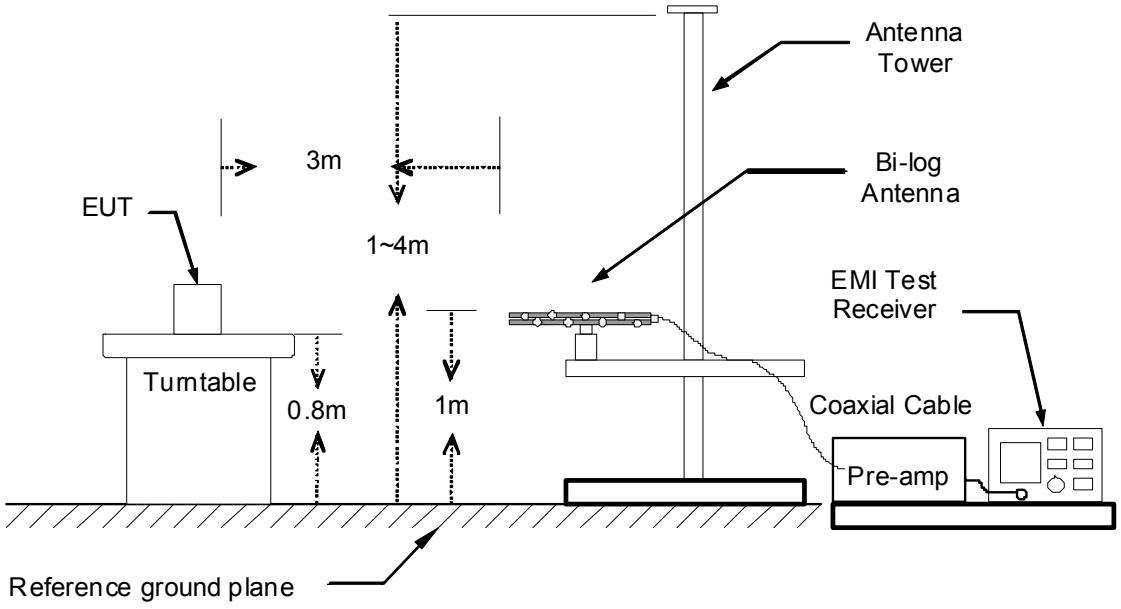
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

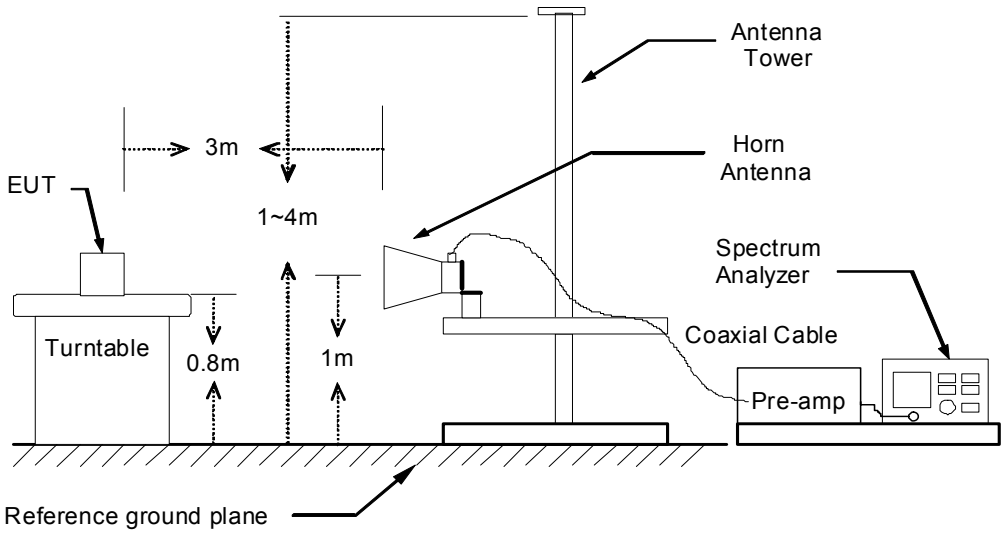
9kHz ~ 30MHz



30MHz ~ 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
7. The tests were performed in accordance with KDB 558074 5.4 .

Remark：

1. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.*
2. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.*
3. *The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.*

TEST RESULTS

Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

Below 1 GHz (30MHz ~ 1GHz)

Model	DIR-840L	Test By	Taiyu Cyu
Test Mode	3G Mode	Test Date	2012/07/26
TEMP & Humidity	29°C, 55%	Adapter 1	AMS4-1202000FU

Horizontal

Freq. MHz	Reading Level dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
125.00	1.10	13.68	2.39	17.16	30.00	-12.84	QP
160.00	5.10	12.45	2.80	20.35	30.00	-9.65	QP
250.00	16.97	11.87	3.51	32.35	37.00	-4.65	QP
320.00	1.28	13.86	3.94	19.08	37.00	-17.92	QP
375.00	12.40	15.00	4.23	31.62	37.00	-5.38	QP
480.00	1.30	17.46	4.73	23.50	37.00	-13.50	QP
500.00	5.10	17.83	4.83	27.76	37.00	-9.24	QP
600.00	3.10	18.46	5.64	27.20	37.00	-9.80	QP
625.00	8.20	19.16	5.84	33.19	37.00	-3.81	QP
720.00	0.90	20.44	6.59	27.93	37.00	-9.07	QP
750.00	3.20	20.80	6.81	30.81	37.00	-6.19	QP
840.00	1.00	21.81	7.42	30.23	37.00	-6.77	QP
875.00	0.80	22.14	7.64	30.57	37.00	-6.43	QP

Vertical

Freq. MHz	Reading Level dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
69.20	13.10	8.07	1.75	22.92	30.00	-7.08	QP
125.00	4.90	13.68	2.39	20.96	30.00	-9.04	QP
160.00	10.80	12.45	2.80	26.05	30.00	-3.95	QP
250.00	17.80	11.87	3.51	33.18	37.00	-3.82	QP
320.00	1.60	13.86	3.94	19.40	37.00	-17.60	QP
375.00	12.40	15.00	4.23	31.62	37.00	-5.38	QP
480.00	1.50	17.46	4.73	23.70	37.00	-13.30	QP
500.00	4.30	17.83	4.83	26.96	37.00	-10.04	QP
600.00	1.50	18.46	5.64	25.60	37.00	-11.40	QP
625.00	8.29	19.16	5.84	33.28	37.00	-3.72	QP
720.00	1.50	20.44	6.59	28.53	37.00	-8.47	QP
750.00	1.22	20.80	6.81	28.83	37.00	-8.17	QP
840.00	1.70	21.81	7.42	30.93	37.00	-6.07	QP
875.00	1.76	22.14	7.64	31.53	37.00	-5.47	QP

REMARK: Emission level (dBμV/m) =Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).

Model	DIR-840L	Test By	Taiyu Cyu
Test Mode	WAN Mode	Test Date	2012/07/26
TEMP & Humidity	29°C, 55%	Adapter 1	AMS4-1202000FU

Horizontal

Freq. MHz	Reading Level dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
125.00	0.30	13.68	2.39	16.36	30.00	-13.64	QP
160.00	2.90	12.45	2.80	18.15	30.00	-11.85	QP
250.00	17.10	11.87	3.51	32.48	37.00	-4.52	QP
320.00	0.50	13.86	3.94	18.30	37.00	-18.70	QP
375.00	9.20	15.00	4.23	28.42	37.00	-8.58	QP
480.00	0.14	17.46	4.73	22.34	37.00	-14.66	QP
500.00	2.20	17.83	4.83	24.86	37.00	-12.14	QP
600.00	1.40	18.46	5.64	25.50	37.00	-11.50	QP
625.00	7.80	19.16	5.84	32.79	37.00	-4.21	QP
720.00	0.30	20.44	6.59	27.33	37.00	-9.67	QP
750.00	1.10	20.80	6.81	28.71	37.00	-8.29	QP
840.00	0.20	21.81	7.42	29.43	37.00	-7.57	QP
875.00	0.80	22.14	7.64	30.57	37.00	-6.43	QP

Vertical

Freq. MHz	Reading Level dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
68.95	10.40	8.07	1.75	20.22	30.00	-9.78	QP
125.00	5.10	13.68	2.39	21.16	30.00	-8.84	QP
160.00	10.67	12.45	2.80	25.92	30.00	-4.08	QP
250.00	17.53	11.87	3.51	32.91	37.00	-4.09	QP
320.00	1.30	13.86	3.94	19.10	37.00	-17.90	QP
375.00	12.42	15.00	4.23	31.64	37.00	-5.36	QP
480.00	2.20	17.46	4.73	24.40	37.00	-12.60	QP
500.00	4.30	17.83	4.83	26.96	37.00	-10.04	QP
600.00	1.60	18.46	5.64	25.70	37.00	-11.30	QP
625.00	7.80	19.16	5.84	32.79	37.00	-4.21	QP
720.00	1.40	20.44	6.59	28.43	37.00	-8.57	QP
750.00	3.60	20.80	6.81	31.21	37.00	-5.79	QP
840.00	1.40	21.81	7.42	30.63	37.00	-6.37	QP
875.00	3.50	22.14	7.64	33.27	37.00	-3.73	QP

REMARK: Emission level (dBμV/m) =Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).

Model	DIR-840L	Test By	Taiyu Cyu
Test Mode	3G Mode	Test Date	2012/07/26
TEMP & Humidity	29°C, 55%	Adapter 2	UU324-1220

Horizontal

Freq.	Reading Level	Antenna Factor	Cable Loss	Measure Level	Limit	Over Limit	Detector
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dBuV/m	
125.00	1.06	13.68	2.39	17.12	30.00	-12.88	QP
160.00	5.62	12.45	2.80	20.87	30.00	-9.13	QP
250.00	16.23	11.87	3.51	31.61	37.00	-5.39	QP
320.00	1.20	13.86	3.94	19.00	37.00	-18.00	QP
375.00	11.96	15.00	4.23	31.18	37.00	-5.82	QP
480.00	2.15	17.46	4.73	24.35	37.00	-12.65	QP
500.00	5.10	17.83	4.83	27.76	37.00	-9.24	QP
600.00	2.88	18.46	5.64	26.98	37.00	-10.02	QP
625.00	8.34	19.16	5.84	33.33	37.00	-3.67	QP
720.00	1.02	20.44	6.59	28.05	37.00	-8.95	QP
750.00	3.31	20.80	6.81	30.92	37.00	-6.08	QP
840.00	1.07	21.81	7.42	30.30	37.00	-6.70	QP
875.00	0.88	22.14	7.64	30.65	37.00	-6.35	QP

Vertical

Freq.	Reading Level	Antenna Factor	Cable Loss	Measure Level	Limit	Over Limit	Detector
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dBuV/m	
55.36	12.58	7.80	1.53	21.91	30.00	-8.09	QP
125.00	5.21	13.68	2.39	21.27	30.00	-8.73	QP
160.00	11.20	12.45	2.80	26.45	30.00	-3.55	QP
250.00	17.96	11.87	3.51	33.34	37.00	-3.66	QP
320.00	2.36	13.86	3.94	20.16	37.00	-16.84	QP
375.00	11.98	15.00	4.23	31.20	37.00	-5.80	QP
480.00	1.69	17.46	4.73	23.89	37.00	-13.11	QP
500.00	4.56	17.83	4.83	27.22	37.00	-9.78	QP
600.00	1.78	18.46	5.64	25.88	37.00	-11.12	QP
625.00	8.06	19.16	5.84	33.05	37.00	-3.95	QP
720.00	2.33	20.44	6.59	29.36	37.00	-7.64	QP
750.00	1.58	20.80	6.81	29.19	37.00	-7.81	QP
840.00	1.75	21.81	7.42	30.98	37.00	-6.02	QP
875.00	1.69	22.14	7.64	31.46	37.00	-5.54	QP

REMARK: Emission level (dBμV/m) =Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).

Model	DIR-840L	Test By	Taiyu Cyu
Test Mode	WAN Mode	Test Date	2012/07/26
TEMP & Humidity	29°C, 55%	Adapter 2	UU324-1220

Horizontal

Freq. MHz	Reading Level dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
125.00	1.20	13.68	2.39	17.26	30.00	-12.74	QP
160.00	2.55	12.45	2.80	17.80	30.00	-12.20	QP
250.00	17.52	11.87	3.51	32.90	37.00	-4.10	QP
320.00	3.25	13.86	3.94	21.05	37.00	-15.95	QP
375.00	9.50	15.00	4.23	28.72	37.00	-8.28	QP
480.00	1.42	17.46	4.73	23.62	37.00	-13.38	QP
500.00	2.63	17.83	4.83	25.29	37.00	-11.71	QP
600.00	2.10	18.46	5.64	26.20	37.00	-10.80	QP
625.00	8.10	19.16	5.84	33.09	37.00	-3.91	QP
720.00	1.08	20.44	6.59	28.11	37.00	-8.89	QP
750.00	1.36	20.80	6.81	28.97	37.00	-8.03	QP
840.00	0.52	21.81	7.42	29.75	37.00	-7.25	QP
875.00	1.27	22.14	7.64	31.04	37.00	-5.96	QP

Vertical

Freq. MHz	Reading Level dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
68.95	12.36	8.07	1.75	22.18	30.00	-7.82	QP
125.00	4.88	13.68	2.39	20.94	30.00	-9.06	QP
160.00	10.99	12.45	2.80	26.24	30.00	-3.76	QP
250.00	17.89	11.87	3.51	33.27	37.00	-3.73	QP
320.00	1.56	13.86	3.94	19.36	37.00	-17.64	QP
375.00	12.63	15.00	4.23	31.85	37.00	-5.15	QP
480.00	2.65	17.46	4.73	24.85	37.00	-12.15	QP
500.00	4.33	17.83	4.83	26.99	37.00	-10.01	QP
600.00	2.10	18.46	5.64	26.20	37.00	-10.80	QP
625.00	7.68	19.16	5.84	32.67	37.00	-4.33	QP
720.00	1.63	20.44	6.59	28.66	37.00	-8.34	QP
750.00	3.55	20.80	6.81	31.16	37.00	-5.84	QP
840.00	2.69	21.81	7.42	31.92	37.00	-5.08	QP
875.00	3.21	22.14	7.64	32.98	37.00	-4.02	QP

REMARK: Emission level (dBμV/m) =Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).

Above 1 GHz (2.4G)

