Prüfbericht-Nr.: *Test Report No.*:	**50140126 001**	**Auftrags-Nr.:** *Order No.*:	114076042	**Seite 1 von 88** *Page 1 of 88*
Kunden-Referenz-Nr.: *Client Reference No.*:	N/A	**Auftragsdatum:** *Order date*:	30-Mar-2018	
Auftraggeber: *Client*:	Hon Hai Precision Industry Co., Ltd. No.151, Sec. 1, Nankan Rd., Lujhu Township, Taoyuan County, Taiwan			
Prüfgegenstand: *Test item*:	802.11 a/b/g/n/ac module			
Bezeichnung / **Typ-Nr.:** *Identification* / *Type No.*:	WFU033			
Auftrags-Inhalt: *Order content*:	FCC / IC Test report			
Prüfgrundlage: *Test specification*:	FCC 47CFR Part 15: Subpart C Section 15.247 RSS-247 (02-2017)			

Wareneingangsdatum: *Date of receipt*:	10-Apr-2018
Prüfmuster-Nr.: *Test sample No.*:	A000721430-001 A000721430-002
Prüfzeitraum: *Testing period*:	11-Apr-2018 – 12-Apr-2018
Ort der Prüfung: *Place of testing*:	EMC Laboratory Taipei
Prüflaboratorium: *Testing laboratory*:	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result**:	Pass

Report Date / *tested by*:

Datum *Date*	**Name** / **Stellung** *Name* / *Position*	**Unterschrift** *Signature*
2018-04-30	SamC.J. Kuo/Project Engineer	Sam

kontrolliert von / *reviewed by*:

Datum *Date*	**Name** / **Stellung** *Name* / *Position*	**Unterschrift** *Signature*
2018-04-30	Arvin Ho/Vice General Manager	

Sonstiges / *Other*:

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT
RESULT: Passed

5.1.2 PEAK OUTPUT POWER
RESULT: Passed

5.1.3 6DB BANDWIDTH AND 99% BANDWIDTH
RESULT: Passed

5.1.4 POWER DENSITY
RESULT: Passed

5.1.5 CONDUCTED SPURIOUS EMISSIONS AND FREQUENCY BAND EDGE MEASURED IN 100KHZ BANDWIDTH
RESULT: Passed

5.1.6 SPURIOUS EMISSION
RESULT: Passed

5.2.1 MAINS CONDUCTED EMISSIONS
RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS
RESULT: Passed

Contents

1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix P: Photo Documentation
(File Name: 50140126APPENDIXP)
Appendix D: Test Result of Radiated Emissions
(File Name: 50140126APPENDIXD)

Test Specifications

The following standards were applied (in bold: product standards, otherwise: basic standards).

Table 1: Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.247
FCC 47CFR Part 2: Subpart J Section 2.1091
RSS-247 Issue 2 (Feb 2017)
RSS-102 Issue 5
RSS-Gen, Issue 4, November 2014
ANSI C63.10:2013
FCC KDB558074 D01 DTS Meas Guidance v03r05
FCC KDB447498 D01 General RF Exposure Guidance v06

2. Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.
Taipei Office

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

FCC RegistrationNo.: 340738
IC Canada Registration No.: 9465A-1
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2016-Jul-1st to 2019-Jun-30th

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manu-facturer	Type	S/N	Last Calibration	Next Calibration
Test Software	Farad	EZ_EMC	Ver. TUV3A1	N/A	N/A
EMI Test Receiver	R&S	ESR 7	101549	2017/11/10	2018/11/10
Spectrum Analyzer	R&S	FSV 40	100921	2017/05/02	2018/05/01
Spectrum Analyzer	Agilent	N9010A	MY53470241	2017/05/23	2018/05/22
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	2017/08/14	2018/08/14
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	2018/01/18	2019/01/18
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	60558	2017/11/21	2018/11/21
Bilog Antenna	TESEQ	CBL6111D	29804	2017/08/18	2018/08/18
Horn Antenna	ETS-Lindgren	3117	201918	2017/08/18	2018/08/18
Horn Antenna (18GHz~40GHz)	COM-POWER	AH-840	101029	2017/11/28	2018/11/28
Temp. & Humid. Chamber	Giant Force	GCT-099-40-S	MAF0103-007	2017/03/09	2019/03/09
LISN (1 phase)	R&S	ENV216	101243	2017/06/18	2018/06/18
LISN	R&S	ENV216	101262	2017/06/22	2018/06/21
Test Software	Audix	e3	Ver. 9	N/A	N/A
Test Software	Agilent	300328 testsystem	V1.9.1	N/A	N/A
Power sensor	Agilent	U2021XA	MY54020001	2018/03/31	2019/03/31

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are ±3dB.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
RF power, conducted	± 1.5 dB
Adjacent channel power	± 3 dB
Radiated emission of transmitter, valid up to 26 GHz	± 6 dB
Radiated emission of receiver, valid up to 26 GHz	± 6 dB
Temperature	± 2 ºC
Humidity	± 10 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is an 802.11 a/b/g/n/ac module. It contains a Wi-Fi 2.4GHz and 5GHz compatible module enabling the user to communicate data through a Wireless interface.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment	802.11 a/b/g/n/ac module
Type Designation	WFU033
Product Type	WLAN (2TX, 2RX)
FCC ID	RX3-WFU033
IC ID	2878F-WFU033
HVIN	WFU033

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	2412 MHz ~ 2462 MHz
Channel Spacing	5 MHz
Channel number	802.11b/g/n20 : 11 (2412 MHz ~ 2462 MHz), 802.11n40: 7 (2422 MHz ~ 2452 MHz)
Operation Voltage	5V
Modulation	802.11b: DSSS；802.11g/n: OFDM
Antenna gain	2.76dBi for ANT1, 2.72dBi for ANT2
Antenna Type	PCB Antenna

3.3 Independent Operation Modes

Basic operation modes are:

A. Transmitting
    1. Low channel
    2. Middle channel
    3. High channel
B. Receiving
C. Standby
D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Bill of Material
- PCB Layout
- Photo Document
- Technical Description
- Circuit Diagram
- Instruction Manual
- Rating Label

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with a USB interface which makes it possible to control them through test software installed on a notebook computer.

This software, MT7662UQA was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate.

Full test was applied on all test modes, but only worst case was shown

IEEE 802.11b mode:
Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE 802.11g mode:
Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 mode:
Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 13Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 mode:
Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13Mbps data rate were chosen for full testing.

4.3 Auxiliary Equipment

The product has been tested together with the following additional accessories:

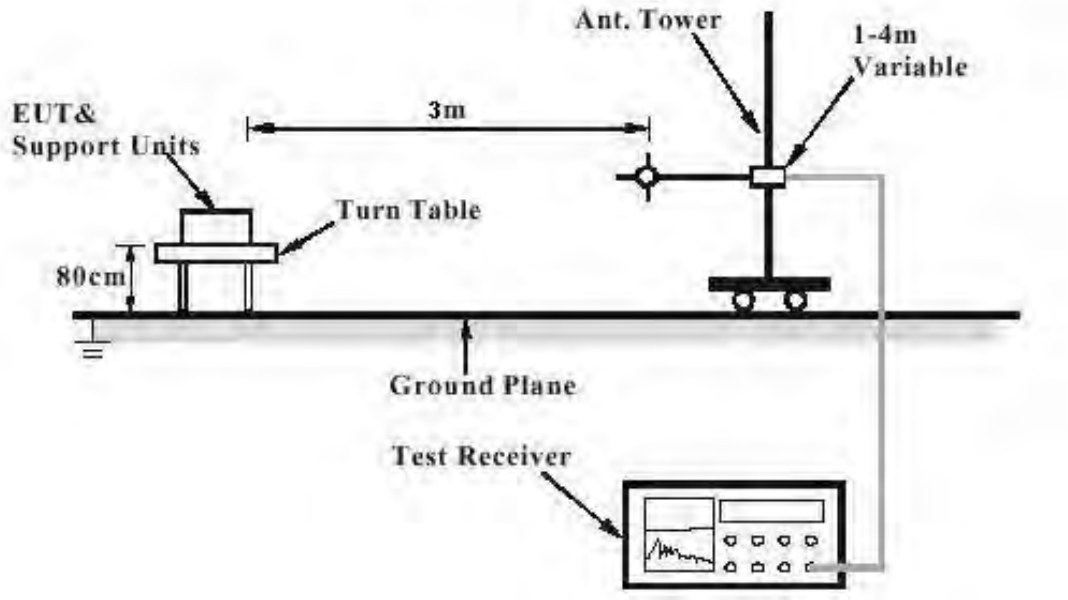
Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

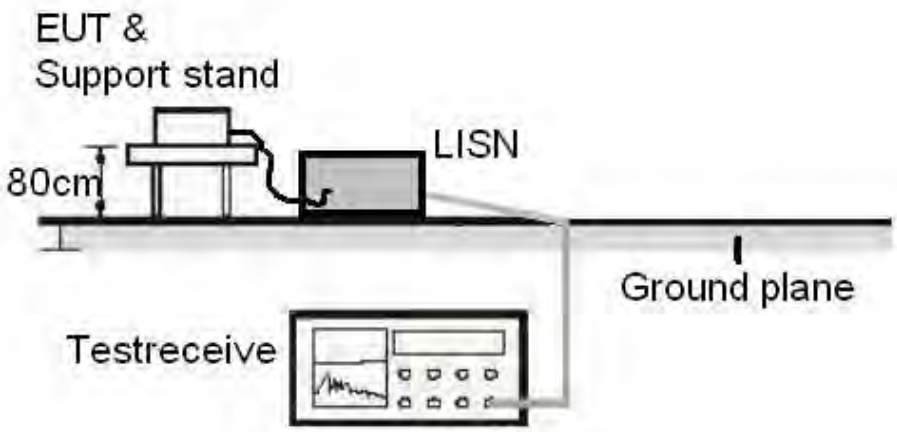
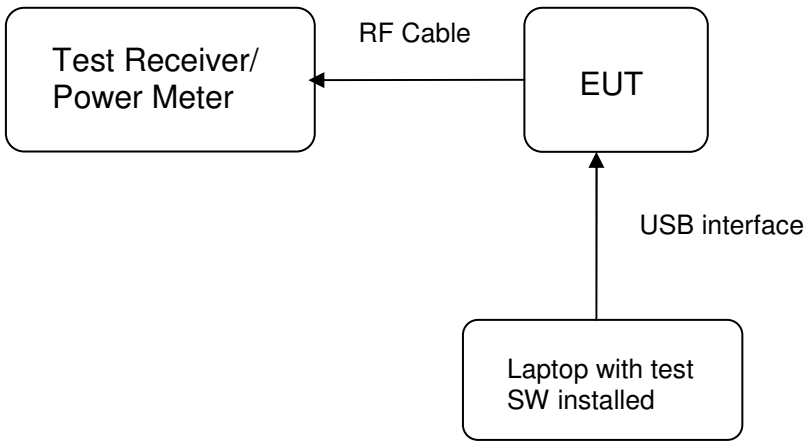


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



4.6 Test Environment

Temperature	18 - 25˚C
Humidity	35 – 75%

5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Test standard	:	FCC Part 15.247(b)(4), Part 15.203 and RSS-Gen 8.3
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 2.76dBi for ANT1 and 2.72 for ANT2 .The antenna is a printed PCB trace with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

	Ant1	**Ant2**
Frequency (MHz)	Peak Gain (dBi)	Peak Gain (dBi)
2400	2.44	2.25
2450	**2.76**	**2.72**
2500	2.59	2.69

5.1.2 Peak Output Power

RESULT: **Passed**

Test standard	:	FCC Part 15.247(b)(3), RSS-247 5.4(d)
Basic standard	:	ANSI C63.10:2013, KDB558074
Limit	:	FCC Part 15.247(b), RSS-247 5.4(d) 1 Watt / 30dBm
Kind of test site	:	Shielded room/Conducted room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A

Table 6: Test result of Peak Output Power (802.11b)

ANT1						
Duty Cycle:	0.97	Duty fac:	0.13		Add Fac.	RESULT
802.11b	peak	avg	set	Peak (dBm)	Avg (dBm)	
2412	18.45	15.34	1D	**18.45**	15.47	PASS
2437	19.87	16.6	20	**19.87**	16.73	PASS
2462	18.75	15.94	1E	**18.75**	16.07	PASS

ANT2						
Duty Cycle:	0.97	Duty fac:	0.13		Add Fac.	RESULT
802.11b	peak	avg	set	Peak (dBm)	Avg (dBm)	
2412	18.09	15.16	1D	**18.09**	15.29	PASS
2437	19.85	16.84	20	**19.85**	16.97	PASS
2462	19.01	16.04	1E	**19.01**	16.17	PASS

Note: Average conducted power is equal to measured power plus duty factor, where duty factor is 10log (1/0.97).

Table 7: Test result of Peak Output Power (802.11g)

ANT1						
Duty Cycle:	0.87	Duty fac:	0.60		Add Fac.	RESULT
802.11g	peak	avg	set	Peak (dBm)	Avg (dBm)	
2412	22.41	13.4	1B	**22.41**	14.00	PASS
2437	25.11	16.31	21	**25.11**	16.91	PASS
2462	22.2	13.35	1B	**22.20**	13.95	PASS

ANT2						
Duty Cycle:	0.87	Duty fac:	0.60		Add Fac.	RESULT
802.11g	peak	avg	set	Peak (dBm)	Avg (dBm)	
2412	22.24	13.38	1B	**22.24**	13.98	PASS
2437	24.92	16.13	21	**24.92**	16.73	PASS
2462	22.38	13.59	1B	**22.38**	14.19	PASS

Note: Average conducted power is equal to measured power plus duty factor, where duty factor is 10log (1/0.87).

Table 8: Test result of Peak Output Power (802.11n HT20)

ANT1+ANT2													
Duty Cycle:	0.78	Duty fac:	1.08				POWER + fac		POWER + fac		Total (dBm)		RESULT
802.11n20	chain0			chain1			chain0		chain1				
	peak	avg	set	peak	avg	set	peak	avg	peak	avg	Peak	Avg	
2412	19.28	10.56	15	19	10.21	15	19.28	11.64	19.00	11.29	**22.15**	14.48	PASS
2437	20.62	11.56	18	20.5	11.87	18	20.62	12.64	20.50	12.95	**23.57**	15.81	PASS
2462	19.04	10.23	15	19.2	10.41	15	19.04	11.31	19.20	11.49	**22.13**	14.41	PASS

Note: Average conducted power is equal to measured power plus duty factor, where duty factor is 10log (1/0.78).

Table 9: Test result of Peak Output Power (802.11n HT40)

ANT1+ANT2													
Duty Cycle:	0.66	Duty fac:	1.80				POWER + fac		POWER + fac		Total (dBm)		RESULT
802.11n40	chain0			chain1			chain0		chain1				
	peak	avg	set	peak	avg	set	peak	avg	peak	avg	Peak	Avg	
2422	18.24	8.94	13	18.32	9.03	13	18.24	10.74	18.32	10.83	**21.29**	13.80	PASS
2437	19.78	10.52	16	19.85	10.58	16	19.78	12.32	19.85	12.38	**22.83**	15.36	PASS
2452	17.93	8.42	12	18.11	8.69	12	17.93	10.22	18.11	10.49	**21.03**	13.37	PASS

Note: Average conducted power is equal to measured power plus duty factor, where duty factor is 10log (1/0.66).

Maximum Average Conducted power: 16.97dBm
Maximum Peak Conducted power: 25.11dBm

5.1.3 6dB Bandwidth and 99% Bandwidth

RESULT: **Passed**

Test standard	:	FCC Part 15.247(a)(2), RSS-247 5.2(a)
Basic standard	:	ANSI C63.10:2013, KDB558074
Limit	:	FCC Part 15.247(a)(2), RSS-247 5.2(a)
Kind of test site	:	Shielded room/Conducted room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A

Table 10: Test result of 6dB Bandwidth (802.11b)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	10.09	0.5	Pass
Mid Channel	2437	10.07	0.5	Pass
High Channel	2462	10.09	0.5	Pass

Table 11: Test result of 6dB Bandwidth (802.11g)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	16.06	0.5	Pass
Mid Channel	2437	15.95	0.5	Pass
High Channel	2462	16.06	0.5	Pass

Table 12: Test result of 6dB Bandwidth (802.11n HT20)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	17.58	0.5	Pass
Mid Channel	2437	17.05	0.5	Pass
High Channel	2462	17	0.5	Pass

Table 13: Test result of 6dB Bandwidth (802.11n HT40)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	35.39	0.5	Pass
Mid Channel	2437	35.51	0.5	Pass
High Channel	2462	35.53	0.5	Pass

Table 14: Test result of 99% Bandwidth (802.11b)

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2412	13.338
Mid Channel	2437	13.368
High Channel	2462	13.332

Table 15: Test result of 99% Bandwidth (802.11g)

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2412	16.769
Mid Channel	2437	16.815
High Channel	2462	16.766

Table 16: Test result of 99% Bandwidth (802.11n HT20)

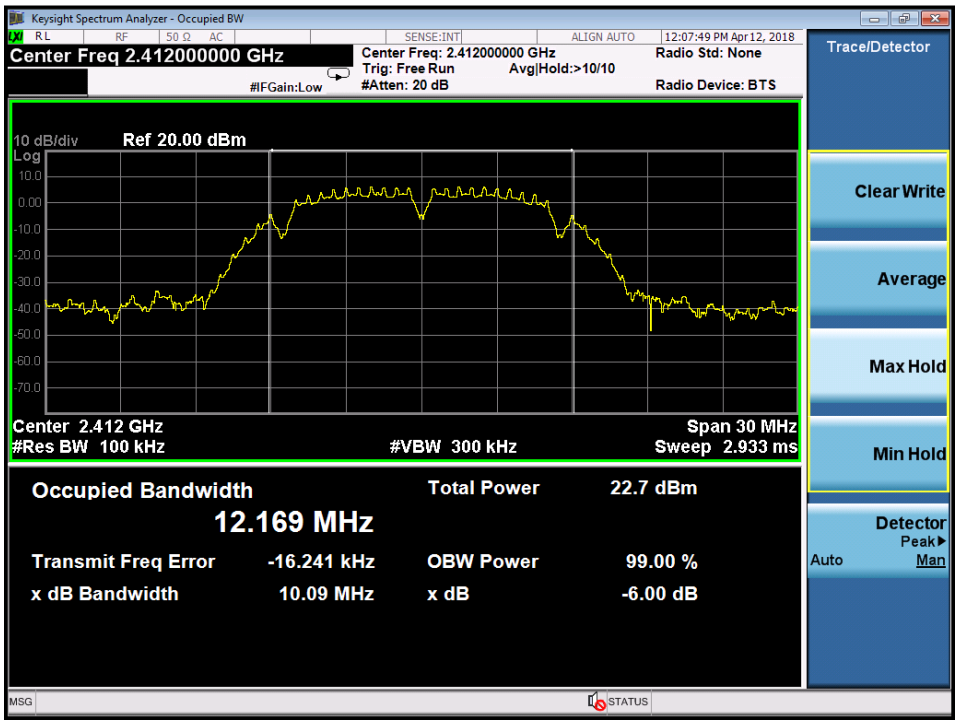
Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2412	17.706
Mid Channel	2437	17.679
High Channel	2462	17.706

Table 17: Test result of 99% Bandwidth (802.11n HT40)

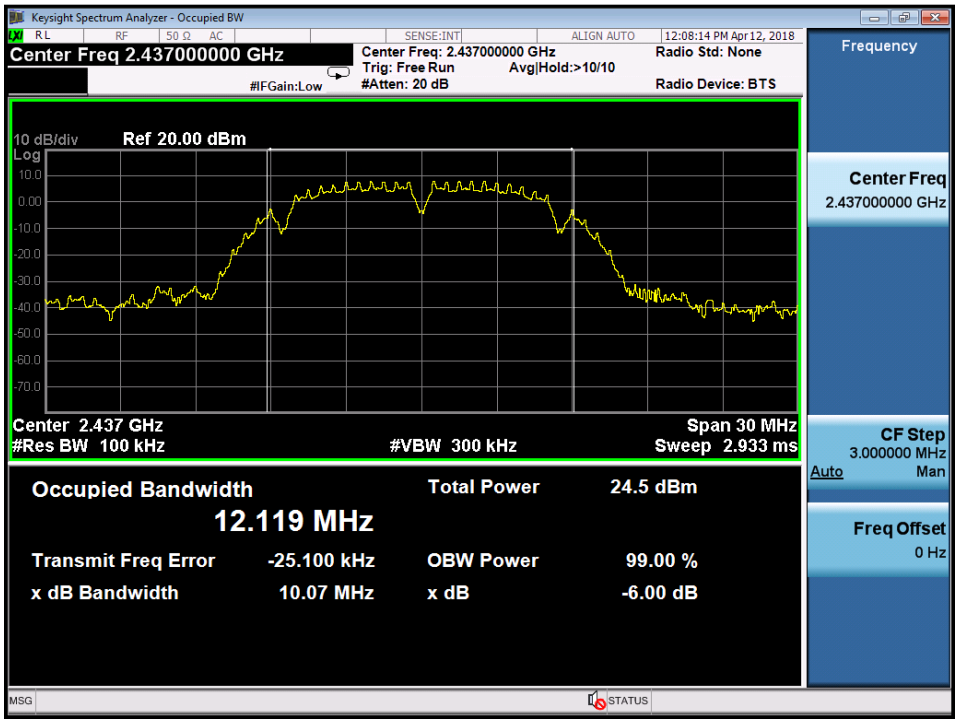
Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2412	36.334
Mid Channel	2437	36.151
High Channel	2462	36.187

