Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 1 of 106

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: Full HD Golf Camcorder

Brand Name: N/A

Model No.: HD-13DW, SS-5

Model Difference: For marketing purpose only

FCC ID: 2ABDZ61HD13DWS02791

E2/2013/B0028 **Report No.:**

Issue Date: Feb. 21, 2014

FCC Rule Part: §15.247, Cat: DTS

SALIX TECHNOLOGY CO., LTD.

Prepared for: 5F, NO. 16, LANE 77, HSING AI RD., NEI-HU,

TAIPEI 114, TAIWAN, R.O.C.

SGS Taiwan Ltd.

Electronics & Communication Laboratory Prepared by:

No.2, Keji 1st Rd., Guishan Township, Taoyuan

County, Taiwan 333





Test ing Laborators 0513

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 2 of 106

VERIFICATION OF COMPLIANCE

Applicant: SALIX TECHNOLOGY CO., LTD.

5F, NO. 16, LANE 77, HSING AI RD., NEI-HU, TAIPEI 114, TAIWAN,

R.O.C.

Product Name: Full HD Golf Camcorder

Brand Name: N/A

Model No.: HD-13DW, SS-5

Model Difference: For marketing purpose only

FCC ID: 2ABDZ61HD13DWS02791

File Number: E2/2013/B0028

Jan. 15, 2014 ~ Feb. 14, 2014 Date of test:

Jan. 15, 2014 **Date of EUT Received:**

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 C63.4:2009 the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part

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

Test By:	Jazz Huang	Date	Feb. 21, 2014	
Prepared By:	Jazz Huang/Sr. Engineer Utoletta Tang	Date	Feb. 21, 2014	
Approved By:	Violetta Tang / Clerk Jim Chang / Supervisor	Date 	Feb. 21, 2014	

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Page: 3 of 106

Version

Version No.	Date	Description
00	Feb. 21, 2014	Initial creation of document

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 4 of 106

Table of Contents

1	GEN	NERAL INFORMATION	6
	1.1	Product description.	6
	1.2	Related Submittal(s) / Grant (s)	8
	1.3	Test Methodology	8
	1.4	Test Facility	8
	1.5	Special Accessories	8
	1.6	Equipment Modifications	8
2	SYS	TEM TEST CONFIGURATION	9
	2.1	EUT Configuration.	9
	2.2	EUT Exercise	9
	2.3	Test Procedure	9
	2.4	Configuration of Tested System	10
3	SUM	IMARY OF TEST RESULTS	11
4	DES	CRIPTION OF TEST MODES	12
5	MEA	ASUREMENT UNCERTAINTY	13
6	CON	NDUCTED EMISSION TEST	14
	6.1	Standard Applicable:	14
	6.2	Measurement Equipment Used:	14
	6.3	EUT Setup:	14
	6.4	Test SET-UP (Block Diagram of Configuration)	
	6.5	Measurement Procedure:	
	6.6	Measurement Result:	
7	PEA	K OUTPUT POWER MEASUREMENT	19
	7.1	Standard Applicable:	19
	7.2	Measurement Equipment Used:	20
	7.3	Test Set-up:	20
	7.4	Measurement Procedure:	21
	7.5	Measurement Result:	24
8	6dB	BANDWIDTH	26
	8.1	Standard Applicable:	26
	8.2	Measurement Equipment Used:	26
	8.3	Test Set-up:	
	8.4	Measurement Procedure:	
	8.5	Measurement Result:	27

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 5 of 106

9	BAN	D EDGES MEASUREMENT	34
	9.1	Standard Applicable:	34
	9.2	Measurement Equipment Used:	34
	9.3	Test SET-UP:	36
	9.4	Measurement Procedure:	37
	9.5	Field Strength Calculation:	38
	9.6	Measurement Result:	38
10	SPUF	RIOUS EMISSION TEST	51
	10.1	Standard Applicable	51
	10.2	Measurement Equipment Used:	51
	10.3	Test SET-UP:	51
	10.4	Measurement Procedure:	52
	10.5	Field Strength Calculation	52
	10.6	Measurement Result:	52
11	PEAL	K POWER SPECTRAL DENSITY	89
	11.1	Standard Applicable:	89
	11.2	Measurement Equipment Used:	89
	11.3	Test Set-up:	89
	11.4	Measurement Procedure (following the measurement procedure 10.2 of KDB558074):	89
	11.5	Measurement Result:	90
12	ANT	ENNA REQUIREMENT	97
	12.1	Standard Applicable:	97
	12.2	Antenna Connected Construction:	97
13	MAX	IMUM PERMISSIBLE EXPOSURE (MPE)	98
	13.1	Standard Applicable	98
	13.2	Maximum Permissible Exposure (MPE) Evaluation	99

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 6 of 106

GENERAL INFORMATION

Product description

General:

Product Name:	Full HD Golf Camcorder				
Brand Name:	N/A				
Model No.:	HD-13DW, S	S-5			
Model difference:	For marketing	g purpose only			
Hardware Version:	N/A				
Software Version:	N/A				
Data Cable (USB):	Model No.: 052-USB0A-M1508; Supplier: LINK STAR Technology Co., Ltd.				
Battery Charger:	Model No.: 2A5-BA1A0-00000; Supplier: Salix Technology Co., Ltd.				
	3.7Vdc Rechargeable Li- ion Prismatic Battery or 5Vdc from AC/DC Adapter				
D C 1	Battery:	Model No.: APP00117, Supplier: APack			
Power Supply:	Adapter:	1. Model No.: CAP005051; Supplier: Channel Well Technology			
		2. Model No.: PA-2; Supplier: Salix Technology Co., Ltd.			

WLAN:

LAII.						
Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology		
11b/g 2412-2462		11	b: 16.52dBm g: 19.44dBm	DSSS, OFDM		
11n	11n HT20 2412-2462		n: 19.23dBm	OFDM		
11n	11n HT40 2422-2452		n: 18.85dBm	OFDM		
Antenna Desig	gnation:	PCB Antenna, 4.13dBi				
Modulation ty	pe:	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM				
Transition Rat	e:	802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 72.2Mbps 802.11 n_40MHz: 15 –135Mbps				

The EUT is in compliance with FCC \$15.247 at which the frequency band of 2400~2483.5 has been tested.

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Page: 7 of 106

IEEE 802.11n Spec:

MCS			R	NBPSC	NCBPS		Vinne		Datarate(Mbps)				
Index	Nss	Modulation			NC.	BPS	ND	NDBPS		800nsGI		400nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15	
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30	
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45	
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60	
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90	
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120	
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135	
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150	

Symbol	Explanation			
NSS	Number of spatial streams			
R	Code rate			
NBPSC	Number of coded bite per single carrier			
NCBPS	Number of coded bite per symbol			
NDBPS	Number of data bite per symbol			
GI	Guard interval			

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 8 of 106

Related Submittal(s) / Grant (s) 1.2

This submittal(s) (test report) is intended for FCC ID: 2ABDZ61HD13DWS02791 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a Doc procedure.

Test Methodology 1.3

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4:2009. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Apr 2013 KDB558074 D01 V03 for compliance to FCC 47CFR 15.247 requirements.

Test Facility 1.4

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009. FCC Registration Number is: 990257. Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

Special Accessories 1.5

There are no special accessories used while test was conducted.

1.6 **Equipment Modifications**

There was no modification incorporated into the EUT.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 9 of 106

SYSTEM TEST CONFIGURATION

2.1 **EUT Configuration**

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

2.2 **EUT Exercise**

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. According to the general criterion in Section 7.1 of ANSI C63.4:2009. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz, and the measurement procedure 7.3 in ANSI 63.4:2009 & 6.2.2 is followed to carry out the test. The CISPR Quasi-Peak and Average detector mode is employed according to §15.107

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes 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. according to the requirements in Section 8 and 13 and of ANSI C63.4:2009, & Section 6.3, 6.4, 6.5.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 10 of 106

Configuration of Tested System

Fig. 2-1 Radiated Emission & Conducted (Antenna Port) Configuration

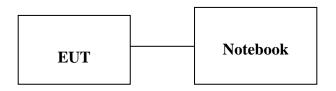


Fig. 2-2 AC Power Line Conducted Emission

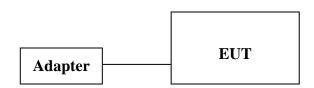


Table 2-1 Equipment Used in Tested System

Item	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	L412	LR-027LM	N/A	N/A

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 11 of 106

SUMMARY OF TEST RESULTS

FCC 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 Bandwidth	Compliant
§15.247(d)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d)	Spurious Emission	Compliant
§15.247(e)	Peak Power Density	Compliant
§15.203	Antenna Requirement	Compliant

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 12 of 106

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

802.11 b mode: Channel low (2412MHz), mid (2437MHz) and high (2462MHz) with 1Mbps lowest data rate are chosen for full testing.

802.11 g mode: Channel low (2412MHz), mid (2437MHz) and high (2462MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n 20MHz mode: Channel low (2412MHz), mid (2437MHz) and high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.

802.11 n 40MHz mode: Channel low (2422MHz), mid (2437MHz) and high (2452MHz) with 13.5Mbps lowest data rate are chosen for full testing.

The worst case is determined by the output power that generates the highest emission. As examined in the section of output power measurement, the section 7.5, the lowest data rate at b/g/n HT20/n HT40 resulted the highest level of fundamental emission, and therefore, the lowest data rate is chosen as the worst-case to conduct the remaining of other mandatory test cases.

The field strength of radiation emission was measured as EUT stand-up position (H mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case H position was reported.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 13 of 106

MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.55dB (for Spectrum) +/- 1.42 dB (for Power Meter)
6dB Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Peak Power Density	+/- 1.55 dB
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

Radiated Spurious Emission:

	30MHz - 180MHz: +/- 3.37dB
Management	180MHz -417MHz: +/- 3.19dB
Measurement uncertainty (Polarization : Vertical)	0.417GHz-1GHz: +/- 3.19dB
(1 olditzation : Vertical)	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB
	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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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 14 of 106

CONDUCTED EMISSION TEST

6.1 **Standard Applicable:**

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

Frequency range	Limits dB(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:**

	SGS Conducted Emission Test Site No.A											
Name of E	М	Calibration		Calibration	Calibration							
Name of Equipment	Manufacturer	Model	Serial Number	Date	Due							
EMI Test Receiver	R&S	ESCI 3	101311	06/27/2013	06/26/2014							
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	02/07/2013	02/06/2014							
LISN	Schwarzbeck	NSLK 8127	8127-648	06/17/2013	06/16/2014							
LISN	Rolf-Heine	NNB-2/16Z	99012	08/18/2013	08/17/2014							

6.3 EUT Setup:

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4:2009.
- 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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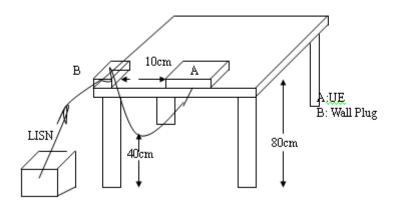
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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 15 of 106

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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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 16 of 106

AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation Mode			Test Date:	Jan. 15, 2014
Temperature:	15℃	Humidity:	56 %	Test By:	Jazz
M/N:	HD-13DW, SS-5			Probe:	L1/N

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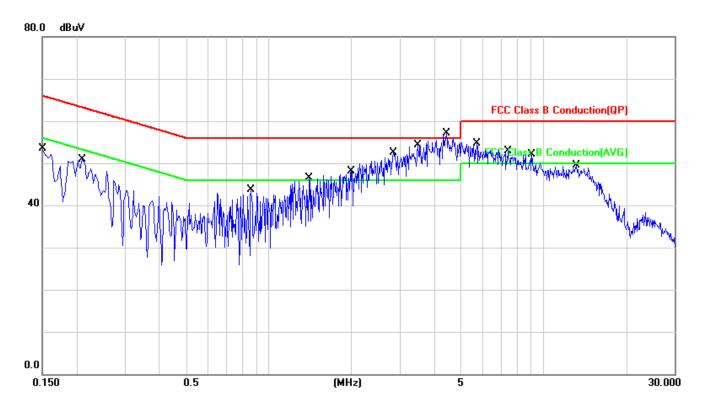
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Page: 17 of 106



No.	Mk.	Freq.₽	Reading₽	Factor₽	Measurement€	Limit₽	Over₽	Detector₽	Comment₽
47	42	(MHz)₽	dBuV₽	(dB)₽	(dBuV)₄□	(dBuV)₽	(dB)₽	₽	₽
1₽	42	0.1500₽	46.89₽	0.52₽	47.41₽	66.00₽	-18.59₽	QP₽	₽
2₽	42	0.1500₽	33.43₽	0.52₽	33.95₽	56.00₽	-22.05₽	AVG₽	₽
3₽	٠	0.2100₽	41.82₽	0.51₽	42.33₽	63.21₽	-20.88₽	QP₽	₽
4₽	٦	0.2100₽	30.08₽	0.51₽	30.59₽	53.21₽	-22.62₽	AVG₽	₽
5₽	٦	0.8620₽	35.72₽	0.54₽	36.26₽	56.00₽	-19.74₽	QP₽	₽
6₽	٦	0.8620₽	25.12₽	0.54₽	25.66₽	46.00₽	-20.34₽	AVG₽	₽
7₽	٦	1.4100₽	39.11₽	0.59₽	39.70₽	56.00₽	-16.30₽	QP₽	₽
8₽	٦	1.4100₽	27.35₽	0.59₽	27.94₽	46.00₽	-18.06₽	AVG₽	₽
9₽	٦	2.0060₽	42.59₽	0.63₽	43.22₽	56.00₽	-12.78₽	QP₽	₽
10₽	42	2.0060₽	31.23₽	0.63₽	31.86₽	46.00₽	-14.14₽	AVG₽	₽
11₽	٦	2.8460₽	45.43₽	0.67₽	46.10₽	56.00₽	-9.90₽	QP₽	₽
12₽	42	2.8460₽	35.61₽	0.67₽	36.28₽	46.00₽	-9.72₽	AVG₽	₽
13₽	٦	3.4940₽	46.64₽	0.69₽	47.33₽	56.00₽	-8.67₽	QP₽	₽
14₽	42	3.4940₽	37.31₽	0.69₽	38.00₽	46.00₽	-8.00₽	AVG₽	₽
15₽	٦	4.4420₽	48.13₽	0.72₽	48.85₽	56.00₽	-7.15₽	QP₽	₽
16₽	**	4.4420₽	38.55₽	0.72₽	39.27₽	46.00₽	-6.73₽	AVG₽	₽
17₽	٦	5.7420₽	45.78₽	0.80₽	46.58₽	60.00₽	-13.42₽	QP₽	₽
18₽	٦	5.7420₽	34.04₽	0.80₽	34.84₽	50.00₽	-15.16₽	AVG₽	₽
19₽	42	7.4460₽	44.11₽	0.88₽	44.99₽	60.00₽	-15.01₽	QP₽	₽
20₽	٠	7.4460₽	29.70₽	0.88₽	30.58₽	50.00₽	-19.42₽	AVG₽	₽
21₽	÷,	9.1020₽	41.75₽	0.96₽	42.71₽	60.00₽	-17.29₽	QP₽	₽
22₽	٦	9.1020₽	29.08₽	0.96₽	30.04₽	50.00₽	-19.96₽	AVG₽	₽
23₽	42	13.2420₽	40.38₽	1.17₽	41.55₽	60.00₽	-18.45₽	QP₽	₽
24₽	42	13.2420₽	28.55₽	1.17₽	29.72₽	50.00₽	-20.28₽	AVG₽	₽

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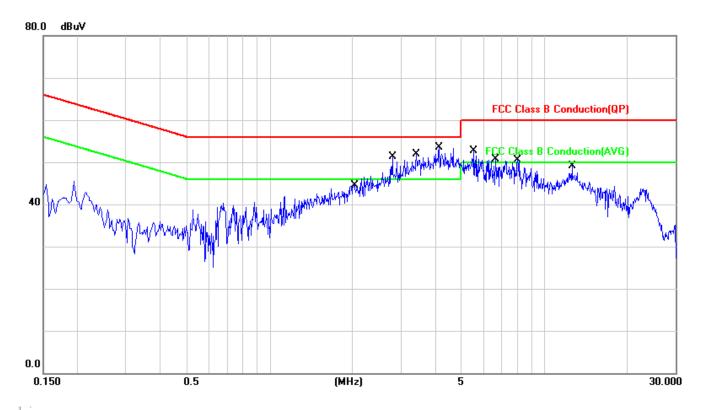
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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 18 of 106



