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FCC REPORT

Application No: SZEMO100905834RF **Applicant/Manufacturer:** Altec Lansing, LLC

Factory: Dong Guan Tai Sing Manufacturing Factory

Product Name: Dongle iMW725

Allowable Frequency Range: 2400MHz to 2483.5MHz

FCC ID: VJS-A13998

Standards: FCC CFR Title 47 Part 15 C Section 15.247: 2009

Date of Receipt: 2010-09-10

Date of Test: 2010-09-10 to 2010-09-29

Date of Issue: 2010-10-20

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Jack Zhang

Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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3 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(1)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (b)	Pass
Dwell Time	15.247 (a)(1)	Pass
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)&TCB Exclusion List (7 July 2002)	Pass
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	Pass

Remark: Passed: The EUT complies with the essential requirements in the standard.

Failed: The EUT does not comply with the essential requirements in the standard.



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4 General Information

4.1 Client Information

Applicant/Manufacturer:	Altec Lansing, LLC
Factory:	Dong Guan Tai Sing Manufacturing Factory
Address of Applicant:	535 Routes 6 & 209, Milford, PA 18337, USA
Address of Manufacturer:	535 Routes 6 & 209, Milford, PA 18337, USA
Address of Factory:	Tai Sing Industrial Road, Bai Zhou Bian Village, Dong Cheng, Dongguan City, Guangdong Province 523113, P.R. China

4.2 General Description of E.U.T.

Product Name:	Dongle iMW725
Item No.:	A13998
Trade mark:	ALTEC LANSING
Allowable Frequency Range:	2400MHz~2483.5MHz
Channel numbers:	79
Channel separation:	1MHz
Modulation type:	GFSK, Pi/4QPSK, 8DPSK
Antenna Type:	Integral
Antenna gain:	0dBi
EUT Power Supply:	USB Voltage:5.0V d.c.



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Operation Frequency each of channel								
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz	
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz	
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz	
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz	
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz	
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz	
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz	
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz	
9	2410MHz	29	2430MHz	49 2450MHz		69	2470MHz	
10	2411MHz	30	2431MHz	50 2451MHz		70	2471MHz	
11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz	
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz	
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz	
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz	
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz	
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz	
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz	
18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz	
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz	
20	2421MHz	40	2441MHz	60	2461MHz			

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel for testing see below:

Channel	Frequency			
lowest channel	2402MHz			
middle channel	2441MHz			
highest channel	2480MHz			



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4.3 E.U.T Operation mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	50 % RH
Atmospheric Pressure:	1010 mBar
Test mode:	
Transmitting	Keep the EUT Transmitted the continuous modulation signal at the specific channel(s).

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4.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

VCCI

The 3m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197 and C-2383 respectively.

Date of Registration: September 29, 2008. Valid until September 28, 2011.

FCC - Registration No.: 556682

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 556682, June 27, 2008.

Industry Canada (IC)

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594 No tests were sub-contracted.

4.6 Other Information Requested by the Customer

None.

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4.7 Test Instruments list

RE i	RE in Chamber									
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)				
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2010-06-17	2011-06-17				
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2009-11-05	2010-11-05				
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A				
4	Coaxial cable	SGS	N/A	SEL0028	2008-06-18	2011-06-18				
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2009-11-05	2010-11-05				
6	Double-ridged horn (1-18GHz) ETS-LINDGREN		3117	SEL0006	2009-11-10	2010-11-10				
7	Horn Antenna (18-26GHz) ETS-LINDGREN		3160	SEL0076	2009-11-10	2010-11-10				
8	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2010-06-02	2011-06-02				
9	Pre-Amplifier (0.1-26.5GHz) Compliance Directions Systems Inc.		PAP-0126	SEL0168	2009-12-18	2010-12-18				
10	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	SEL0080	2010-06-04	2011-06-04				
11	Band filter	Amindeon	82346	SEL0094	2010-06-02	2011-06-02				

Con	Conducted Emission										
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)					
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	N/A	N/A					
2	LISN ETS-LINDGREN Two-Line V-Network Rohde & Schwarz		3816/2	SEL0021	2010-06-02	2011-06-02					
3			ENV216	SEL0152	2009-10-22	2010-10-22					
4	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2010-06-02	2011-06-02					
5	Coaxial Cable	SGS	N/A	SEL0024	2008-06-18	2011-06-18					



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RF c	RF conducted								
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)			
1	Spectrum Analyzer	Rohde & Schwarz	FSP 30	SEL0154	2009-10-22	2010-10-22			
2	Coaxial cable	SGS	N/A	SEL0028	2008-06-18	2011-06-18			





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5 Test results and Measurement Data

5.1 Antenna requirement:

Standard requirement: FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

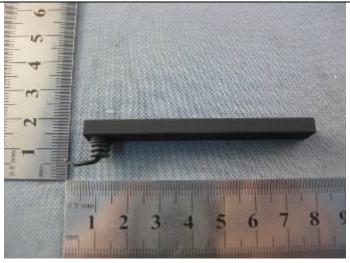
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(c) (1)(i) requirement:

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

E.U.T Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best gain of the antenna is 0dBi.







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5.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207						
Test Method:	ANSI C63.10: 2009						
Test Frequency Range:	150KHz to 30MHz						
Class / Severity:	Class B						
Limit:	Frequency range (MHz)						
		Quasi-peak Average					
	0.15-0.5	66 to 56*	56 to 46*				
	0.5-5 56 4 5-30 60 5						
	* Decreases with the logarithm						
Test procedure	The E.U.T and simulators are impedance stabilization netwo coupling impedance for the main some are also connected to the main 50ohm/50uH coupling impeda to the block diagram of the test. A.C. line are checked for maxifind the maximum emission, the interface cables must be conducted measurement.	ork(L.I.S.N.). The provide easuring equipment. The power through a LISI name with 500hm terminates the setup and photograpimum conducted interface relative positions of	de a 500hm/50uH he peripheral devices N that provides a nation. (Please refers hs). Both sides of erence. In order to equipment and all of				
Test setup:	Refere	nce Plane					
	AUX Equipment E.U Test table/Insulation pla Remark: E.U.T: Equipment Under Test LISN: Line Impedence Stabilization Test table height=0.8m		er — AC power				
Test Instruments:	Refer to section 4.7 for details						
Test mode:	Transmitting						
Test result:	Pass						

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

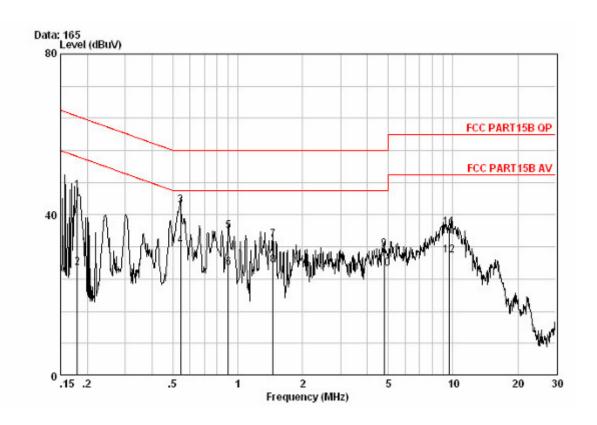
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



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Live line:



		Cable	LISN	Read		Limit	Over	
	Freq	Loss	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.17961	0.14	-0.05	45.82	45.92	64.50	-18.59	QP
2	0.17961	0.14	-0.05	26.70	26.79	54.50	-27.71	Average
3	0.54355	0.16	-0.04	42.08	42.20	56.00	-13.80	QP
4	0.54355	0.16	-0.04	32.10	32.22	46.00	-13.78	Average
5	0.90394	0.19	-0.05	35.80	35.94	56.00	-20.06	QP
6	0.90394	0.19	-0.05	26.60	26.74	46.00	-19.26	Average
7	1.456	0.20	-0.06	33.66	33.80	56.00	-22.20	QP
8	1.456	0.20	-0.06	27.40	27.54	46.00	-18.46	Average
9	4.797	0.22	-0.11	31.32	31.43	56.00	-24.57	QP
10	4.797	0.22	-0.11	26.50	26.61	46.00	-19.39	Average
11	9.603	0.27	-0.28	36.85	36.84	60.00	-23.16	QP
12	9.603	0.27	-0.28	29.80	29.79	50.00	-20.21	Average

Notes:

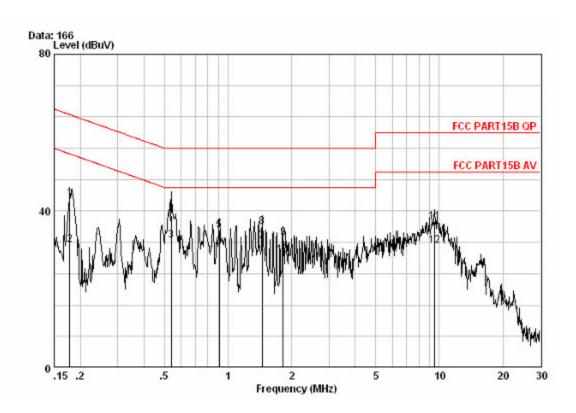
- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.