Test Plot of 6dB Bandwidth (802.11b)

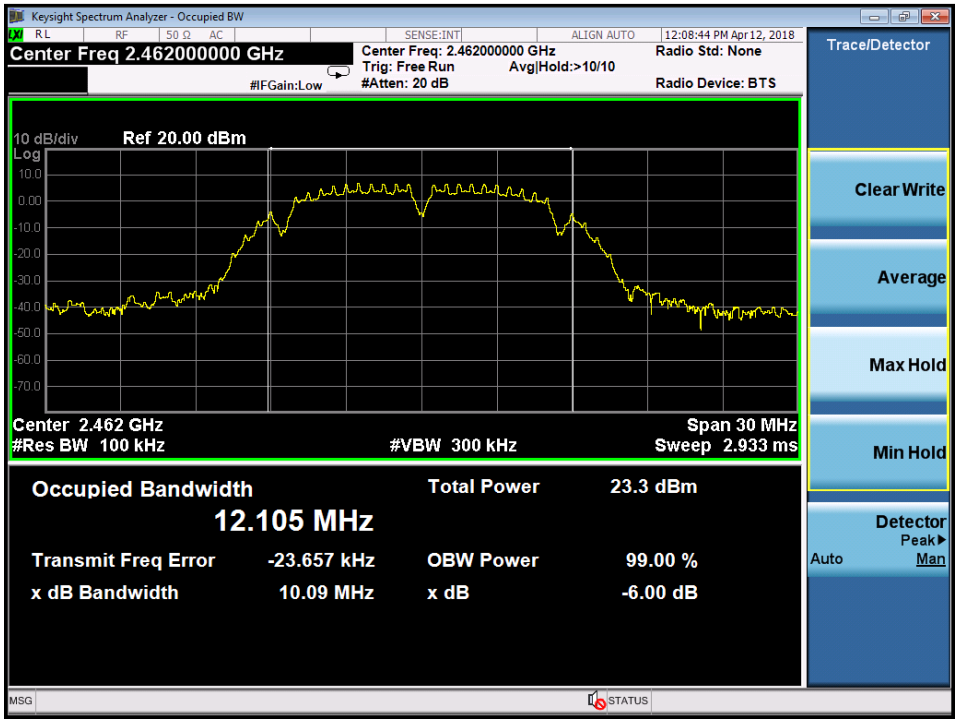
Low Channel



Middle Channel

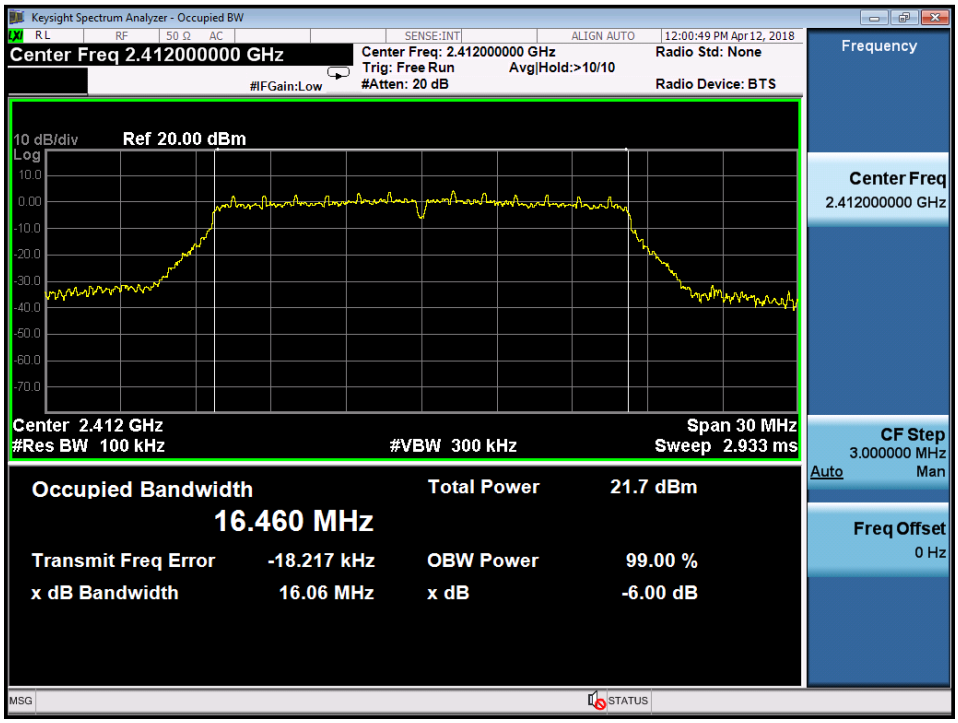


High Channel

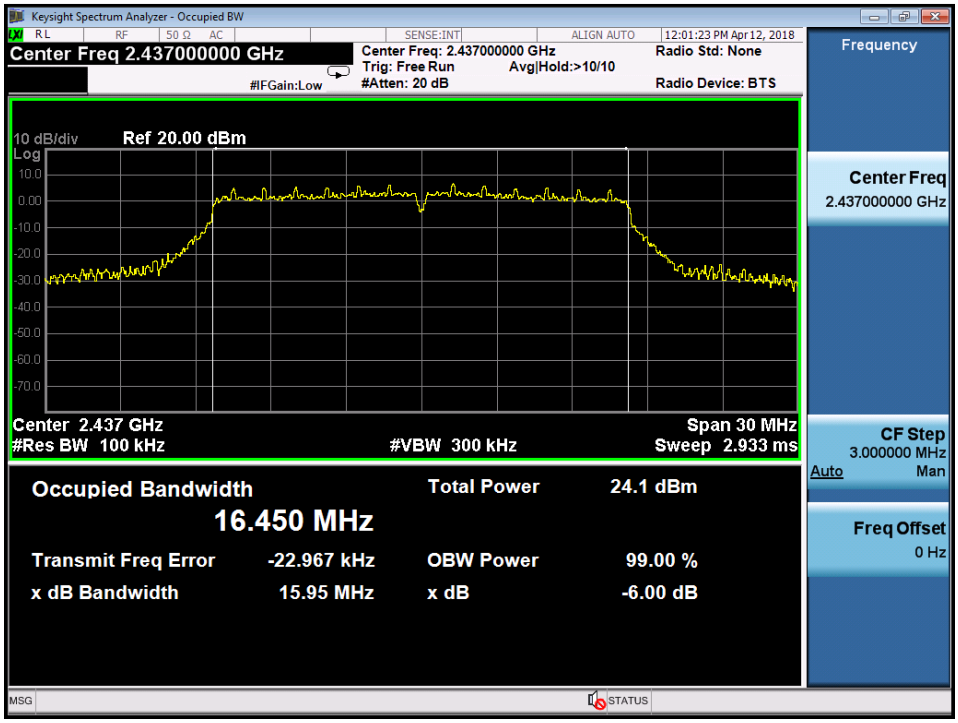


Test Plot of 6dB Bandwidth (802.11g)

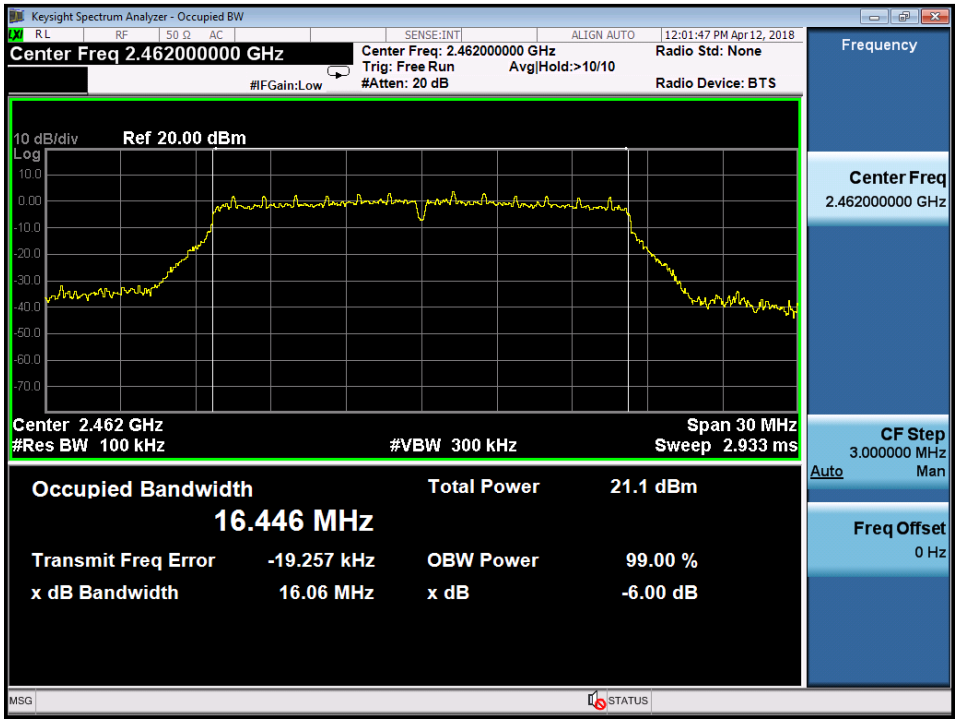
Low Channel



Middle Channel

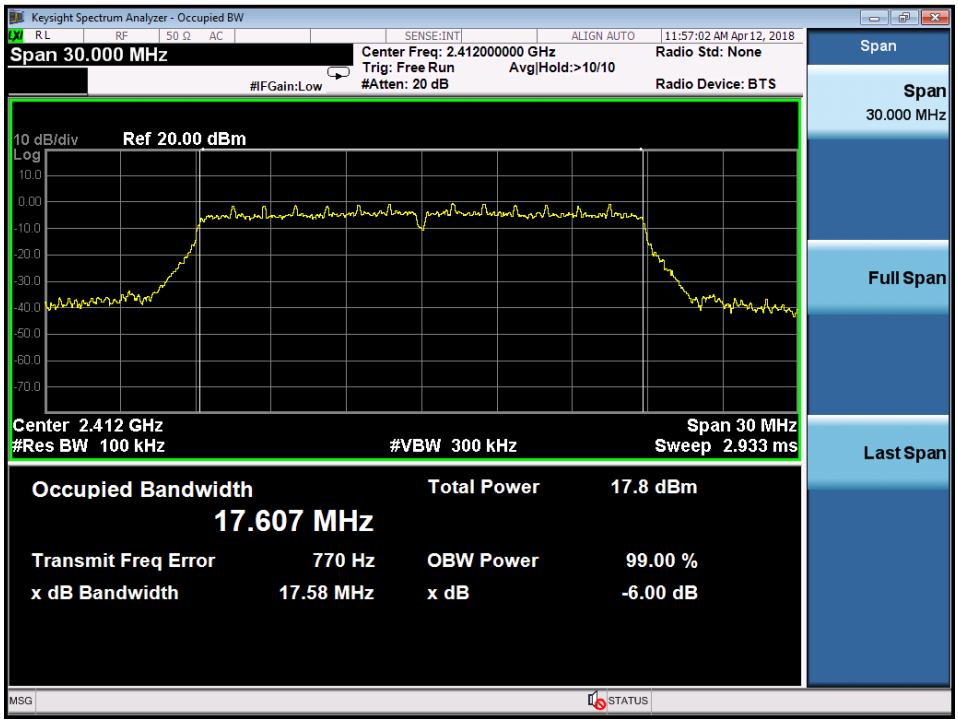


High Channel

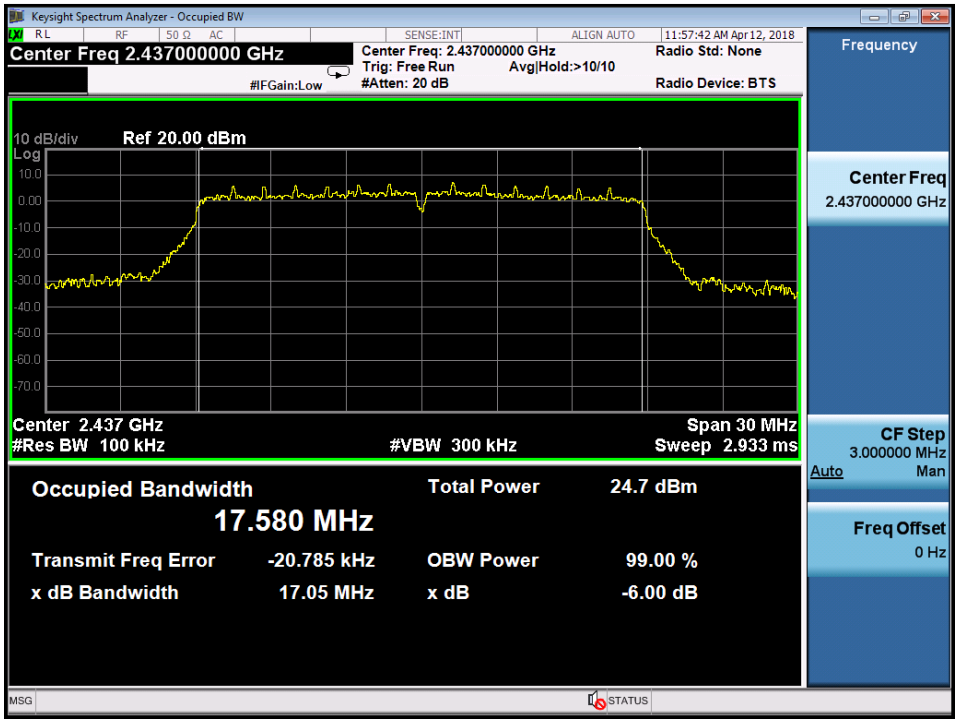


Test Plot of 6dB Bandwidth (802.11n HT20)

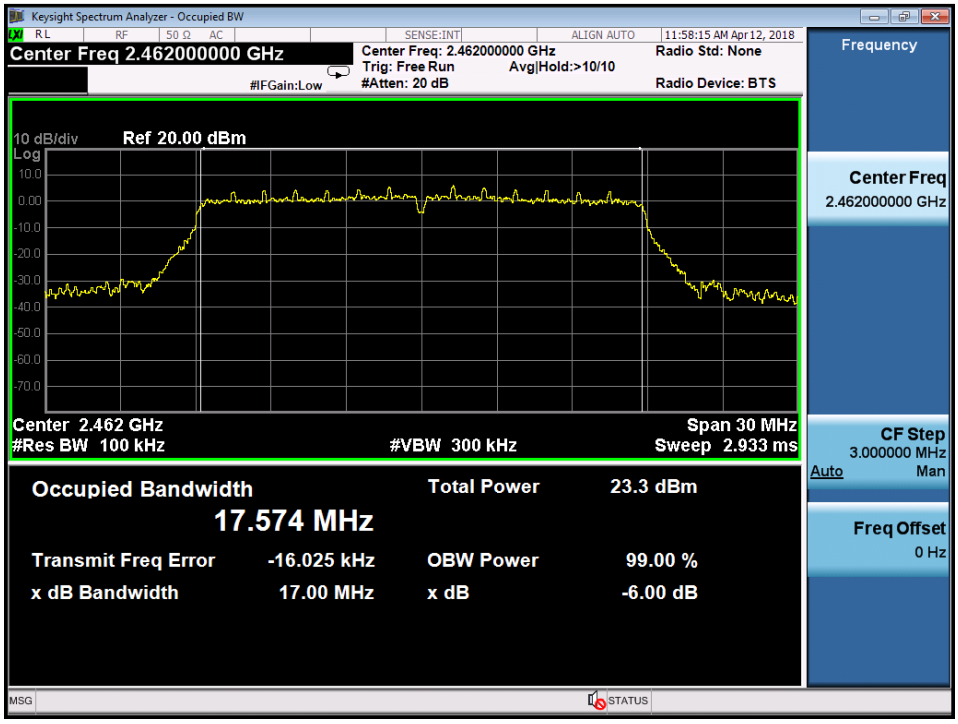
Low Channel



Middle Channel

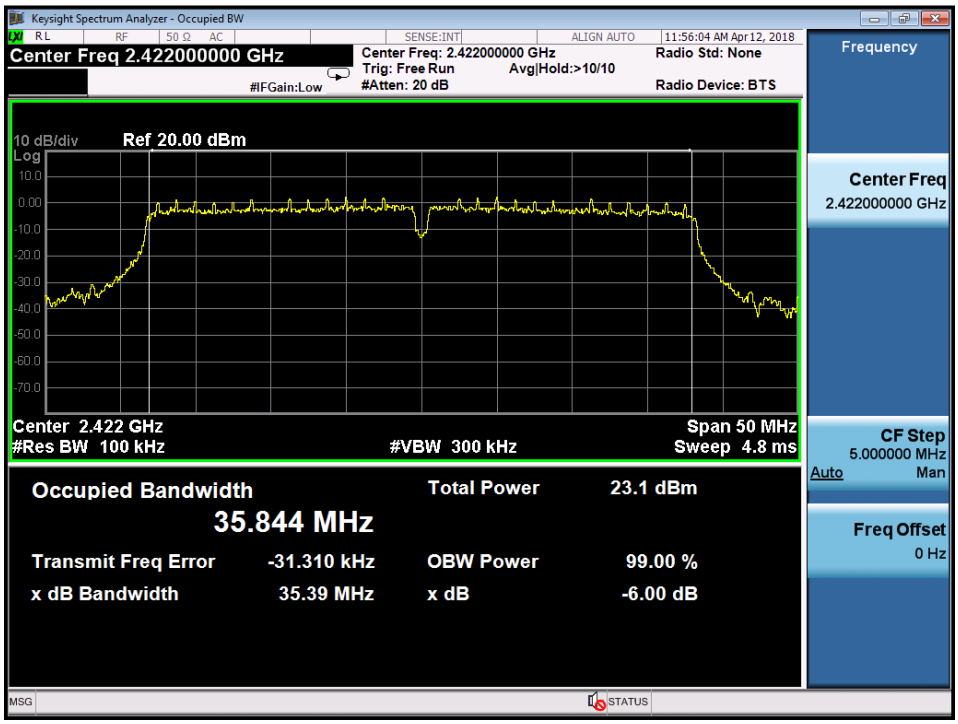


High Channel

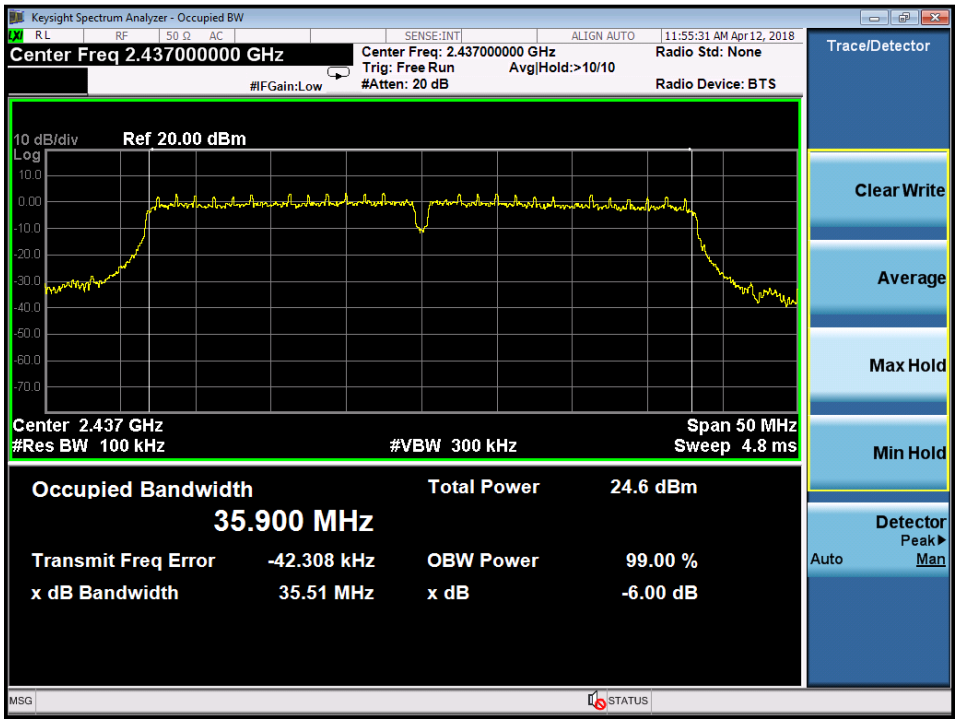


Test Plot of 6dB Bandwidth (802.11n HT40)

