TEST REPORT

of

FCC Part 15 Subpart C

☒ New Application; ☐ Class I PC; ☐ Class II PC

Product :	**Pyxis AIO Panel**
Brand:	**N/A**
Model:	**351300-XX**
Model Difference:	**Where x is 0-9, A-Z, a-z, -or blank for marketing purpose**
FCC ID:	**OHB351300**
FCC Rule Part:	**§15.247, Cat: DTS**
Applicant:	**AAEON Technology Inc**
Address:	**5F,No.135, Lane 235,Pao Chiao Rd. Hsin-Tien Dist, New Taipei City , Taiwan, R.O.C.**

Test Performed by:

International Standards Laboratory
<Lung-Tan LAB>
*Site Registration No.
BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-3;
*Address:
No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
*Tel : 886-3-407-1718; Fax: 886-3-407-1738

Report No.: **ISL-13LR073FC**

Issue Date : **2013/05/10**

VERIFICATION OF COMPLIANCE

Applicant:	AAEON Technology Inc
Product Description:	Pyxis AIO Panel
Brand Name:	N/A
Model No.:	351300-XX
Model Difference:	Where x is 0-9, A-Z, a-z, -or blank for marketing purpose
FCC ID:	OHB351300
Date of test:	2013/04/24 ~ 2013/05/09
Date of EUT Received:	2013/04/24

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:		***Date:***	2013/05/10
	Dion Chang / Engineer		
Prepared By:		***Date:***	2013/05/10
	Eva Kao / Technical Supervisor		
Approved By:		***Date:***	2013/05/10
	Vincent Su / Technical Manager		

Version

Version No.	Date	Description
00	2013/05/10	Initial creation of document

Table of Contents

1 GENERAL INFORMATION

General:

Product Name	Pyxis AIO Panel
Brand Name	N/A
Model Name	351300-XX
Model Difference	Where x is 0-9, A-Z, a-z, -or blank for marketing purpose
Docking assembly	Model name: 351253-xx
Power Supply	DC12V form AC/DC Adapter Model No.: EA11001F-240

WLAN: 1TX/1RX:

Frequency Range:	802.11b/g/n HT20: 2412 – 2462MHz 802.11n HT40: 2422 – 2452MHz
Channel number:	802.11b/g/n HT20: 11 channels 802.11n HT40: 7 channels
Transmit Power(Peak):	802.11b: 17.99dBm 802.11g: 20.21dBm 802.11n HT20: 19.81dBm 802.11n HT40: 20.13dBm
Modulation Technology	11b/g: DSSS, OFDM 11n: OFDM
Modulation type:	CCK, DQPSK, DBPSK for DSSS 64QAM. 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n HT20MHz: 6.5 – 65Mbps 802.11 n HT40MHz: 13.5 – 135Mbps
Antenna Designation:	Dipole Antenna: 2.87 dBi;P/N: PFA-02-P33-70-200-K Dipole Antenna, 2.82dBi ;P/N: PFA-02-P33-70B-350-K

The EUT is compliance with IEEE 802.11 b/g/n Standard.

Bluetooth: 1TX

Bluetooth Version	V2.1 + EDR (GFSK + π /4 DQPSK + 8DPSK)	V4.0(GFSK)
Frequency Range:	2402 – 2480MHz	2402 – 2480MHz
Channel number:	79 channels	40 channels
Modulation type:	Frequency Hopping Spread Spectrum	Digital Modulation (Direct Sequence Spread Spectrum)
Transmit Power: (Peak)	5.50 dBm	2.87dBm
Dwell Time:	<= 0.4s	N/A
Operating Mode:	Point-to-Point	
Antenna Designation:	Dipole Antenna: 2.87 dBi;P/N: PFA-02-P33-70-200-K Dipole Antenna, 2.82dBi ;P/N: PFA-02-P33-70B-350-K	

The EUT is compliance with Bluetooth EDR V2.1 +V4.0 Standard.

This report is applied for wifi and BT 4.0 modes.

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: OHB351300** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

1.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

KDB Document:

558074 D01 DTS Meas Guidance v03r01

1.3 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory** <Lung-Tan LAB> No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd., Lung-Tan Hsiang, Tao Yuan County 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number is: TW1036, Canada Registration Number: 4067B-3.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

2.4 Configuration of Tested System

Fig. 1 Configuration

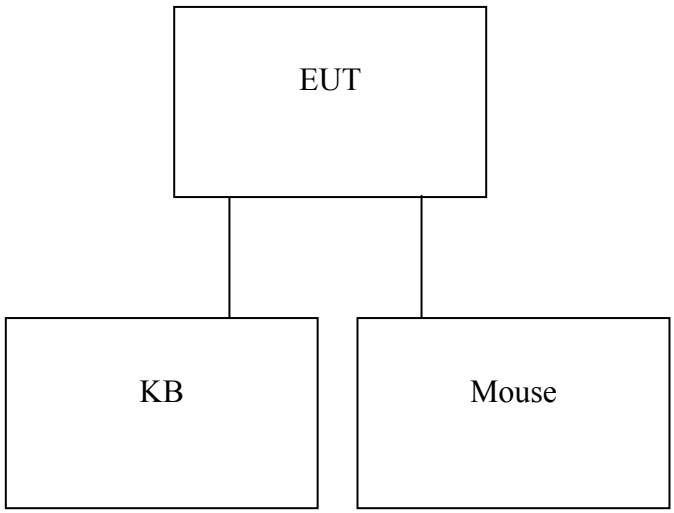


Table 1-1 Equipment Used in Tested System

Item	Equipment	Mrf/Brand	Model name	Series No	Data Cable	Power Cable
1	KB	DELL	SK-8115	N/A	Shield	N/A
2	Mouse	DELL	MO56UC	N/A	No- Shiel-ding	N/A

3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3),(4)	Peak Output Power	Compliant
§15.247(a)(2)	6dB Bandwidth	Compliant
§15.247(d)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d)	Spurious Emission	Compliant
§15.247(e)	Peak Power Density	Compliant
§15.203	Antenna Requirement	Compliant
§2.1091	MPE	Compliant

4 DESCRIPTION OF TEST MODES

The EUT has been tested under engineering operating condition.
Test program used to control the EUT for staying in continuous transmitting mode is programmed.

802.11 b mode: Channel low (2412MHz)、mid (2437MHz) and high (2462MHz) with 1Mbps lowest data rate are chosen for full testing.
802.11 g mode: Channel low (2412MHz)、mid (2437MHz) and high (2462MHz) with 6Mbps lowest data rate are chosen for full testing.
802.11 n _20MHz: Channel low (2412MHz)、mid (2437MHz) and high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.
802.11 n_40MHz: Lowest (2422MHz), Mid (2437MHz) and Highest (2452MHz) with 13.5Mbps lowest data rate are chosen for full testing.

BT BLE mode: Channel low (2402MHz)、mid (2441MHz) and high (2480MHz) were chosen for pre-test testing of radiated emissions.

The worst case 802.11 g mode channel 2412MHz, 2437MHz, 2462MHz was reported for Radiated Spurious Emission.

5 CONDUCTED EMISSION TEST

5.1 Standard Applicable:

According to §15.207, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

5.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	ROHDE & SCHWARZ	ESCI7	100877	10/25/2012	10/25/2013
LISN 16	ROHDE & SCHWARZ	ESH3-Z6	100795	10/20/2012	10/20/2013
LISN 17	ROHDE & SCHWARZ	ESH3-Z6	100796	10/20/2012	10/20/2013
LISN 18	ROHDE & SCHWARZ	ENV216	101424	03/13/2013	03/13/2014
LISN 19	ROHDE & SCHWARZ	ENV216	101425	03/13/2013	03/13/2014
INS T8 07	Teseq GmbH	ISN T800	30834	05/29/2012	05/29/2013
Conduction 04-1 Cable	WOKEN	CFD 300-NL	Conduction 04 -1	09/10/2012	09/10/2013

5.3 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

5.4 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

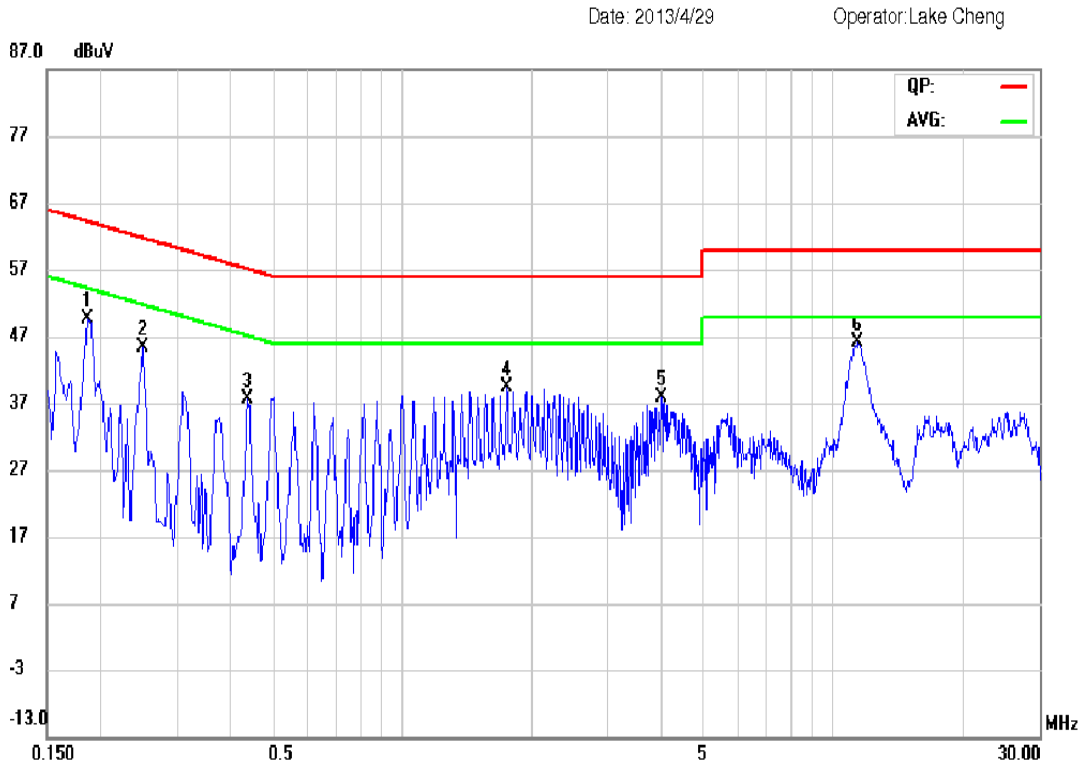
5.5 Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Note: Refer to next page for measurement data and plots.

AC POWER LINE CONDUCTED EMISSION TEST DATA

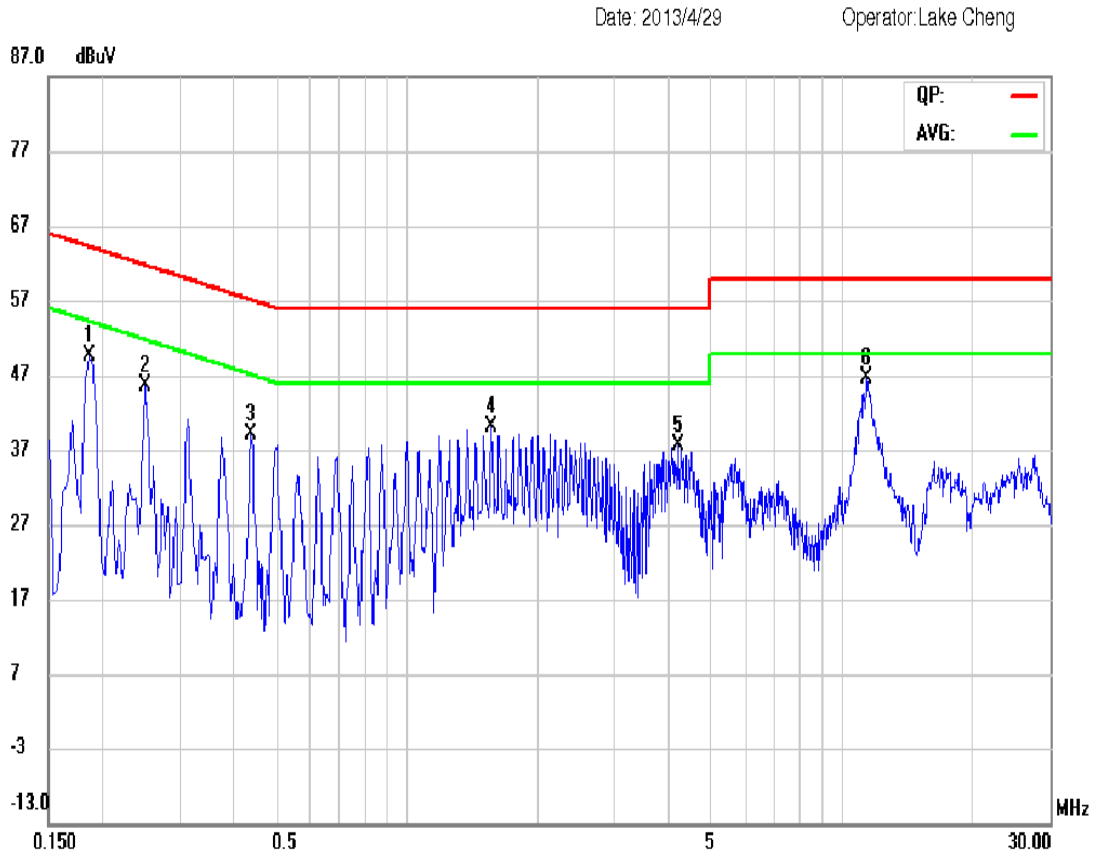
Operation Mode:	Operation Mode	Test Date:	2013/04/29
Test By:	Lake		



Site Conduction 04 Phase: L1 Temperature: 26 ℃

Condition : CISPR22 Class B Conduction Humidity: 54 %

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		
	MHz	Peak	QP	AVG	(dB)	peak	QP	AVG	P/Q	AVG	P/Q	AVG	P/F Comment
1	0.1860	40.90	39.69	30.39	9.61	50.51	49.30	40.00	64.21	54.21	-14.91	-14.21	
2	0.2500	36.15	34.01	25.36	9.61	45.76	43.62	34.97	61.76	51.76	-18.14	-16.79	
3	0.4380	30.38	28.43	24.10	9.61	39.99	38.04	33.71	57.10	47.10	-19.06	-13.39	
4 *	1.7500	30.53	28.41	24.23	9.62	40.15	38.03	33.85	56.00	46.00	-17.97	-12.15	
5	4.0060	29.10	25.97	19.49	9.63	38.73	35.60	29.12	56.00	46.00	-20.40	-16.88	
6	11.4300	29.30	24.22	15.34	9.67	38.97	33.89	25.01	60.00	50.00	-26.11	-24.99	



Site Conduction 04 Phase: N Temperature: 26 ℃

Condition : CISPR22 Class B Conduction Humidity: 54 %

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		
	MHz	Peak	QP	AVG	(dB)	peak	QP	AVG	P/Q	AVG	P/Q	AVG	P/F Comment
1	0.1860	40.59	38.94	29.74	9.58	50.17	48.52	39.32	64.21	54.21	-15.69	-14.89	
2	0.2500	36.71	34.13	25.88	9.58	46.29	43.71	35.46	61.76	51.76	-18.05	-16.30	
3	0.4380	30.04	27.61	22.87	9.58	39.62	37.19	32.45	57.10	47.10	-19.91	-14.65	
4 *	1.5660	30.80	29.00	24.71	9.60	40.40	38.60	34.31	56.00	46.00	-17.40	-11.69	
5	4.1900	29.00	26.02	17.17	9.61	38.61	35.63	26.78	56.00	46.00	-20.37	-19.22	
6	11.3940	37.97	33.31	24.21	9.69	47.66	43.00	33.90	60.00	50.00	-17.00	-16.10	

6 PEAK /AVERAGE OUTPUT POWER MEASUREMENT

6.1 Standard Applicable:

According to §15.247(b)(3),(4)(b)

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

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

(c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

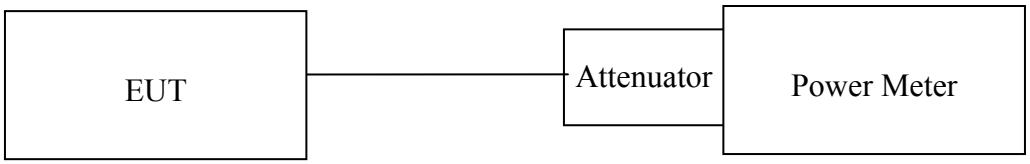
(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

(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 conducted output power.

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Power Meter 05	Anritsu	ML2495A	1116010	04/19/2013	04/18/2014
Power Sensor 05	Anritsu	MA2411B	34NKF50	04/19/2013	04/18/2014
Temperature Chamber	KSON	THS-B4H100	2287	03/15/2013	03/14/2014
DC Power supply	ABM	51850	N/A	06/17/2012	06/16/2013
AC Power supply	EXTECH	CFC105W	NA	12/19/2012	12/18/2013
Splitter	MCLI	PS4-199	12465	07/18/2012	07/17/2013
Spectrum analyzer	Agilent	N9030A	MY51360021	03/29/2013	03/28/2014

6.3 Test Set-up:



6.4 Measurement Procedure:

Refer to section 9.1.3 and 9.2.3 Peak and Average Conducted Output Power Measurement Procedure of KDB Document: 558074 D01 DTS Meas Guidance v03r01

6.5 Measurement Result:

802.11b

Cable loss = 0		Output Power		Limit (dBm)
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	
1	2412	17.87	15.60	30
6	2437	17.99	15.72	
11	2462	17.81	15.74	

802.11g

Cable loss = 0		Output Power		Limit (dBm)
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	
1	2412	20.04	11.34	30
6	2437	20.21	11.86	
11	2462	19.76	11.43	

802.11N 20MHz(2.4G)

Cable loss = 0		Output Power		Limit (dBm)
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	
1	2412	19.51	11.31	30
6	2437	19.81	11.59	
11	2462	19.24	11.07	

802.11N 40MHz(2.4G)

Cable loss = 0		Output Power		Limit (dBm)
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	
3	2422	20.12	10.96	30
6	2437	20.13	11.1	
9	2452	19.25	10.44	

BT BLE Mode

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	2.87	0.00	2.87	0.00194	1
2440.00	2.19	0.00	2.19	0.00166	1
2480.00	1.81	0.00	1.81	0.00152	1

7 6dB Bandwidth(EBW)

7.1 Standard Applicable:

According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

7.2 Measurement Equipment Used:

Refer to section 6.2 for details.

7.3 Test Set-up:

Refer to section 6.3 for details.

7.4 Measurement Procedure:

Refer to section 8.1 DTS bandwidth Measurement Procedure of KDB Document: 558074 D01 DTS Meas Guidance v03r01

1. Set resolution bandwidth (RBW) = 100KHz.
2. Set the video bandwidth (VBW) =300KHz.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement.

7.5 Measurement Result:

802.11b

Frequency (MHz)	6dB Bandwidth (MHz)	Bandwidth (KHz)	Result
2412	10.11	> 500	PASS
2437	10.12	> 500	PASS
2462	10.11	> 500	PASS

802.11g

Frequency (MHz)	6dB Bandwidth (MHz)	Bandwidth (KHz)	Result
2412	16.37	> 500	PASS
2437	16.39	> 500	PASS
2462	16.38	> 500	PASS

802.11n HT20

Frequency (MHz)	6dB Bandwidth (MHz)	Bandwidth (KHz)	Result
2412	17.58	> 500	PASS
2437	17.57	> 500	PASS
2462	17.57	> 500	PASS

802.11n HT40

Frequency (MHz)	6dB Bandwidth (MHz)	Bandwidth (KHz)	Result
2422	35.15	> 500	PASS
2437	35.12	> 500	PASS
2452	35.12	> 500	PASS

BT BLE Mode

Frequency (MHz)	6dB Bandwidth (MHz)	Bandwidth (KHz)	Result
2402	655.7	> 500	PASS
2440	654.3	> 500	PASS
2480	649.4	> 500	PASS

Note: Refer to next page for plots.