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Neutral line:



		Cable	LISN	Read		Limit	Over		
	Freq	Loss	Factor	Level	Level	Line	Limit	Remark	
	MHz	dB	dB	dBuV	dBuV	dBuV	dB		
1	0.17772	0.14	-0.04	43.00	43.10	64.59	-21.49	QP	
2	0.17772	0.14	-0.04	31.20	31.30	54.59	-23.30	Average	
3 0	0.53782	0.16	-0.04	32.40	32.52	46.00	-13.48	Average	
4	0.53782	0.16	-0.04	38.76	38.88	56.00	-17.12	QP	
5	0.90874	0.19	-0.04	35.02	35.17	56.00	-20.83	QP	
6	0.90874	0.19	-0.04	30.60	30.75	46.00	-15.25	Average	
7	1.449	0.20	-0.05	32.10	32.25	46.00	-13.75	Average	
8	1.449	0.20	-0.05	35.72	35.87	56.00	-20.13	QP	
9	1.819	0.20	-0.06	32.92	33.06	56.00	-22.94	QP	
10	1.819	0.20	-0.06	28.70	28.84	46.00	-17.16	Average	
11	9.502	0.27	-0.31	37.34	37.30	60.00	-22.70	QP	
12	9.502	0.27	-0.31	31.20	31.16	50.00	-18.84	Average	

Notes:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.



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5.3 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(1)		
Test Method:	ANSI C63.10:2009 and KDB DA00-705		
Limit:	30dBm		
Test setup:	Spectrum Analyzer		
	E.U.T		
	Non-Conducted Table		
	Ground Reference Plane		
	Remark: Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.		
Test Instruments:	Refer to section 4.7 for details		
Test state:	Non-hopping transmitting with all kinds of modulation.		
Test results:	Pass		



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Measurement Data

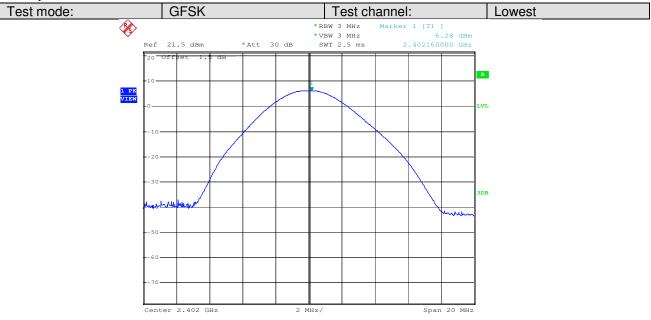
GFSK mode					
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	6.28	30.00	Pass		
Middle	5.49	30.00	Pass		
Highest	4.05	30.00	Pass		
	Pi/4QPSK m	ode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	4.34	30.00	Pass		
Middle	3.74	30.00	Pass		
Highest	2.32	30.00	Pass		
8DPSK mode					
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	4.50	30.00	Pass		
Middle	3.79	30.00	Pass		
Highest	2.33	30.00	Pass		



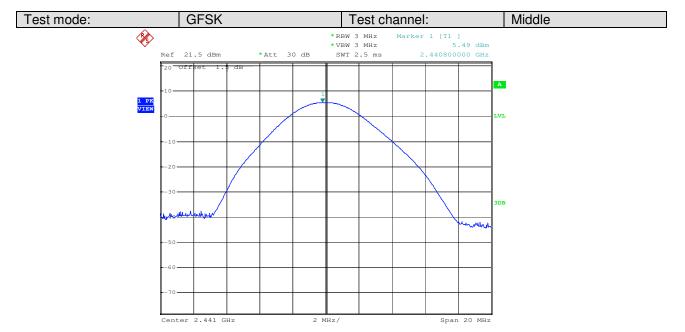
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Test plot as follows:



Date: 21.SEP.2010 08:09:31

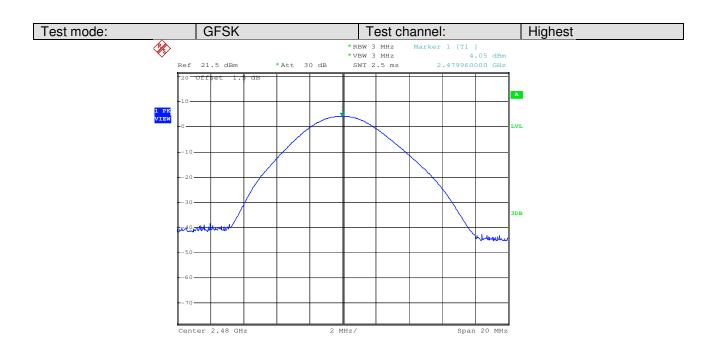


Date: 21.SEP.2010 08:15:08

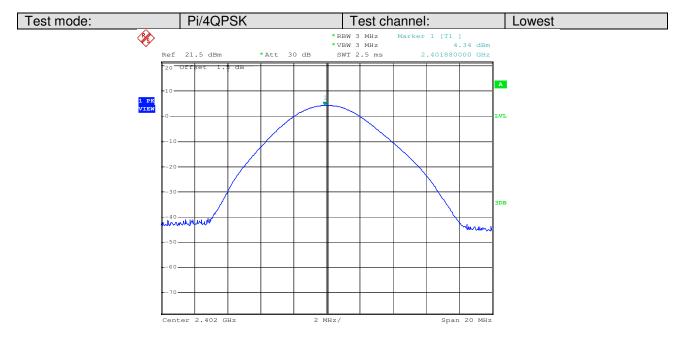


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Date: 21.SEP.2010 08:23:25

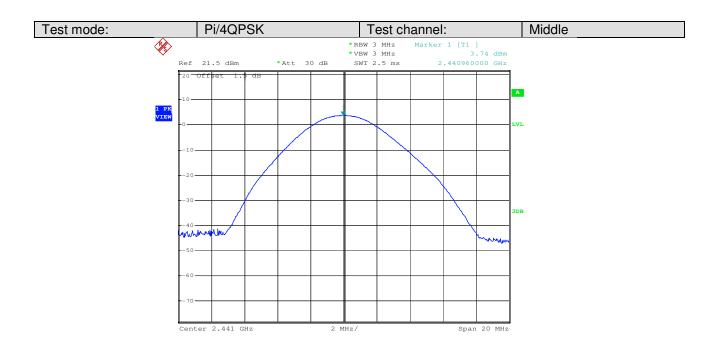


Date: 21.SEP.2010 09:38:32

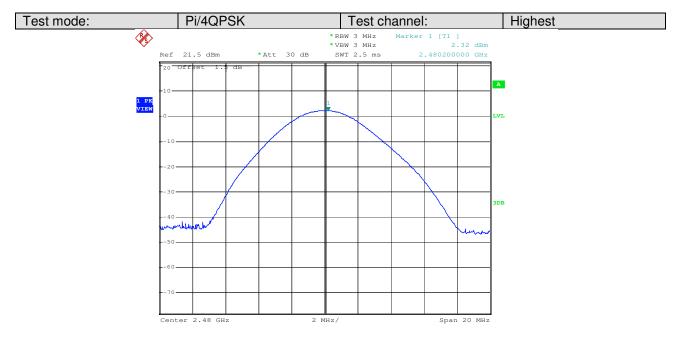


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Date: 21.SEP.2010 09:50:51

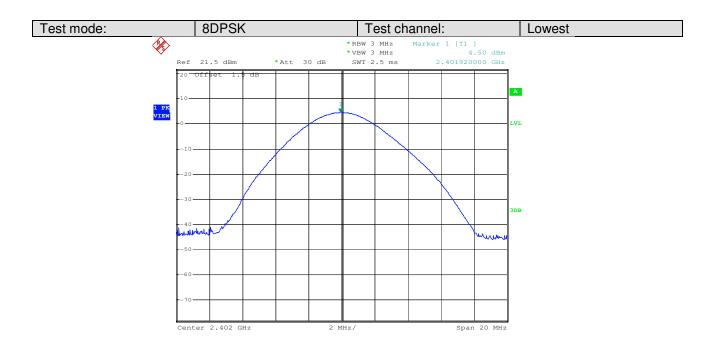


Date: 21.SEP.2010 10:03:56

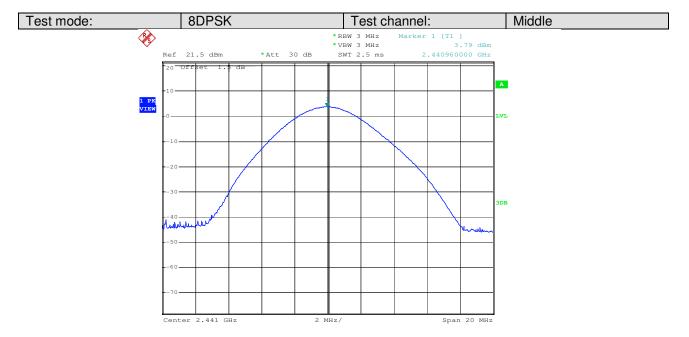


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Date: 25.SEP.2010 10:40:51

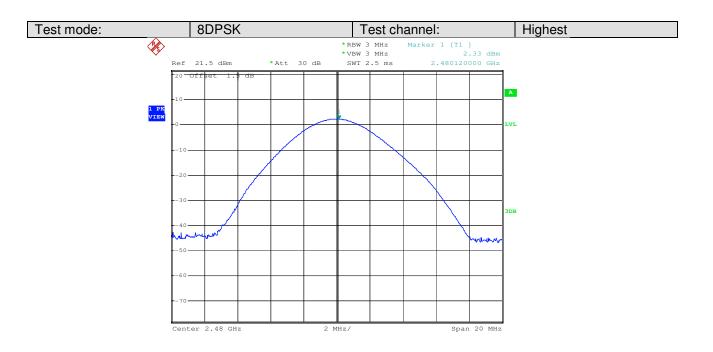


Date: 25.SEP.2010 12:02:55



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Date: 25.SEP.2010 12:13:07



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5.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)		
Test Method:	ANSI C63.10:2009 and KDB DA00-705		
Limit:	NA		
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 4.7 for details		
Test state:	Non-hopping transmitting with all kind of modulation.		
Test results:	Pass		