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6°C, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11b TX (CH Low)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3216.04	52.53	30.14	3.00	41.19	1.26	45.74	74.00	-28.26	P
	3216.04	46.67	30.14	3.00	41.19	1.26	39.88	54.00	-14.12	A
*	4824.02	53.14	33.17	3.73	42.38	0.69	48.35	74.00	-25.65	P
*	4824.02	41.29	33.17	3.73	42.38	0.69	36.50	54.00	-17.50	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3216.10	55.44	30.14	3.00	41.19	1.26	48.65	74.00	-25.35	P
	3216.10	51.97	30.14	3.00	41.19	1.26	45.18	54.00	-8.82	A
*	4824.13	54.34	33.17	3.73	42.38	0.69	49.55	74.00	-24.45	P
*	4824.13	43.97	33.17	3.73	42.38	0.69	39.18	54.00	-14.82	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6°C, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11b TX (CH Mid)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3249.41	53.14	30.15	3.02	41.20	1.22	46.33	74.00	-27.67	P
	3249.41	47.05	30.15	3.02	41.20	1.22	40.24	54.00	-13.76	A
*	4874.09	54.29	33.32	3.74	42.43	0.71	49.64	74.00	-24.36	P
*	4874.09	42.36	33.32	3.74	42.43	0.71	37.71	54.00	-16.29	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3249.36	55.72	30.15	3.02	41.20	1.22	48.91	74.00	-25.09	P
	3249.36	52.25	30.15	3.02	41.20	1.22	45.44	54.00	-8.56	A
*	4874.15	55.94	33.32	3.74	42.43	0.71	51.29	74.00	-22.71	P
*	4874.15	44.38	33.32	3.74	42.43	0.71	39.73	54.00	-14.27	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6°C, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11b TX (CH High)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3282.73	51.26	30.16	3.05	41.21	1.17	44.43	74.00	-29.57	P
	3282.73	45.93	30.16	3.05	41.21	1.17	39.10	54.00	-14.90	A
*	4923.93	54.23	33.47	3.76	42.48	0.73	49.71	74.00	-24.29	P
*	4923.93	41.70	33.47	3.76	42.48	0.73	37.18	54.00	-16.82	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3282.70	55.43	30.16	3.05	41.21	1.17	48.60	74.00	-25.40	P
	3282.70	51.63	30.16	3.05	41.21	1.17	44.80	54.00	-9.20	A
*	4924.02	54.79	33.47	3.76	42.48	0.73	50.27	74.00	-23.73	P
*	4924.02	43.88	33.47	3.76	42.48	0.73	39.36	54.00	-14.64	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6°C, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11g TX (CH Low)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3216.01	52.14	30.14	3.00	41.19	1.26	45.35	74.00	-28.65	P
	3216.01	46.09	30.14	3.00	41.19	1.26	39.30	54.00	-14.70	A
*	4824.08	53.96	33.17	3.73	42.38	0.69	49.17	74.00	-24.83	P
*	4824.08	40.76	33.17	3.73	42.38	0.69	35.97	54.00	-18.03	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3216.05	55.62	30.14	3.00	41.19	1.26	48.83	74.00	-25.17	P
	3216.05	51.48	30.14	3.00	41.19	1.26	44.69	54.00	-9.31	A
*	4824.14	54.36	33.17	3.73	42.38	0.69	49.57	74.00	-24.43	P
*	4824.14	41.50	33.17	3.73	42.38	0.69	36.71	54.00	-17.29	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6°C, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11g TX (CH Mid)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3249.38	51.49	30.15	3.02	41.20	1.22	44.68	74.00	-29.32	P
	3249.38	45.25	30.15	3.02	41.20	1.22	38.44	54.00	-15.56	A
*	4874.13	53.99	33.32	3.74	42.43	0.71	49.34	74.00	-24.66	P
*	4874.13	41.32	33.32	3.74	42.43	0.71	36.67	54.00	-17.33	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3249.33	55.07	30.15	3.02	41.20	1.22	48.26	74.00	-25.74	P
	3249.33	51.24	30.15	3.02	41.20	1.22	44.43	54.00	-9.57	A
*	4874.11	53.69	33.32	3.74	42.43	0.71	49.04	74.00	-24.96	P
*	4874.11	41.57	33.32	3.74	42.43	0.71	36.92	54.00	-17.08	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6°C, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11g TX (CH High)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3282.68	52.36	30.16	3.05	41.21	1.17	45.53	74.00	-28.47	P
	3282.68	46.44	30.16	3.05	41.21	1.17	39.61	54.00	-14.39	A
*	4924.22	53.16	33.47	3.76	42.48	0.73	48.64	74.00	-25.36	P
*	4924.22	41.05	33.47	3.76	42.48	0.73	36.53	54.00	-17.47	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3282.74	56.94	30.16	3.05	41.21	1.17	50.11	74.00	-23.89	P
	3282.74	53.17	30.16	3.05	41.21	1.17	46.34	54.00	-7.66	A
*	4924.02	52.69	33.47	3.76	42.48	0.73	48.17	74.00	-25.83	P
*	4924.02	42.55	33.47	3.76	42.48	0.73	38.03	54.00	-15.97	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6℃, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11n HT20 (CH Low)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3216.06	51.89	30.14	3.00	41.19	1.26	45.10	74.00	-28.90	P
	3216.06	45.99	30.14	3.00	41.19	1.26	39.20	54.00	-14.80	A
*	4824.08	52.35	33.17	3.73	42.38	0.69	47.56	74.00	-26.44	P
*	4824.08	40.25	33.17	3.73	42.38	0.69	35.46	54.00	-18.54	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3216.00	55.11	30.14	3.00	41.19	1.26	48.32	74.00	-25.68	P
	3216.00	51.13	30.14	3.00	41.19	1.26	44.34	54.00	-9.66	A
*	4824.01	53.11	33.17	3.73	42.38	0.69	48.32	74.00	-25.68	P
*	4824.01	41.37	33.17	3.73	42.38	0.69	36.58	54.00	-17.42	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6℃, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11n HT20 (CH Mid)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3249.34	50.84	30.15	3.02	41.20	1.22	44.03	74.00	-29.97	P
	3249.34	44.65	30.15	3.02	41.20	1.22	37.84	54.00	-16.16	A
*	4874.11	53.14	33.32	3.74	42.43	0.71	48.49	74.00	-25.51	P
*	4874.11	40.76	33.32	3.74	42.43	0.71	36.11	54.00	-17.89	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3249.36	54.38	30.15	3.02	41.20	1.22	47.57	74.00	-26.43	P
	3249.36	50.94	30.15	3.02	41.20	1.22	44.13	54.00	-9.87	A
*	4874.05	52.99	33.32	3.74	42.43	0.71	48.33	74.00	-25.67	P
*	4874.05	41.35	33.32	3.74	42.43	0.71	36.69	54.00	-17.31	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6°C, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11n HT20 (CH High)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3282.65	52.19	30.16	3.05	41.21	1.17	45.36	74.00	-28.64	P
	3282.65	45.87	30.16	3.05	41.21	1.17	39.04	54.00	-14.96	A
*	4924.15	51.89	33.47	3.76	42.48	0.73	47.37	74.00	-26.63	P
*	4924.15	40.26	33.47	3.76	42.48	0.73	35.74	54.00	-18.26	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3282.71	56.94	30.16	3.05	41.21	1.17	50.11	74.00	-23.89	P
	3282.71	52.13	30.16	3.05	41.21	1.17	45.30	54.00	-8.70	A
*	4924.13	54.56	33.47	3.76	42.48	0.73	50.04	74.00	-23.96	P
*	4924.13	41.77	33.47	3.76	42.48	0.73	37.25	54.00	-16.75	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6℃, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11n HT40 (CH Low)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3229.35	51.36	30.15	3.01	41.19	1.24	44.56	74.00	-29.44	P
	3229.35	45.72	30.15	3.01	41.19	1.24	38.92	54.00	-15.08	A
*	4844.16	52.67	33.23	3.74	42.40	0.70	47.94	74.00	-26.06	P
*	4844.16	39.98	33.23	3.74	42.40	0.70	35.25	54.00	-18.75	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3229.39	53.64	30.15	3.01	41.19	1.24	46.84	74.00	-27.16	P
	3229.39	49.93	30.15	3.01	41.19	1.24	43.13	54.00	-10.87	A
*	4844.07	52.14	33.23	3.74	42.40	0.70	47.41	74.00	-26.59	P
*	4844.07	41.62	33.23	3.74	42.40	0.70	36.89	54.00	-17.11	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6℃, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11n HT40 (CH Mid)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3249.35	50.95	30.15	3.02	41.20	1.22	44.14	74.00	-29.86	P
	3249.35	44.89	30.15	3.02	41.20	1.22	38.08	54.00	-15.92	A
*	4874.04	52.67	33.32	3.74	42.43	0.71	48.01	74.00	-25.99	P
*	4874.04	41.24	33.32	3.74	42.43	0.71	36.58	54.00	-17.42	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3249.33	54.69	30.15	3.02	41.20	1.22	47.88	74.00	-26.12	P
	3249.33	49.52	30.15	3.02	41.20	1.22	42.71	54.00	-11.29	A
*	4874.24	54.36	33.32	3.74	42.43	0.71	49.71	74.00	-24.29	P
*	4874.24	41.86	33.32	3.74	42.43	0.71	37.21	54.00	-16.79	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	29.6°C, 67%	Test Date	2012/07/31
Test Mode	IEEE 802.11n HT40 (CH High)		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3269.36	51.36	30.15	3.04	41.21	1.19	44.54	74.00	-29.46	P
	3269.36	45.44	30.15	3.04	41.21	1.19	38.62	54.00	-15.38	A
*	4904.19	53.08	33.41	3.75	42.46	0.72	48.51	74.00	-25.49	P
*	4904.19	41.17	33.41	3.75	42.46	0.72	36.60	54.00	-17.40	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	3269.32	54.39	30.15	3.04	41.21	1.19	47.57	74.00	-26.43	P
	3269.32	49.25	30.15	3.04	41.21	1.19	42.43	54.00	-11.57	A
*	4904.07	54.37	33.41	3.75	42.46	0.72	49.79	74.00	-24.21	P
*	4904.07	41.80	33.41	3.75	42.46	0.72	37.22	54.00	-16.78	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Above 1 GHz (5G)

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	31.3°C, 55%	Test Date	2012/08/06
Test Mode	IEEE 802.11a TX / CH Low		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.00	53.14	23.70	4.64	26.08	0.00	55.40	74.00	-18.60	P
*	1000.00	45.39	23.70	4.64	26.08	0.00	47.65	54.00	-6.35	A
*	11490.12	49.47	40.48	6.62	37.43	1.20	60.34	74.00	-13.66	P
*	11490.12	39.34	40.48	6.62	37.43	1.20	50.21	54.00	-3.79	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.05	49.95	24.80	1.61	39.37	0.69	37.68	74.00	-36.32	P
*	1000.05	43.11	24.80	1.61	39.37	0.69	30.84	54.00	-23.16	A
*	11490.02	49.52	40.48	6.62	37.43	1.20	60.39	74.00	-13.61	P
*	11490.02	39.12	40.48	6.62	37.43	1.20	49.99	54.00	-4.01	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	31.3°C, 55%	Test Date	2012/08/06
Test Mode	IEEE 802.11a TX / CH Mid		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.06	54.62	24.80	1.61	39.37	0.69	42.35	74.00	-31.65	P
*	1000.06	46.44	24.80	1.61	39.37	0.69	34.17	54.00	-19.83	A
*	11530.11	50.13	40.53	6.65	37.45	1.18	61.03	74.00	-12.97	P
*	11530.11	40.25	40.53	6.65	37.45	1.18	51.15	54.00	-2.85	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.00	50.13	23.70	4.64	26.08	0.00	52.39	74.00	-21.61	P
*	1000.00	42.62	23.70	4.64	26.08	0.00	44.88	54.00	-9.12	A
*	11530.04	49.25	40.53	6.65	37.45	1.18	60.15	74.00	-13.85	P
*	11530.04	39.88	40.53	6.65	37.45	1.18	50.78	54.00	-3.22	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	31.3°C, 55%	Test Date	2012/08/06
Test Mode	IEEE 802.11a TX / CH High		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.03	55.13	24.80	1.61	39.37	0.69	42.86	74.00	-31.14	P
*	1000.03	46.60	24.80	1.61	39.37	0.69	34.33	54.00	-19.67	A
*	11610.07	48.14	40.61	6.69	37.47	1.11	59.08	74.00	-14.92	P
*	11610.07	39.05	40.61	6.69	37.47	1.11	49.99	54.00	-4.01	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.02	51.82	24.80	1.61	39.37	0.69	39.55	74.00	-34.45	P
*	1000.02	43.71	24.80	1.61	39.37	0.69	31.44	54.00	-22.56	A
*	11610.04	49.25	40.61	6.69	37.47	1.11	60.19	74.00	-13.81	P
*	11610.04	39.24	40.61	6.69	37.47	1.11	50.18	54.00	-3.82	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	31.3°C, 55%	Test Date	2012/08/06
Test Mode	IEEE 802.11n HT20 / CH Low		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.05	53.97	24.80	1.61	39.37	0.69	41.70	74.00	-32.30	P
*	1000.05	45.25	24.80	1.61	39.37	0.69	32.98	54.00	-21.02	A
*	11490.09	49.24	40.48	6.62	37.43	1.20	60.11	74.00	-13.89	P
*	11490.09	39.14	40.48	6.62	37.43	1.20	50.01	54.00	-3.99	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.07	50.81	24.80	1.61	39.37	0.69	38.54	74.00	-35.46	P
*	1000.07	44.02	24.80	1.61	39.37	0.69	31.75	54.00	-22.25	A
*	11490.01	49.20	40.48	6.62	37.43	1.20	60.07	74.00	-13.93	P
*	11490.01	38.87	40.48	6.62	37.43	1.20	49.74	54.00	-4.26	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	31.3°C, 55%	Test Date	2012/08/06
Test Mode	IEEE 802.11n HT20 / CH Mid		

	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.02	53.62	24.80	1.61	39.37	0.69	41.35	74.00	-32.65	P
*	1000.02	45.78	24.80	1.61	39.37	0.69	33.51	54.00	-20.49	A
*	11530.05	50.33	40.53	6.65	37.45	1.18	61.23	74.00	-12.77	P
*	11530.05	39.84	40.53	6.65	37.45	1.18	50.74	54.00	-3.26	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.03	52.36	24.80	1.61	39.37	0.69	40.09	74.00	-33.91	P
*	1000.03	43.47	24.80	1.61	39.37	0.69	31.20	54.00	-22.80	A
*	11530.00	48.92	40.53	6.65	37.45	1.18	59.82	74.00	-14.18	P
*	11530.00	39.25	40.53	6.65	37.45	1.18	50.15	54.00	-3.85	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	31.3°C, 55%	Test Date	2012/08/06
Test Mode	IEEE 802.11n HT20 / CH High		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.00	54.62	23.70	4.64	26.08	0.00	56.88	74.00	-17.12	P
*	1000.00	45.80	23.70	4.64	26.08	0.00	48.06	54.00	-5.94	A
*	11610.01	48.23	40.61	6.69	37.47	1.11	59.17	74.00	-14.83	P
*	11610.01	39.34	40.61	6.69	37.47	1.11	50.28	54.00	-3.72	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.02	52.49	24.80	1.61	39.37	0.69	40.22	74.00	-33.78	P
*	1000.02	44.51	24.80	1.61	39.37	0.69	32.24	54.00	-21.76	A
*	11610.03	48.83	40.61	6.69	37.47	1.11	59.77	74.00	-14.23	P
*	11610.03	39.34	40.61	6.69	37.47	1.11	50.28	54.00	-3.72	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	31.3°C, 55%	Test Date	2012/08/06
Test Mode	IEEE 802.11n HT40 / CH Low		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.02	52.94	24.80	1.61	39.37	0.69	40.67	74.00	-33.33	P
*	1000.02	44.89	24.80	1.61	39.37	0.69	32.62	54.00	-21.38	A
*	11490.10	49.23	40.48	6.62	37.43	1.20	60.10	74.00	-13.90	P
*	11490.10	39.16	40.48	6.62	37.43	1.20	50.03	54.00	-3.97	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.03	50.32	24.80	1.61	39.37	0.69	38.05	74.00	-35.95	P
*	1000.03	43.84	24.80	1.61	39.37	0.69	31.57	54.00	-22.43	A
*	11490.09	50.26	40.48	6.62	37.43	1.20	61.13	74.00	-12.87	P
*	11490.09	39.43	40.48	6.62	37.43	1.20	50.30	54.00	-3.70	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	31.3°C, 55%	Test Date	2012/08/06
Test Mode	IEEE 802.11n HT40 / CH Mid		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.00	55.62	23.70	4.64	26.08	0.00	57.88	74.00	-16.12	P
*	1000.00	46.73	23.70	4.64	26.08	0.00	48.99	54.00	-5.01	A
*	11530.14	49.93	40.53	6.65	37.45	1.18	60.83	74.00	-13.17	P
*	11530.14	39.50	40.53	6.65	37.45	1.18	50.40	54.00	-3.60	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.04	50.36	24.80	1.61	39.37	0.69	38.09	74.00	-35.91	P
*	1000.04	43.94	24.80	1.61	39.37	0.69	31.67	54.00	-22.33	A
*	11530.11	49.88	40.53	6.65	37.45	1.18	60.78	74.00	-13.22	P
*	11530.11	39.76	40.53	6.65	37.45	1.18	50.66	54.00	-3.34	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Model	DIR-840L	Test By	John Chen
TEMP & Humidity	31.3°C, 55%	Test Date	2012/08/06
Test Mode	IEEE 802.11n HT40 / CH High		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.01	54.26	24.80	1.61	39.37	0.69	41.99	74.00	-32.01	P
*	1000.01	45.92	24.80	1.61	39.37	0.69	33.65	54.00	-20.35	A
*	11610.06	48.62	40.61	6.69	37.47	1.11	59.56	74.00	-14.44	P
*	11610.06	39.43	40.61	6.69	37.47	1.11	50.37	54.00	-3.63	A

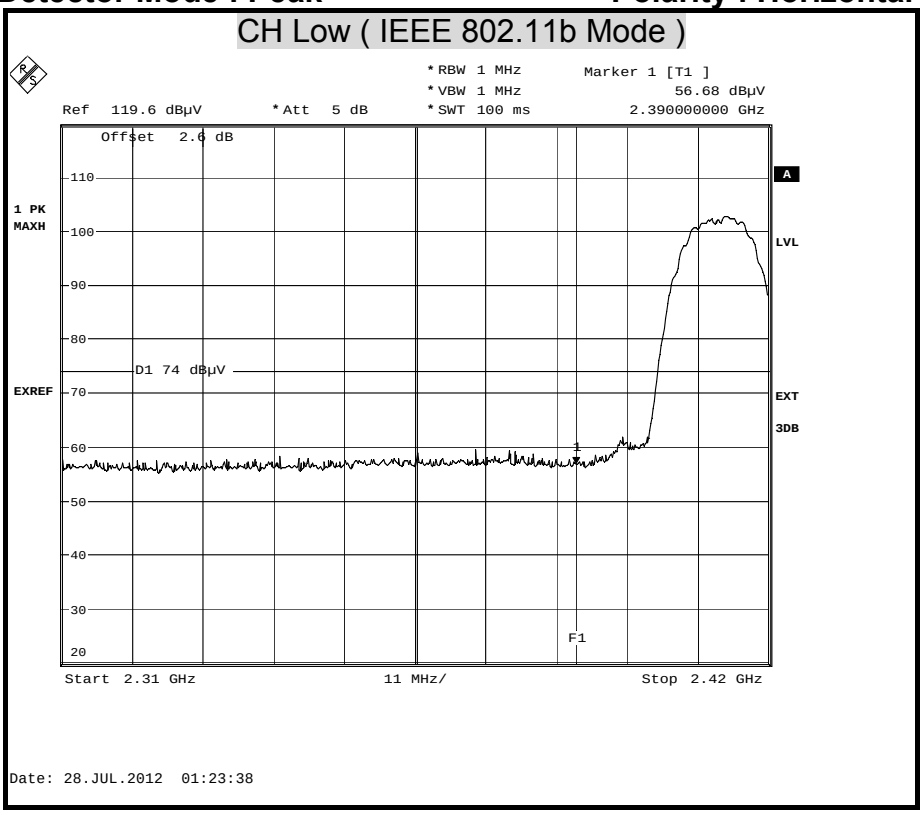
	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1000.04	52.14	24.80	1.61	39.37	0.69	39.87	74.00	-34.13	P
*	1000.04	43.84	24.80	1.61	39.37	0.69	31.57	54.00	-22.43	A
*	11610.13	49.67	40.61	6.69	37.47	1.11	60.61	74.00	-13.39	P
*	11610.13	39.18	40.61	6.69	37.47	1.11	50.12	54.00	-3.88	A

REMARK:

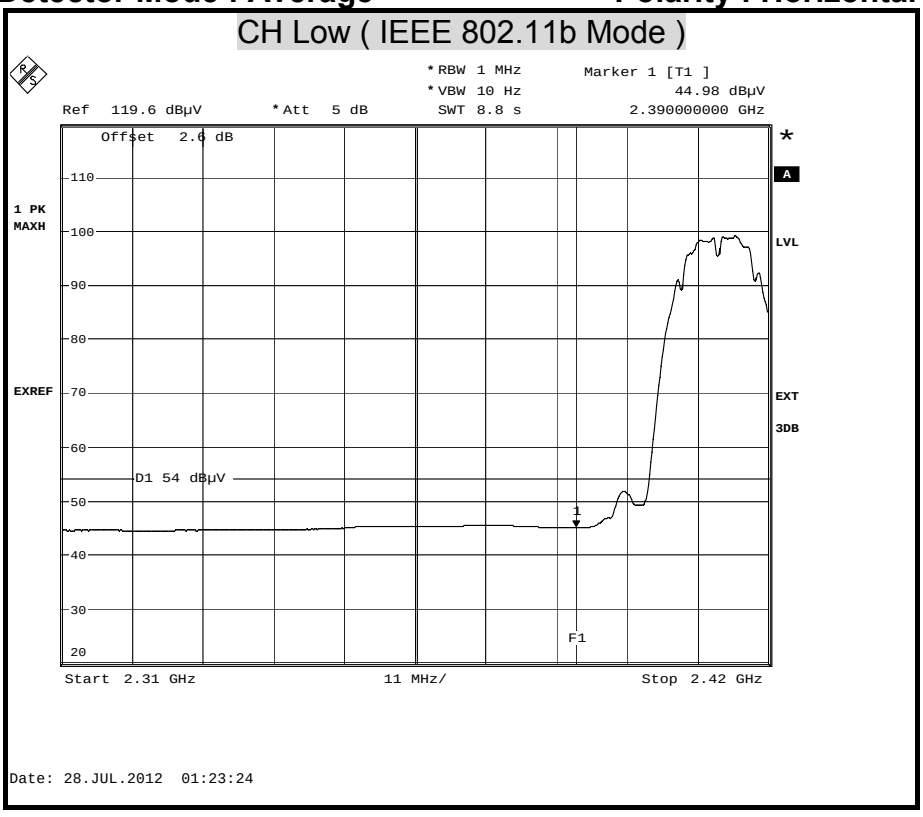
1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*

Restricted Band Edges (2.4G)

