

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT ~ ~

	0F
Applicant:	Advantech Co., Ltd No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 11491,
	Taiwan, R.O.C.
Product Name:	Motherboard
Brand Name:	Advantech
Model No.:	RSB-4760
Model Difference:	N/A
FCC ID:	M82-RSB-4760
Report Number:	E2/2017/90148
FCC Rule Part:	§15.247, Cat: DTS
Issue Date:	Oct. 20, 2017
Date of Test:	Sep. 29, 2017~ Oct. 12, 2017
Date of EUT Received:	Sep. 29, 2017
We hereby certify that:	

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Prepared By:

Stefanie Yu / Clerk

Approved By:

Jim Chang / Asst. Manager





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Revision History

Report Number	Revision	Description	Issue Date				
E2/2017/90148	Rev.00	Initial creation of document	Oct. 20, 2017				

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GENERAL INFORMATION 1

1.1 Product description

General:

Product Name:	Motherboard		
Brand Name:	Advantech		
Model No.:	RSB-4760		
Model Difference:	N/A		
Product SW version:	N/A		
Radio HW version:	N/A		
	12VDC from Adapter		
Power Supply:	Adapter:	Model No.: FSP036-RBBN2, Supplier: FSP GROUP INC.	

WLAN 2.4GHz:

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (dBm)	Modulation Technology		
b			19.03	DSSS,		
g	2412-2462	13	23.11	OFDM		
n_HT20			22.75	OFDM		
Modulati	on type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM			
Transition Rate: 802.11			: 1/2/5.5/11 Mbps : 6/9/12/18/24/36/48/54 Mbps _20MHz: 6.5 – 72.2Mbps			

Antenna Type	Supplier	Antenna Part No.	Freq.	Peak Antenna Gain (dBi)	Worst Antenna Gain
Dipole type	INVAX	1750008671-01	2.4GHz	2.89	
External	INVAX	1750007622-01	2.4GHz	3.50	V
Antenna	INVAX	1750008717-01	2.4GHz	2.89	
Antenna	Walsin	1750008772-01	2.4GHz	2.93	
		on the above 4 antennas, the 175 eted set of measurement was don		•	

test report.

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

FCC KDB 662911 D01 Multiple Transmitter Output

ANSI C63.10:2013

Note:

All test items have been performed and record as per the above standards. 1.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory

No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333

(TAF code 0513)

FCC Registration Number and Designation numer are: 735305 / TW0002

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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SYSTEM TEST CONFIGURATION 2

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

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

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. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. 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 transmitter (EUT) was rotated through three orthogonal axes and 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.

2.4 Measurement Results Explanation Example

For all conducted test items:

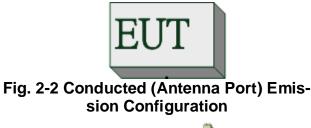
The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level. Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

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2.5 Configuration of Tested System Fig. 2-1 Radiated Emission Configuration



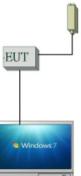


Fig. 2-3 Conducted (AC powerline) **Emission Configuration**

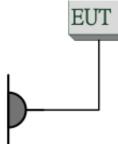


Table 2-1 Equipment Used in Tested System

ltem	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L430	R9-WR6X4	Shielded	Unshielded

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3 SUMMARY OF TEST RESULTS

FCC Rules / IC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	6dB & 99% Emission Bandwidth	Compliant
§15.247(d)	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

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DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2462MHz Band

11 channels are provided for 802.11b, 802.11g and 802.11n HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

4.2 The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- 2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
- 3. Investigation has been done on all the possible configurations for searching the worst case. Pre-scanned was done on the four antenna ports and main antenna port results higher emission at 2.4GHz. Therefore the completed set of measurement was done on main antenna port.
- 4. Pre-scanned 1750008671-01.1750007622-01. was done on external antenna: 1750008717-01 and antenna 1750008772-01, and antenna 1750007622-01 results higher emission at 2.4GHz. Therefore, the completed set of measurement was done on antenna: 1750007622-01 to be presented on this test report.

		•				
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT	
	RADIATED EMISSION TEST (BELOW 1 GHz)					
802.11g	1 to 11	1,6,11	OFDM	6	Main	
	RADIA	ATED EMISS	ION TEST (ABO)	VE 1 GHz)		
802.11b	1 to 11	1, 6, 11	DSSS	1	Main	
802.11g	1 to 11	1, 6, 11	OFDM	6	Main	
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0	Main	
Note:						
The field strength of radiation emission was measured as EUT stand-up position (H mode) and						

RADIATED EMISSION TEST:

lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case E2 position was reported.

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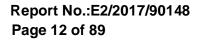
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ANTENNA PORT CONDUCTED MEASUREMENT:

	CONDUCTED TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT	
802.11b	1 to 11	1, 6, 11	DSSS	1	Main	
802.11g	1 to 11	1, 6, 11	OFDM	6	Main	
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0	Main	

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MEASUREMENT UNCERTAINTY 5

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
6dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

	9kHz-30MHz: +/-2.87dB
	30MHz - 180MHz: +/- 3.37dB
Measurement uncertainty	180MHz -417MHz: +/- 3.19dB
(Polarization : Vertical)	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

	9kHz-30MHz: +/-2.87dB
	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB
(Polarization : Horizontal)	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

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

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CONDUCTED EMISSION TEST 6

6.1 Standard Applicable

Frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range		nits (uV)
MHz	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.

6.2 Measurement Equipment Used

Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
EMI Test Receiver	R&S	ESCI 7	100950	12/12/2016	12/11/2017					
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	08/30/2017	08/29/2018					
LISN	Schwarzbeck	NSLK 8127	8127-648	06/18/2017	06/17/2018					
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.					

6.3 EUT Setup

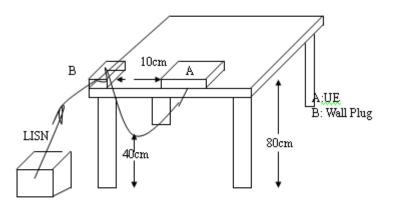
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP (Block Diagram of Configuration)



6.5 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 phases of power being supplied by given UE are completed

6.6 Measurement Result

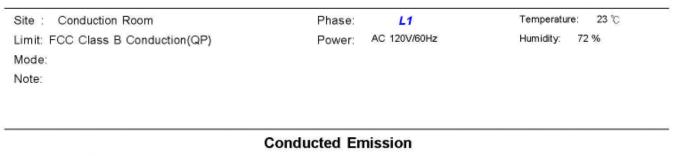
Note: Refer to next page for measurement data and plots. Note2: The * reveals the worst-case results that closet to the limit

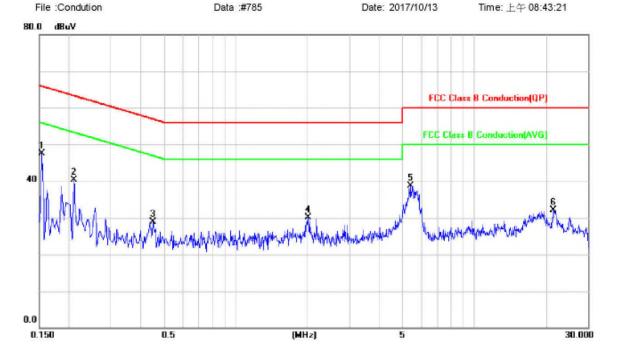
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AC POWER LINE CONDUCTED EMISSION TEST DATA



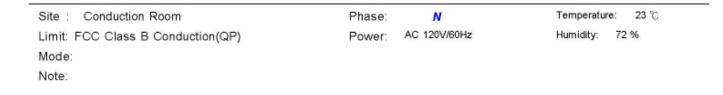


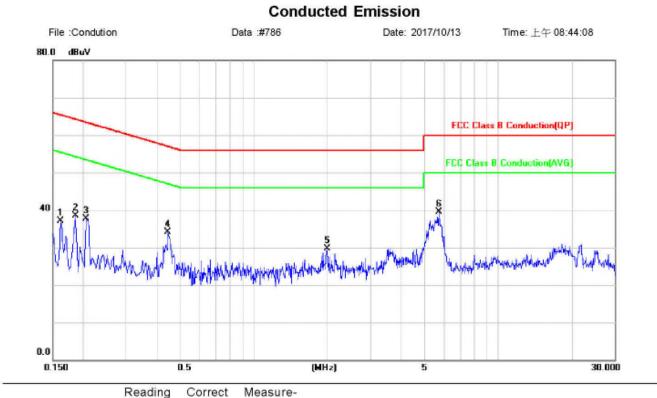
No. M	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1.*	ļ.	0.1540	27.89	19.65	47.54	65.78	-18.24	peak	
2		0.2100	20.56	19.66	40.22	63.21	-22.99	peak	
3		0.4500	8.86	20.05	28.91	56.88	-27.97	peak	
4		2.0180	9.54	20.56	30.10	56.00	-25.90	peak	
5		5.3940	18.69	20.09	38.78	60.00	-21.22	peak	
6		21.5780	11.80	20.27	32.07	60.00	-27.93	peak	