Measurement Data

medodrement bata					
	20dB Occupy Bandwidth (KHz)				
Test channel	GFSK	Pi/4QPSK	8DPSK		
Lowest	800	1212	1208		
Middle	800	1220	1212		
Highest	804	1216	1212		



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Test plot as follows:



Date: 21.SEP.2010 08:03:05



Date: 21.SEP.2010 08:13:22

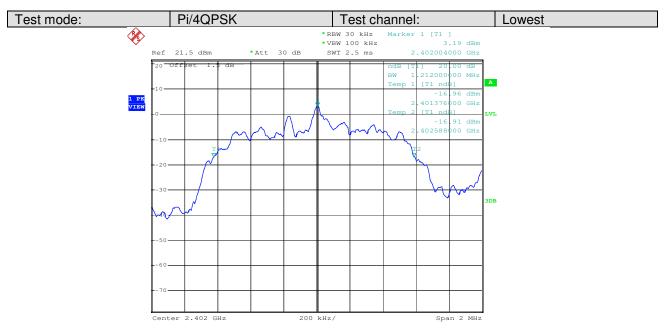


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Date: 21.SEP.2010 08:17:41

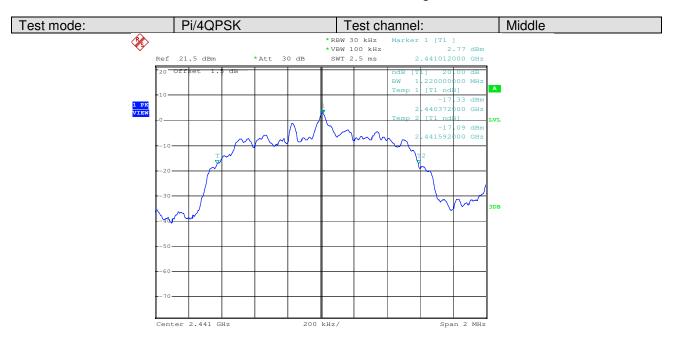


Date: 21.SEP.2010 09:33:34

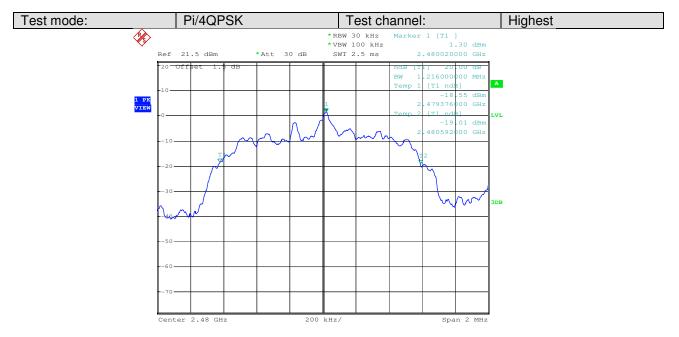


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Date: 21.SEP.2010 09:41:17

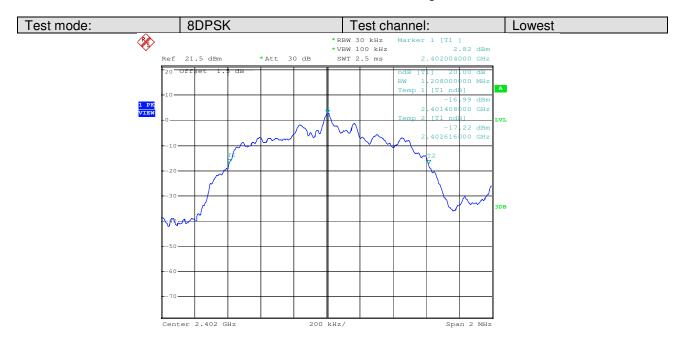


Date: 21.SEP.2010 09:54:41

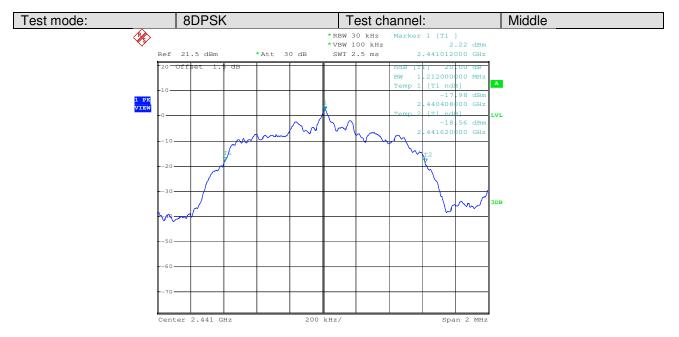


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Date: 25.SEP.2010 10:35:44

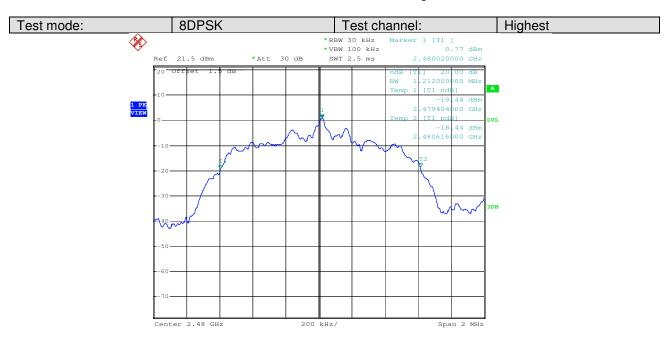


Date: 25.SEP.2010 12:01:41



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Date: 25.SEP.2010 12:04:52



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5.5 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)		
Test Method:	ANSI C63.10:2009 and KDB DA00-705		
Test state:	Hopping transmitting with all kind of modulation.		
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 4.7 for details		
Limit:	0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)		
Test results:	Pass		



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Measurement Data

GFSK mode				
Carrier Frequencies Separation (KHz) Limit (KHz)		Result		
1000	813.3	Pass		
	Pi/4QPSK mode			
Carrier Frequencies Separation (KHz)	Limit (KHz)	Result		
1000	813.3	Pass		
8DPSK mode				
Carrier Frequencies Separation (KHz)	Limit (KHz)	Result		
1000	813.3	Pass		

Note: According to section 5.4,

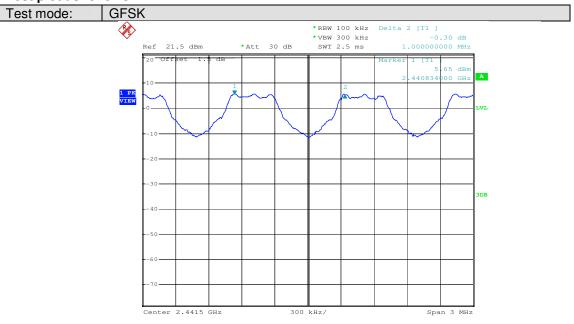
Mode	20dB bandwidth (KHz) (worse case)	Limit (KHz) (Carrier Frequencies Separation)
GFSK	804	536.0
PI/4QPSK	1220	813.3
8DPSK	1212	808.0



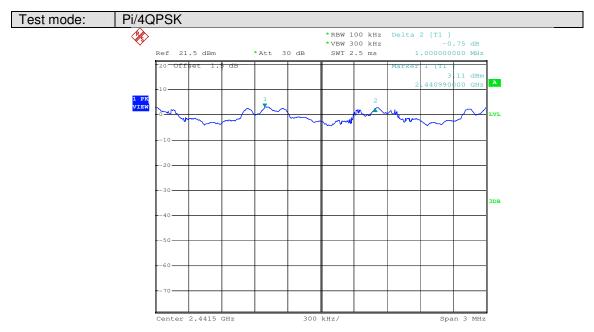
Report No.: SZEMO10090583401

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Test plot as follows:



Date: 21.SEP.2010 09:24:16

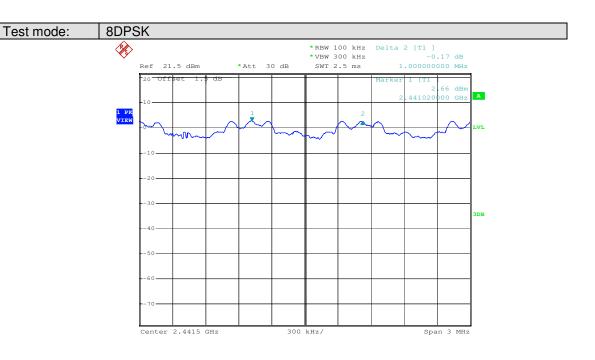


Date: 21.SEP.2010 10:22:37



Report No.: SZEMO10090583401

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Date: 25.SEP.2010 12:26:06



Report No.: SZEMO10090583401

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5.6 Hopping Channel Number

Test Requirement:	FCC Part15 C Section 15.247 (b)		
Test Method:	ANSI C63.10:2009 and KDB DA00-705		
Requirement:	≥75 channels		
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 4.7 for details		
Test state:	Hopping transmitting with all kind of modulation.		
Test results:	Pass		