Detector Mode : Peak **Polarity : Horizontal**

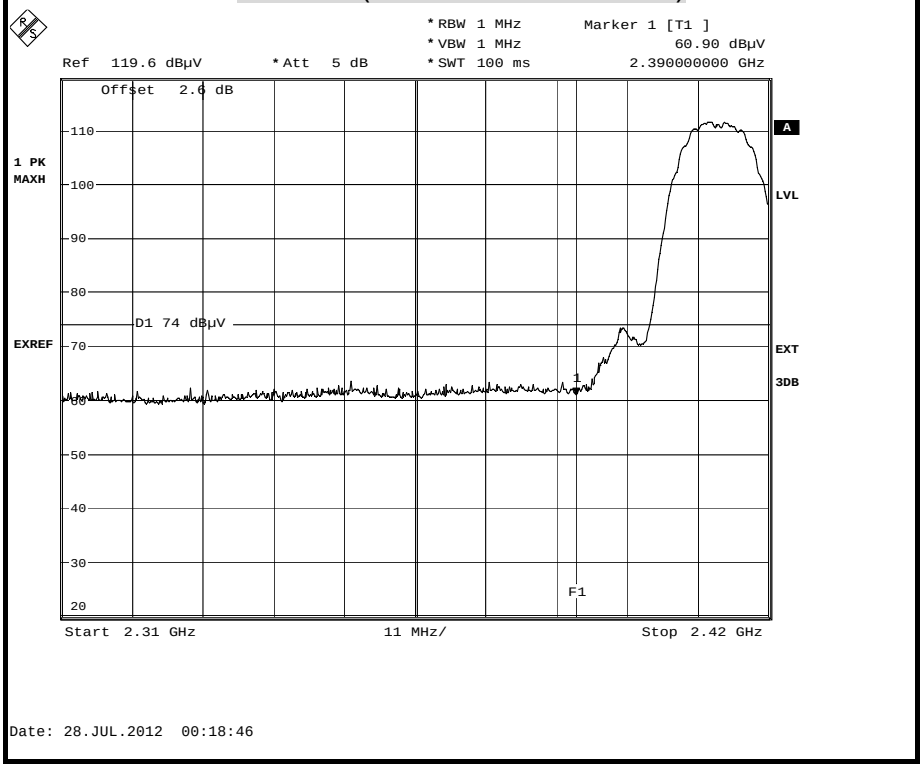


Detector Mode : Average **Polarity : Horizontal**



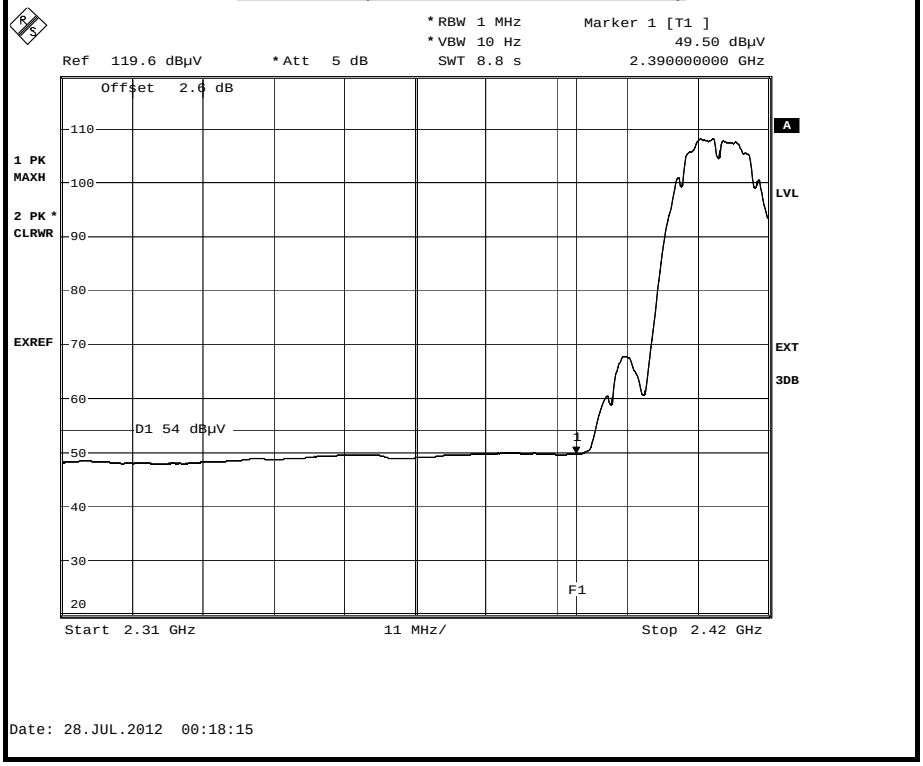
Detector Mode : Peak **Polarity : Vertical**

CH Low (IEEE 802.11b Mode)



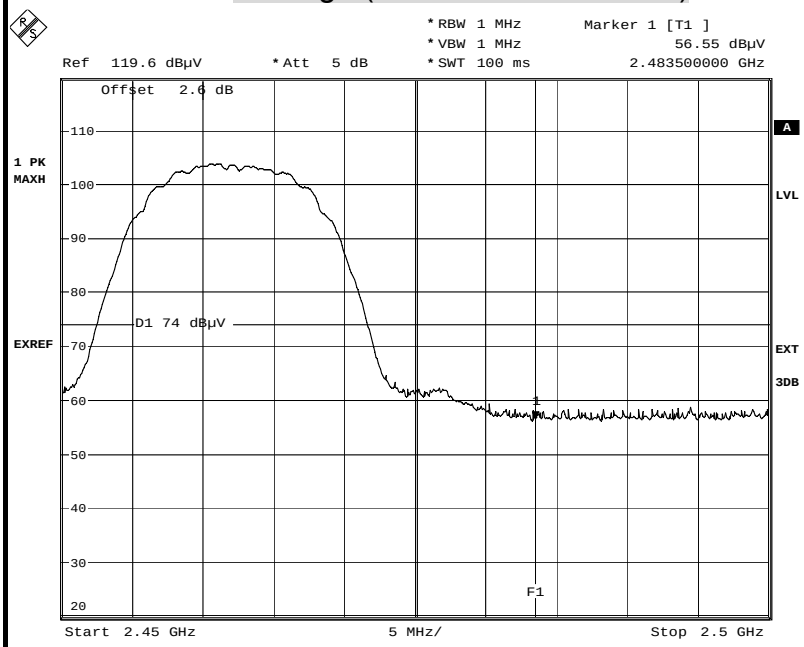
Detector Mode : Average **Polarity : Vertical**

CH Low (IEEE 802.11b Mode)



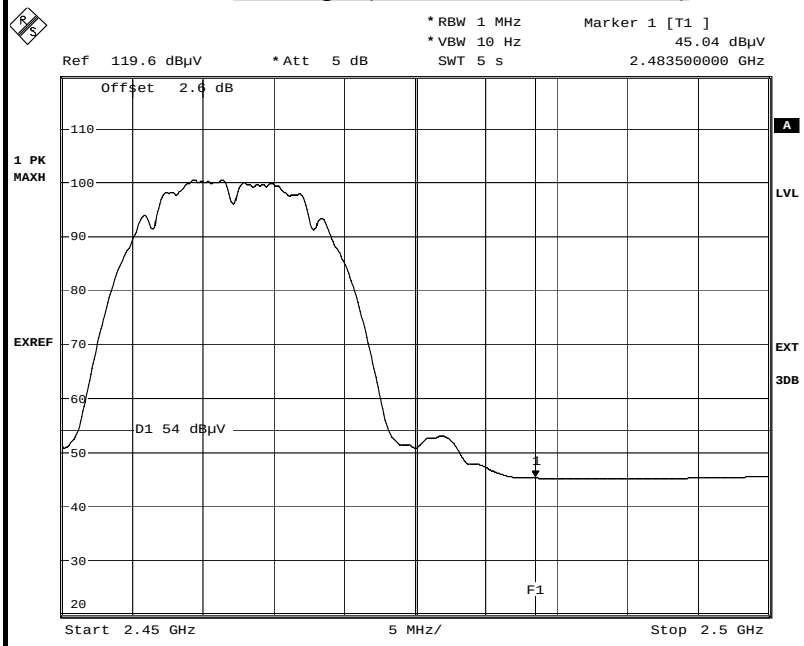
Detector Mode : Peak **Polarity : Horizontal**

CH High (IEEE 802.11b Mode)



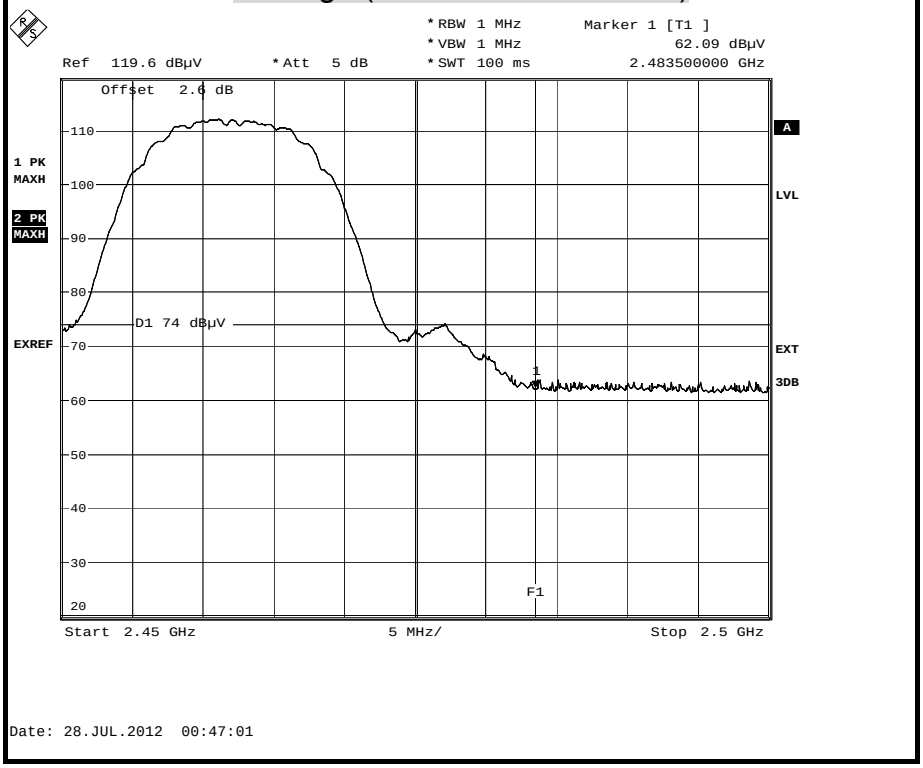
Detector Mode : Average **Polarity : Horizontal**

CH High (IEEE 802.11b Mode)



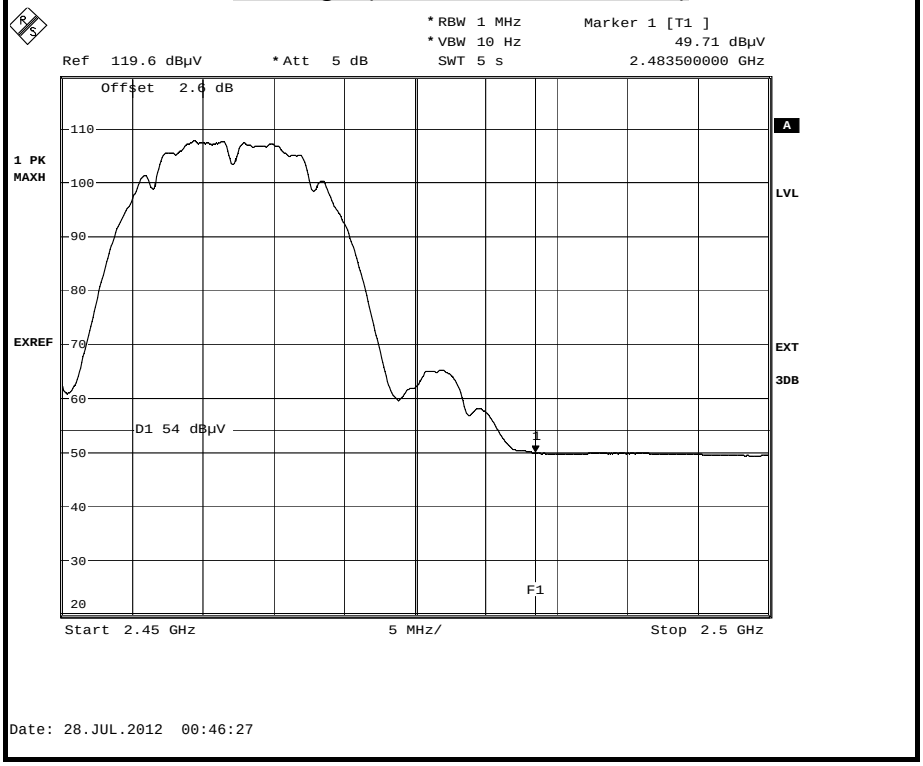
Detector Mode : Peak **Polarity : Vertical**

CH High (IEEE 802.11b Mode)



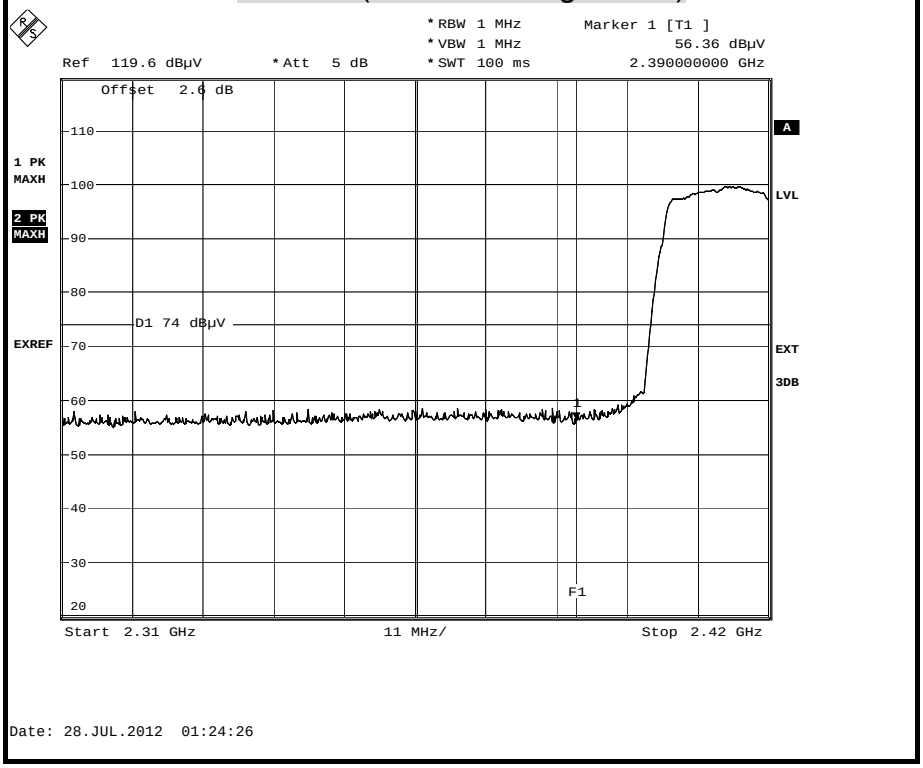
Detector Mode : Average **Polarity : Vertical**

CH High (IEEE 802.11b Mode)



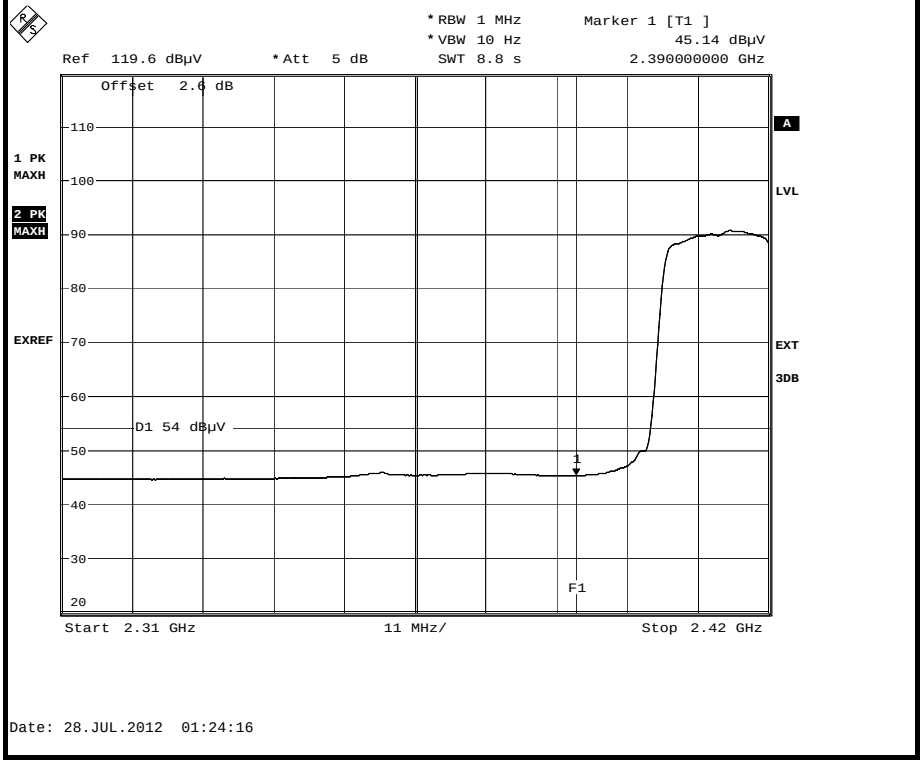
Detector Mode : Peak **Polarity : Horizontal**

CH Low (IEEE 802.11g Mode)