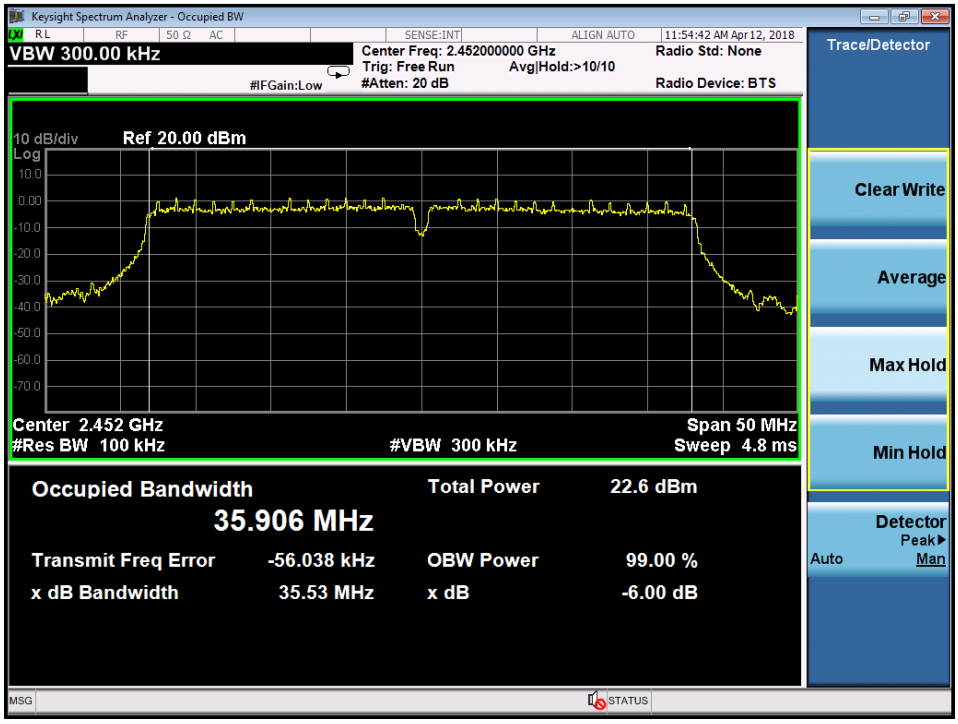
Low Channel



Middle Channel

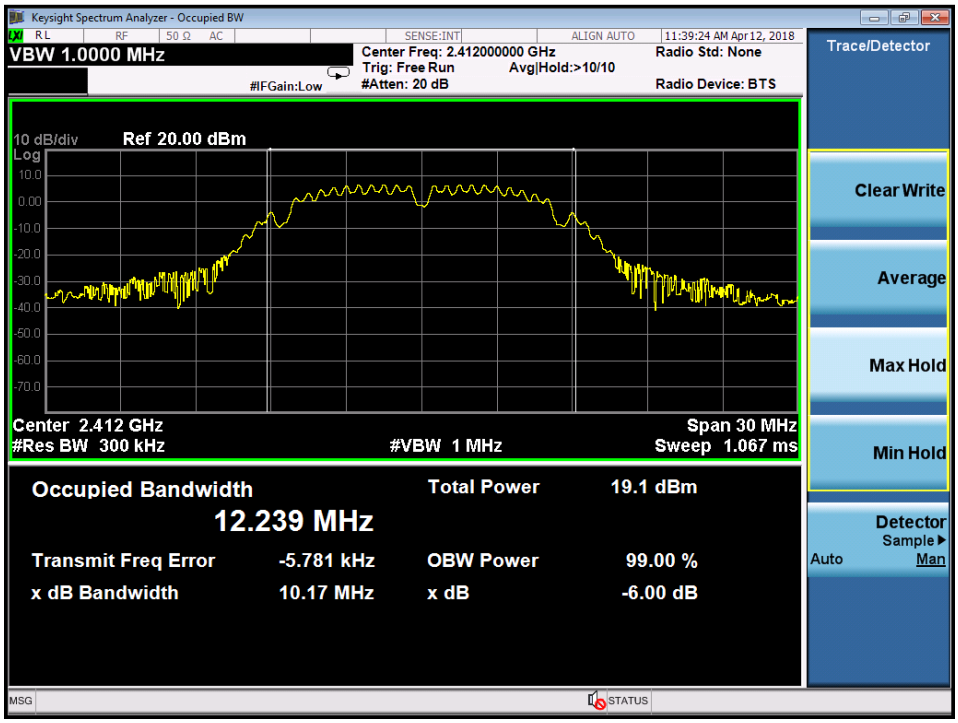


High Channel

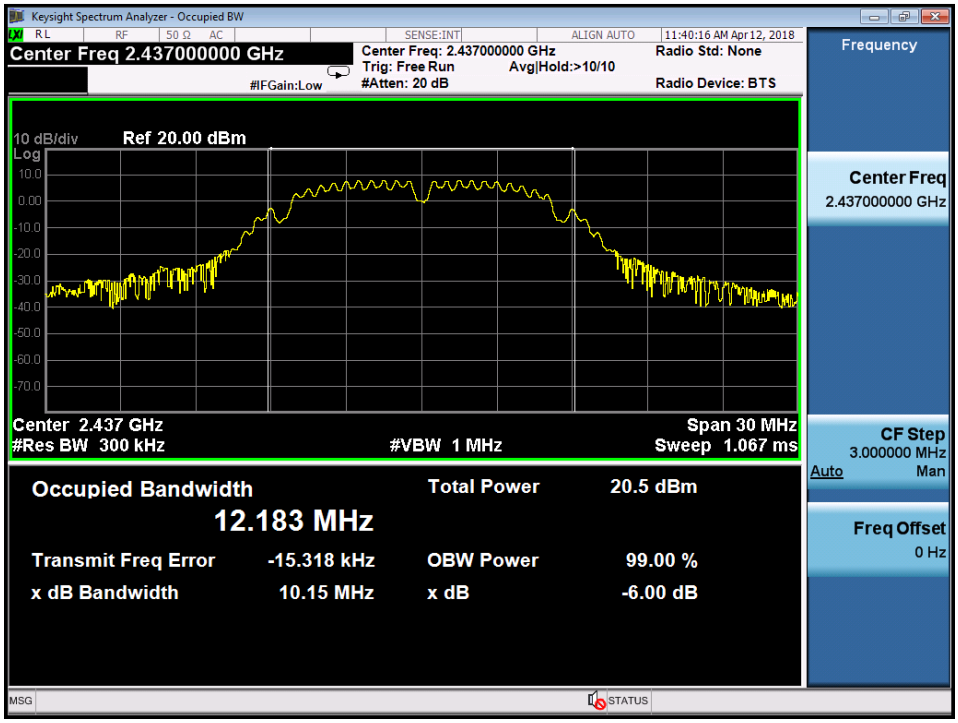


Test Plot of 99% Bandwidth (802.11b)

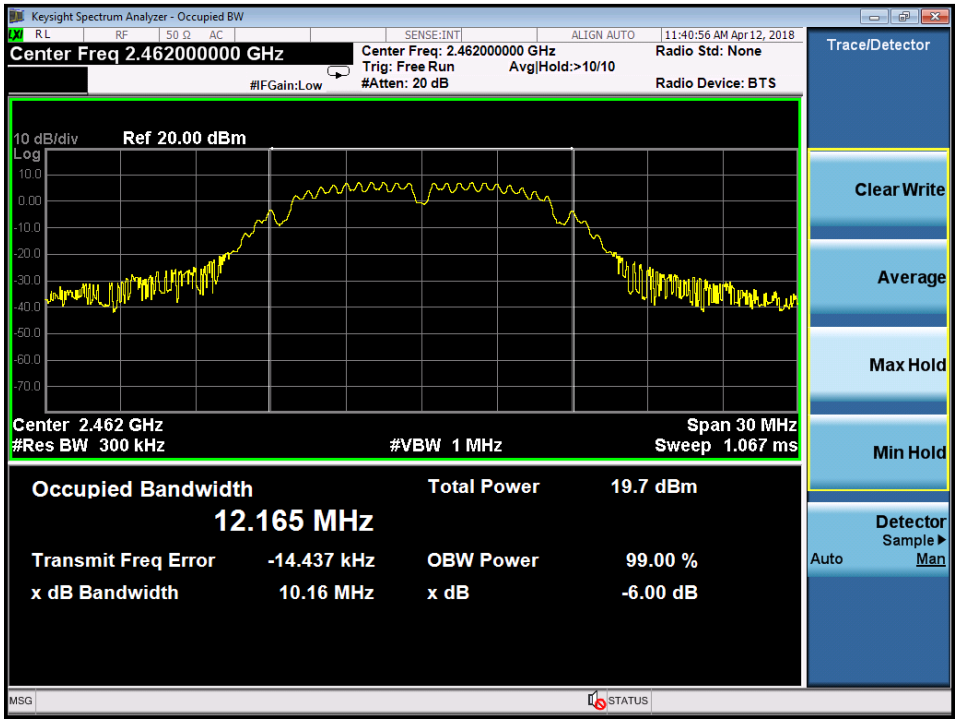
Low Channel



Middle Channel

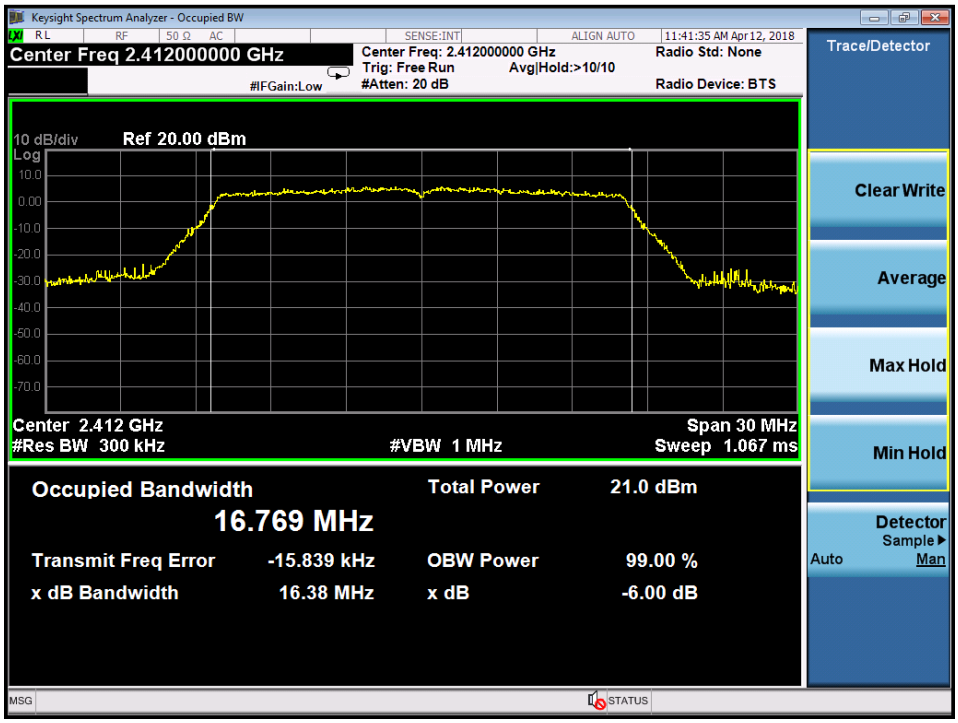


High Channel

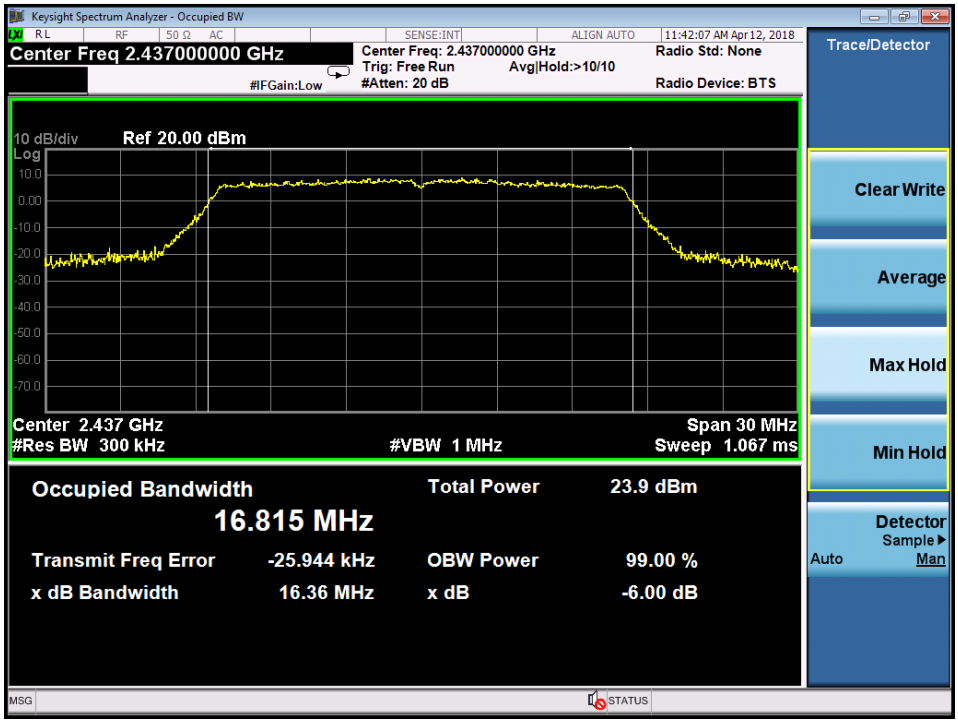


Test Plot of 99% Bandwidth (802.11g)

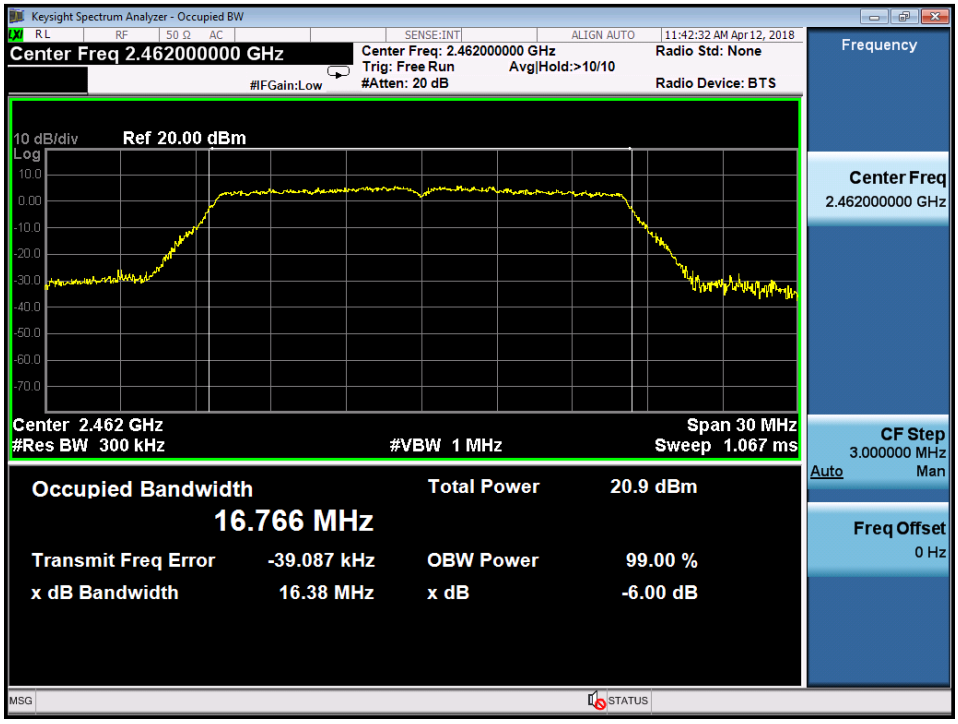
Low Channel



Middle Channel

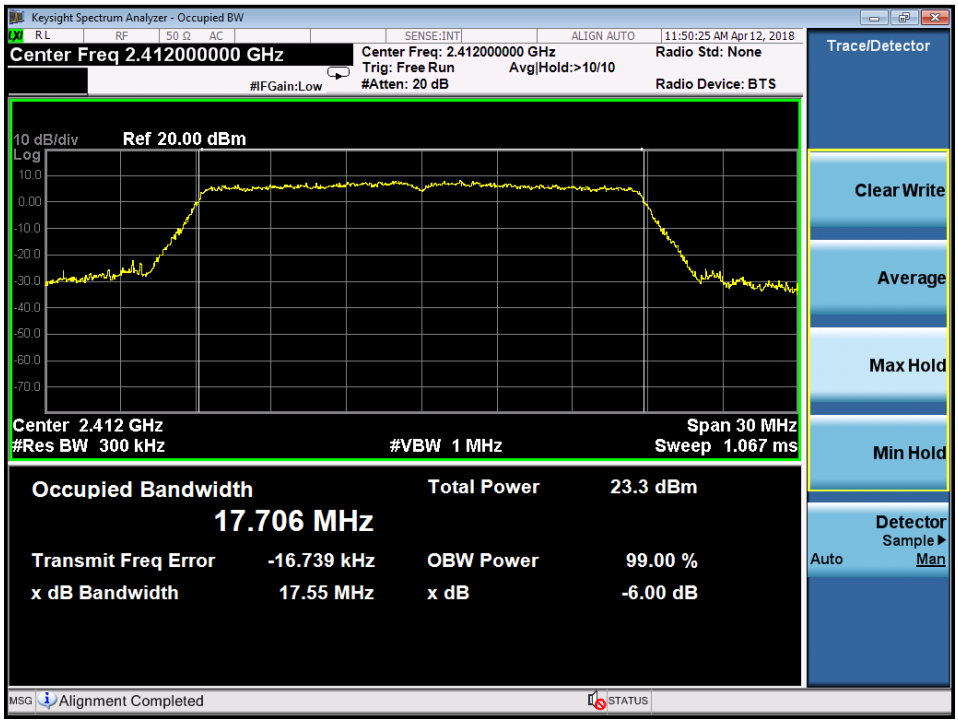


High Channel

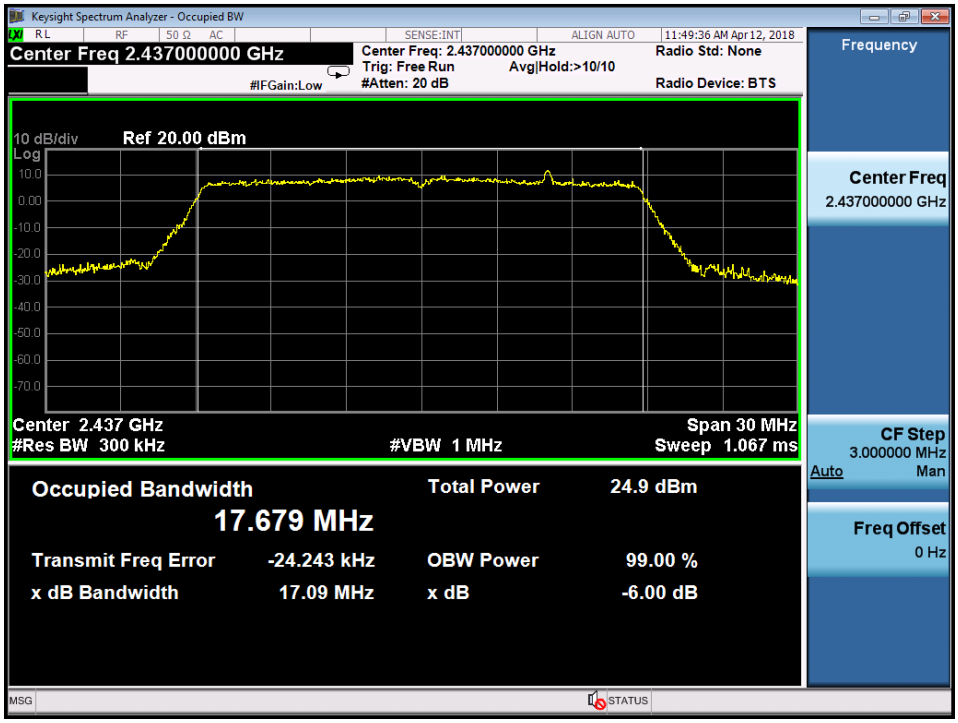


Test Plot of 99% Bandwidth (802.11n HT20)