Measurement Data

modelarionicity Data					
Mode	Hopping channel	Requirement			
GFSK	79	≥75			
Pi/4QPSK	79	≥75			
8DPSK	79	≥75			



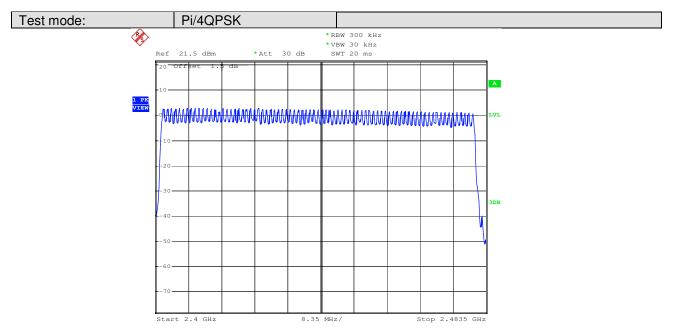
Report No.: SZEMO10090583401

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Test plot as follows



Date: 21.SEP.2010 08:41:09

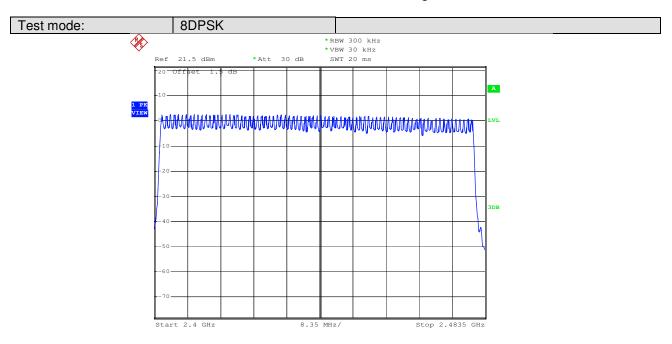


Date: 21.SEP.2010 10:07:57



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Date: 25.SEP.2010 12:15:50



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5.7 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)		
Test Method:	ANSI C63.10:2009 and KDB DA00-705		
Limit:	≤ 0.4 Second		
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table		
	Ground Reference Plane		
Test Instruments:	Refer to section 4.7 for details		
Test state:	Hopping transmitting with all kind of modulation.		
Test results:	Pass		

Measurement Data

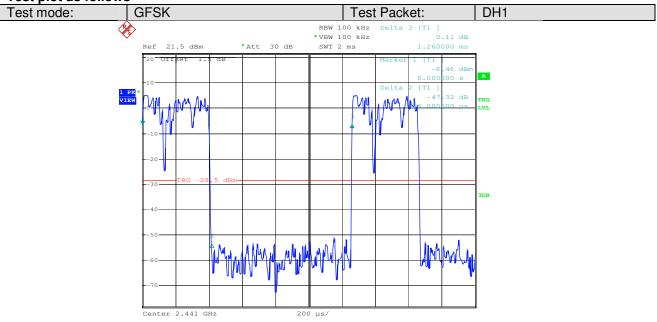
Mode	Packet	Dwell time (second)	Limit (second)
	DH1	0.1331	≪0.4
GFSK	DH3	0.2681	≤0.4
	DH5	0.3116	≪0.4
	2-DH1	0.1434	≤0.4
Pi/4QPSK	2-DH3	0.2717	≤0.4
	2-DH5	0.3138	≤0.4
	3-DH1	0.1382	≤0.4
8DPSK	3-DH3	0.2691	≤0.4
	3-DH5	0.3138	≤0.4