802.11b

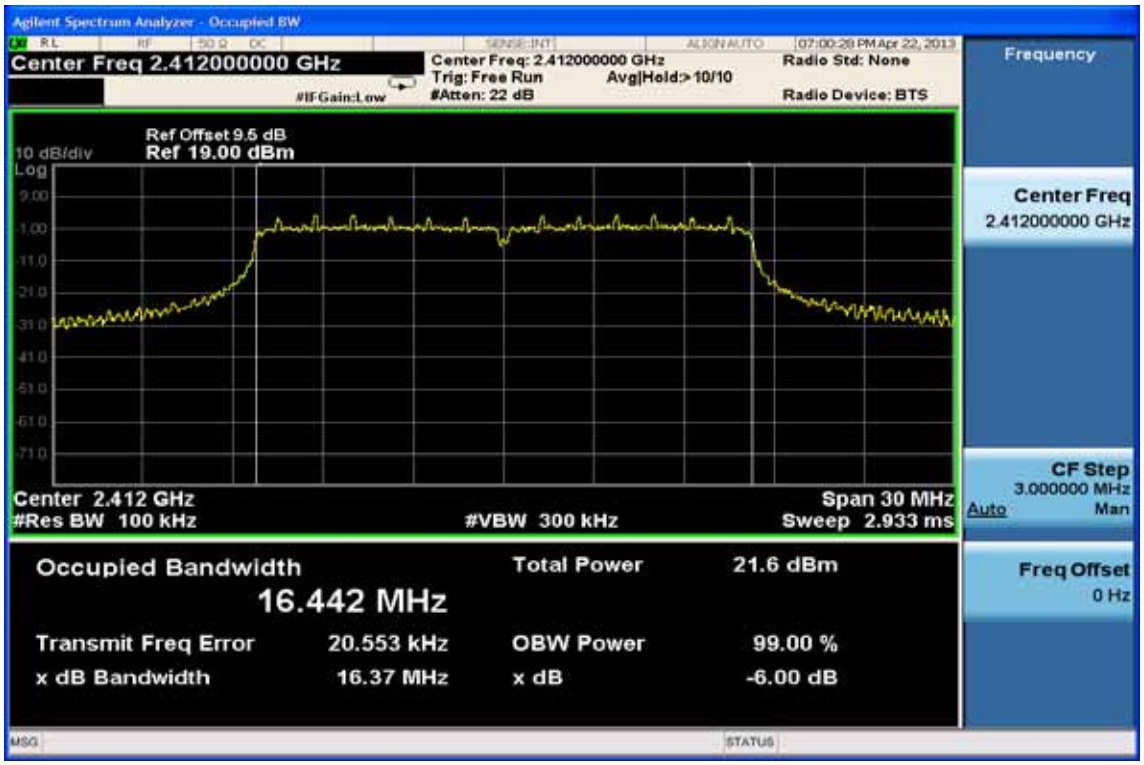
6dB Band Width Test Data CH-Low

6dB Band Width Test Data CH-Mid

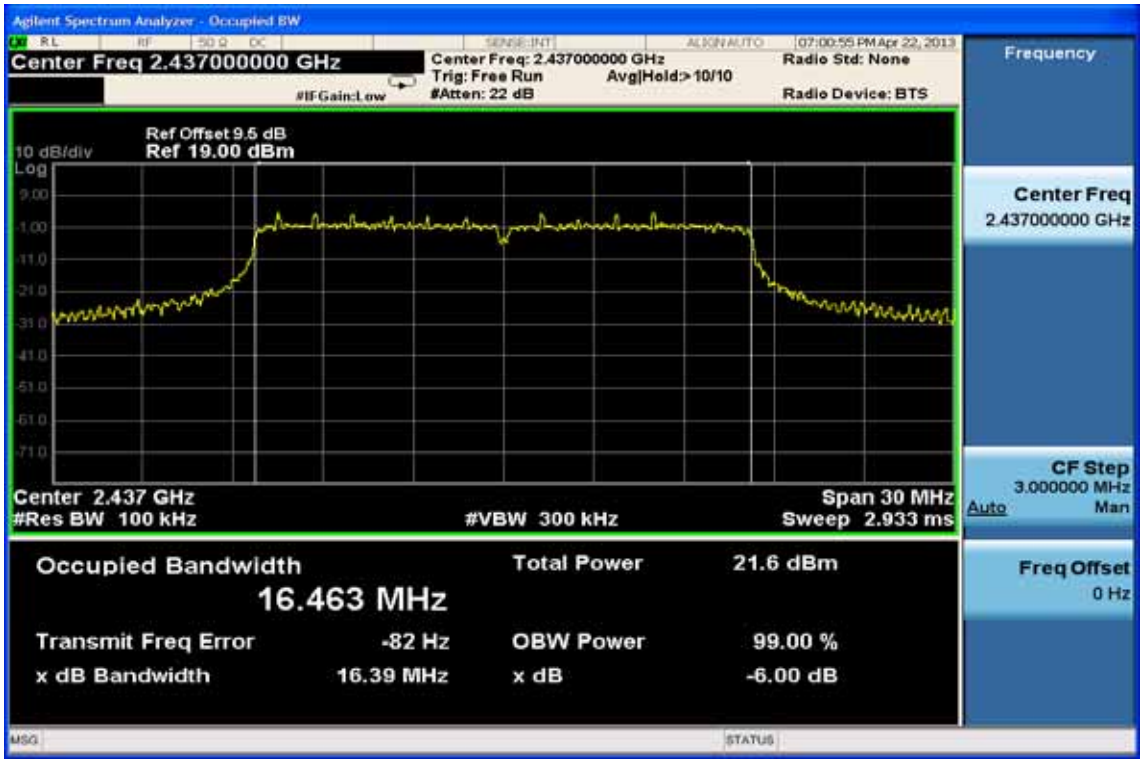
6dB Band Width Test Data CH-High

802.11g

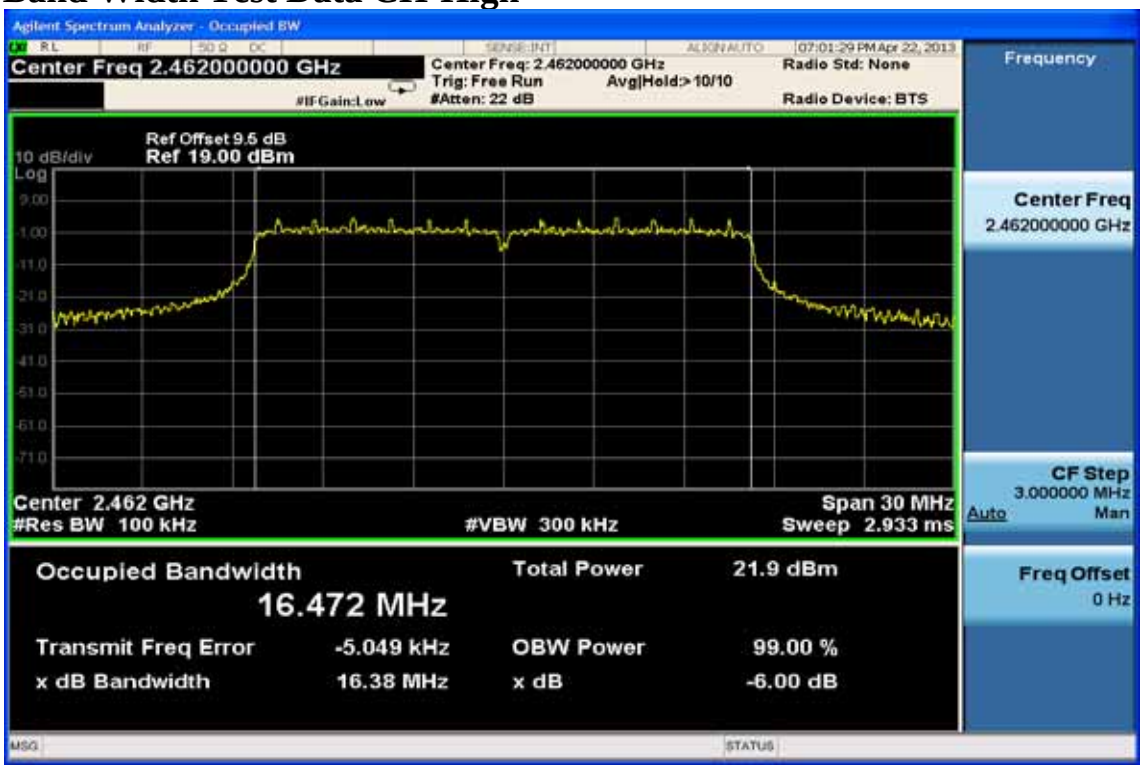
6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

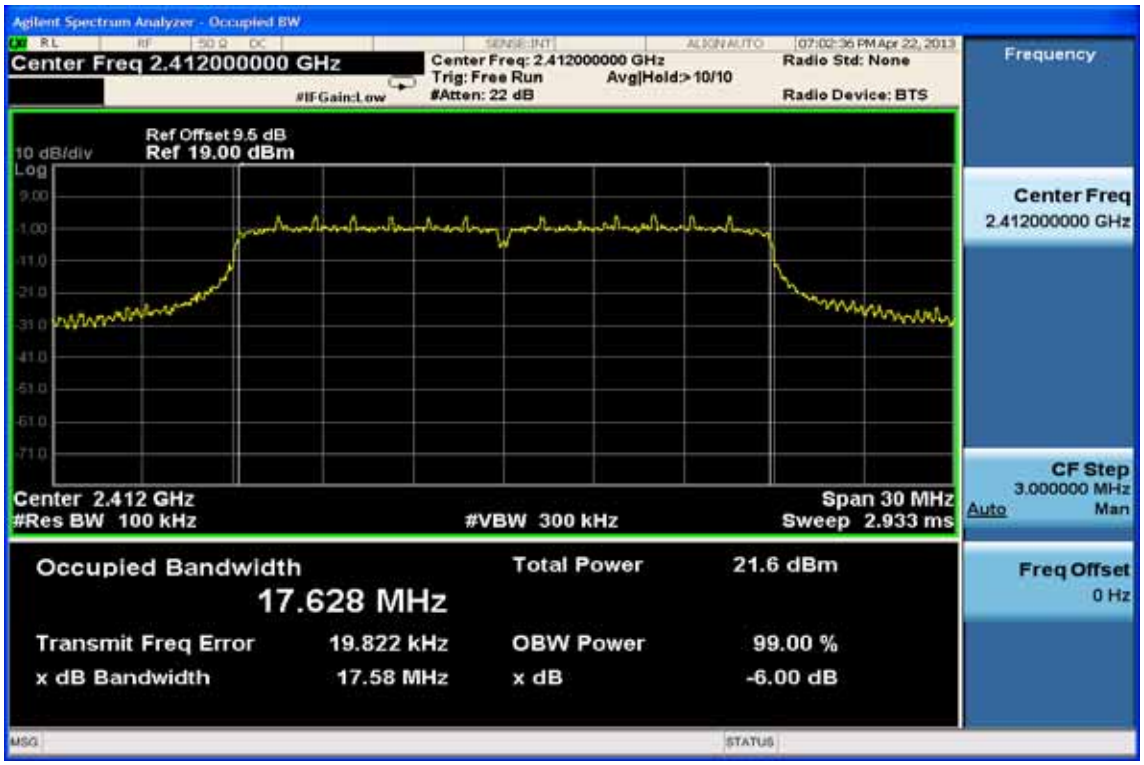


6dB Band Width Test Data CH-High

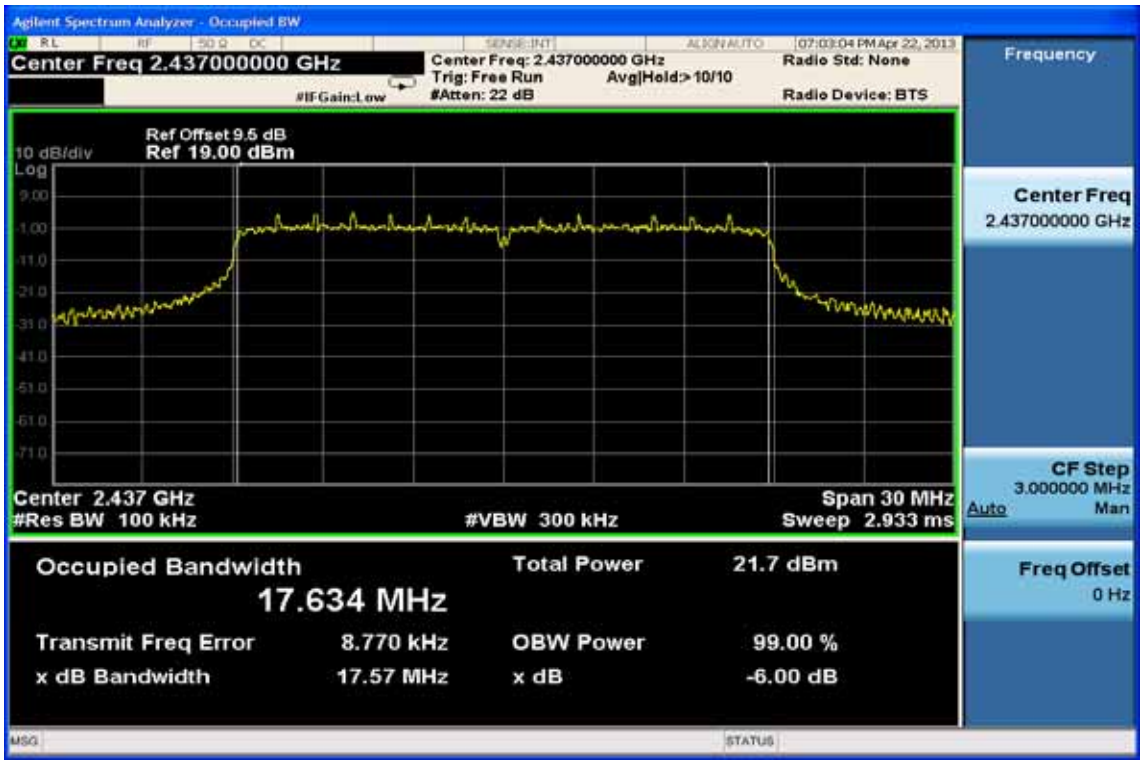


802.11n_20M

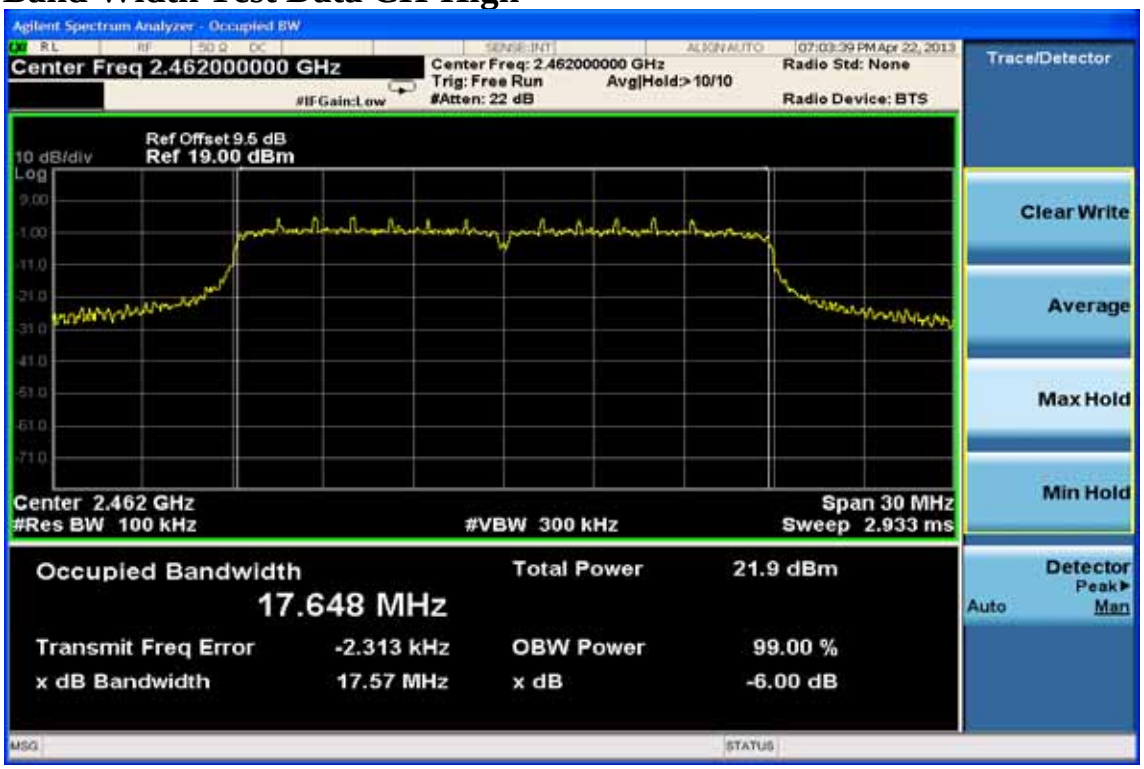
6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