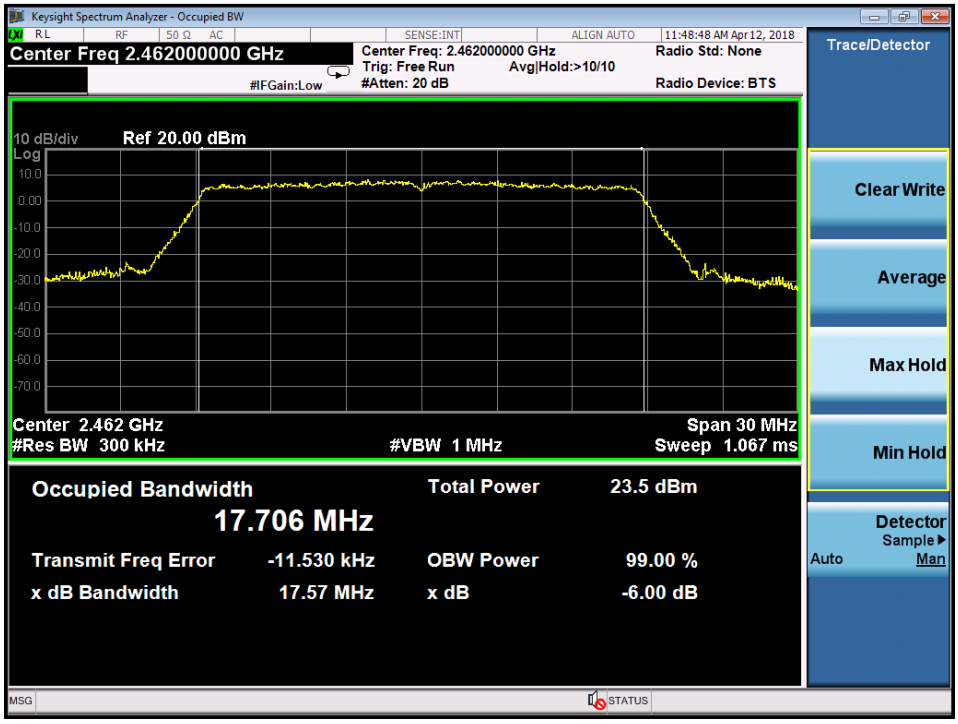
Low Channel



Middle Channel

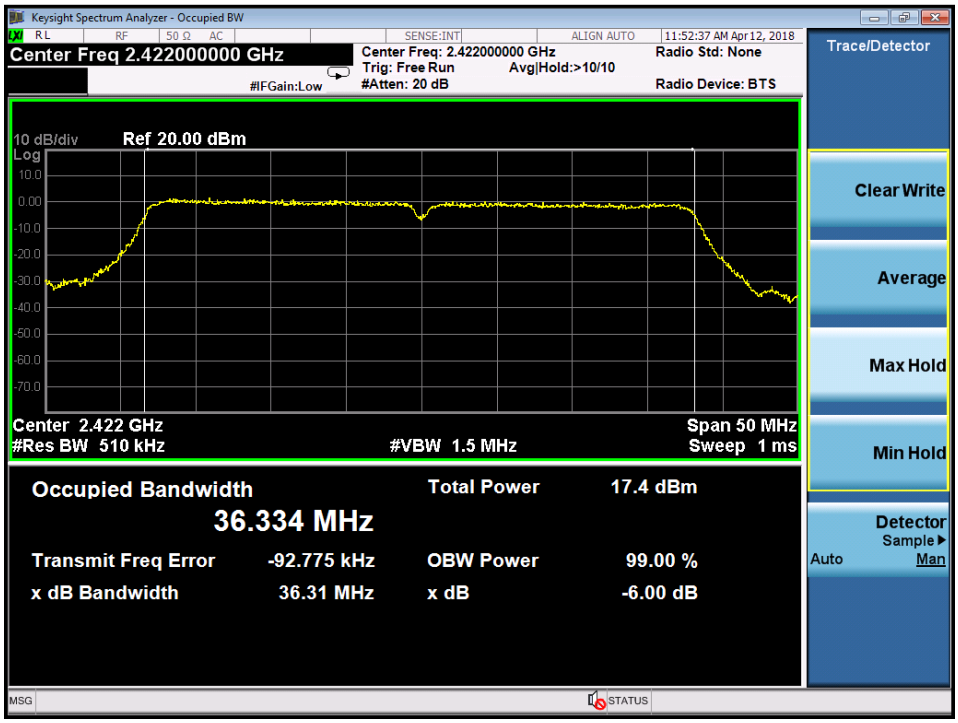


High Channel

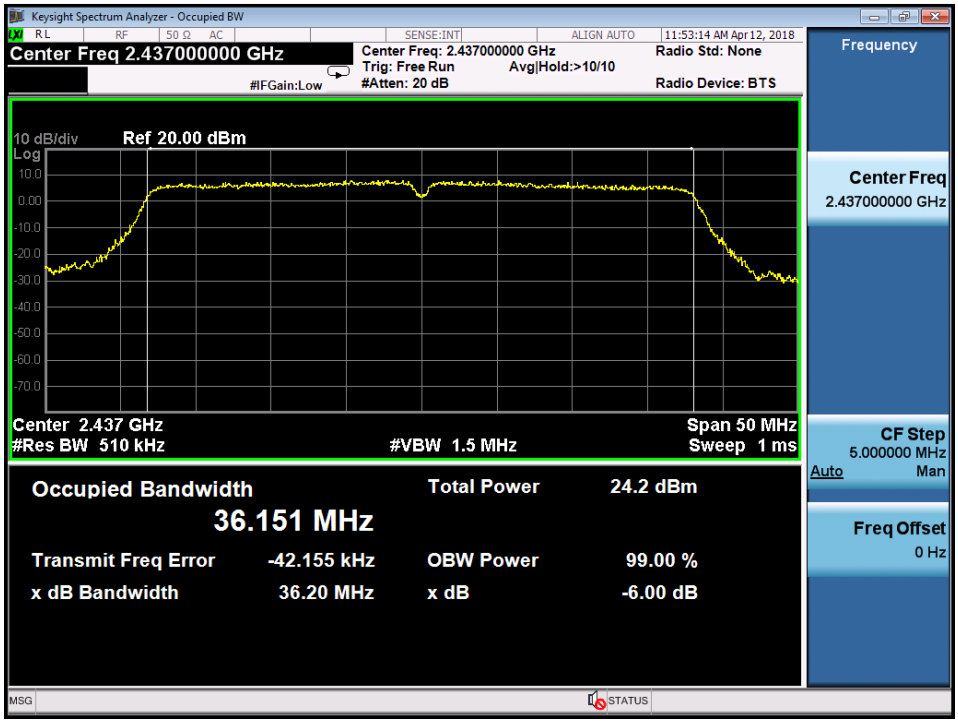


Test Plot of 99% Bandwidth (802.11n HT40)

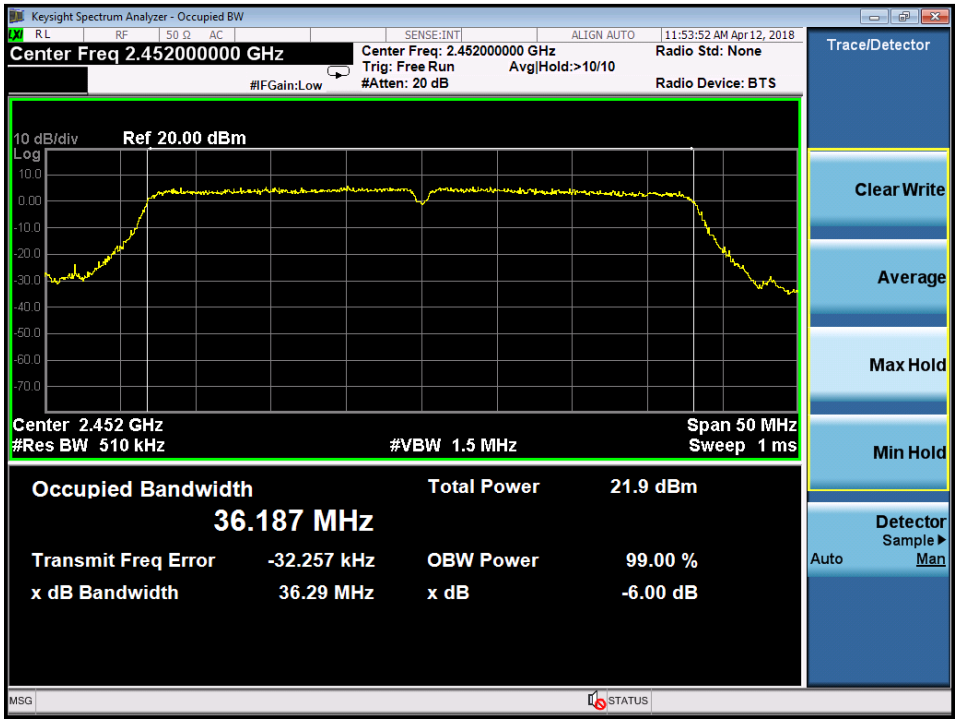
Low Channel



Middle Channel



High Channel



5.1.4 Peak Power Density

RESULT: **Passed**

Test standard	:	FCC Part 15.247(e) , RSS-247 5.2(2)
Basic standard	:	ANSI C63.10:2013, KDB558074 D01v04
Limit	:	FCC Part 15.247(e) , RSS-247 5.2(b)
Kind of test site	:	Shielded room/Conducted room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A

Table 18: Test result of Peak Power Density (802.11b)

Channel	Channel Frequency (MHz)	PPSD ANT1	PPSD ANT2	Limit
		(dBm)	(dBm)	(dBm)
Low Channel	2412	-7.06	-7.07	8
Middle Channel	2437	-6.56	-6.54	8
High Channel	2462	-6.86	-7.26	8

Table 19: Test result of Peak Power Density (802.11g)

Channel	Channel Frequency (MHz)	PPSD ANT1	PPSD ANT2	Limit
		(dBm)	(dBm)	(dBm)
Low Channel	2412	-10.27	-10.53	8
Middle Channel	2437	-8.4	-8.18	8
High Channel	2462	-10.07	-9.59	8

Table 20: Test result of Peak Power Density (802.11n HT20)

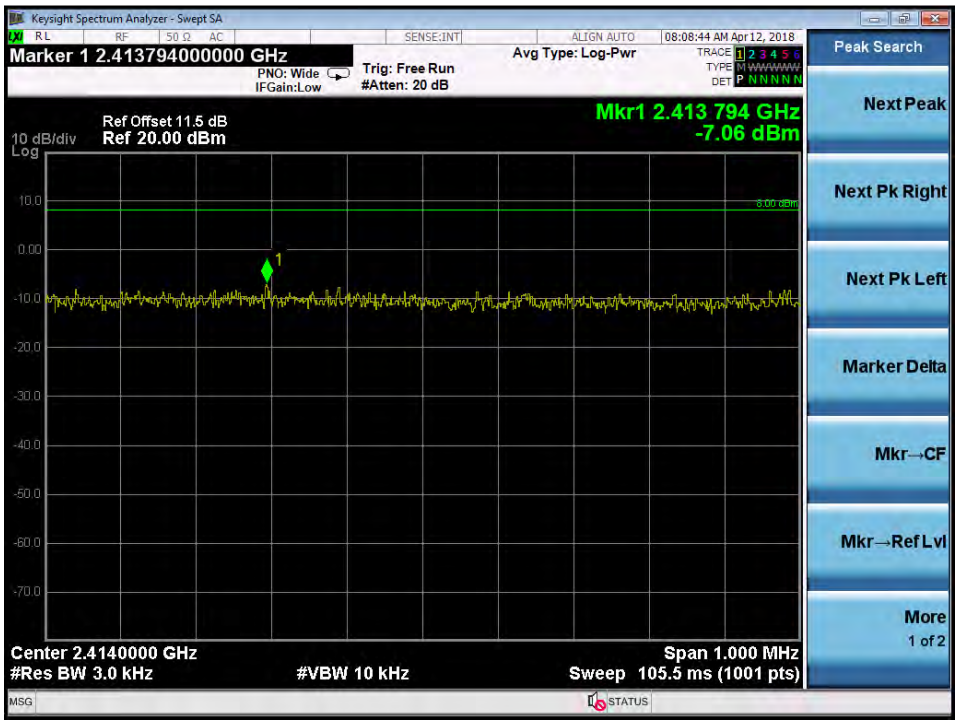
Channel	Channel Frequency (MHz)	PPSD ANT1	PPSD ANT2	PPSD ANT1+ANT2	Limit
		(dBm)	(dBm)	(dBm)	(dBm)
Low Channel	2412	-13.44	-13.27	-10.34	8
Middle Channel	2437	-11.44	-11.83	-8.62	8
High Channel	2462	-14.32	-13.95	-11.12	8

Table 21: Test result of Peak Power Density (802.11n HT40)

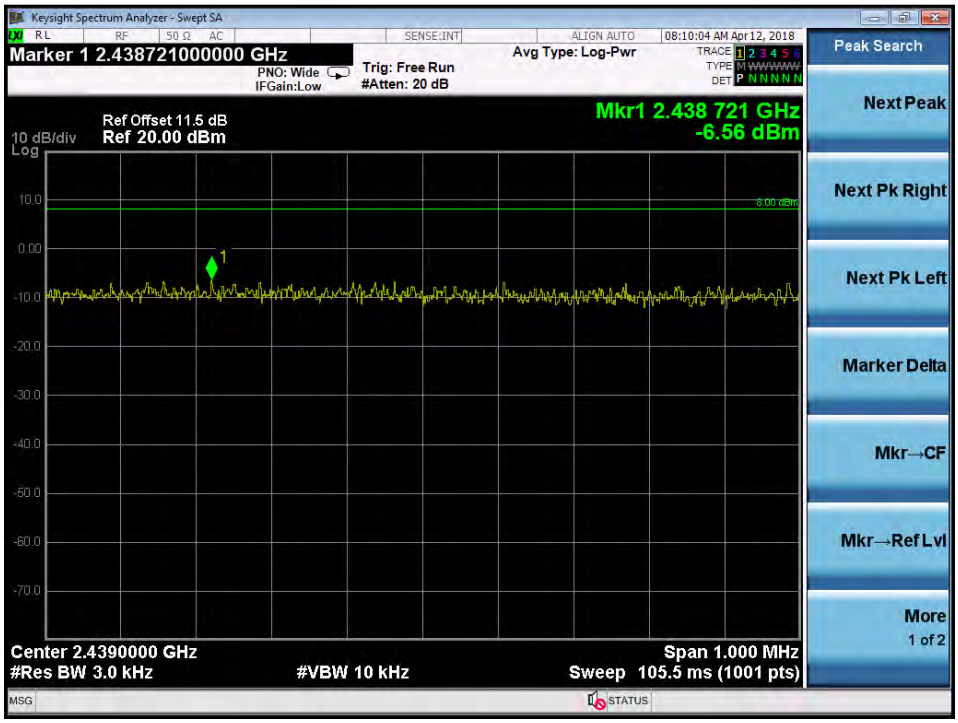
Channel	Channel Frequency (MHz)	PPSD ANT1	PPSD ANT2	PPSD ANT1+ANT2	Limit
		(dBm)	(dBm)	(dBm)	(dBm)
Low Channel	2412	-17.83	-17.71	-14.76	8
Middle Channel	2437	-15.69	-16.27	-12.96	8
High Channel	2462	-18.54	-17.88	-15.19	8