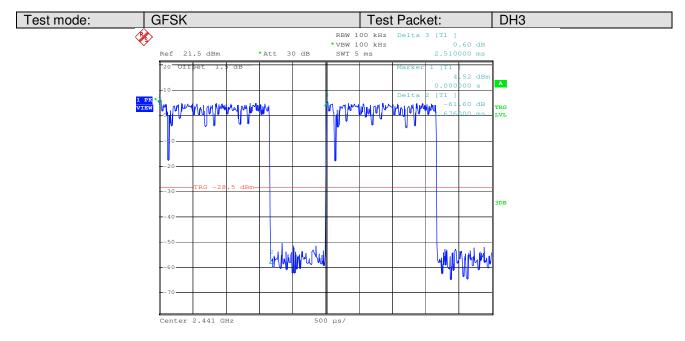
Report No.: SZEMO10090583401

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Test plot as follows



Date: 27.SEP.2010 16:02:33

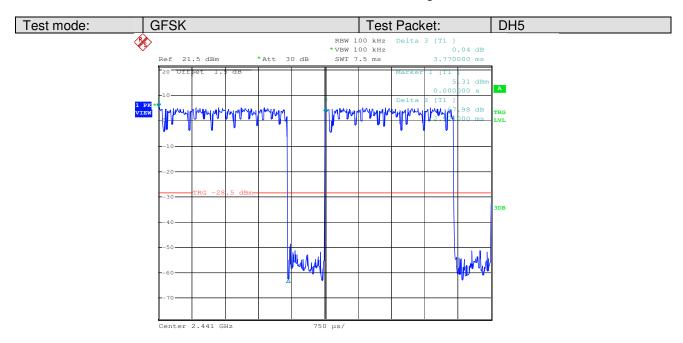


Date: 27.SEP.2010 16:03:58

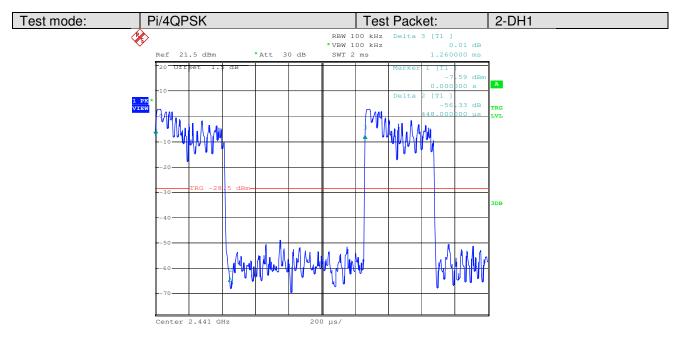


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Date: 27.SEP.2010 16:05:07

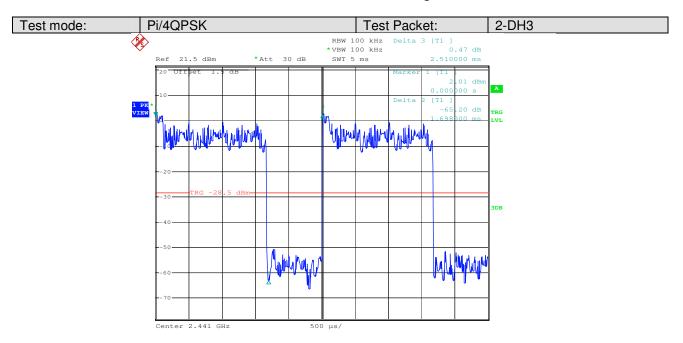


Date: 27.SEP.2010 16:06:13

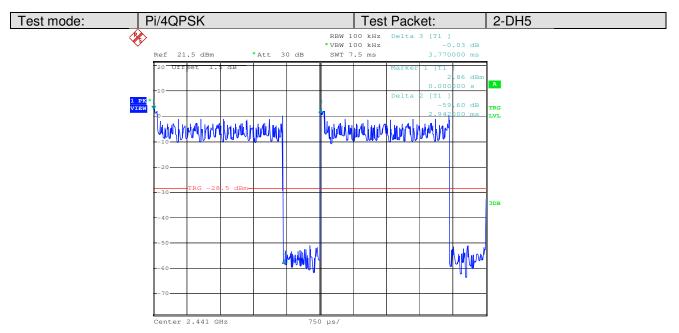


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Date: 27.SEP.2010 16:07:14

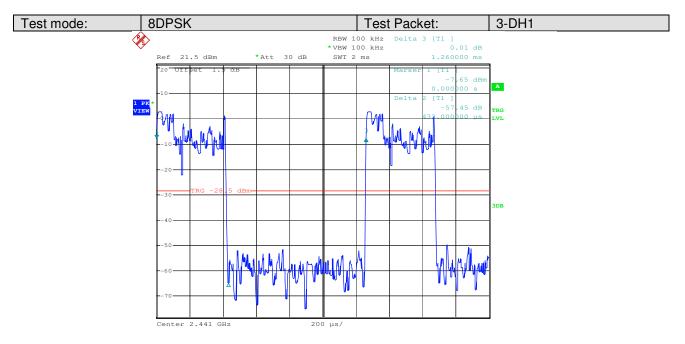


Date: 27.SEP.2010 16:12:03

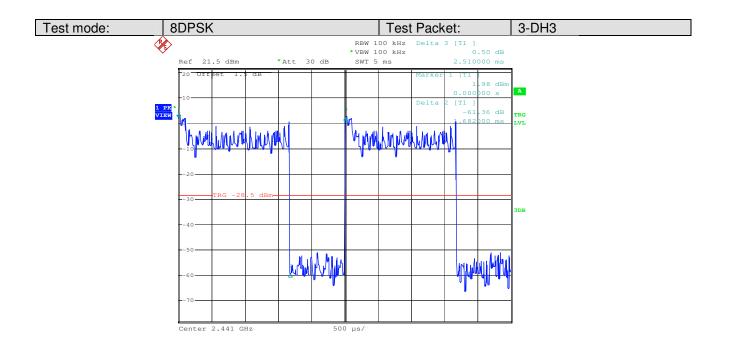


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Date: 27.SEP.2010 16:10:21

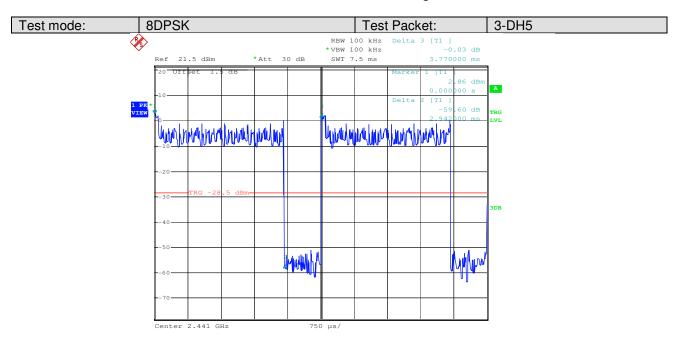


Date: 27.SEP.2010 16:11:12



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Date: 27.SEP.2010 16:12:03



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5.8 Band Edge

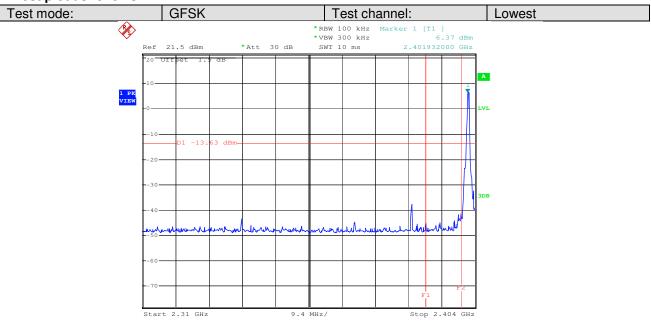
Test Requirement:	FCC Part15 C Section 15.247 (d)							
Test Method:	ANSI C63.10:2009 and KDB DA00-705							
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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.							
Test setup:	Spectrum Analyzer E.U.T							
	Non-Conducted Table Ground Reference Plane							
	Remark:							
	Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.							
Test Instruments:	Refer to section 4.7 for details							
Test state:	Hopping transmitting with all kinds of modulation.							
Test results:	Pass							



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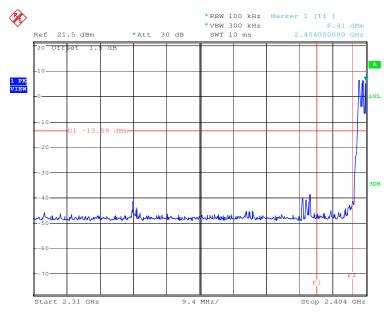
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Test plot as follows:



Date: 21.SEP.2010 08:05:25

F1=2390MHz F2=2400MHz



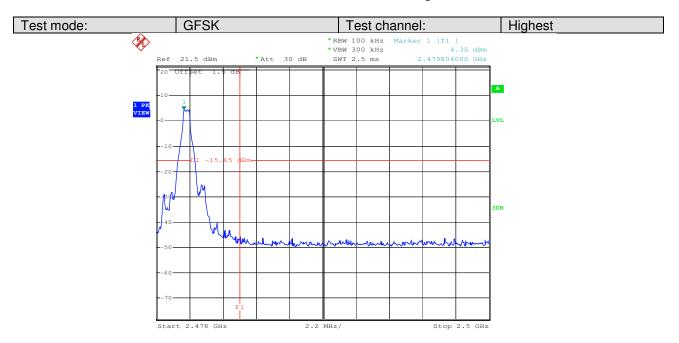
Date: 21.SEP.2010 08:07:40

F1=2390MHz F2=2400MHz



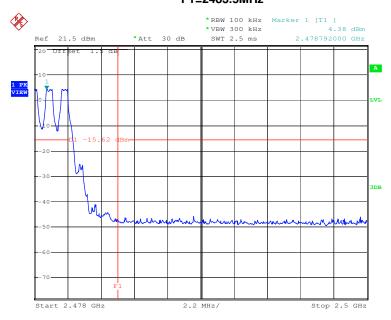
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Date: 21.SEP.2010 08:19:46

F1=2483.5MHz



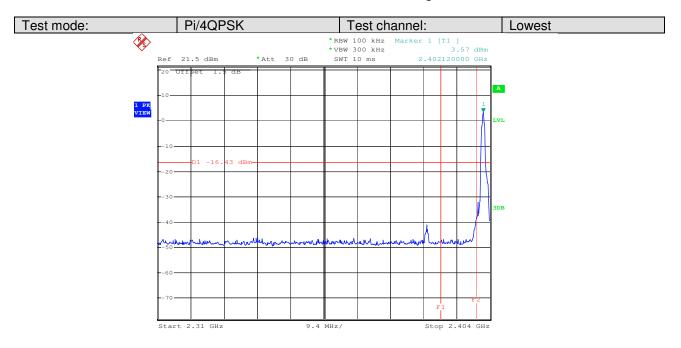
Date: 21.SEP.2010 08:21:56

F1=2483.5MHz



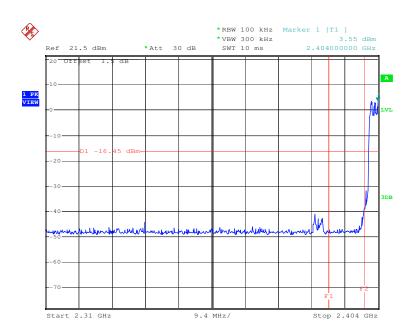
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Date: 21.SEP.2010 09:35:14

F1=2390MHz F2=2400MHz



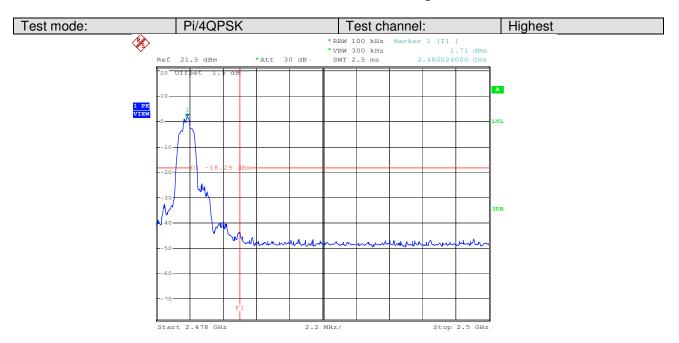
Date: 21.SEP.2010 09:36:41

F1=2390MHz F2=2400MHz



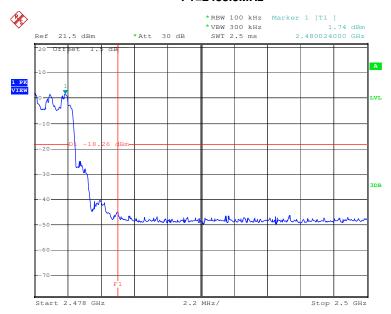
Report No.: SZEMO10090583401

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Date: 21.SEP.2010 10:00:58

F1=2483.5MHz



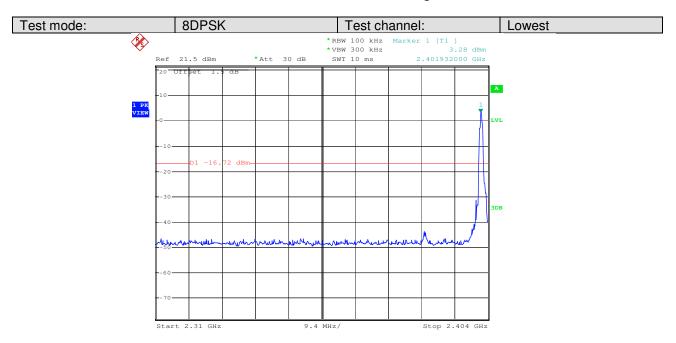
Date: 21.SEP.2010 10:02:33

F1=2483.5MHz



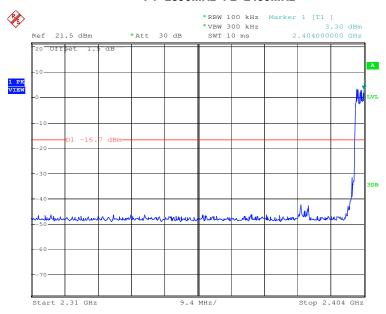
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Date: 25.SEP.2010 10:37:15

F1=2390MHz F2=2400MHz



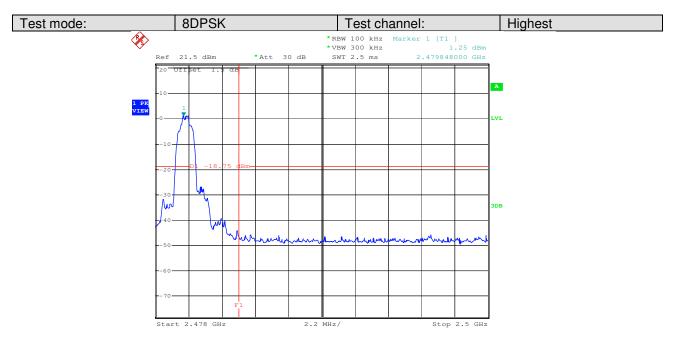
Date: 25.SEP.2010 10:39:18

F1=2390MHz F2=2400MHz



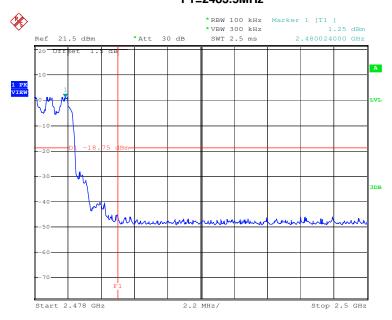
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Date: 25.SEP.2010 12:08:42