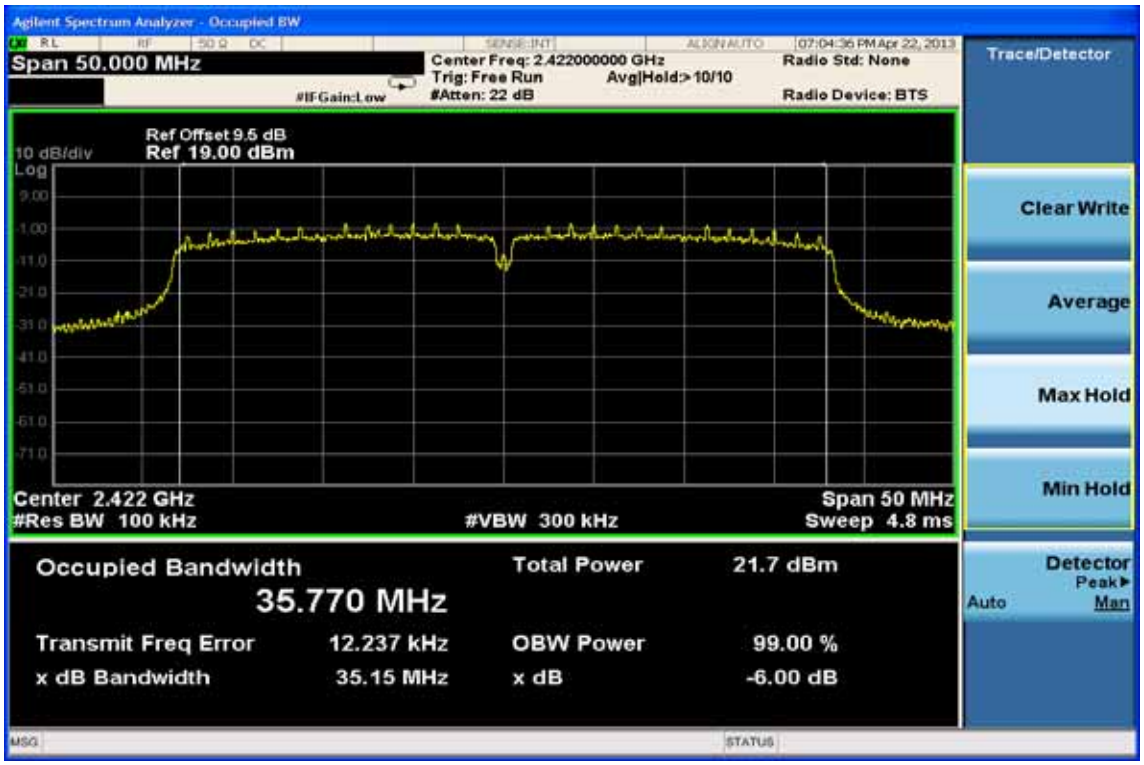


6dB Band Width Test Data CH-High

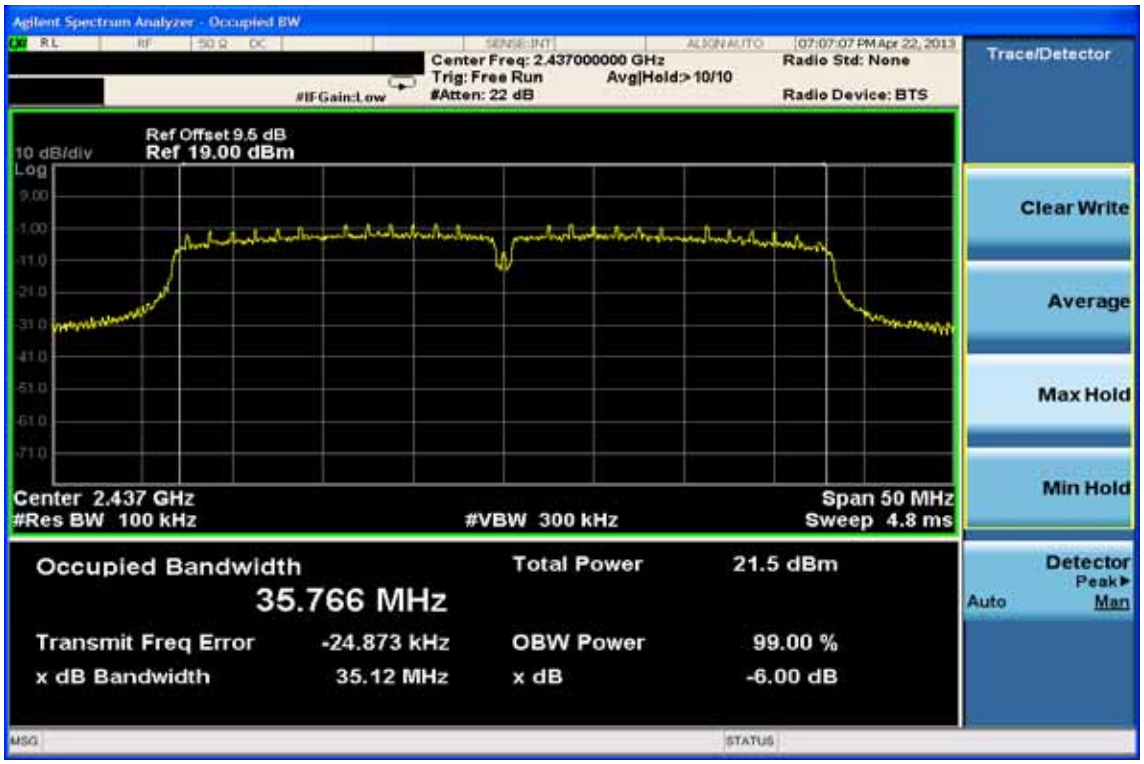


802.11n_40M

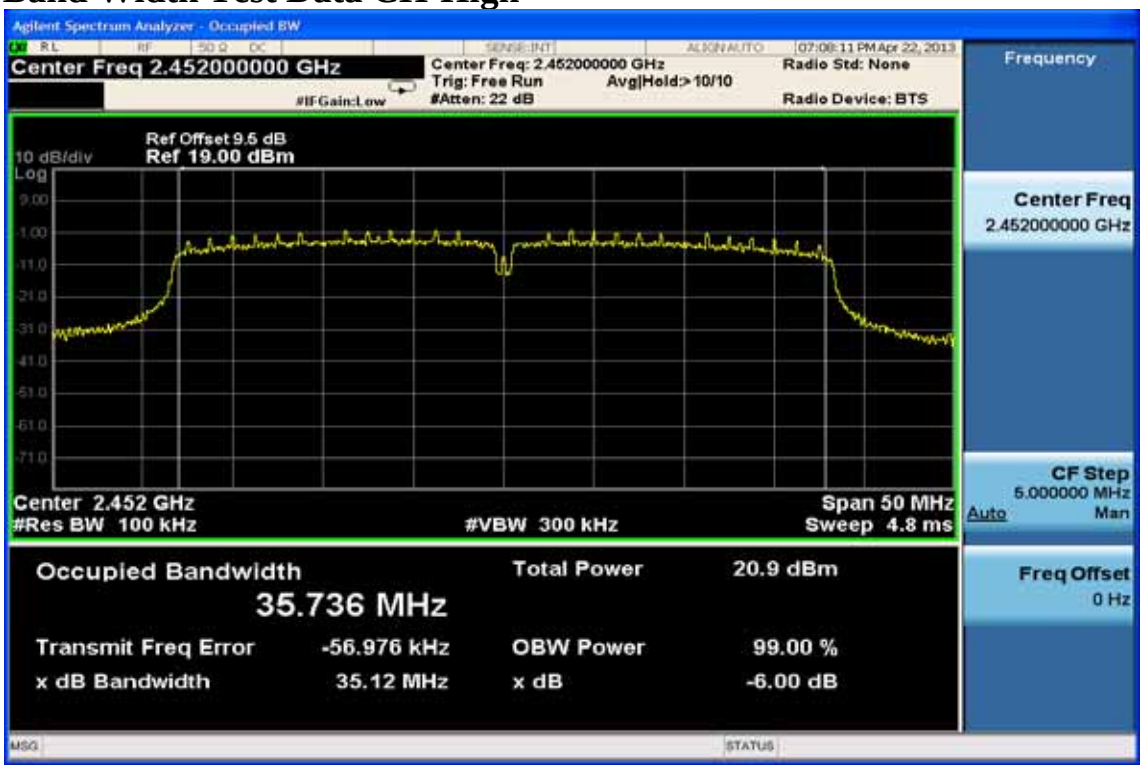
6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



BT LE mode

6dB Band Width Test Data CH-Low

6dB Band Width Test Data CH-Mid

6dB Band Width Test Data CH-High

8 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 Standard Applicable:

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, 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 in15.209(a).

8.2 Measurement Equipment Used:

8.2.1 Conducted Emission at antenna port:

Refer to section 6.2 for details.

8.2.2 Radiated emission:

Chamber 14(966)					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer 21(26.5GHz)	Agilent	N9010A	MY49060537	07/17/2012	07/16/2013
Spectrum Analyzer 20(6.5GHz)	Agilent	E4443A	MY48250315	05/24/2012	05/23/2013
Spectrum Analyzer 22(43GHz)	R&S	FSU43	100143	04/25/2013	04/24/2014
Loop Antenna9K-30M	A.H.SYSTEM	SAS-564	294	03/07/2013	03/06/2015
Bilog Antenna30-1G	Schaffner	CBL 6112B	2756	01/11/2013	01/10/2014
Horn antenna1-18G(06)	EMCO	3117	0006665	10/15/2012	10/14/2013
Horn antenna26-40G(05)	Com-power	AH-640	100A	01/09/2013	01/08/2015
Horn antenna18-26G(04)	Com-power	AH-826	081001	05/04/2013	05/03/2015
Preamplifier9-1000M	HP	8447D	NA	02/19/2013	02/18/2014
Preamplifier1-18G	MITEQ	AFS44-00101800-25-10P-44	1329256	07/23/2012	07/22/2013
Preamplifier1-26G	EM	EM01M26G	NA	02/26/2013	02/25/2014
Preamplifier26-40G	MITEQ	JS-26004000-27-5A	818471	05/21/2011	05/20/2013
Cable1-18G	HUBER SUHNER	Sucoflex 106	NA	09/07/2012	09/06/2013
Cable UP to 1G	HUBER SUHNER	RG 214/U	NA	10/08/2012	10/07/2013
SUCOFLEX 1GHz~40GHz cable	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	09/21/2011	09/20/2013
2.4G Filter	Micro-Tronics	Brm50702	76	12/27/2012	12/26/2013

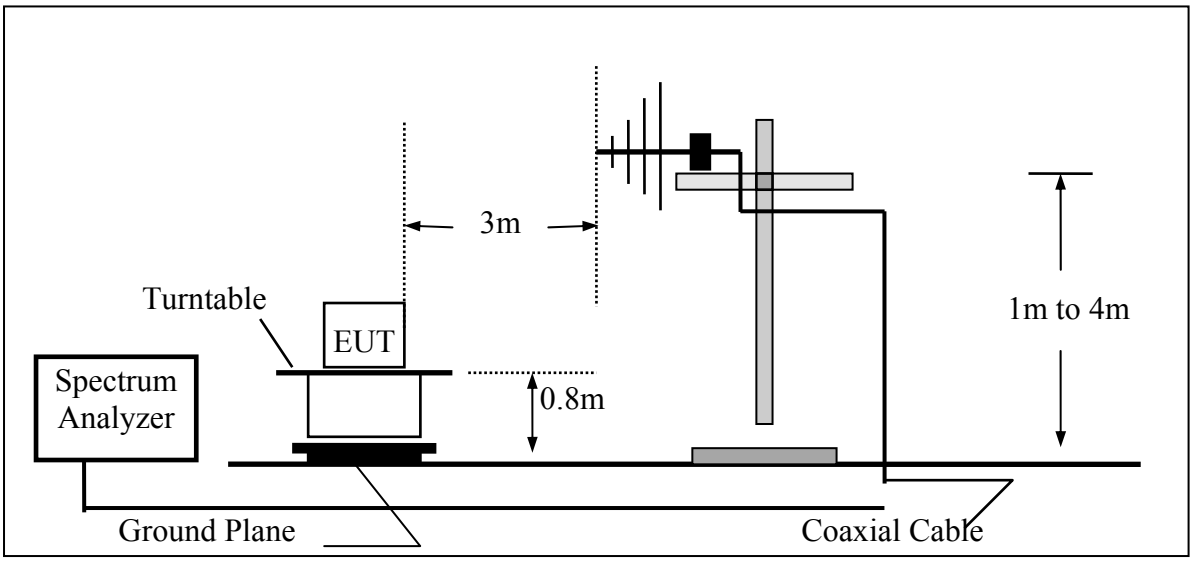
8.3 Test SET-UP:

8.3.1 Conducted Emission at antenna port:

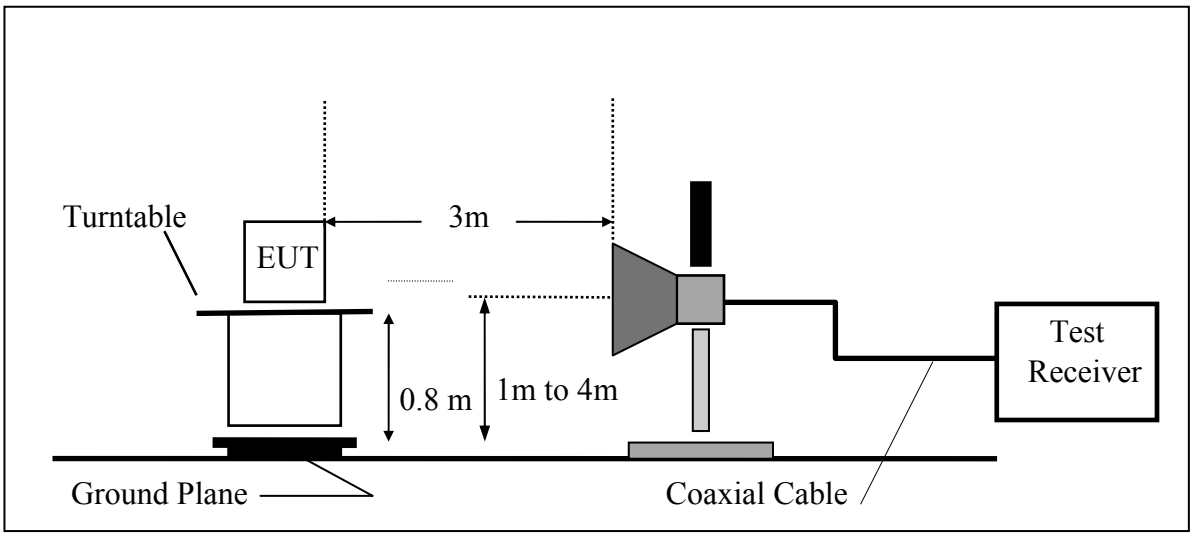
Refer to section 6.3 for details.

8.3.2 Radiated emission:

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



8.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

Refer to section 11 and 12 emissions in restricted and non-restricted frequency bands Measurement Procedure of KDB Document: 558074 D01 DTS Meas Guidance v03r01

The measurement of unwanted emissions at the edge of the authorized frequency bands can be complicated by the leakage of RF energy from the fundamental emission into the RBW pass band. Thus, for measurements at the band edges, a narrower resolution bandwidth (no less than 10 kHz) can be used within the first 1 MHz beyond the fundamental emission, provided that that measured energy is subsequently integrated over the appropriate reference bandwidth (i.e., 100 kHz or 1 MHz). This integration can be performed using the band power function of the spectrum analyzer or by summing the spectral levels (in linear power units) over the appropriate reference bandwidth.

8.5 Field Strength Calculation:

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

8.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

802.11b

Band Edges Test Data CH-Low

Band Edges Test Data CH-High

Radiated Emission: 802.11 b mode

Operation Mode	TX CH Low	Test Date	2013/04/25
Fundamental Frequency	2412 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2390.00	16.06	31.48	47.54	54.00	-6.46	Average	VERTICAL
2	2390.00	27.23	31.48	58.71	74.00	-15.29	Peak	VERTICAL
1	2390.00	15.41	31.48	46.89	54.00	-7.11	Average	HORIZONTAL
2	2390.00	27.07	31.48	58.55	74.00	-15.45	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2013/04/25
Fundamental Frequency	2462 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.50	15.28	31.65	46.93	54.00	-7.07	Average	VERTICAL
2	2483.50	26.91	31.65	58.56	74.00	-15.44	Peak	VERTICAL
1	2483.50	15.05	31.65	46.70	54.00	-7.30	Average	HORIZONTAL
2	2483.50	27.08	31.65	58.73	74.00	-15.27	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

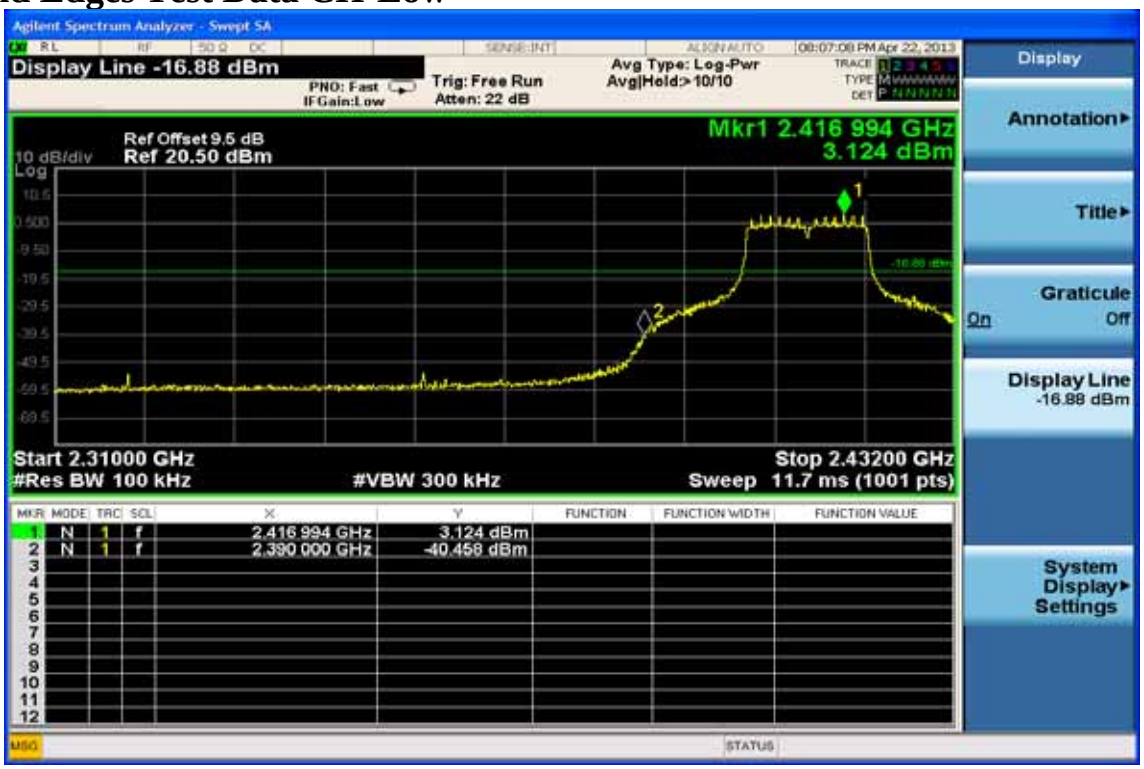
3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

802.11g

Band Edges Test Data CH-Low



Band Edges Test Data CH-High

Radiated Emission: 802.11 g mode

Operation Mode	TX CH Low	Test Date	2013/04/25
Fundamental Frequency	2412 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2390.00	19.83	31.48	51.31	54.00	-2.69	Average	VERTICAL
2	2390.00	39.23	31.48	70.71	74.00	-3.29	Peak	VERTICAL
1	2389.74	16.04	31.47	47.51	54.00	-6.49	Average	HORIZONTAL
2	2389.74	28.95	31.47	60.42	74.00	-13.58	Peak	HORIZONTAL
3	2390.00	16.21	31.48	47.69	54.00	-6.31	Average	HORIZONTAL
4	2390.00	28.73	31.48	60.21	74.00	-13.79	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2013/04/25
Fundamental Frequency	2462 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.50	17.96	31.65	49.61	54.00	-4.39	Average	VERTICAL
2	2483.50	36.94	31.65	68.59	74.00	-5.41	Peak	VERTICAL
1	2483.50	15.55	31.65	47.20	54.00	-6.80	Average	HORIZONTAL
2	2483.50	27.16	31.65	58.81	74.00	-15.19	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

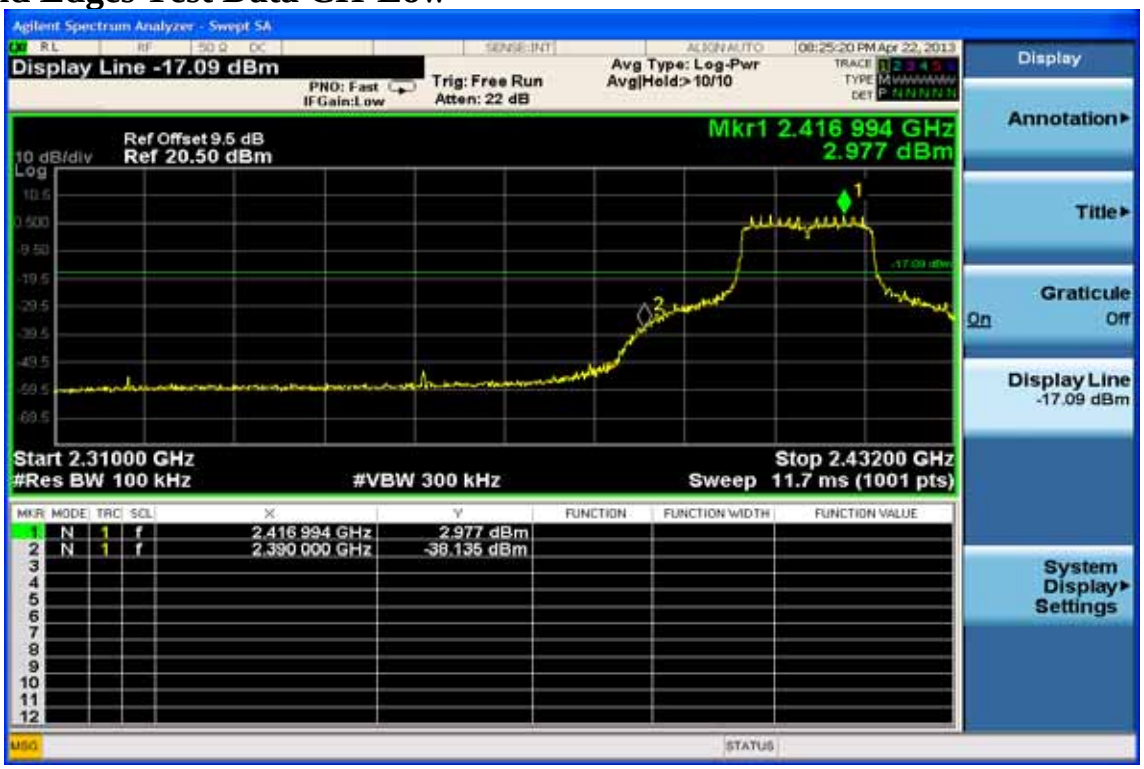
3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