Test Plot of Power Density (802.11b), ANT1

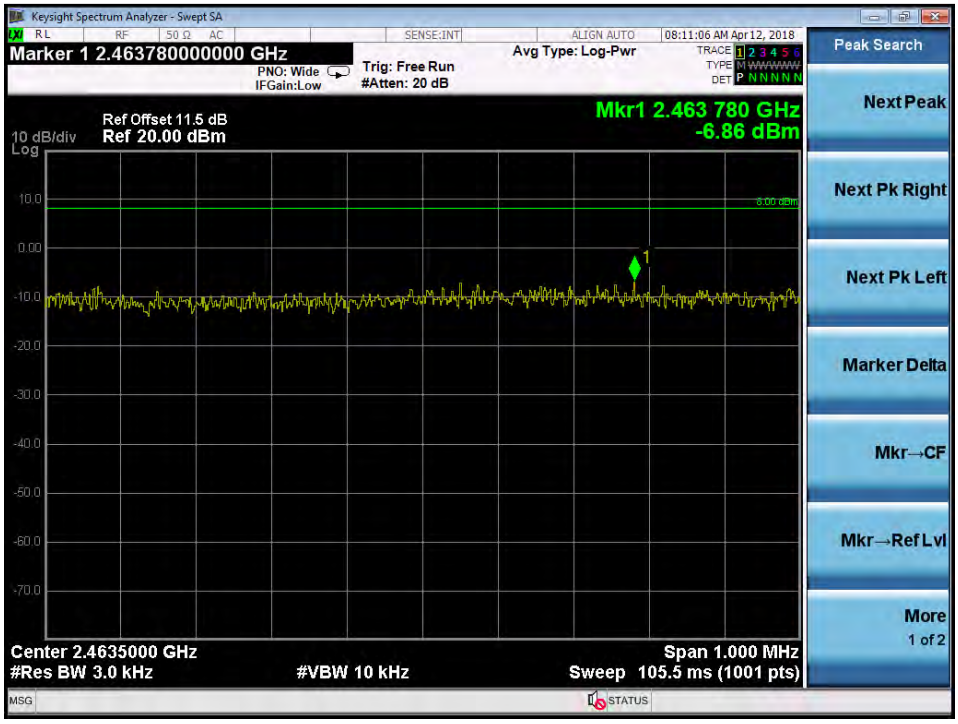
Low Channel



Middle Channel

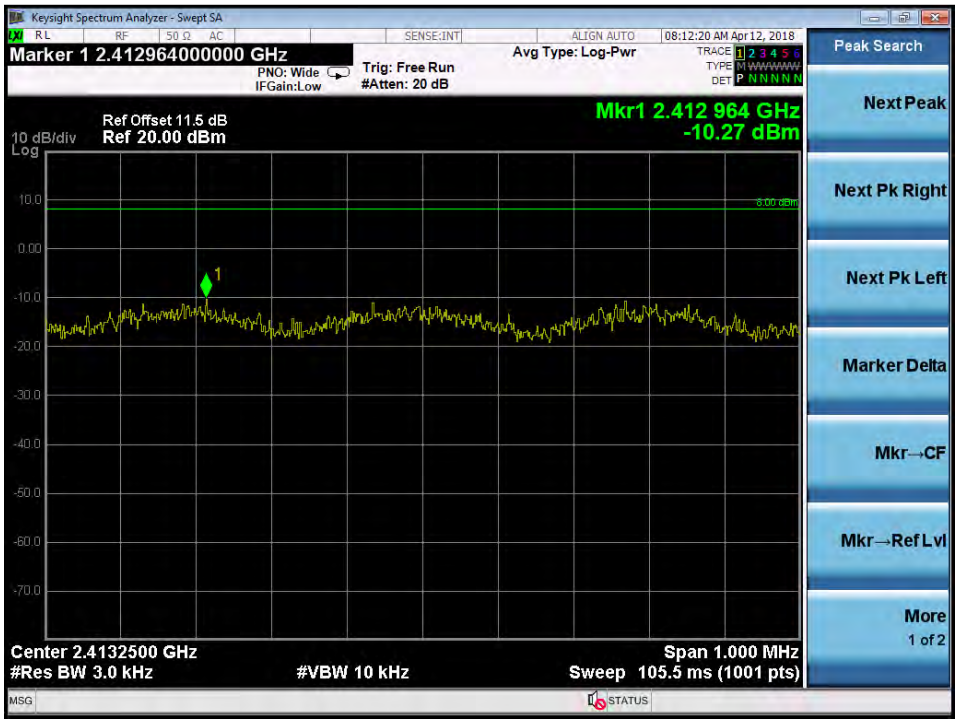


High Channel

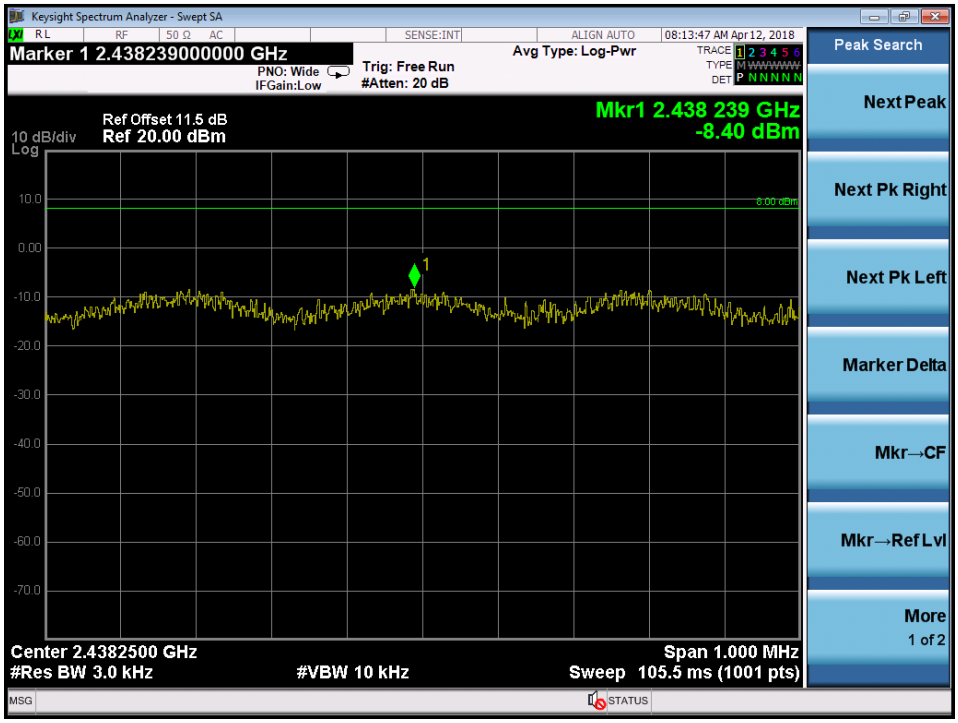


Test Plot of Power Density (802.11g), ANT1

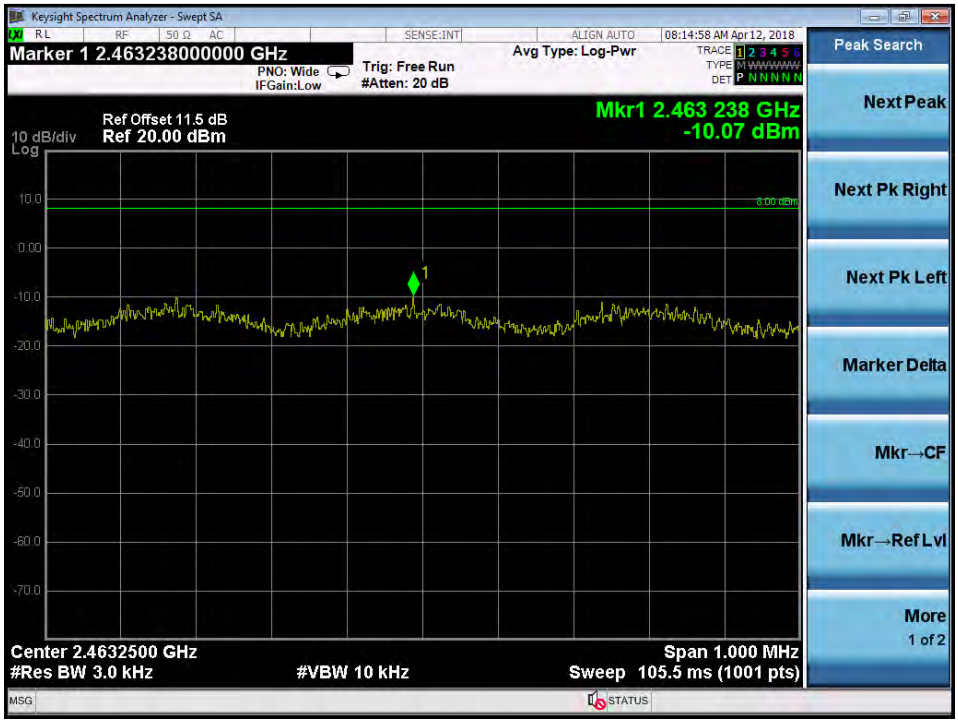
Low Channel



Middle Channel

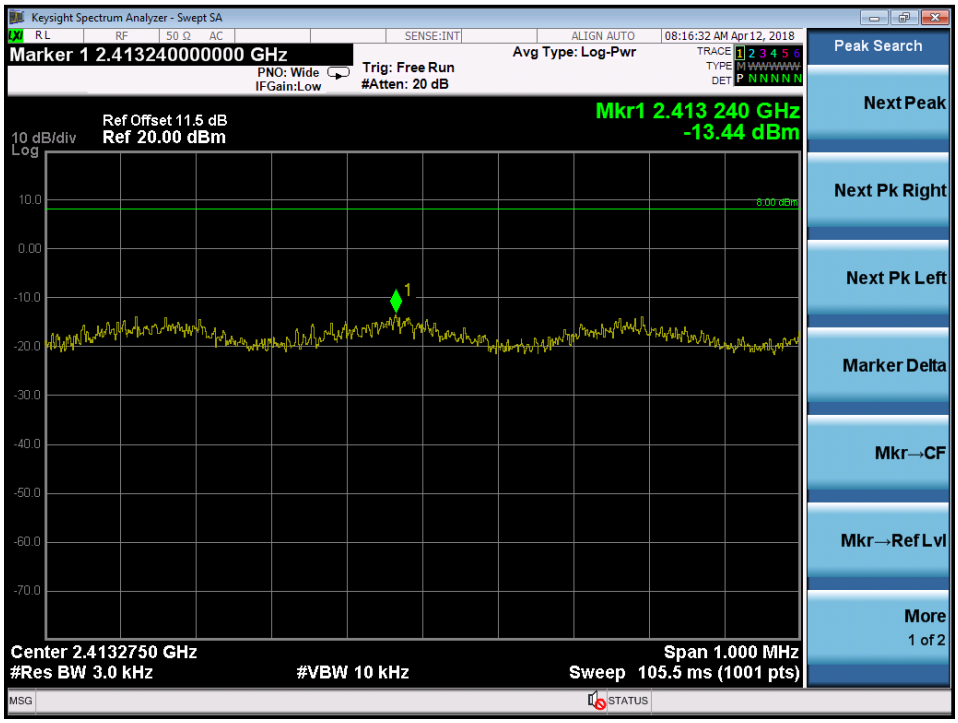


High Channel

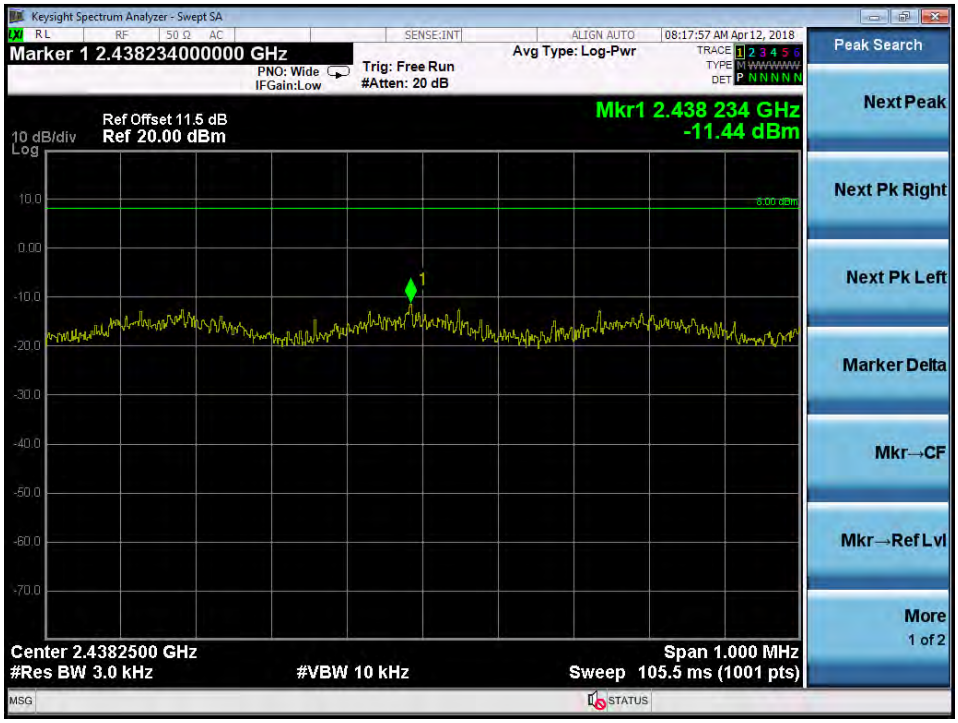


Test Plot of Power Density (802.11n HT20), ANT1

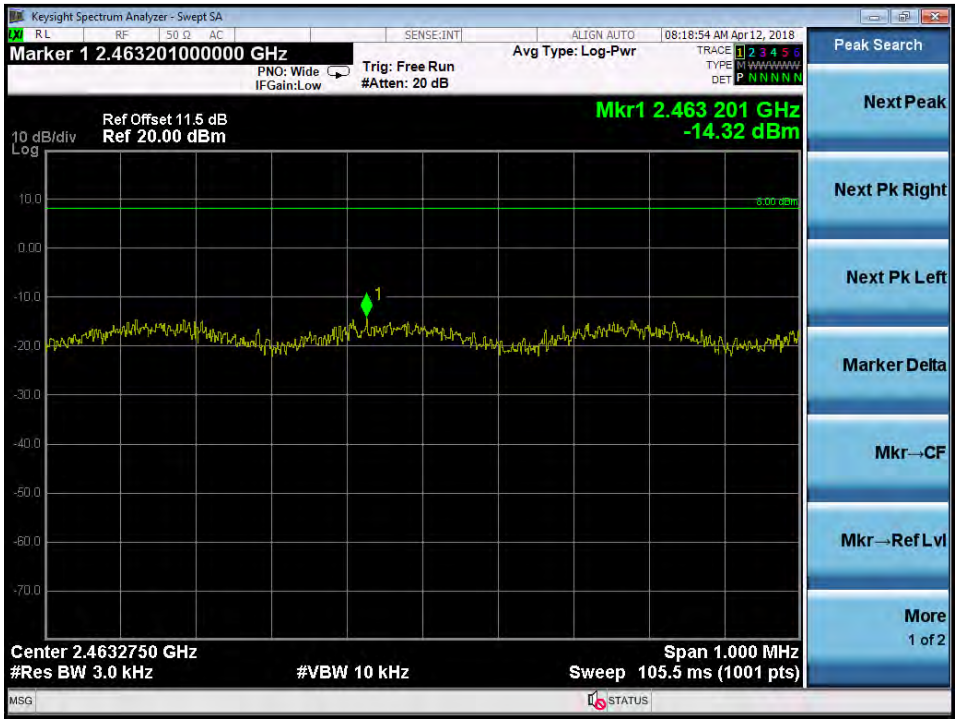
Low Channel



Middle Channel

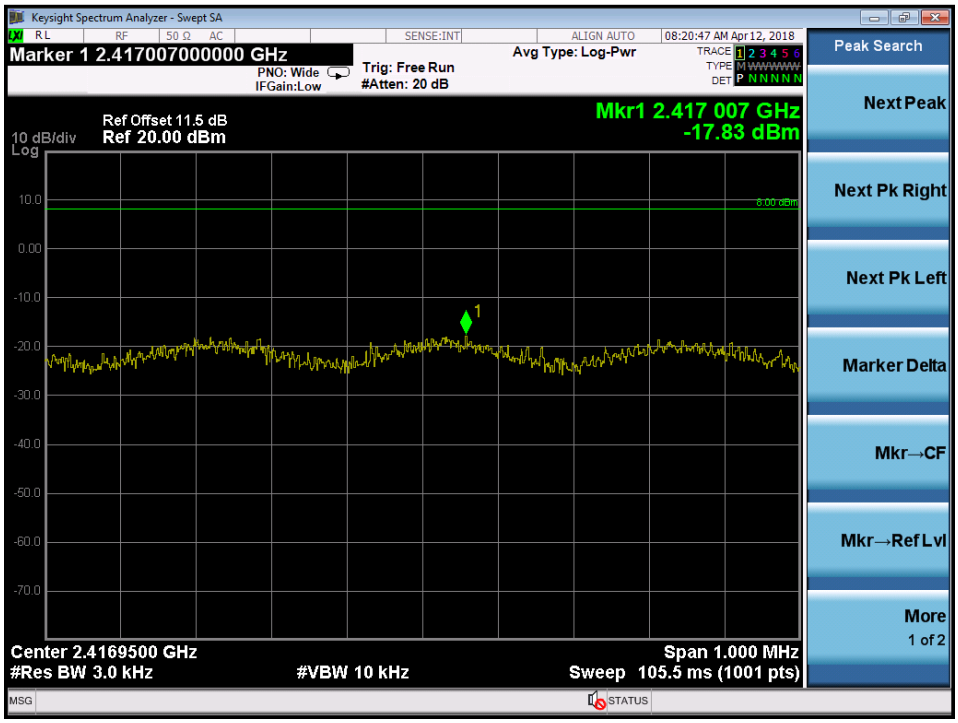


High Channel

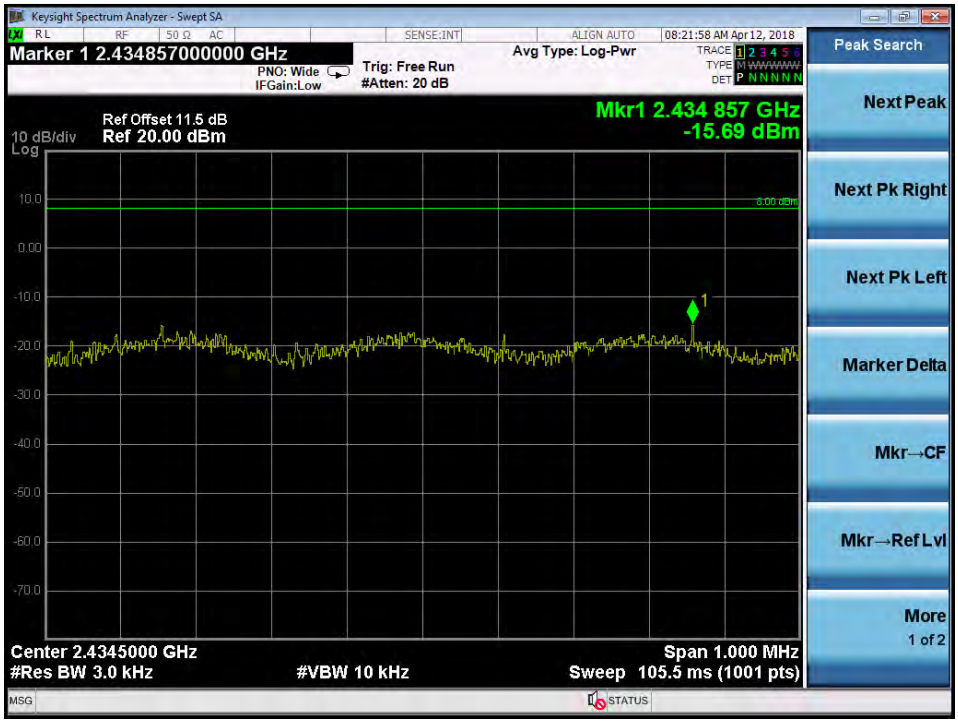


Test Plot of Power Density (802.11n HT40), ANT1

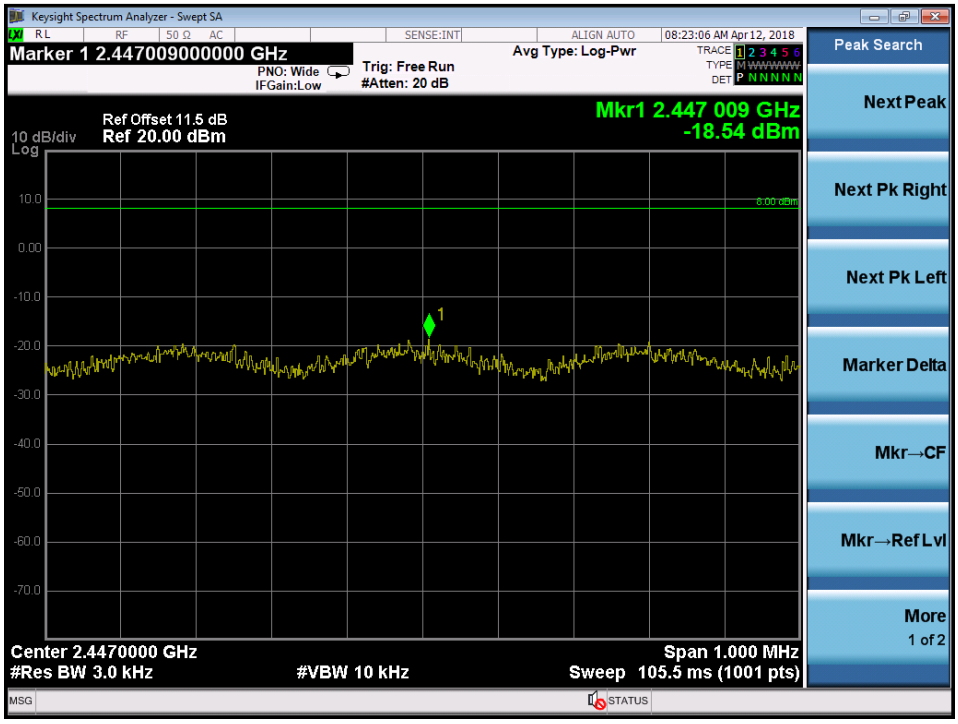
Low Channel



Middle Channel

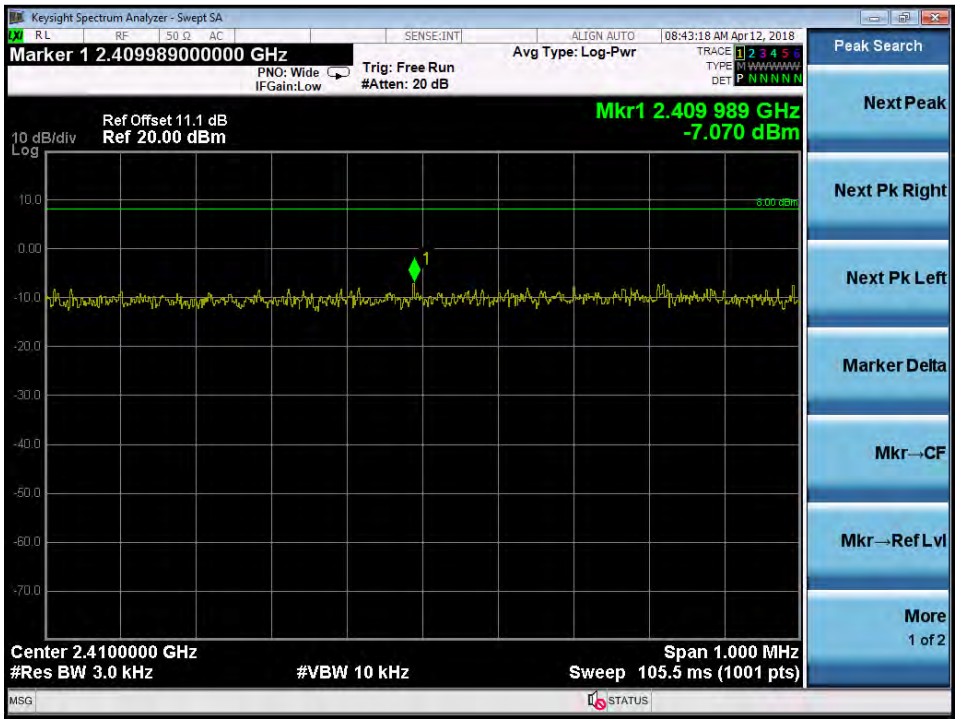


High Channel

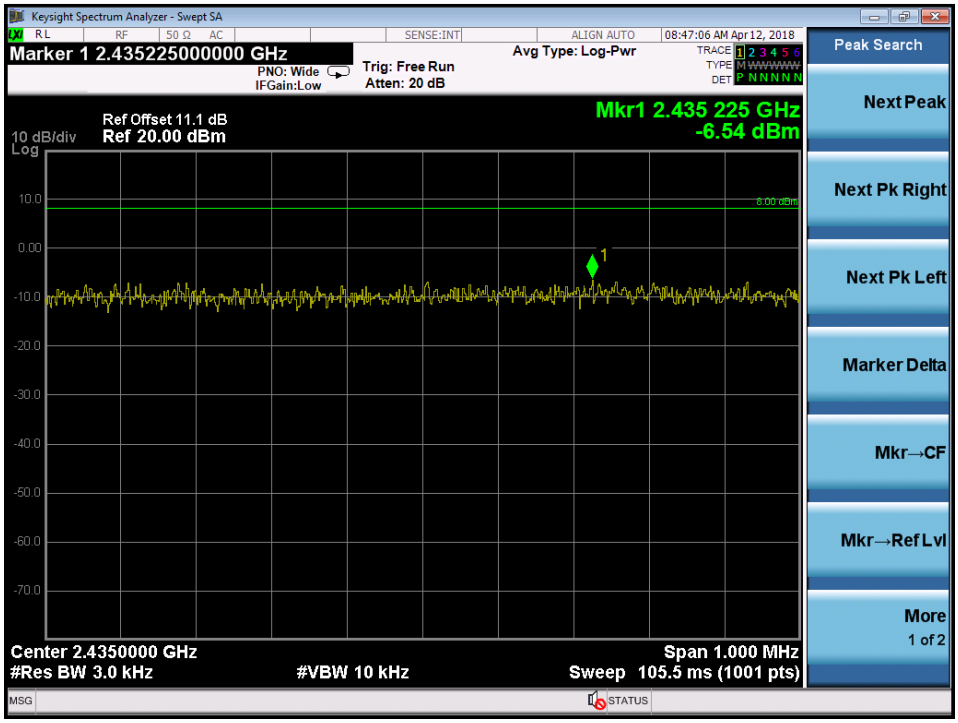


Test Plot of Power Density (802.11b), ANT2

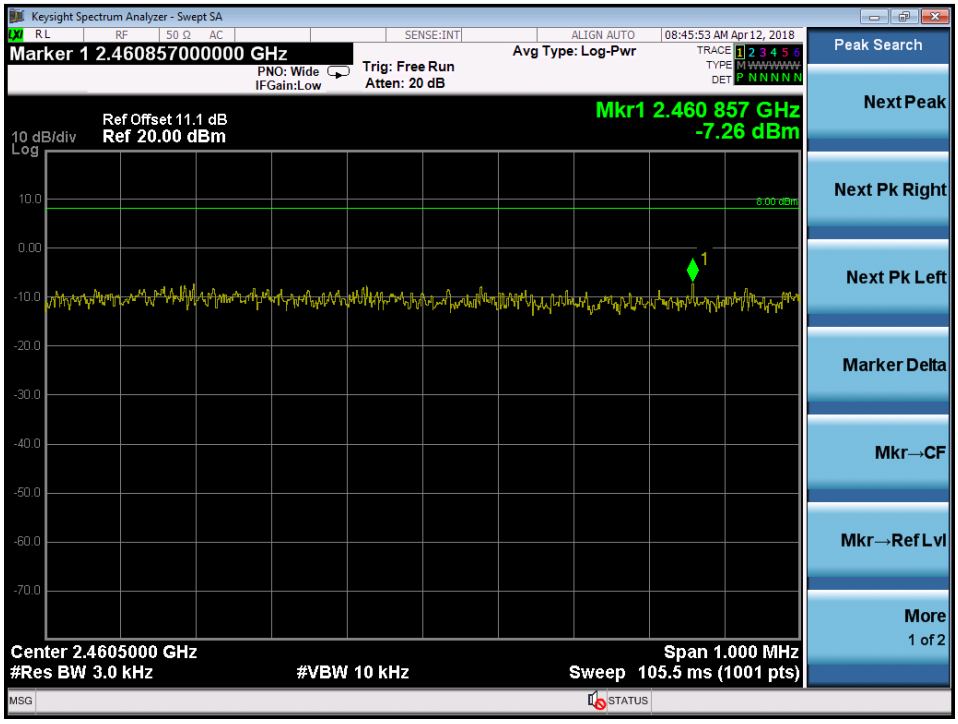
Low Channel



Middle Channel

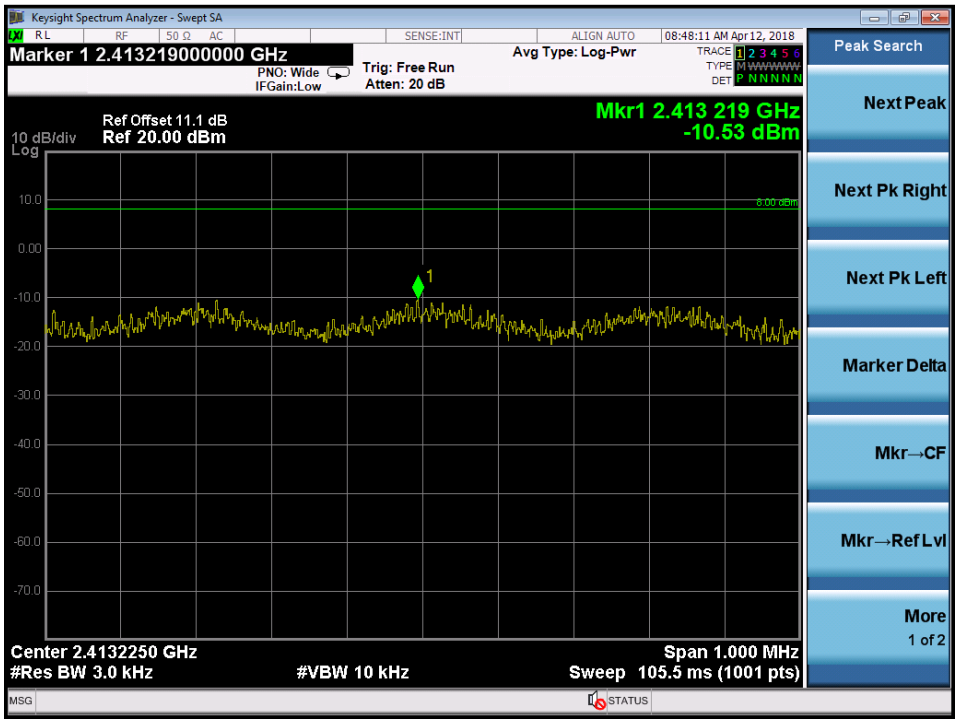


High Channel

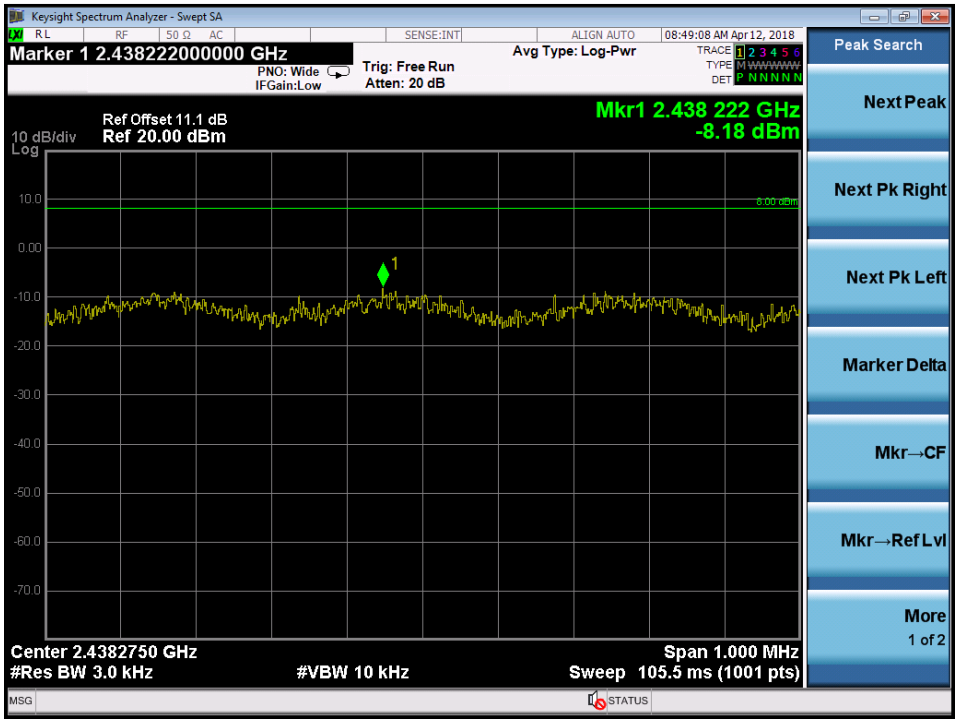


Test Plot of Power Density (802.11g), ANT2

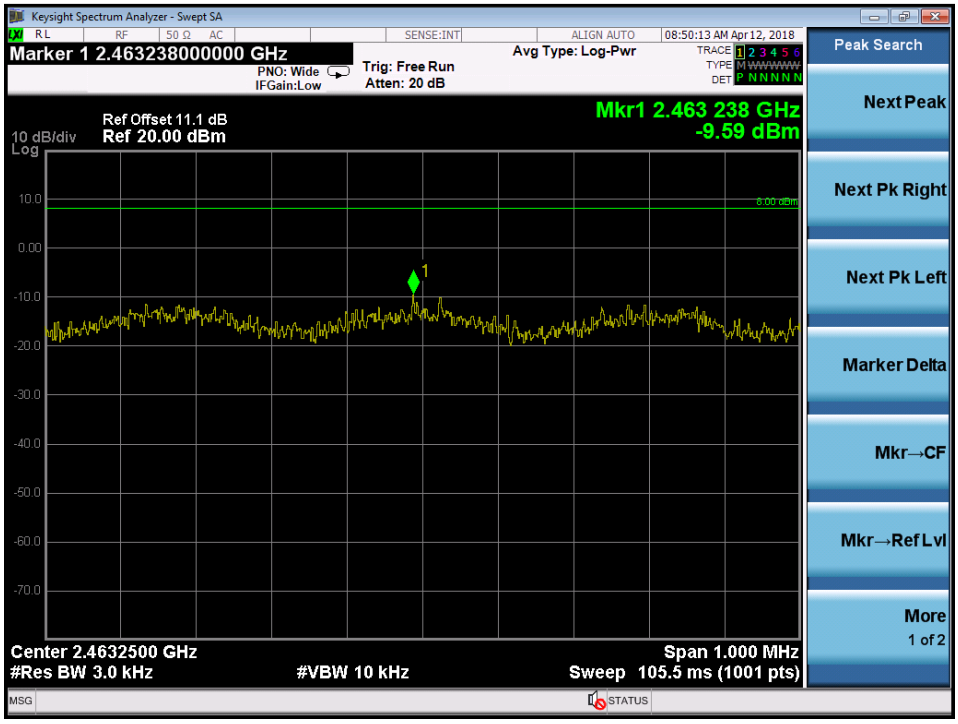
Low Channel



Middle Channel