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No.	Mk.	Freq.	Level	Factor	ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1		0.1620	17.52	19.50	37.02	65.36	-28.34	peak		
2		0.1860	19.05	19.49	38.54	64.21	-25.67	peak		
3		0.2060	18.30	19.50	37.80	63.37	-25.57	peak		
4		0.4460	14.19	19.90	34.09	56.95	-22.86	peak		
5		2.0020	9.26	20.42	29.68	56.00	-26.32	peak		
6	٠	5.7140	19.46	19.96	39.42	60.00	-20.58	peak		

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DUTY CYCLE OF TEST SIGNAL 7

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

- 1. Set span = Zero
- 2. RBW = 8MHz
- 3. VBW = 8MHz,
- 4. Detector = Peak

Duty Cycle:

	Duty Cycle (%)	Duty Factor (dB)
802.11b	97.75	0.10
802.11g	87.41	0.58
802.11n_20	86.48	0.63

b = 97.75%, *g* = 87.41%,*n*_*ht*_20 = 86.48% Duty Cycle Factor: $10 * \log(1/0.9775) = 0.1$ Duty Cycle Factor: $10 * \log(1/0.8741) = 0.58$ Duty Cycle Factor: $10 * \log(1/0.8648) = 0.63$

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7.1 DUTY CYCLE TEST SIGNAL Measurement Result 802.11 b

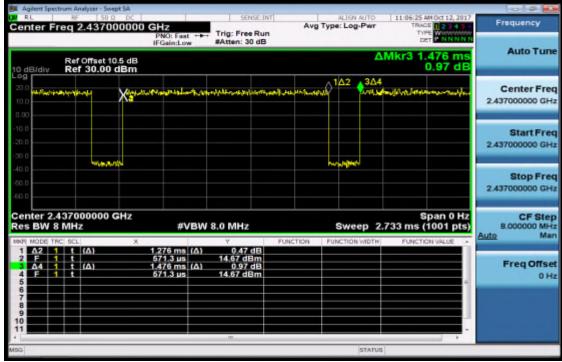


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802.11 n 20 MHz



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PEAK OUTPUT POWER MEASUREMENT 8

8.1 Standard Applicable

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power form the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

Note:	
Main Antenna Gain:	<i>3.50</i> dBi
Aux1 Antenna Gain:	<i>0.00</i> dBi
Aux2 Antenna Gain:	<i>0.00</i> dBi
Aux3 Antenna Gain:	<i>0.00</i> dBi
Number Antenna:	1 pcs
Limit:	<i>30</i> dBm

The antenna gain is grater than 6dBi in MIMO mode the limit reduce as below:

Directional gain = gain of antenna element + 10 log (# of TX antenna elements) Effective Legacy Gain (dBi) = 3.5+0=3.5dBi Limit: 30dBm - (3.5-6dBi)=30

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8.2 Measurement Equipment Used

	Condu	cted Emission	n Test Site		
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1326001	06/23/2017	06/22/2018
Power Sensor	Anritsu	MA2411B	1315048	06/23/2017	06/22/2018
Power Sensor	Anritsu	MA2411B	1315049	06/23/2017	06/22/2018
Coaxial Cable 30cm	WOKEN	00100A1F1A 195C	RF01	12/12/2016	12/11/2017
DC Block	PASTERNACK	PE8210	RF29	12/12/2016	12/11/2017
Splitter	RF-LAMBAD	RFLT2W1G1 8G	RF35	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018

8.3 Test Set-up

Power Meter:

8.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter. **Power Meter:**

It is used as the auxiliary test equipment to conduct the output power measurement.

4. Record the max. Reading as observed from Spectrum or Power Meter.

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8.5 Measurement Result

802.1	802.11b Main									
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit RESULT						
1	2412	1	18.95	1 Watt =	30.00	dBm	PASS			
6	2437	1	19.03	1 Watt =	30.00	dBm	PASS			
11	2462	1	18.87	1 Watt =	30.00	dBm	PASS			
802.1	1b Main									
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)		RESULT					
1	2412	1	15.81	1 Watt =	30.00	dBm	PASS			
6	2437	1	15.74	1 Watt =	30.00	dBm	PASS			
11	2462	1	15.69	1 Watt =	30.00	dBm	PASS			

802.1	802.11g Main									
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit RESU						
1	2412	6	23.11	1 Watt =	30.00	dBm	PASS			
6	2437	6	23.03	1 Watt =	30.00	dBm	PASS			
11	2462	6	23.05	1 Watt =	30.00	dBm	PASS			
802.1	1g Main									
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)		RESULT					
1	2412	6	15.95	1 Watt =	30.00	dBm	PASS			
6	2437	6	15.59	1 Watt =	30.00	dBm	PASS			
11	2462	6	15.74	1 Watt =	30.00	dBm	PASS			

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802.11n_HT20M Main								
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit		RESULT		
1	2412	MCS0	22.73	1 Watt =	30.00	dBm	PASS	
6	2437	MCS0	22.75	1 Watt =	30.00	dBm	PASS	
11	2462	MCS0	22.65	1 Watt =	30.00	dBm	PASS	
802.1	1n_HT20	M Main						
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit		RESULT		
1	2412	MCS0	14.46	1 Watt =	30.00	dBm	PASS	
6	2437	MCS0	14.58	1 Watt =	30.00	dBm	PASS	
11	2462	MCS0	14.25	1 Watt =	30.00	dBm	PASS	

Note:

offset 10.50 dB for SISO mode

* Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.

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6DB & 99% BANDWIDTH MEASUREMENT 9

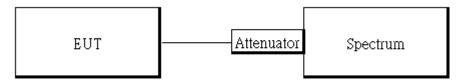
9.1 Standard Applicable

The minimum 6 dB bandwidth shall be at least 500 kHz.

9.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.				
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018				
Coaxial Cable 30cm	WOKEN	00100A1F1A 195C	RF01	12/12/2016	12/11/2017				
DC Block	PASTERNACK	PE8210	RF29	12/12/2016	12/11/2017				
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017				
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018				

9.3 Test Set-up



9.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- For 6dB Bandwidth:

Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=peak, Sweep=auto.

- 5. Mark the peak frequency and -6dB (upper and lower) frequency.
- 6. For 99% Bandwidth:

Set the spectrum analyzer as RBW=1%, VBW = 3*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.

- 7. Turn on the 99% bandwidth function, max reading.
- 8. Repeat above procedures until all frequency of interest measured was complete.

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9.5 Measurement Result

802.11b Main								
Freq.	6dB BW	Limit	Result					
(MHz)	(kHz)	(kHz)	Nesuit					
2412	7121	> 500	PASS					
2437	7583	> 500	PASS					
2462	7551	> 500	PASS					
802.11g	Main							
Freq.	6dB BW	Limit	Result					
(MHz)	(kHz)	(kHz)	Result					
2412	16360	> 500	PASS					
2437	16390	> 500	PASS					
2462	16330	> 500	PASS					
802.11_	n_HT20 Ma	ain						
Freq.	6dB BW	Limit	Result					
(MHz)	(kHz)	(kHz)	Result					
2412	17560	> 500	PASS					
2437	17610	> 500	PASS					
2462	16960	> 500	PASS					

*Refer to next page for plots

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802.11b CH-Low



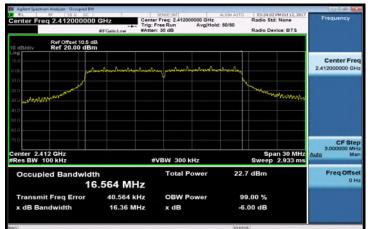
802.11b CH-Mid



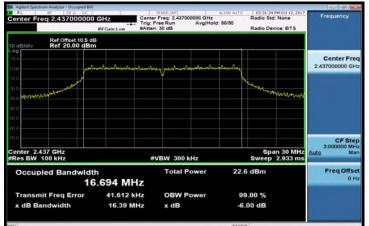
802.11b CH-High



802.11g CH-Low



802.11g CH-Mid



802.11g CH-High



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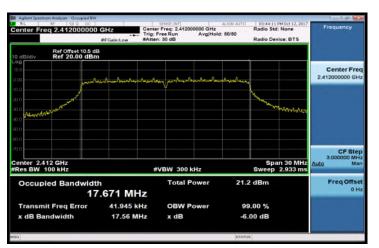
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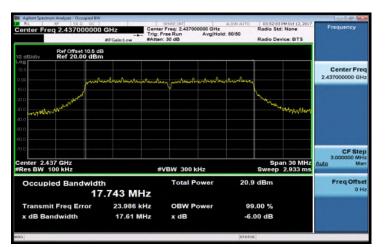
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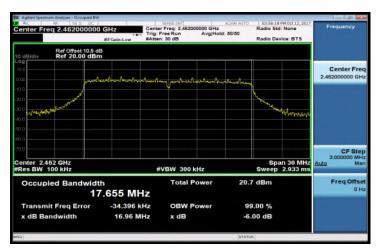
802.11n_20M CH-Low



802.11n_20M CH-Mid



802.11n_20M) CH-High



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

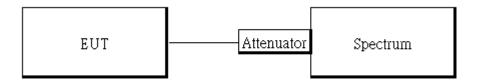
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018				
Coaxial Cable 30cm	WOKEN	00100A1F1A 195C	RF01	12/12/2016	12/11/2017				
DC Block	PASTERNACK	PE8210	RF29	12/12/2016	12/11/2017				
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017				
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018				

10.2 Measurement Equipment Used

10.3 Test SET-UP



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10.4 Measurement Procedure Conducted Band Edge:

- 1. To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
- 6. Mark the highest reading of the emission as the reference level measurement.
- 7. Set DL as the limit = reading on marker 1 20dBm
- 8. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 kHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
- 9. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Conducted Spurious Emission:

- 1. To connect Antenna Port of EUT to Spectrum
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set RBW = 100 kHz & VBW = 300 kHz, Detector = Peak, Sweep = Auto.
- 4. Allow trace to fully stabilize.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- Repeat above procedures until all default test channel measured were complete.