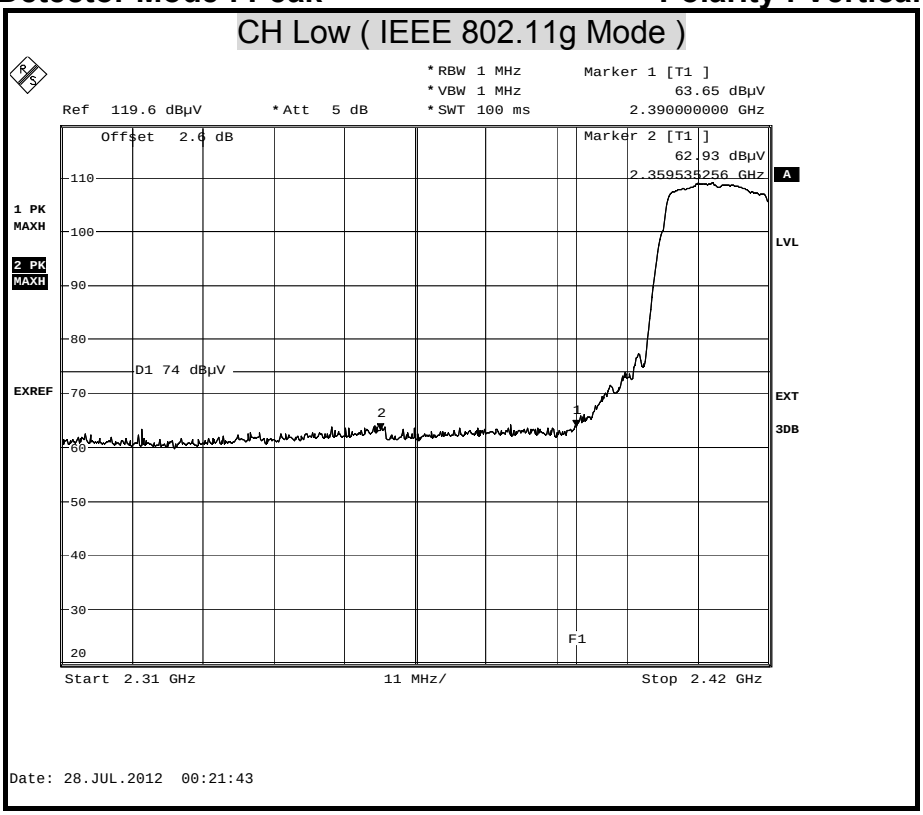


Detector Mode : Average **Polarity : Horizontal**

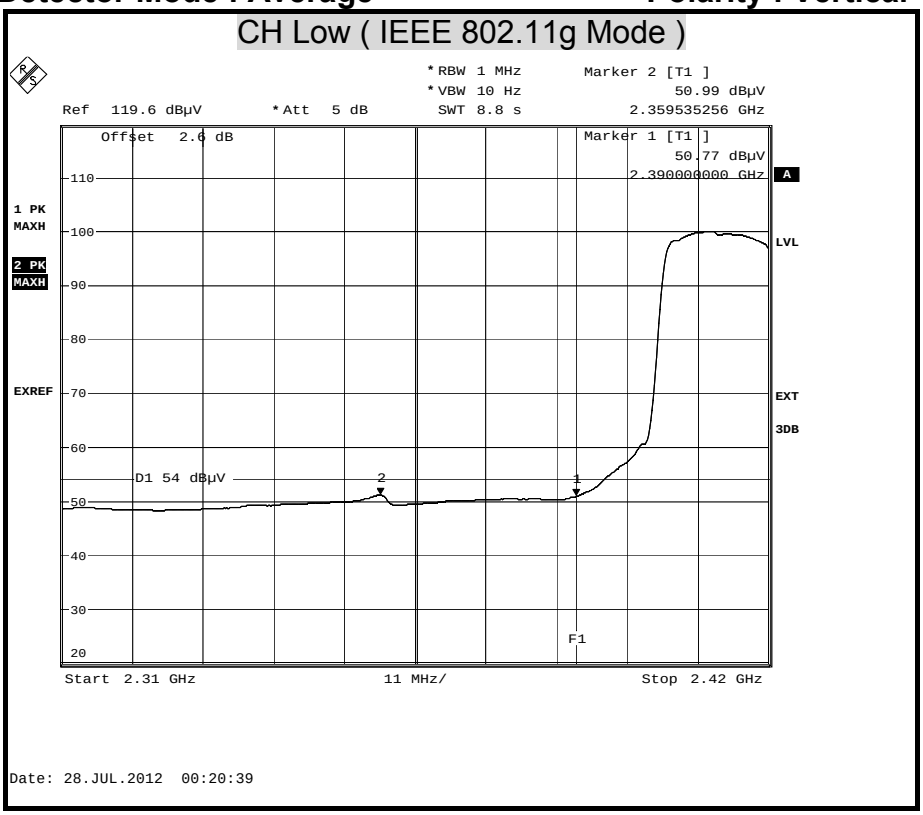
CH Low (IEEE 802.11g Mode)



Detector Mode : Peak **Polarity : Vertical**

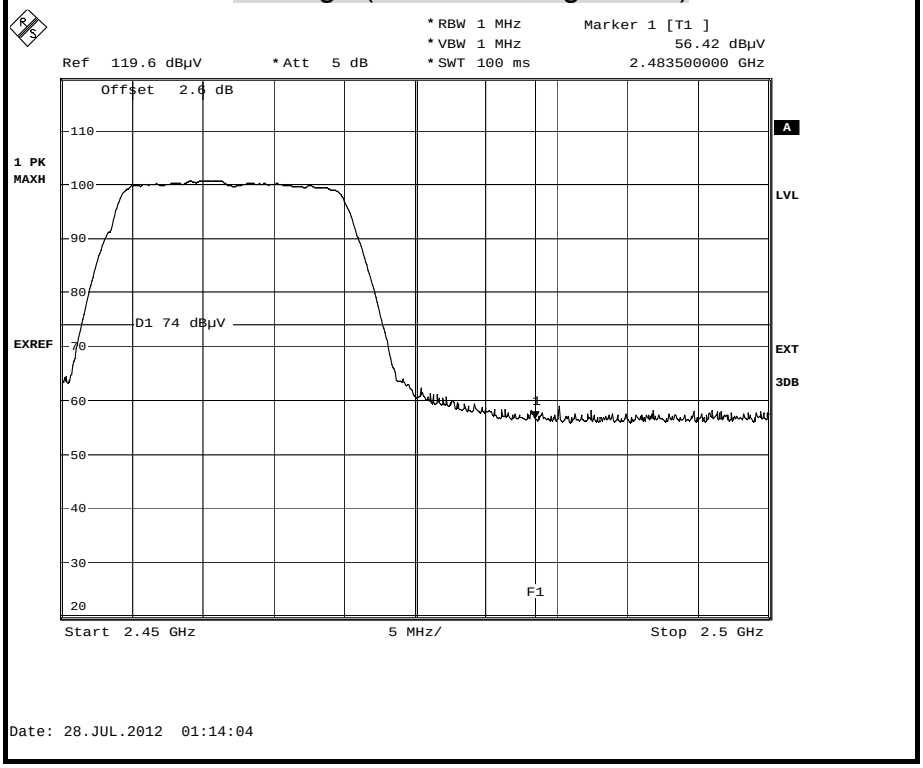


Detector Mode : Average **Polarity : Vertical**



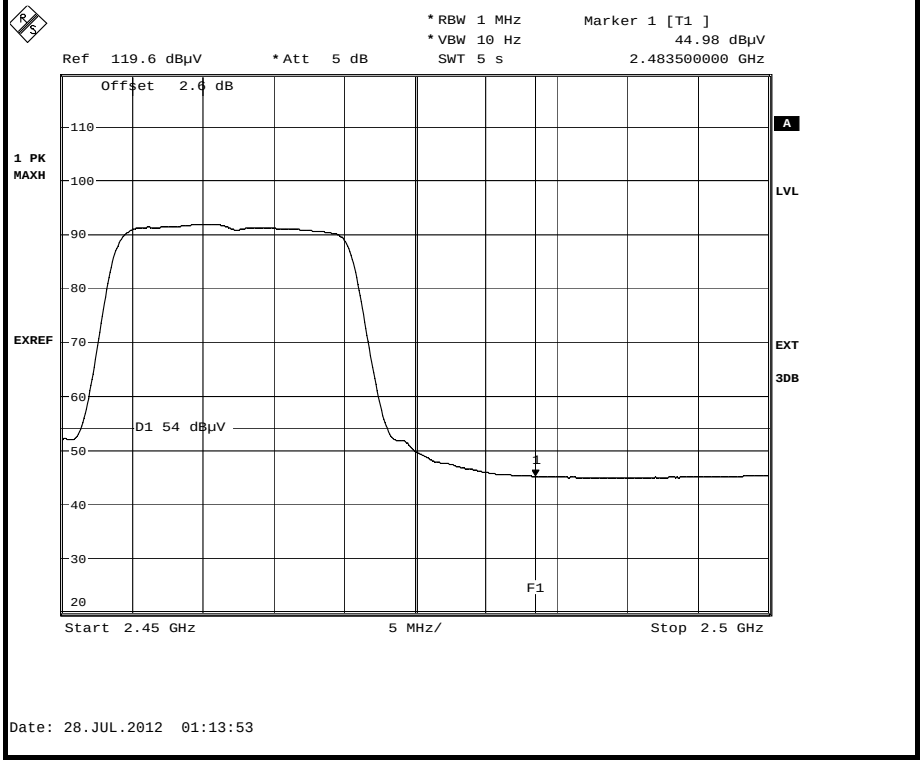
Detector Mode : Peak **Polarity : Horizontal**

CH High (IEEE 802.11g Mode)



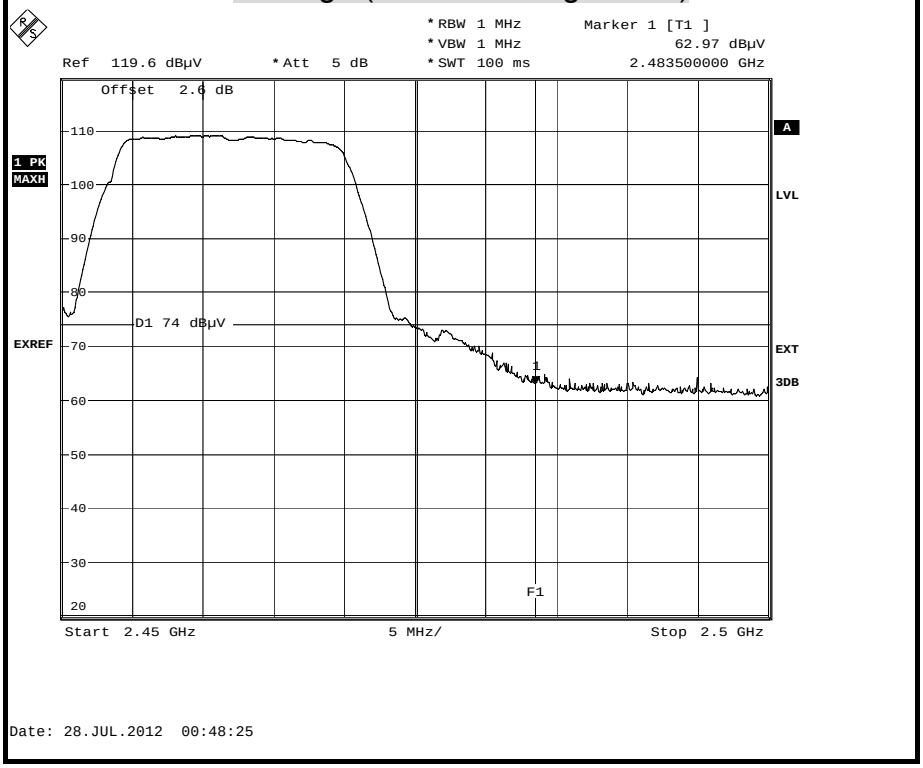
Detector Mode : Average **Polarity : Horizontal**

CH High (IEEE 802.11g Mode)



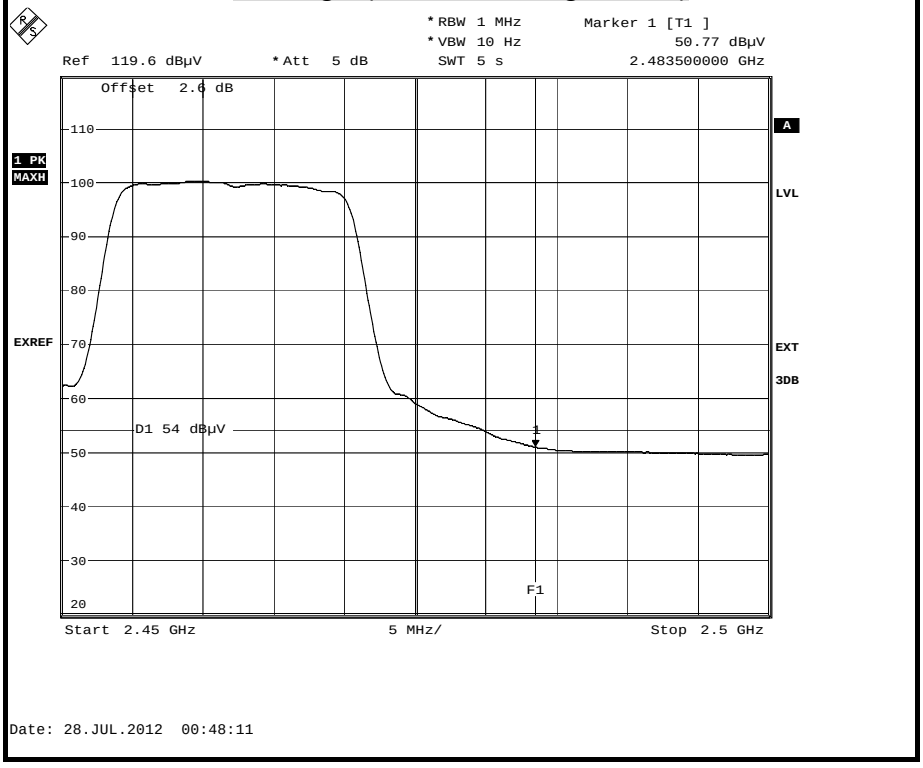
Detector Mode : Peak **Polarity : Vertical**

CH High (IEEE 802.11g Mode)

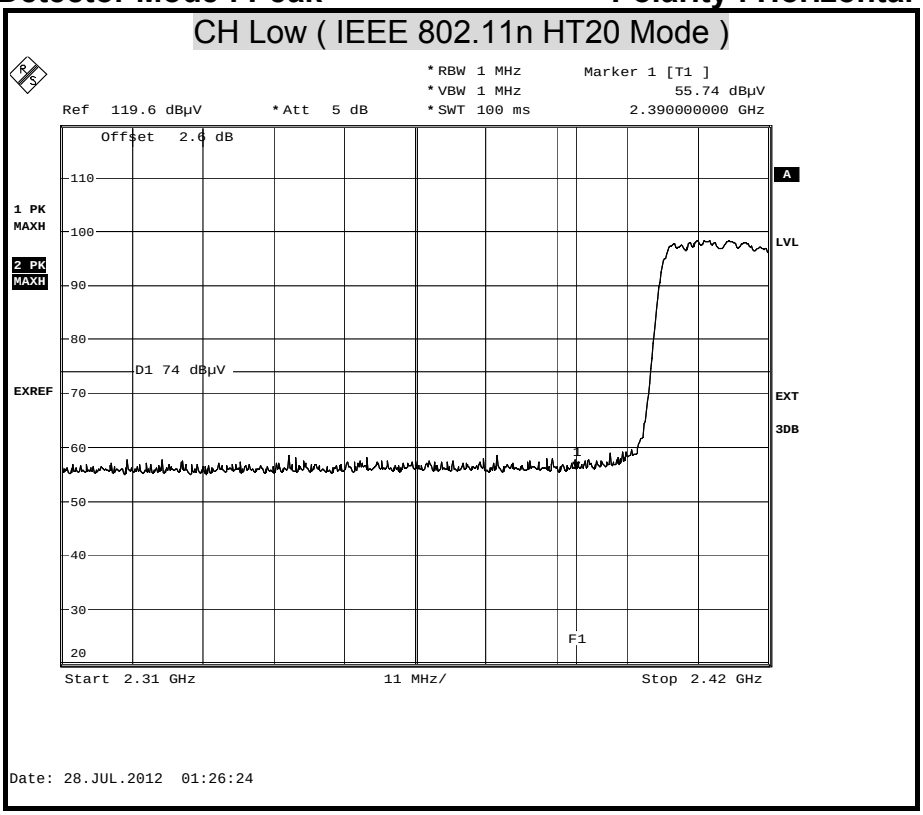


Detector Mode : Average **Polarity : Vertical**

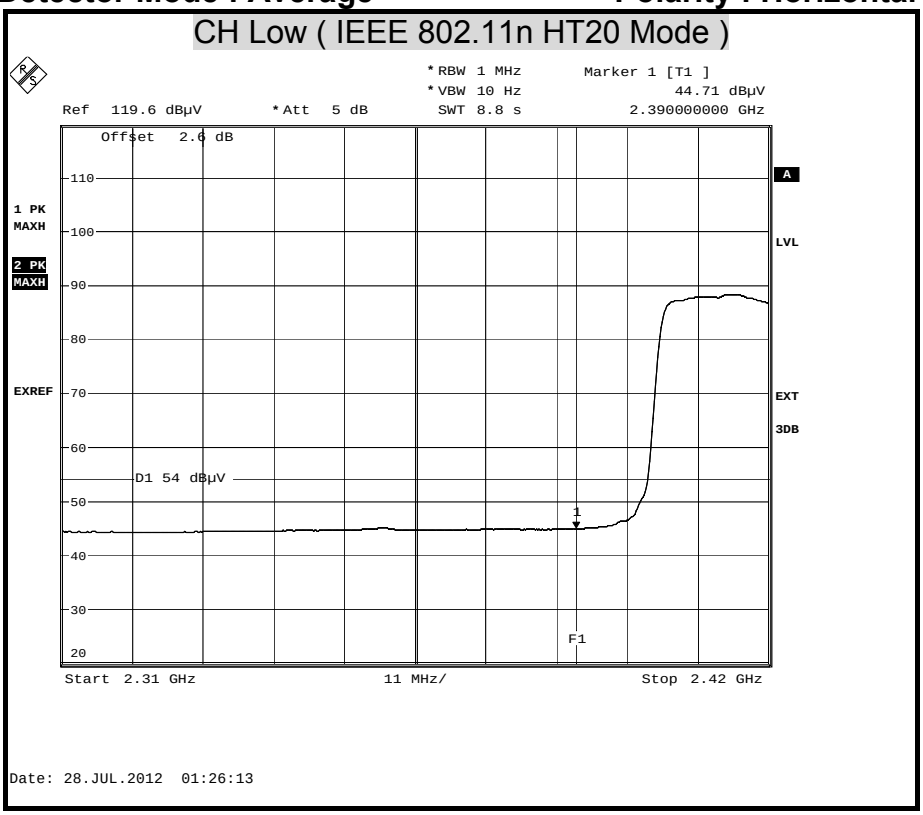
CH High (IEEE 802.11g Mode)



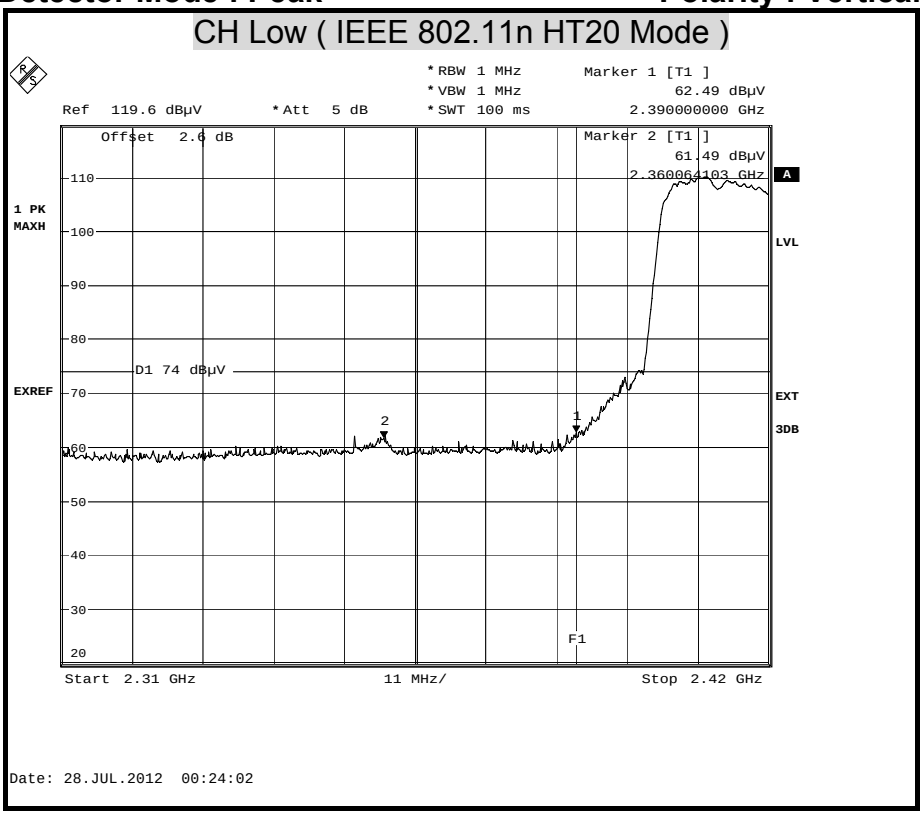
Detector Mode : Peak **Polarity : Horizontal**