F1=2483.5MHz



Date: 25.SEP.2010 12:11:53

F1=2483.5MHz



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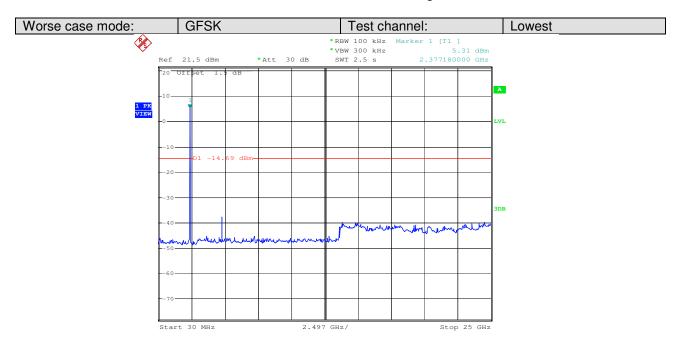
5.9 RF Antenna Conducted spurious emissions

Test Requirement:	FCC Part15 C Section 15.247 (d)							
Test Method:	ANSI C63.10:2009 and KDB DA00-705							
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.							
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane Remark: Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.							
Test Instruments:	Refer to section 4.7 for details							
Test results:	Pass							

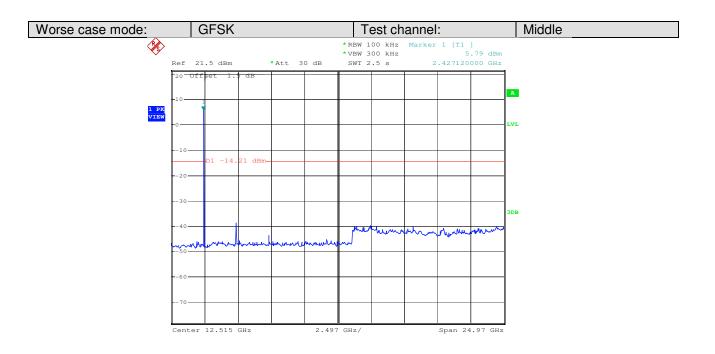


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Date: 21.SEP.2010 08:46:53

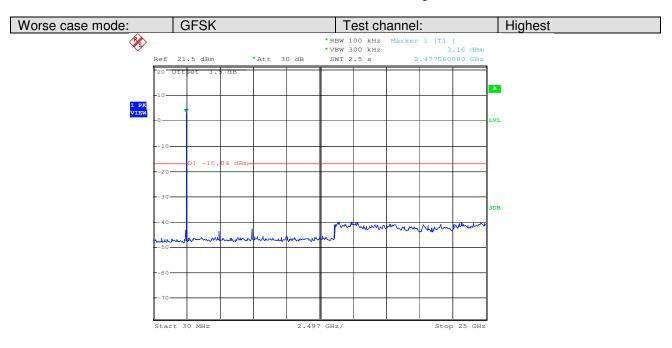


Date: 21.SEP.2010 08:48:37

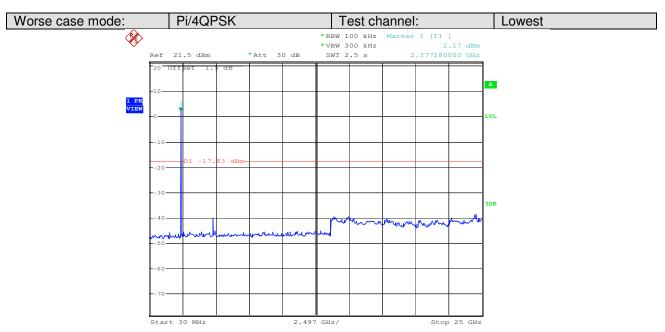


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Date: 21.SEP.2010 08:51:18

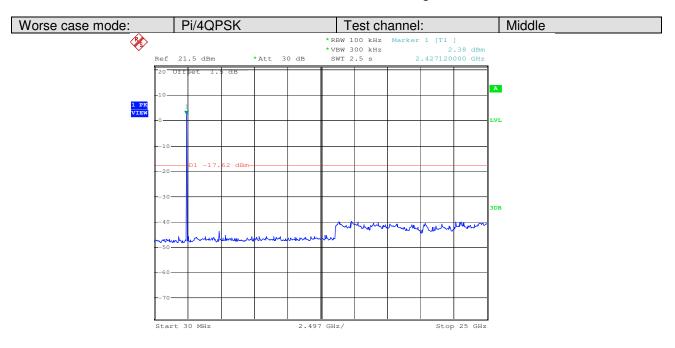


Date: 21.SEP.2010 10:12:38

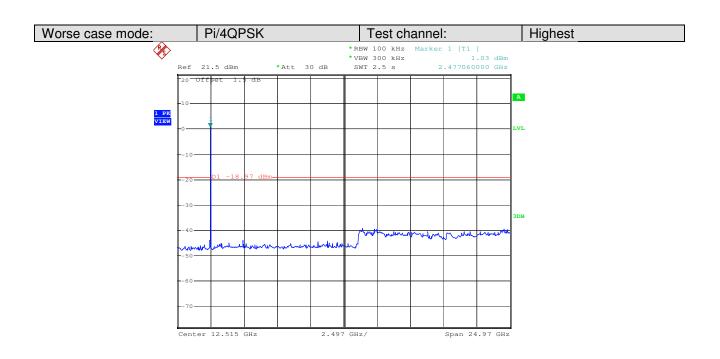


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Date: 21.SEP.2010 10:15:17

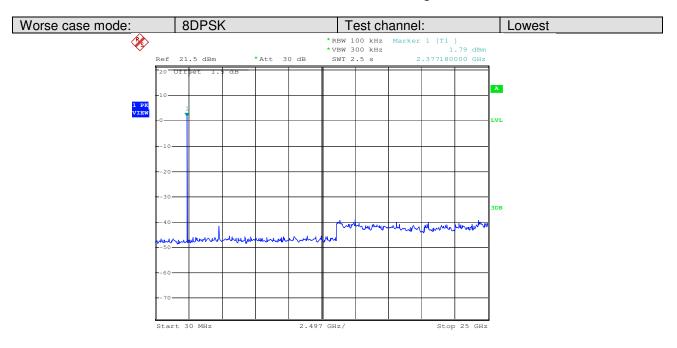


Date: 21.SEP.2010 10:20:21

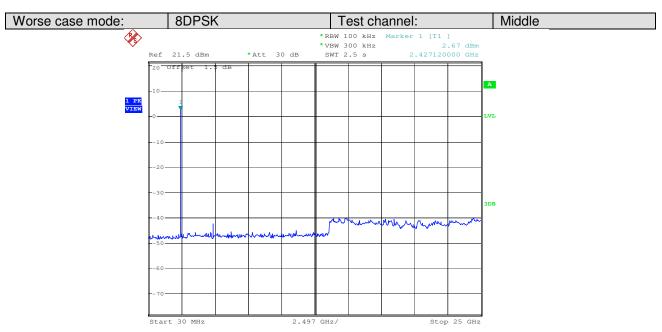


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Date: 25.SEP.2010 12:18:09

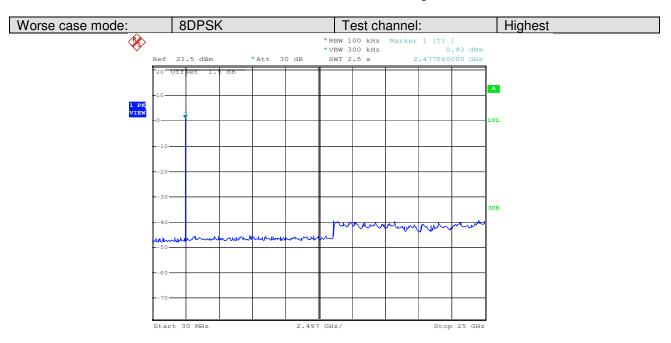


Date: 25.SEP.2010 12:19:56



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Date: 25.SEP.2010 12:30:40



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5.10 Pseudorandom Frequency Hopping Sequence

Test Requirement: FCC Part15 C Section 15.247 (a)(1) requirement:

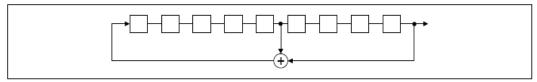
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively. Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence

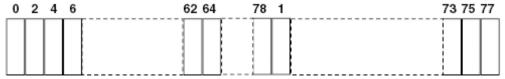
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: 29 -1 = 511 bits
- · Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.