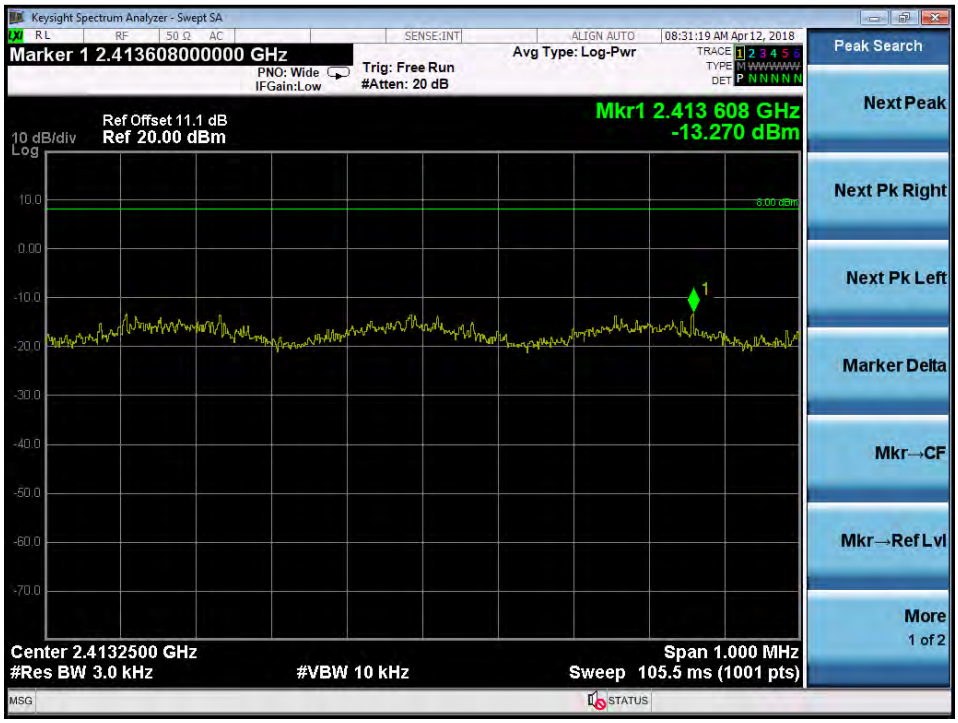


High Channel

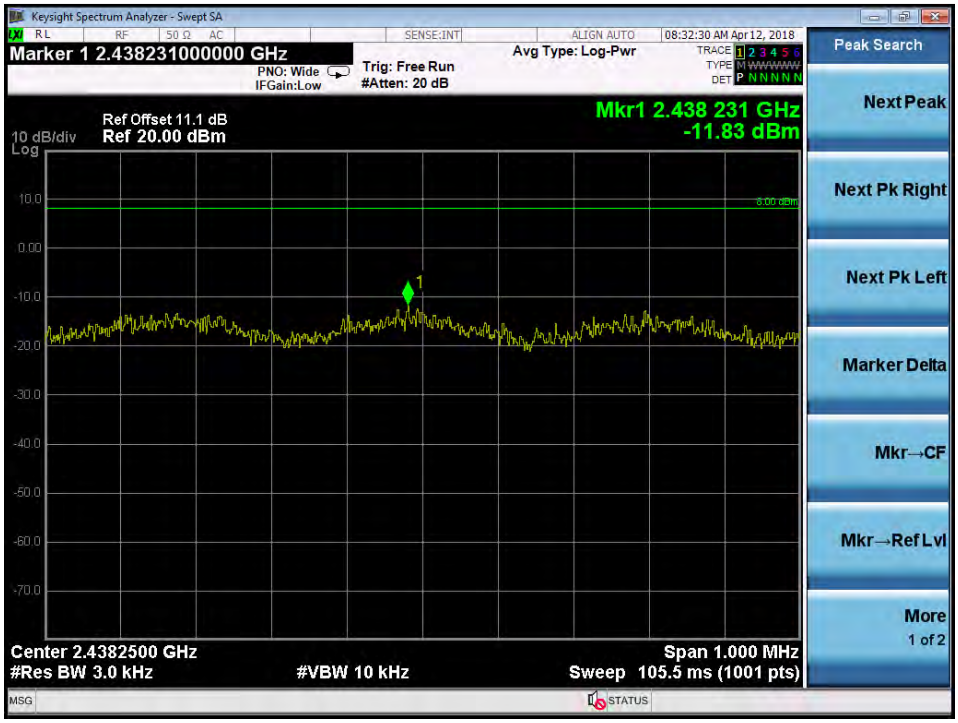


Test Plot of Power Density (802.11n HT20), ANT2

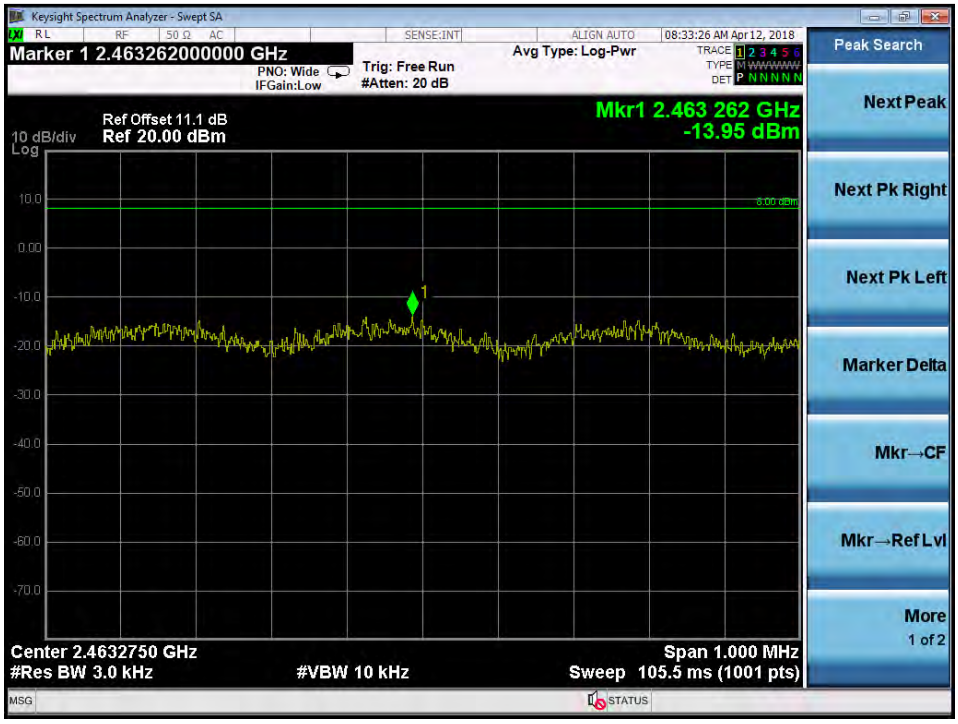
Low Channel



Middle Channel

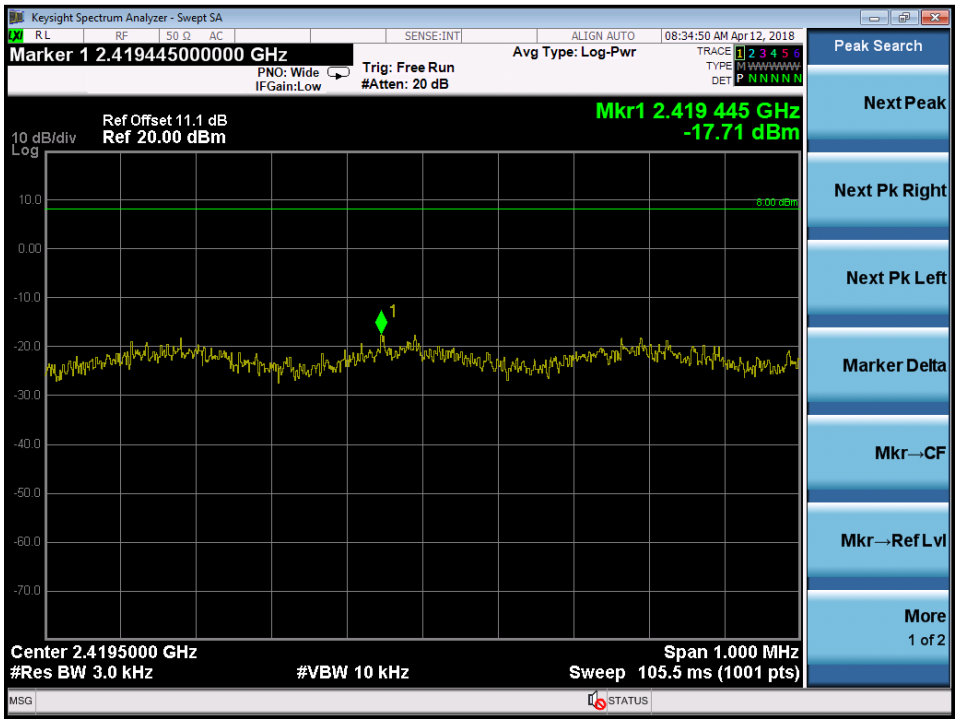


High Channel

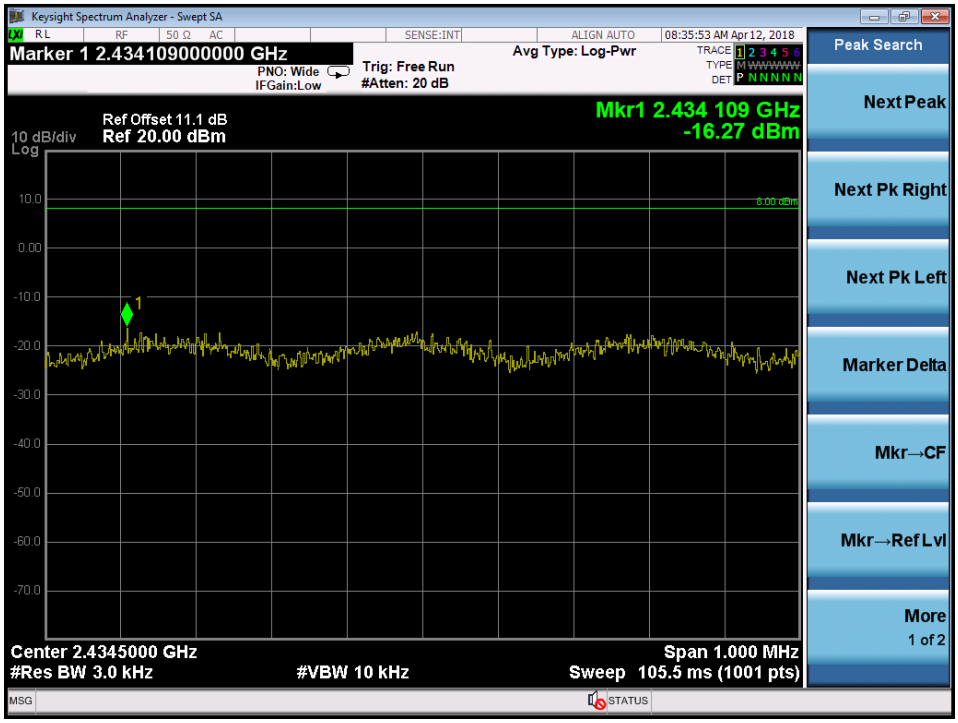


Test Plot of Power Density (802.11n HT40), ANT2

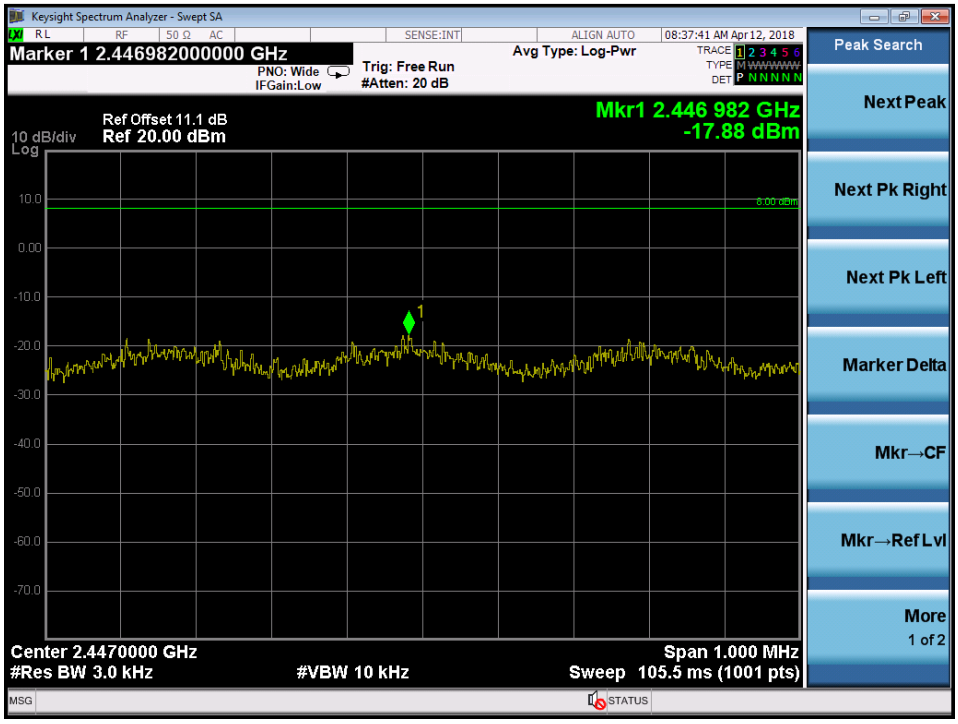
Low Channel



Middle Channel



High Channel



5.1.5 Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth

RESULT: **Passed**

Test standard	:	FCC part 15.247(d), RSS-247 5.5
Basic standard	:	ANSI C63.10:2013, KDB558074
Limit	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power)
Kind of test site	:	Shielded room/Conducted room

Test setup

Test Channel	:	Low/ High for Band Edge, Low/Mid/High for spurious emissions
Operation mode	:	A

All emissions are more than 20dB below fundamental, details refer to following test plot, and compliance is achieved as well.
Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

Test Plot 100kHz Conducted Emissions (802.11b), ANT1

Low Channel

Middle Channel

High Channel

Test Plot 100kHz Conducted Emissions (802.11g), ANT1

Low Channel

Middle Channel