802.11n_20M

Band Edges Test Data CH-Low



Band Edges Test Data CH-High

Radiated Emission: 802.11 n_20M mode

Operation Mode	TX CH Low	Test Date	2013/04/25
Fundamental Frequency	2412 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2389.52	20.33	31.47	51.80	54.00	-2.20	Average	VERTICAL
2	2389.52	37.94	31.47	69.41	74.00	-4.59	Peak	VERTICAL
3	2390.00	20.69	31.48	52.17	54.00	-1.83	Average	VERTICAL
4	2390.00	37.66	31.48	69.14	74.00	-4.86	Peak	VERTICAL
1	2390.00	16.43	31.48	47.91	54.00	-6.09	Average	HORIZONTAL
2	2390.00	29.66	31.48	61.14	74.00	-12.86	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2013/04/25
Fundamental Frequency	2462 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.50	18.06	31.65	49.71	54.00	-4.29	Average	VERTICAL
2	2483.50	33.74	31.65	65.39	74.00	-8.61	Peak	VERTICAL
3	2483.92	17.87	31.65	49.52	54.00	-4.48	Average	VERTICAL
4	2483.92	34.29	31.65	65.94	74.00	-8.06	Peak	VERTICAL
1	2483.50	15.65	31.65	47.30	54.00	-6.70	Average	HORIZONTAL
2	2483.50	27.12	31.65	58.77	74.00	-15.23	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

802.11n_40M

Band Edges Test Data CH-Low

Band Edges Test Data CH-High

Radiated Emission: 802.11 n_40M mode

Operation Mode	TX CH Low	Test Date	2013/04/25
Fundamental Frequency	2422 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2388.54	21.06	31.47	52.53	54.00	-1.47	Average	VERTICAL
2	2388.54	38.23	31.47	69.70	74.00	-4.30	Peak	VERTICAL
3	2390.00	21.73	31.48	53.21	54.00	-0.79	Average	VERTICAL
4	2390.00	35.06	31.48	66.54	74.00	-7.46	Peak	VERTICAL
1	2387.09	16.53	31.47	48.00	54.00	-6.00	Average	HORIZONTAL
2	2387.09	28.97	31.47	60.44	74.00	-13.56	Peak	HORIZONTAL
3	2390.00	16.67	31.48	48.15	54.00	-5.85	Average	HORIZONTAL
4	2390.00	29.39	31.48	60.87	74.00	-13.13	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2013/04/25
Fundamental Frequency	2452 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.50	17.36	31.65	49.01	54.00	-4.99	Average	VERTICAL
2	2483.50	30.22	31.65	61.87	74.00	-12.13	Peak	VERTICAL
3	2489.19	17.36	31.66	49.02	54.00	-4.98	Average	VERTICAL
4	2489.19	35.74	31.66	67.40	74.00	-6.60	Peak	VERTICAL
1	2483.50	15.25	31.65	46.90	54.00	-7.10	Average	HORIZONTAL
2	2483.50	27.96	31.65	59.61	74.00	-14.39	Peak	HORIZONTAL
3	2487.49	15.57	31.66	47.23	54.00	-6.77	Average	HORIZONTAL
4	2487.49	29.45	31.66	61.11	74.00	-12.89	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

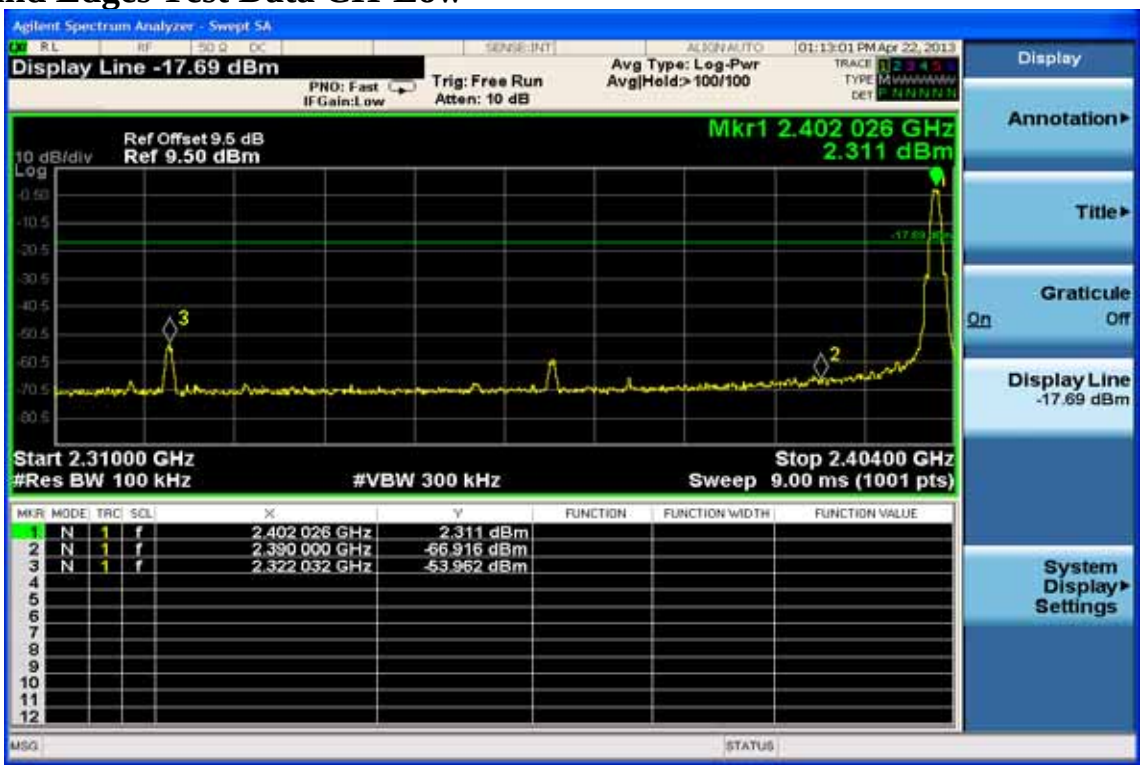
3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

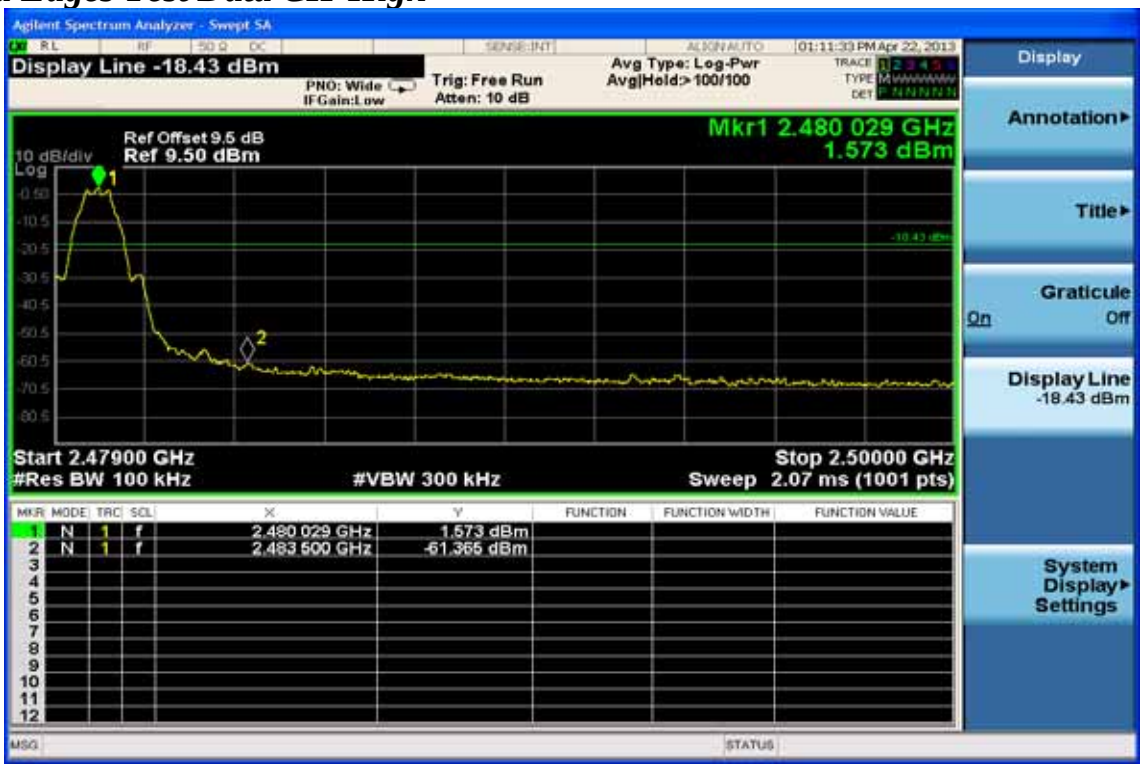
5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

LE Mode

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



Radiated Emission: BLE mode

Operation Mode	TX CH Low	Test Date	2013/04/25
Fundamental Frequency	2402 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2321.68	54.96	-7.17	47.79	74.00	-26.21	Peak	VERTICAL
2	2390.00	50.80	-7.01	43.79	74.00	-30.21	Peak	VERTICAL
1	2353.06	53.17	-7.10	46.07	74.00	-27.93	Peak	HORIZONTAL
2	2390.00	50.68	-7.01	43.67	74.00	-30.33	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2013/04/25
Fundamental Frequency	2480 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.50	52.86	-6.81	46.05	74.00	-27.95	Peak	VERTICAL
2	2499.70	56.47	-6.77	49.70	74.00	-24.30	Peak	VERTICAL
1	2483.50	50.18	-6.81	43.37	74.00	-30.63	Peak	HORIZONTAL
2	2499.86	57.48	-6.77	50.71	74.00	-23.29	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

9 SPURIOUS RADIATED EMISSION TEST

9.1 Standard Applicable

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

9.2 Measurement Equipment Used:

9.2.1 Conducted Emission at antenna port:

Refer to section 6.2 for details.

9.2.2 Radiated emission:

Refer to section 7.2 for details.

9.3 Test SET-UP:

9.3.1 Conducted Emission at antenna port:

Refer to section 6.3 for details.

9.3.2 Radiated emission:

Refer to section 7.3 for details.

9.4 Measurement Procedure:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

Refer to section 11 and 12 emissions in restricted and non-restricted frequency bands Measurement Procedure of KDB Document: 558074 D01 DTS Meas Guidance v03r01

9.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

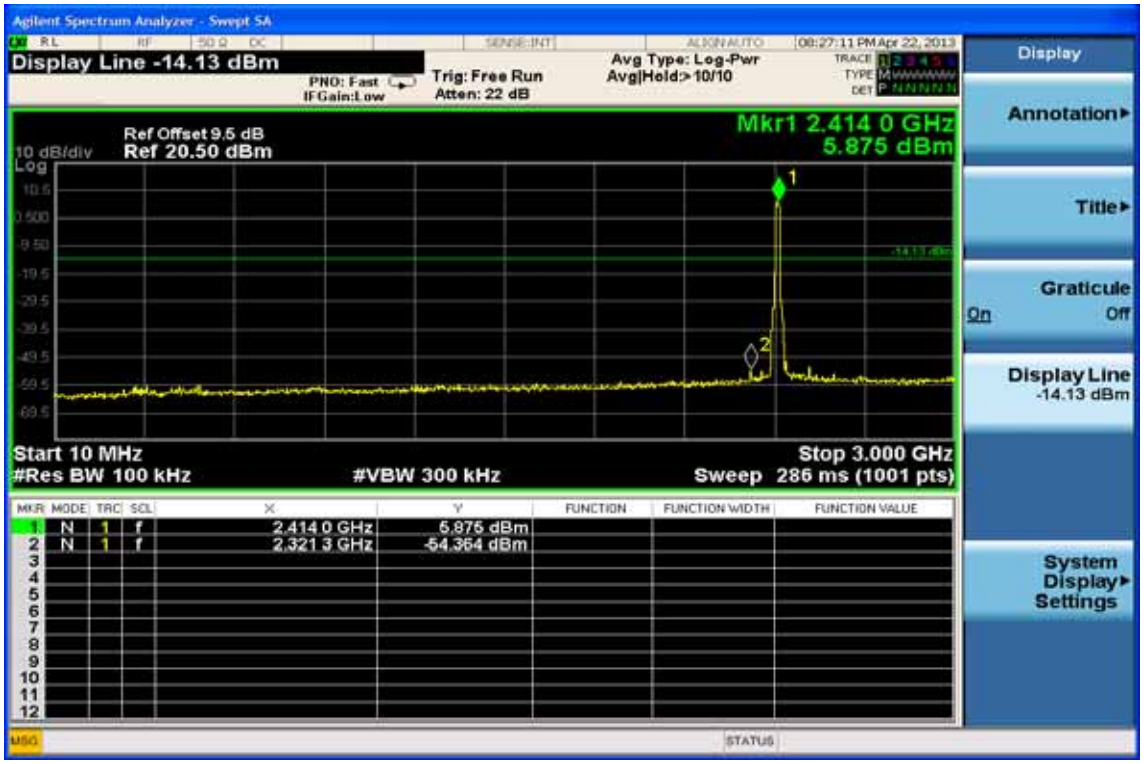
Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.6 Measurement Result:

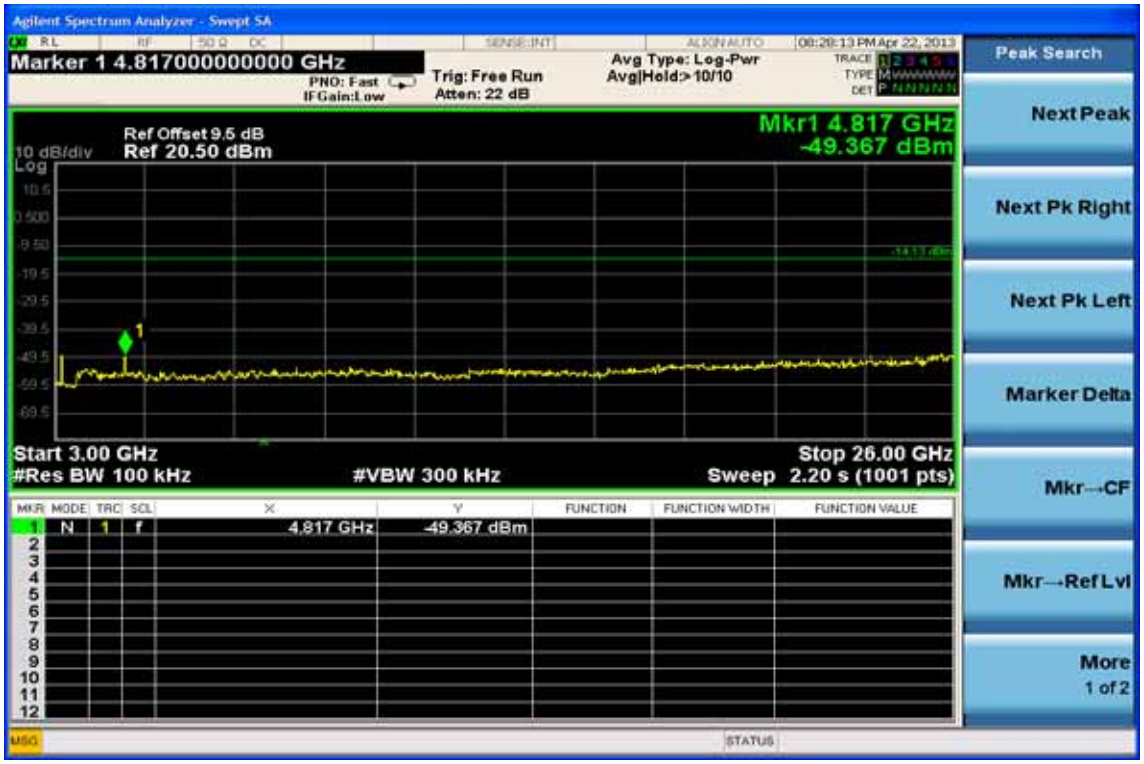
Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

Conducted Spurious Emission Measurement Result (802.11b)