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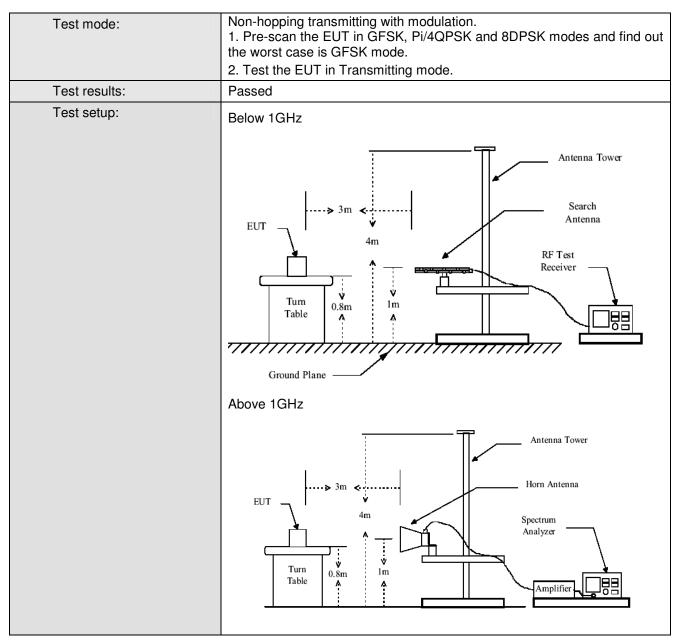
5.11 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.209 and 15.205								
Test Method:	ANSI C63.10: 2	009							
Test Frequency Range:	30MHz to 25GH	lz							
Test site:	Measurement D	istance: 3m (S	emi-Anecho	ic Chambei	r)				
Receiver setup:									
· ·	Frequency	Detector	RBW	VBW	Remark				
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value				
	Above 1GHz	Peak	1MHz	3MHz	Peak Value				
	1	Peak	1MHz	10Hz	Average Value				
Limit:	l								
	Freque		Limit (dBuV/	•	Remark				
	30MHz-8)	Quasi-peak Value					
	88MHz-216MHz 43.5 Quasi-peak Value								
	216MHz-960MHz 46.0 Quasi-peak Value								
	960MHz-1GHz 54.0 Quasi-peak Value								
	II ADOVE ICHZ								
Test Procedure:									
	54.0 Average Value								
Test Instruments:	Refer to section	4.7 for details							



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Note

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor



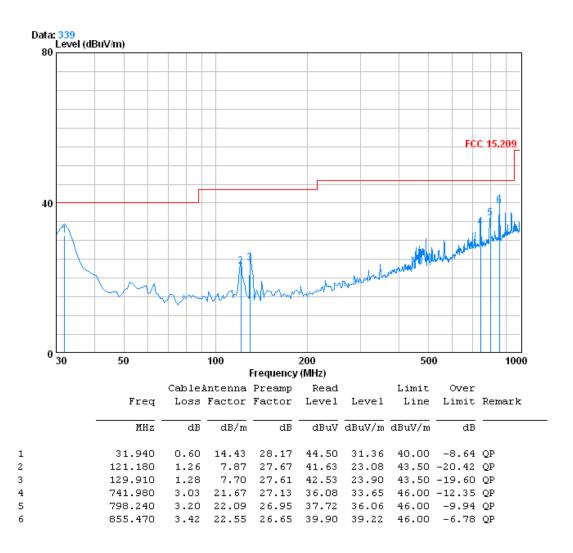


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5.11.1 Radiated emission below 1GHz

Vertical

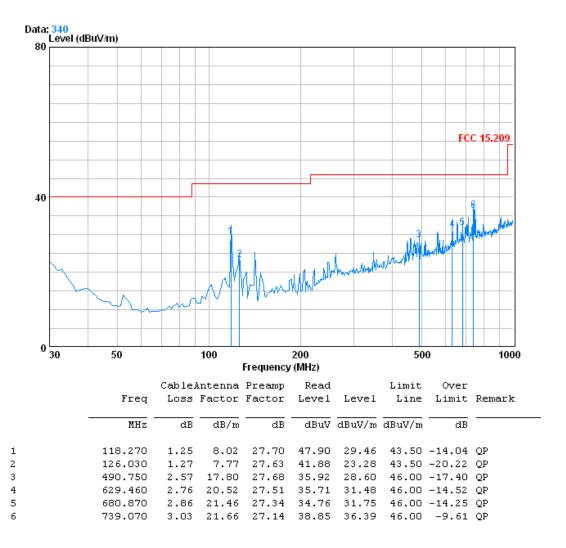




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Horizontal



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5.11.2 Transmitter emission above 1GHz

Worse case	mode:	GFSK	Tes	t channel:	Lowest	Rem	ark:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Emission Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Antenna polarization
4804	9.36	34.04	41.53	55.36	57.23	74.00	-16.77	Vertical
7206	13.38	36.33	40.98	49.30	58.03	74.00	-15.97	Vertical
9608	13.39	36.99	37.56	46.15	58.97	74.00	-15.03	Vertical
12010	16.45	38.80	39.09	46.00	62.16	74.00	-11.84	Vertical
14412	17.44	39.40	44.77	48.00	60.07	74.00	-13.93	Vertical
4804	9.36	34.04	41.53	58.00	59.87	74.00	-14.13	Horizontal
7206	13.38	36.33	40.98	51.32	60.05	74.00	-13.95	Horizontal
9608	13.39	36.99	37.56	45.43	58.25	74.00	-15.75	Horizontal
12010	16.45	38.80	39.09	45.18	61.34	74.00	-12.66	Horizontal
14412	17.44	39.40	44.77	48.50	60.57	74.00	-13.43	Horizontal

Worse case	orse case mode: GFSK		Tes	t channel:	Lowest	Rem	ark:	Average
Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBµV)	Emission Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Antenna polarization
4804	9.36	34.04	41.53	44.75	46.62	54.00	-7.38	Vertical
7206	13.38	36.33	40.98	37.24	45.97	54.00	-8.03	Vertical
9608	13.39	36.99	37.56	33.26	46.08	54.00	-7.92	Vertical
12010	16.45	38.80	39.09	29.46	45.62	54.00	-8.38	Vertical
14412	17.44	39.40	44.77	33.90	45.97	54.00	-8.03	Vertical
4804	9.36	34.04	41.53	43.81	45.68	54.00	-8.32	Horizontal
7206	13.38	36.33	40.98	37.89	46.62	54.00	-7.38	Horizontal
9608	13.39	36.99	37.56	34.00	46.82	54.00	-7.18	Horizontal
12010	16.45	38.80	39.09	30.60	46.76	54.00	-7.24	Horizontal
14412	17.44	39.40	44.77	34.20	46.27	54.00	-7.73	Horizontal



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Worse case	orse case mode: GFSK			t channel:	Middle	Rem	ark:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Emission Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Antenna polarization
4882	10.57	34.02	40.33	54.99	59.25	74.00	-14.75	Vertical
7323	12.91	36.10	40.40	50.00	58.61	74.00	-15.39	Vertical
9764	13.89	37.10	37.94	46.59	59.64	74.00	-14.36	Vertical
12205	17.95	38.93	39.30	45.58	63.16	74.00	-10.84	Vertical
14646	17.18	39.63	45.96	48.36	59.21	74.00	-14.79	Vertical
4882	10.57	34.02	40.33	56.99	61.25	74.00	-12.75	Horizontal
7323	12.91	36.10	40.40	53.00	61.61	74.00	-12.39	Horizontal
9764	13.89	37.10	37.94	46.22	59.27	74.00	-14.73	Horizontal
12205	17.95	38.93	39.30	45.84	63.42	74.00	-10.58	Horizontal
14646	17.18	39.63	45.96	46.30	57.15	74.00	-16.85	Horizontal

Worse case	Vorse case mode: GFSK		Tes	t channel:	Middle	Rem	ark:	Average
Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBµV)	Emission Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Antenna polarization
4882	10.57	34.02	40.33	42.74	47.00	54.00	-7.00	Vertical
7323	12.91	36.10	40.40	38.56	47.17	54.00	-6.83	Vertical
9764	13.89	37.10	37.94	34.00	47.05	54.00	-6.95	Vertical
12205	17.95	38.93	39.30	29.58	47.16	54.00	-6.84	Vertical
14646	17.18	39.63	45.96	34.33	45.18	54.00	-8.82	Vertical
4882	10.57	34.02	40.33	42.49	46.75	54.00	-7.25	Horizontal
7323	12.91	36.10	40.40	38.00	46.61	54.00	-7.39	Horizontal
9764	13.89	37.10	37.94	33.02	46.07	54.00	-7.93	Horizontal
12205	17.95	38.93	39.30	29.99	47.57	54.00	-6.43	Horizontal
14646	17.18	39.63	45.96	35.67	46.52	54.00	-7.48	Horizontal



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Worse case	se mode: GFSK		Tes	t channel:	Highest	Rem	ark:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Emission Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Antenna polarization
4960	10.43	34.01	41.03	56.36	59.77	74.00	-14.23	Vertical
7440	12.72	35.91	40.01	48.36	56.98	74.00	-17.02	Vertical
9920	14.24	37.23	37.78	47.60	61.29	74.00	-12.71	Vertical
12400	17.55	39.04	39.48	45.77	62.88	74.00	-11.12	Vertical
14880	16.69	39.80	46.61	48.68	58.56	74.00	-15.44	Vertical
4960	10.43	34.01	41.03	57.98	61.39	74.00	-12.61	Horizontal
7440	12.72	35.91	40.01	53.00	61.62	74.00	-12.38	Horizontal
9920	14.24	37.23	37.78	46.99	60.68	74.00	-13.32	Horizontal
12400	17.55	39.04	39.48	44.99	62.10	74.00	-11.90	Horizontal
14880	16.69	39.80	46.61	48.91	58.79	74.00	-15.21	Horizontal