10.5 Measurement Result

Bandedge Limit 802.11b MODE			Bande	edge Lir	nit 802.11g MODE	Bandedge Limit 802.11n20 MODE		
Freq.	PSD	Bandedge Limit	Freq.	PSD	Bandedge Limit	Freq.	PSD	Bandedge Limit
(MHz)	(dBm)	(dBm)	(MHz)	(dBm)	(dBm)	(MHz)	(dBm)	(dBm)
2412	6.91	-13.09	2412	4.64	-15.36	2412	3.07	-16.93
2462	7.65	-12.35	2462	4.45	-15.55	2462	2.95	-17.05

Note:

dB for SISO mode 10.50 offset

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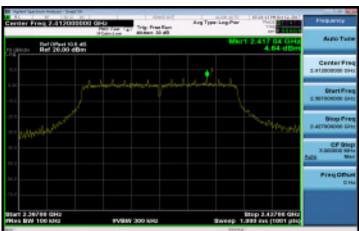
802.11b PSD for Band edge Limit (CH-Low)



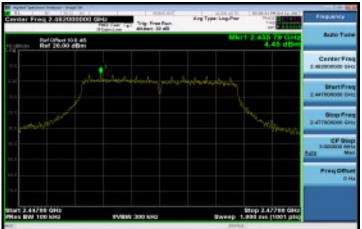
802.11b PSD for Bandedge Limit(CH-High)



802.11g PSD for Bandedge Limit(CH-Low)



802.11g PSD for Bandedge Limit(CH-High)



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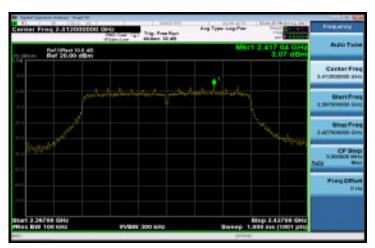
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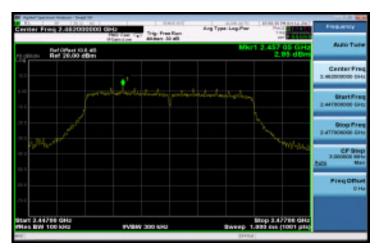
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802.11n_HT20 PSD for Bandedge Limit(CH-Low)



802.11n_HT20 PSD for Bandedge Limit(CH-High)



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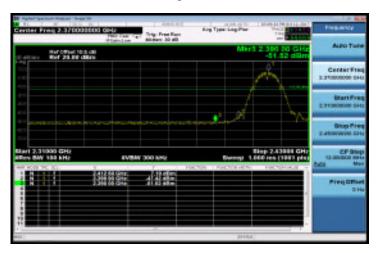
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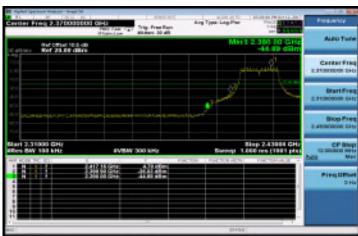
802.11b: Band Edges Test Data CH-Low

SG



802.11b: Band Edges Test Data CH-High





802.11g: Band Edges Test Data CH-Low





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802.11n_HT20: Band Edges Test Data CH-Low



802.11n_HT20: Band Edges Test Data CH-High



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802.11b: Spurious Emission Test Data CH-Mid



802.11b: Spurious Emission Test Data CH-Low

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802.11g: Spurious Emission Test Data CH-Low



802.11b: Spurious Emission Test Data CH-High

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802.11g: Spurious Emission Test Data CH-High



802.11g: Spurious Emission Test Data CH-Mid

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802.11n_HT20: Spurious Emission Test Data CH-Mid



802.11n_HT20: Spurious Emission Test Data CH-Low

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802.11n_HT20: Spurious Emission Test Data CH-High

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11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

11.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

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.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.

2. Emission level $(dB\mu V/m) = 20 \log Emission level (dB\mu V/m)$

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11.2 Measurement Equipment Used:

	• •	966 Chambe	r		
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESU 40	100363	04/18/2017	04/17/2018
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/201 6	12/22/2017
Broadband Antenna	TESEQ	CBL 6112D	35240	11/03/2016	11/02/2017
Horn Antenna	ETS-Lindgren	3117	00143272	12/15/2016	12/16/2017
Horn Antenna	Schwarzbeck	BBHA9170	185	08/01/2017	07/31/2018
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2016	12/11/2017
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-18	10204	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-26	100780	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2016	12/11/2017
Coaxial Cable	Coaxial Cable Huber+Suhner		966Rx 30M-3G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF27	12/12/2016	12/11/2017
Site NSA	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
Site VSWR	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2017	05/03/2018
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

NOTE: N.C.R refers to Not Calibrated Required.

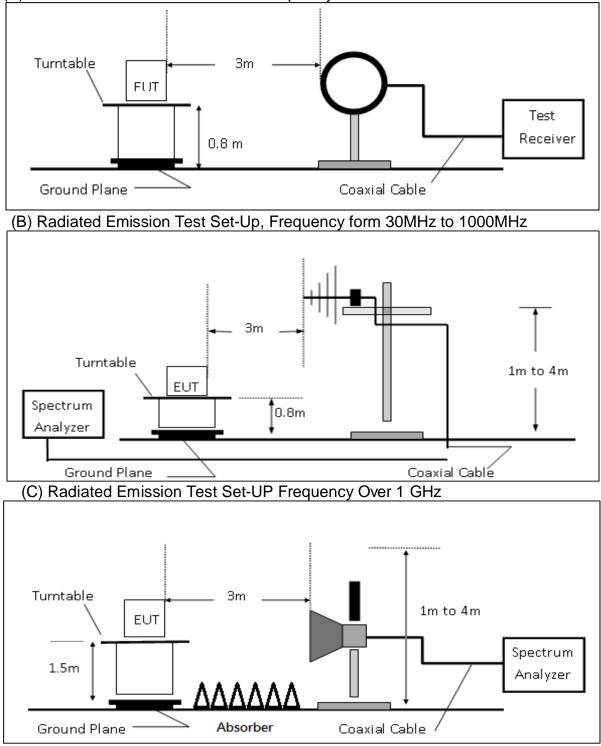
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11.3 Test SET-UP





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11.4 Measurement Procedure

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. 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.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- 10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- 12. Repeat above procedures until all default test channel measured were complete.

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11.5 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	

Actual FS(dB μ V/m) = SPA. Reading level(dB μ V) + Factor(dB)

Factor(dB) = Antenna Factor(dBµV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note :

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

11.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

11.7 Measurement Result

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

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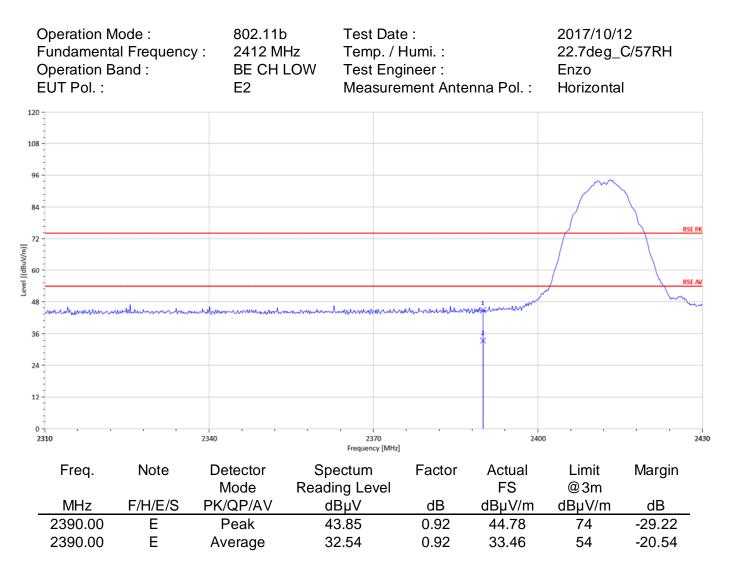


Radiated Band Edge Measurement Result (802.11b)