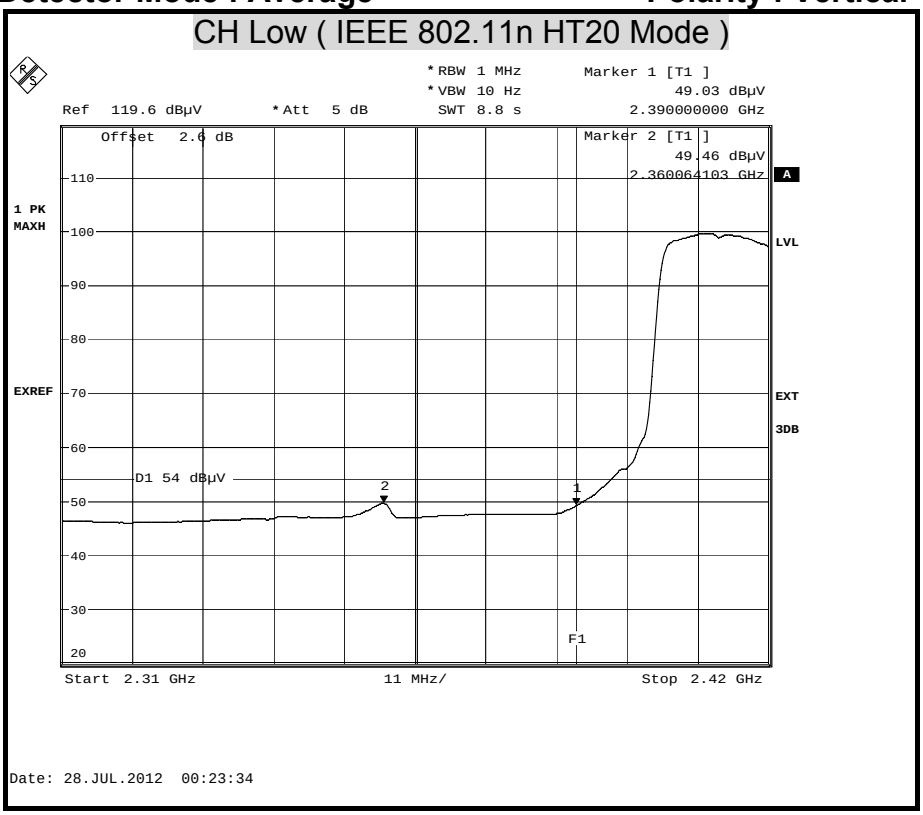
Detector Mode : Average **Polarity : Horizontal**



Detector Mode : Peak **Polarity : Vertical**

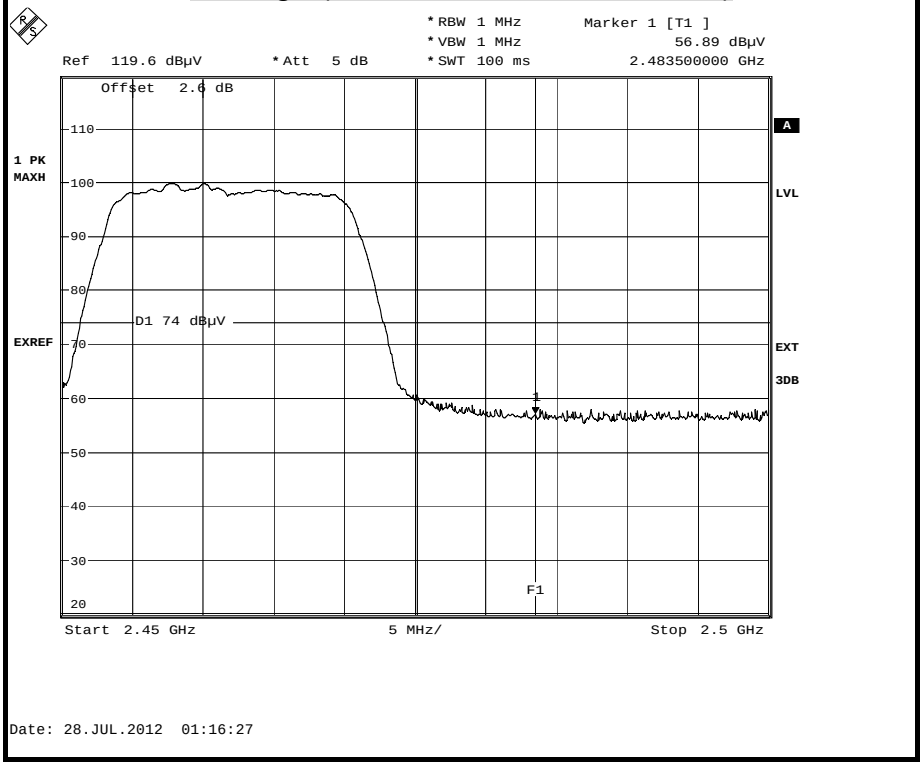


Detector Mode : Average **Polarity : Vertical**



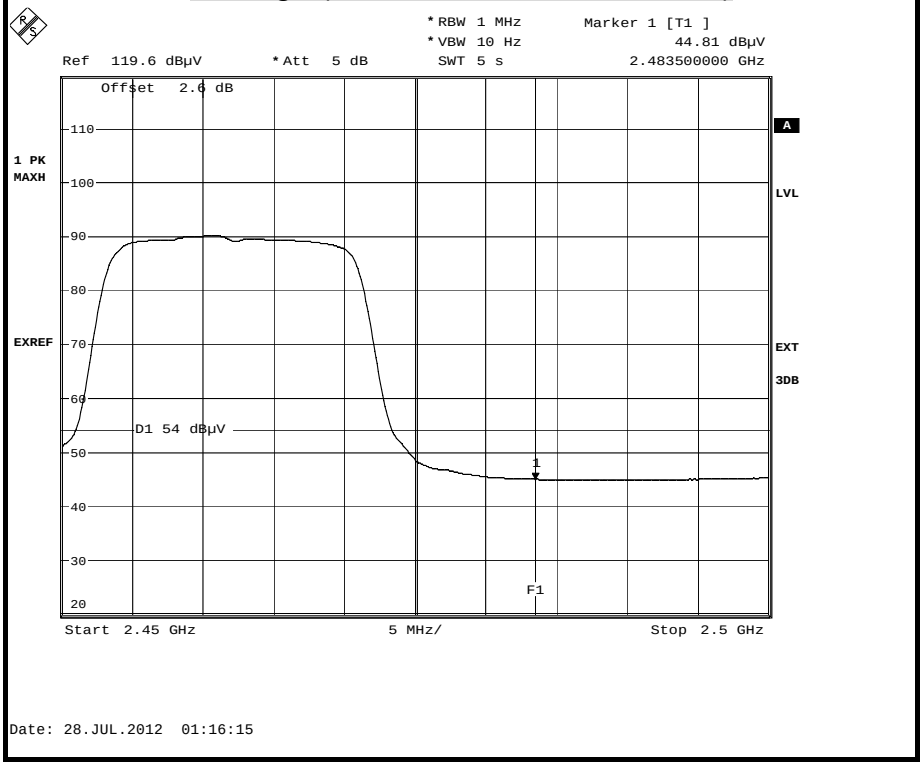
Detector Mode : Peak **Polarity : Horizontal**

CH High (IEEE 802.11n HT20 Mode)



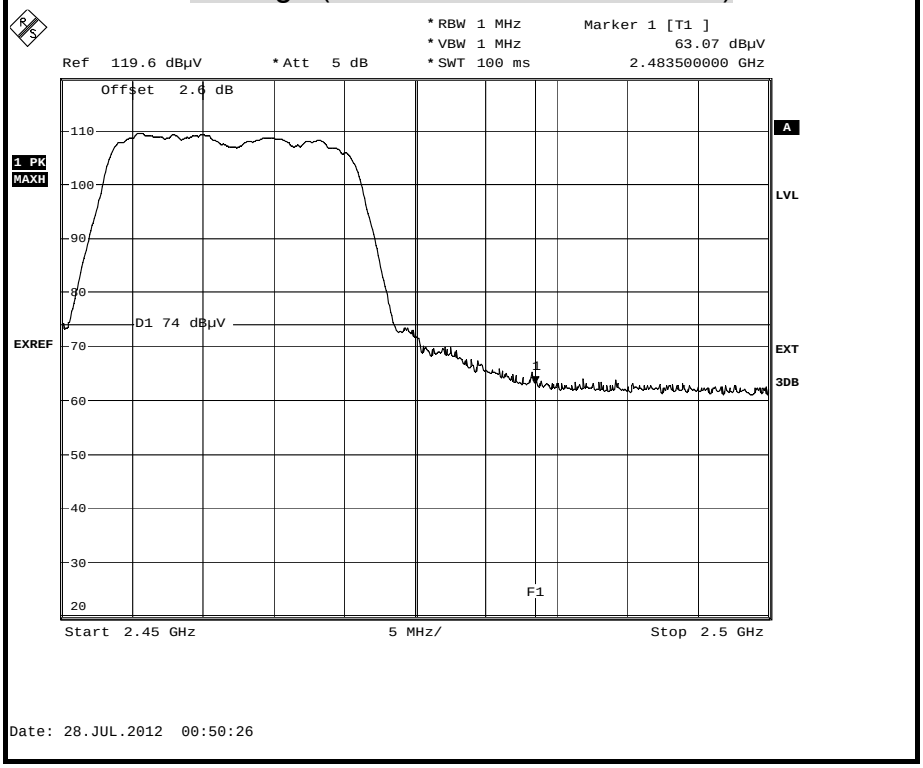
Detector Mode : Average **Polarity : Horizontal**

CH High (IEEE 802.11n HT20 Mode)



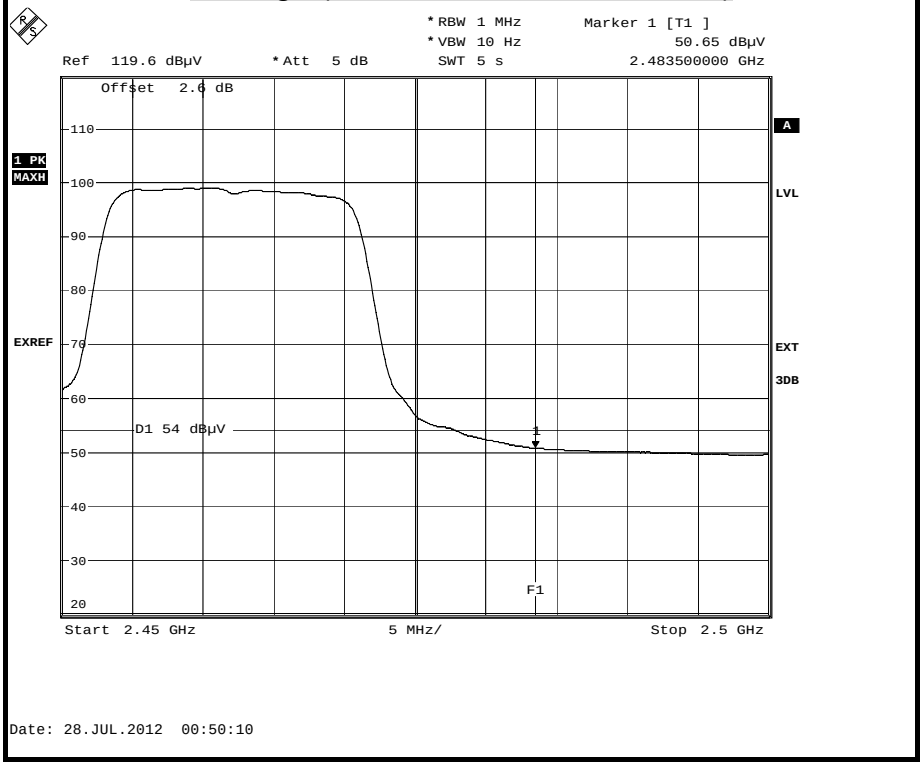
Detector Mode : Peak **Polarity : Vertical**

CH High (IEEE 802.11n HT20 Mode)



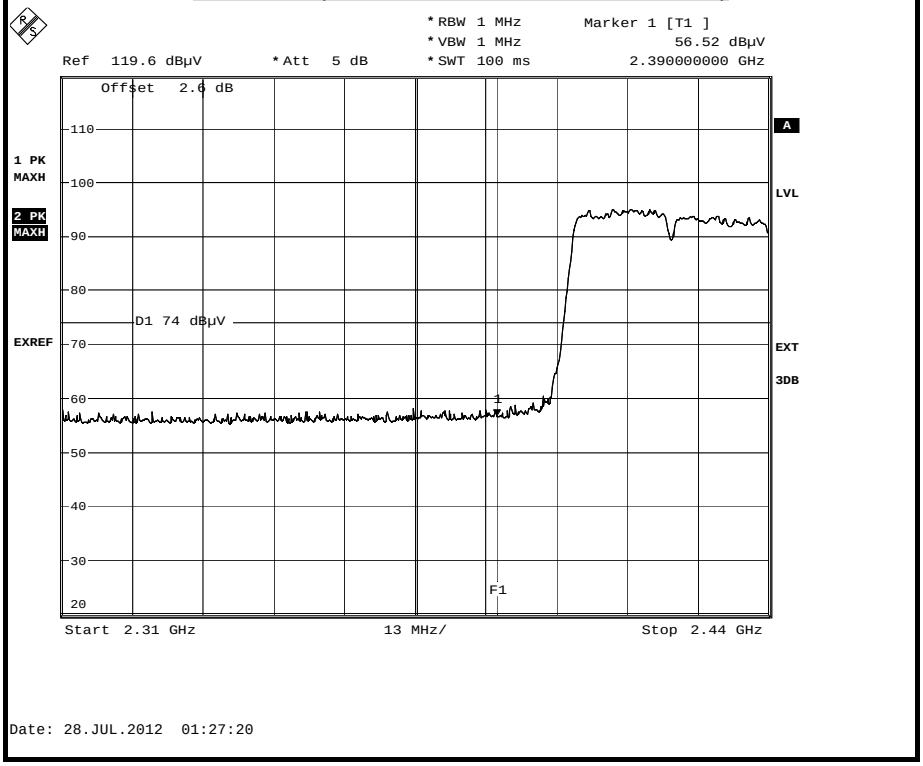
Detector Mode : Average **Polarity : Vertical**

CH High (IEEE 802.11n HT20 Mode)



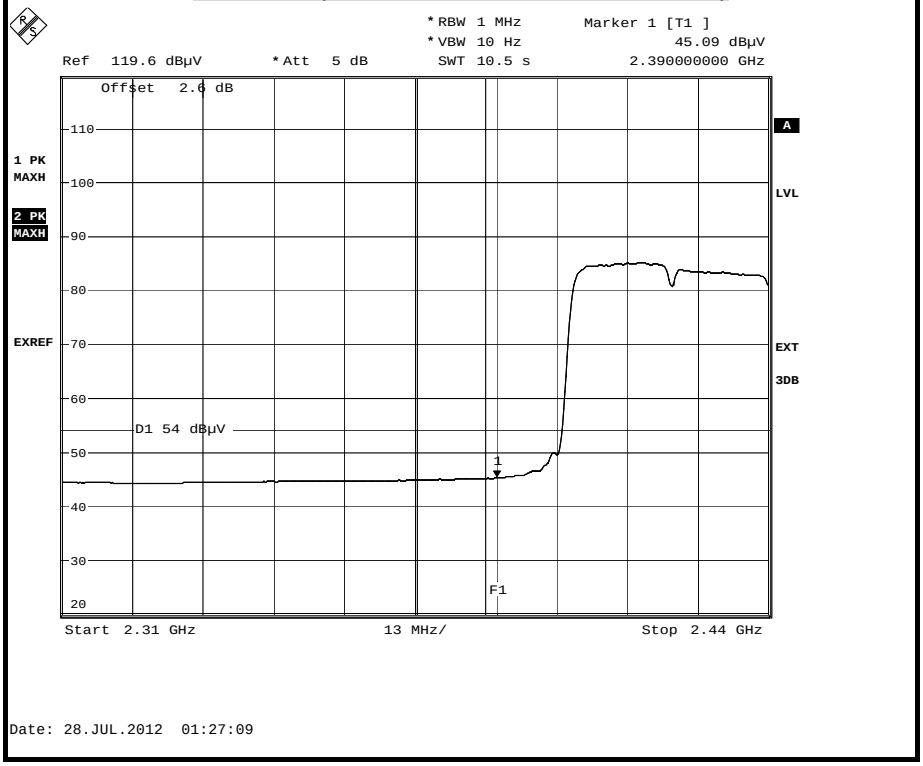
Detector Mode : Peak **Polarity : Horizontal**

CH Low (IEEE 802.11n HT40 Mode)



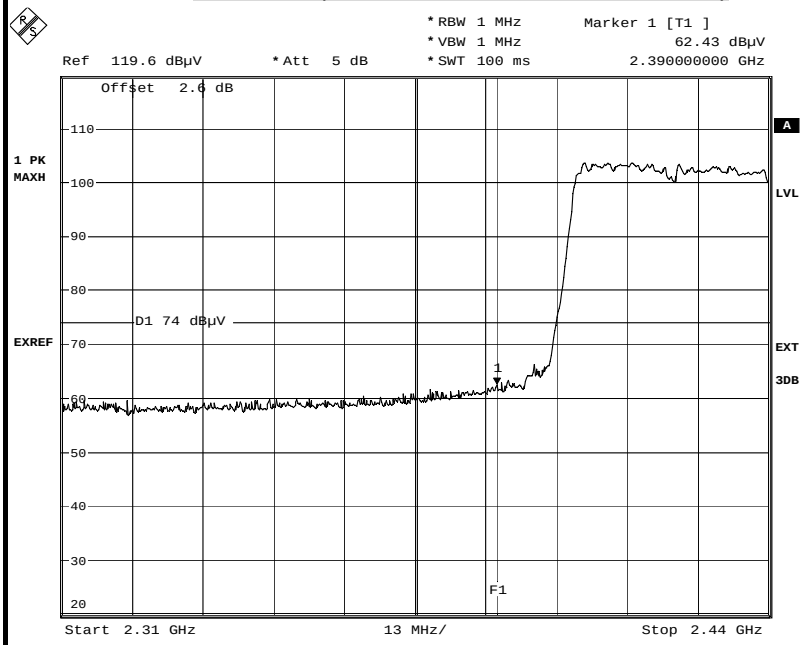
Detector Mode : Average **Polarity : Horizontal**

CH Low (IEEE 802.11n HT40 Mode)