No.₽	Mk.⇔	Freq.₽	Reading₽	Factor₽	Measurement-	Limit₽	Over₽	Detector₽	Comment₽
٩	47	(MHz)√	dBuV₽	(dB)√	(dBuV)₽	(dBuV)₽	(dB)₽	₽	₽
1₽	42	2.0380₽	39.76₽	0.31₽	40.07₽	56.00₽	-15.93₽	QP₽	₽
2₽	42	2.0380₽	30.81₽	0.31₽	31.12₽	46.00₽	-14.88₽	AVG₽	₽
3₽	42	2.8060₽	42.59₽	0.35₽	42.94₽	56.00₽	-13.06₽	QP₽	₽
4₽	42	2.8060₽	33.82₽	0.35₽	34.17₽	46.00₽	-11.83₽	AVG₽	₽
5₽	42	3.4300₽	43.62₽	0.38₽	44.00₽	56.00₽	-12.00₽	QP₽	₽
6₽	42	3.4300₽	35.35₽	0.38₽	35.73₽	46.00₽	-10.27₽	AVG₽	₽
7₽	42	4.1380₽	45.22₽	0.40₽	45.62₽	56.00₽	-10.38₽	QP₽	₽
8₽	**	4.1380₽	37.02₽	0.40₽	37.42₽	46.00₽	-8.58₽	AVG₽	₽
9₽	42	5.5580₽	42.63₽	0.46₽	43.09₽	60.00₽	-16.91₽	QP₽	₽
10₽	٠	5.5580₽	34.05₽	0.46₽	34.51₽	50.00₽	-15.49₽	AVG₽	₽
11₽	47	6.6580₽	40.82₽	0.50₽	41.32₽	60.00₽	-18.68₽	QP₽	₽
12₽	42	6.6580₽	31.36₽	0.50₽	31.86₽	50.00₽	-18.14₽	AVG₽	₽
13₽	٠	8.0060₽	38.88₽	0.56₽	39.44₽	60.00₽	-20.56₽	QP₽	₽
14₽	÷,	8.0060₽	29.49₽	0.56₽	30.05₽	50.00₽	-19.95₽	AVG₽	₽
15₽	٠	12.5940₽	38.55₽	0.70₽	39.25₽	60.00₽	-20.75₽	QP₽	₽
16₽	٠	12.5940₽	29.63₽	0.70₽	30.33₽	50.00₽	-19.67₽	AVG₽	₽

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Page: 19 of 106

7 PEAK OUTPUT POWER MEASUREMENT

7.1 Standard Applicable:

According to §15.247 (b)

- (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
- (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 20 of 106

7.2 **Measurement Equipment Used:**

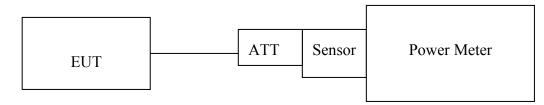
	\$	SGS Conducted Roo	om(ALL)		
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY53400256	10/26/2013	10/25/2014
Power Meter	Anritsu	ML2496A	1326001	06/28/2013	06/27/2014
Power Sensor	Anritsu	MA2411B	1315048	06/28/2013	06/27/2014
Power Sensor	Anritsu	MA2411B	1315049	06/28/2013	06/27/2014
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	HY-144	01/06/2014	01/05/2015
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	HY-145	01/06/2014	01/05/2015
Coaxial Cable 80cm	WOKEN	00100A1F1A185C	HY-143	01/06/2014	01/05/2015
DC Block	Mini-Circuits	BLK-18-S+	HY-146	01/06/2014	01/05/2015
DC Block	PASTERNACK	PE8210	HY-147	01/06/2014	01/05/2015
Splitter	RF-LAMBAD	RFLT2W1G18G	11-JSPF412-019	01/06/2014	01/05/2015
Splitter	WOKEN	-	DOM35LW1A2	01/06/2014	01/05/2015
Attenuator	Mini-Circuits	BW-S10W2+	HY-148	01/06/2014	01/05/2015
Attenuator	WOKEN	218FS-10	HY-149	01/06/2014	01/05/2015
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/20/2013	06/19/2014
DC Power Supply	HOLA	DP-3003	D707003S	N.C.R.	N.C.R.
DC Power Supply	DHA	DPS-3003	9411005787	N.C.R.	N.C.R.
DC Power Supply	Agilent	E3640A	MY53140006	N.C.R.	N.C.R.

7.3 Test Set-up:

Spectrum:



Power Meter:



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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 21 of 106

Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (**Peak power setting on Spectrum:** Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector =peak, Sweep = Auto. Setting on spectrum is adjusted based on the mandatory procedure in 9.1.2 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.1.3 in KDB558074 is followed.

(Avg. power setting on Spectrum: Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector = Avg., Trace avg = 100, Sweep = Auto, Setting on spectrum is adjusted based on the mandatory procedure in 9.2.2.4 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.2.3, option 3 in KDB558074 is followed.

- 3. Record the max. Reading as observed from Spectrum or Power Meter.
- 4. Repeat above procedures until all frequency of interest measured was complete.

Pre-anaysis Check: While conducting average power measurement, duty cycle of each mode (n ht20/ n ht40) 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. b = 99.2%, g = 99.6%, $n_ht_20 = 98.6\%$, and $n_40 = 98.8\%$, where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

 $Duty\ Cycle = Ton/(Ton+Toff)$

Test Procedure:

 $Set\ span = 0,\ RBW = 8MHz,\ VBW = 8MHz,\ Detector = Peak$ *Duty Cycle:*

	Duty Cycle	Duty Factor
802.11b	0.992	0.072
802.11g	0.996	0.038
802.11n_20 (2.4G)	0.986	0.122
802.11n_40 (2.4G)	0.988	0.102

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

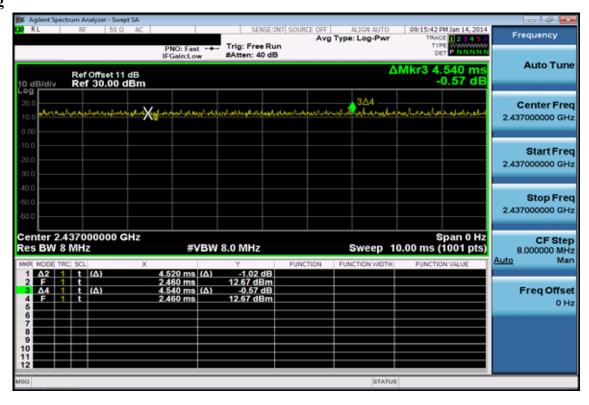
Page: 22 of 106

Duty Factor:

802.11 b



802.11 g



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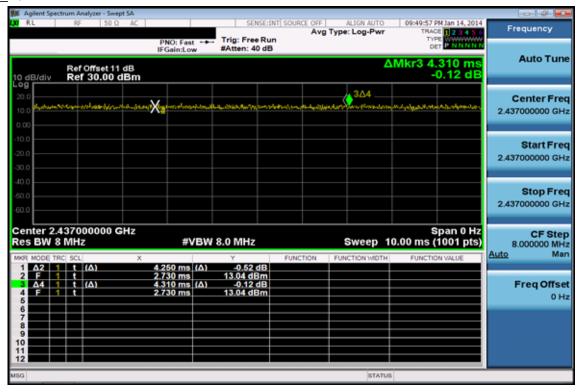
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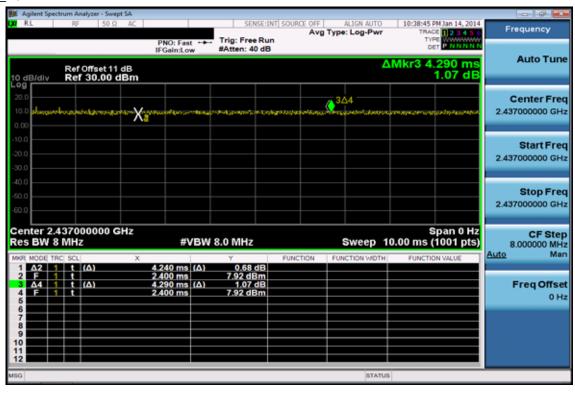
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 23 of 106

802.11 n 20 MHz



802.11 n 40M



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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 24 of 106

7.5 **Measurement Result:**

802.11b

V2.110													
			Peak Power Output (dBm)										
CII	Frequency		Degrained Limit										
СН	(MHz)	1	2	5.5	11	Required Limit							
1	2412	16.48	16.44	16.31	16.17	1 Watt = 30 dBm							
6	2437	16.40	16.30	16.32	16.31	1 Watt = 30 dBm							
11	2462	16.52	16.49	16.50	16.44	1 Watt = 30 dBm							

			Average Power Output (dBm)										
CII	Frequency (MHz)		D 11 ' '										
СН		1	2	5.5	11	Required Limit							
1	2412	14.32	14.21	14.02	13.89	1 Watt = 30 dBm							
6	2437	14.13	14.04	14.04	14.03	1 Watt = 30 dBm							
11	2462	14.25	14.22	14.19	14.16	1 Watt = 30 dBm							

802.11g

CII	Frequency (MHz)	Frequency Data Rate									Degrained Limit
СН		6	9	12	18	24	36	48	54	Required Limit	
1	2412	19.15	19.01	18.89	18.07	19.09	19.06	18.63	19.00	1 Watt = 30 dBm	
6	2437	19.16	19.01	18.92	18.27	19.08	19.04	18.81	19.02	1 Watt = 30 dBm	
11	2462	19.44	19.14	19.21	18.38	19.24	19.12	18.88	19.04	1 Watt = 30 dBm	

					Bm)						
СН	Frequency			Dogwined Limit							
Сп	(MHz)	6	9	12	18	8 24 36 48 54				Required Limit	
1	2412	9.58	9.56	9.49	9.43	9.42	9.37	9.29	9.25	1 Watt = 30 dBm	
6	2437	9.75	9.67	9.68	9.65	9.64	9.57	9.56	9.60	1 Watt = 30 dBm	
11	2462	10.03	9.83	9.81	9.77	9.73	9.67	9.61	9.63	1 Watt = 30 dBm	

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 25 of 106

802.11n 20M

			Peak Power Output(dBm)											
СН	Frequency	ency Data Rate												
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit				
1	2412	18.53	18.45	18.41	18.17	18.42	18.26	18.18	18.41	1 Watt = 30 dBm				
6	2437	19.23	19.18	19.14	18.40	18.72	18.60	18.54	18.51	1 Watt = 30 dBm				
11	2462	18.97	18.94	18.82	18.55	18.76	18.72	18.68	18.63	1 Watt = 30 dBm				

	Average Power Output(dBm)									
CII	Frequency (MHz)	Data Rate								Required
СН		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit
1	2412	9.35	9.31	9.28	9.26	9.25	9.21	9.23	9.20	1 Watt = 30 dBm
6	2437	9.95	9.80	9.81	9.66	9.60	9.58	9.54	9.54	1 Watt = 30 dBm
11	2462	9.86	9.84	9.77	9.69	9.64	9.67	9.64	9.61	1 Watt = 30 dBm

202 11n 40M

802.1	1n_40M					Dool	l. Darwa	. 0	4	
	Emagnaman					eal Pata Rat		Outpu	ι	
CH	Frequency (MHz)		MCS1	MCS2	1			MCS6	MCS7	Required Limit
3	2422	18.49	18.36	18.34	18.41	18.32	18.28	18.26	17.97	1 Watt = 30 dBm
6	2437	18.79	18.66	18.53	18.67	18.50	18.48	18.40	18.01	1 Watt = 30 dBm
9	2452	18.85	18.63	18.58	18.72	18.54	18.47	18.44	18.16	1 Watt = 30 dBm
						Avera	ige Pow	er Outp	out	
СН	Frequency	requency Data Rate						Dogwinod I ii4		
СН	(MHz)		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Required Limit
3	2422	9.20	9.17	9.16	9.12	9.10	9.06	9.08	9.08	1 Watt = 30 dBm
6	2437	9.48	9.43	9.35	9.28	9.30	9.25	9.24	9.15	1 Watt = 30 dBm
9	2452	9.57	9.44	9.41	9.38	9.35	9.32	9.31	9.33	1 Watt = 30 dBm

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

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 26 of 106

6dB BANDWIDTH

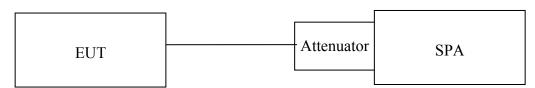
Standard Applicable:

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

Measurement Equipment Used:

Please refer to section 7.2 for the plots

8.3 **Test Set-up:**



Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto, the setting on spectrum is adjusted based on the procedure as guide in 8.1 option 1 of KDB558074.
- 4. Mark the peak frequency and –6dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency of interest measured was complete.

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 27 of 106

8.5 Measurement Result:

802.11b

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result	
2412	10.11	> 500	PASS	
2437	10.08	> 500	PASS	
2462	10.11	> 500	PASS	

802.11g

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result	
2412	16.57	> 500	PASS	
2437	16.57	> 500	PASS	
2462	16.57	> 500	PASS	

802.11n_20M

Frequency	Bandwidth	Limit	Result	
(MHz)	(kHz)	(kHz)		
2412	17.71	> 500	PASS	
2437	17.71	> 500	PASS	
2462	17.75	> 500	PASS	

802.11n_40M

Frequency	Bandwidth	Bandwidth	Result	
(MHz)	(kHz)	(kHz)		
2422	36.44	> 500	PASS	
2437	36.44	> 500	PASS	
2452	36.44	> 500	PASS	

^{*} Note: Offset 11dB for 2.4G 802.11b/g/n_20/n_40;

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^{*}Refer to next page for plots

Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 28 of 106

802.11b

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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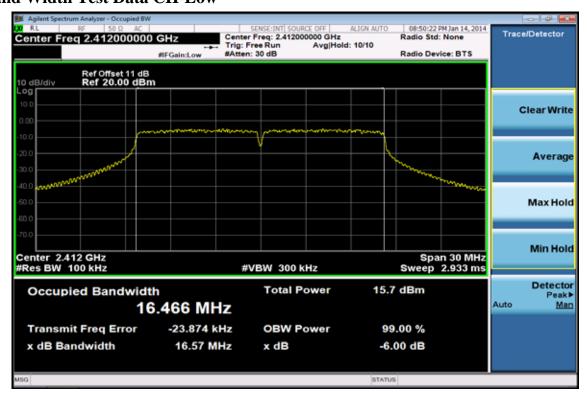
Page: 29 of 106

6dB Band Width Test Data CH-High



802.11g

6dB Band Width Test Data CH-Low



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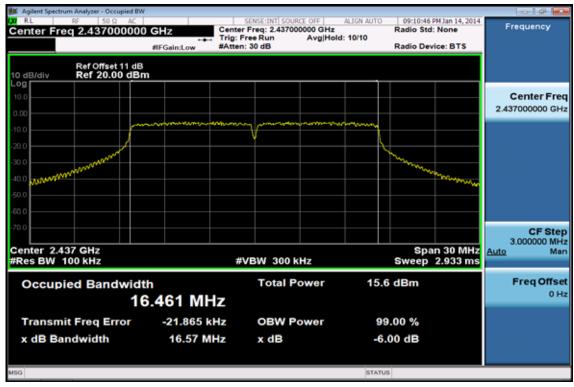
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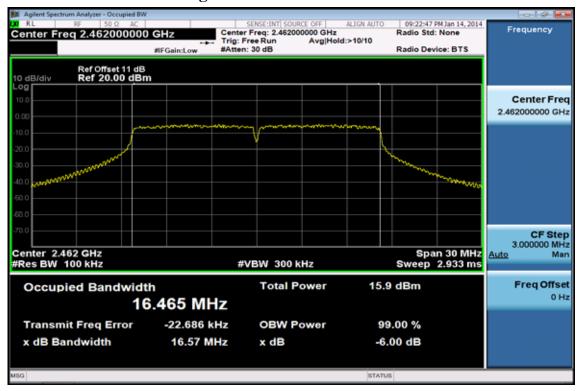
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Page: 30 of 106