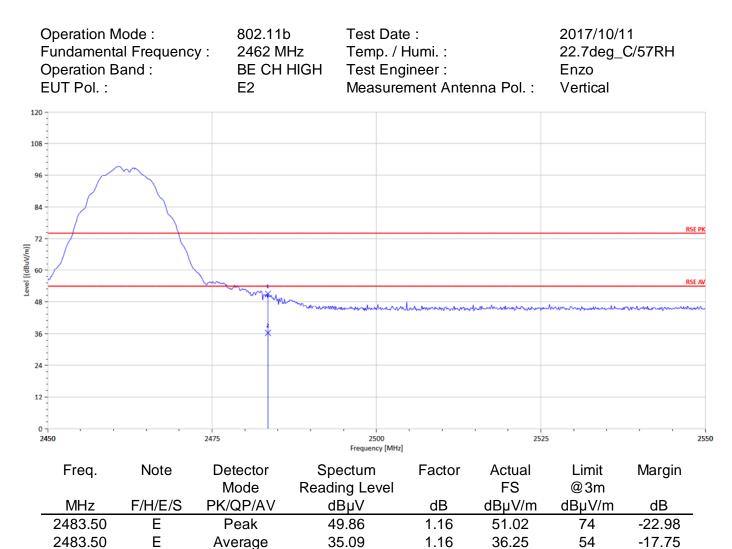
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12									
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	Freq.	Note	Detector Mode	Spectum Reading Le	vel	Actual FS	Limit @3m	Margin	
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
	2390.00	E	Peak	45.10	0.92	46.03	74	-27.97	
	2390.00	E	Average	32.85	0.92	33.77	54	-20.23	

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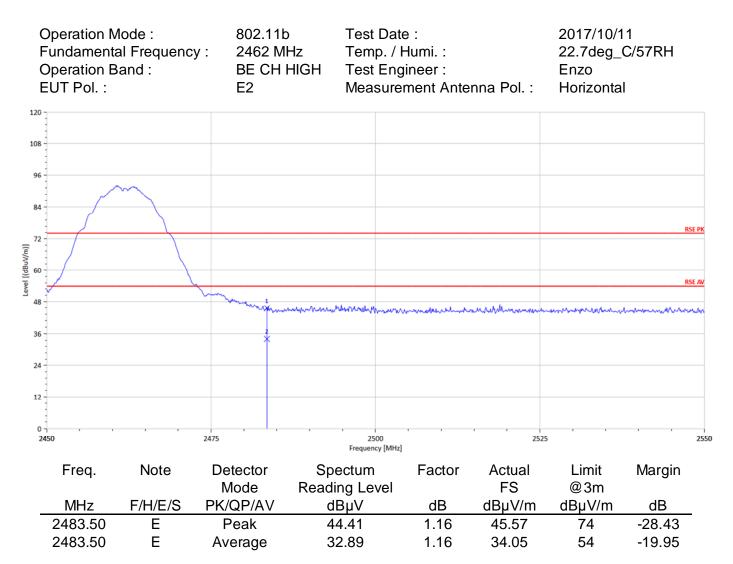












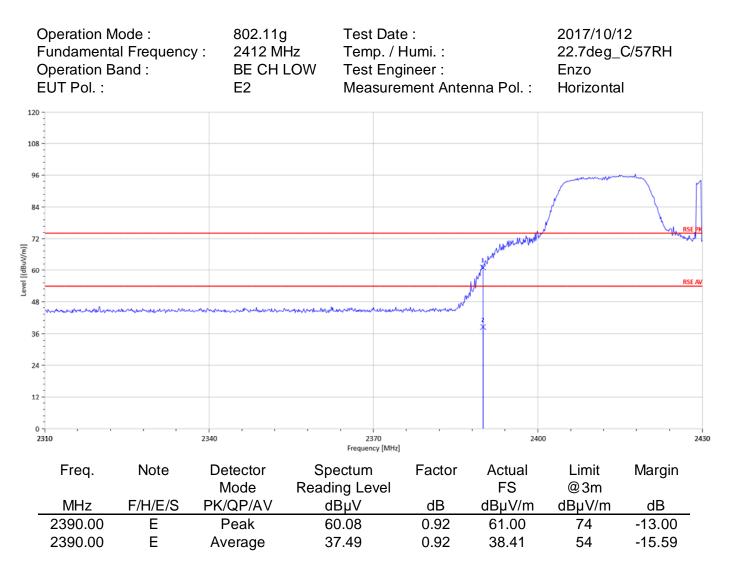


Radiated Band Edge Measurement Result (802.11g)

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0 2	310		2340		770 cy [MHz]	240	0	2430
	Freq.	Note	Detector Mode	Spectum Reading Le	vel	Actual FS	Limit @3m	Margin
-	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	2390.00	E	Peak	64.54	0.92	65.46	74 54	-8.54
	2390.00	E	Average	39.54	0.92	40.46	54	-13.54

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72

36

24

12

0 -2450

Freq.

MHz

2483.50

2483.50

2483.80

2483.80

Level [(dBuV/m)]

RSE AV

2550

Margin

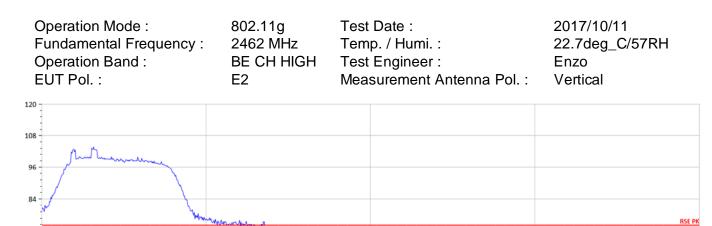
dB

-3.02

-8.40

-1.87

-8.76



2500

Frequency [MHz]

Factor

dB

1.16

1.16

1.16

1.16

Spectum

Reading Level

dBµV

69.82

44.44

70.97

44.08

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2475

Detector

Mode

PK/QP/AV

Peak

Average

Peak

Average

Note

F/H/E/S

Е

Е

S

S

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2525

Limit

@3m

dBµV/m

74

54

74

54

Actual

FS

dBµV/m

70.98

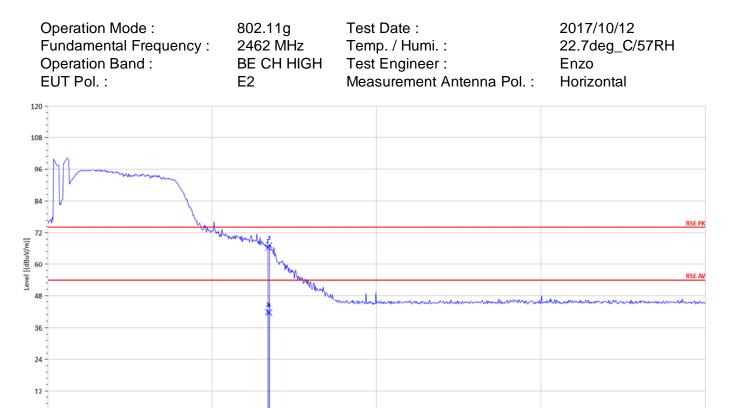
45.60

72.13

45.24



0



2450		2475	2500 Frequency [MHz]		2525			2550
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
2483.50	Е	Peak	65.08	1.16	66.24	74	-7.76	_
2483.50	E	Average	40.71	1.16	41.87	54	-12.13	
2483.70	S	Peak	66.09	1.16	67.25	74	-6.75	
2483.70	S	Average	40.44	1.16	41.60	54	-12.40	

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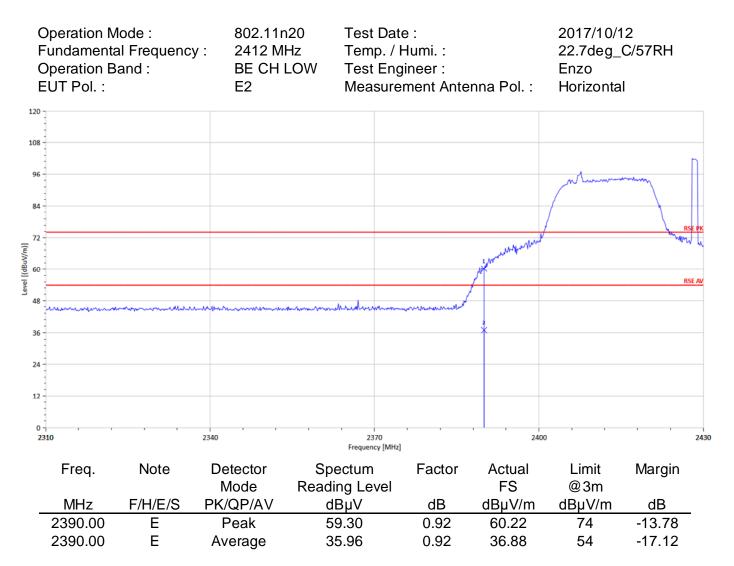


Radiated Rand Edge Measurement Result (802 11 HT20)