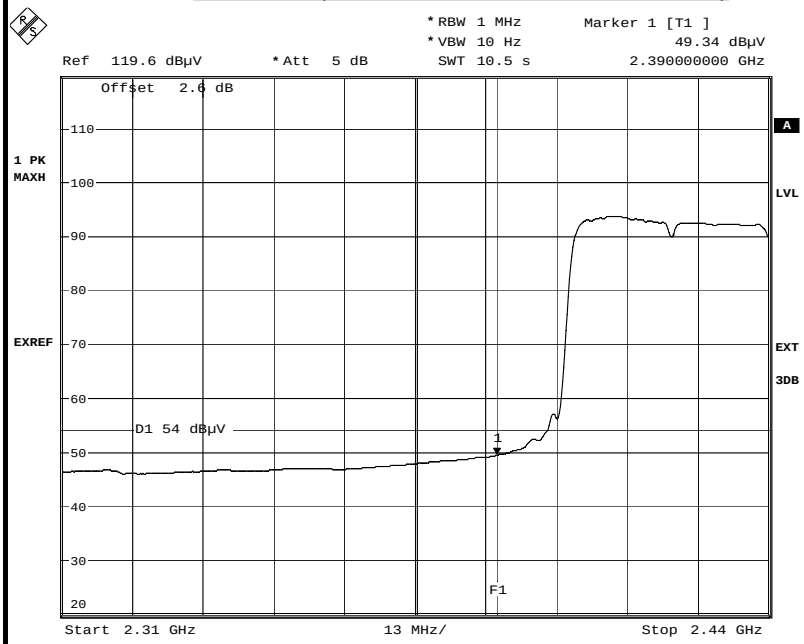
Detector Mode : Peak **Polarity : Vertical**

CH Low (IEEE 802.11n HT40 Mode)



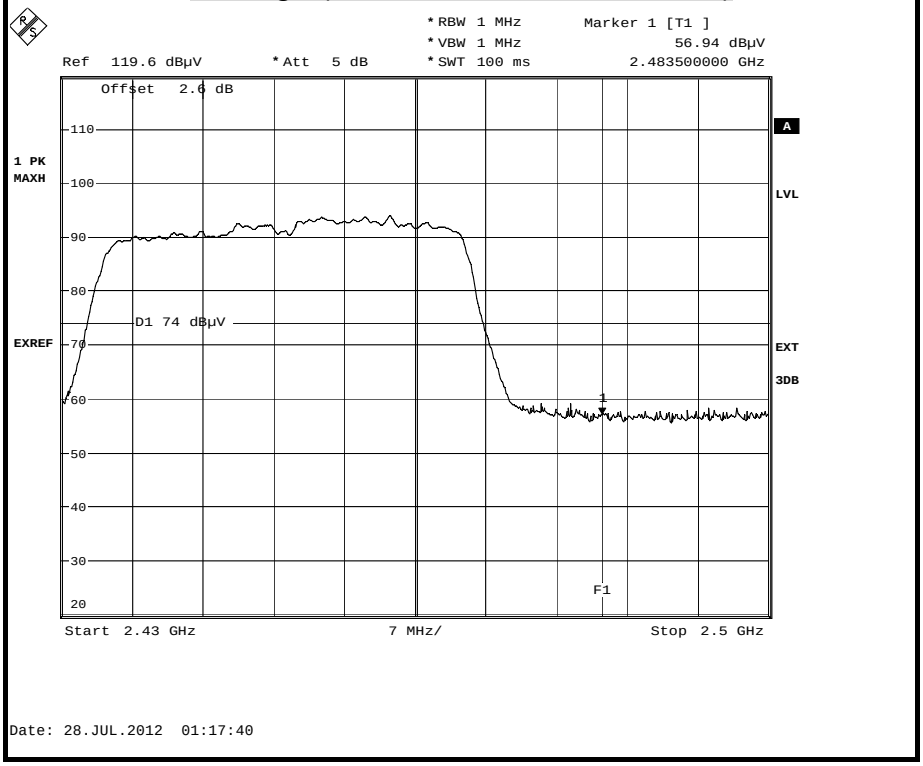
Detector Mode : Average **Polarity : Vertical**

CH Low (IEEE 802.11n HT40 Mode)



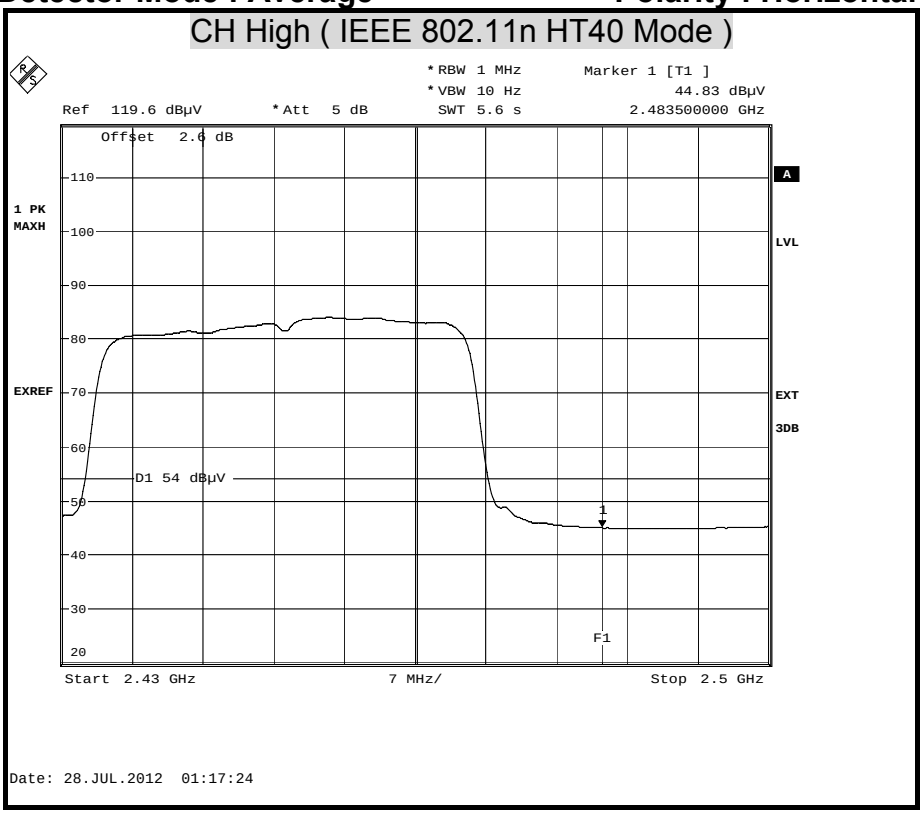
Detector Mode : Peak **Polarity : Horizontal**

CH High (IEEE 802.11n HT40 Mode)



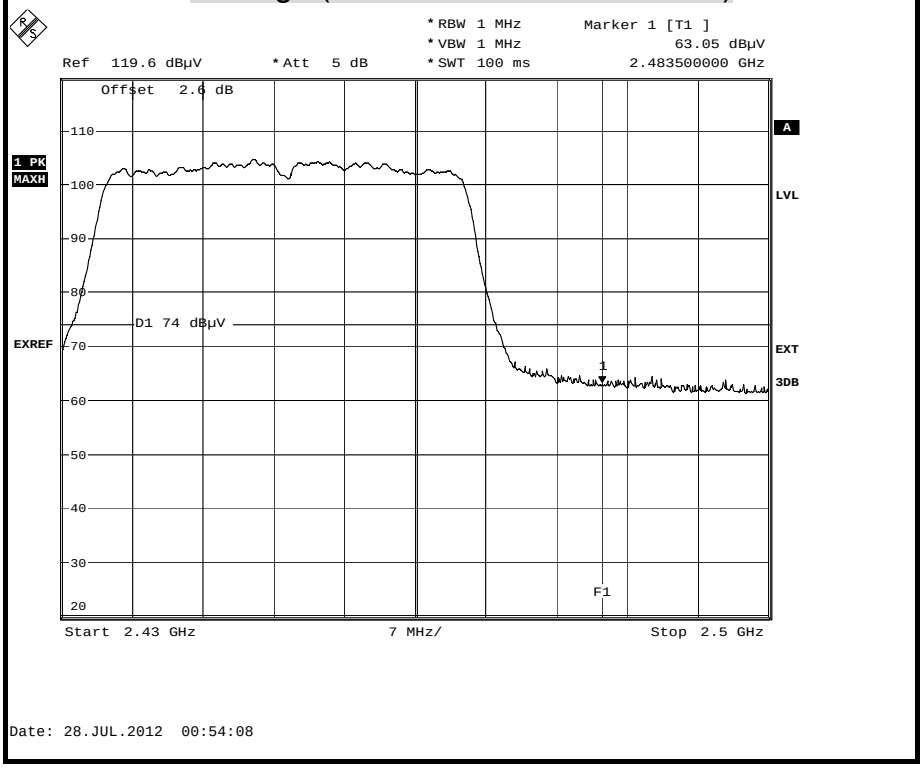
Detector Mode : Average **Polarity : Horizontal**

CH High (IEEE 802.11n HT40 Mode)



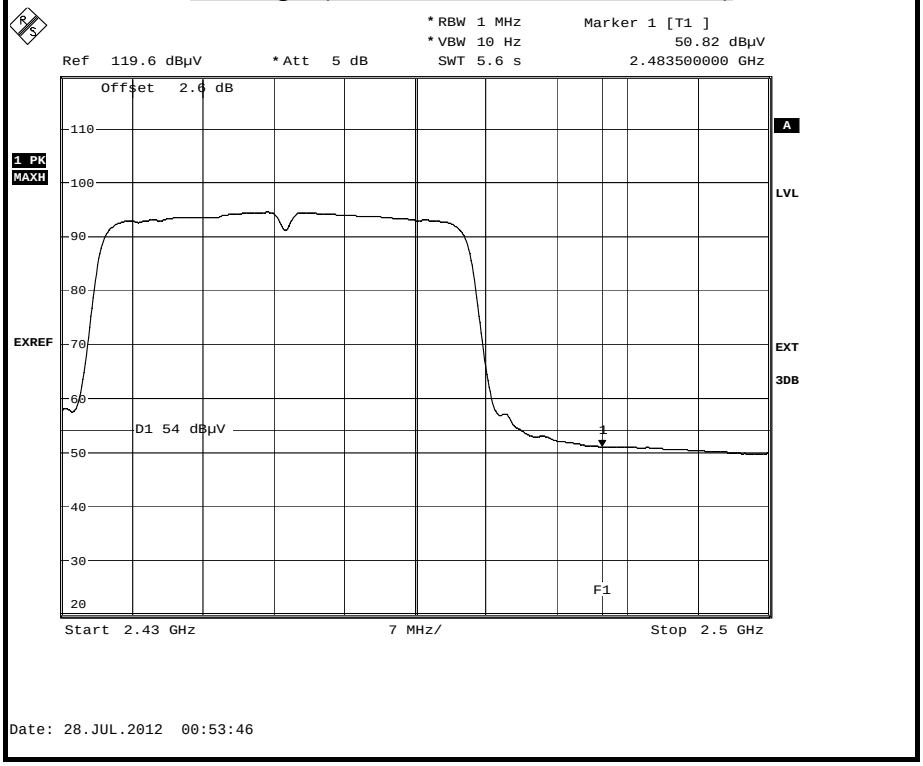
Detector Mode : Peak **Polarity : Vertical**

CH High (IEEE 802.11n HT40 Mode)



Detector Mode : Average **Polarity : Vertical**

CH High (IEEE 802.11n HT40 Mode)



7.7 CONDUCTED EMISSION

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

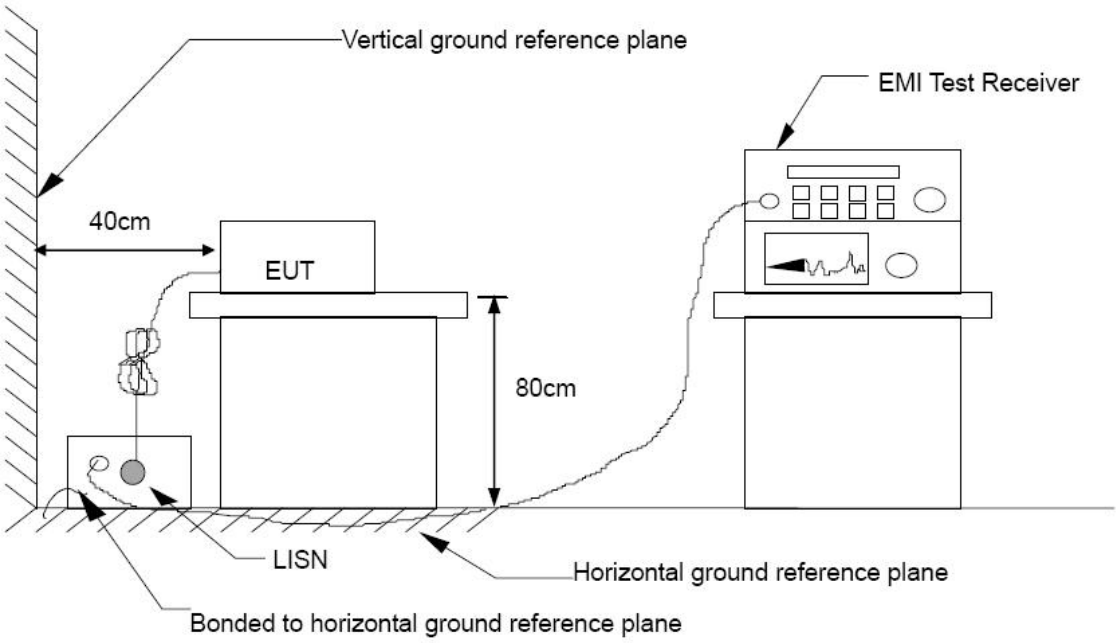
Frequency Range (MHz)	Conducted Limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

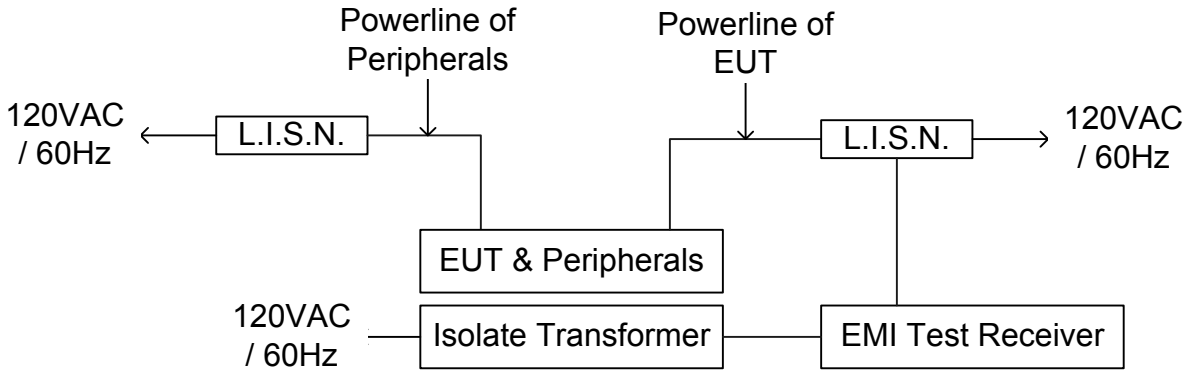
TEST EQUIPMENT

Conducted Emission room #1				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N.	SCHWARZBECK	NNLK 8130	8130124	SEP. 25, 2012
	Rohde & Schwarz	ESH 3-Z5	840062/021	AUG. 02, 2013
TEST RECEIVER	Rohde & Schwarz	ESCS 30	100348	JUL. 03, 2013
BNC COAXIAL CABLE	CCS	BNC50	11	OCT. 30, 2012
Test S/W	e-3 (5.04211c) R&S (2.27)			

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP





TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2003.

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

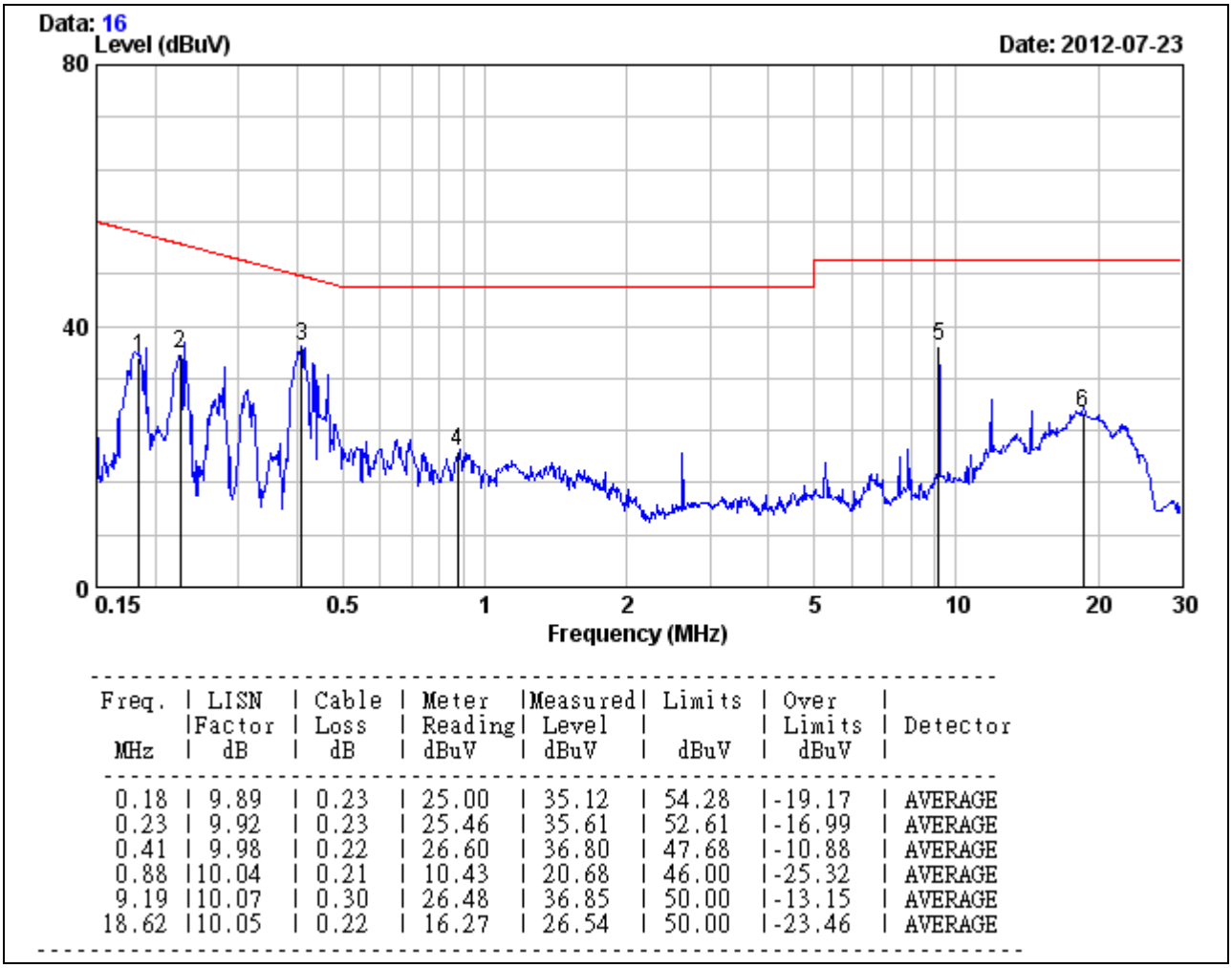
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