6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



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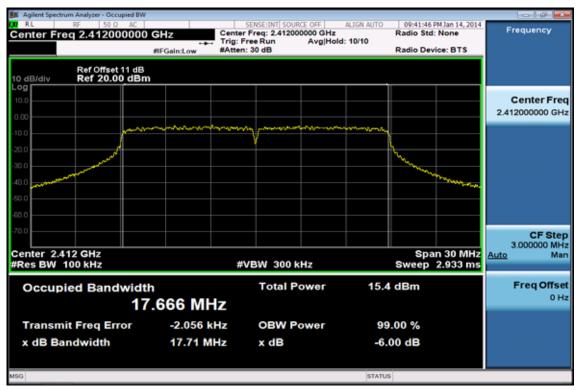
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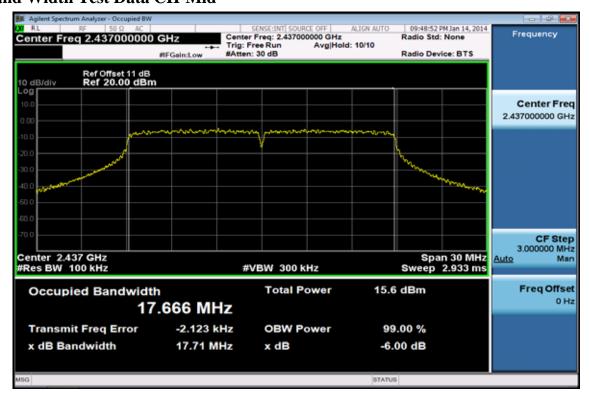
Page: 31 of 106

802.11n 20M

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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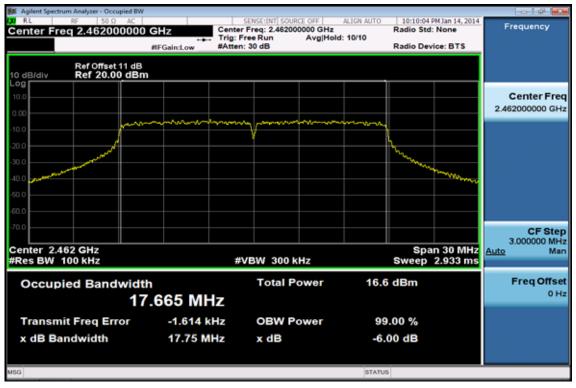
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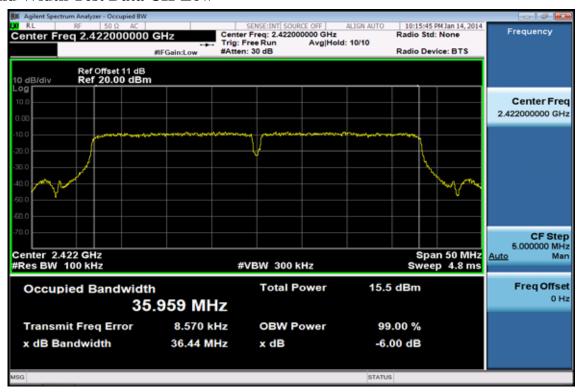
Page: 32 of 106

6dB Band Width Test Data CH-High



802.11n 40M

6dB Band Width Test Data CH-Low



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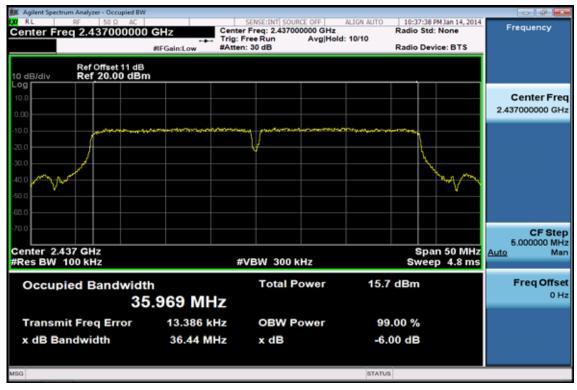
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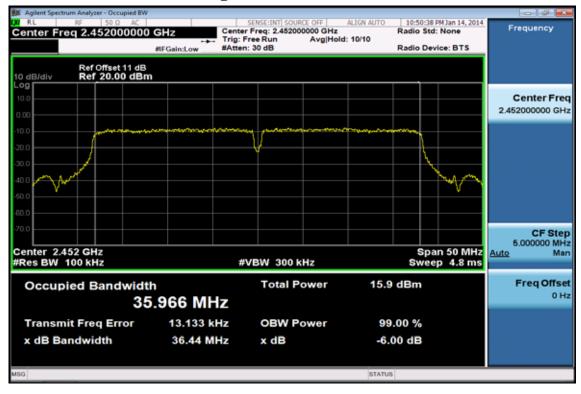
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 33 of 106

6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 34 of 106

BAND EDGES MEASUREMENT

Standard Applicable:

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

9.2 **Measurement Equipment Used:**

Conducted Emission at antenna port:

Refer to section 7.2 for details.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 35 of 106

9.2.2 Radiated emission:

SGS SAC Chamber No.C (FCC/IC/NCC)								
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due			
Signal Analyzer	R&S	FSV 40	101493	01/07/2014	01/06/2015			
EMI Test Receiver	R&S	ESCI 7	100950	01/11/2014	01/10/2015			
Broadband Antenna	TESEQ	CBL 6112D	35240	01/17/2014	01/16/2015			
Horn Antenna	ETS-Lindgren	3117	00143272	01/27/2014	01/26/2015			
Horn Antenna	ETS-Lindgren	3160-09	00117911	01/22/2014	01/21/2015			
Horn Antenna	ETS-Lindgren	3160-10	00117783	01/22/2014	01/21/2015			
Pre-Amplifier	R&S	SCU-18	10203	04/29/2013	04/28/2014			
Pre-Amplifier	EM Electronics Corp.	EMC330	980096	01/24/2014	01/23/2015			
Pre-Amplifier	EM Electronics Corp.	EMC184045	980135	01/24/2014	01/23/2015			
Coaxial Cable	Huber+Suhner	SAC-C TX-30M-1GHz	TX1	04/22/2013	04/21/2014			
Coaxial Cable	Huber+Suhner	SAC-C TX-1-26.5GHz	TX2	04/22/2013	04/21/2014			
Coaxial Cable	Huber+Suhner	SAC-C RX-150k-30MH z	RX1	04/22/2013	04/21/2014			
Coaxial Cable	Huber+Suhner	SAC-C RX-30M-1GHz	RX2	04/22/2013	04/21/2014			
Coaxial Cable	Huber+Suhner	SAC-C RX-1-26.5GHz	RX3	04/22/2013	04/21/2014			
Filter Bank	R&S	TS8996	SCIN.EMC.1023.12	04/22/2013	04/21/2014			
Attenuator	WOKEN	218FS-10	HY-151	01/06/2014	01/05/2015			
Controller	Chance Most	886	N/A	N.C.R.	N.C.R.			
Antenna Master	Chance Most	N/A	N/A	N.C.R.	N.C.R.			
Turn Table	Chance Most	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.			

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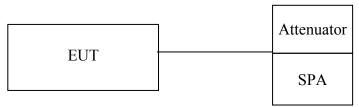


Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 36 of 106

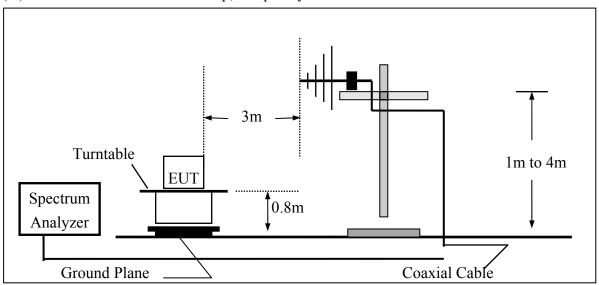
9.3 Test SET-UP:

9.3.1 Conducted Emission at antenna port:

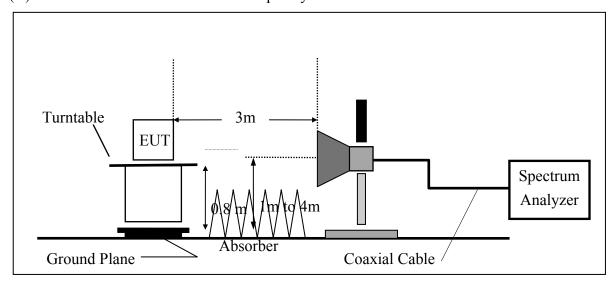


9.3.2 Radiated emission:

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



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



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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 37 of 106

Measurement Procedure:

Unwanted Emissions into Non-Restricted Frequency Bands, Measurement Procedure followed by 11.1 of KDB558074 D01

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- 4. Set the spectrum analyzer as RBW, VBW=300KHz, Detector = Peak, Sweep = auto
- 5. Mark the highest reading of the emission as the reference level measurement.
- 6. Set DL as the limit = reading on marker 1 20dBm
- 7. 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.
- 8. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Unwanted Emission falling into Restricted Frequency Bands, Measurement Procedure followed by 12.1 of KDB558074 D01:

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 3.EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 7.On spectrum, following 8.1.2, and RBW = 1MHz, VBW = 3MHz, & Marker 2390MHz, and 2483.5MHz (Peak Measurement). Average Measurement: following 8.2 with the modification span to 1MHz, &RBW = 1MHz, VBW = 3MHz and peak marker function to obtain the highest reading on 2390, and 2483.5MHz.
- 8. Repeat above procedures until all default test channel (low, middle, and high) was complete

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 38 of 106

9.5 **Field Strength Calculation:**

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

$$FS = RA + AF + CL - AG$$

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

Measurement Result:

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

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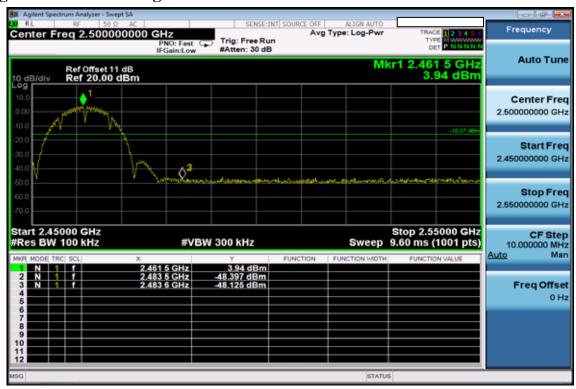
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 39 of 106

802.11b - Unwanted Emissions into Non-Restricted Frequency Bands **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 40 of 106

Radiated Emission:

(Unwanted Emissions into Restricted Frequency Bands): 802.11 b mode

:802.11b Test Date **Operation Band** :2014-02-11 Fundamental Frequency :2412 MHz Temp./Humi. :18.3deg C/55RH

Operation Mode :BANDEDGE LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Lev	el	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2373.80	S	Peak	48.14	3.09	51.23	74.00	-22.77
2373.80	S	Average	35.39	3.09	38.48	54.00	-15.52
2390.00	E	Peak	46.94	3.14	50.08	74.00	-23.92
2390.00	E	Average	34.78	3.14	37.92	54.00	-16.08
Fundamental Frequency :2412 Operation Mode :BANI		:802.11b :2412 MHz :BANDEDG :H Plan		Test Date Temp./Humi. Engineer Measurement An	tenna Pol.	:2014-02-11 :18.3deg_C/5: :Vito :HORIZONTA	

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor($dB\mu V/m$) + 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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2352.35	S	Peak	46.55	3.02	49.56	74.00	-24.44
2352.35	S	Average	32.74	3.02	35.76	54.00	-18.24
2390.00	E	Peak	45.31	3.14	48.45	74.00	-25.55
2390.00	E	Average	34.21	3.14	37.35	54.00	-16.65

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 41 of 106

Operation Band :802.11b Test Date :2014-02-11

Fundamental Frequency :2462 MHz Temp./Humi. :18.3deg C/55RH

Operation Mode :BANDEDGE HIGH Engineer :Vito EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Peak	47.81	3.35	51.16	74.00	-22.84
2483.50	Е	Average	37.18	3.35	40.53	54.00	-13.47
2483.90	S	Peak	48.52	3.35	51.88	74.00	-22.12
2483.90	S	Average	36.43	3.35	39.78	54.00	-14.22

Operation Band :802.11b Test Date :2014-02-11 Fundamental Frequency :2462 MHz Temp./Humi. :18.3deg C/55RH

Operation Mode Engineer :BANDEDGE HIGH :Vito

EUT Pol. Measurement Antenna Pol. :HORIZONTAL :H Plan

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Peak	46.13	3.35	49.48	74.00	-24.52
2483.50	E	Average	35.97	3.35	39.32	54.00	-14.68

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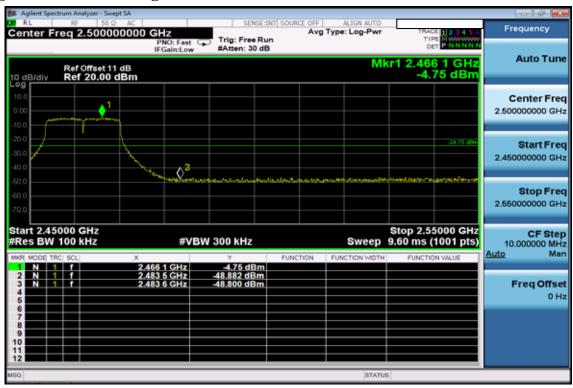
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 42 of 106

802.11g - Unwanted Emissions into Non-Restricted Frequency Bands **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 43 of 106

Radiated Emission:

(Unwanted Emissions into Restricted Frequency Bands): 802.11 g mode

Test Date **Operation Band** :802.11g :2014-02-11 :18.3deg C/55RH Fundamental Frequency :2412 MHz Temp./Humi.

Operation Mode :BANDEDGE LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Peak	45.64	3.14	48.78	74.00	-25.22
2390.00	E	Average	21.11	3.14	24.25	54.00	-29.75
•		:802.11g :2412 MHz		Date		:2014-02-11 :18.3deg_C/5	5RH

:BANDEDGE LOW Operation Mode Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

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

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Peak	45.49	3.14	48.63	74.00	-25.37
2390.00	E	Average	33.41	3.14	36.55	54.00	-17.45

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 44 of 106

Operation Band :802.11g Test Date :2014-02-11

Fundamental Frequency :2462 MHz Temp./Humi. :18.3deg C/55RH

Operation Mode :BANDEDGE HIGH Engineer :Vito EUT Pol. ·H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	dBμV/m	dBμV/m	dB
2483.50	E	Peak	48.10	3.35	51.46	74.00	-22.54
2483.50	E	Average	34.42	3.35	37.77	54.00	-16.23

Operation Band Test Date :2014-02-11 :802.11g Fundamental Frequency :2462 MHz Temp./Humi. :18.3deg C/55RH

Operation Mode :BANDEDGE HIGH Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

 $Factor(dB) = Antenna \; Factor(dB\mu V/m) + Cable \; Loss(dB) - Pre_Amplifier \; Gain(dB)$

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
2483.50	E	Peak	45.46	3.35	48.82	74.00	-25.18
2483.50	E	Average	33.95	3.35	37.30	54.00	-16.70

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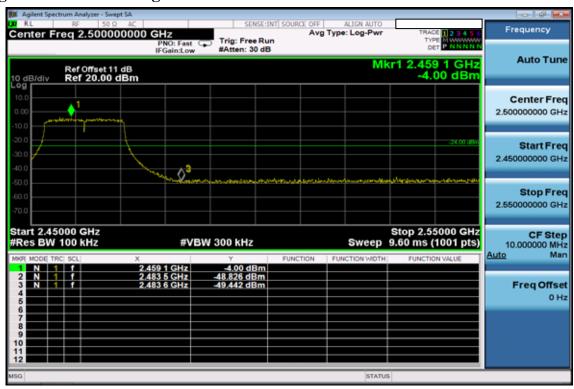
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 45 of 106

802.11n_20M- Unwanted Emissions into Non-Restricted Frequency Bands **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 46 of 106

Radiated Emission: 802.11 n 20M mode

(Unwanted Emissions into Restricted Frequency Bands): 802.11 n 20M mode

Test Date **Operation Band** :802.11n20M :2014-02-11 :18.3deg C/55RH Fundamental Frequency Temp./Humi. :2412 MHz

Operation Mode :BANDEDGE LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2390.00	E	Peak	49.62	3.14	52.76	74.00	-21.24
2390.00	E	Average	33.84	3.14	36.98	54.00	-17.02

Operation Band Test Date :2014-02-11 :802.11n20M Fundamental Frequency Temp./Humi. :2412 MHz :18.3deg C/55RH