High Channel

Test Plot 100kHz Conducted Emissions (802.11n HT20), ANT1

Low Channel

Middle Channel

High Channel

Test Plot 100kHz Conducted Emissions (802.11n HT40), ANT1

Low Channel

Middle Channel

High Channel

Test Plot 100kHz Conducted Emissions (802.11b), ANT2

Low Channel

Middle Channel

High Channel

Test Plot 100kHz Conducted Emissions (802.11g), ANT2

Low Channel

Middle Channel

High Channel

Test Plot 100kHz Conducted Emissions (802.11n HT20), ANT2

Low Channel

Middle Channel

High Channel

Test Plot 100kHz Conducted Emissions (802.11n HT40), ANT2

Low Channel

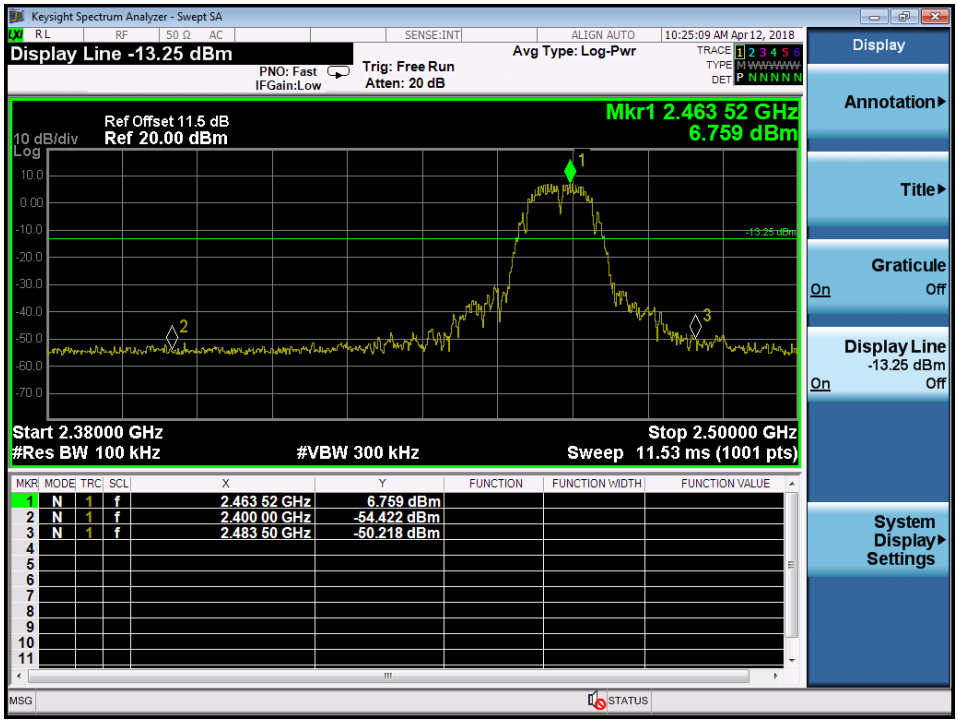
Middle Channel

High Channel

Test Plot 100kHz RBW of Band Edge (802.11b), ANT1

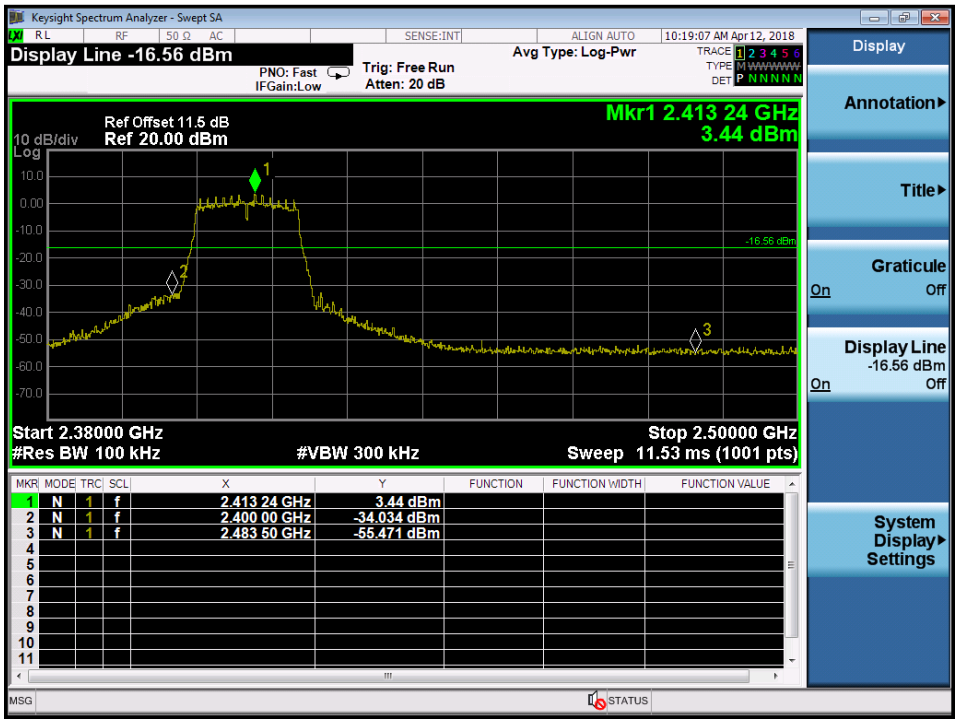
Low Channel

High Channel



Test Plot 100kHz RBW of Band Edge (802.11g), ANT1

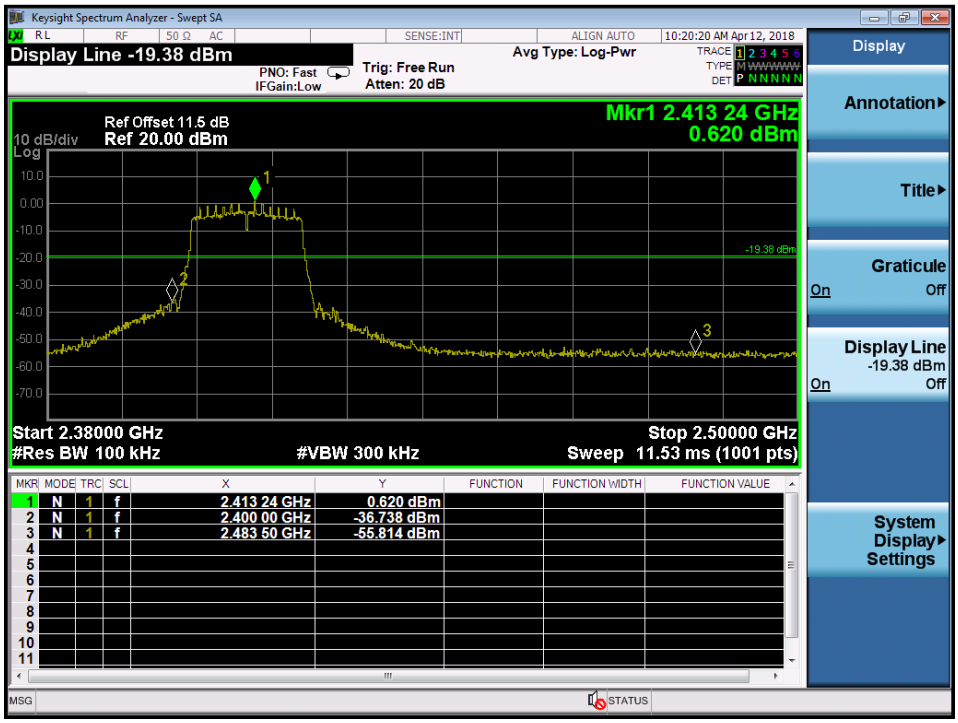
Low Channel



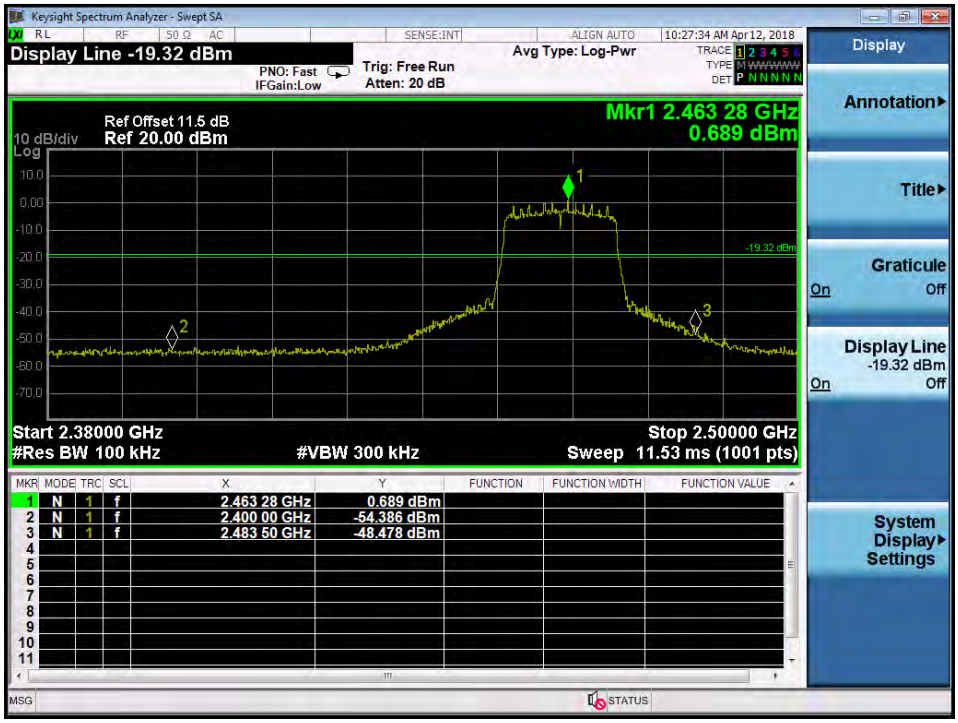
High Channel

Test Plot 100kHz RBW of Band Edge (802.11n HT20), ANT1

Low Channel



High Channel



Test Plot 100kHz RBW of Band Edge (802.11n HT40), ANT1

Low Channel

High Channel

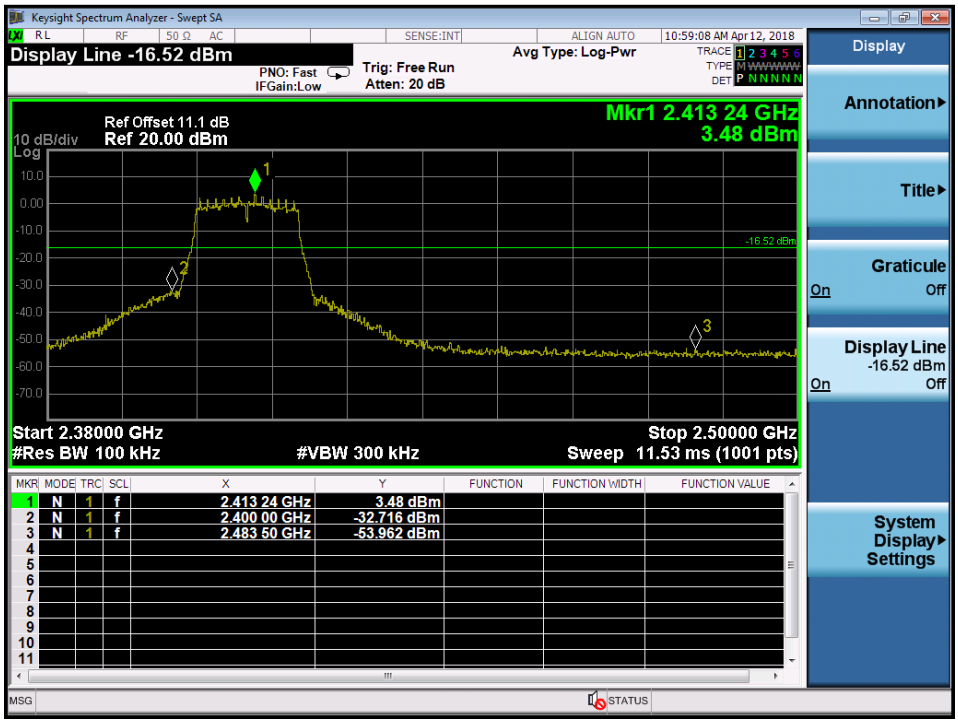
Test Plot 100kHz RBW of Band Edge (802.11b), ANT2