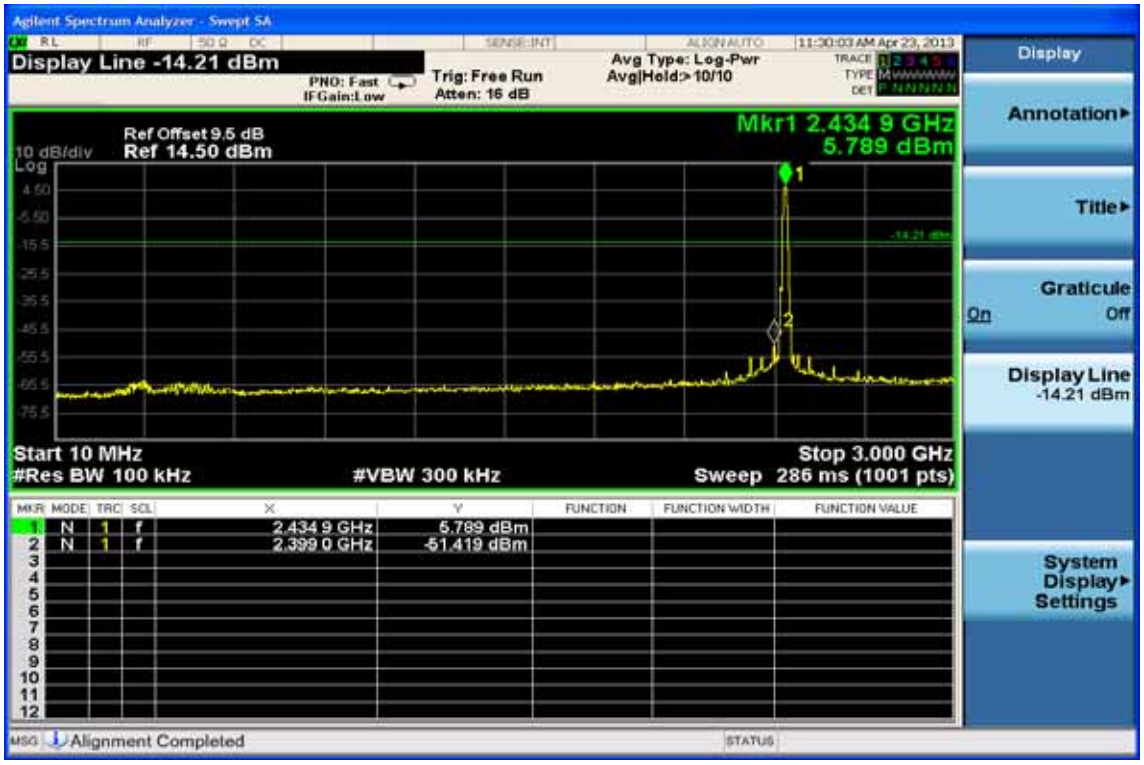
Ch Low 30MHz – 3GHz



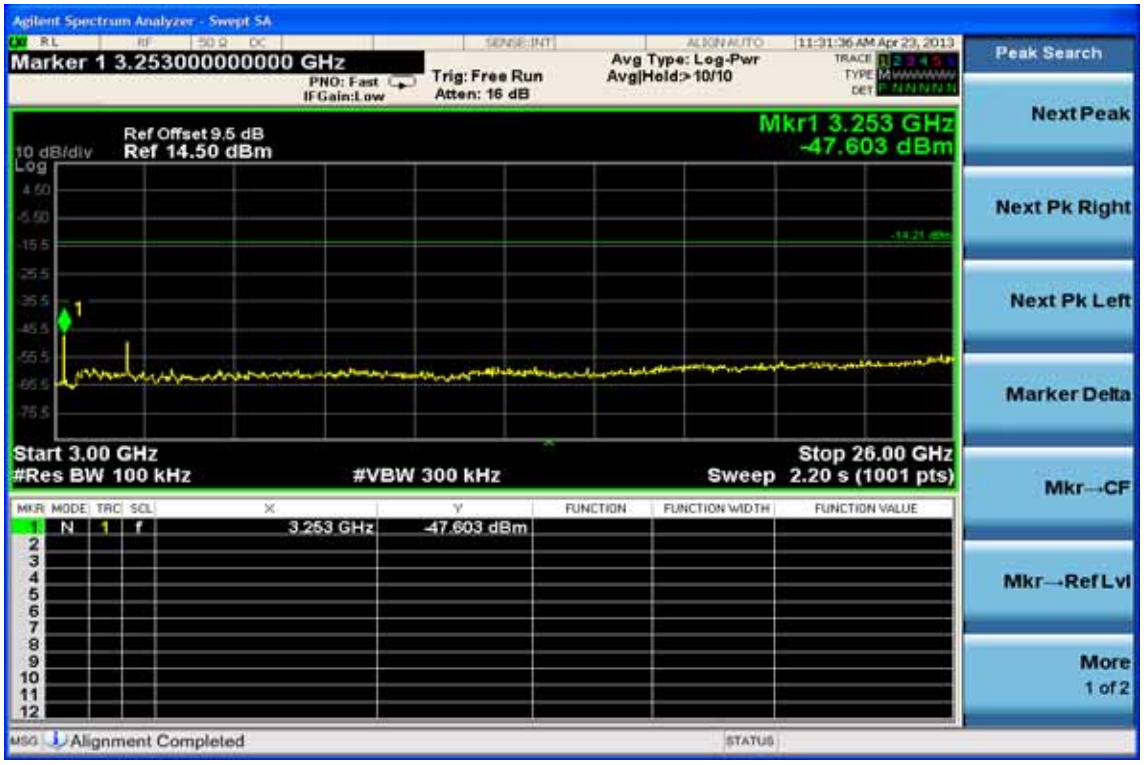
Ch Low 3GHz – 26.5GHz



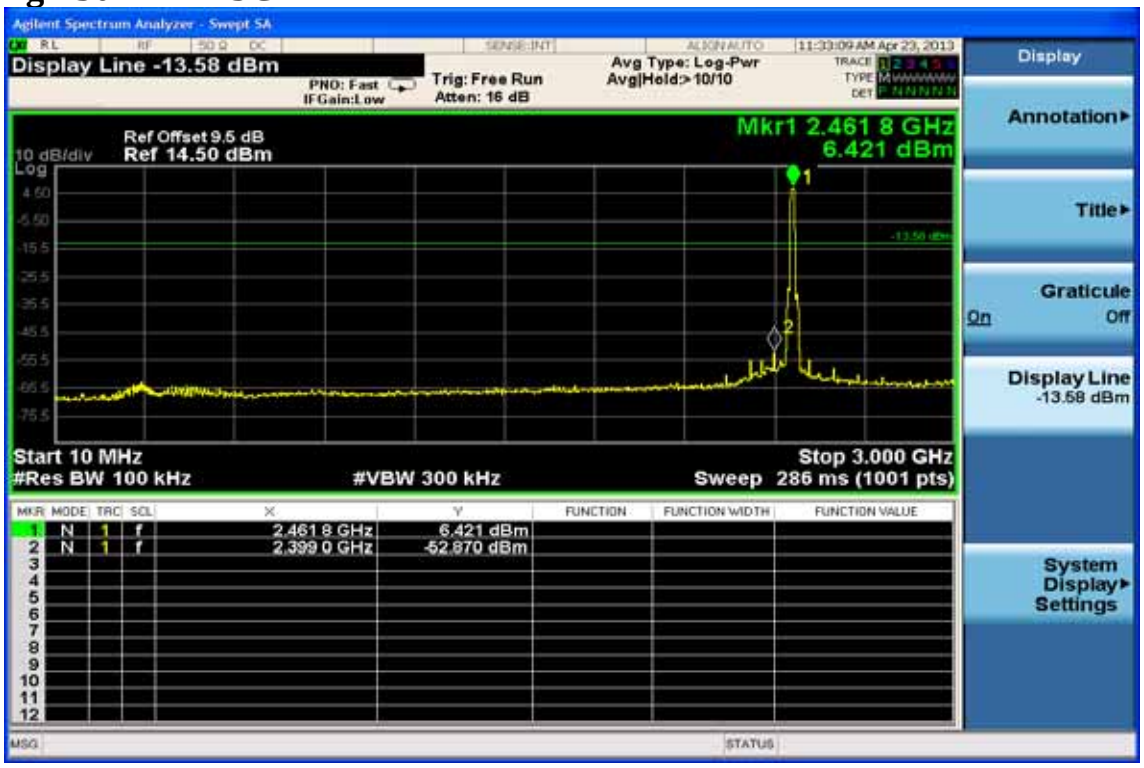
Ch Mid 30MHz – 3GHz



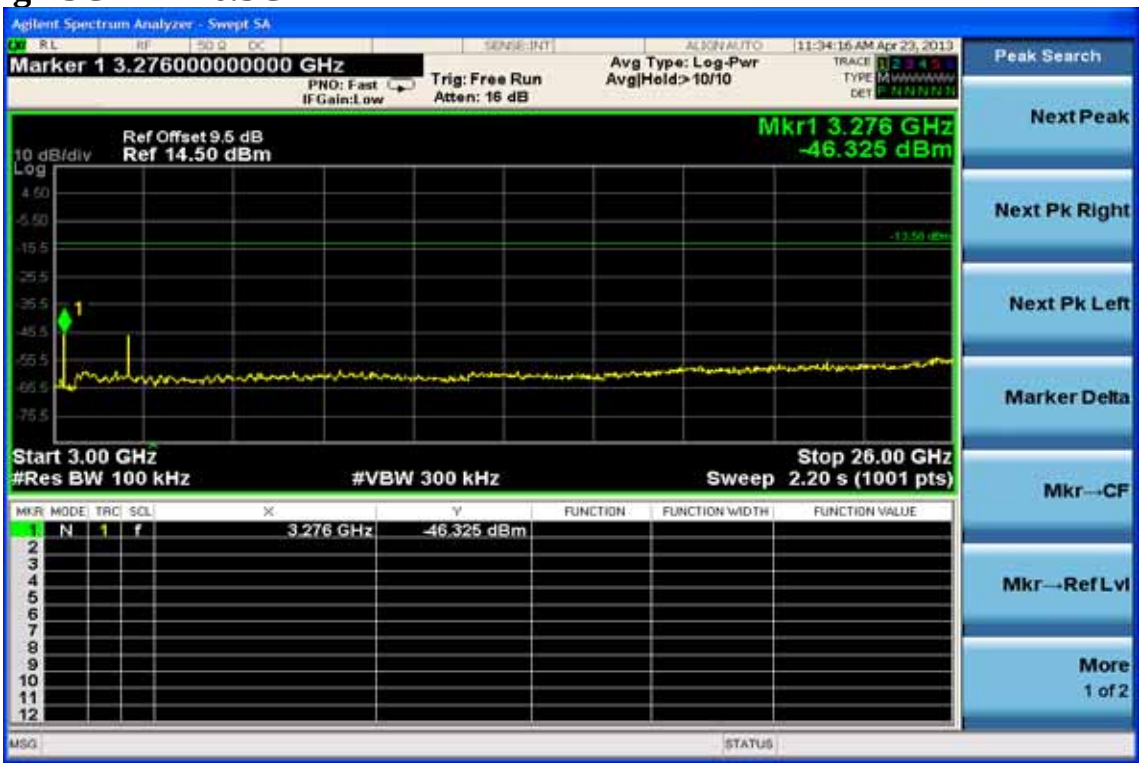
Ch Mid 3GHz – 26.5GHz



Ch High 30MHz – 3GHz

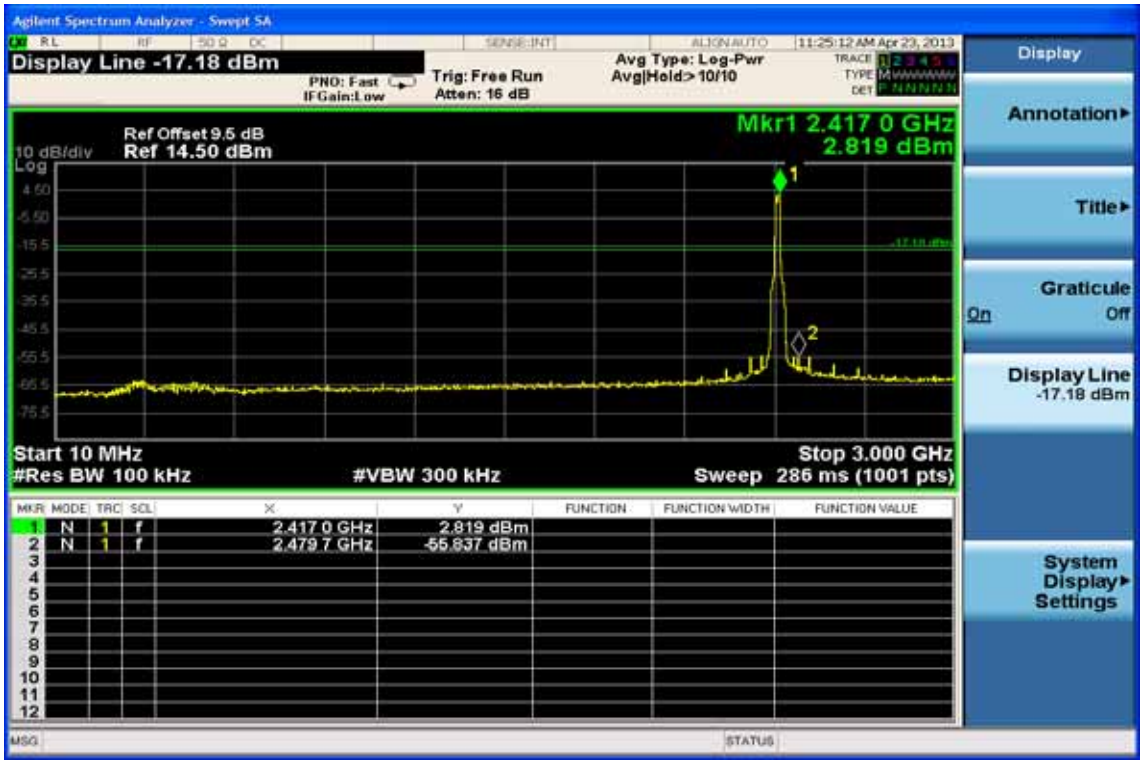


Ch High 3GHz – 26.5GHz

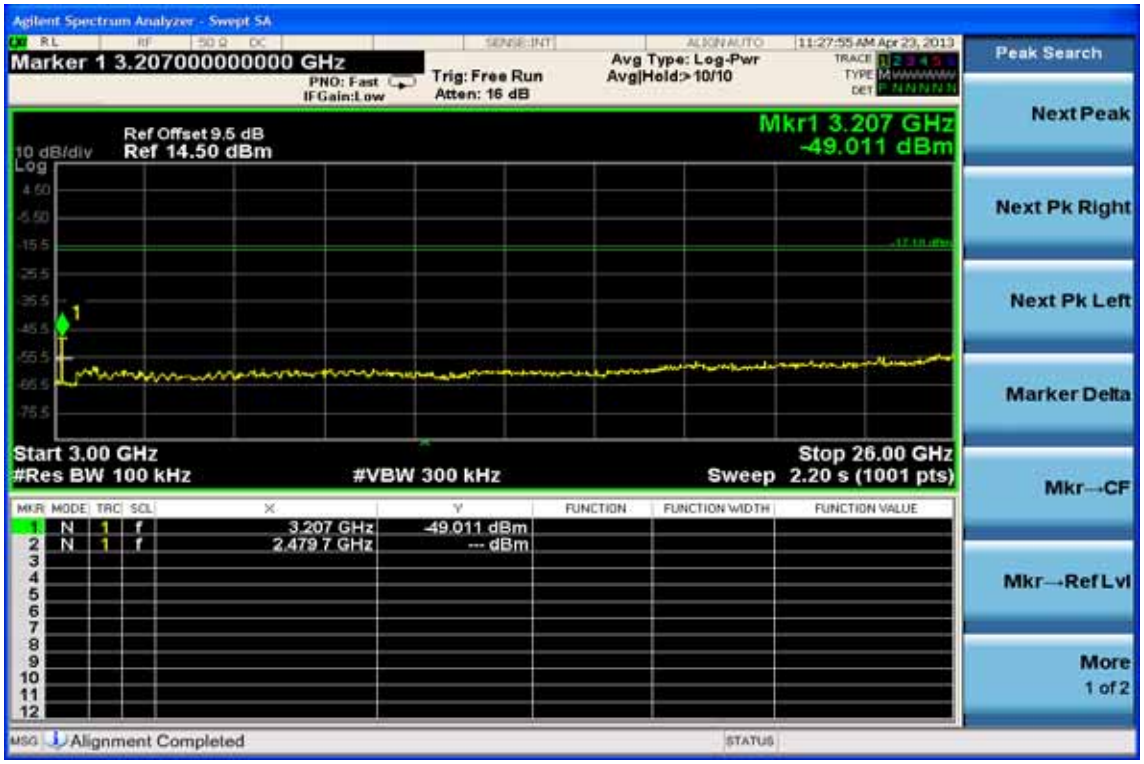


Conducted Spurious Emission Measurement Result (802.11g)