Operation Mode :BANDEDGE LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

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

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
2351.91	S	Peak	45.35	3.02	48.36	74.00	-25.64
2351.91	S	Average	32.01	3.02	35.03	54.00	-18.97
2390.00	E	Peak	44.25	3.14	47.39	74.00	-26.61
2390.00	E	Average	31.99	3.14	35.13	54.00	-18.87

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 47 of 106

Operation Band :802.11n20M Test Date :2014-02-11

Fundamental Frequency :2462 MHz Temp./Humi. :18.3deg C/55RH

Operation Mode :BANDEDGE HIGH Engineer :Vito EUT Pol. ·H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Peak	50.48	3.35	53.83	74.00	-20.17
2483.50	E	Average	34.89	3.35	38.24	54.00	-15.76
2485.70	S	Peak	50.74	3.36	54.10	74.00	-19.90
2485.70	S	Average	34.25	3.36	37.61	54.00	-16.39

Operation Band :802.11n20M Test Date :2014-02-11 Fundamental Frequency :2462 MHz Temp./Humi. :18.3deg C/55RH

Operation Mode Engineer :BANDEDGE HIGH :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Peak	44.41	3.35	47.76	74.00	-26.24
2483.50	E	Average	33.60	3.35	36.95	54.00	-17.05

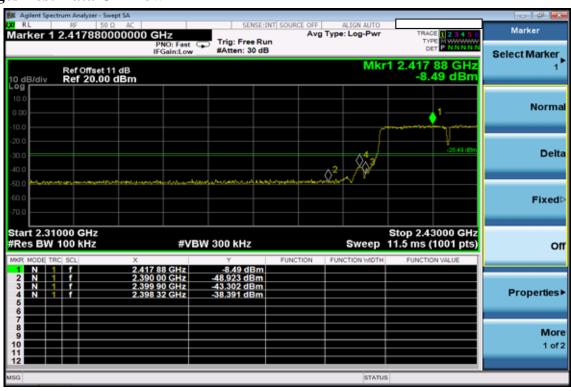
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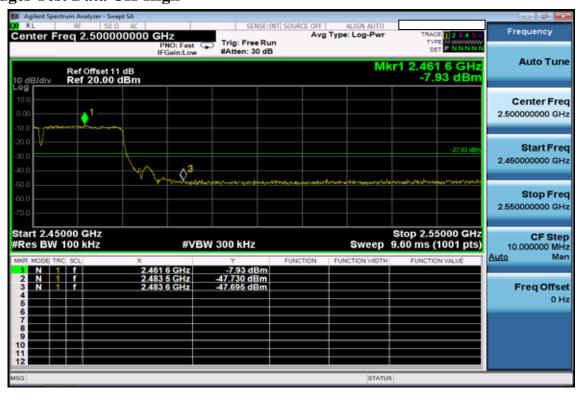
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 48 of 106

802.11n_40M - Unwanted Emissions into Non-Restricted Frequency Bands **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 49 of 106

Radiated Emission: 802.11 n 40M mode

(Unwanted Emissions into Restricted Frequency Bands): 802.11 n 40M mode

Operation Band Test Date :802.11n40M :2014-02-11 :18.3deg C/55RH Fundamental Frequency Temp./Humi. :2422 MHz

Operation Mode :BANDEDGE LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Peak	48.51	3.14	51.65	74.00	-22.35
2390.00	E	Average	33.96	3.14	37.10	54.00	-16.90
Operation Band	[:802.11n40M	Tes	t Date		:2014-02-11	

Fundamental Frequency Temp./Humi. :2422 MHz :18.3deg C/55RH Operation Mode :BANDEDGE LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

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

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2390.00	E	Peak	44.75	3.14	47.89	74.00	-26.11
2390.00	E	Average	32.52	3.14	35.66	54.00	-18.34

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 50 of 106

Operation Band :802.11n40M Test Date :2014-02-11

Fundamental Frequency :2452 MHz Temp./Humi. :18.3deg C/55RH Operation Mode :BANDEDGE HIGH Engineer

:Vito EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Peak	49.61	3.35	52.96	74.00	-21.04
2483.50	E	Average	35.41	3.35	38.76	54.00	-15.24
2484.10	S	Peak	52.40	3.36	55.75	74.00	-18.25
2484.10	S	Average	34.91	3.36	38.27	54.00	-15.73

Operation Band :802.11n40M Test Date :2014-02-11 Fundamental Frequency :2452 MHz Temp./Humi. :18.3deg C/55RH Operation Mode Engineer :BANDEDGE HIGH

:Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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

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

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Peak	46.26	3.35	49.62	74.00	-24.38
2483.50	E	Average	32.21	3.35	35.56	54.00	-18.44
2483.90	S	Peak	47.53	3.35	50.88	74.00	-23.12
2483.90	S	Average	32.23	3.35	35.58	54.00	-18.42

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 51 of 106

10 SPURIOUS EMISSION TEST

10.1 Standard Applicable

According to §15.247(d),

Emission at antenna port:

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Radiated Spurious Emission

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

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.

10.2 Measurement Equipment Used:

10.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

10.2.2 Radiated emission:

Refer to section 9.2.2 for details.

10.3 Test SET-UP:

10.3.1 Conducted Emission at antenna port:

Refer to section 7.3 for details.

10.3.2 Radiated emission:

Refer to section 9.3.2 for details.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 52 of 106

10.4 Measurement Procedure:

Radiated Emission:

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emis-
- 4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- 7. Repeat above procedures until all default test channel measured were complete.

Conducted Emission:

- To connect Antenna Port of EUT to Spectrum. 1.
- Set RBW = 100K & VBW = 300K on Spectrum. 2.
- 3. Sweep the frequency to determine spurious emission as seen on spectrum from span of 30 to 3G, 3G to 8G, 8G to 13G, 13G to 18G and 18G to 26.5GHz, 18G to 40GHz (applicable if operation mode is 5GHz)
- Via Software, combine 5 spans of frequency range into one plot 4.
- Repeat above procedures until all default test channel measured were complete. 5.

10.5 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	

10.6 Measurement Result:

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

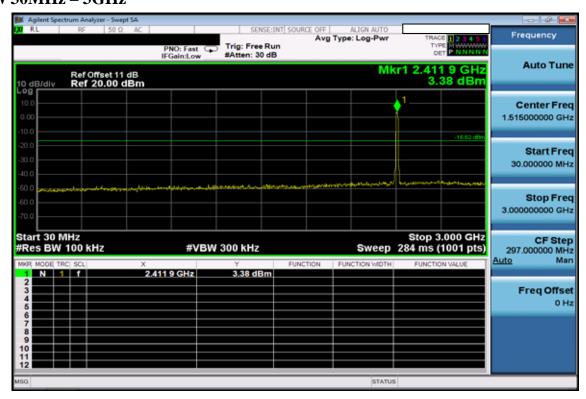
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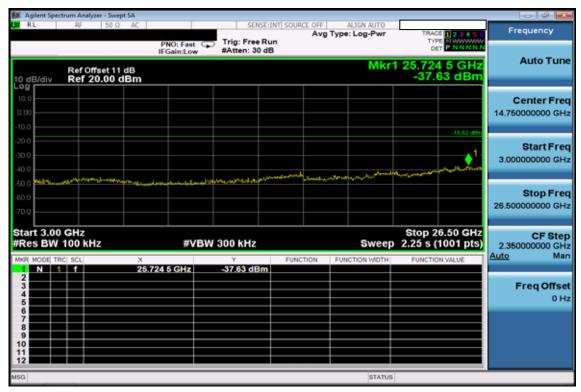
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 53 of 106

Conducted Spurious Emission Measurement Result (802.11b) Ch Low 30MHz - 3GHz



Ch Low 3GHz - 26.5GHz



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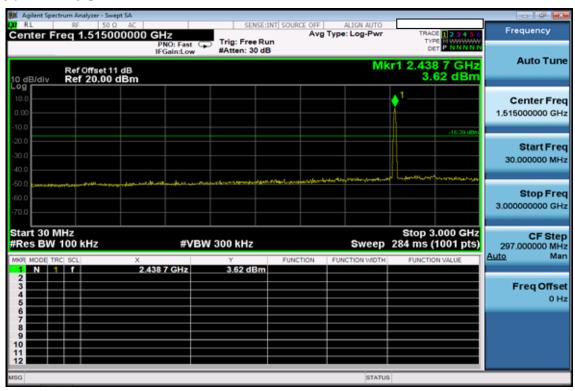
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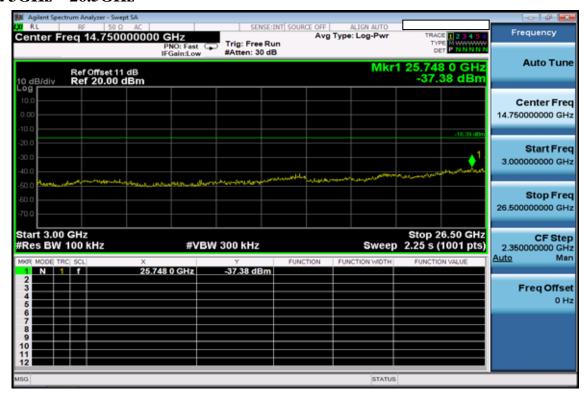
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 54 of 106

Ch Mid 30MHz - 3GHz



Ch Mid 3GHz - 26.5GHz



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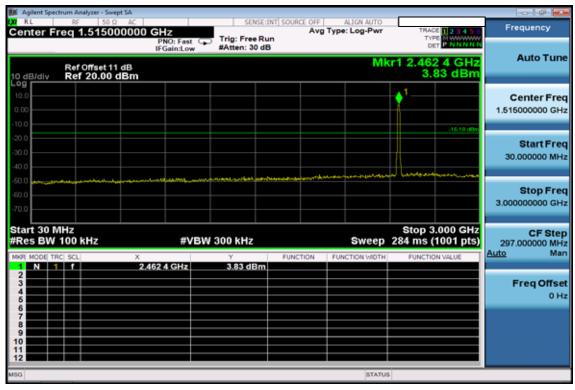
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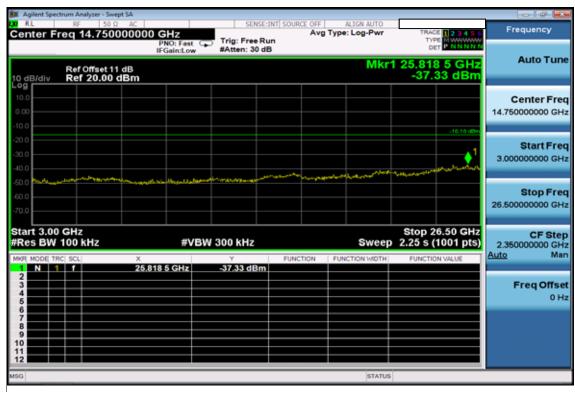
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 55 of 106

Ch High 30MHz - 3GHz



Ch High 3GHz - 26.5GHz



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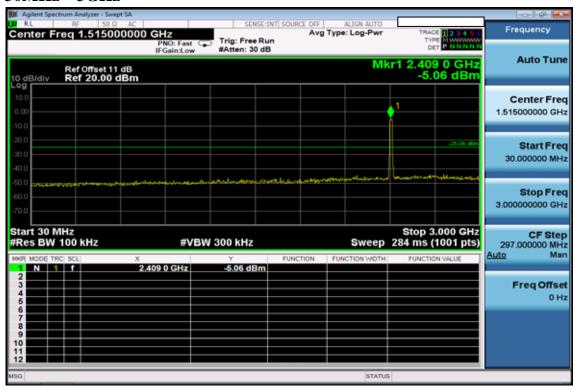
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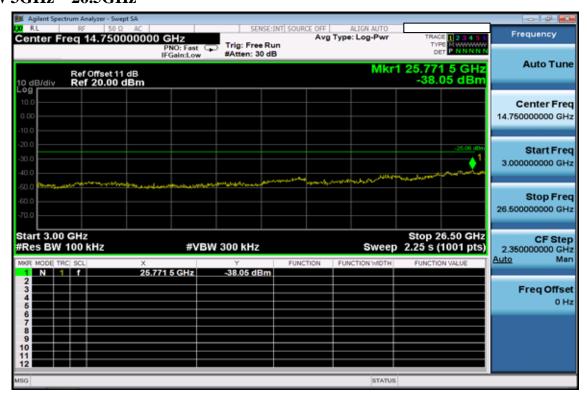
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 56 of 106

Conducted Spurious Emission Measurement Result (802.11g) Ch Low 30MHz - 3GHz



Ch Low 3GHz - 26.5GHz



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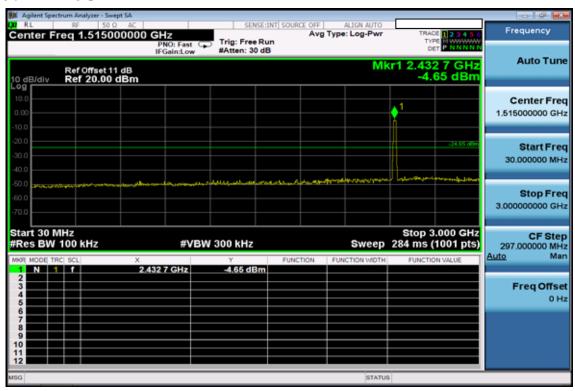
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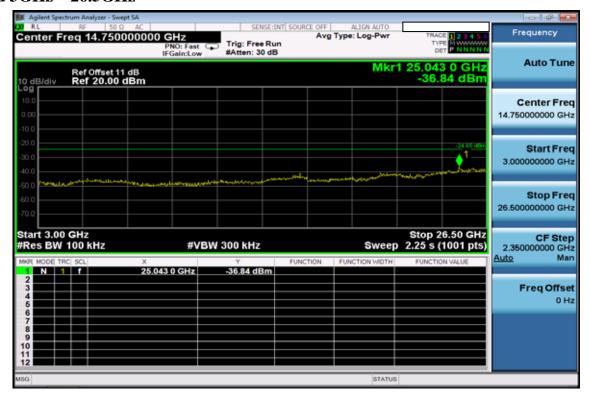
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 57 of 106

Ch Mid 30MHz - 3GHz



Ch Mid 3GHz - 26.5GHz



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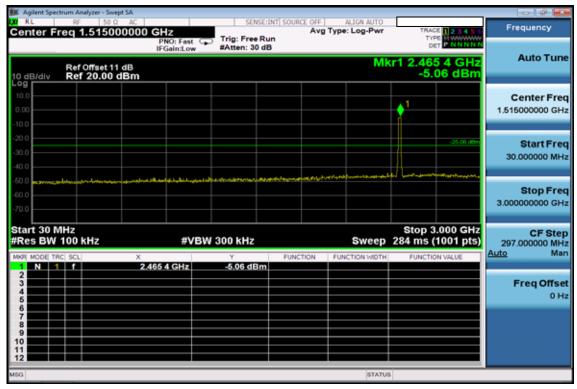
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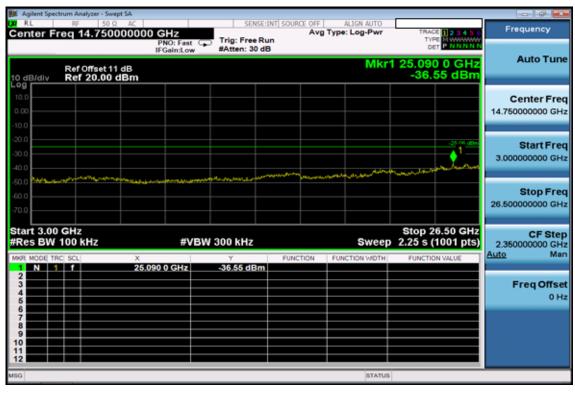
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 58 of 106

Ch High 30MHz - 3GHz



Ch High 3GHz - 26.5GHz



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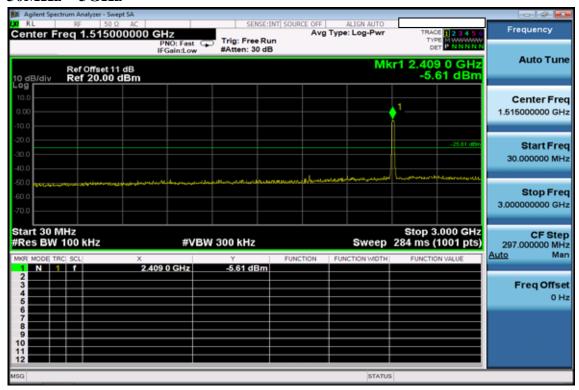
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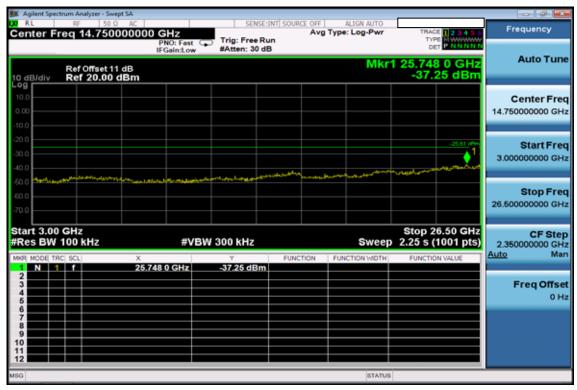
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 59 of 106