Low Channel

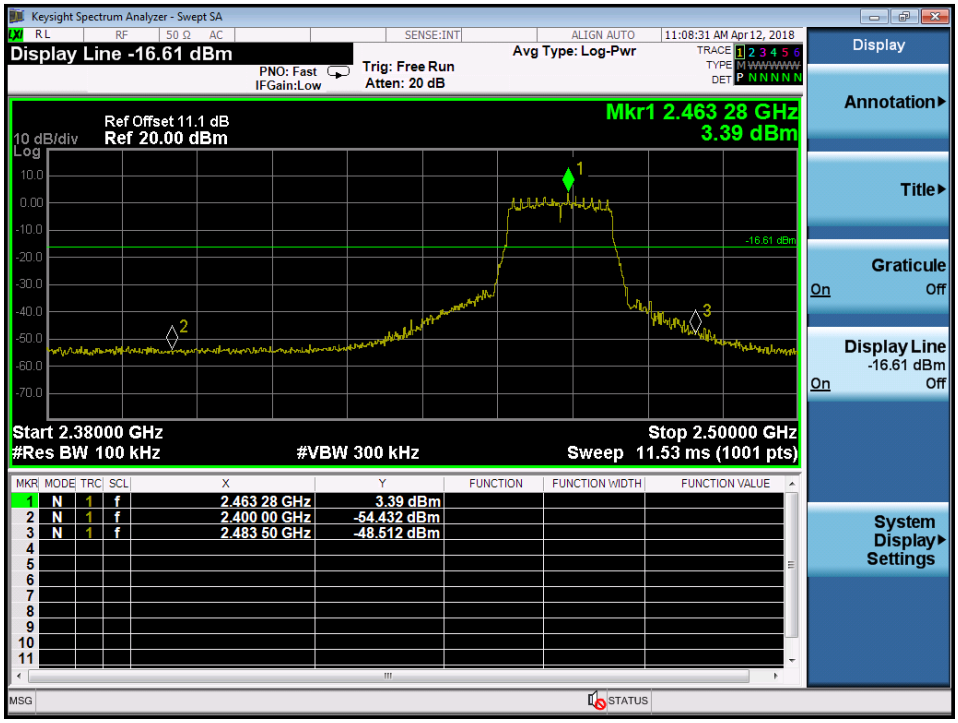
High Channel

Test Plot 100kHz RBW of Band Edge (802.11g), ANT2

Low Channel

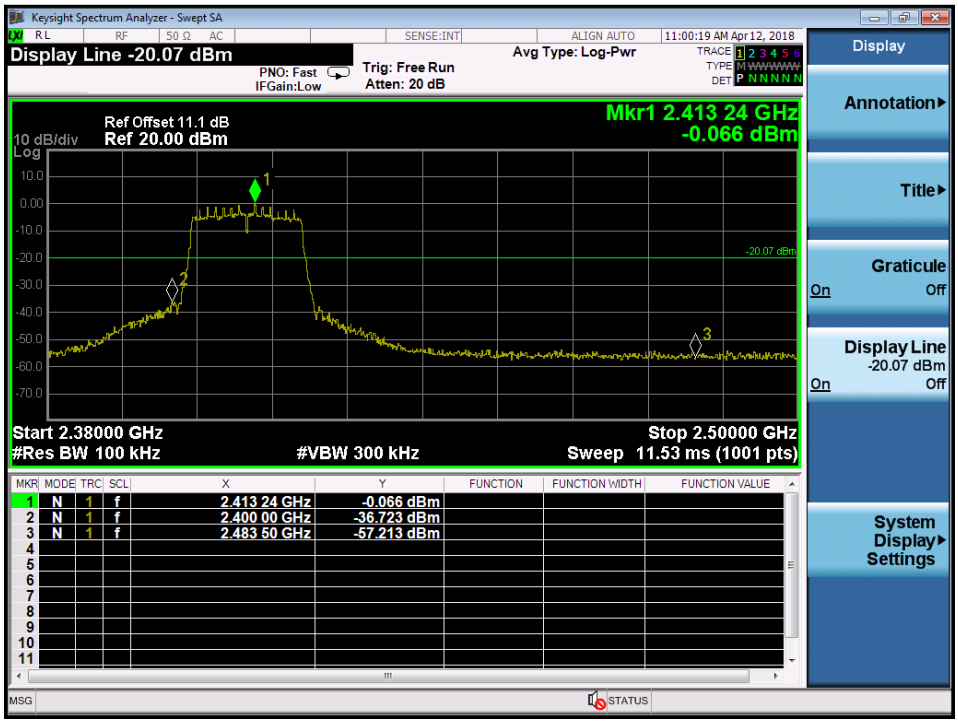


High Channel

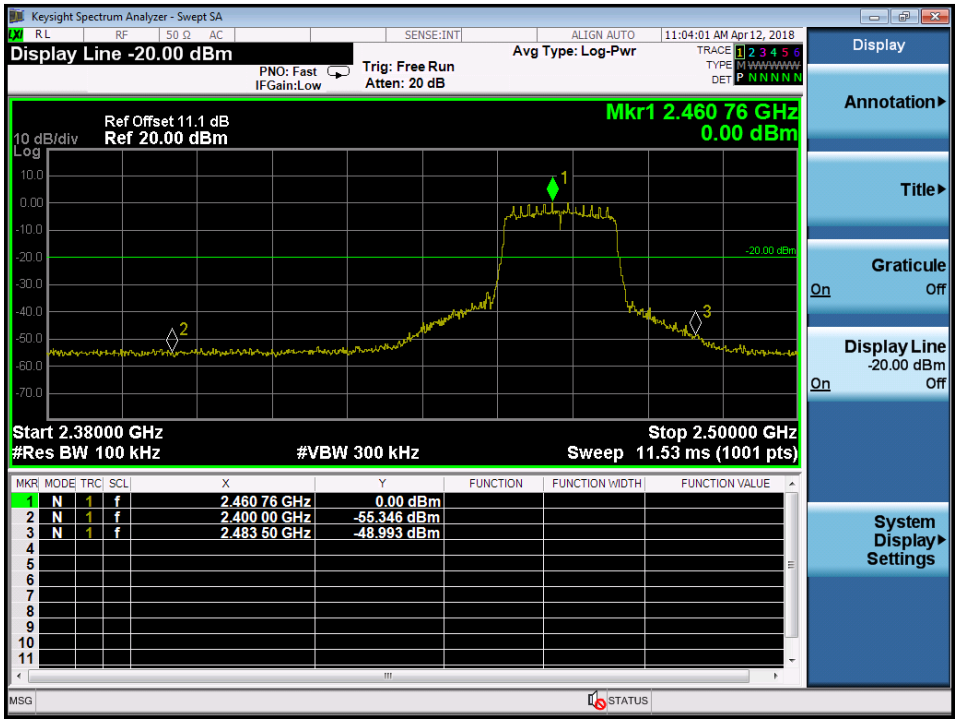


Test Plot 100kHz RBW of Band Edge (802.11n HT20), ANT2

Low Channel



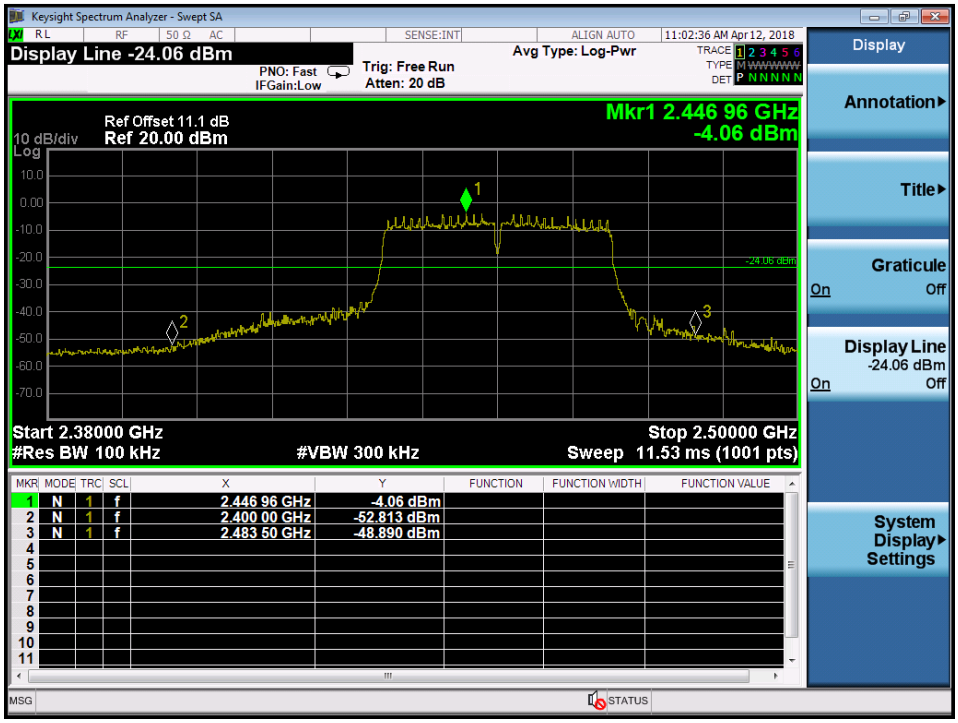
High Channel



Test Plot 100kHz RBW of Band Edge (802.11n HT40), ANT2

Low Channel

High Channel



5.1.6 Spurious Emission

RESULT: **Passed**

Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-247 5.5 and RSS-Gen 8.9
Basic standard	:	ANSI C63.10:2013
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-Gen i4, 8.9 (Table 6), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-Gen i4, 8.9 (Table 4 and 5). Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a) and FCC 15.249(a), RSS-Gen i4, 8.9 (Table 4 and 5) and RSS-210 A2.9(a).
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, B

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic.

For details refer to Appendix D.

The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The X Axis orientation is the worst-case and recorded in this test report. Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

5.2 Mains Emissions

5.2.1 Mains Conducted Emissions

RESULT: **Passed**

Test standard	:	FCC Part 15.207 FCC Part 15.107 RSS-Gen 8.8
Limits	:	Mains Conducted emissions as defined in above standards
Kind of test site	:	Shielded Room

Test setup

Test Channel	:	Middle
Operation mode	:	A

Remark: For details refer to Appendix D.

6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT: **Passed**

Test standard : FCC KDB Publication 447498 D01 v06
RSS-102 Issue 5

Separation distance is more than 20 cm, thus mobile device exposure limits can be applied

Maximum Exposure:

Power to Antenna (mW)	50.11 mW
Power to Antenna (dBm)	17.0 dBm
Antenna Gain	2.76 dBi
Power+Ant Gain	94.6 mW
Distance	20 cm
S=	0.019 mW/cm^2

Limit FCC:

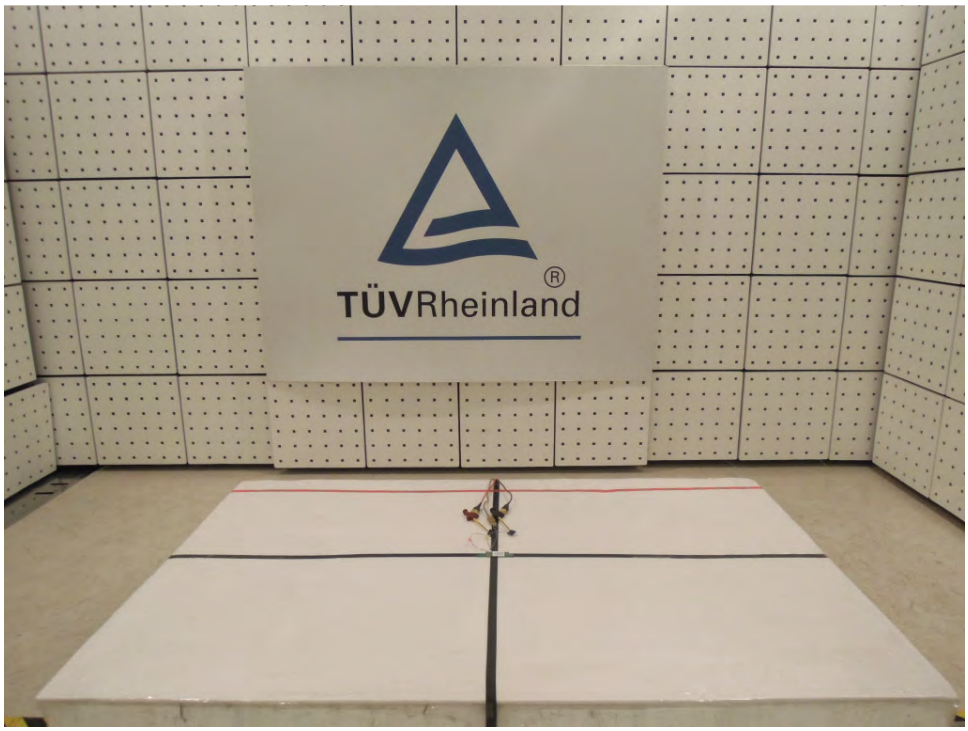
0.3-1.34 MHz	(100) mW/cm^2
1.34-30 MHz	(180/f2) mW/cm^2
30-300 MHz	0.2 mW/cm^2
300-1500 MHz	f/1500 mW/cm^2
1500-100,000 MHz	**1.0 mW/cm^2**

Limit Canada: 0.543 mW/cm^2

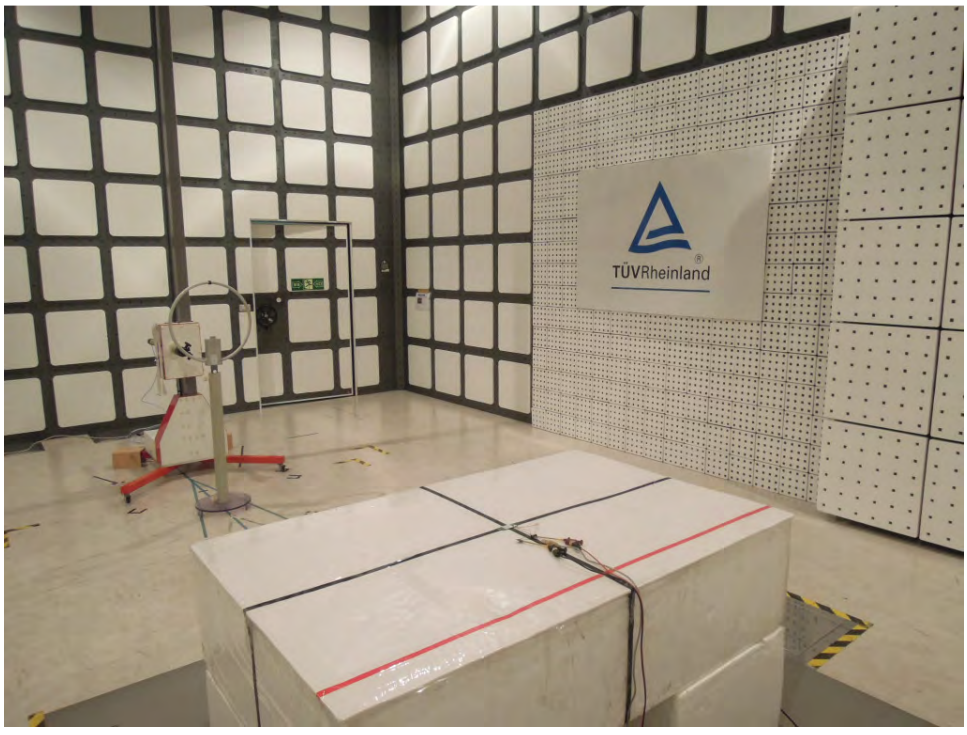
---End---

Photographs of the Test Set-Up

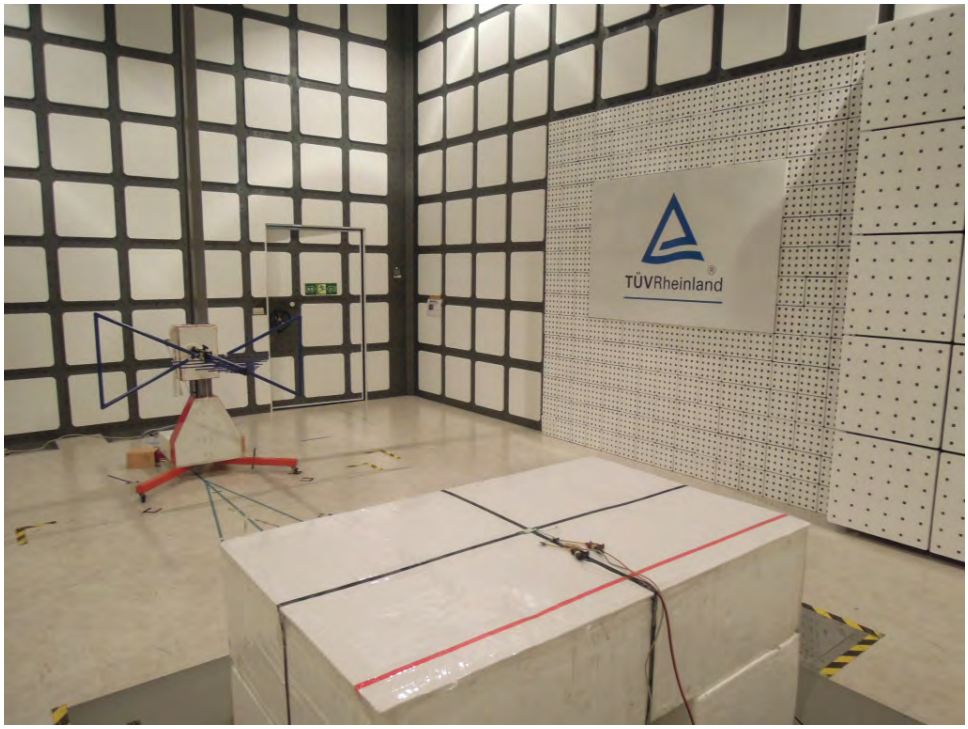
Photograph 1: Set-up for Spurious Emissions (Front View)



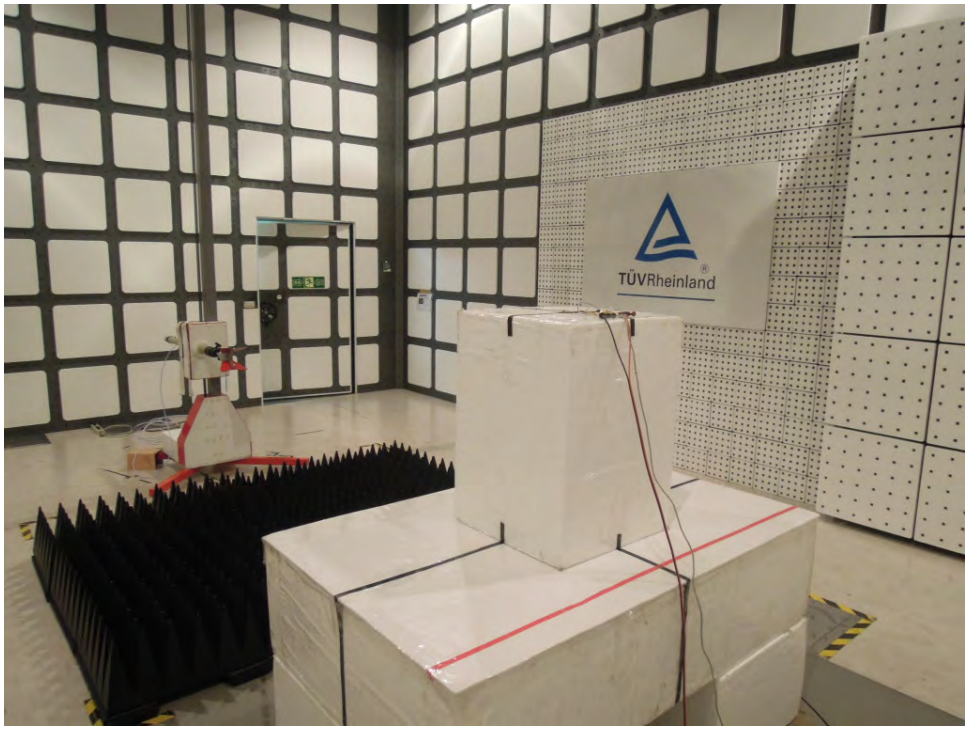
Photograph 2: Set-up for Spurious Emissions (Back View 1)



Photograph 3: Set-up for Spurious Emissions (Back View 2)

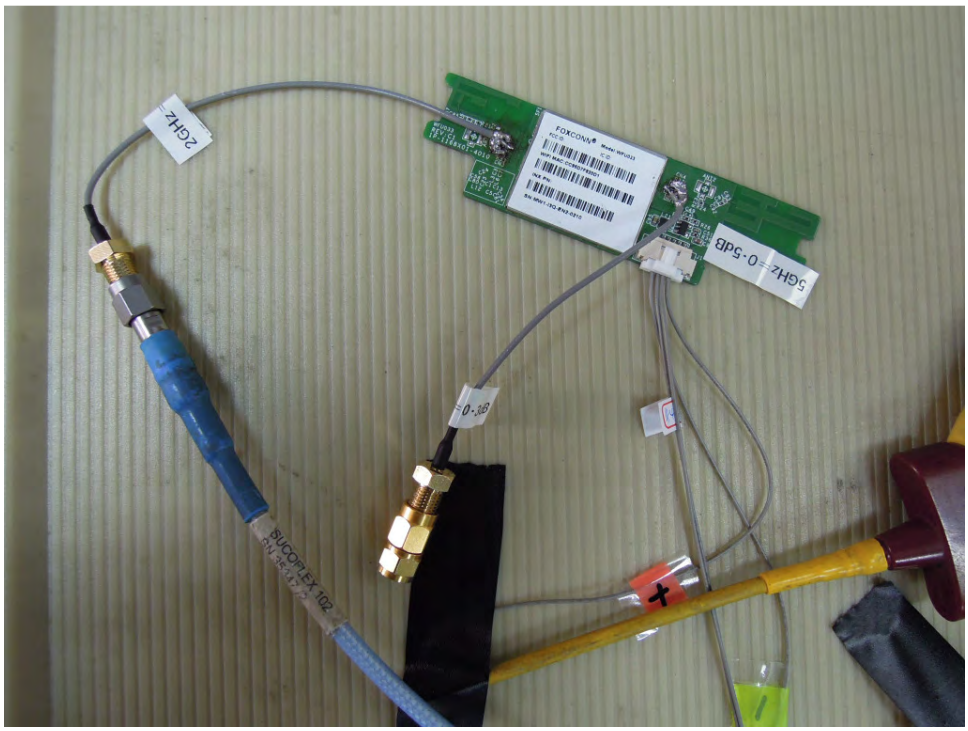


Photograph 4: Set-up for Spurious Emissions (Back View 3)



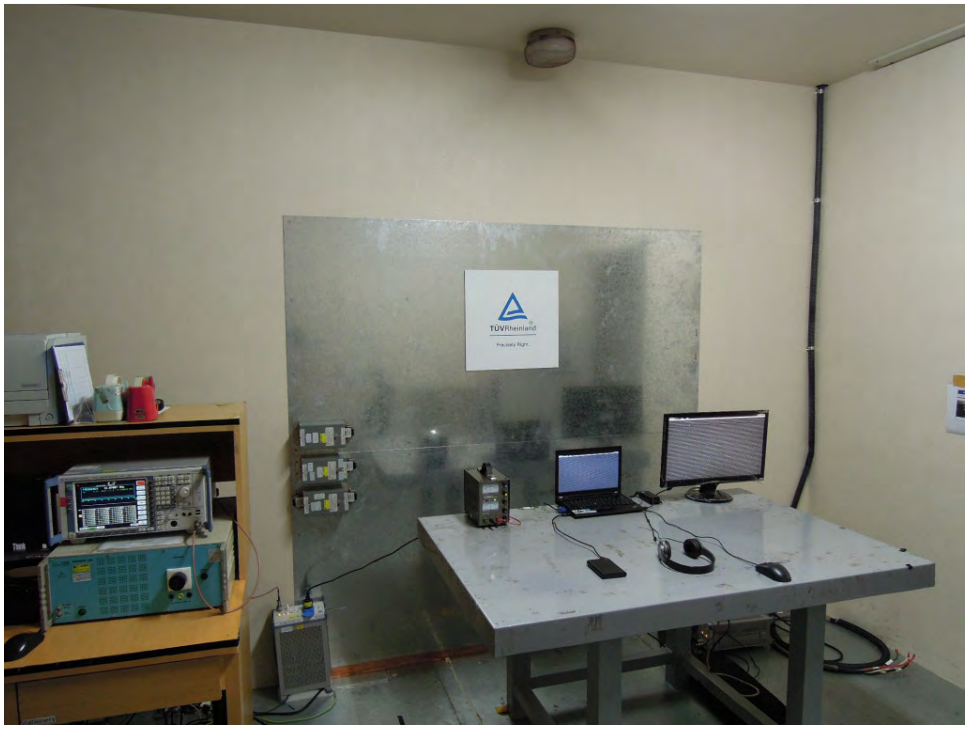
Photograph 5: Set-up for Conducted testing

Photograph 6: Set-up for Conducted testing



Photograph 7: Set-up for Mains Conducted testing (Back View)

Photograph 8: Set-up for Mains Conducted testing (Front View)



7. List of Tables

8. List of Photographs