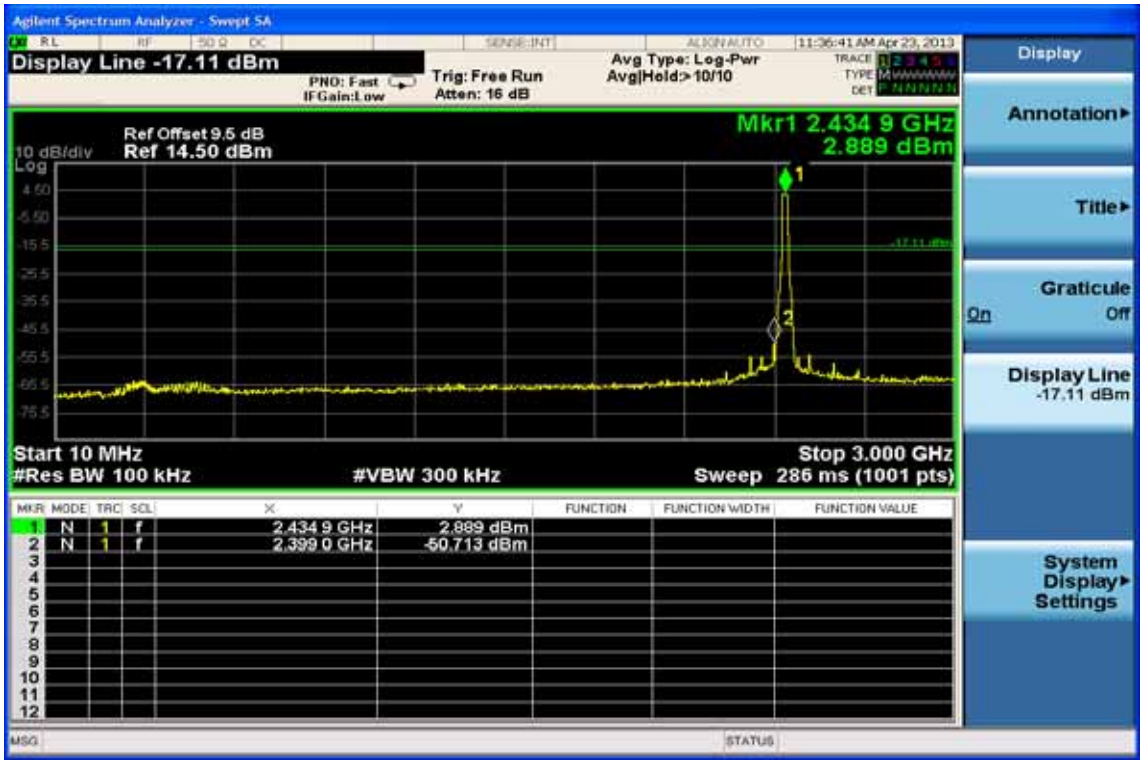
Ch Low 30MHz – 3GHz



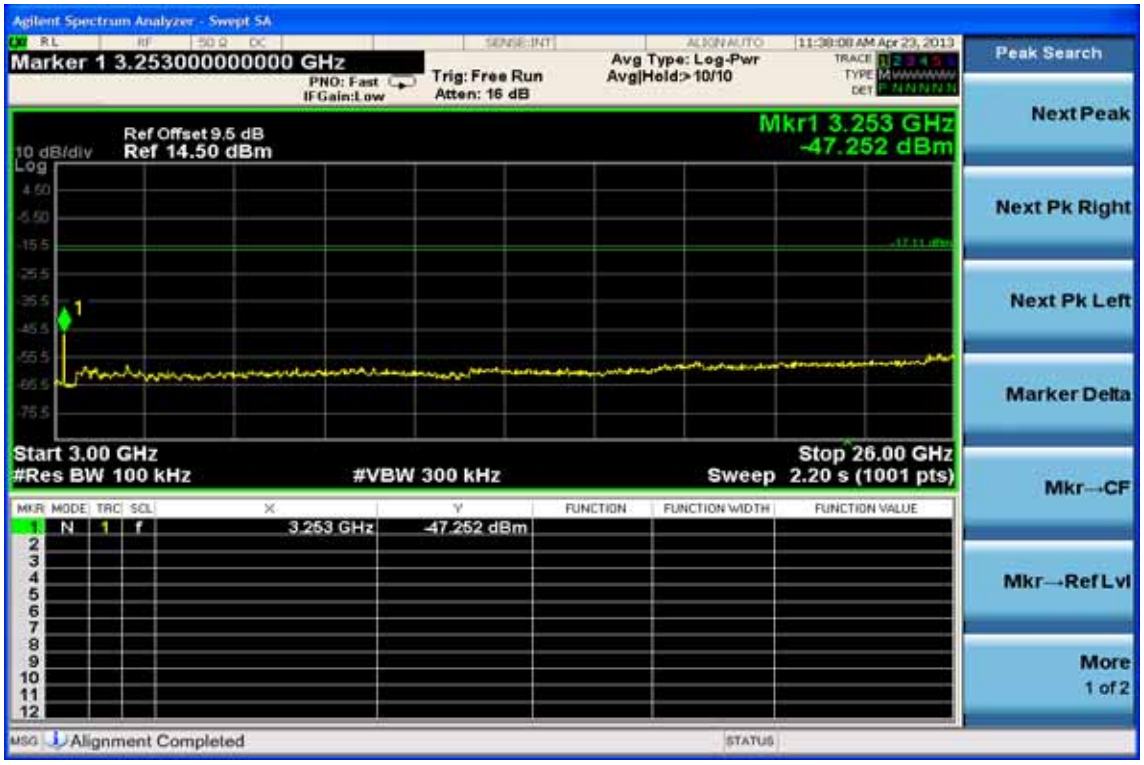
Ch Low 3GHz – 26.5GHz



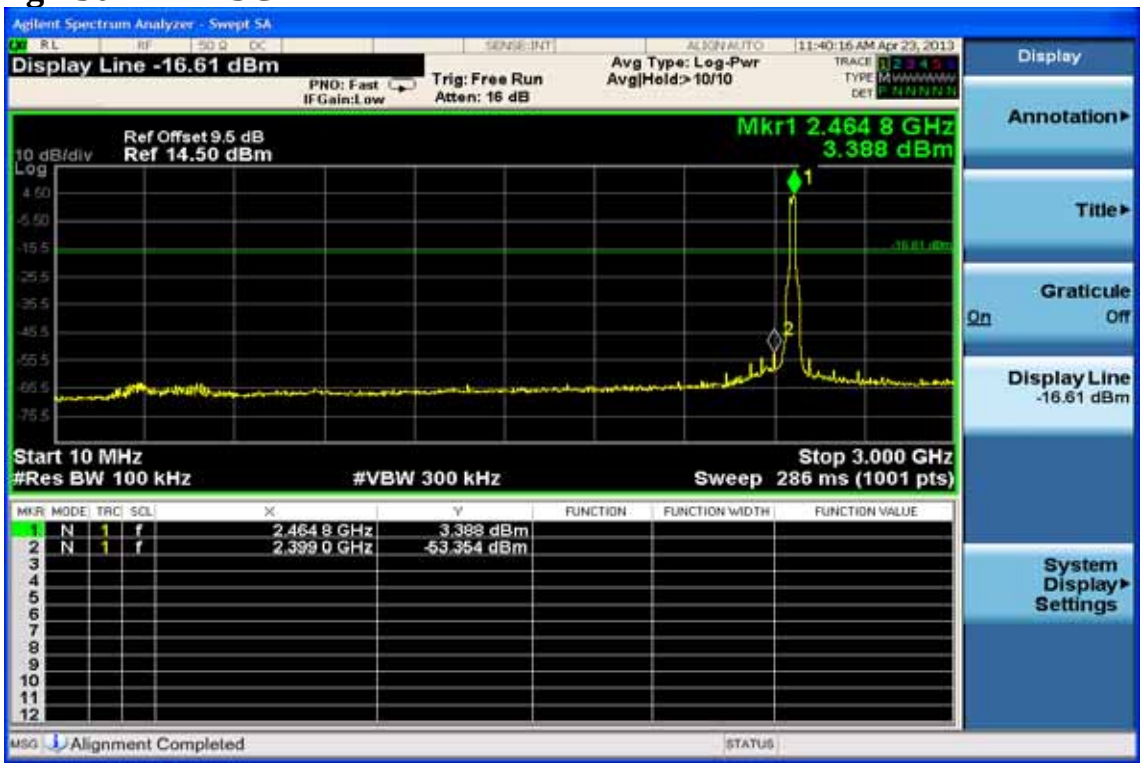
Ch Mid 30MHz – 3GHz



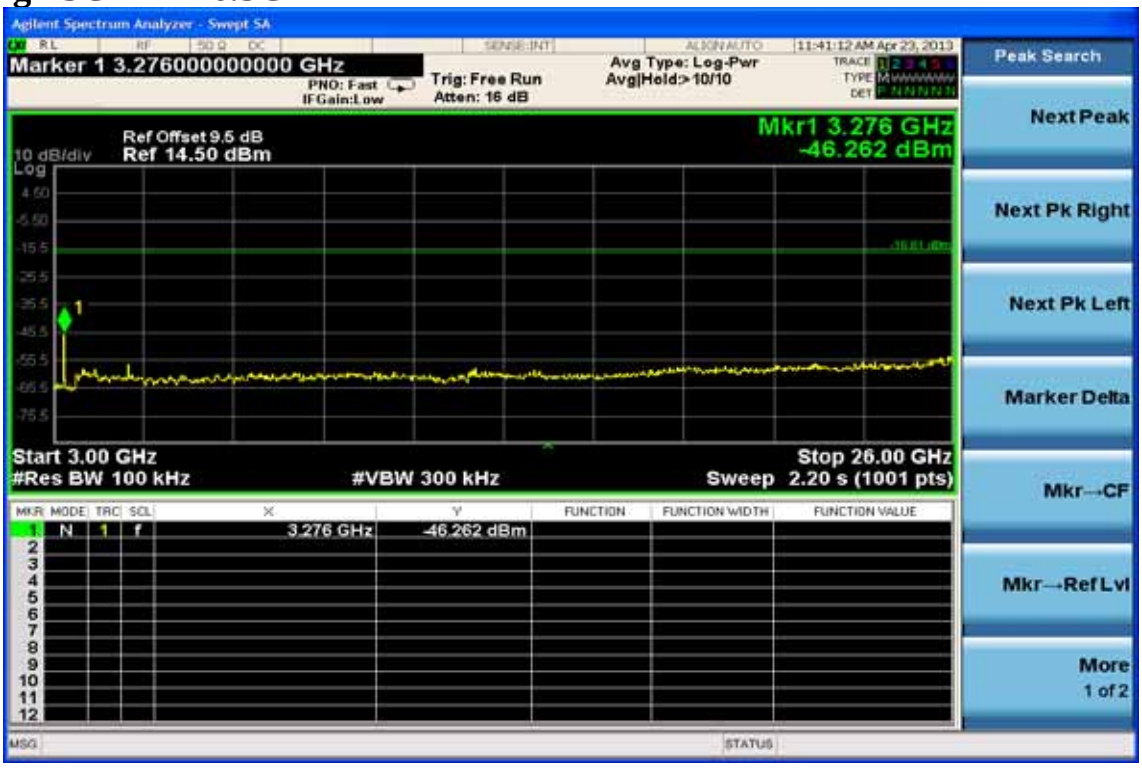
Ch Mid 3GHz – 26.5GHz



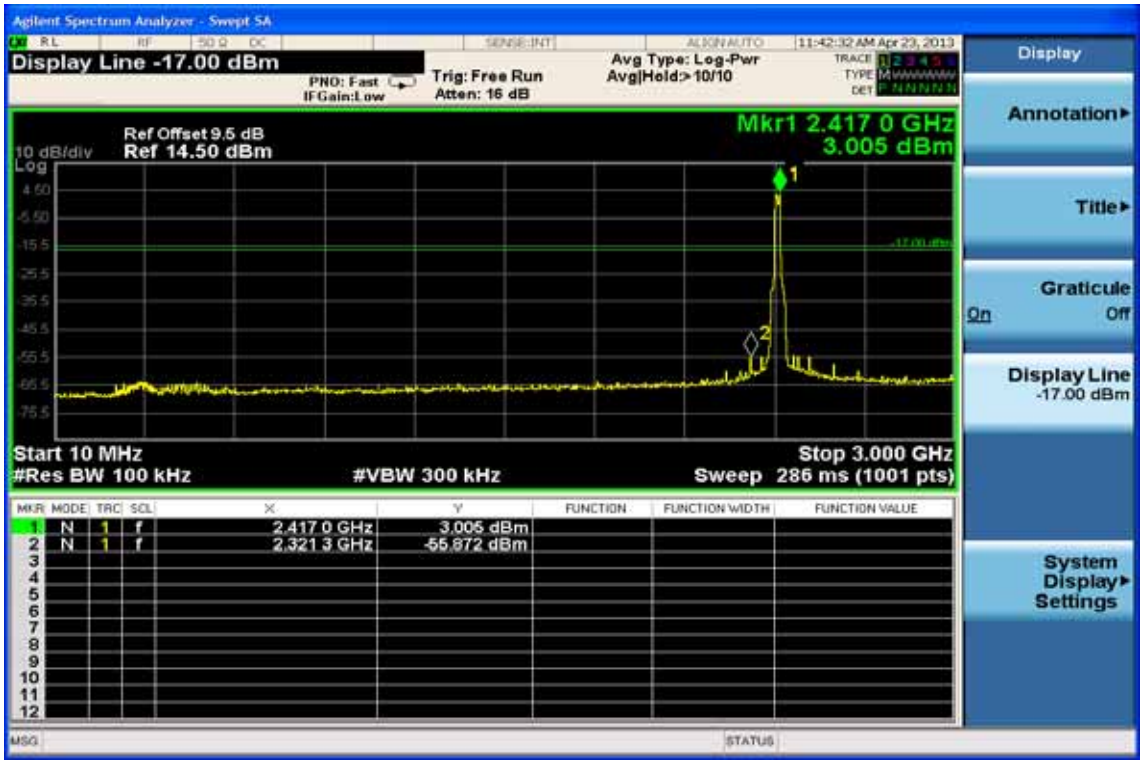
Ch High 30MHz – 3GHz



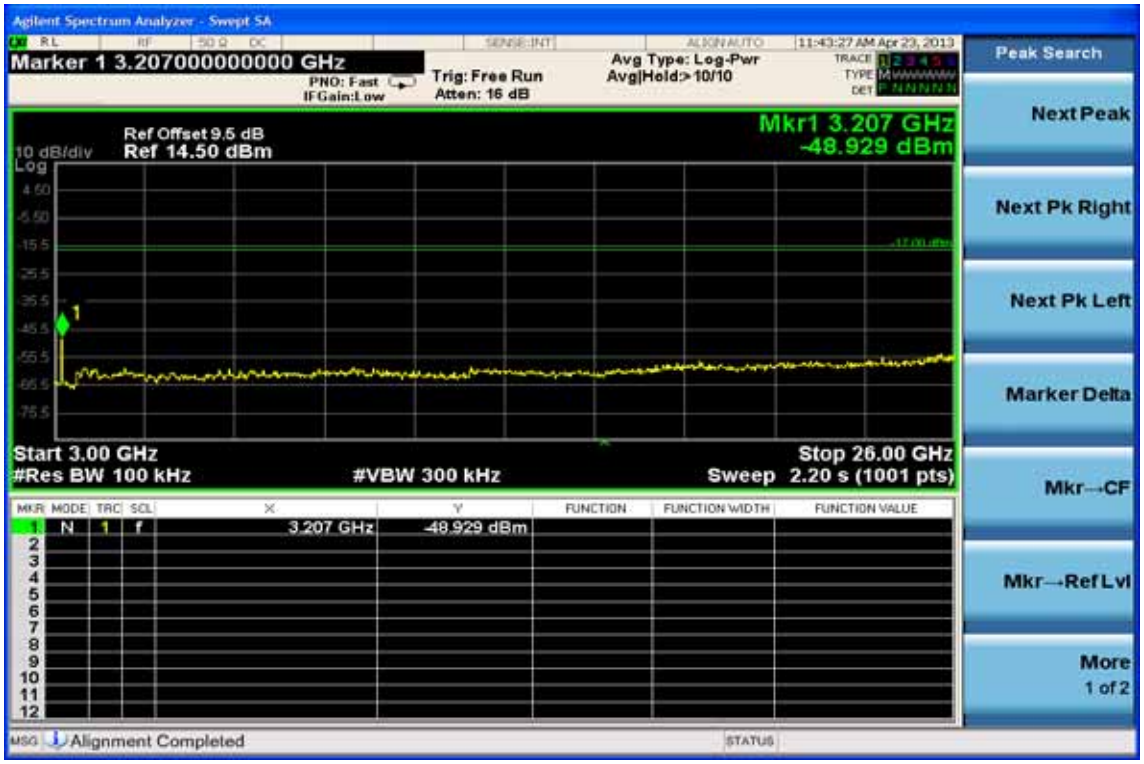
Ch High 3GHz – 26.5GHz



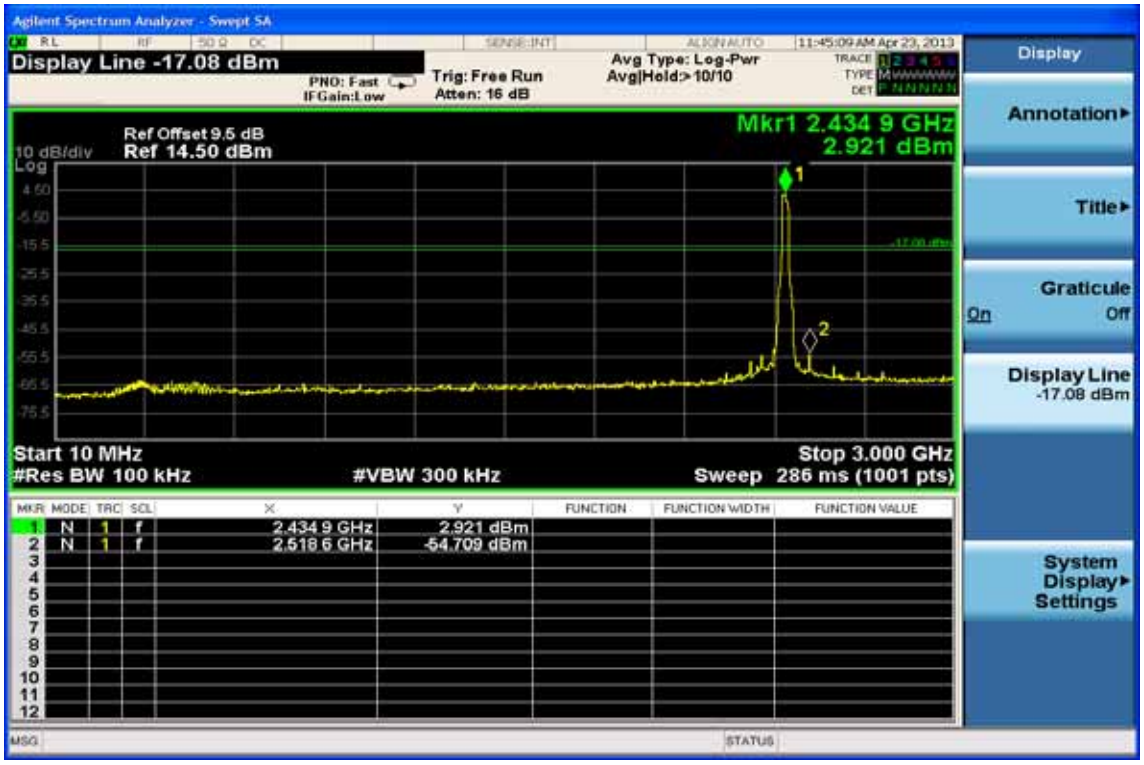
Conducted Spurious Emission Measurement Result (802.11n_20M)
Ch Low 30MHz – 3GHz