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



Ch Low 3GHz - 26.5GHz



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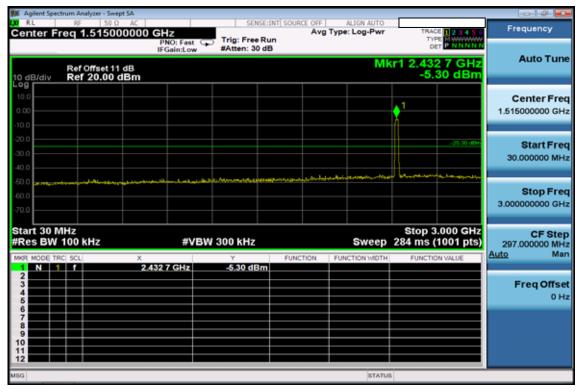
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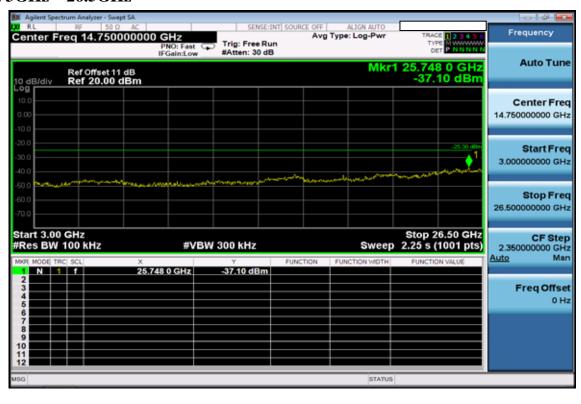
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 60 of 106

Ch Mid 30MHz - 3GHz



Ch Mid 3GHz - 26.5GHz



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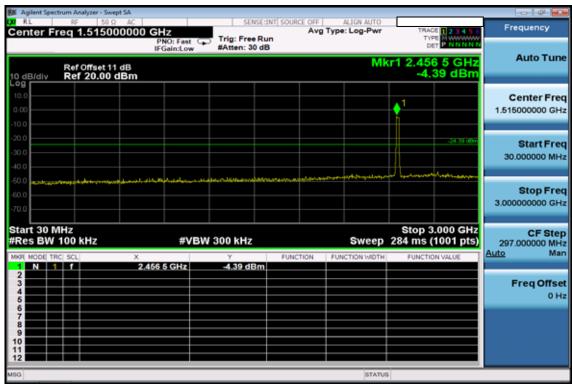
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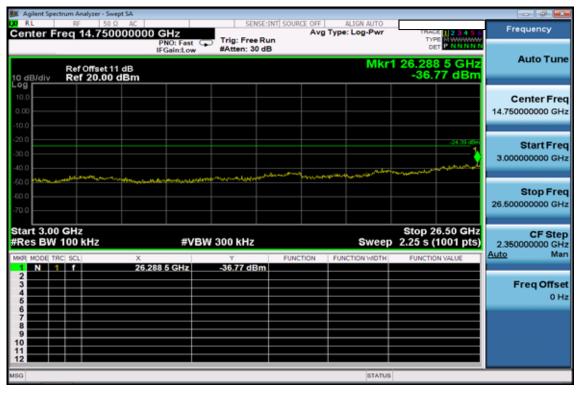
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 61 of 106

Ch High 30MHz - 3GHz



Ch High 3GHz - 26.5GHz



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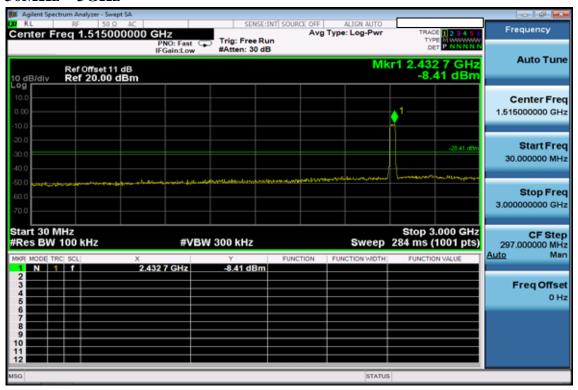
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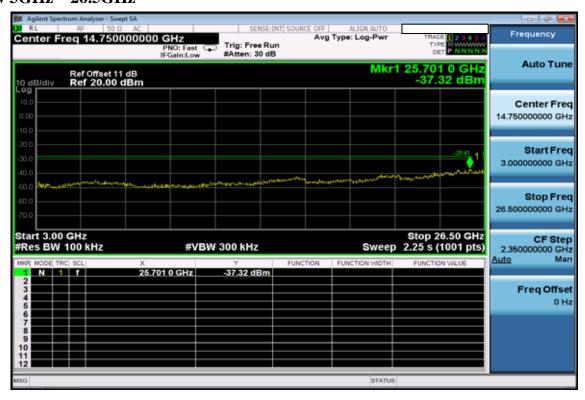
Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 62 of 106

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



Ch Low 3GHz - 26.5GHz



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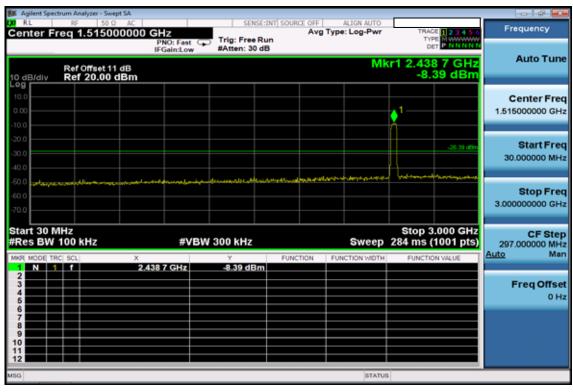
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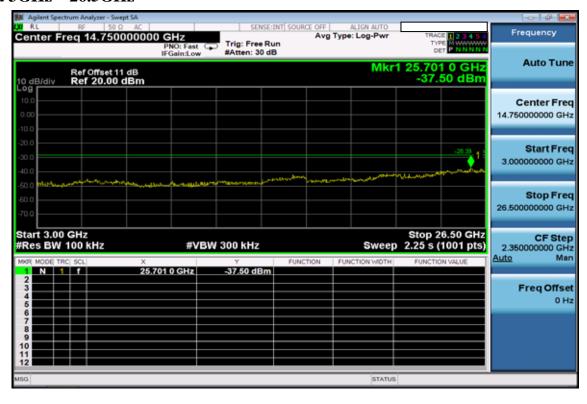
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 63 of 106

Ch Mid 30MHz - 3GHz



Ch Mid 3GHz - 26.5GHz



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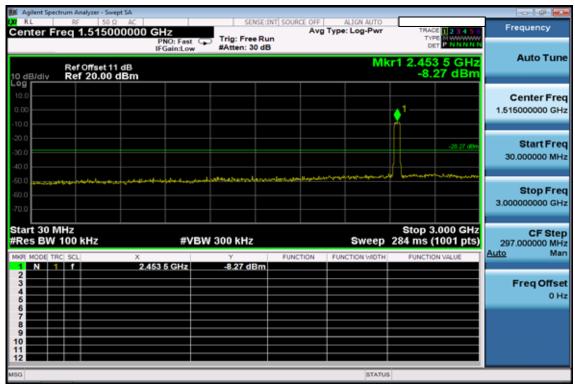
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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 64 of 106

Ch High 30MHz - 3GHz



Ch High 3GHz - 26.5GHz



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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 65 of 106

Radiated Spurious Emission Measurement Result (802.11b)

Operation Band :802.11b Test Date :2014-02-11 Fundamental Frequency :2412 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
37.76	S	Peak	34.51	-19.82	14.69	40.00	-25.31
205.57	S	Peak	42.11	-23.75	18.36	43.50	-25.14
243.40	S	Peak	51.54	-21.14	30.40	46.00	-15.60
336.52	S	Peak	53.22	-17.93	35.29	46.00	-10.71
405.39	S	Peak	48.31	-15.46	32.85	46.00	-13.15
641.10	S	Peak	48.09	-11.91	36.18	46.00	-9.82
2138.00	S	Peak	42.35	2.25	44.60	74.00	-29.40
2138.00	S	Average	29.31	2.25	31.56	54.00	-22.44
4824.00	Н	Peak	49.91	0.38	50.29	74.00	-23.71
4824.00	Н	Average	45.06	0.38	45.44	54.00	-8.56
4985.00	S	Peak	46.84	0.69	47.53	74.00	-26.47
4985.00	S	Average	34.83	0.69	35.52	54.00	-18.48
7236.00	Н	Peak	43.82	4.72	48.54	74.00	-25.46
7236.00	Н	Average	32.94	4.72	37.66	54.00	-16.34
7480.00	S	Peak	45.28	4.96	50.24	74.00	-23.76
7480.00	S	Average	28.44	4.96	33.40	54.00	-20.60
9648.00	Н	Peak	-	-	-	-	-
12060.00	Н	Peak	-	-	-	-	-
14472.00	Н	Peak	-	-	-	-	-
16884.00	Н	Peak	-	-	-	-	-
19296.00	Н	Peak	-	-	-	-	-
21708.00	Н	Peak	-	-	-	-	-
24120.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 66 of 106

Operation Band :802.11b Test Date :2014-02-11 Fundamental Frequency :2412 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
58.13	S	Peak	49.51	-28.71	20.79	40.00	-19.21
127.00	S	Peak	41.22	-21.55	19.67	43.50	-23.83
243.40	S	Peak	46.93	-21.14	25.78	46.00	-20.22
336.52	S	Peak	49.17	-17.93	31.24	46.00	-14.76
672.14	S	Peak	46.02	-11.60	34.42	46.00	-11.58
864.20	S	Peak	45.83	-9.82	36.01	46.00	-9.99
2138.00	S	Peak	42.81	2.25	45.06	74.00	-28.94
2138.00	S	Average	28.93	2.25	31.18	54.00	-22.82
3695.00	S	Peak	48.44	-2.05	46.39	74.00	-27.61
3695.00	S	Average	41.62	-2.05	39.57	54.00	-14.43
4824.00	Н	Peak	45.68	0.38	46.06	74.00	-27.94
4824.00	Н	Average	40.09	0.38	40.47	54.00	-13.53
7236.00	Н	Peak	-	-	-	-	-
9648.00	Н	Peak	-	-	-	-	-
12060.00	Н	Peak	-	-	-	-	-
14472.00	Н	Peak	-	-	-	-	-
16884.00	Н	Peak	-	-	-	-	-
19296.00	Н	Peak	-	-	-	-	-
21708.00	Н	Peak	-	-	-	-	-
24120.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 67 of 106

Operation Band :802.11b Test Date :2014-02-11 Fundamental Frequency :2437 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX MID Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
32.91	S	Peak	31.73	-17.34	14.39	40.00	-25.61
107.60	S	Peak	39.08	-22.28	16.80	43.50	-26.70
243.40	S	Peak	51.66	-21.14	30.52	46.00	-15.48
336.52	S	Peak	53.47	-17.93	35.54	46.00	-10.46
405.39	S	Peak	48.05	-15.46	32.58	46.00	-13.42
641.10	S	Peak	48.74	-11.91	36.83	46.00	-9.17
2246.00	S	Peak	41.23	2.62	43.86	74.00	-30.14
2246.00	S	Average	26.58	2.62	29.20	54.00	-24.80
4874.00	Н	Peak	47.55	0.41	47.95	74.00	-26.05
4874.00	Н	Average	43.68	0.41	44.09	54.00	-9.91
4990.00	S	Peak	46.50	0.71	47.21	74.00	-26.79
4990.00	S	Average	29.92	0.71	30.63	54.00	-23.37
7311.00	Н	Peak	43.02	4.83	47.84	74.00	-26.16
7311.00	Н	Average	33.74	4.83	38.57	54.00	-15.44
7475.00	S	Peak	46.22	4.97	51.19	74.00	-22.81
7475.00	S	Average	28.73	4.97	33.70	54.00	-20.30
9748.00	Н	Peak	-	-	-	-	-
12185.00	Н	Peak	-	-	-	-	-
14622.00	Н	Peak	-	-	-	-	-
17059.00	Н	Peak	-	-	-	-	-
19496.00	Н	Peak	-	-	-	-	-
21933.00	Н	Peak	-	-	-	-	-
24370.00	Н	Peak	-	-	-	-	-

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Page: 68 of 106

Operation Band :802.11b Test Date :2014-02-11 Fundamental Frequency :2437 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX MID Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MII-		Mode	Reading Level	ďΓ	FS	@3m	ďΓ
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
32.91	S	Peak	32.33	-17.34	14.99	40.00	-25.01
101.78	S	Peak	38.33	-22.93	15.40	43.50	-28.10
243.40	S	Peak	46.69	-21.14	25.55	46.00	-20.45
336.52	S	Peak	47.51	-17.93	29.58	46.00	-16.42
672.14	S	Peak	42.52	-11.60	30.92	46.00	-15.08
864.20	S	Peak	46.04	-9.82	36.22	46.00	-9.78
1224.00	S	Peak	44.63	1.21	45.84	74.00	-28.16
1224.00	S	Average	34.08	1.21	35.29	54.00	-18.71
3695.00	S	Peak	47.84	-2.05	45.79	74.00	-28.21
3695.00	S	Average	41.62	-2.05	39.57	54.00	-14.43
4874.00	Н	Peak	44.84	0.41	45.25	74.00	-28.75
4874.00	Н	Average	39.52	0.41	39.93	54.00	-14.07
7311.00	Н	Peak	-	-	-	-	-
9748.00	Н	Peak	-	-	-	-	-
12185.00	Н	Peak	-	-	-	-	-
14622.00	Н	Peak	-	-	-	-	-
17059.00	Н	Peak	-	-	-	-	-
19496.00	Н	Peak	-	-	-	-	-
21933.00	Н	Peak	-	-	-	-	-
24370.00	Н	Peak	-	-	-	-	-

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Page: 69 of 106

Operation Band :802.11b Test Date :2014-02-11 Fundamental Frequency :2462 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX HIGH Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
33.88	S	Peak	32.54	-17.83	14.70	40.00	-25.30
189.08	S	Peak	41.65	-24.24	17.42	43.50	-26.08
243.40	S	Peak	51.88	-21.14	30.74	46.00	-15.26
336.52	S	Peak	53.04	-17.93	35.10	46.00	-10.90
641.10	S	Peak	47.44	-11.91	35.53	46.00	-10.47
672.14	S	Peak	45.97	-11.60	34.37	46.00	-11.63
2138.00	S	Peak	42.24	2.25	44.48	74.00	-29.52
2138.00	S	Average	29.31	2.25	31.56	54.00	-22.44
4924.00	Н	Peak	46.75	0.50	47.25	74.00	-26.75
4924.00	Н	Average	40.91	0.50	41.41	54.00	-12.59
4990.00	S	Peak	46.23	0.71	46.94	74.00	-27.06
4990.00	S	Average	29.88	0.71	30.59	54.00	-23.41
7386.00	Н	Peak	42.60	5.01	47.61	74.00	-26.39
7386.00	Н	Average	33.61	5.01	38.62	54.00	-15.38
7485.00	S	Peak	46.63	4.96	51.58	74.00	-22.42
7485.00	S	Average	28.56	4.96	33.52	54.00	-20.48
9848.00	Н	Peak	-	-	-	-	-
12310.00	Н	Peak	-	-	-	-	-
14772.00	Н	Peak	-	-	-	-	-
17234.00	Н	Peak	-	-	-	-	-
19696.00	Н	Peak	-	-	-	-	-
22158.00	Н	Peak	-	-	-	-	-
24620.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 70 of 106