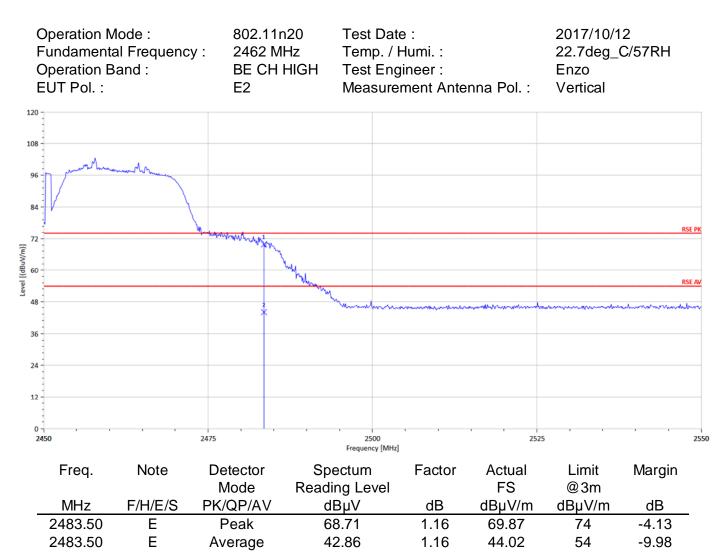
Rad	diated Bar	nd Edge M	easurement	Result	(802.11_	HT20)				
F	Dperation M Fundamenta Dperation B EUT Pol. :	al Frequenc	802.11r y : 2412 M BE CH E2	Hz	Test Dat Temp. / I Test Eng Measure	Humi. :	nna Pol. :	2017/10/1 22.7deg_ Enzo Vertical		
120										
96									ming M	
84								/	Win, R	SÊ PR
Level [(dBuV/m)] 00	-						and the second second			
)] ləvə1 48		mmmmmm	Maller and Marine and Annual Street	www.	mmm	manund	/		RS	SE AV
36							2 *			
24										
12										
0 2	310		2340	1	2370 Frequency [MHz]		2400)	1 1	2430
	Freq.	Note	Detector Mode		ectum ng Level	Factor	Actual FS	Limit @3m	Margin	
_	MHz	F/H/E/S	PK/QP/AV	d	ΒμV	dB	dBµV/m	dBµV/m	dB	_
-	2390.00 2390.00	E E	Peak Average		4.19 7.91	0.92 0.92	65.11 38.83	74 54	-8.89 -15.17	

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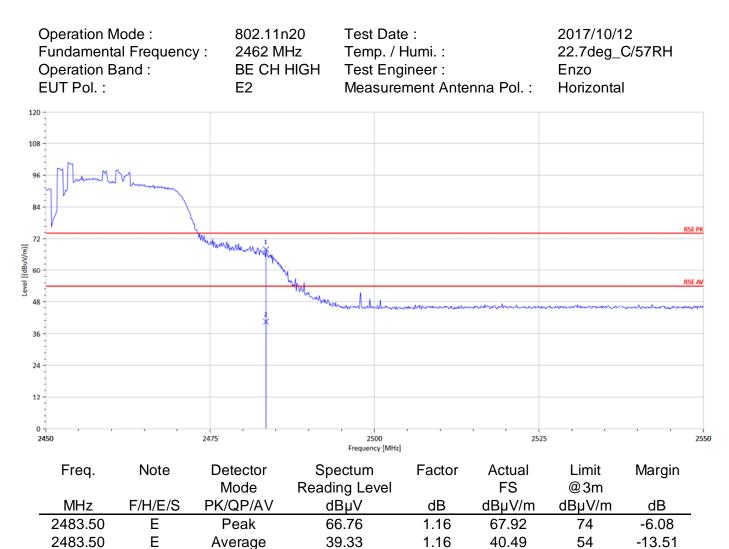














Below 1GHz Worst-Case Data:

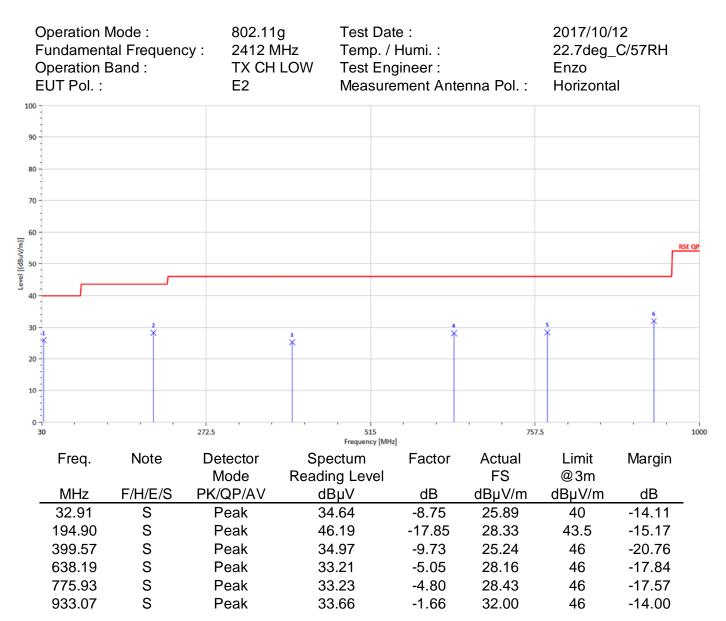
Radiated Spurious Emission Measurement Result (802.11 g) **Operation Mode :** 802.11g Test Date : 2017/10/12 22.7deg_C/57RH Fundamental Frequency : 2412 MHz Temp. / Humi. : Test Engineer : **Operation Band :** TX CH LOW Enzo EUT Pol. : E2 Measurement Antenna Pol. : Vertical 100 90 80 70 60 Level [(dBuV/m)] RSE O 50 40 30 20 10 -0 -30 272.5 515 757.5 1000 . (MH-1

			Frequency [Minz	1			
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
36.79	S	Peak	46.48	-10.93	35.54	40	-4.46
93.05	S	Peak	46.05	-18.95	27.10	43.5	-16.40
399.57	S	Peak	37.04	-9.73	27.31	46	-18.69
536.34	S	Peak	32.83	-7.30	25.53	46	-20.47
639.16	S	Peak	32.99	-5.26	27.73	46	-18.27
797.27	S	Peak	34.36	-4.01	30.35	46	-15.65

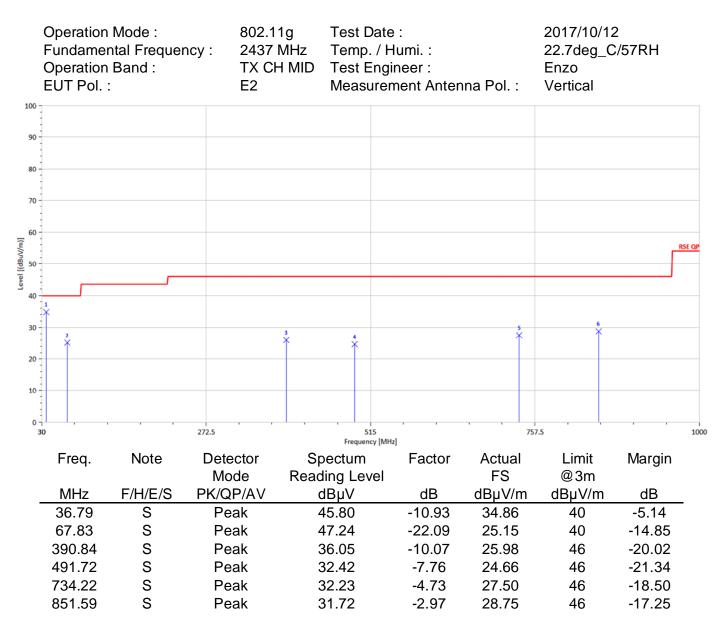
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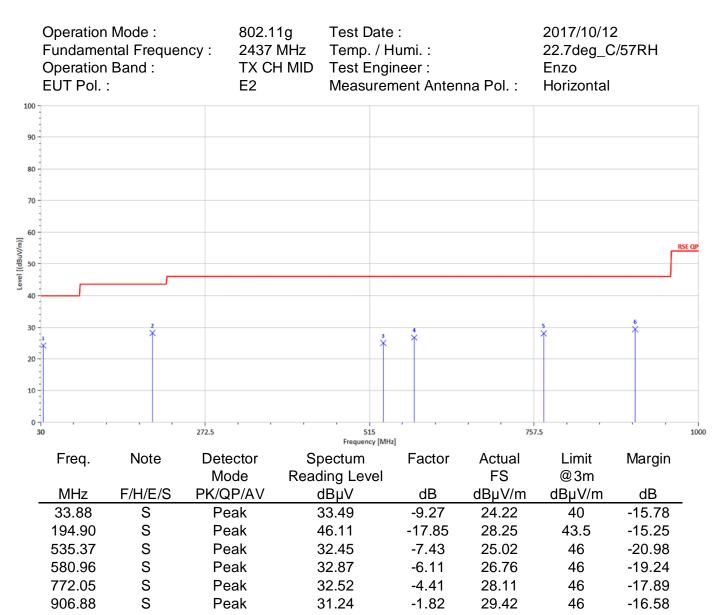