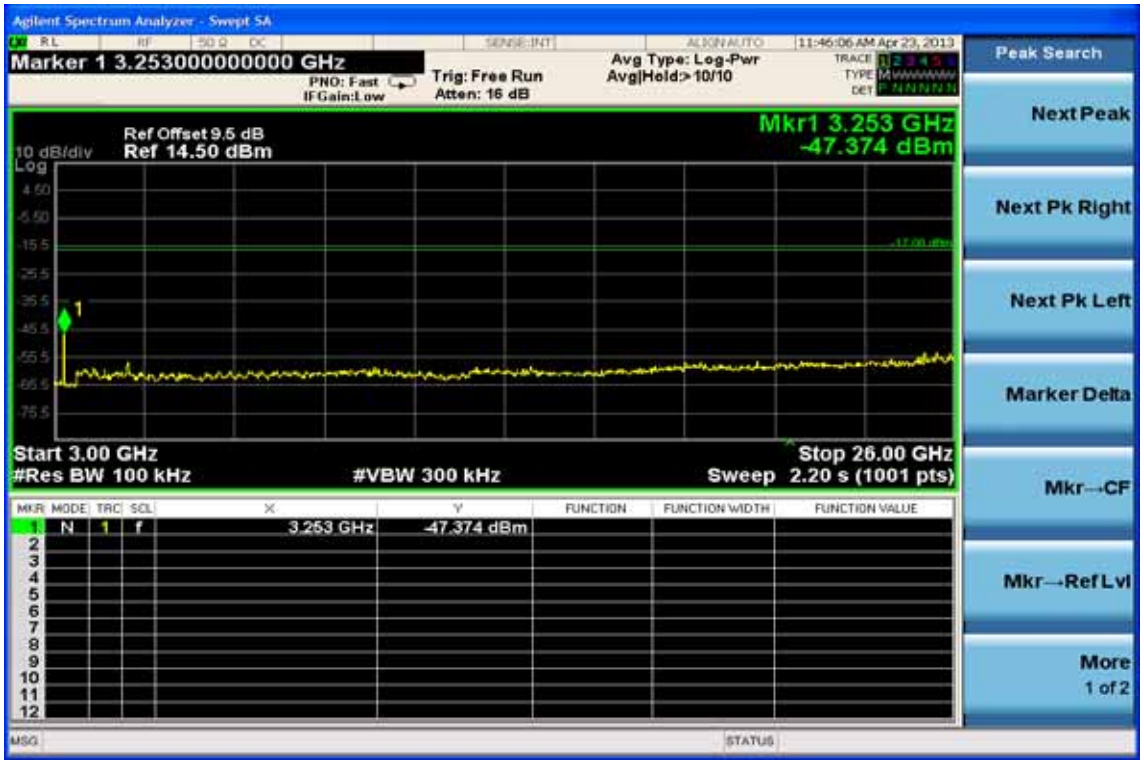
Ch Low 3GHz – 26.5GHz



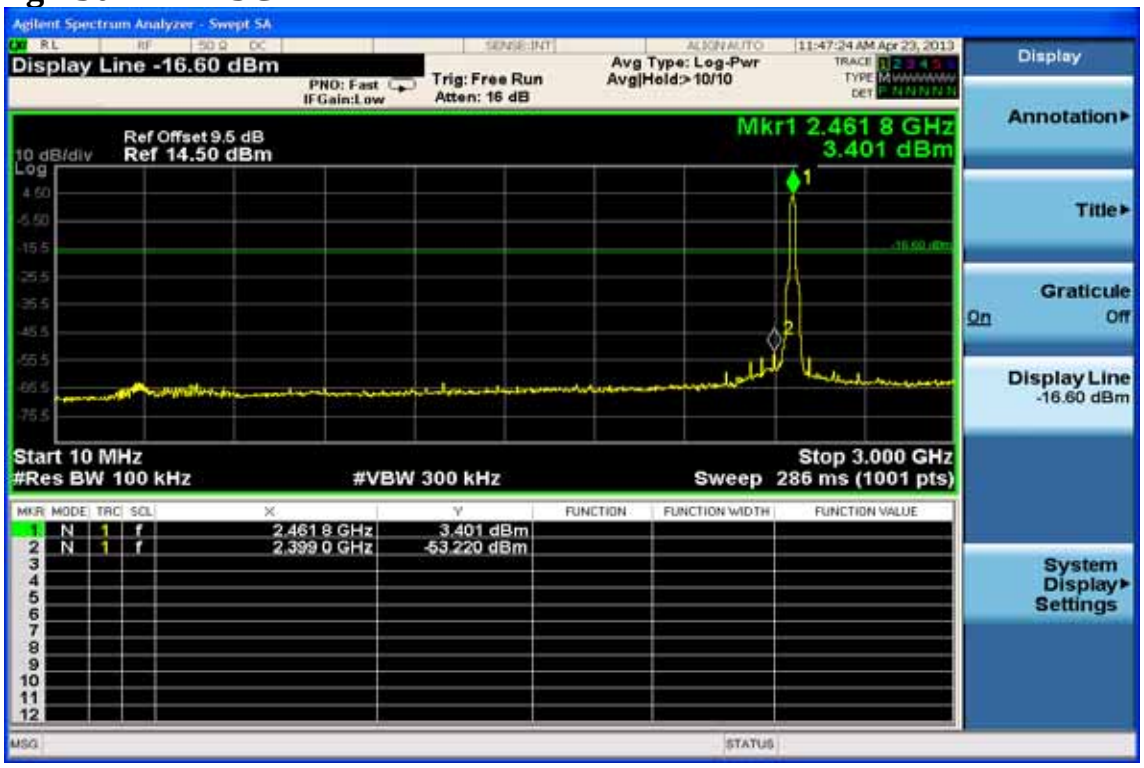
Ch Mid 30MHz – 3GHz



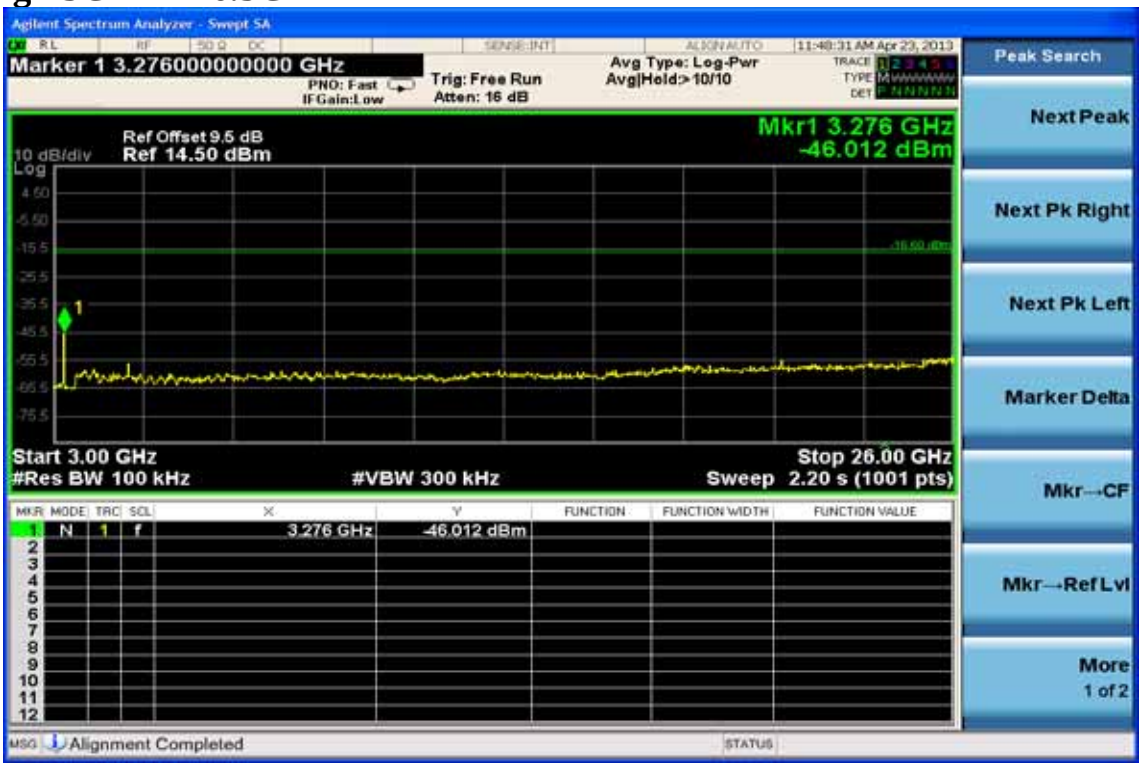
Ch Mid 3GHz – 26.5GHz



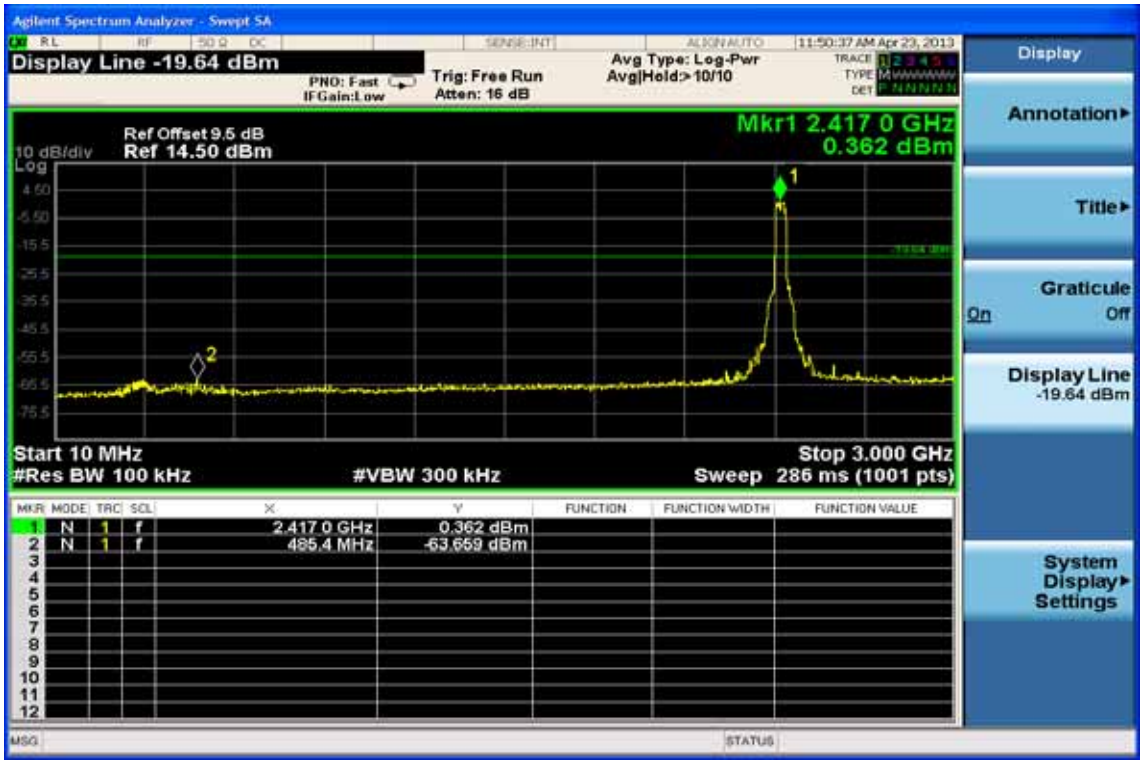
Ch High 30MHz – 3GHz



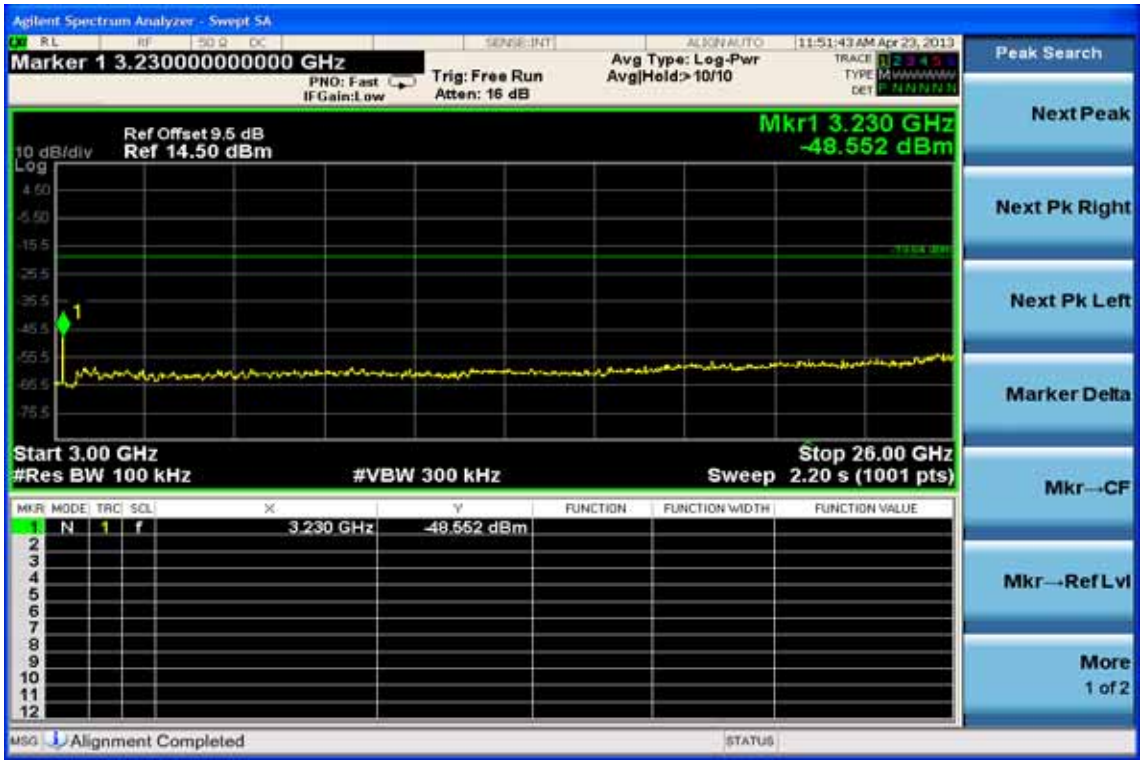
Ch High 3GHz – 26.5GHz



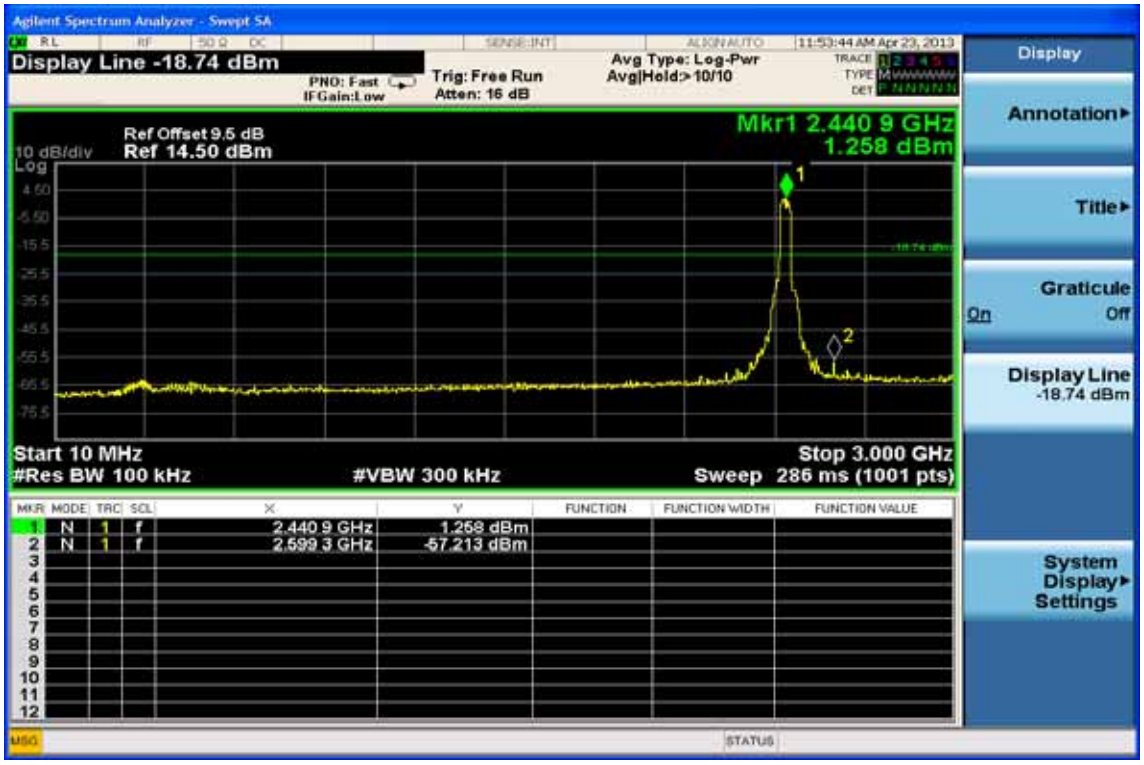
Conducted Spurious Emission Measurement Result (802.11n_40M)
Ch Low 30MHz – 3GHz



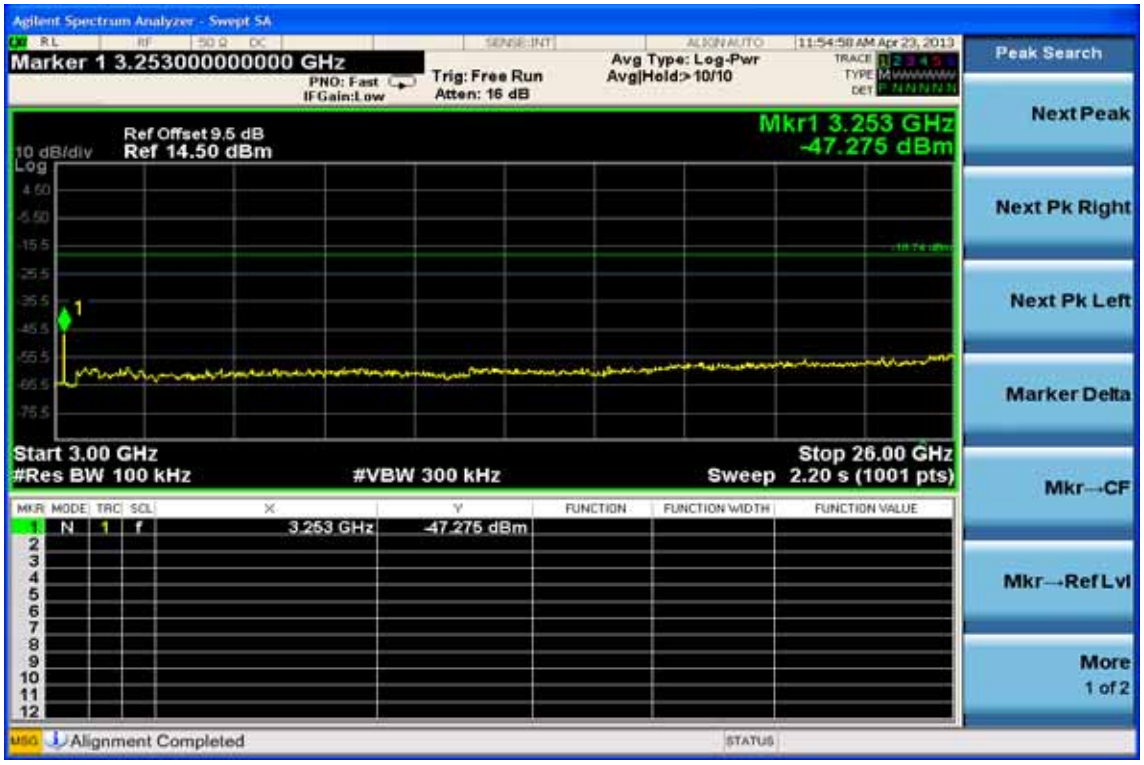
Ch Low 3GHz – 26.5GHz



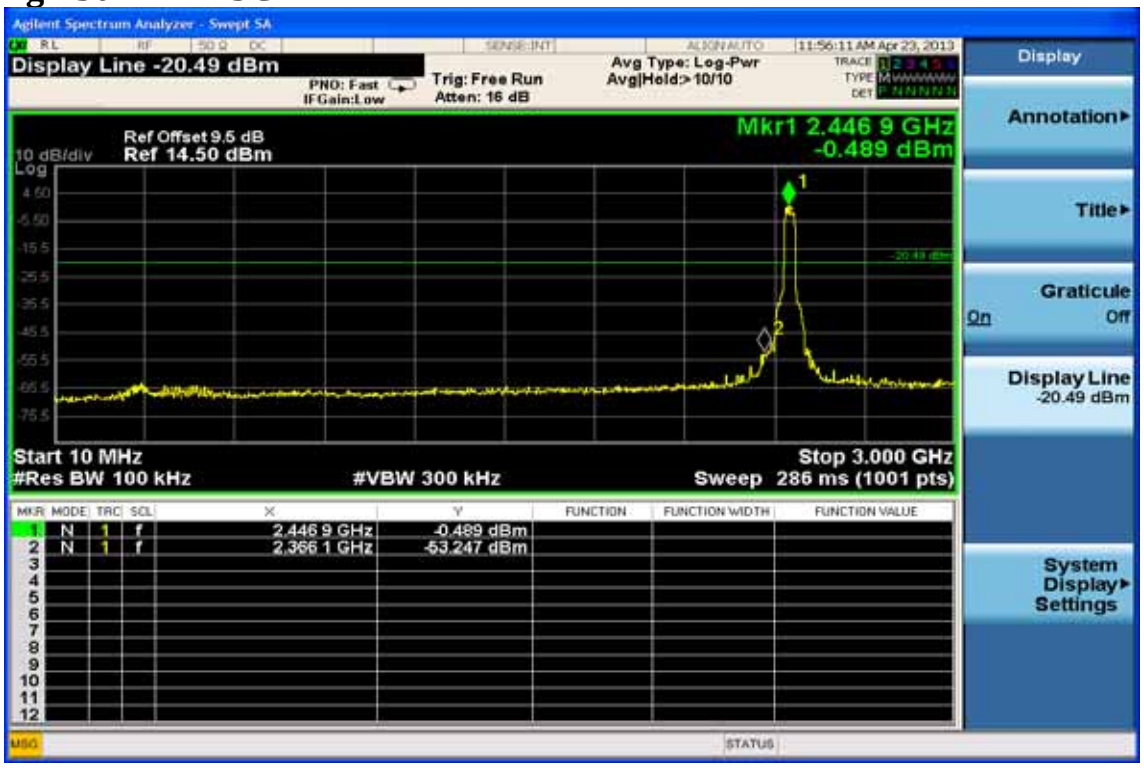
Ch Mid 30MHz – 3GHz



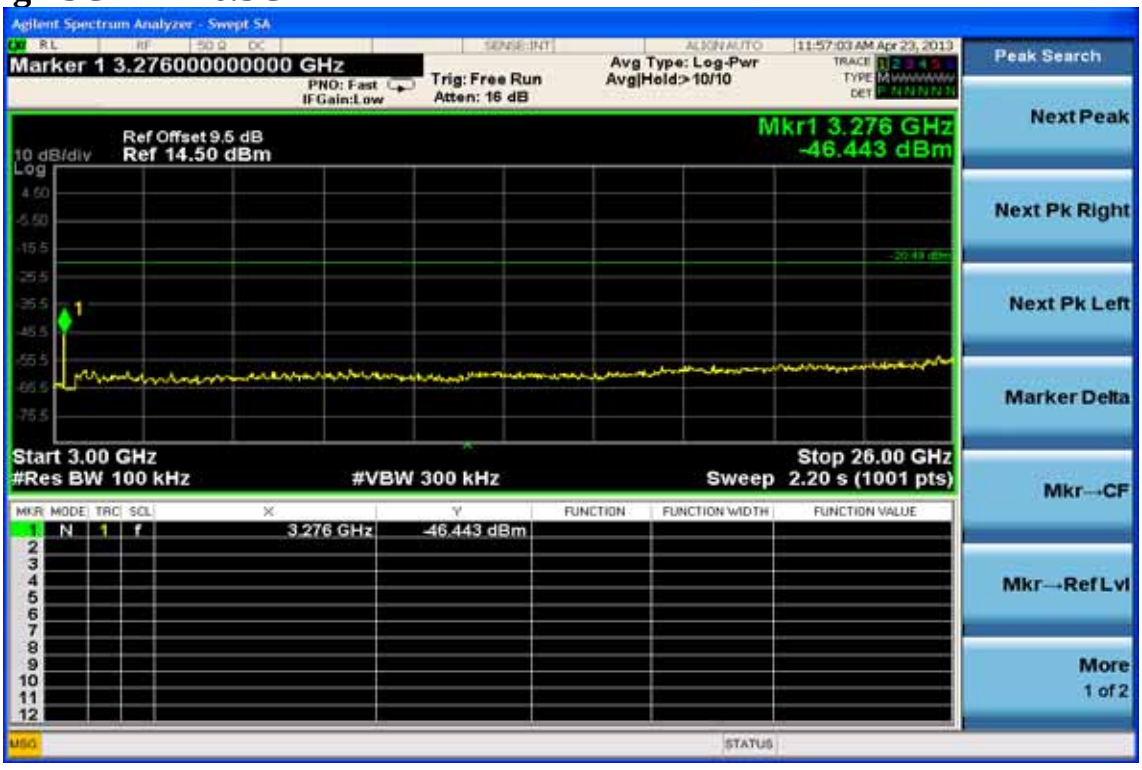
Ch Mid 3GHz – 26.5GHz



Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



Radiated Spurious Emission Measurement Result (below 1GHz) (worst case)

Operation Mode	802.11g TX CH Low	Test Date	2013/04/25
Fundamental Frequency	2412MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	41.64	42.29	-13.26	29.03	40.00	-10.97	Peak	VERTICAL
2	199.75	46.68	-16.38	30.30	43.50	-13.20	Peak	VERTICAL
3	266.68	46.54	-13.30	33.24	46.00	-12.76	Peak	VERTICAL
4	325.85	45.61	-11.49	34.12	46.00	-11.88	Peak	VERTICAL
5	480.08	43.92	-8.70	35.22	46.00	-10.78	Peak	VERTICAL
6	789.51	33.36	-2.75	30.61	46.00	-15.39	Peak	VERTICAL
1	129.91	44.72	-15.12	29.60	43.50	-13.90	Peak	HORIZONTAL
2	266.68	48.54	-13.30	35.24	46.00	-10.76	Peak	HORIZONTAL
3	455.83	39.78	-8.95	30.83	46.00	-15.17	Peak	HORIZONTAL
4	600.36	43.28	-6.10	37.18	46.00	-8.82	Peak	HORIZONTAL
5	647.89	35.65	-5.33	30.32	46.00	-15.68	Peak	HORIZONTAL
6	867.11	32.31	-1.71	30.60	46.00	-15.40	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz) (worst case)

Operation Mode	802.11g TX CH Mid	Test Date	2013/04/25
Fundamental Frequency	2437MHz	Test By	Dino
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	41.64	42.56	-13.26	29.30	40.00	-10.70	Peak	VERTICAL
2	199.75	46.90	-16.38	30.52	43.50	-12.98	Peak	VERTICAL
3	260.86	49.21	-13.61	35.60	46.00	-10.40	Peak	VERTICAL
4	455.83	43.93	-8.95	34.98	46.00	-11.02	Peak	VERTICAL
5	647.89	36.26	-5.33	30.93	46.00	-15.07	Peak	VERTICAL
6	933.07	35.01	-0.55	34.46	46.00	-11.54	Peak	VERTICAL
1	41.64	40.05	-13.26	26.79	40.00	-13.21	Peak	HORIZONTAL
2	199.75	45.00	-16.38	28.62	43.50	-14.88	Peak	HORIZONTAL
3	266.68	48.44	-13.30	35.14	46.00	-10.86	Peak	HORIZONTAL
4	455.83	37.82	-8.95	28.87	46.00	-17.13	Peak	HORIZONTAL
5	600.36	44.24	-6.10	38.14	46.00	-7.86	Peak	HORIZONTAL
6	867.11	32.33	-1.71	30.62	46.00	-15.38	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz) (worst case)