Operation Band :802.11b Test Date :2014-02-11 Fundamental Frequency :2462 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX HIGH Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	32.30	-16.84	15.46	40.00	-24.54
101.78	S	Peak	37.90	-22.93	14.97	43.50	-28.53
243.40	S	Peak	47.14	-21.14	26.00	46.00	-20.00
336.52	S	Peak	47.52	-17.93	29.58	46.00	-16.42
672.14	S	Peak	42.66	-11.60	31.06	46.00	-14.94
864.20	S	Peak	43.96	-9.82	34.14	46.00	-11.86
1188.00	S	Peak	43.90	1.08	44.98	74.00	-29.02
1188.00	S	Average	36.27	1.08	37.35	54.00	-16.65
3695.00	S	Peak	48.15	-2.05	46.10	74.00	-27.90
3695.00	S	Average	41.21	-2.05	39.16	54.00	-14.84
4924.00	Н	Peak	43.49	0.50	43.98	74.00	-30.02
4924.00	Н	Average	33.85	0.50	34.35	54.00	-19.65
4995.00	S	Peak	46.06	0.72	46.79	74.00	-27.21
4995.00	S	Average	29.93	0.72	30.65	54.00	-23.35
7386.00	Н	Peak	-	-	-	-	-
9848.00	Н	Peak	-	-	-	-	-
12310.00	Н	Peak	-	-	-	-	-
14772.00	Н	Peak	-	-	-	-	-
17234.00	Н	Peak	-	-	-	-	-
19696.00	Н	Peak	-	-	-	-	-
22158.00	Н	Peak	-	-	-	-	-
24620.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 71 of 106

Radiated Spurious Emission Measurement Result (802.11g)

Operation Band :802.11g Test Date :2014-02-11 Fundamental Frequency :2412 MHz Temp./Humi. :25.7deg C/59RH

Operation Mode :TX LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB) "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. "E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
32.91	S	Peak	31.71	-17.34	14.37	40.00	-25.63
189.08	S	Peak	41.27	-24.24	17.04	43.50	-26.46
243.40	S	Peak	51.72	-21.14	30.57	46.00	-15.43
336.52	S	Peak	53.51	-17.93	35.57	46.00	-10.43
405.39	S	Peak	48.23	-15.46	32.77	46.00	-13.23
644.98	S	Peak	48.78	-11.67	37.12	46.00	-8.88
2154.00	S	Peak	41.83	2.31	44.14	74.00	-29.86
2154.00	S	Average	28.48	2.31	30.79	54.00	-23.21
4824.00	Н	Peak	43.31	0.38	43.69	74.00	-30.31
4824.00	Н	Average	35.10	0.38	35.48	54.00	-18.52
4985.00	S	Peak	46.15	0.69	46.84	74.00	-27.16
4985.00	S	Average	29.79	0.69	30.48	54.00	-23.52
6145.00	S	Peak	44.37	3.25	47.62	74.00	-26.38
6145.00	S	Average	40.01	3.25	43.26	54.00	-10.74
7236.00	Н	Peak	-	-	-	-	-
7475.00	S	Peak	47.19	4.97	52.16	74.00	-21.84
7475.00	S	Average	28.41	4.97	33.38	54.00	-20.62
9648.00	Н	Peak	-	-	-	-	-
12060.00	Н	Peak	-	-	-	-	-
14472.00	Н	Peak	-	-	-	-	-
16884.00	Н	Peak	-	-	-	-	-
19296.00	Н	Peak	-	-	-	-	-
21708.00	Н	Peak	-	-	-	-	-
24120.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 72 of 106

Operation Band :802.11g Test Date :2014-02-11 Fundamental Frequency :2412 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

3. T. .

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	$dB\mu V/m$	$dB\mu V/m$	dB
41.64	S	Peak	41.58	-22.28	19.30	40.00	-20.70
107.60	S	Peak	43.36	-22.28	21.07	43.50	-22.43
243.40	S	Peak	46.84	-21.14	25.69	46.00	-20.31
336.52	S	Peak	48.11	-17.93	30.18	46.00	-15.82
641.10	S	Peak	43.01	-11.91	31.10	46.00	-14.90
864.20	S	Peak	44.81	-9.82	34.99	46.00	-11.01
2140.00	S	Peak	42.20	2.25	44.45	74.00	-29.55
2140.00	S	Average	28.39	2.25	30.64	54.00	-23.36
3695.00	S	Peak	47.65	-2.05	45.60	74.00	-28.40
3695.00	S	Average	40.90	-2.05	38.85	54.00	-15.15
4824.00	Н	Peak	44.00	0.38	44.39	74.00	-29.61
4824.00	Н	Average	35.75	0.38	36.13	54.00	-17.87
7236.00	Н	Peak	-	-	-	-	-
9648.00	Н	Peak	-	-	-	-	-
12060.00	Н	Peak	-	-	-	-	-
14472.00	Н	Peak	-	-	-	-	-
16884.00	Н	Peak	-	-	-	-	-
19296.00	Н	Peak	-	-	-	-	-
21708.00	Н	Peak	-	-	-	-	-
24120.00	Н	Peak	-	-	-	-	-

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Page: 73 of 106

Operation Band :802.11g Test Date :2014-02-11 Fundamental Frequency :2437 MHz Temp./Humi. :25.7deg C/59RH

Operation Mode :TX MID Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
32.91	S	Peak	31.66	-17.34	14.32	40.00	-25.68
107.60	S	Peak	51.32	-22.28	29.04	43.50	-14.46
243.40	S	Peak	51.80	-21.14	30.66	46.00	-15.34
336.52	S	Peak	52.76	-17.93	34.82	46.00	-11.18
641.10	S	Peak	48.25	-11.91	36.34	46.00	-9.66
672.14	S	Peak	45.85	-11.60	34.25	46.00	-11.75
2140.00	S	Peak	41.87	2.25	44.12	74.00	-29.88
2140.00	S	Average	28.05	2.25	30.30	54.00	-23.70
4874.00	Н	Peak	43.27	0.41	43.68	74.00	-30.32
4874.00	Н	Average	34.80	0.41	35.21	54.00	-18.79
4995.00	S	Peak	47.28	0.72	48.01	74.00	-25.99
4995.00	S	Average	29.81	0.72	30.53	54.00	-23.47
7311.00	Н	Peak	-	-	-	-	-
7475.00	S	Peak	46.13	4.97	51.09	74.00	-22.91
7475.00	S	Average	28.33	4.97	33.30	54.00	-20.70
9748.00	Н	Peak	-	-	-	-	-
12185.00	Н	Peak	-	-	-	-	-
14622.00	Н	Peak	-	-	-	-	-
17059.00	Н	Peak	-	-	-	-	-
19496.00	Н	Peak	-	-	-	-	-
21933.00	Н	Peak	-	-	-	-	-
24370.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 74 of 106

Operation Band :802.11g Test Date :2014-02-11 Fundamental Frequency :2437 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX MID Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

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Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	$dB\mu V/m$	$dB\mu V/m$	dB
							_
58.13	S	Peak	45.82	-28.71	17.10	40.00	-22.90
173.56	S	Peak	51.30	-23.87	27.43	43.50	-16.07
243.40	S	Peak	46.82	-21.14	25.68	46.00	-20.32
336.52	S	Peak	47.02	-17.93	29.08	46.00	-16.92
672.14	S	Peak	50.10	-11.60	38.50	46.00	-7.50
864.20	S	Peak	44.69	-9.82	34.87	46.00	-11.13
2370.00	S	Peak	42.26	3.07	45.34	74.00	-28.66
2370.00	S	Average	26.76	3.07	29.83	54.00	-24.17
3695.00	S	Peak	47.97	-2.05	45.92	74.00	-28.08
3695.00	S	Average	41.05	-2.05	39.00	54.00	-15.00
4874.00	Н	Peak	43.94	0.41	44.35	74.00	-29.65
4874.00	Н	Average	35.78	0.41	36.19	54.00	-17.81
7311.00	Н	Peak	-	-	-	-	-
9748.00	Н	Peak	-	-	-	-	-
12185.00	Н	Peak	-	-	-	-	-
14622.00	Н	Peak	-	-	-	-	-
17059.00	Н	Peak	-	-	-	-	-
19496.00	Н	Peak	-	-	-	-	-
21933.00	Н	Peak	-	-	-	-	-
24370.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 75 of 106

Operation Band Test Date :2014-02-11 :802.11g Fundamental Frequency :2462 MHz Temp./Humi. :25.7deg C/59RH

Operation Mode :TX HIGH Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB) "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. "E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	$dB\mu V/m$	dBμV/m	dB
37.76	S	Peak	55.17	-19.82	35.35	40.00	-4.65
189.08	S	Peak	41.66	-24.24	17.42	43.50	-26.08
243.40	S	Peak	51.65	-21.14	30.51	46.00	-15.49
336.52	S	Peak	53.14	-17.93	35.21	46.00	-10.79
405.39	S	Peak	48.44	-15.46	32.98	46.00	-13.02
637.22	S	Peak	46.02	-12.17	33.85	46.00	-12.15
2324.00	S	Peak	40.96	2.93	43.89	74.00	-30.11
2324.00	S	Average	26.57	2.93	29.50	54.00	-24.50
4924.00	Н	Peak	43.54	0.50	44.03	74.00	-29.97
4924.00	Н	Average	33.86	0.50	34.36	54.00	-19.64
4985.00	S	Peak	45.90	0.69	46.59	74.00	-27.41
4985.00	S	Average	29.70	0.69	30.39	54.00	-23.61
6145.00	S	Peak	44.50	3.25	47.75	74.00	-26.25
6145.00	S	Average	39.76	3.25	43.01	54.00	-10.99
7386.00	Н	Peak	-	-	-	-	-
7485.00	S	Peak	45.64	4.96	50.60	74.00	-23.40
7485.00	S	Average	28.37	4.96	33.33	54.00	-20.67
9848.00	Н	Peak	-	-	-	-	-
12310.00	Н	Peak	-	-	-	-	-
14772.00	Н	Peak	-	-	-	-	-
17234.00	Н	Peak	-	-	-	-	-
19696.00	Н	Peak	-	-	-	-	-
22158.00	Н	Peak	-	-	-	-	-
24620.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 76 of 106

Operation Band :802.11g Test Date :2014-02-11 Fundamental Frequency :2462 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX HIGH Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
32.91	S	Peak	32.24	-17.34	14.90	40.00	-25.10
171.62	S	Peak	43.21	-23.82	19.39	43.50	-24.11
243.40	S	Peak	47.35	-21.14	26.20	46.00	-19.80
336.52	S	Peak	53.14	-17.93	35.21	46.00	-10.79
672.14	S	Peak	42.91	-11.60	31.31	46.00	-14.69
864.20	S	Peak	43.99	-9.82	34.17	46.00	-11.83
2162.00	S	Peak	42.86	2.34	45.21	74.00	-28.79
2162.00	S	Average	27.04	2.34	29.38	54.00	-24.62
3695.00	S	Peak	47.69	-2.05	45.64	74.00	-28.36
3695.00	S	Average	40.96	-2.05	38.91	54.00	-15.09
4924.00	Н	Peak	43.11	0.50	43.60	74.00	-30.40
4924.00	Н	Average	35.76	0.50	36.26	54.00	-17.74
4980.00	S	Peak	45.89	0.68	46.56	74.00	-27.44
4980.00	S	Average	29.24	0.68	29.92	54.00	-24.08
7386.00	Н	Peak	-	-	-	-	-
9848.00	Н	Peak	-	-	-	-	-
12310.00	Н	Peak	-	-	-	-	-
14772.00	Н	Peak	-	-	-	-	-
17234.00	Н	Peak	-	-	-	-	-
19696.00	Н	Peak	-	-	-	-	-
22158.00	Н	Peak	-	-	-	-	-
24620.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 77 of 106

Radiated Spurious Emission Measurement Result (802.11n 20M)

Operation Band :802.11n20M :2014-02-11 Test Date Fundamental Frequency :2412 MHz Temp./Humi. :25.7deg C/59RH

Operation Mode :TX LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB) "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. "E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
82.38	S	Peak	46.96	-26.27	20.68	40.00	-19.32
189.08	S	Peak	41.45	-24.24	17.21	43.50	-26.29
243.40	S	Peak	51.88	-21.14	30.74	46.00	-15.26
336.52	S	Peak	53.70	-17.93	35.77	46.00	-10.23
640.13	S	Peak	44.95	-11.95	33.00	46.00	-13.00
672.14	S	Peak	44.94	-11.60	33.33	46.00	-12.67
2364.00	S	Peak	42.30	3.05	45.36	74.00	-28.64
2364.00	S	Average	29.47	3.05	32.52	54.00	-21.48
4824.00	Н	Peak	43.04	0.38	43.42	74.00	-30.58
4824.00	Н	Average	35.08	0.38	35.46	54.00	-18.54
4980.00	S	Peak	46.92	0.68	47.60	74.00	-26.40
4980.00	S	Average	29.71	0.68	30.39	54.00	-23.61
6145.00	S	Peak	44.21	3.25	47.46	74.00	-26.54
6145.00	S	Average	39.81	3.25	43.06	54.00	-10.94
7236.00	Н	Peak	-	-	-	-	-
7475.00	S	Peak	46.50	4.97	51.47	74.00	-22.53
7475.00	S	Average	28.44	4.97	33.41	54.00	-20.59
9648.00	Н	Peak	-	-	-	-	-
12060.00	Н	Peak	-	-	-	-	-
14472.00	Н	Peak	-	-	-	-	-
16884.00	Н	Peak	-	-	-	-	-
19296.00	Н	Peak	-	-	-	-	-
21708.00	Н	Peak	-	-	-	-	-
24120.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 78 of 106

Operation Band :802.11n20M Test Date :2014-02-11 Fundamental Frequency :2412 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level	150	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
33.88	S	Peak	34.31	-17.83	16.48	40.00	-23.52
118.27	S	Peak	41.43	-21.78	19.65	43.50	-23.85
243.40	S	Peak	46.89	-21.14	25.74	46.00	-20.26
336.52	S	Peak	47.48	-17.93	29.54	46.00	-16.46
672.14	S	Peak	43.20	-11.60	31.60	46.00	-14.40
864.20	S	Peak	45.46	-9.82	35.64	46.00	-10.36
2368.00	S	Peak	41.80	3.07	44.87	74.00	-29.13
2368.00	S	Average	27.54	3.07	30.61	54.00	-23.39
3695.00	S	Peak	48.07	-2.05	46.02	74.00	-27.98
3695.00	S	Average	40.95	-2.05	38.90	54.00	-15.10
4824.00	Н	Peak	43.54	0.38	43.93	74.00	-30.07
4824.00	Н	Average	35.61	0.38	35.99	54.00	-18.01
4975.00	S	Peak	45.81	0.66	46.47	74.00	-27.53
4975.00	S	Average	29.74	0.66	30.40	54.00	-23.60
7236.00	Н	Peak	-	-	-	-	-
9648.00	Н	Peak	-	-	-	-	-
12060.00	Н	Peak	-	-	-	-	-
14472.00	Н	Peak	-	-	-	-	-
16884.00	Н	Peak	-	-	-	-	-
19296.00	Н	Peak	-	-	-	-	-
21708.00	Н	Peak	-	-	-	-	-
24120.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 79 of 106

Operation Band :802.11n20M Test Date :2014-02-11 Fundamental Frequency :2437 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX MID Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	31.54	-16.84	14.70	40.00	-25.30
189.08	S	Peak	41.61	-24.24	17.38	43.50	-26.12
243.40	S	Peak	51.71	-21.14	30.57	46.00	-15.43
336.52	S	Peak	53.09	-17.93	35.16	46.00	-10.84
405.39	S	Peak	48.56	-15.46	33.10	46.00	-12.90
641.10	S	Peak	46.30	-11.91	34.39	46.00	-11.61
2384.00	S	Peak	42.02	3.12	45.14	74.00	-28.86
2384.00	S	Average	27.76	3.12	30.88	54.00	-23.12
4874.00	Н	Peak	43.54	0.41	43.95	74.00	-30.05
4874.00	Н	Average	34.23	0.41	34.64	54.00	-19.36
4995.00	S	Peak	45.33	0.72	46.05	74.00	-27.95
4995.00	S	Average	29.70	0.72	30.42	54.00	-23.58
7311.00	Н	Peak	-	-	-	-	-
7470.00	S	Peak	46.40	4.97	51.38	74.00	-22.62
7470.00	S	Average	28.38	4.97	33.35	54.00	-20.65
9748.00	Н	Peak	-	-	-	-	-
12185.00	Н	Peak	-	-	-	-	-
14622.00	Н	Peak	-	-	-	-	-
17059.00	Н	Peak	-	-	-	-	-
19496.00	Н	Peak	-	-	-	-	-
21933.00	Н	Peak	-	-	-	-	-
24370.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 80 of 106