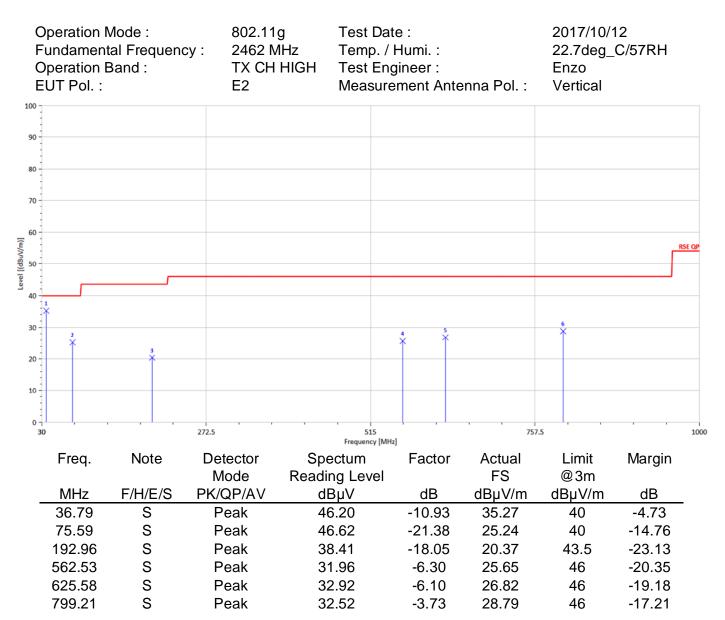




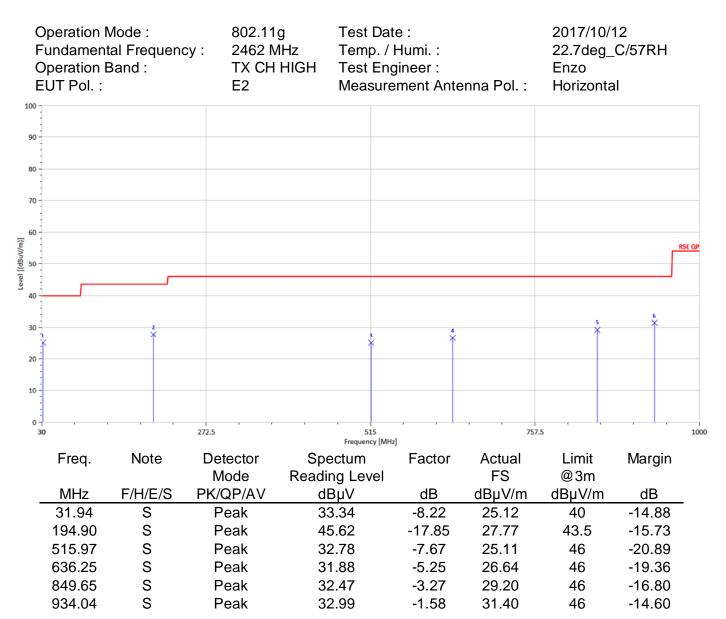














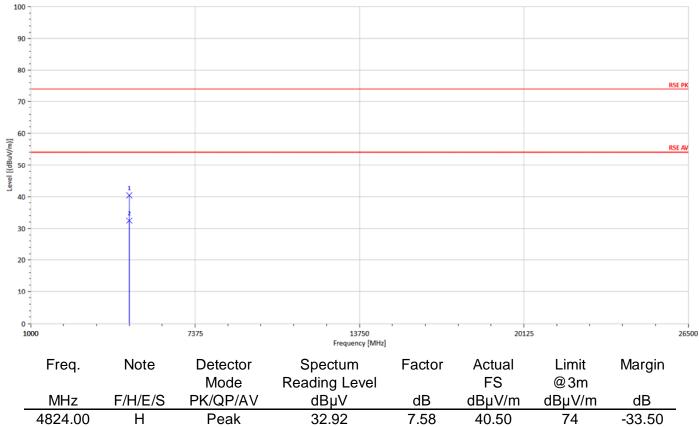
Above 1GHz Data:

4824.00

н

Radiated Spurious Emission Measurement Result (802.11 b)

Operation Mode : Fundamental Frequency :	802.11b 2412 MHz	Test Date : Temp. / Humi. :	2017/10/12 22.7deg_C/57RH
Operation Band :	TX CH LOW	Test Engineer :	Enzo
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



24.86

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

Average

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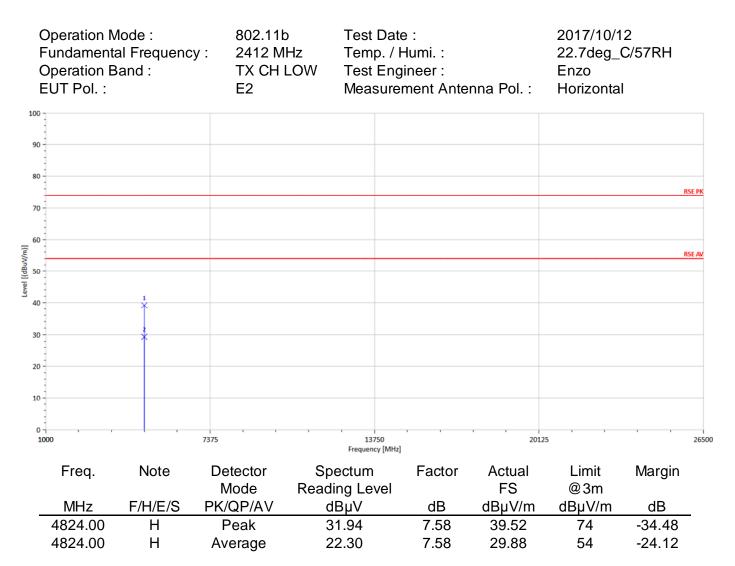
7.58

32.44

54

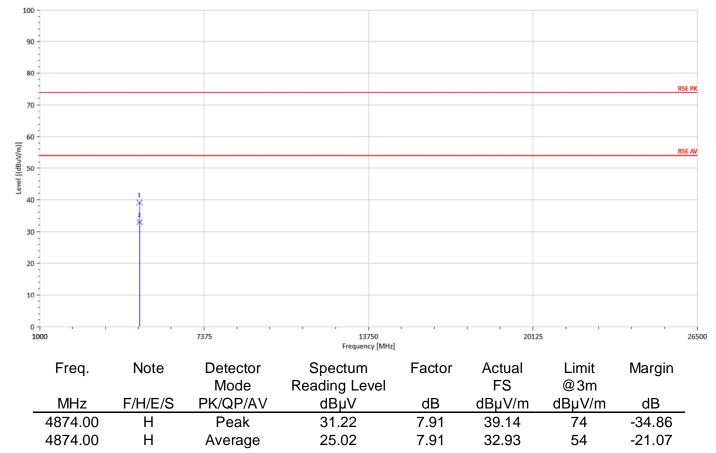
-21.56







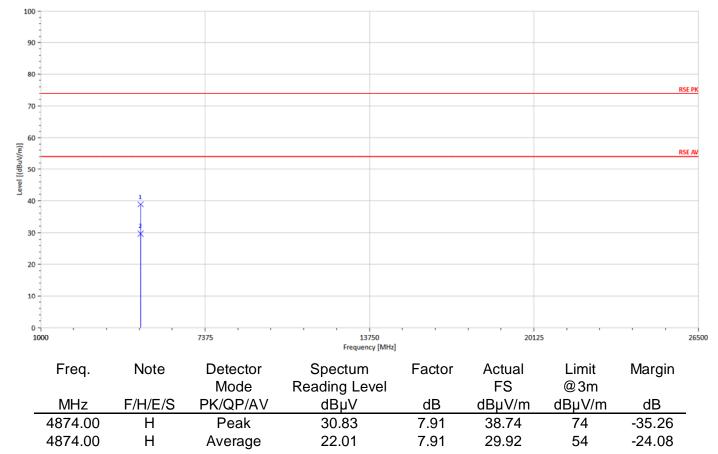
EUT POI.: E2 Measurement Antenna Pol.: Vertical	Fundamental Frequency :2437 MHzTemp. / Humi. :2Operation Band :TX CH MIDTest Engineer :E	2017/10/12 22.7deg_C/57RH Enzo Vertical
---	--	--



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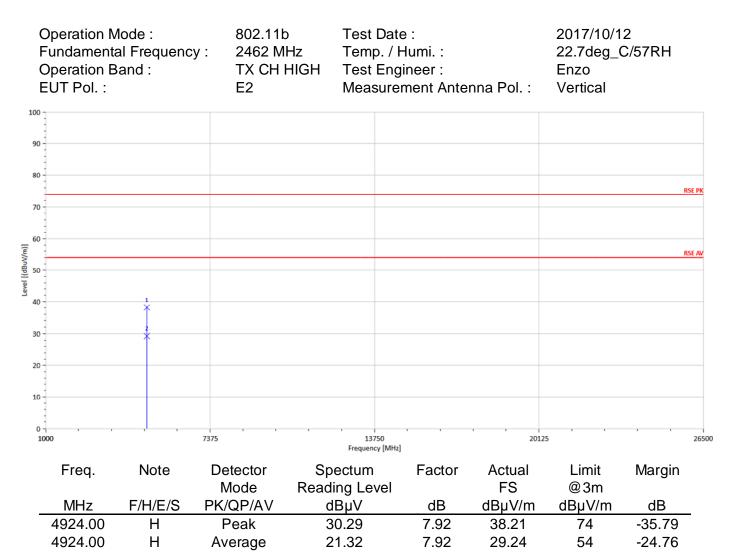


EUT Pol. : E2 Measurement Antenna Pol. : Horizontal	Operation Mode :	802.11b	Test Date :	2017/10/12
	Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
	Operation Band :	TX CH MID	Test Engineer :	Enzo
	EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal
EUT POL: E2 Measurement Antenna Pol.: Horizontal	EUT POL:	EZ	Measurement Antenna Pol. :	Horizontai