Operation Mode	802.11g TX CH High	Test Date	2013/04/25
Fundamental Frequency	2462MHz	Test By	Dino
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	41.64	42.88	-13.26	29.62	40.00	-10.38	Peak	VERTICAL
2	199.75	46.94	-16.38	30.56	43.50	-12.94	Peak	VERTICAL
3	266.68	46.32	-13.30	33.02	46.00	-12.98	Peak	VERTICAL
4	325.85	44.18	-11.49	32.69	46.00	-13.31	Peak	VERTICAL
5	480.08	43.58	-8.70	34.88	46.00	-11.12	Peak	VERTICAL
6	933.07	35.68	-0.55	35.13	46.00	-10.87	Peak	VERTICAL
1	54.25	47.33	-14.23	33.10	40.00	-6.90	Peak	HORIZONTAL
2	199.75	44.92	-16.38	28.54	43.50	-14.96	Peak	HORIZONTAL
3	266.68	48.72	-13.30	35.42	46.00	-10.58	Peak	HORIZONTAL
4	455.83	36.50	-8.95	27.55	46.00	-18.45	Peak	HORIZONTAL
5	600.36	43.41	-6.10	37.31	46.00	-8.69	Peak	HORIZONTAL
6	866.14	32.60	-1.73	30.87	46.00	-15.13	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)

Operation Mode	802.11g TX CH Low	Test Date	2013/04/25
Fundamental Frequency	2412MHz	Test By	Dino
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1728.00	55.42	-9.54	45.88	74.00	-28.12	Peak	VERTICAL
2	4824.00	41.56	1.30	42.86	74.00	-31.14	Peak	VERTICAL
1	1714.00	53.51	-9.62	43.89	74.00	-30.11	Peak	HORIZONTAL
2	4824.00	42.31	1.30	43.61	74.00	-30.39	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)

Operation Mode	802.11g TX CH Mid	Test Date	2013/04/25
Fundamental Frequency	2437MHz	Test By	Dino
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1707.00	55.65	-9.67	45.98	74.00	-28.02	Peak	VERTICAL
2	4874.00	41.33	1.46	42.79	74.00	-31.21	Peak	VERTICAL
1	2001.00	52.55	-7.90	44.65	74.00	-29.35	Peak	HORIZONTAL
2	4874.00	42.12	1.45	43.57	74.00	-30.43	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)

Operation Mode	802.11g TX CH High	Test Date	2013/04/25
Fundamental Frequency	2462MHz	Test By	Dino
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1714.00	56.26	-9.62	46.64	74.00	-27.36	Peak	VERTICAL
2	4924.00	42.48	1.61	44.09	74.00	-29.91	Peak	VERTICAL
1	1707.00	53.41	-9.67	43.74	74.00	-30.26	Peak	HORIZONTAL
2	4924.00	41.46	1.61	43.07	74.00	-30.93	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

10 Peak Power Spectral Density

10.1 Standard Applicable:

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

10.2 Measurement Equipment Used:

Refer to section 6.2 for details.

10.3 Test Set-up:

Refer to section 6.3 for details.

10.4 Measurement Procedure:

Refer to section 10.2 Peak Power Density(PKPPSD) Measurement Procedure of KDB Document: 558074 D01 DTS Meas Guidance v03r01

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 3KHz <= ; >=100 kHz.
3. Set the VBW ≥ 3* RBW.
4. Set the span to 1.5 * DTS bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
10. The resulting peak PSD level must be ≤ 8 dBm.

10.5 Measurement Result:

802.11b Mode

Frequency	Power Density	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-7.809	8
2437	-7.284	8
2462	-6.452	8

802.11g Mode

Frequency	Power Density	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-10.561	8
2437	-9.891	8
2462	-10.574	8

802.11n HT20 Mode

Frequency	Power Density	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-10.605	8
2437	-10.587	8
2462	-9.701	8

802.11n HT40 Mode

Frequency	Power Density	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-14.517	8
2437	-12.477	8
2462	-13.127	8

BT BLE Mode

Frequency	Power Density	Maximum Limit
MHz	Reading (dBm)	(dBm)
2402	1.466	8
2440	1.764	8
2480	1.462	8

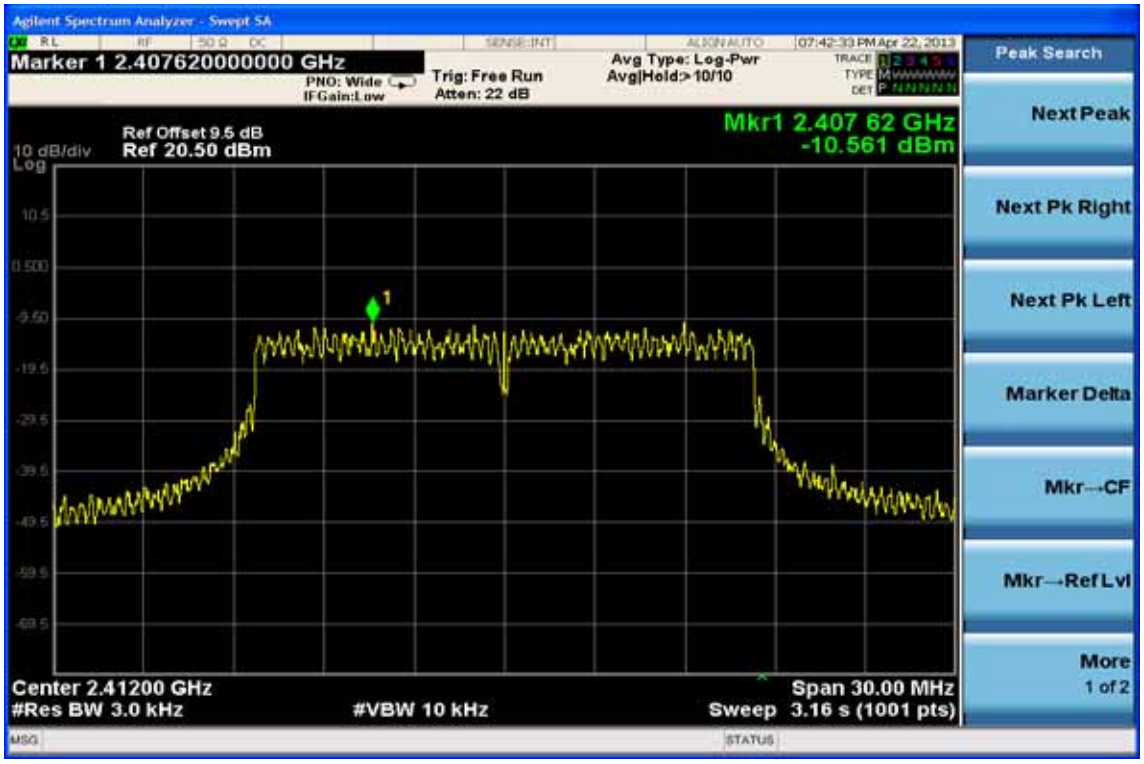
802.11b

Power Spectral Density Test Plot (CH-Low)

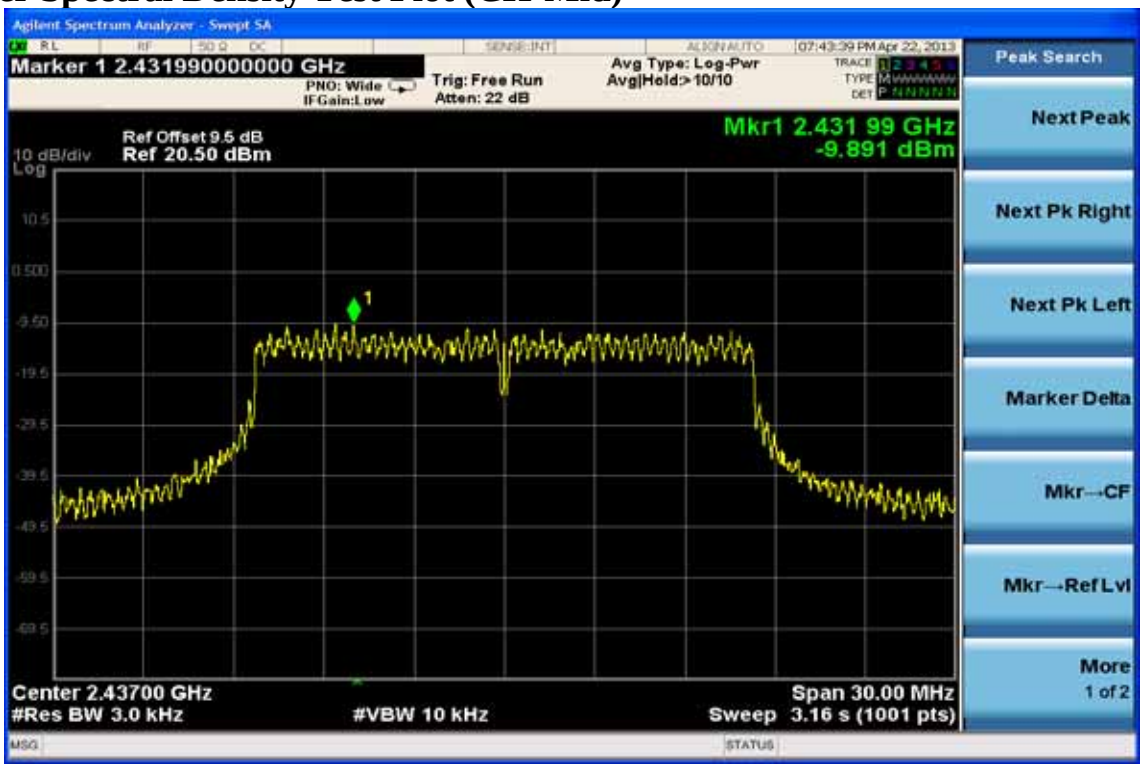
Power Spectral Density Test Plot (CH-Mid)

Power Spectral Density Test Plot (CH-High)

802.11g
Power Spectral Density Test Plot (CH-Low)

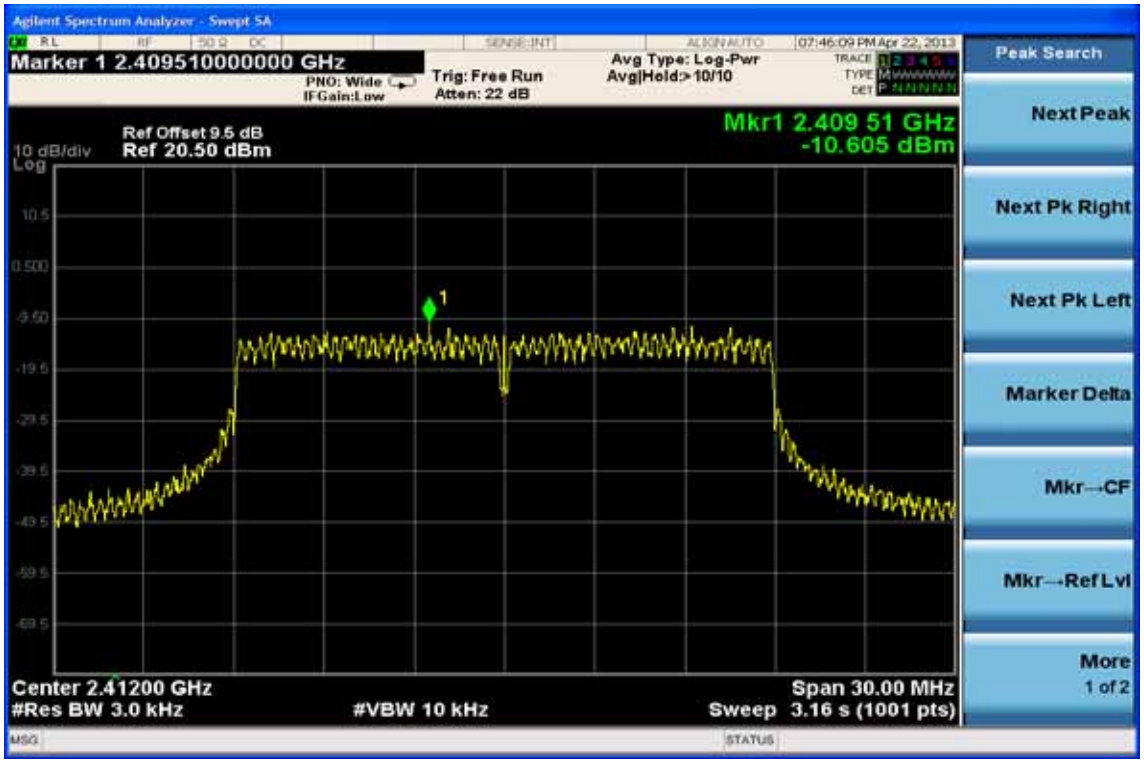


Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)

802.11n_20M
Power Spectral Density Test Plot (CH-Low)

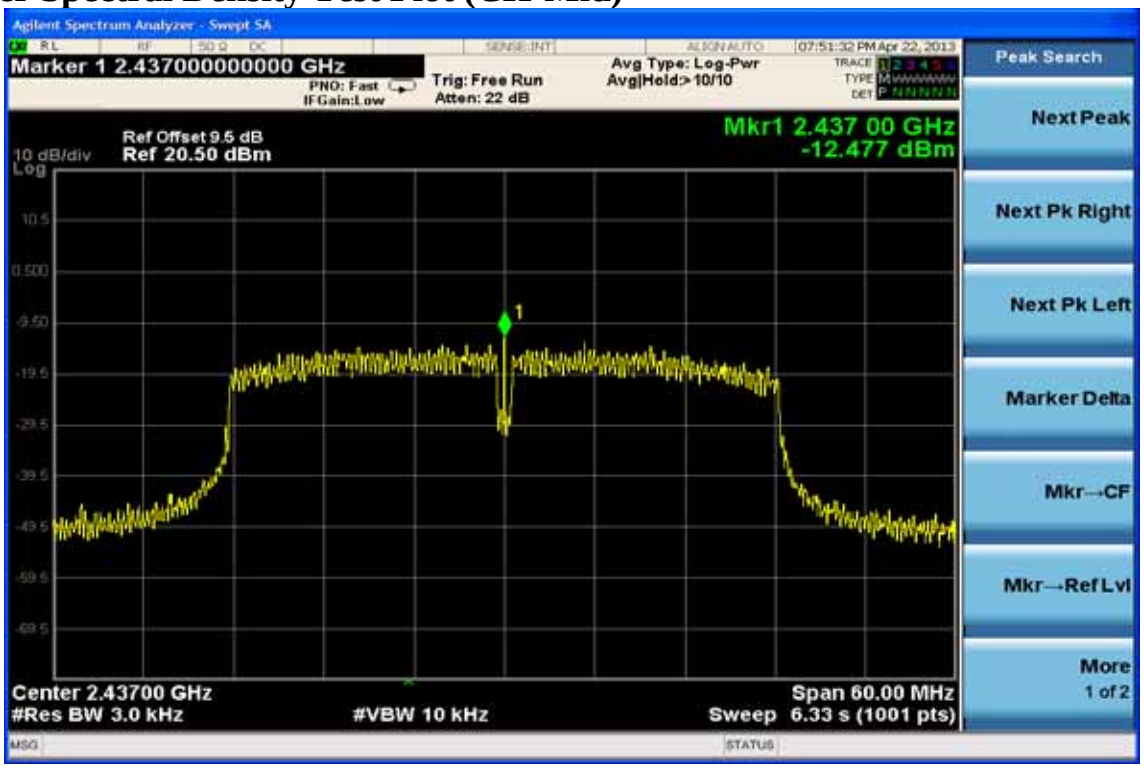


Power Spectral Density Test Plot (CH-Mid)

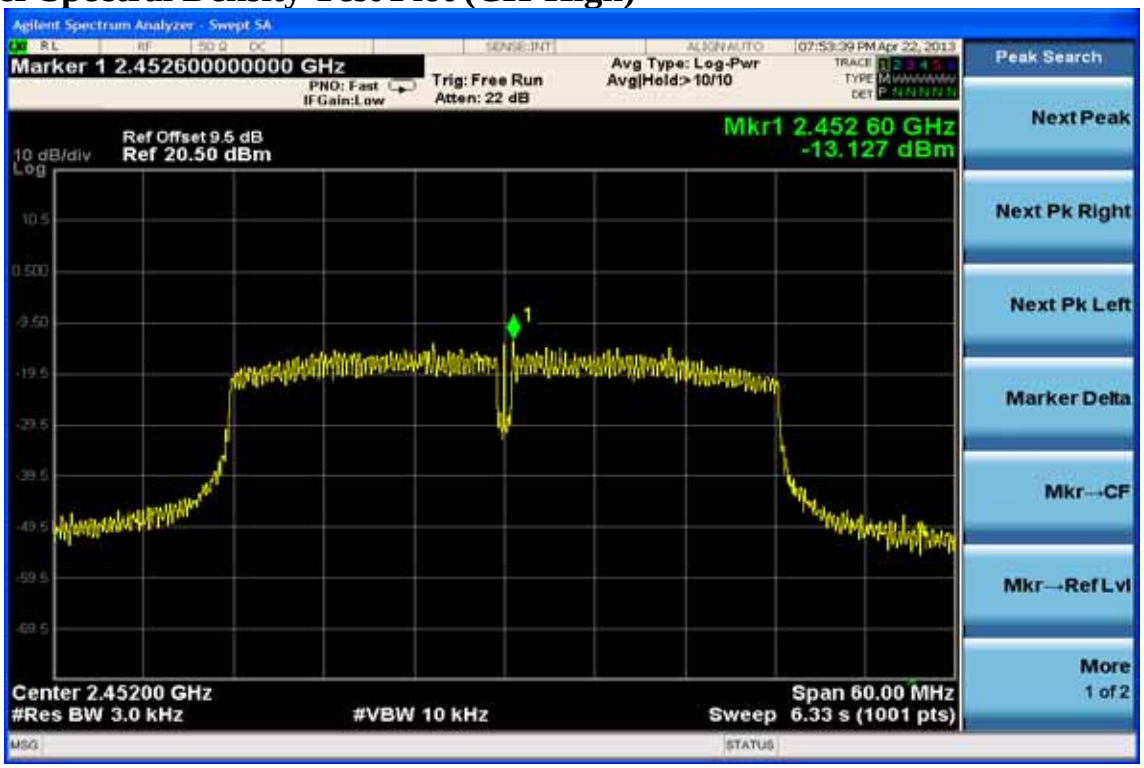
Power Spectral Density Test Plot (CH-High)

802.11n_40M
Power Spectral Density Test Plot (CH-Low)

Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



LE mode

Power Spectral Density Test Plot (CH-Low)

Power Spectral Density Test Plot (CH-Mid)

Power Spectral Density Test Plot (CH-High)

11 ANTENNA REQUIREMENT

11.1 Standard Applicable:

According to §15.203, Antenna requirement.

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

11.2 Antenna Connected Construction:

The directional gins of antenna used for transmitting is 2.87 dBi, and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

12 Maximum Permissible Exposure (MPE)

12.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to §1.1310 and 2.1091, This is a Mobile device, the MPE is required.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

12.2 Maximum Permissible Exposure (MPE) Evaluation

The worst case of Peak power of 802.11 g mode: refer to section 6.5 for detail measurement date.

802.11g

Cable loss = 0		Output Power		Limit (dBm)
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	
1	2412	20.04	11.34	30
6	2437	20.21	11.86	
11	2462	19.76	11.43	

MPE Prediction (802.11b)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Maximum Peak output power at antenna input terminal:	20.21	(dBm)
Maximum Peak output power at antenna input terminal:	104.9542429	(mW)
Duty cycle:	99	(%)
Maximum Pav :	103.9047004	(mW)
Antenna gain (typical):	2.87	(dBi)
Maximum antenna gain:	1.936421964	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0400484	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.0400mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 2437MHz.