Operation Band :802.11n20M Test Date :2014-02-11 Fundamental Frequency :2437 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX MID Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
	P/II/P/G	Mode	Reading Level	tr.	FS	@3m	tr.
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
32.91	S	Peak	32.28	-17.34	14.93	40.00	-25.07
101.78	S	Peak	39.37	-22.93	16.44	43.50	-27.06
243.40	S	Peak	49.01	-21.14	27.87	46.00	-18.13
336.52	S	Peak	47.66	-17.93	29.72	46.00	-16.28
672.14	S	Peak	42.51	-11.60	30.91	46.00	-15.09
864.20	S	Peak	46.45	-9.82	36.63	46.00	-9.37
2496.00	S	Peak	42.29	3.38	45.68	74.00	-28.33
2496.00	S	Average	27.49	3.38	30.87	54.00	-23.13
3695.00	S	Peak	48.76	-2.05	46.71	74.00	-27.29
3695.00	S	Average	40.99	-2.05	38.94	54.00	-15.06
4874.00	Н	Peak	43.37	0.41	43.78	74.00	-30.22
4874.00	Н	Average	36.00	0.41	36.41	54.00	-17.59
7311.00	Н	Peak	-	-	-	-	-
9748.00	Н	Peak	-	-	-	-	-
12185.00	Н	Peak	-	-	-	-	-
14622.00	Н	Peak	-	-	-	-	-
17059.00	Н	Peak	-	-	-	-	-
19496.00	Н	Peak	-	-	-	-	-
21933.00	Н	Peak	-	-	-	-	-
24370.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 81 of 106

Operation Band :802.11n20M Test Date :2014-02-11 Fundamental Frequency :2462 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX HIGH Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
57.16	S	Peak	48.50	-28.49	20.01	40.00	-19.99
101.78	S	Peak	40.26	-22.93	17.33	43.50	-26.17
243.40	S	Peak	51.69	-21.14	30.55	46.00	-15.45
336.52	S	Peak	54.37	-17.93	36.44	46.00	-9.56
641.10	S	Peak	55.30	-11.91	43.39	46.00	-2.61
907.85	S	Peak	49.74	-9.10	40.64	46.00	-5.36
2370.00	S	Peak	41.69	3.07	44.77	74.00	-29.23
2370.00	S	Average	28.76	3.07	31.83	54.00	-22.17
4924.00	Н	Peak	44.08	0.50	44.58	74.00	-29.42
4924.00	Н	Average	34.00	0.50	34.50	54.00	-19.50
4980.00	S	Peak	46.15	0.68	46.83	74.00	-27.17
4980.00	S	Average	29.78	0.68	30.46	54.00	-23.54
7386.00	Н	Peak	-	-	-	-	-
7490.00	S	Peak	46.76	4.95	51.71	74.00	-22.29
7490.00	S	Average	28.49	4.95	33.44	54.00	-20.56
9848.00	Н	Peak	-	-	-	-	-
12310.00	Н	Peak	-	-	-	-	-
14772.00	Н	Peak	-	-	-	-	-
17234.00	Н	Peak	-	-	-	-	-
19696.00	Н	Peak	-	-	-	-	-
22158.00	Н	Peak	-	-	-	-	-
24620.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 82 of 106

Operation Band :802.11n20M Test Date :2014-02-11 Fundamental Frequency :2462 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX HIGH Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

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Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	$dB\mu V/m$	$dB\mu V/m$	dB
63.95	S	Peak	50.03	-29.19	20.84	40.00	-19.16
159.98	S	Peak	38.19	-23.08	15.12	43.50	-28.38
243.40	S	Peak	47.37	-21.14	26.23	46.00	-19.77
336.52	S	Peak	48.30	-17.93	30.37	46.00	-15.63
641.10	S	Peak	47.26	-11.91	35.35	46.00	-10.65
914.64	S	Peak	47.45	-9.15	38.30	46.00	-7.70
2372.00	S	Peak	41.55	3.08	44.63	74.00	-29.37
2372.00	S	Average	27.11	3.08	30.19	54.00	-23.81
3695.00	S	Peak	47.79	-2.05	45.74	74.00	-28.26
3695.00	S	Average	40.97	-2.05	38.92	54.00	-15.08
4924.00	Н	Peak	43.71	0.50	44.21	74.00	-29.79
4924.00	Н	Average	35.52	0.50	36.02	54.00	-17.98
7386.00	Н	Peak	-	-	-	-	-
9848.00	Н	Peak	-	-	-	-	-
12310.00	Н	Peak	-	-	-	-	-
14772.00	Н	Peak	-	-	-	-	-
17234.00	Н	Peak	-	-	-	-	-
19696.00	Н	Peak	-	-	-	-	-
22158.00	Н	Peak	-	-	-	-	-
24620.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 83 of 106

Radiated Spurious Emission Measurement Result (802.11n_40M)

Operation Band :802.11n40M Test Date :2014-02-11 Fundamental Frequency :2422 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

$$\label{eq:Factor} \begin{split} & Factor(dB) = Antenna \ Factor(dB\mu V/m) + Cable \ Loss(dB) - Pre_Amplifier \ Gain(dB) \\ & Note: \quad \text{``F''}: denotes \ Fundamental \ Frequency.; \ \text{``H''}: denotes \ Harmonic \ Frequency. } \\ & \quad \text{``E''}: denotes \ Band \ Edge \ Frequency.; \ \text{``S''}: denotes \ Spurious \ Frequency. } \end{split}$$

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
31.41	S	Peak	31.20	-16.56	14.64	40.00	-25.36
101.78	S	Peak	37.09	-22.93	14.16	43.50	-29.34
243.40	S	Peak	50.42	-21.14	29.28	46.00	-16.72
336.52	S	Peak	52.59	-17.93	34.65	46.00	-11.35
636.25	S	Peak	52.11	-12.17	39.94	46.00	-6.06
918.52	S	Peak	48.86	-9.12	39.74	46.00	-6.26
2366.00	S	Peak	42.16	3.06	45.22	74.00	-28.78
2366.00	S	Average	28.77	3.06	31.83	54.00	-22.17
4844.00	Н	Peak	43.09	0.39	43.48	74.00	-30.52
4844.00	Н	Average	34.78	0.39	35.17	54.00	-18.83
4985.00	S	Peak	45.51	0.69	46.20	74.00	-27.80
4985.00	S	Average	29.81	0.69	30.50	54.00	-23.50
6145.00	S	Peak	43.89	3.25	47.14	74.00	-26.86
6145.00	S	Average	39.75	3.25	43.00	54.00	-11.00
7356.00	Н	Peak	-	-	-	-	-
7465.00	S	Peak	46.43	4.98	51.40	74.00	-22.60
7465.00	S	Average	28.39	4.98	33.37	54.00	-20.63
9688.00	Н	Peak	-	-	-	-	-
12110.00	Н	Peak	-	-	-	-	-
14532.00	Н	Peak	-	-	-	-	-
16954.00	Н	Peak	-	-	-	-	-
19376.00	Н	Peak	-	-	-	-	-
21798.00	Н	Peak	-	-	-	-	-
24220.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 84 of 106

Operation Band :802.11n40M Test Date :2014-02-11 Fundamental Frequency :2422 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX LOW Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
30.00	S	Peak	32.45	-15.85	16.60	40.00	-23.40
127.97	S	Peak	38.81	-21.57	17.23	43.50	-26.27
243.40	S	Peak	47.75	-21.14	26.61	46.00	-19.39
336.52	S	Peak	51.87	-17.93	33.94	46.00	-12.06
641.10	S	Peak	48.26	-11.91	36.35	46.00	-9.65
914.64	S	Peak	48.75	-9.15	39.60	46.00	-6.40
2570.00	S	Peak	42.61	3.58	46.19	74.00	-27.81
2570.00	S	Average	27.22	3.58	30.80	54.00	-23.20
3695.00	S	Peak	48.84	-2.05	46.79	74.00	-27.21
3695.00	S	Average	40.97	-2.05	38.92	54.00	-15.08
4844.00	Н	Peak	43.25	0.39	43.64	74.00	-30.36
4844.00	Н	Average	37.10	0.39	37.49	54.00	-16.51
4995.00	S	Peak	46.04	0.72	46.76	74.00	-27.24
4995.00	S	Average	29.85	0.72	30.57	54.00	-23.43
7356.00	Н	Peak	-	-	-	-	-
9688.00	Н	Peak	-	-	-	-	-
12110.00	Н	Peak	-	-	-	-	-
14532.00	Н	Peak	-	-	-	-	-
16954.00	Н	Peak	-	-	-	-	-
19376.00	Н	Peak	-	-	-	-	-
21798.00	Н	Peak	-	-	-	-	-
24220.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 85 of 106

Operation Band Test Date :2014-02-11 :802.11n40M Fundamental Frequency :2437 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode Engineer :TX MID :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
30.00	S	Peak	37.87	-15.85	22.02	40.00	-17.98
101.78	S	Peak	38.70	-22.93	15.77	43.50	-27.73
336.52	S	Peak	53.32	-17.93	35.39	46.00	-10.61
384.05	S	Peak	50.83	-16.40	34.42	46.00	-11.58
640.13	S	Peak	51.75	-11.95	39.80	46.00	-6.20
914.64	S	Peak	49.57	-9.15	40.42	46.00	-5.58
2768.00	S	Peak	41.99	3.95	45.93	74.00	-28.07
2768.00	S	Average	26.98	3.95	30.93	54.00	-23.07
4874.00	Н	Peak	43.32	0.41	43.72	74.00	-30.28
4874.00	Н	Average	34.49	0.41	34.90	54.00	-19.10
5000.00	S	Peak	46.40	0.74	47.14	74.00	-26.86
5000.00	S	Average	29.67	0.74	30.41	54.00	-23.59
7311.00	Н	Peak	-	-	-	-	-
7500.00	S	Peak	46.83	4.94	51.77	74.00	-22.23
7500.00	S	Average	29.97	4.94	34.91	54.00	-19.09
9748.00	Н	Peak	-	-	-	-	-
12185.00	Н	Peak	-	-	-	-	-
14622.00	Н	Peak	-	-	-	-	-
17059.00	Н	Peak	-	-	-	-	-
19496.00	Н	Peak	-	-	-	-	-
21933.00	Н	Peak	-	-	-	-	-
24370.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 86 of 106

Operation Band :802.11n40M Test Date :2014-02-11 Fundamental Frequency :2437 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX MID Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
32.91	S	Peak	39.77	-17.34	22.42	40.00	-17.58
159.98	S	Peak	37.73	-23.08	14.65	43.50	-28.85
336.52	S	Peak	50.98	-17.93	33.05	46.00	-12.95
636.25	S	Peak	50.19	-12.17	38.02	46.00	-7.98
863.23	S	Peak	48.04	-9.85	38.18	46.00	-7.82
2760.00	S	Peak	41.97	3.89	45.85	74.00	-28.15
2760.00	S	Average	26.83	3.89	30.72	54.00	-23.28
3695.00	S	Peak	48.51	-2.05	46.46	74.00	-27.54
3695.00	S	Average	40.97	-2.05	38.92	54.00	-15.08
4874.00	Н	Peak	43.46	0.41	43.87	74.00	-30.13
4874.00	Н	Average	36.32	0.41	36.73	54.00	-17.27
7311.00	Н	Peak	-	-	-	-	-
9748.00	Н	Peak	-	-	-	-	-
12185.00	Н	Peak	-	-	-	-	-
14622.00	Н	Peak	-	-	-	-	-
17059.00	Н	Peak	-	-	-	-	-
19496.00	Н	Peak	-	-	-	-	-
21933.00	Н	Peak	-	-	-	-	-
24370.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 87 of 106

Operation Band :802.11n40M Test Date :2014-02-11 Fundamental Frequency :2452 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX HIGH Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :VERTICAL

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
30.00	S	Peak	39.87	-15.85	24.02	40.00	-15.98
189.08	S	Peak	40.71	-24.24	16.47	43.50	-27.03
324.88	S	Peak	57.72	-18.18	39.54	46.00	-6.46
383.08	S	Peak	53.11	-16.42	36.69	46.00	-9.31
637.22	S	Peak	54.67	-12.17	42.50	46.00	-3.50
908.82	S	Peak	47.84	-9.10	38.73	46.00	-7.27
2152.00	S	Peak	42.03	2.30	44.33	74.00	-29.67
2152.00	S	Average	27.95	2.30	30.25	54.00	-23.75
4904.00	Н	Peak	42.76	0.43	43.19	74.00	-30.81
4904.00	Н	Average	34.21	0.43	34.64	54.00	-19.36
4995.00	S	Peak	47.23	0.72	47.96	74.00	-26.04
4995.00	S	Average	29.70	0.72	30.42	54.00	-23.58
7356.00	Н	Peak	-	-	-	-	-
7480.00	S	Peak	45.86	4.96	50.82	74.00	-23.18
7480.00	S	Average	28.51	4.96	33.47	54.00	-20.53
9808.00	Н	Peak	-	-	-	-	-
12260.00	Н	Peak	-	-	-	-	-
14712.00	Н	Peak	-	-	-	-	-
17164.00	Н	Peak	-	-	-	-	-
19616.00	Н	Peak	-	-	-	-	-
22068.00	Н	Peak	-	-	-	-	-
24520.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 88 of 106

Operation Band :802.11n40M Test Date :2014-02-11 Fundamental Frequency :2452 MHz Temp./Humi. :25.7deg_C/59RH

Operation Mode :TX HIGH Engineer :Vito

EUT Pol. :H Plan Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/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.

"---": denotes Noise Floor.

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Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	$dB\mu V/m$	dB
							_
69.77	S	Peak	52.08	-28.61	23.47	40.00	-16.53
159.98	S	Peak	38.98	-23.08	15.90	43.50	-27.60
243.40	S	Peak	47.47	-21.14	26.33	46.00	-19.67
320.03	S	Peak	50.74	-18.33	32.41	46.00	-13.59
641.10	S	Peak	49.22	-11.91	37.31	46.00	-8.69
868.08	S	Peak	48.58	-9.73	38.85	46.00	-7.15
2128.00	S	Peak	42.42	2.20	44.63	74.00	-29.37
2128.00	S	Average	27.98	2.20	30.18	54.00	-23.82
3695.00	S	Peak	47.71	-2.05	45.66	74.00	-28.34
3695.00	S	Average	41.06	-2.05	39.01	54.00	-14.99
4904.00	Н	Peak	42.95	0.43	43.38	74.00	-30.62
4904.00	Н	Average	36.69	0.43	37.12	54.00	-16.88
7356.00	Н	Peak	-	-	-	-	-
9808.00	Н	Peak	-	-	-	-	-
12260.00	Н	Peak	-	-	-	-	-
14712.00	Н	Peak	-	-	-	-	-
17164.00	Н	Peak	-	-	-	-	-
19616.00	Н	Peak	-	-	-	-	-
22068.00	Н	Peak	-	-	-	-	-
24520.00	Н	Peak	-	-	-	-	-

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 89 of 106

11 PEAK POWER SPECTRAL DENSITY

11.1 Standard Applicable:

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

11.2 Measurement Equipment Used:

Refer to section 7.2 for details.

11.3 Test Set-up:

Refer to section 7.3 for details. (Spectrum Option)

11.4 Measurement Procedure (following the measurement procedure 10.2 of KDB558074):

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS channel bandwidth.
- 3. Set the RBW \geq 3 kHz.
- 4. Set the VBW \geq 3 x RBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 90 of 106

11.5 Measurement Result:

802.11b

Frequency	RF Power Density	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-16.380	8
2437	-16.252	8
2462	-16.178	8

802.11g

Frequency	RF Power Density	Maximum Limit (dBm)		
MHz	Reading (dBm)			
2412	-19.400	8		
2437	-19.278	8		
2462	-19.080	8		

802.11n 20M

Frequency	RF Power Density	Maximum Limit		
MHz	Reading (dBm)	(dBm)		
2412	-19.163	8		
2437	-19.020	8		
2462	-18.020	8		

802.11n_40M

Frequency	RF Power Density	Maximum Limit		
MHz	Reading (dBm)	(dBm)		
2422	-19.036	8		
2437	-19.180	8		
2452	-20.062	8		

^{*} Note: Offset 11dB for 2.4G 802.11b/g/n_20/n_40.