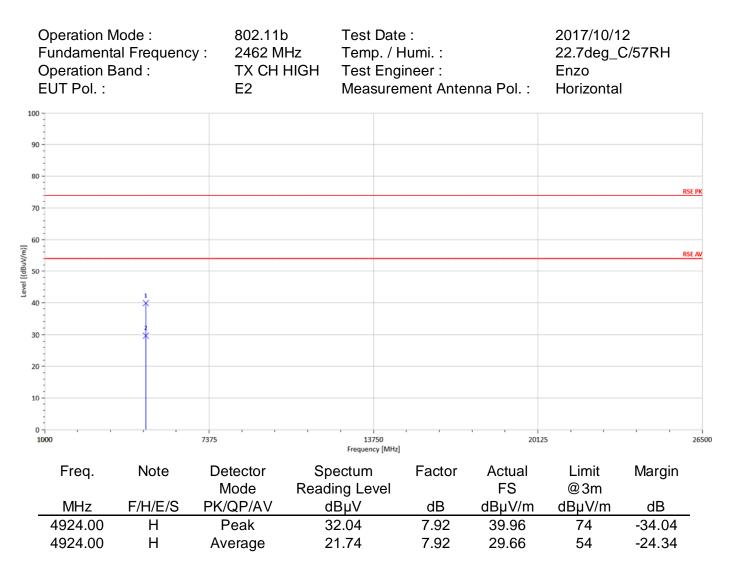


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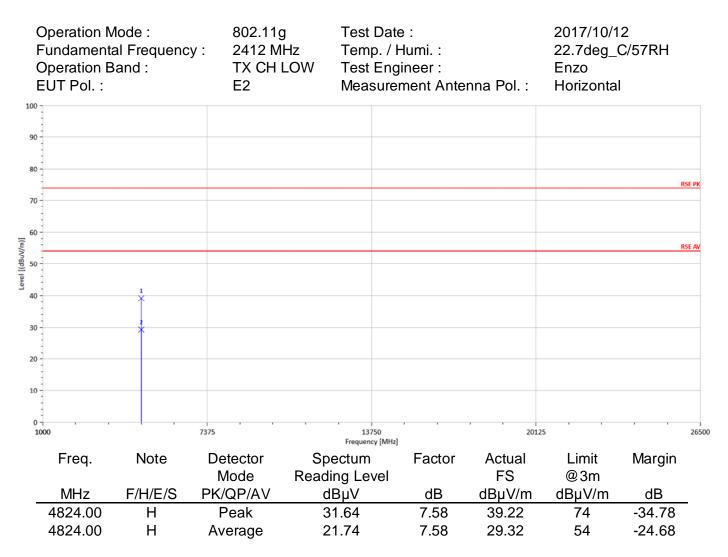


Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11g 2412 MHz TX CH LO ^v E2	W Test Er	ate : / Humi. : ngineer : rement Anter		2017/10/12 22.7deg_C/5 Enzo Vertical	57RH	
100 - 								
80								RSE PK
70 - 								
Level [(dBuV/m)]								RSE AV
40 -		×						
30		2 *						
20								
0 - 100	ю		7375		750 cy [MHz]	20	125	26500
	Freq.	Note	Detector Mode	Spectum Reading Le	Facto	r Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	4824.00 4824.00	H H	Peak Average	30.68 21.47	7.58 7.58	38.25 29.05	74 54	-35.75 -24.95

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	Operation EUT Pol. :	tal Frequer	802.1 ⁷ ncy : 2437 I TX CH E2	MHz Temp I MID Test	Date : b. / Humi. : Engineer : urement Ante	enna Pol. :	2017/10/12 22.7deg_C, Enzo Vertical	
100	:							
90	-							
80	<u> </u>							
								RSE PK
70	-							
_ 60								
(ɯ//mgp 50	-							RSE AV
Level [(dBuV/m)] S								
40		Ť						
30	-							
	-	Î						
20	:							
10								
0	-							
	000		7375		3750 ncy [MHz]	201	25	26500
	Freq.	Note	Detector	Spectur			Limit	Margin
			Mode	Reading Le		FS	@3m	
-	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	4874.00	Н	Peak	32.43	7.91	40.34	74	-33.66
	4874.00	Н	Average	21.37	7.91	29.28	54	-24.72

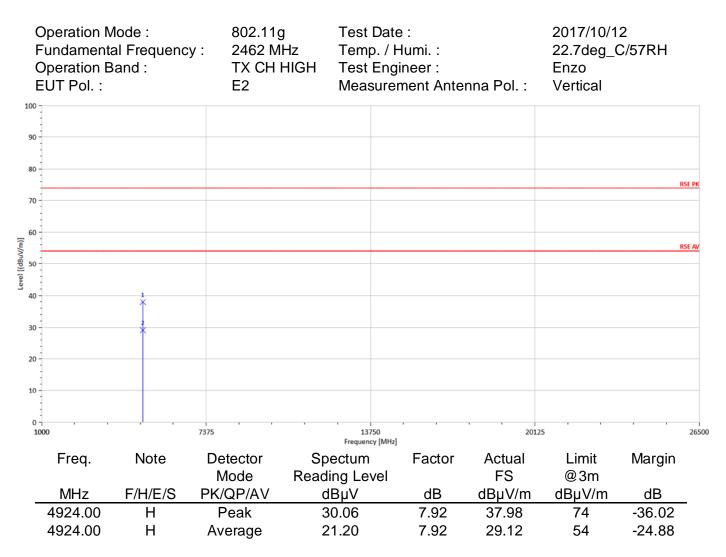
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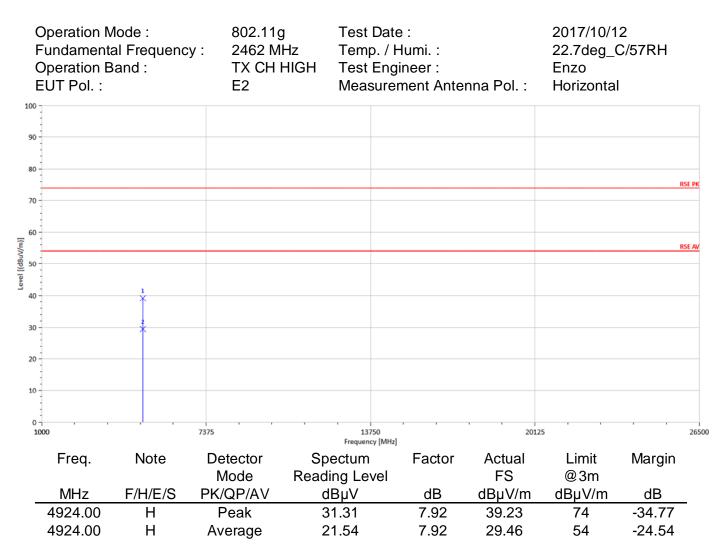
	Operation EUT Pol. :	ital Frequer	802.11 ncy : 2437 M TX CH E2	MHz Tem I MID Test	Date : p. / Hun Engine sureme		na Pol. :	2017/10/12 22.7deg_C/ Enzo Horizontal	
100									
90	-								
80									
70	-								RSE PK
[(m/									RSE AV
Level [(dBuV/m)] S									
aval 40	<u>:</u>	1							
	-	Į							
30	-	Ť							
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	Freq.	Note	Detector	Spectur		Factor	Actual	Limit	Margin
	MHz	F/H/E/S	Mode PK/QP/AV	Reading L dBµV	evel	dB	FS dBµV/m	@3m dBµV/m	dB
-	4874.00	H	Peak	30.98		7.91	38.89	74	-35.11
	4874.00	Н	Average	21.75		7.91	29.66	54	-24.34

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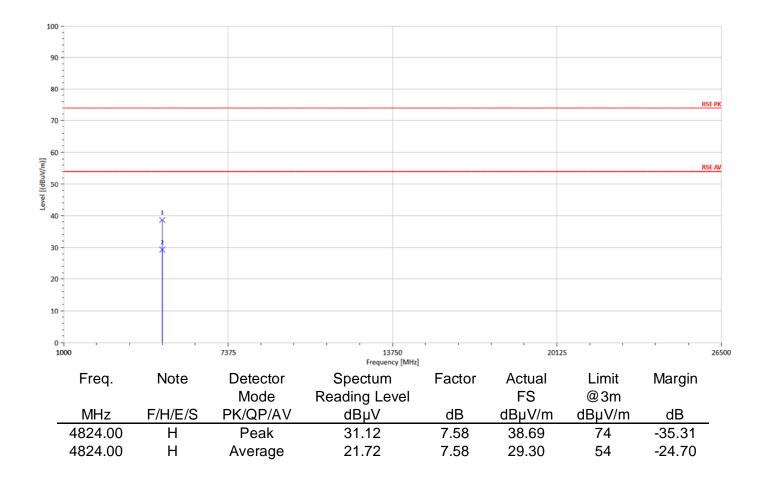
Radiated Spurious Emission Measurement Result (802.11_HT20)

F	Operation M Fundamenta Operation B EUT Pol. :	al Frequenc	802.11r cy : 2412 M TX CH E2	Hz Tem LOW Test	Date : p. / Humi. : Engineer :	, ntenna Pol. :	2017/10/1 22.7deg_ Enzo Vertical	
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	Freq.	Note	Detector Mode	Spectum Reading Le	Facto	r Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
-	4824.00 4824.00	H H	Peak Average	30.75 21.44	7.58 7.58	38.32 29.02	74 54	-35.68 -24.98