TEST RESULTS

Model	DIR-840L	Test By	Weici Lo
Temp. & Humidity	26°C, 69%	Test Date	2012/07/23
Test Mode	Normal Operation / Average	Adapter 1	AMS4-1202000FU

LINE



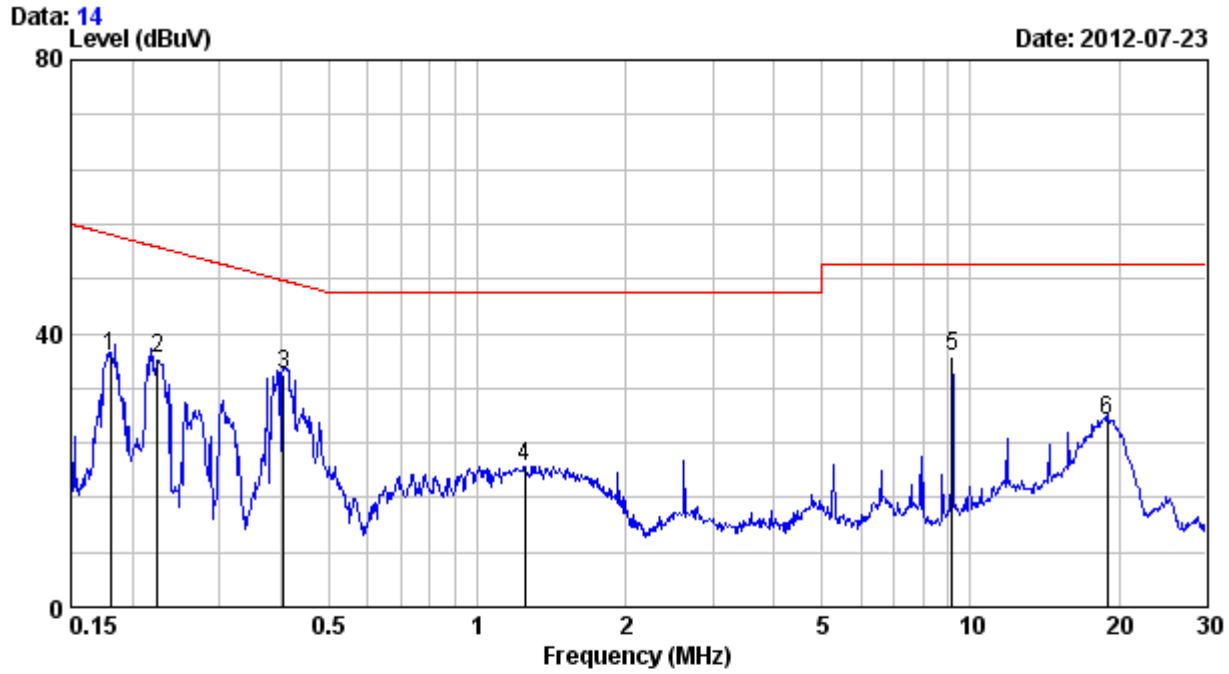
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.18	9.89	0.23	25.00	35.12	54.28	-19.17	AVERAGE
0.23	9.92	0.23	25.46	35.61	52.61	-16.99	AVERAGE
0.41	9.98	0.22	26.60	36.80	47.68	-10.88	AVERAGE
0.88	10.04	0.21	10.43	20.68	46.00	-25.32	AVERAGE
9.19	10.07	0.30	26.48	36.85	50.00	-13.15	AVERAGE
18.62	10.05	0.22	16.27	26.54	50.00	-23.46	AVERAGE

Remark:

1. *Correction Factor = Insertion loss + Cable loss*
2. *Emission level = Reading Value + Correction factor*
3. *Margin value = Emission level – Limit value*

Model	DIR-840L	Test By	Weici Lo
Temp. & Humidity	26°C, 69%	Test Date	2012/07/23
Test Mode	Normal Operation / Average	Adapter 1	AMS4-1202000FU

NEUTRAL



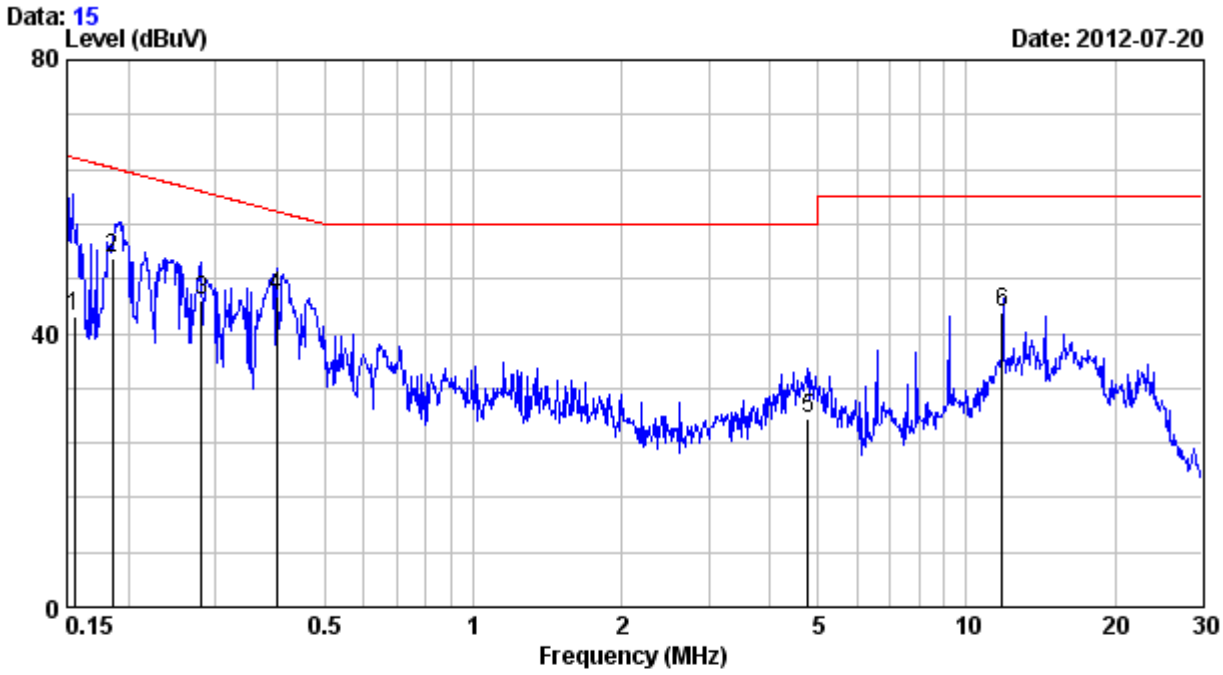
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.18	9.89	0.23	26.66	36.77	54.46	-17.69	AVERAGE
0.22	9.92	0.23	26.19	36.34	52.64	-16.30	AVERAGE
0.40	9.98	0.22	23.72	33.92	47.76	-13.84	AVERAGE
1.25	10.05	0.21	10.24	20.50	46.00	-25.50	AVERAGE
9.19	10.07	0.30	26.28	36.65	50.00	-13.35	AVERAGE
18.92	10.05	0.22	16.93	27.20	50.00	-22.80	AVERAGE

Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value

Model	DIR-840L	Test By	Weici Lo
Temp. & Humidity	26℃, 69%	Test Date	2012/07/23
Test Mode	Normal Operation / QP	Adapter 1	AMS4-1202000FU

LINE



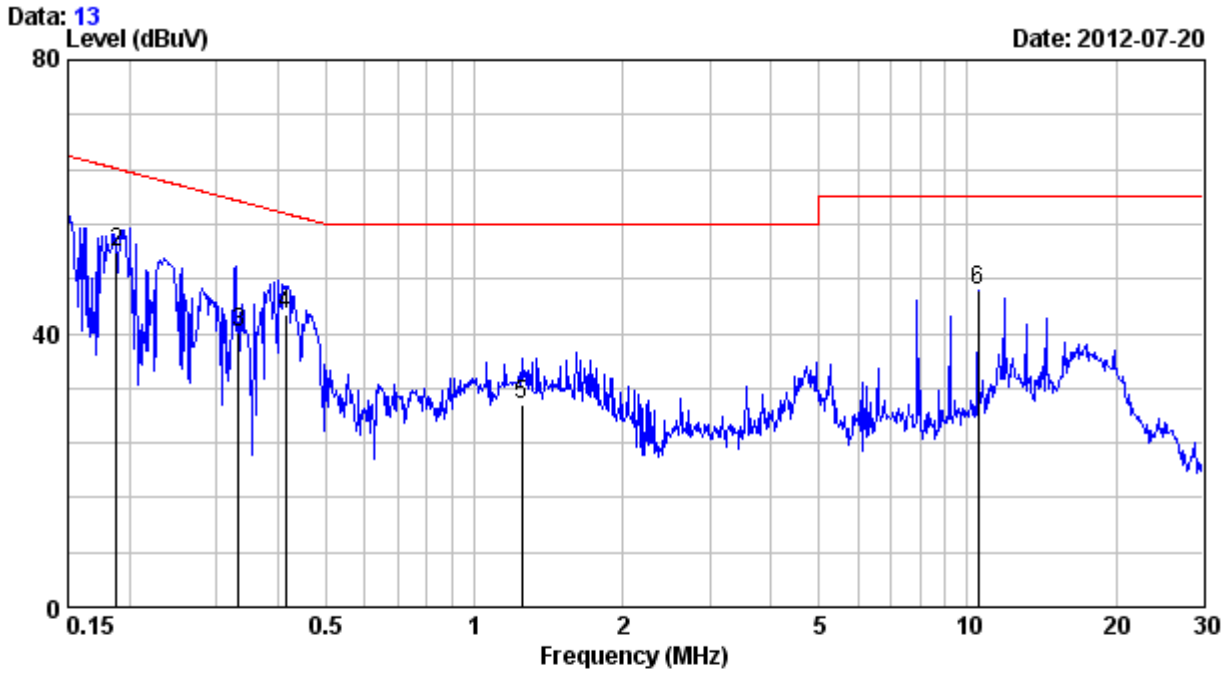
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.16	9.88	0.20	32.33	42.42	65.71	-23.30	QP
0.19	9.89	0.23	40.95	51.07	64.25	-13.18	QP
0.28	9.97	0.22	34.67	44.86	60.77	-15.91	QP
0.40	9.98	0.22	35.15	45.35	57.86	-12.52	QP
4.77	10.07	0.24	17.38	27.68	56.00	-28.32	QP
11.82	10.07	0.29	32.81	43.16	60.00	-16.84	QP

Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value

Model	DIR-840L	Test By	Weici Lo
Temp. & Humidity	26°C, 69%	Test Date	2012/07/23
Test Mode	Normal Operation / QP	Adapter 1	AMS4-1202000FU

NEUTRAL



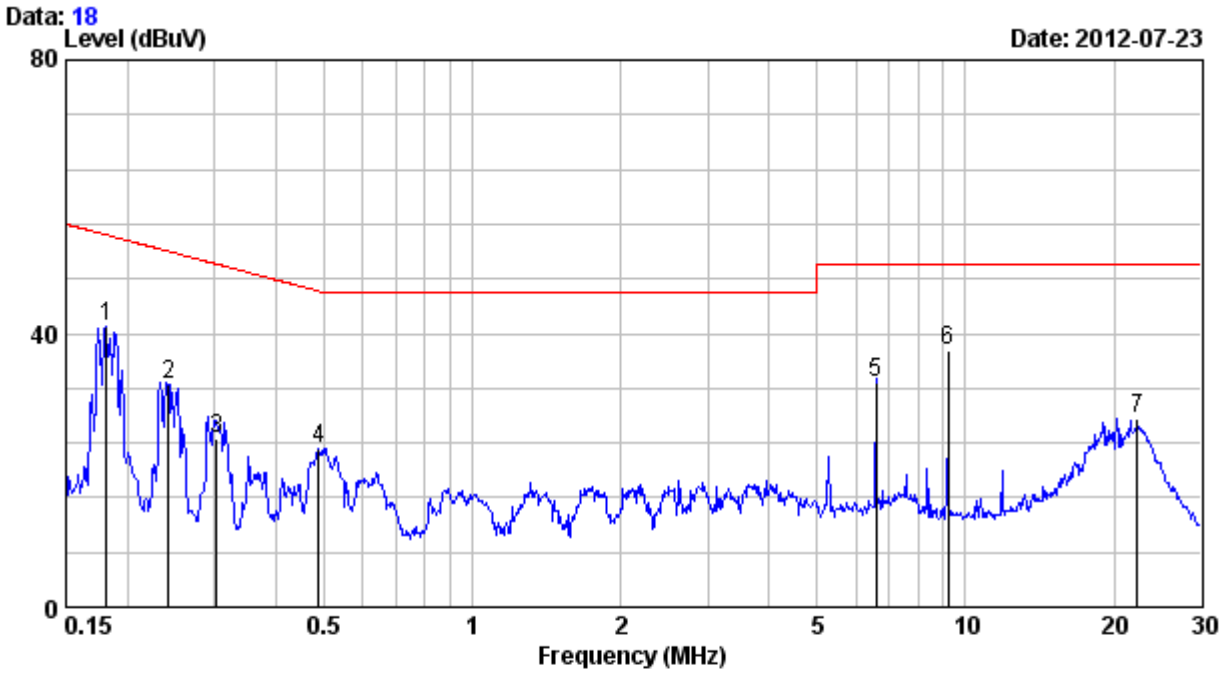
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.15	9.88	0.20	41.72	51.80	66.00	-14.20	QP
0.19	9.89	0.23	41.84	51.96	64.12	-12.16	QP
0.33	9.99	0.21	29.91	40.11	59.38	-19.27	QP
0.41	9.98	0.22	32.55	42.76	57.57	-14.81	QP
1.25	10.05	0.21	19.30	29.56	56.00	-26.44	QP
10.51	10.07	0.30	35.79	46.16	60.00	-13.84	QP

Remark:

1. *Correction Factor = Insertion loss + Cable loss*
2. *Emission level = Reading Value + Correction factor*
3. *Margin value = Emission level – Limit value*

Model	DIR-840L	Test By	Weici Lo
Temp. & Humidity	26℃, 69%	Test Date	2012/07/23
Test Mode	Normal Operation / Average	Adapter 2	UU324-1220

LINE



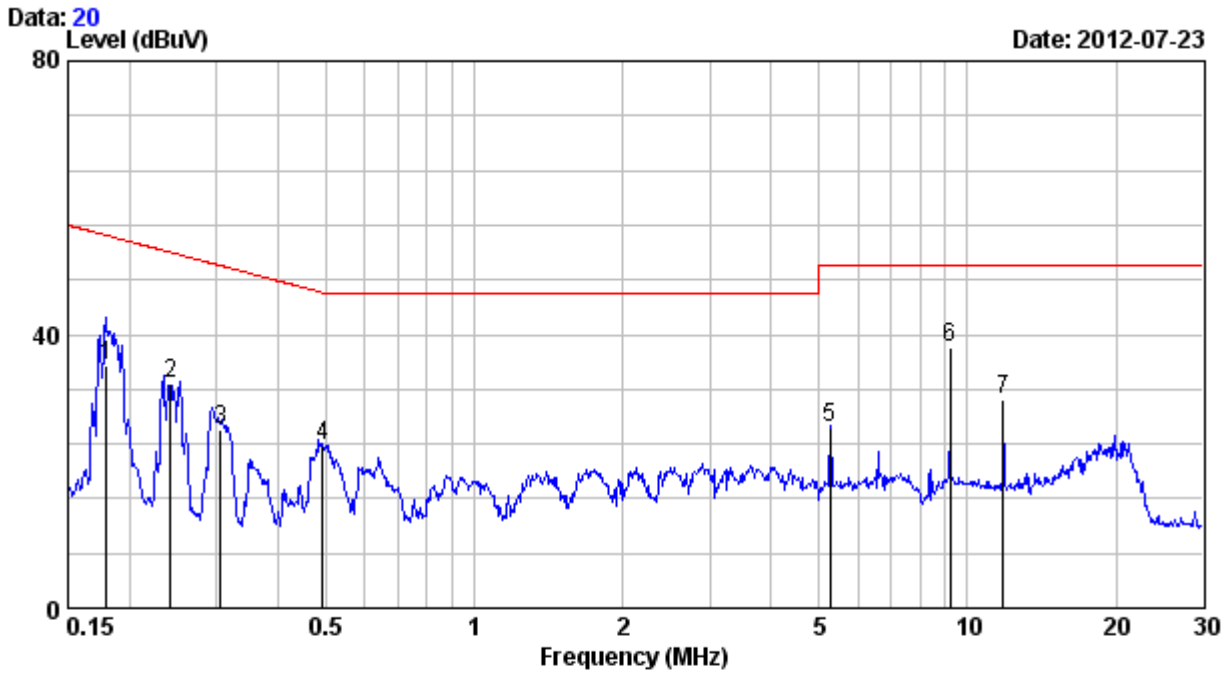
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.18	9.89	0.23	30.85	40.96	54.42	-13.45	AVERAGE
0.24	9.94	0.23	22.35	32.51	52.04	-19.53	AVERAGE
0.30	9.99	0.21	14.44	24.64	50.15	-25.51	AVERAGE
0.49	10.01	0.23	12.86	23.10	46.19	-23.09	AVERAGE
6.57	10.07	0.26	22.55	32.88	50.00	-17.12	AVERAGE
9.20	10.07	0.30	27.12	37.49	50.00	-12.51	AVERAGE
22.30	10.03	0.24	17.32	27.59	50.00	-22.41	AVERAGE

Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value

Model	DIR-840L	Test By	Weici Lo
Temp. & Humidity	26°C, 69%	Test Date	2012/07/23
Test Mode	Normal Operation / Average	Adapter 2	UU324-1220