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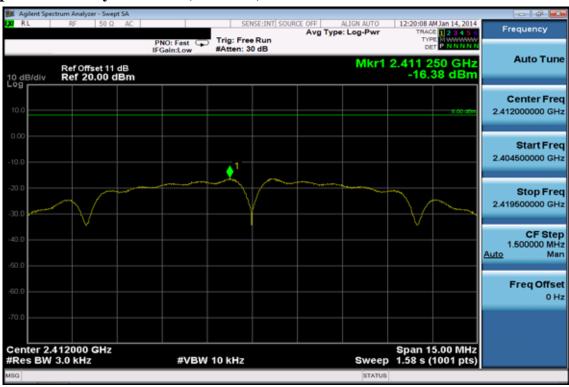
^{*}Refer to next page for plots

Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

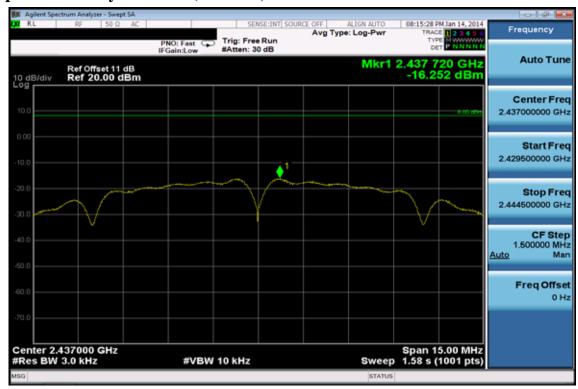
Page: 91 of 106

802.11b

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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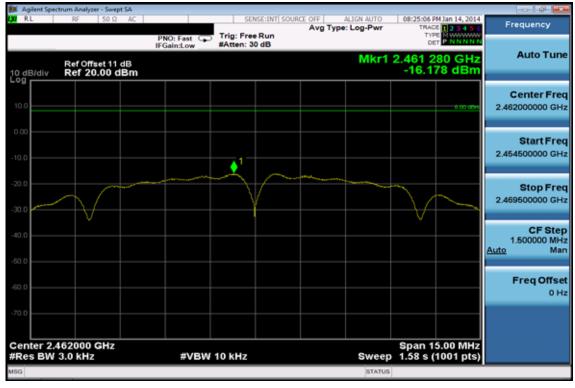
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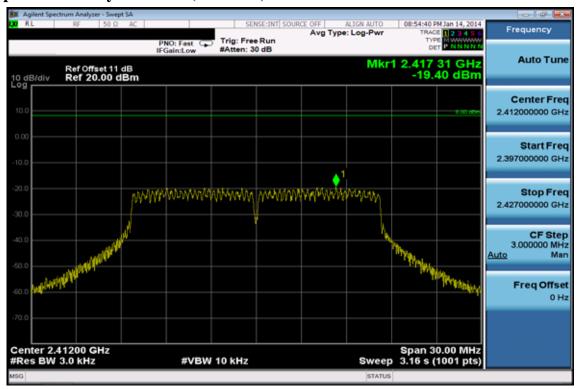
Page: 92 of 106

Power Spectral Density Test Plot (CH-High)



802.11g

Power Spectral Density Test Plot (CH-Low)



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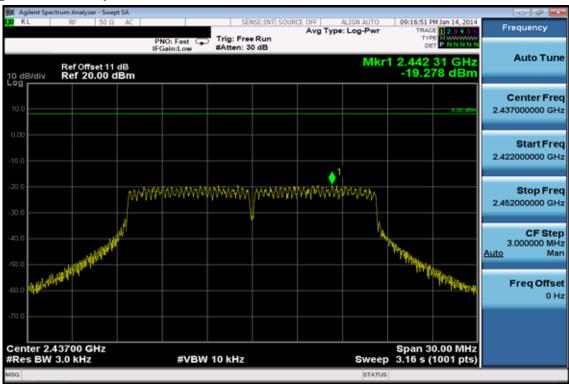
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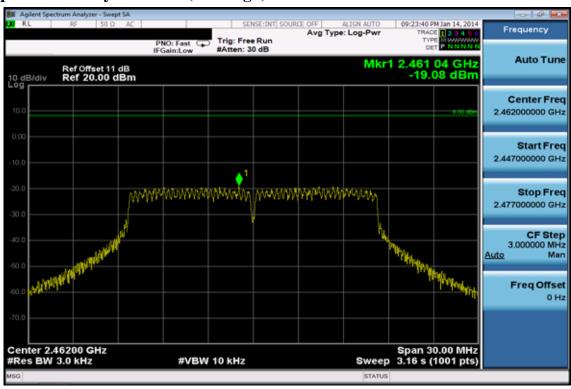
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 93 of 106

Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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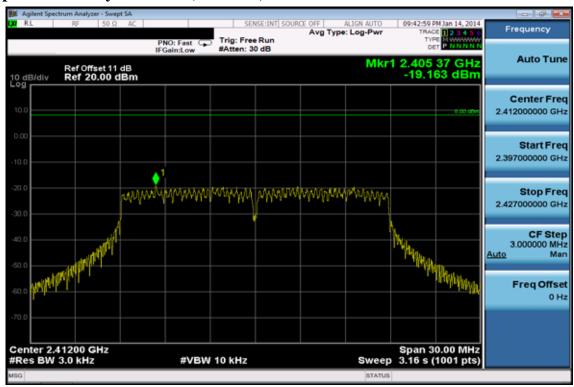
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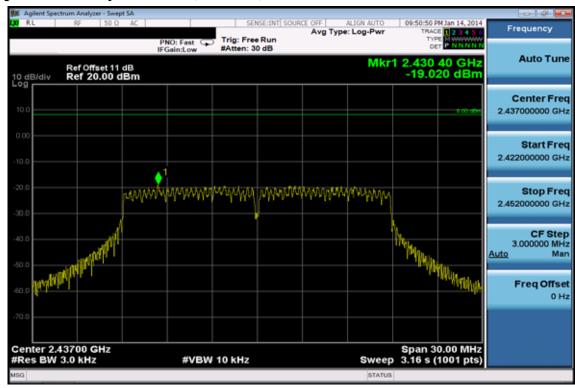
Page: 94 of 106

802.11n 20M

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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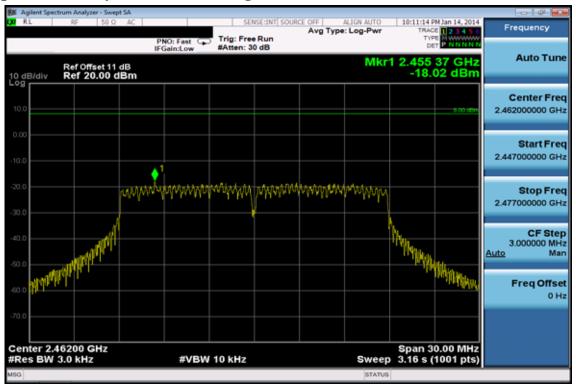
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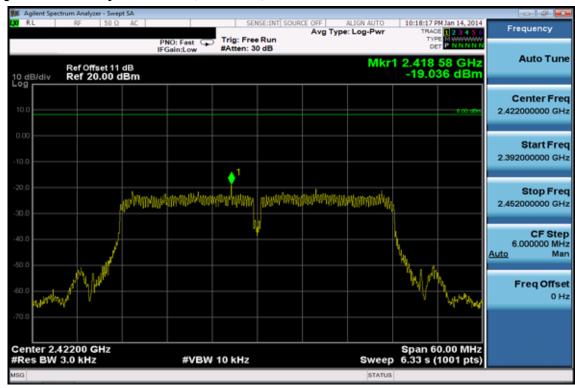
Page: 95 of 106

Power Spectral Density Test Plot (CH-High)



802.11n 40M

Power Spectral Density Test Plot (CH-Low)



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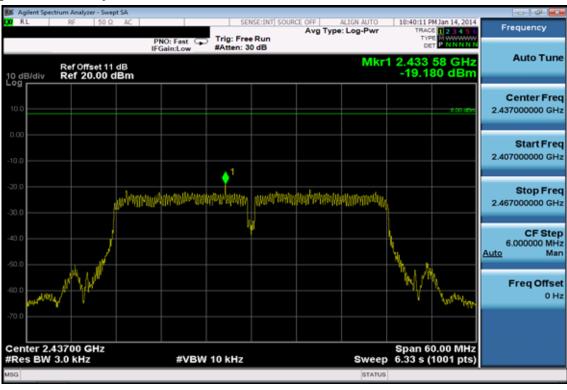
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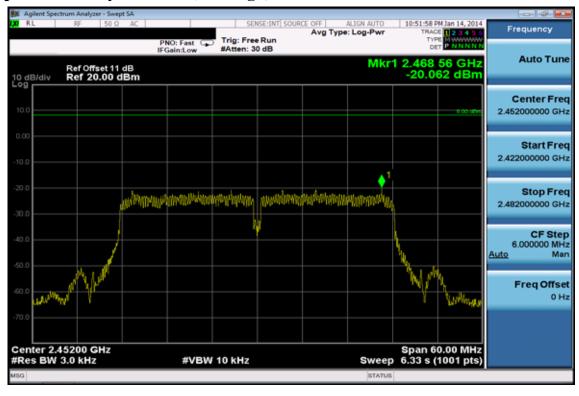
Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 96 of 106

Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 97 of 106

12 ANTENNA REQUIREMENT

12.1 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.

12.2 Antenna Connected Construction:

The directional gains of antenna used for transmitting is 4.13dBi and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 98 of 106

13 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

13.1 Standard Applicable

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

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

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

F = frequency in MHz

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^{* =} Plane-wave equipment power density



Report No.: E2/2013/B0028 Issue Date: Feb. 21, 2014

Page: 99 of 106

13.2 Maximum Permissible Exposure (MPE) Evaluation

802.11b

02.11	~								
			Peak Power Output (dBm)						
СН	Frequency		Data	Rate		Decembed Limit			
СН	(MHz)	1	2	5.5	11	Required Limit			
1	2412	16.48	16.44	16.31	16.17	1 Watt = 30 dBm			
6	2437	16.40	16.30	16.32	16.31	1 Watt = 30 dBm			
11	2462	16.52	16.49	16.50	16.44	1 Watt = 30 dBm			
			Aver	age Power Oi	utput (dBm)				
СН	Frequency		Data	Rate		Dogwinod Limit			
СН	(MHz)	1	2	5.5	11	Required Limit			
1	2412	14.32	14.21	14.02	13.89	1 Watt = 30 dBm			
6	2437	14.13	14.04	14.04	14.03	1 Watt = 30 dBm			
11	2462	14.25	14.22	14.19	14.16	1 Watt = 30 dBm			

*Note: Measured by power meter, cable loss as 11dB that offsets on the power meter.

MPE Prediction (802.11b)

Prediction of MPE limit at a given distance

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

S=PG/4 R^2

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 100 of 106

Maximum peak avg output power at antenna input	16.52	(dBm)
Maximum peak avg output power at antenna input	44.87453899	(mW)
Duty cycle:	0.992	(%)
Maximum Pav :	0.445155427	(mW)
Antenna gain (typical):	4.13	(dBi)
Maximum antenna gain:	2.588212915	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	$0.0002\overline{29}$	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.000229mW/cm². This is below the uncontrolled exposure limit of 1mW/cm² at 2462MHz.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 101 of 106

802,11g

02.11	5									
			Peak Power Output(dBm)							
CII	Frequency				Data	Rate				Degrained Limit
СН	(MHz)	6	9	12	18	24	36	48	54	Required Limit
1	2412	19.15	19.01	18.89	18.07	19.09	19.06	18.63	19.00	1 Watt = 30 dBm
6	2437	19.16	19.01	18.92	18.27	19.08	19.04	18.81	19.02	1 Watt = 30 dBm
11	2462	19.44	19.14	19.21	18.38	19.24	19.12	18.88	19.04	1 Watt = 30 dBm
					Aver	age Po	wer Oı	ıtput(d	Bm)	
СН	Frequency				Data	Rate				Degrained Limit
Сн	(MHz)	6	9	12	18	24	36	48	54	Required Limit
1	2412	9.58	9.56	9.49	9.43	9.42	9.37	9.29	9.25	1 Watt = 30 dBm
6	2437	9.75	9.67	9.68	9.65	9.64	9.57	9.56	9.60	1 Watt = 30 dBm
11	2462	10.03	9.83	9.81	9.77	9.73	9.67	9.61	9.63	1 Watt = 30 dBm

^{*}Note: Measured by power meter, cable loss as 11dB that offsets on the power meter.

MPE Prediction (802.11g)

Prediction of MPE limit at a given distance

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

S=PG/4 R^2

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 102 of 106

Maximum peak avg output power at antenna input	19.44	(dBm)
Maximum peak avg output power at antenna input	87.90225168	(mW)
Duty cycle:	0.996	(%)
Maximum Pav :	0.875506427	(mW)
Antenna gain (typical):	4.13	(dBi)
Maximum antenna gain:	2.588212915	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.000451	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.000451mW/cm2. This is below the uncontrolled exposure limit of 1mW/cm2 at 2462MHz.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 103 of 106

802.11n 20M

	2011										
		Peak Power Output(dBm)									
СН	Frequency		Required								
СН	CH	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit
1	2412	18.53	18.45	18.41	18.17	18.42	18.26	18.18	18.41	1 Watt = 30 dBm	
6	2437	19.23	19.18	19.14	18.40	18.72	18.60	18.54	18.51	1 Watt = 30 dBm	
11	2462	18.97	18.94	18.82	18.55	18.76	18.72	18.68	18.63	1 Watt = 30 dBm	
	Average Power Output(dBm)										
CII	Frequency		Required								
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit	
1	2412	9.35	9.31	9.28	9.26	9.25	9.21	9.23	9.20	1 Watt = 30 dBm	
6	2437	9.95	9.80	9.81	9.66	9.60	9.58	9.54	9.54	1 Watt = 30 dBm	
11	2462	9.86	9.84	9.77	9.69	9.64	9.67	9.64	9.61	1 Watt = 30 dBm	

^{*}Note: Measured by power meter, cable loss as 11dB that offsets on the power meter.

MPE Prediction (802.11 n_20M)

Prediction of MPE limit at a given distance

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

S=PG/4 R^2

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 104 of 106

Maximum peak output power at antenna input terminal:	19.23	(dBm)
Maximum peak output power at antenna input terminal:	83.75292821	(mW)
Duty cycle:		(%)
Maximum Pav :	0.825803872	(mW)
Antenna gain (typical):	4.13	(dBi)
Maximum antenna gain:	2.588212915	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.000425	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.000425mW/cm2. This is below the uncontrolled exposure limit of 1mW/cm2 at 2437MHz.

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 105 of 106

802.11n 40M

502.1111_401/1											
			Peak Power Output(dBm)								
CII	Frequency		Required								
СН	СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit
3	2422	18.49	18.36	18.34	18.41	18.32	18.28	18.26	17.97	1 Watt = 30 dBm	
6	2437	18.79	18.66	18.53	18.67	18.50	18.48	18.40	18.01	1 Watt = 30 dBm	
9	2452	18.85	18.63	18.58	18.72	18.54	18.47	18.44	18.16	1 Watt = 30 dBm	
	Average Power Output(dBm)										
CII	Frequency		Data Rate							Required	
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit	
3	2422	9.20	9.17	9.16	9.12	9.10	9.06	9.08	9.08	1 Watt = 30 dBm	
6	2437	9.48	9.43	9.35	9.28	9.30	9.25	9.24	9.15	1 Watt = 30 dBm	
9	2452	9.57	9.44	9.41	9.38	9.35	9.32	9.31	9.33	1 Watt = 30 dBm	

^{*}Note: Measured by power meter, cable loss as 11dB that offsets on the power meter.

MPE Prediction (802.11 n_40M)

Prediction of MPE limit at a given distance

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

S=PG/4 R^2

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

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Report No.: E2/2013/B0028 **Issue Date: Feb. 21, 2014**

Page: 106 of 106

Maximum peak output power at antenna input terminal:	18.85	(dBm)
Maximum peak output power at antenna input terminal:	76.73614894	(mW)
Duty cycle:		(%)
Maximum Pav :	0.758153151	(mW)
Antenna gain (typical):	4.13	(dBi)
Maximum antenna gain:	2.588212915	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2452	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.000391	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.000391mW/cm2. This is below the uncontrolled exposure limit of 1mW/cm2 at 2452MHz.

~ End of Report ~

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