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	Operation I Fundamen Operation I EUT Pol. :	tal Frequer	802.11 ncy : 2437 M TX CH E2	MHz Ter I MID Tes	st Date : np. / Hu st Engin asuremo	mi. :	na Pol. :	2017/10/12 22.7deg_C, Enzo Vertical	
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	Freq.	Note	Detector	Spectu		Factor	Actual	Limit	Margin
			Mode	Reading			FS	@3m	
-	MHz	F/H/E/S	PK/QP/AV	dBµ\		dB	dBµV/m	dBµV/m	dB
	4874.00	Н	Peak	30.47		7.91	38.38	74	-35.62
	4874.00	Н	Average	21.46	5	7.91	29.37	54	-24.63

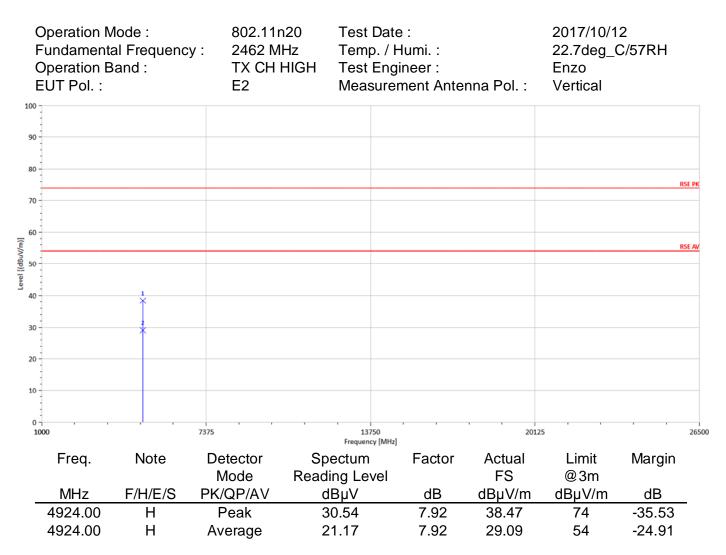
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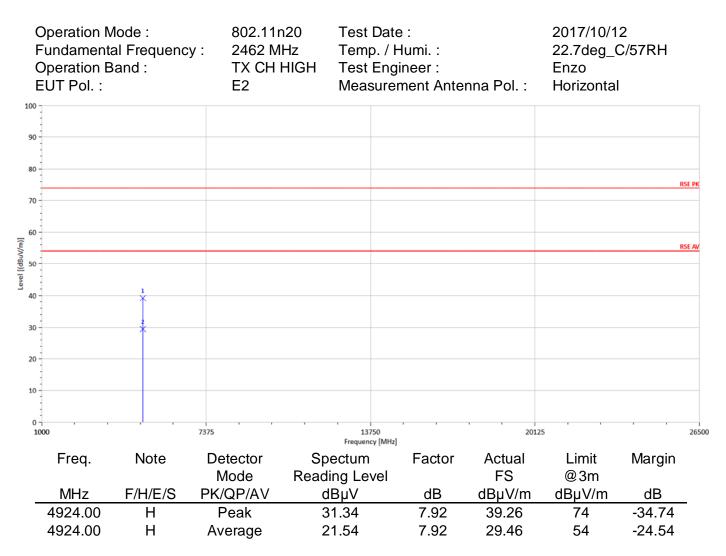
	Operation EUT Pol. :	tal Frequer	802.11 ncy : 2437 M TX CH E2	MHz Ten I MID Tes	t Date : np. / Hu t Engin asuremo	ımi. :	na Pol. :	2017/10/12 22.7deg_C, Enzo Horizontal	
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	Freq.	Note	Detector	Spectu		Factor	Actual	Limit	Margin
			Mode	Reading I			FS	@3m	
-	MHz	F/H/E/S	PK/QP/AV	dBµ∖		dB	dBµV/m	dBµV/m	dB
	4874.00	Н	Peak	30.72		7.91	38.63	74	-35.37
	4874.00	Н	Average	21.62	2	7.91	29.53	54	-24.47

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12 PEAK POWER SPECTRAL DENSITY

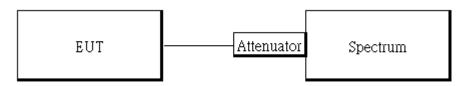
12.1 Standard Applicable

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

12.2 Measurement Equipment Used

Conducted Emission Test Site											
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018						
Coaxial Cable 30cm	WOKEN	00100A1F1A 195C	RF01	12/12/2016	12/11/2017						
DC Block	PASTERNACK	PE8210	RF29	12/12/2016	12/11/2017						
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017						
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018						

12.3 Test Set-up



12.4 Measurement Procedure

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW = 3 kHz & VBW = 10 kHz.
- 5. For defining Restricted Band Edge Limit: Set the RBW = 100kHz & VBW = 300 kHz
- 6. Detector = peak.
- 7. Sweep time = auto couple.
- Trace mode = max hold.
- 9. Allow trace to fully stabilize.
- 10. Use the peak marker function to determine the maximum amplitude level.
- 11.802.11n MIMO mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

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Note:

Antenna Gain:	3.50 dBi	
Number Antenna:	1 pcs	
Limit:	8 dBm	

The antenna gain is grater than 6dBi in MIMO mode the limit reduce as below: Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi) = 3.5+0=3.5dBi

Limit: 8dBm – (3.5– 6dBi)=8

12.5 Measurement Result

	POWER DENSITY 802.11b										
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result					
2412	-5.97	10.50	0.10	-5.87	8.00	PASS					
2437	-6.00	10.50	0.10	-5.90	8.00	PASS					
2462	-5.51	10.50	0.10	-5.41	8.00	PASS					
	POW	ER DEN	SITY 802.	11g							
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result					
2412	-8.68	10.50	0.58	-8.10	8.00	PASS					
2437	-8.17	10.50	0.58	-7.59	8.00	PASS					
2462	-8.62	10.50	0.58	-8.04	8.00	PASS					
	POWER	DENSIT	Y 802.11r	n HT20							
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result					
2412	-10.82	10.50	0.63	-10.19	8.00	PASS					
2437	-10.81	10.50	0.63	-10.18	8.00	PASS					
2462	-10.57	10.50	0.63	-9.94	8.00	PASS					

Note:

10.50 dB for SISO mode offset

*Refer to next page for plots

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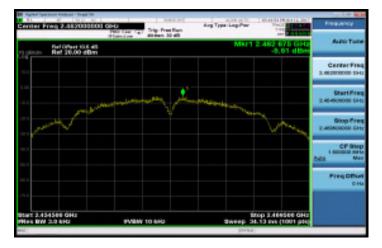
802.11b PSD(CH-Low)



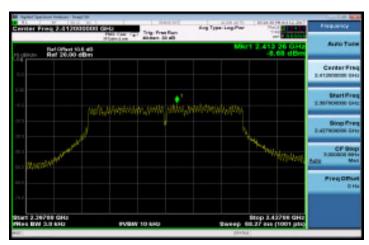
802.11b PSD (CH-Mid)



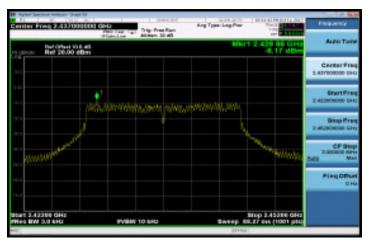
802.11b PSD (CH-High)



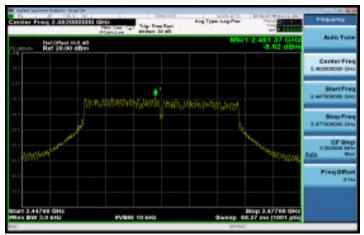
802.11g PSD(CH-Low)



802.11g PSD (CH-Mid)



P802.11g PSD (CH-High)



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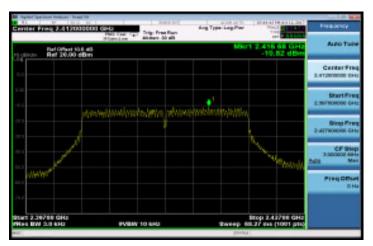
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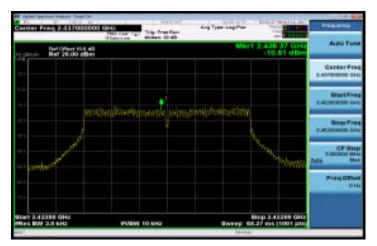
t (886-2) 2299-3279 台灣檢驗科技股份有限公司



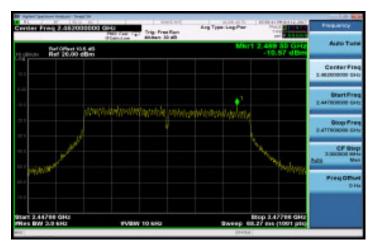
802.11n_HT20 PSD (CH-Low)



802.11n_HT20 PSD (CH-Mid)



802.11n_HT20 PSD (CH-High)



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13 ANTENNA REQUIREMENT

13.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device. If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

13.2 Antenna Connected Construction

An embedded-in antenna design is used.

The antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

~ End of Report ~

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