NEUTRAL



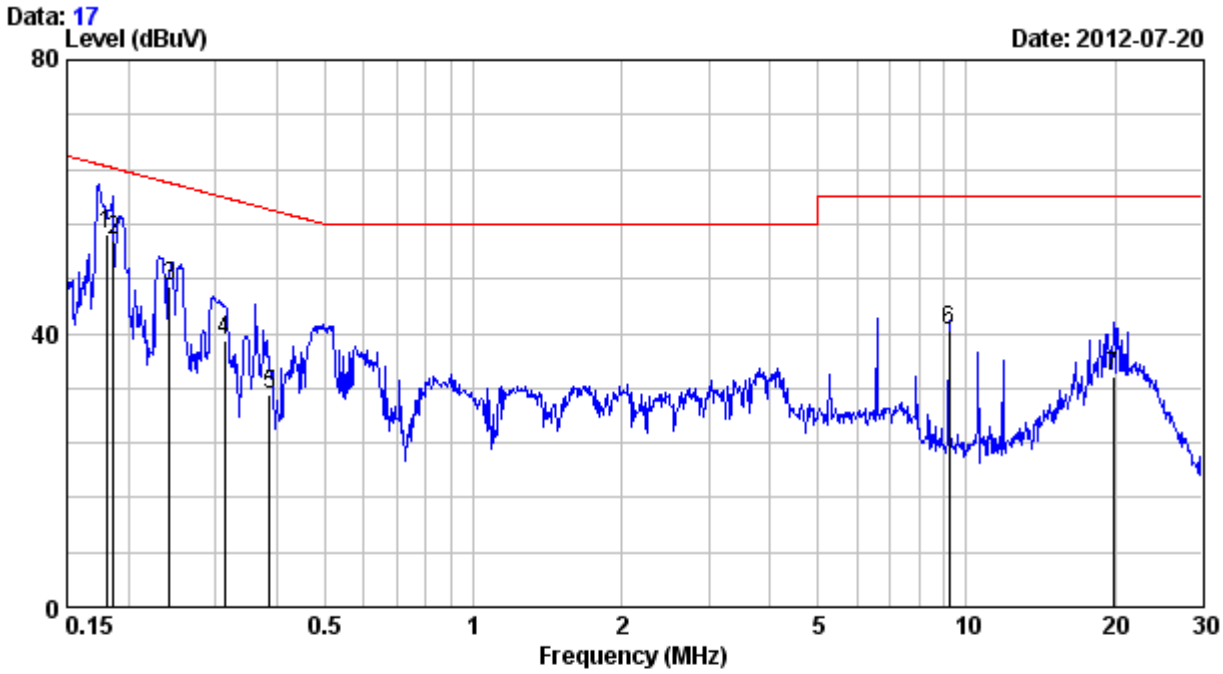
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.18	9.89	0.23	25.27	35.38	54.49	-19.11	AVERAGE
0.24	9.94	0.23	22.66	32.82	52.03	-19.20	AVERAGE
0.31	9.99	0.21	15.94	26.14	50.09	-23.95	AVERAGE
0.49	10.01	0.23	13.42	23.66	46.14	-22.49	AVERAGE
5.26	10.07	0.24	16.16	26.47	50.00	-23.53	AVERAGE
9.20	10.07	0.30	27.73	38.10	50.00	-11.90	AVERAGE
11.83	10.07	0.29	20.23	30.58	50.00	-19.42	AVERAGE

Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value

Model	DIR-840L	Test By	Weici Lo
Temp. & Humidity	26℃, 69%	Test Date	2012/07/23
Test Mode	Normal Operation / QP	Adapter 2	UU324-1220

LINE



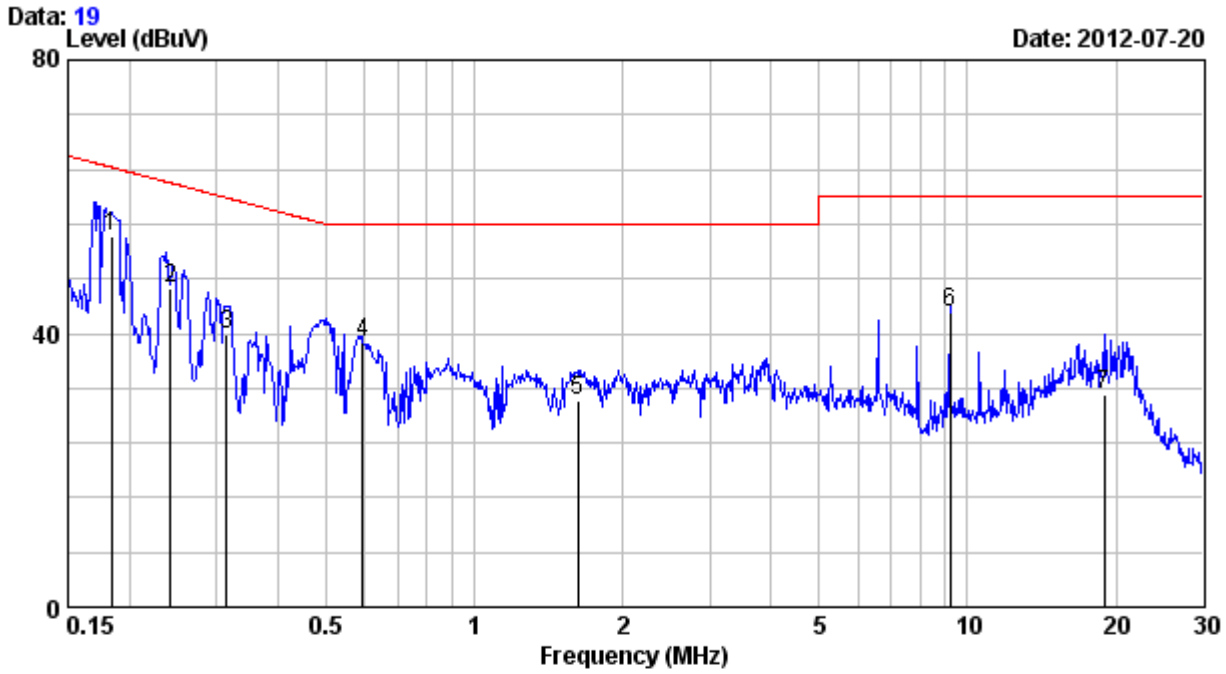
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.18	9.89	0.23	44.53	54.64	64.48	-9.84	QP
0.19	9.89	0.23	43.50	53.62	64.20	-10.58	QP
0.24	9.94	0.23	36.73	46.89	62.04	-15.14	QP
0.31	9.99	0.21	28.73	38.93	59.87	-20.94	QP
0.39	9.98	0.22	20.88	31.08	58.13	-27.05	QP
9.21	10.07	0.30	30.13	40.50	60.00	-19.50	QP
19.84	10.05	0.21	23.43	33.69	60.00	-26.31	QP

Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value

Model	DIR-840L	Test By	Weici Lo
Temp. & Humidity	26°C, 69%	Test Date	2012/07/23
Test Mode	Normal Operation / QP	Adapter 2	UU324-1220

NEUTRAL



Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.18	9.89	0.23	44.21	54.33	64.31	-9.98	QP
0.24	9.94	0.23	36.54	46.70	62.01	-15.30	QP
0.31	9.99	0.21	29.57	39.77	59.87	-20.10	QP
0.59	10.02	0.22	28.51	38.75	56.00	-17.25	QP
1.62	10.05	0.22	19.94	30.21	56.00	-25.79	QP
9.21	10.07	0.30	32.82	43.19	60.00	-16.81	QP
18.92	10.05	0.22	20.83	31.10	60.00	-28.90	QP

Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value

APPENDIX I MAXIMUM PERMISSIBLE EXPOSURE

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate theenvironment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

CALCULATIONS

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where E = Field strength in Volts / meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and
d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$

Where d = Distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm2

LIMIT

Power Density Limit, S=1.0mW/cm^2

TEST RESULTS

Numeric antenna gain :

Antenna Gain 1 (2.4G):	3	dBi =	1.995262
Antenna Gain 2 (2.4G):	6.01	dBi =	3.990525
Antenna Gain (5G):	5	dBi =	3.162278
Total Antenna Gain (5G):	8.01	dBi =	6.324555

No non-compliance noted: (MPE distance equals 20 cm)

IEEE 802.11b (2.4G)	=	0.0796 *	360.5786	*	1.99526231	÷ 400 =	0.14317
IEEE 802.11g (2.4G)	=	0.0796 *	497.7371	*	1.99526231	÷ 400 =	0.19763
IEEE 802.11n HT20 (2.4G)	=	0.0796 *	367.3697	*	3.99052463	÷ 400 =	0.29173
IEEE 802.11n HT40 (2.4G)	=	0.0796 *	262.0236	*	3.99052463	÷ 400 =	0.20808
IEEE 802.11a (5G)	=	0.0796 *	342.7678	*	3.16227766	÷ 400 =	0.2157
IEEE 802.11n HT20 (5G)	=	0.0796 *	219.8557	*	6.32455532	÷ 400 =	0.27671
IEEE 802.11n HT40 (5G)	=	0.0796 *	222.9109	*	6.32455532	÷ 400 =	0.28055

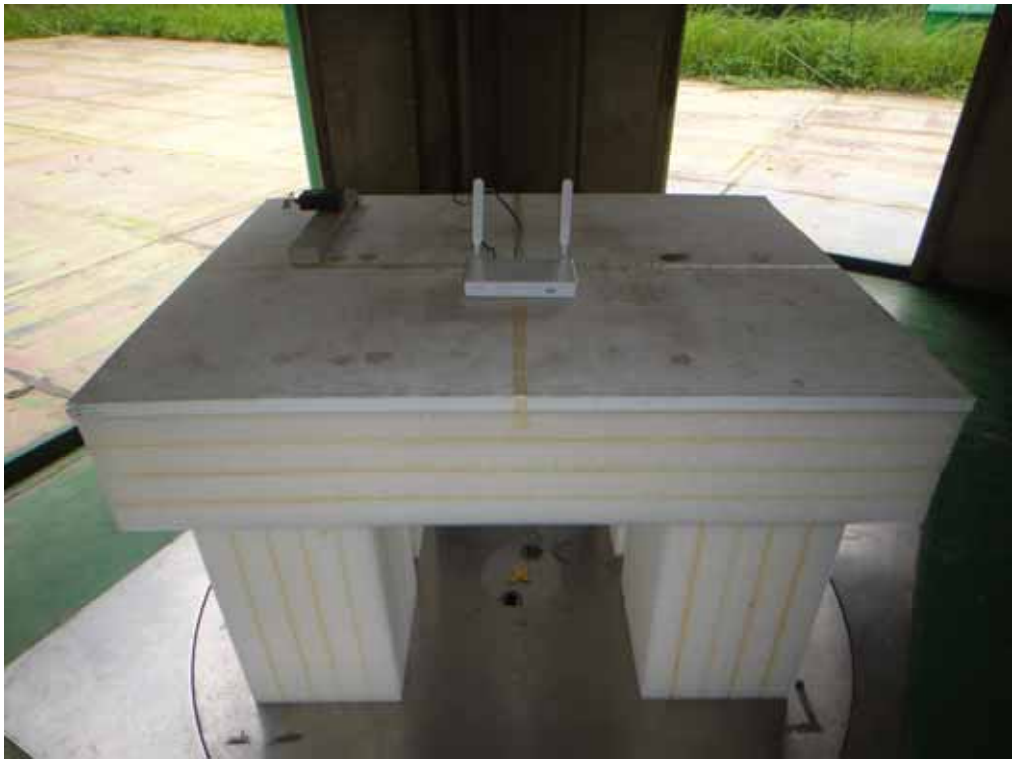
Mode	Antenna Gain (dBi)	Minimum separation distance (cm)	Output Power (dBm)	Output Power (mW)	Power Density Limit (mW/cm^2)	Power Density at 20cm (mW/cm^2)
IEEE 802.11b (2.4G)	3.00	20.0	25.57	360.58	1.00	0.143170
IEEE 802.11g (2.4G)	3.00	20.0	26.97	497.74	1.00	0.197630
IEEE 802.11n HT20 (2.4G)	6.01	20.0	25.65	367.37	1.00	0.291734
IEEE 802.11n HT40 (2.4G)	6.01	20.0	24.18	262.02	1.00	0.208077
IEEE 802.11a (5G)	5.00	20.0	25.35	342.77	1.00	0.215701
IEEE 802.11n HT20 (5G)	8.01	20.0	23.42	219.86	1.00	0.276707
IEEE 802.11n HT40 (5G)	8.01	20.0	23.48	222.91	1.00	0.280553

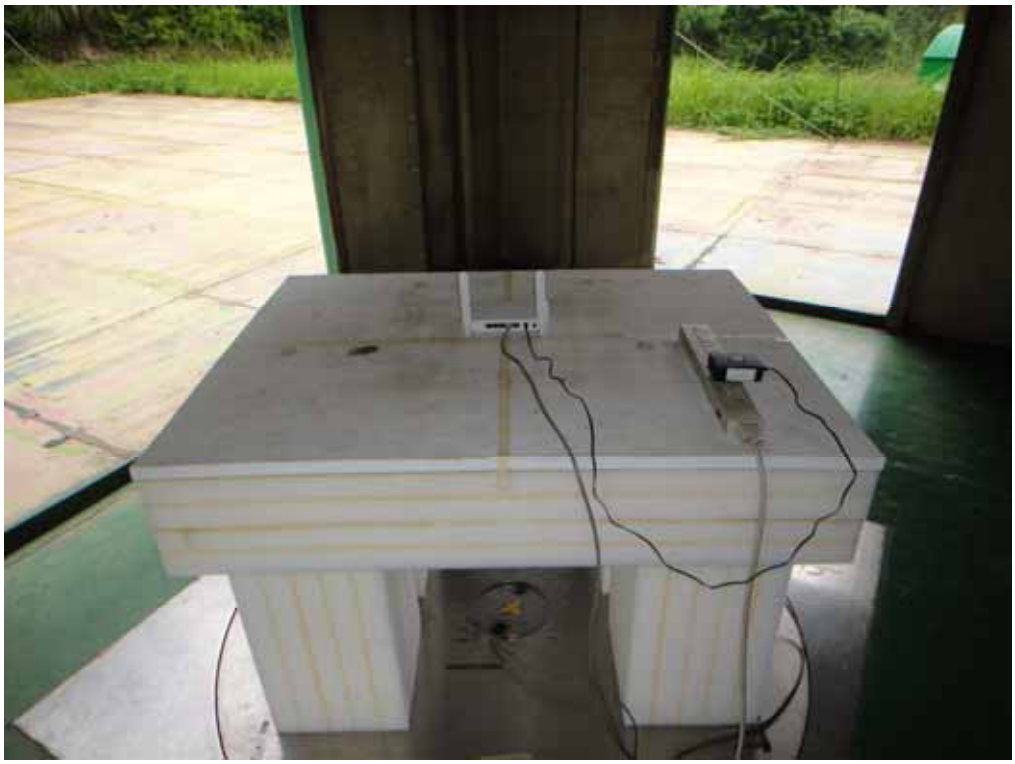
Remark: *For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.*

APPENDIX II SETUP PHOTOS

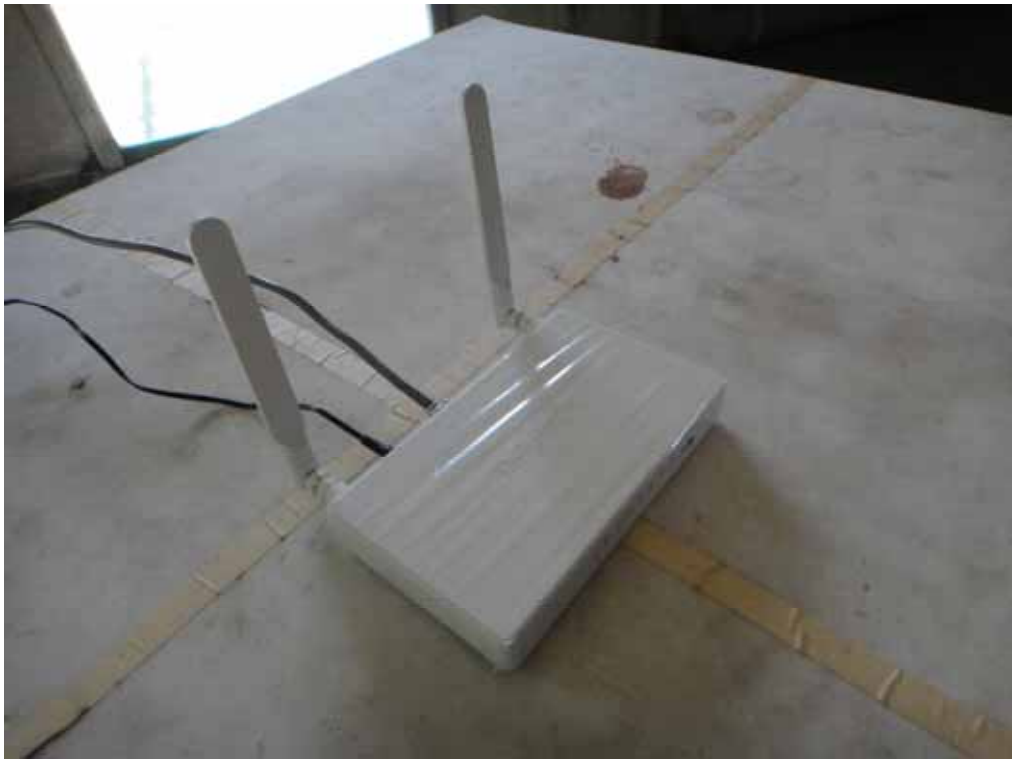
RADIATED EMISSION SETUP

RADIATED RF MEASUREMENT SETUP

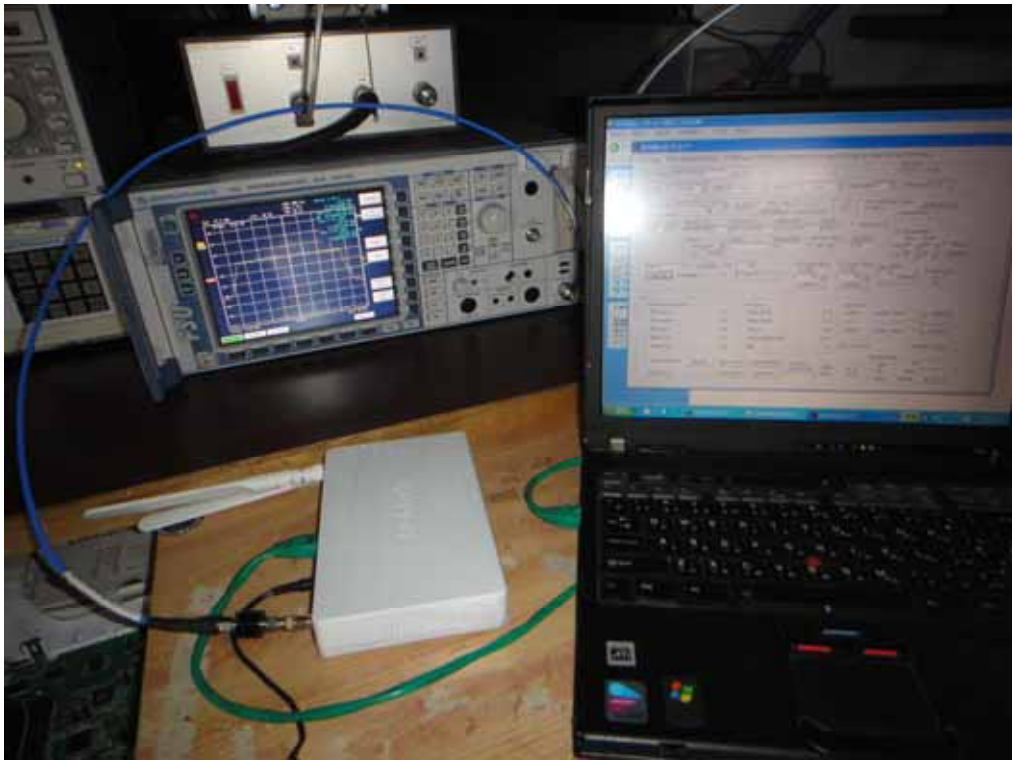




RADIATED RF MEASUREMENT SETUP



ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



CONDUCTED EMISSION SETUP