Worse case	Worse case mode: GFSK		Tes	t channel:	Highest	Rem	ark:	Average
Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBµV)	Emission Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Antenna polarization
4960	10.43	34.01	41.03	42.68	46.09	54.00	-7.91	Vertical
7440	12.72	35.91	40.01	38.69	47.31	54.00	-6.69	Vertical
9920	14.24	37.23	37.78	31.01	44.70	54.00	-9.30	Vertical
12400	17.55	39.04	39.48	29.99	47.10	54.00	-6.90	Vertical
14880	16.69	39.80	46.61	33.98	43.86	54.00	-10.14	Vertical
4960	10.43	34.01	41.03	43.90	47.31	54.00	-6.69	Horizontal
7440	12.72	35.91	40.01	38.02	46.64	54.00	-7.36	Horizontal
9920	14.24	37.23	37.78	33.27	46.96	54.00	-7.04	Horizontal
12400	17.55	39.04	39.48	28.64	45.75	54.00	-8.25	Horizontal
14880	16.69	39.80	46.61	36.01	45.89	54.00	-8.11	Horizontal

Remark: The disturbance above 15GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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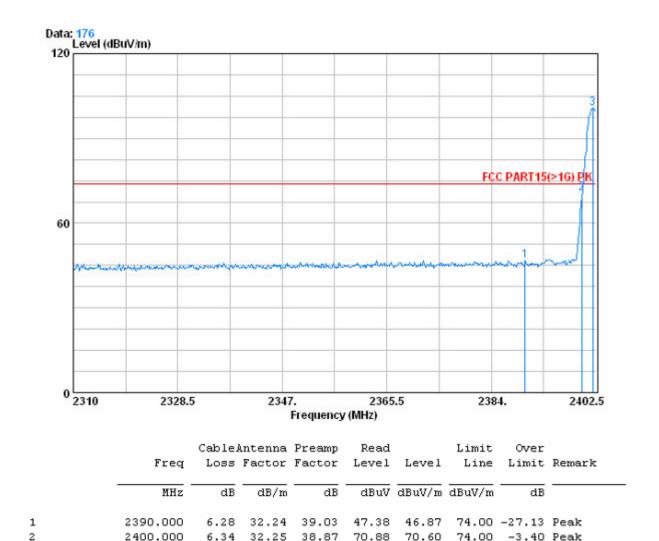
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5.11.3 Band edge (Radiated Emission)

2402.000

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak

Vertical:



32.25 38.87 101.04 100.75 114.00 -13.25 Peak

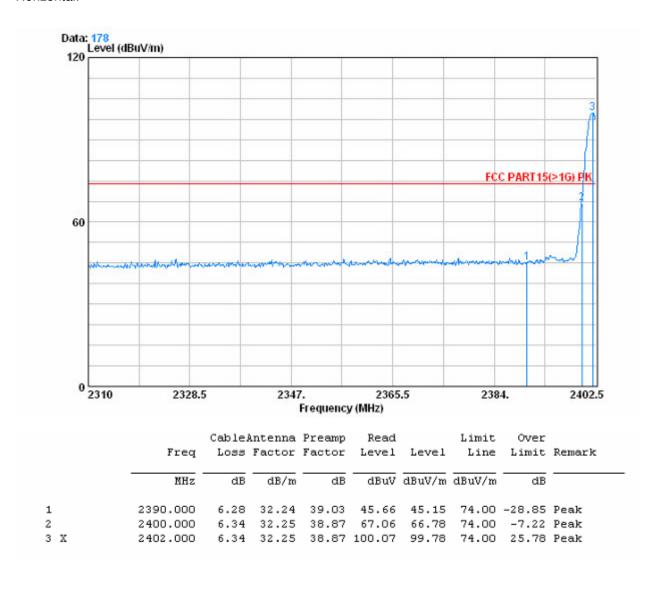
[&]quot;This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only."



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Horizontal:



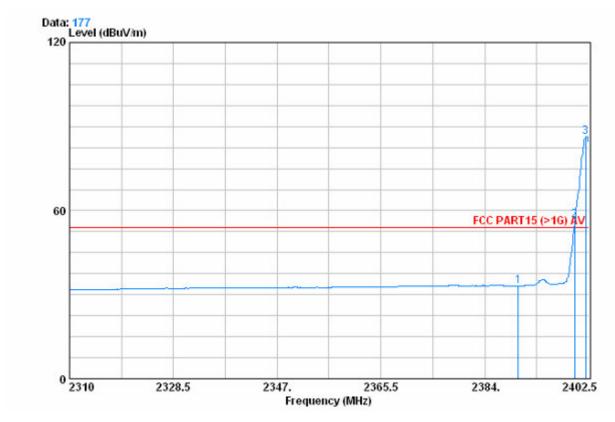


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Test mode: Transmitting Test channel: Lowest Remark: Average

Vertical:



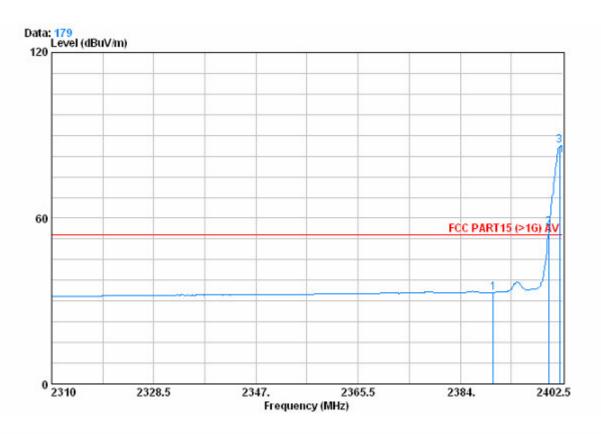
	Freq			Preamp Factor			Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 2 X 3 X	2390.000 2400.000 2402.000	6.34	32.25	38.87	56.96	56.67	54.00	2.67	Average Average Average



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Horizontal:



	Freq			Preamp Factor			Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	6.28	32.24	39.03	33.66	33.15	54.00	-20.85	Average
2 X	2400.000	6.34	32.25	38.87	56.69	56.40	54.00	2.40	Average
3 X	2402.000	6.34	32.25	38.87	86.51	86.22	54.00	32.22	Average

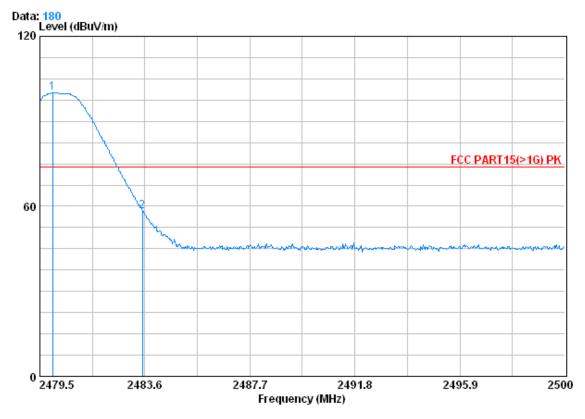


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Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak
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Vertical:



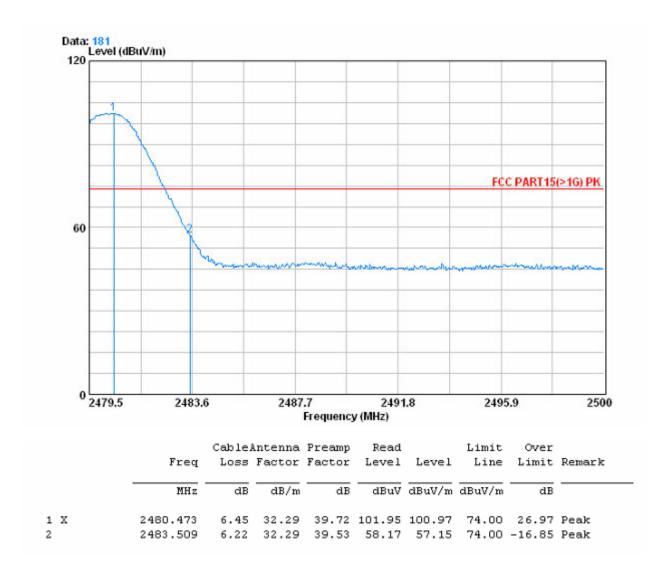
	Freq			Preamp Factor	Read Level		Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 X 2	2480.000 2483.509			39.72 39.53					



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Horizontal:



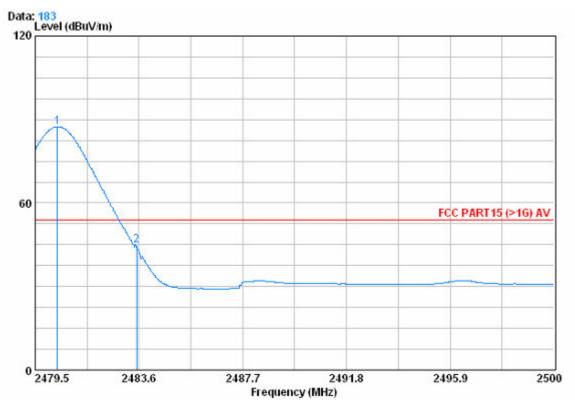


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Test mode: Transmitting Test channel: Highest Remark: Average

Vertical:



	Freq			Preamp Factor			Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 0 2	2480.000 2483.509								Average Average



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Horizontal:

