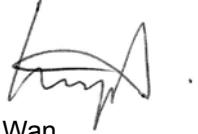


Produkte
Products
Prüfbericht - Nr.: **02422101 001**
Seite 1 von 35
Test Report No.:
Page 1 of 35

Auftraggeber: <i>Client:</i>	Proxim Wireless Corporation 1561 Buckeye Drive Milpitas, CA 95035 USA United States								
Gegenstand der Prüfung: <i>Test item:</i>	Tsunami QB- 8100								
Bezeichnung: <i>Identification:</i>	QB-8100-EPA-US MP-8100-BSU-US MP-8100-SUA-US QB-8150-EPR-US MP-8150-SUR-US	Serien-Nr.: <i>Serial No.</i>	09LT23010035 09LT23010030 09LT23010031 09LT23010037 09LT23010032						
Wareneingangs-Nr.: <i>Receipt No.:</i>	1403007490	Eingangsdatum: <i>Date of receipt:</i>	14.07.2009						
Prüfort: <i>Testing location:</i>	TÜV Rheinland India Pvt. Ltd. #7, Whitefield Main Road, Alpha Tower, Sigma Soft Tech park, Varthur Kodi, Bangalore, India.								
Prüfgrundlage: <i>Test specification:</i>	FCC Part 15, Subpart C								
Prüfergebnis: <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>								
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland India Pvt. Ltd # 7, Whitefield Main Road, Alpha Tower, Sigma Soft Tech park, Varthur Kodi, Bangalore, India.								
geprüft / tested by:	kontrolliert / reviewed by:								
10.09.2009 L.Narasimha Charyulu Manager		10.09.2009 Hugo Wan Project Manager							
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>				
Sonstiges /Other Aspects: FCC ID : HZB815058									
Abkürzungen:		Abbreviations:							
P(pass) = entspricht Prüfgrundlage		P(pass) = passed							
F(fail) = entspricht nicht Prüfgrundlage		F(fail) = failed							
N/A = nicht anwendbar		N/A = not applicable							
N/T = nicht getestet		N/T = not tested							
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.									
<i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>									

Test Result Summary

Clause(s)	Test Item	Result
FCC 15.247(b) (3)	Conducted Peak Output Power	Pass
FCC 15.247(a) (2)	6dB Bandwidth	Pass
FCC 15.247(e)	Transmitter Output Power Spectral Density	Pass
FCC 15.247(d)	Band-edge compliance	Pass
FCC 15.207	Conducted Emission Test on a.c. Power Line	Pass
FCC 15.205 / 15.209	Spurious Radiated Emissions – Transmission mode	Pass

Content

List of Test and Measurement Instruments	4
General Product Information	5
Product Function and Intended Use.....	5
Ratings and System Details	5
Operation Descriptions	7
Test Set-up and Operation Mode	9
Principle of Configuration Selection	9
Test Operation and Test Software.....	9
Special Accessories and Auxiliary Equipment	9
Countermeasures to achieve EMC Compliance.....	9
Test Methodology	10
Radiated Emission Test.....	10
Conducted Emission Test on a.c. mains line	10
Test Results.....	11
Conducted Peak Output Power	Section 15.247(b)(3)
6 dB Bandwidth	Section 15.247(a)(2)
Transmitter Output Spectral Power Density	Section 15.247(e).....
Band-edge Compliance	Section 15.247(d).....
Conducted Emission Test on a.c. Power Line	Section 15.207
Spurious Radiated Emissions	Section 15.205 / 15.209
Appendix 1: Test Setup Photo	
Appendix 2: EUT External Photo	
Appendix 3: EUT Internal Photo	
Appendix 4: FCCID Label and Label Location	
Appendix 5: Block Diagram and Operational Description	
Appendix 6: Schematic Diagrams	
Appendix 7: User Manual	
Appendix 8: Maximum Permissible Exposure Information	
Appendix 9: Bill of Material	

List of Test and Measurement Instruments

Wipro Technologies, Bangalore

List of Test and Measurements

Equipment	Manufacturer	Type	S/N	Calibration Due Date
Spectrum Analyzer	Agilent	E4470B	MY45112947	23.08.2010
EMI Test Receiver	Rohde & Schwarz	ESIB40	100306	24.07.2010
Hybrid Log Periodic Antenna	TDK	HLP3003C	130334	16.02.2010
Broadband Horn Antenna	Schwarzbeck Mess-Electronik	BBHA9170	9170-344,2007	14.02.2010
Double Ridged Horn Antenna	Schwarzbeck Mess-Electronik	BBHA9120D	2008	14.08.2010
Per-Amplifier	TDK-RFSolution	PA-02	100008	14.02.2010
10 dB Attenuator	Huber & Schuner	6810.17.A	770041	12/01/2010
10 dB Attenuator	Huber & Schuner	6810.17.A	770041	12/01/2010
06 dB Attenuator	Huber & Schuner	6806.17.A	773253	10/01/2010
Power combiner	Pulse Microwave Corporation	PS2-18-450/9S	--	14.05.2010
FSUP Signal source analyzer	Rohde & Schwarz	FSUP26	100068	04.06.2010
Power meter	Agilent	E4419B	MY45101723	27.02.2010
Power Sensor	Agilent	E9304A	MY41497506	27.02.2010
Power Sensor	Agilent	E9304A	MY41497508	27.02.2010

SAMEER-Center for Electromagnetics, Chennai

List of Test and Measurements

Equipment	Manufacturer	Type	S/N	Calibration Due Date
EMI Receiver	Rohde & Schwarz	ESIB7	100319	06.03.2010
Loop Antenna	ETS Lingdren	6507	1484	12.10.2009

Testing Facilities

- 1) TARANG
Wipro Technologies
Survey No. 70,77,78 / 8A, Doddakannelli,
Sarjapur Road, Bangalore – 560 035
India
- 2) SAMEER-Center for Electromagnetics
C.I.T.Campus, Taramani,
2nd Main Road, Chennai – 600113
India

General Product Information

Product Function and Intended Use

Wireless product which is built to operate in out door environment.

Ratings and System Details

Wired ethernet	Two Auto MDI-X RJ45 Gigabit Ethernet <ul style="list-style-type: none"> - Port #1 with PoE in & Data - Port #2 with PoE out (802.3af pin out) & Data 																													
Wireless protocol	WORP (Wireless Outdoor Router Protocol)																													
Modulations	OFDM with BPSK, QPSK, QAM16, QAM64																													
Frequency	5725 – 5850 MHz (Subject to Country Regulations)																													
Channel Size	40 MHz, 20 MHz, 10MHz, 5MHz																													
Data Rate	Up to 300 Mbps																													
TX Power	Up to 18 dBm (at antenna port)																													
TX Power Control	0 - 18 dBm, in 1dB steps																													
Rx Sensitivity (BER=10 ⁻⁶)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Channel Size</th> <th>20 MHz</th> <th>40 MHz</th> </tr> </thead> <tbody> <tr><td>BPSK 1/2</td><td>-93</td><td>-87</td></tr> <tr><td>BPSK 3/4</td><td>-90</td><td>-86</td></tr> <tr><td>QPSK 1/2</td><td>-88</td><td>-85</td></tr> <tr><td>Qpsk 3/4</td><td>-85</td><td>-82</td></tr> <tr><td>16-QAM 1/2</td><td>-80</td><td>-80</td></tr> <tr><td>16-QAM 3/4</td><td>-78</td><td>-75</td></tr> <tr><td>64-QAM 2/3</td><td>-75</td><td>-74</td></tr> <tr><td>64-QAM 3/4</td><td>-75</td><td>-71</td></tr> </tbody> </table>			Channel Size	20 MHz	40 MHz	BPSK 1/2	-93	-87	BPSK 3/4	-90	-86	QPSK 1/2	-88	-85	Qpsk 3/4	-85	-82	16-QAM 1/2	-80	-80	16-QAM 3/4	-78	-75	64-QAM 2/3	-75	-74	64-QAM 3/4	-75	-71
Channel Size	20 MHz	40 MHz																												
BPSK 1/2	-93	-87																												
BPSK 3/4	-90	-86																												
QPSK 1/2	-88	-85																												
Qpsk 3/4	-85	-82																												
16-QAM 1/2	-80	-80																												
16-QAM 3/4	-78	-75																												
64-QAM 2/3	-75	-74																												
64-QAM 3/4	-75	-71																												
Antenna Type	External Antenna (Panel or Sectoral) Integrated Panel Antenna with 23 dBi gain																													
Number of antenna	2																													
Antenna Gain	Antenna – 1 5745 MHz : 30 dBi 5785 MHz : 30 dBi 5830 MHz : 30 dBi Antenna – 2 5745 MHz : 30 dBi 5785 MHz : 30 dBi 5830 MHz : 30 dBi																													
Latency	< 3 msec																													
Management – Local	RS-232 serial (RJ11 and DB-9)																													
Management – Remote	Telnet and SSH, Web GUI and SSL, TFTP, SNMPv3																													
Management – SNMP	SNMP v1-v2-v3, RFC-1213, RFC-1215, RFC-2790, RFC-2571, RFC-3412, RFC-3414, Private MIB																													

Network – Gateway Features	DHCP Server & relay, NAT with Std AL Gs, Bridging, Routing, Syslog,SNTP
Network - QoS	Asymmetric Bandwidth Control, Packet Classification Capabilities
Network - VLAN	802.1Q: Management VLAN. Transparent, Access and Trunk mode
Dimensions (L x W x T)	Packaged :15.94 x 15.94 x 8.46 in (405 x 405 x 215 mm) Unpackaged :10.51 x 10.51 x 3.27 in (267 x 267 x 83 mm)
Weight	Packaged :14.77 lbs (6.7 kg) Unpackaged :7.27 lbs (3.3 kg)
Environmental	Operating Temperature : -40° to 60°C (-40° to 140°F) Storage Temperature : -55° to 80°C (-67° to 176°F) Operating Humidity : Max 100% relative humidity (non-condensing) Storage Humidity : Max 100% relative humidity (non-condensing) Wind Loading : 125 Kmph Water & Dust Proof : IP67

Operation Descriptions

Connectorized & Integrated Antenna version :

Tsunami 8100 series is the newest product line of the Outdoor Radio solutions provided by Proxim Wireless Corporation. The products are designed to achieve high throughput with single radio solution based on OFDM technologies.

Tsunami QB-8100 is a point-to-point product and the family is represented by two models. QB-8150-EPR is one radio system with integrated antenna and QB-8100-EPA - one radio system with N-Type connectors, using Atheros MB82 miniPCI Radio. The module is installed on host processor system board and enclosed in ruggedized alloy cast enclosure using approved external antennas in connectorized model or approved integrated antenna in case of integrated model and configured for 5.8 GHz operation.

Tsunami MP-8100 is a point-to-multipoint product and the family is represented by three models. Base station model MP-8100-BSU is one radio system with N-Type connectors. Subscribers are model MP-8150-SUR - one radio system with integrated antenna and model MP-8100-SUA - one radio system with N-Type connectors, using Atheros MB82 miniPCI Radio. The module is installed on host processor system board and enclosed in ruggedized alloy cast enclosure using approved external antennas in connectorized model or approved integrated antenna in case of integrated model and configured for 5.8 GHz operation.

Hardware Description of EUT :

The product Tsunami MP/QB-8100 hardware consists of a Mother Board, Daughter Board and miniPCI Radio Card enclosed in metal enclosure. The mother board consists of main processor from Atheros AR7161 with core operating frequency of 680MHz and provides interfaces to two Gigabit Ethernet Ports, UART interface, two miniPCI connector interfaces and Daughter Board Interface. Mother Board consists of one 40MHz VCXO to feed main processor clock and two 25MHz crystals for Ethernet PHY devices. Mother Board also consists of 128MB RAM through two DDR devices which operate at 166MHz and two Flash device each of 8MB.

Mother Board Ethernet ports are connected to Daughter Board which provides surge protection functionality. Daughter Board is powered from mother Board, Mother Board is powered through POE and all secondary voltages are generated on the board.

The Daughter Board is designed to provide built-in support for surge protection for the Gigabit Ethernet interfaces and provides some complementary features. It also provides two Gigabit Ethernet RJ45 interfaces and one RJ11 serial interface for debugging purpose. MB82 radio is interfaced to Mother Board over miniPCI connector. Radio operates in 5GHz band. Mini PCI radio contains three antenna connectors. Enclosure is provided with three N-Type connectors for external antenna connections.

The block diagram and connection diagram of the unit is shown in Appendix – 5.

The five models are totally identical to each other in terms of circuit design, PCB layouts, BOM, housing design, internal wiring except the antenna type. The variation in model numbers is given in below.

Model Number	Antenna Type	Output Power	Software Configuration	WLAN Configuration	Antenna Gain
QB-8100-EPA-US	External	18 dBm	Connectorized End point	Point – Point	30 dBi
MP-8100-BSU-US	External	18 dBm	Base Station Unit	Point – Multi point	30 dBi
MP-8100-SUA-US	External	18 dBm	Connectorized subscriber unit, works as CPE with external antenna	Point – Multi point	30 dBi
QB-8150-EPR-US	Internal	18 dBm	Integrated End point	Point – Point	23.5 dBi
MP-8150-SUR-US	Internal	18 dBm	Integrated subscriber unit, works as CPE with internal antenna	Point – Multi Point	21.0 dBi

Antenna Type	Manufacturer	Model Name	Antenna Gain
Panel	MARS Antennas & RF Systems Ltd	MA-WA55-30	30.0 dBi
Panel	MARS Antennas & RF Systems Ltd	MA-WA56-DPIP	23.5 dBi
Panel	Smart Ant	PRX09-200250	21.0 dBi
Sector	MARS Antennas & RF Systems Ltd	MA-WC55-DS17	17.0 dBi

Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The test was performed under test mode to obtain the maximum emissions.

Test Operation and Test Software

Testing software was used to enable the continuous transmission and frequency on the EUT for the tests in this report.

Special Accessories and Auxiliary Equipment

The EUT was tested together with the following additional accessory:

- Software was used to controlling different transmit channels and power levels.
- Two transmission ports were used for testing.
- Antenna – 2 Nos.
- AC – DC Power adapter was provided by client for the ac mains line conducted emission test
- PoE, +48VDC, 32W

Countermeasures to achieve EMC Compliance

- none

Additional accessory used for testing

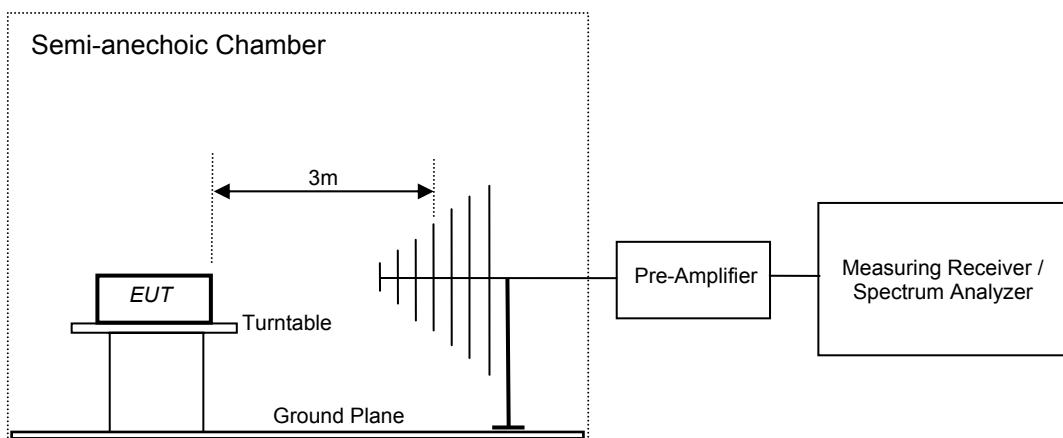
Laptop
Make : Wipro
Serial Number : 07KAMY00200067

Desktop
Make : Wipro Super Genius
Serial Number : AJS63500004

Test Methodology

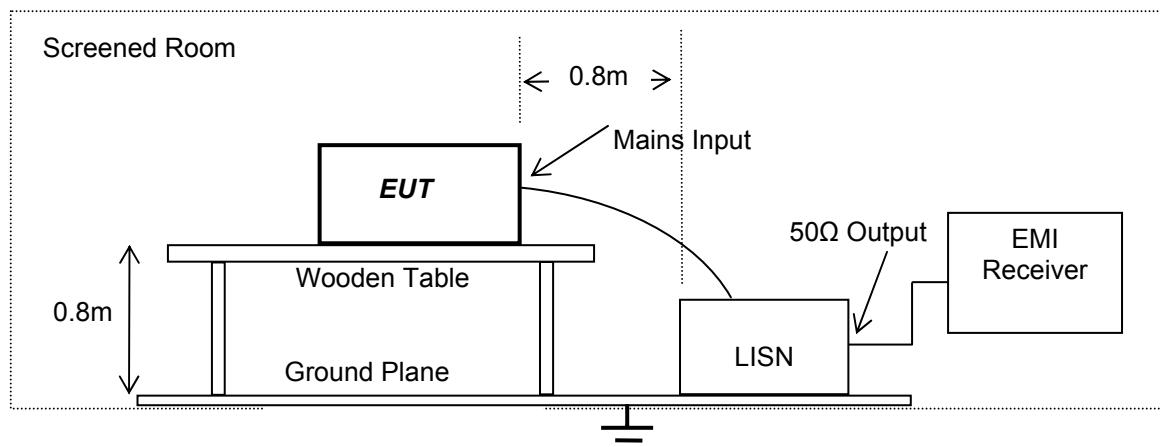
Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.4-2003. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000MHz was performed by horn antenna. The measurement below 30MHz was performed by loop antenna.



Conducted Emission Test on a.c. mains line

The equipment under test (EUT) was placed on a wooden table 80cm above the ground plane, the LISN was place 80cm away from the EUT. The test was performed in accordance with ANSI C63.4: 2003, with the following: an initial measurement was performed in peak and average detection mode on the live and neutral lines. The pre-scan was performed by peak detection on both live and neutral conductors. Any emissions recorded within 20dB of the relevant limit line were re-measured using quasi-peak and average detections, the worst cases was recorded in the table of results.



Test Results

Conducted Peak Output Power

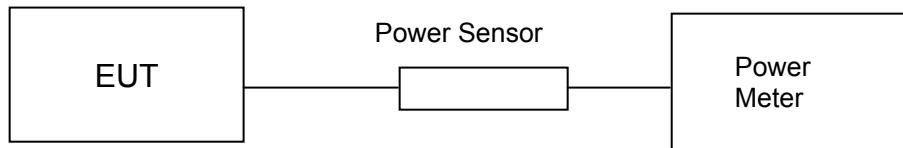
Section 15.247(b)(3)

RESULT:

Pass

Test Specification : FCC Part 15 Section 15.31
 Test Method : ANSI C63.4-2003
 Detector : Peak
 Requirement : 120 Volt AC
 Shall not exceed 1.0 watt (30dBm) for systems using digital modulation.

Test Method:



Test Result:

Configuration : Antenna Port 1

Channel	Frequency (MHz)	Measured Power (dBm)
Low	5745	17.36
Middle	5785	17.19
High	5830	17.12

Configuration : Antenna Port 2

Channel	Frequency (MHz)	Measured Power (dBm)
Low	5745	16.14
Middle	5785	16.17
High	5830	16.08

Configuration : Antenna Port 1 + Antenna Port 2

Channel	Frequency (MHz)	Measured Power (dBm)
Low	5745	17.98
Middle	5785	16.85
High	5830	17.53

6 dB Bandwidth

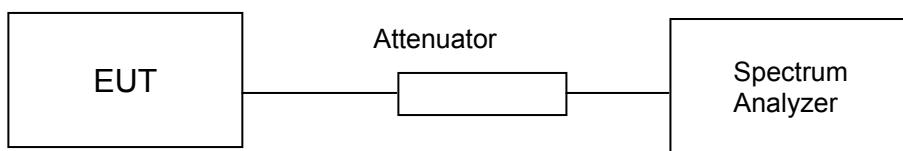
Section 15.247(a)(2)

RESULT:

Pass

Test Specification : FCC Part 15 Section 15.247 (a) (2)
 Detector Function : Peak
 Supply Voltage : 120 Volt AC
 Port of testing : Antenna port
 Requirement : The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Method:



Test Result:

Configuration : Antenna Port 1

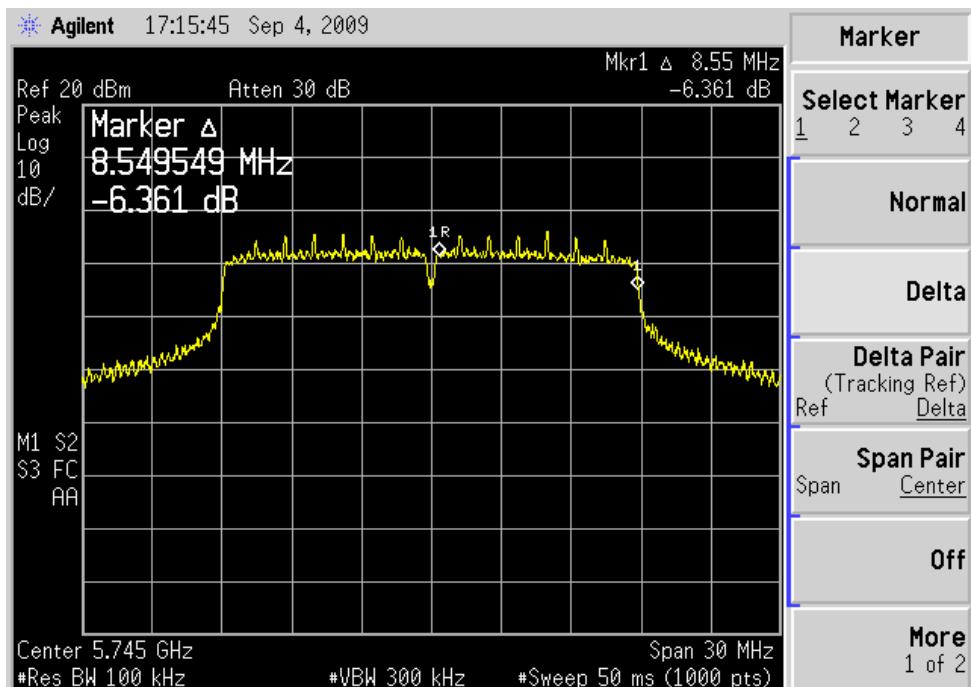
Center Frequency (MHz)	Lower Frequency (MHz)	Upper Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5745	9.270	8.549	17.819	43.150
5785	10.200	7.550	17.750	44.187
5830	9.210	8.636	17.846	41.417

Configuration : Antenna Port 2

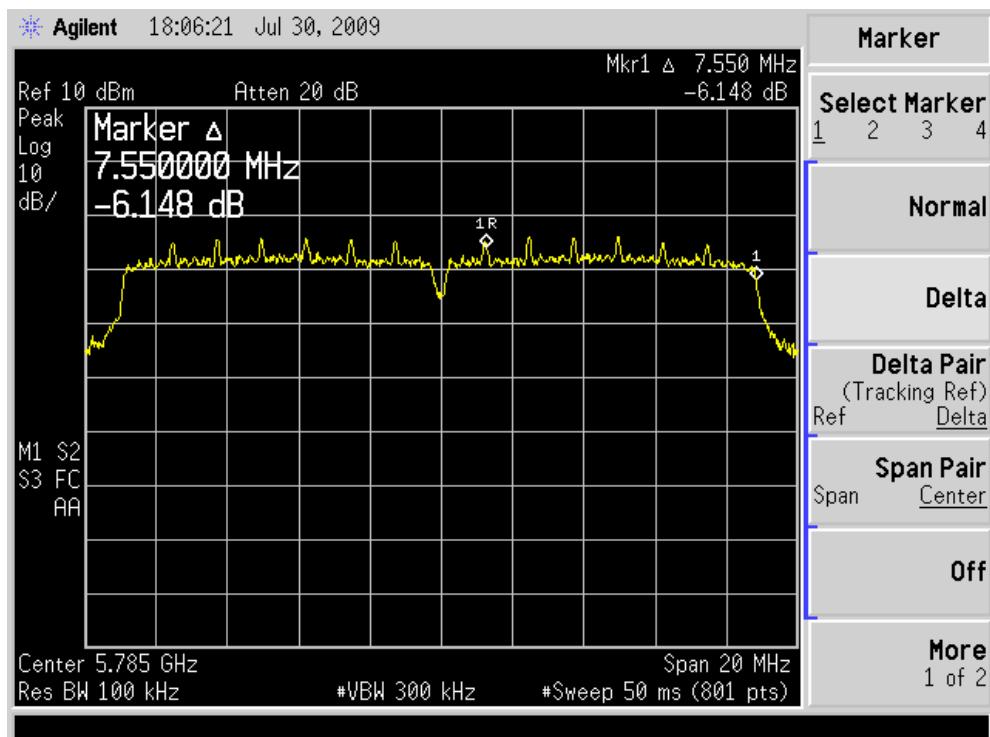
Center Frequency (MHz)	Lower Frequency (MHz)	Upper Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5745	9.180	8.579	17.759	39.764
5785	10.075	7.650	17.725	39.812
5830	9.240	8.639	17.879	40.325

Configuration : Antenna Port 1 + Antenna Port 2

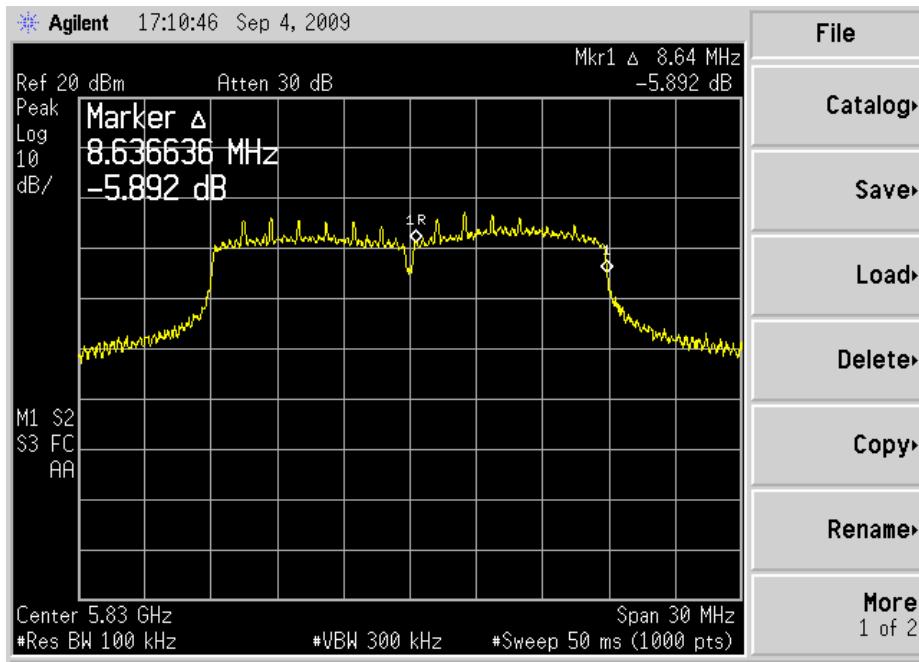
Center Frequency (MHz)	Lower Frequency (MHz)	Upper Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5745	9.180	8.669	17.849	34.785
5785	11.500	5.425	16.925	33.875
5830	9.210	7.531	16.741	33.165



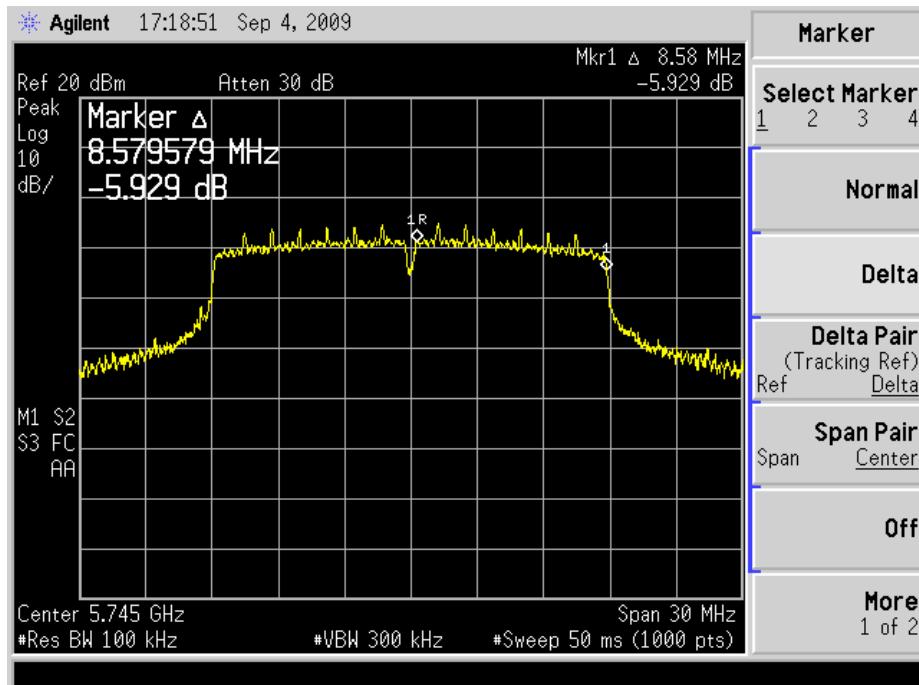
6 dB Bandwidth at 5745 MHz – Antenna Port 1



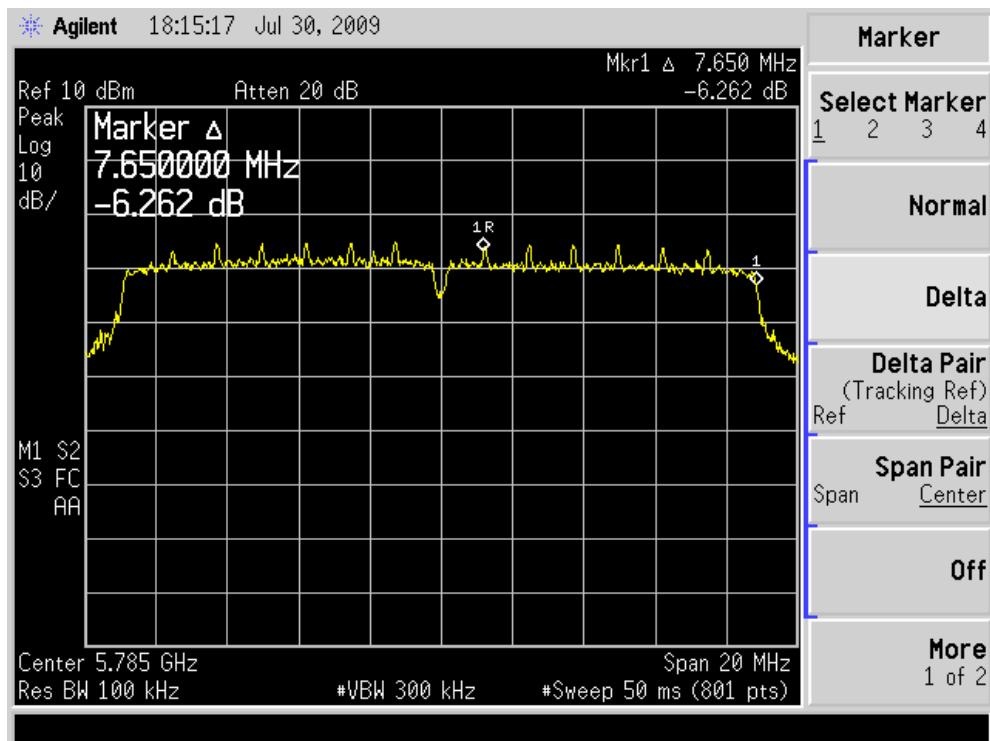
6 dB Bandwidth at 5785 MHz – Antenna Port 1



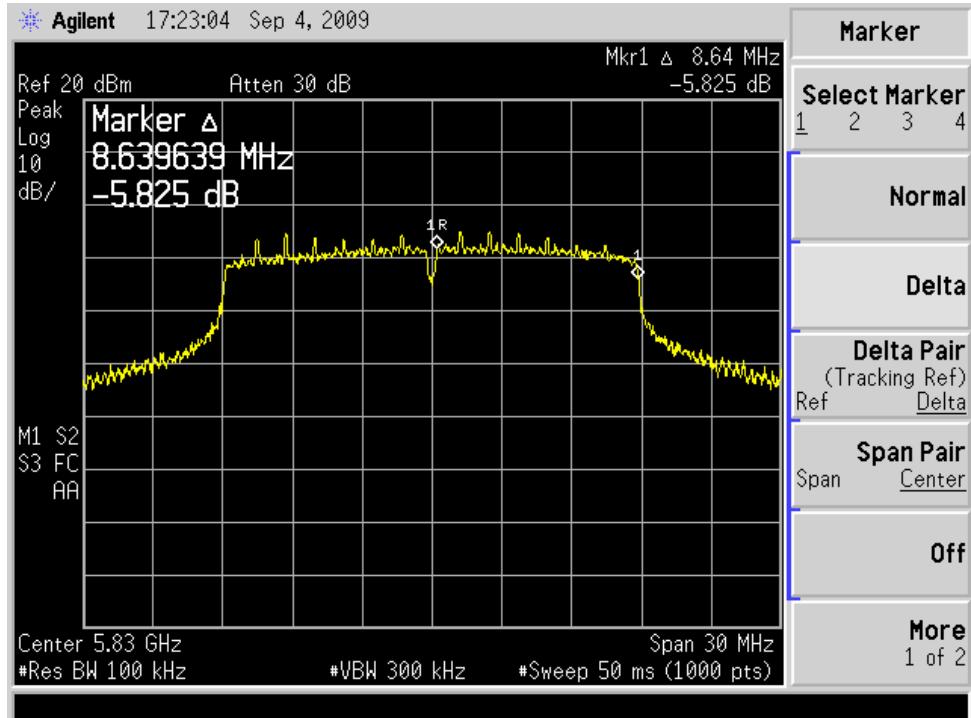
6 dB Bandwidth at 5830 MHz – Antenna Port 1



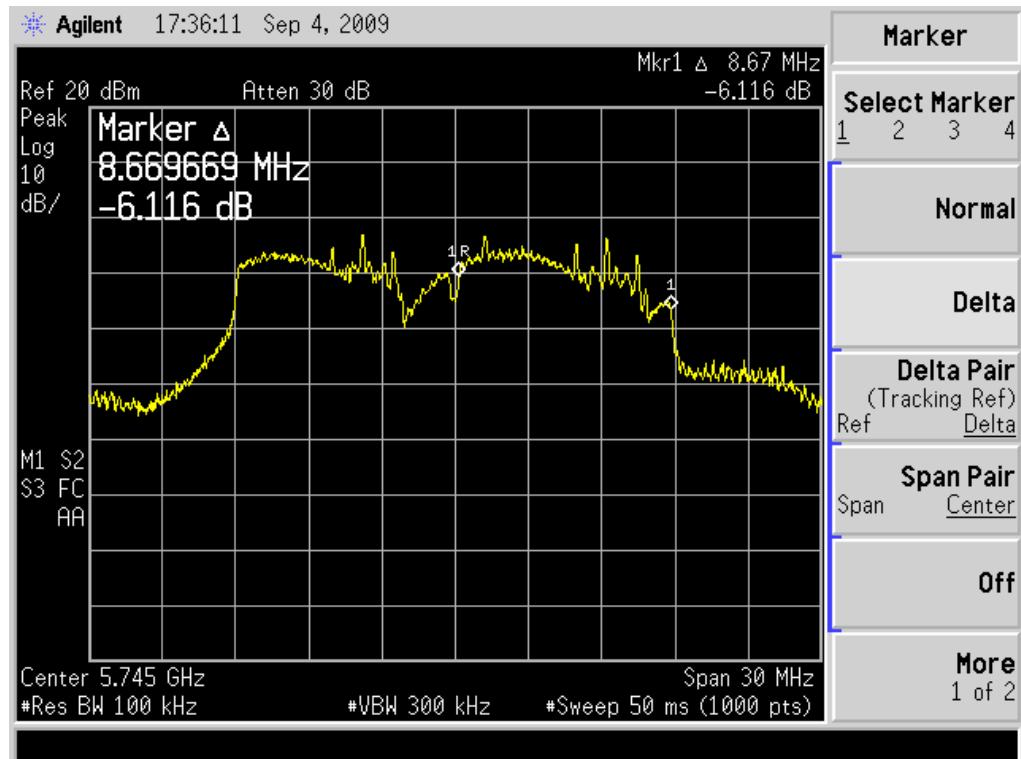
6 dB Bandwidth at 5745 MHz – Antenna Port 2



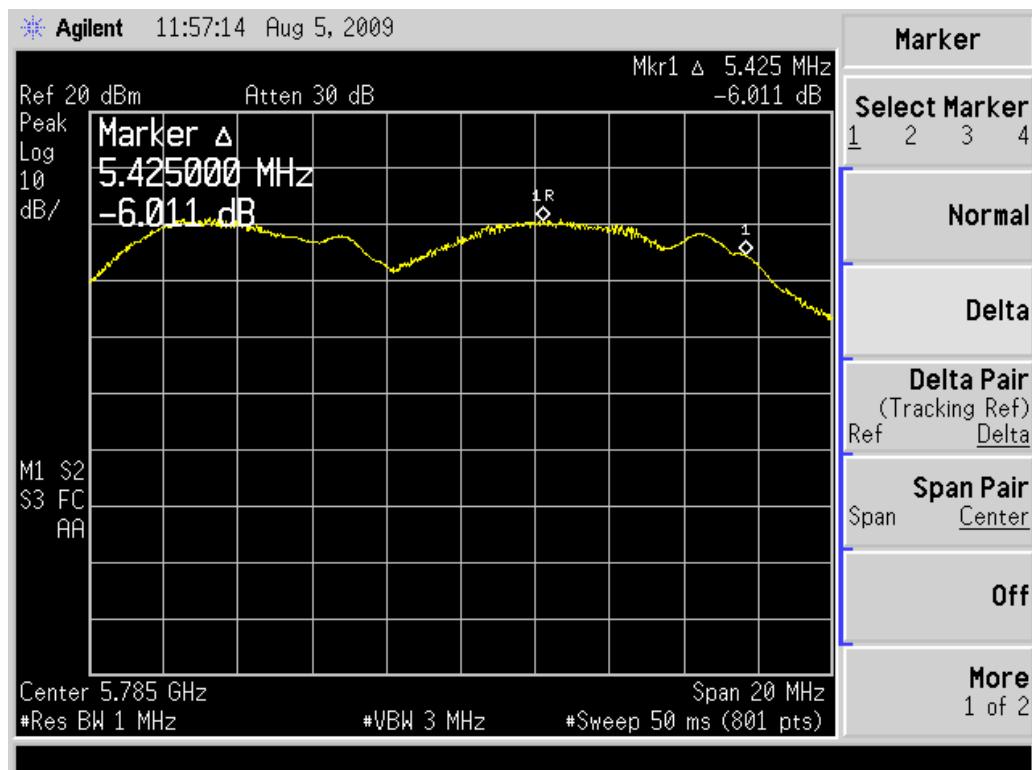
6 dB Bandwidth at 5785 MHz – Antenna Port 2



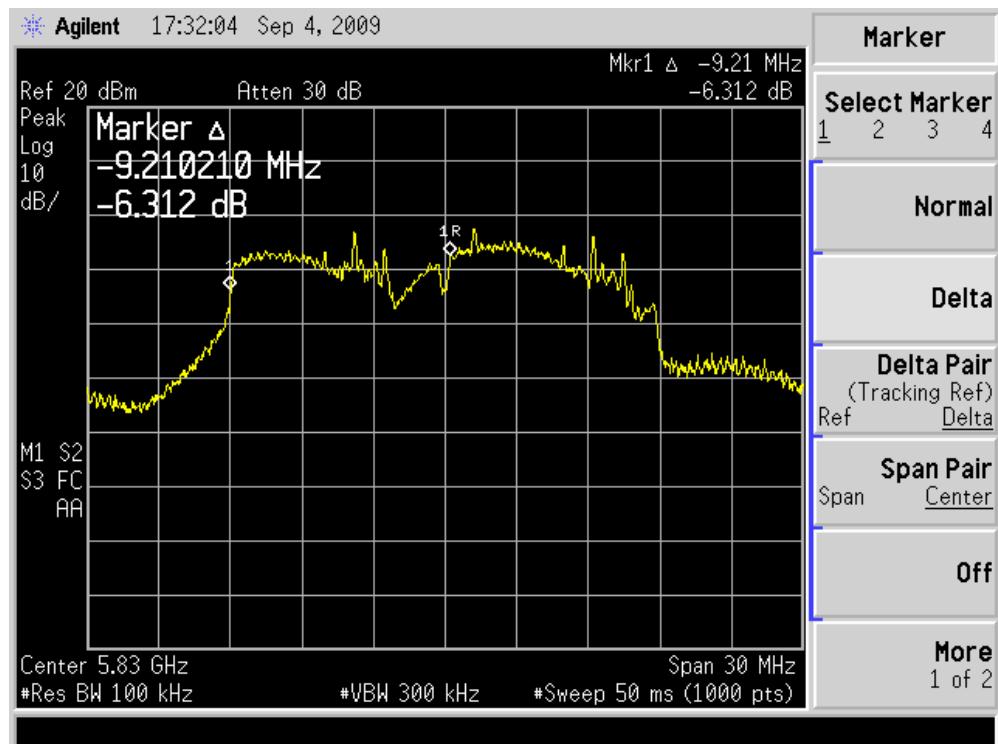
6 dB Bandwidth at 5830 MHz – Antenna Port 2



6 dB Bandwidth at 5745 MHz – Antenna Port 1 + Antenna Port 2



6 dB Bandwidth at 5785 MHz – Antenna Port 1 + Antenna Port 2

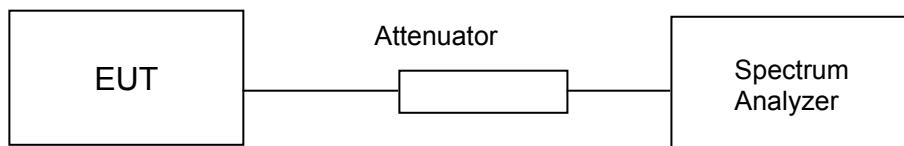


6 dB Bandwidth at 5830 MHz – Antenna 1 + Antenna 2

Transmitter Output Spectral Power Density
Section 15.247(e)
RESULT:
Pass

Test Specification : FCC Part 15 Section 15.247 (e)
 Detector Function : Peak
 Supply Voltage : 120 Volt AC
 Requirement : For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Method:



Test Result:

Configuration : Antenna Port 1

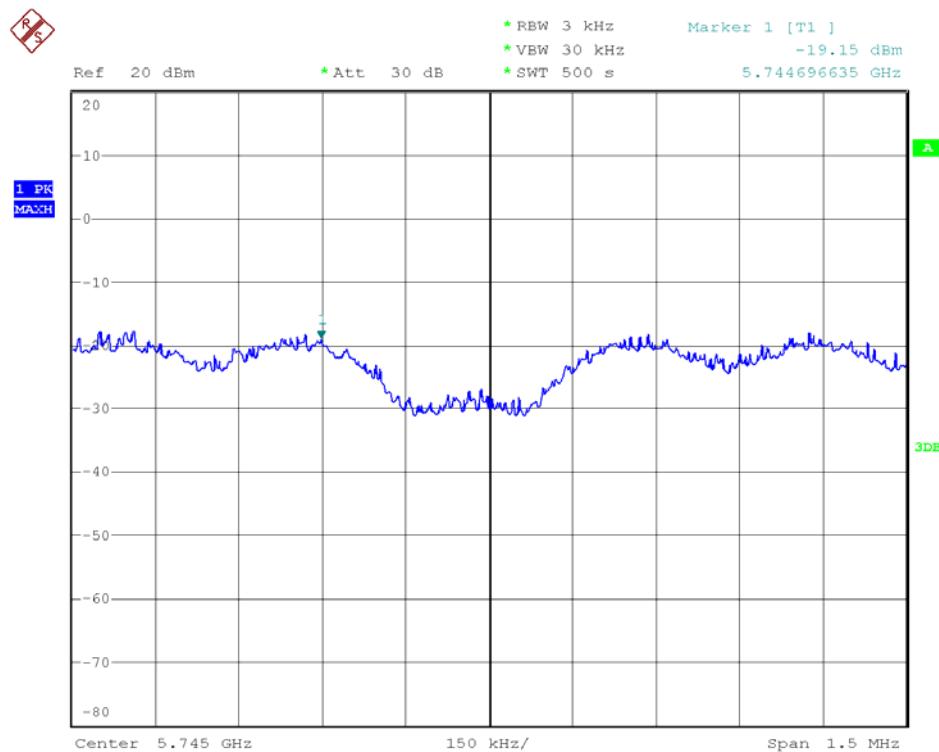
Channel	Frequency (MHz)	Measured Power (dBm)	Attenuation (dB)	Conducted Power (dBm)
Low	5745	-19.150	11.250	-7.93
Middle	5785	-20.700	11.130	-9.57
High	5830	-19.430	11.230	-8.20

Configuration : Antenna Port 2

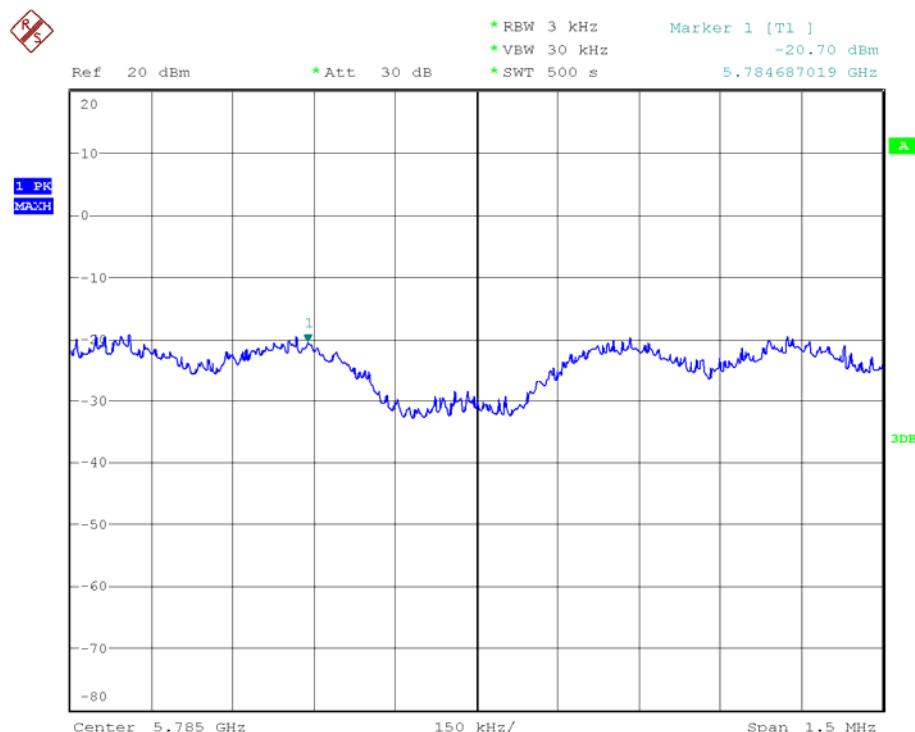
Channel	Frequency (MHz)	Measured Power (dBm)	Attenuation (dB)	Conducted Power (dBm)
Low	5745	-21.550	11.250	-10.300
Middle	5785	-21.070	11.130	-9.940
High	5830	-21.720	11.230	10.490

Configuration : Antenna Port 1 + Antenna Port 2

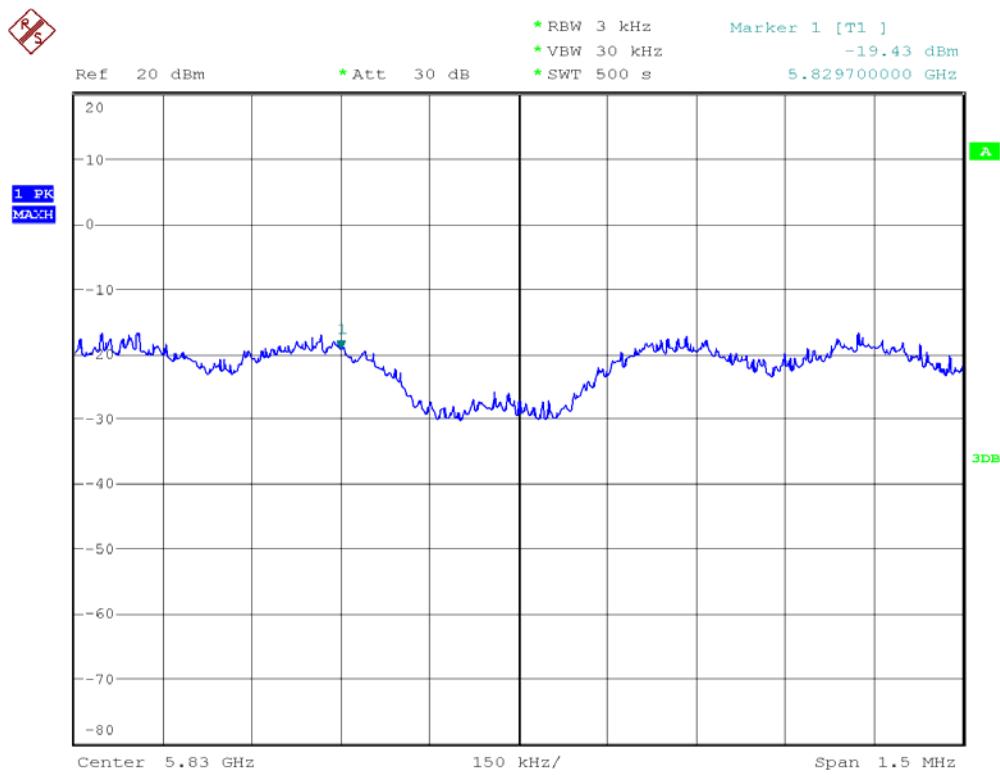
Channel	Frequency (MHz)	Measured Power (dBm)	Attenuation (dB)	Conducted Power (dBm)
Low	5745	-17.750	12.510	-5.240
Middle	5785	-18.050	12.670	-5.380
High	5830	-25.72	12.830	-12.890



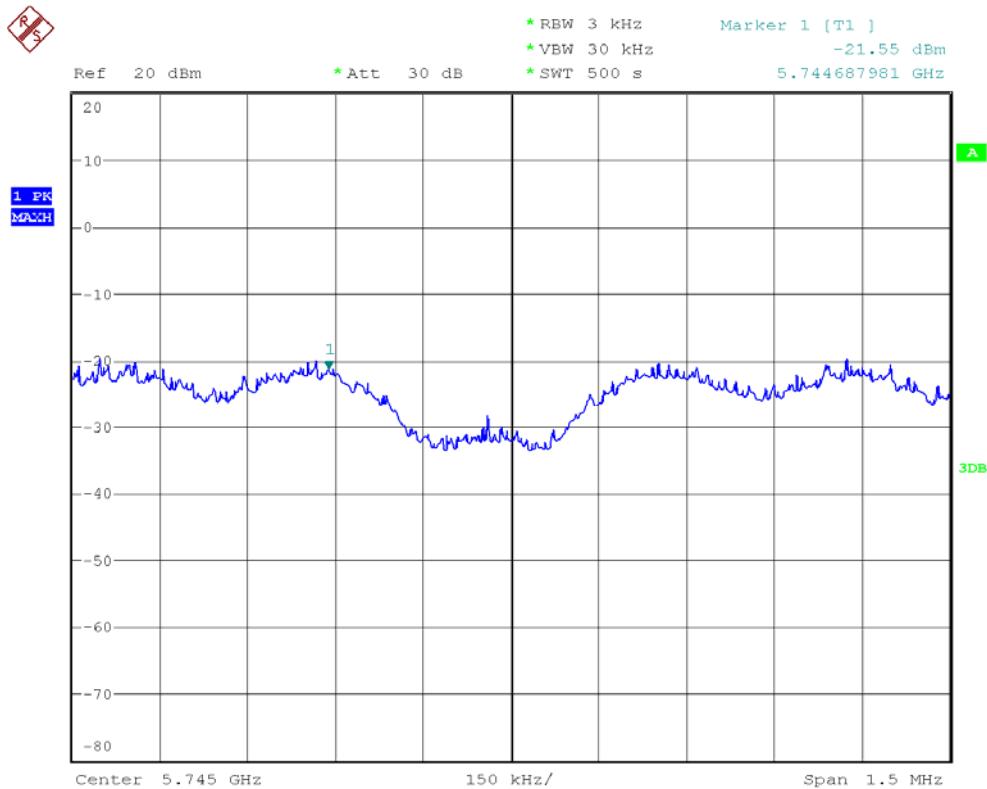
Power Spectral density at 5745 MHz – Antenna Port 1



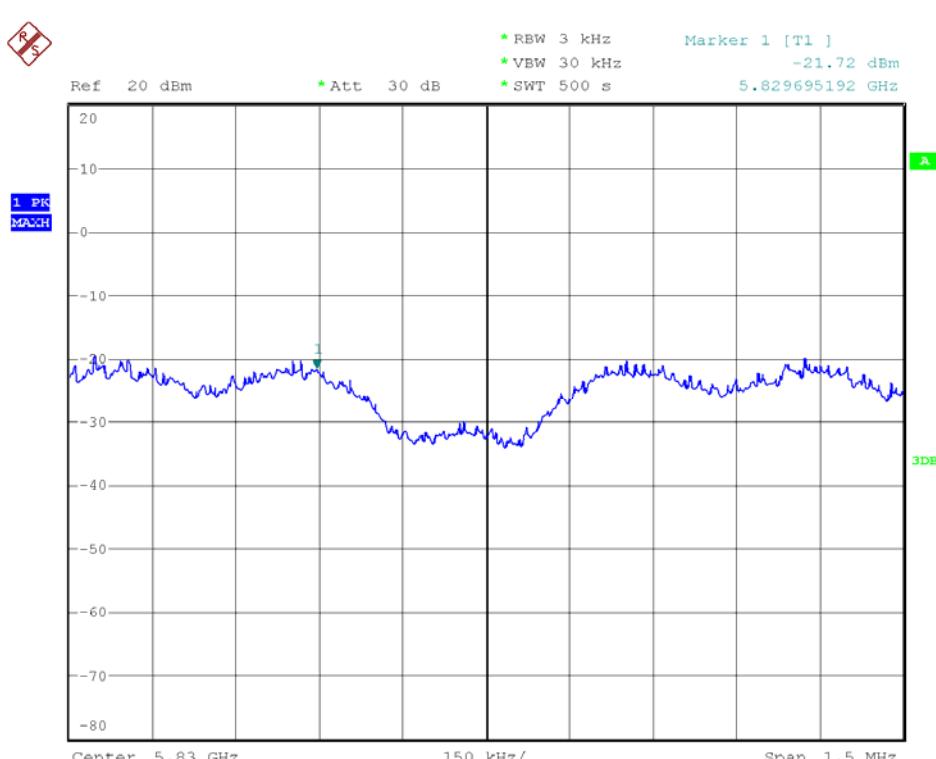
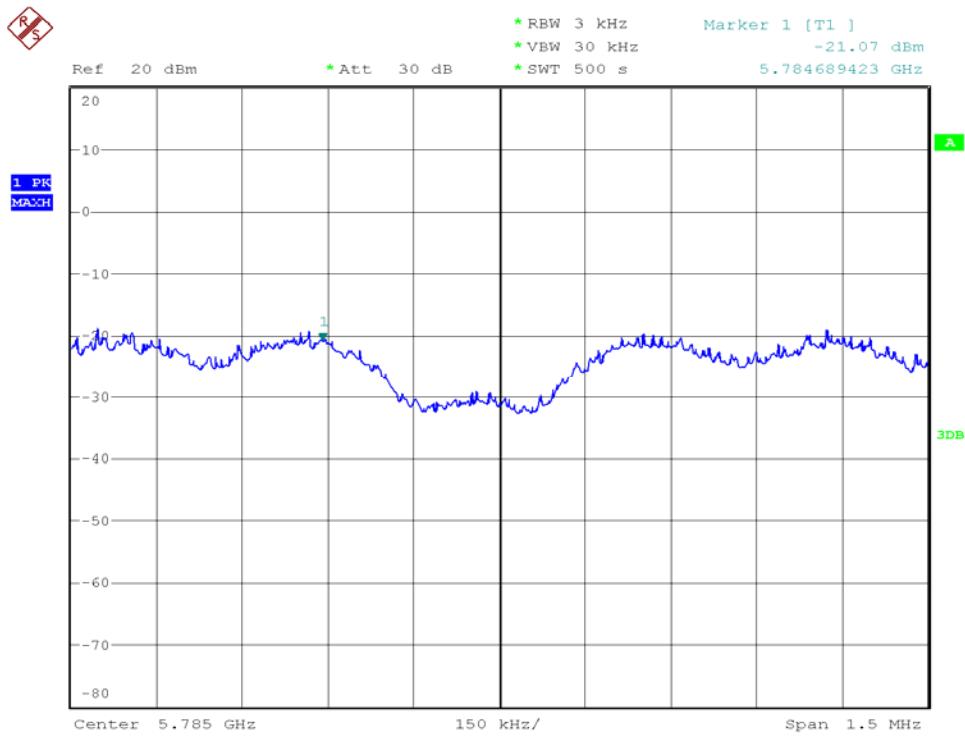
Power Spectral density at 5785 MHz – Antenna Port 1

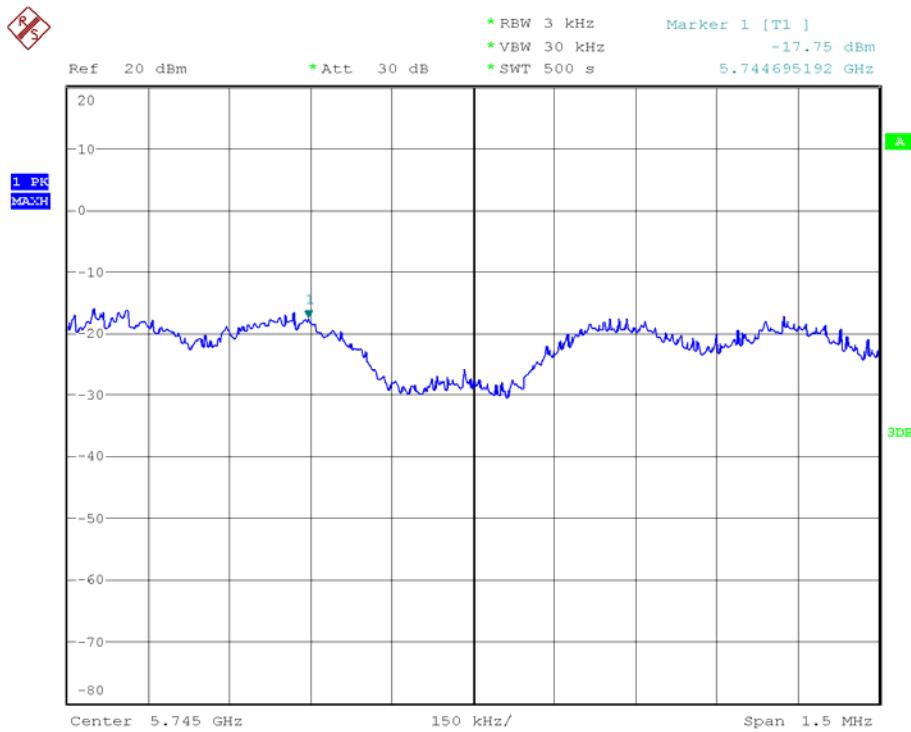


Power Spectral density at 5830 MHz – Antenna Port 1

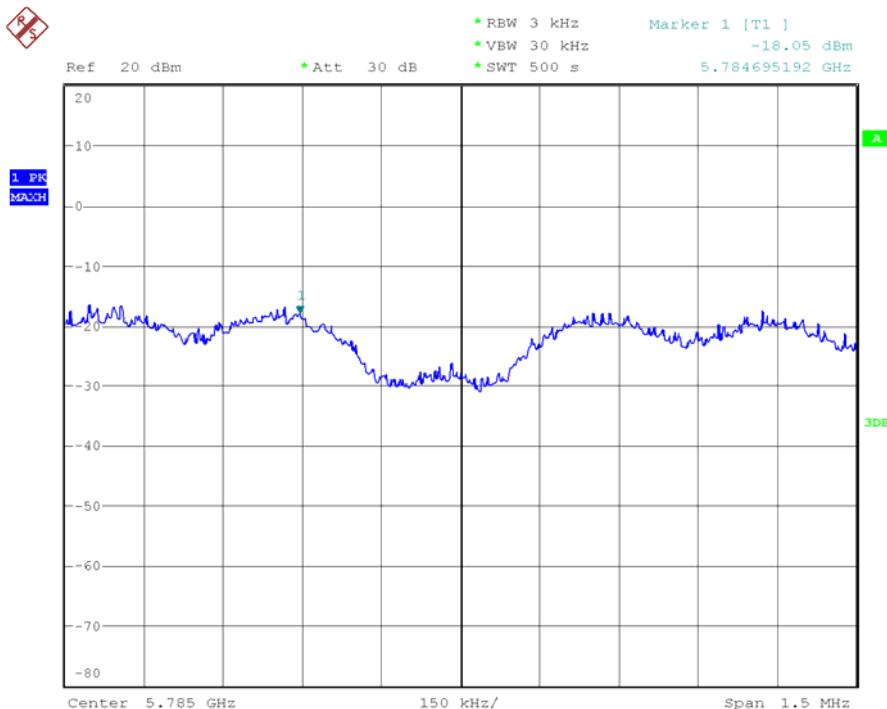


Power Spectral density at 5745 MHz – Antenna Port 2

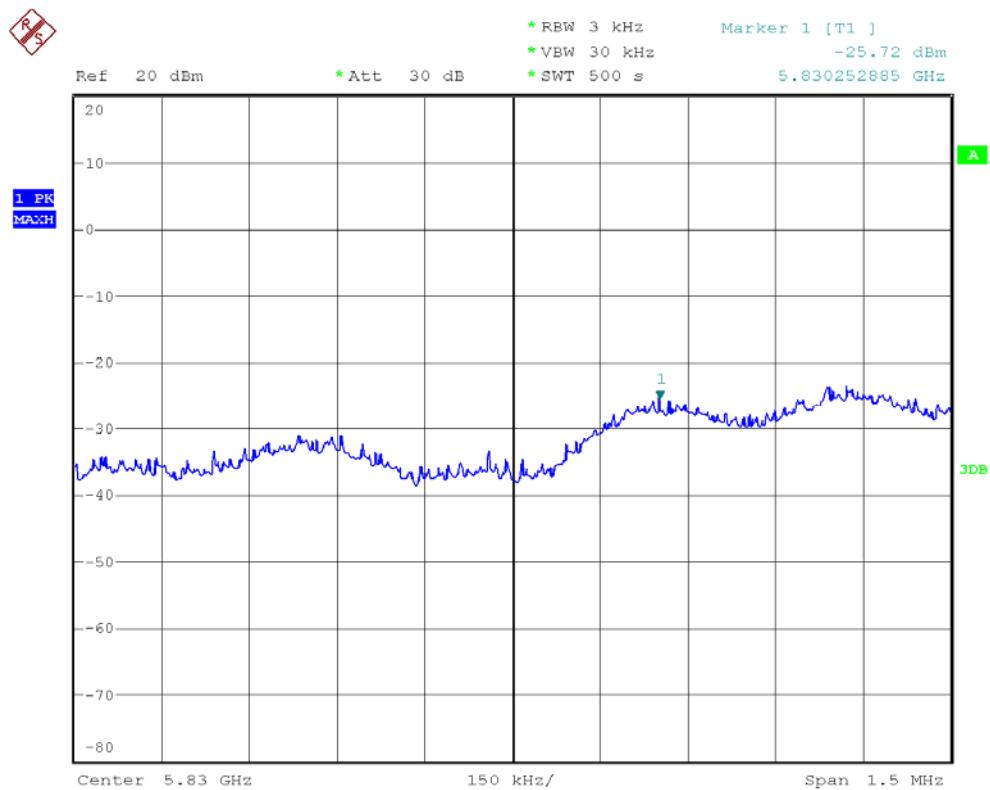




Power Spectral density at 5745 MHz – Antenna Port 1 + Antenna Port 2



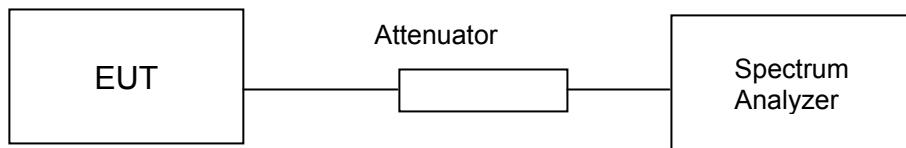
Power Spectral density at 5785 MHz – Antenna Port 1 + Antenna Port 2

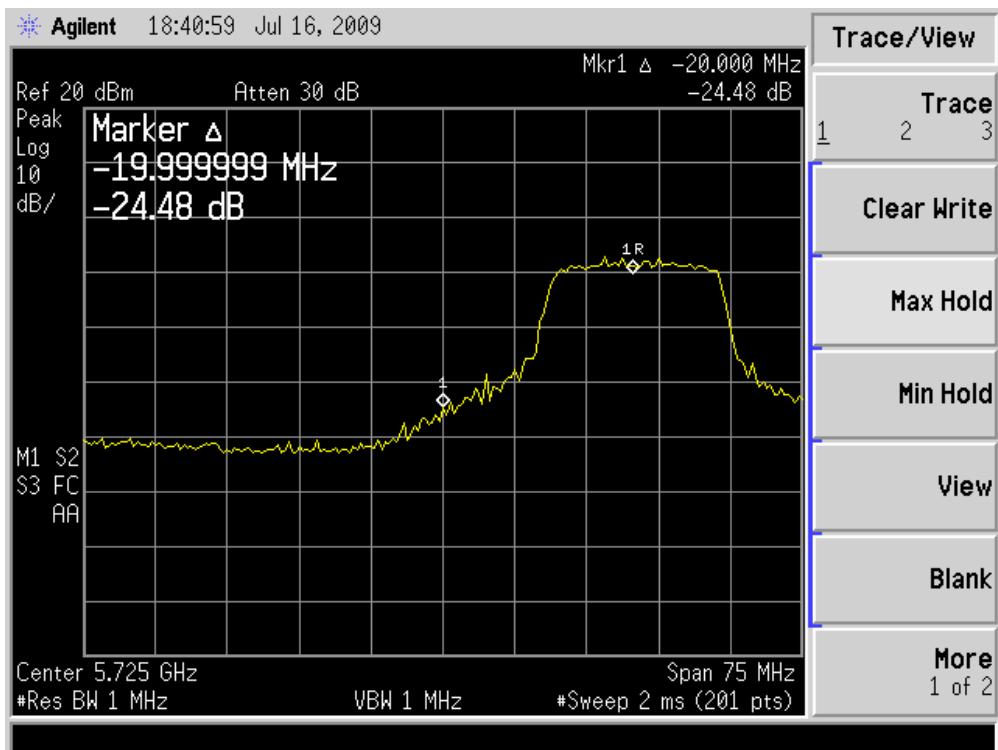


Power Spectral density at 5830 MHz – Antenna Port 1 + Antenna Port 2

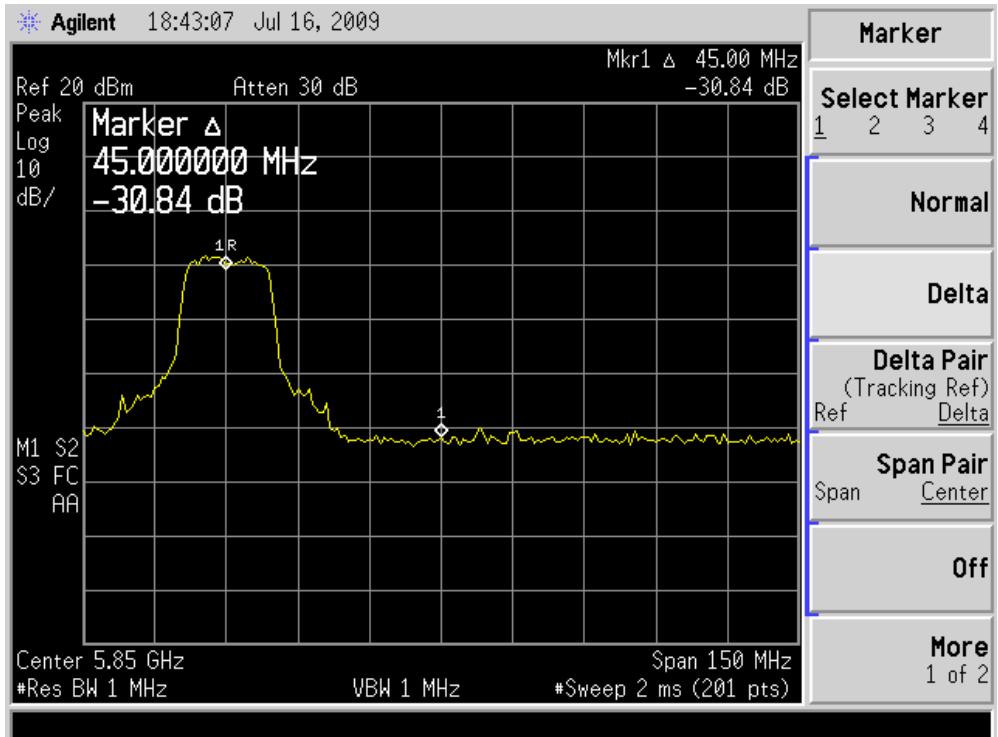
Band-edge Compliance**Section 15.247(d)****RESULT:****Pass**

Test Specification : FCC Part 15 Section 15.247(d)
Detector Function : Peak
Supply Voltage : 120 Volt AC
Requirement : In any 100kHz 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 20dB below that in the 100kHz 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.

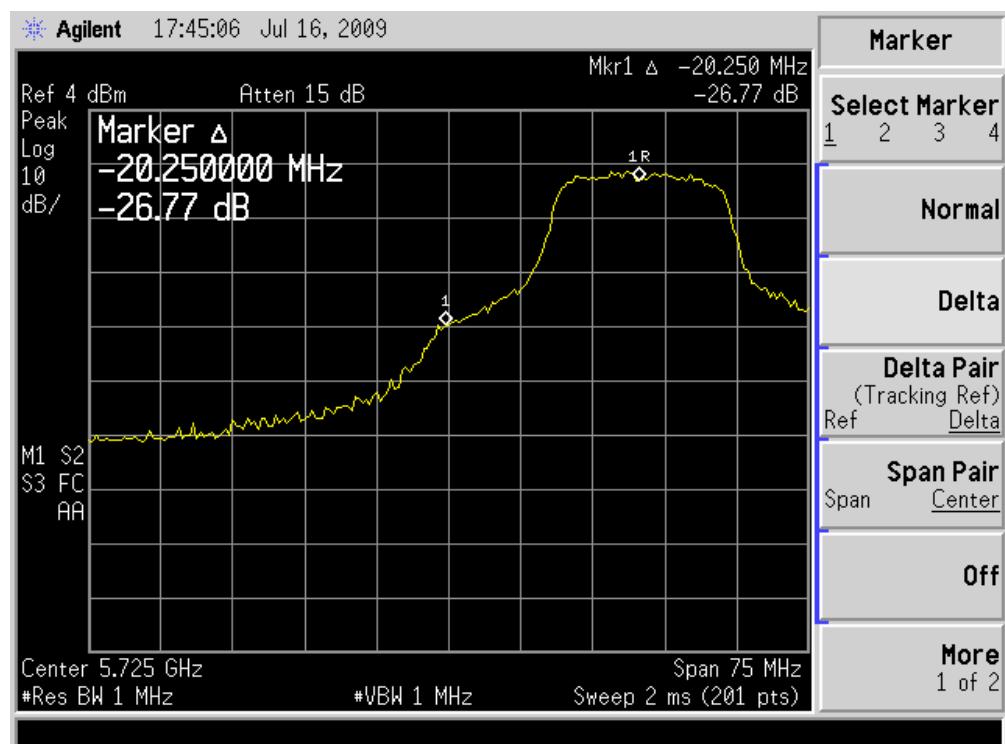
Test Method:



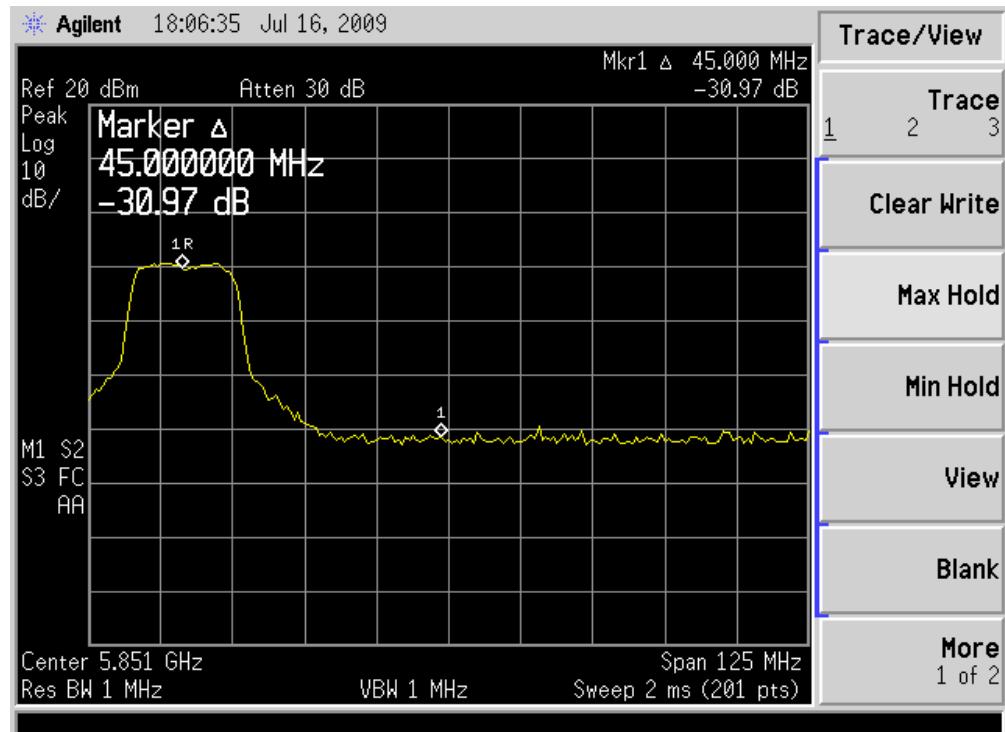
Band-Edge Compliance at 5745 MHz – Antenna Port 1



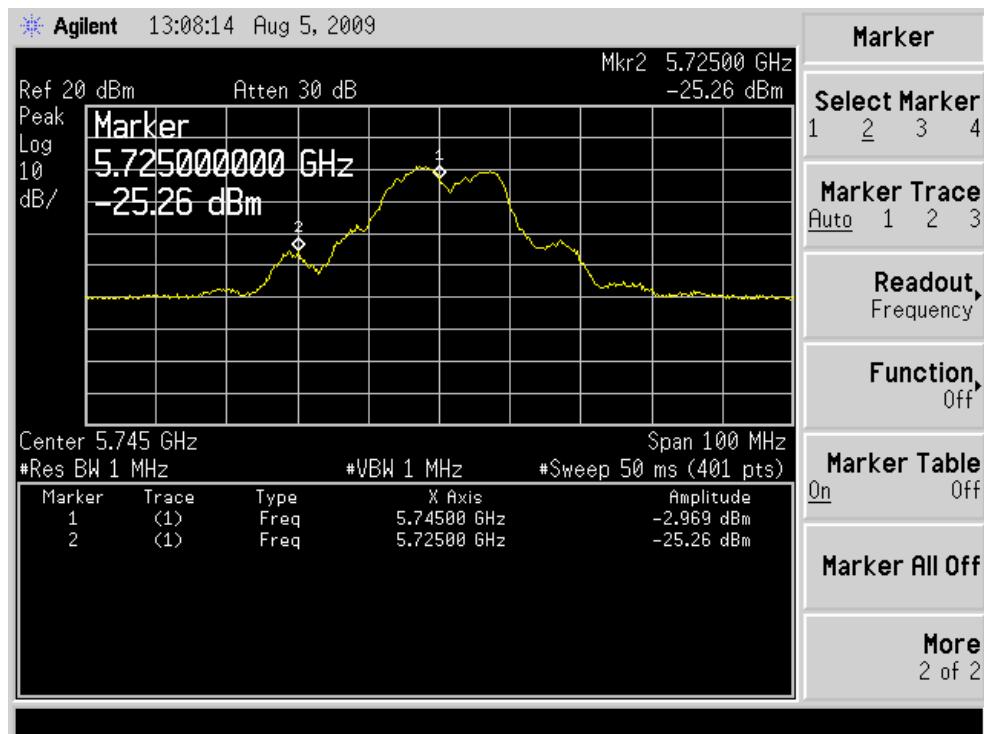
Band-Edge Compliance at 5830 MHz – Antenna Port 1



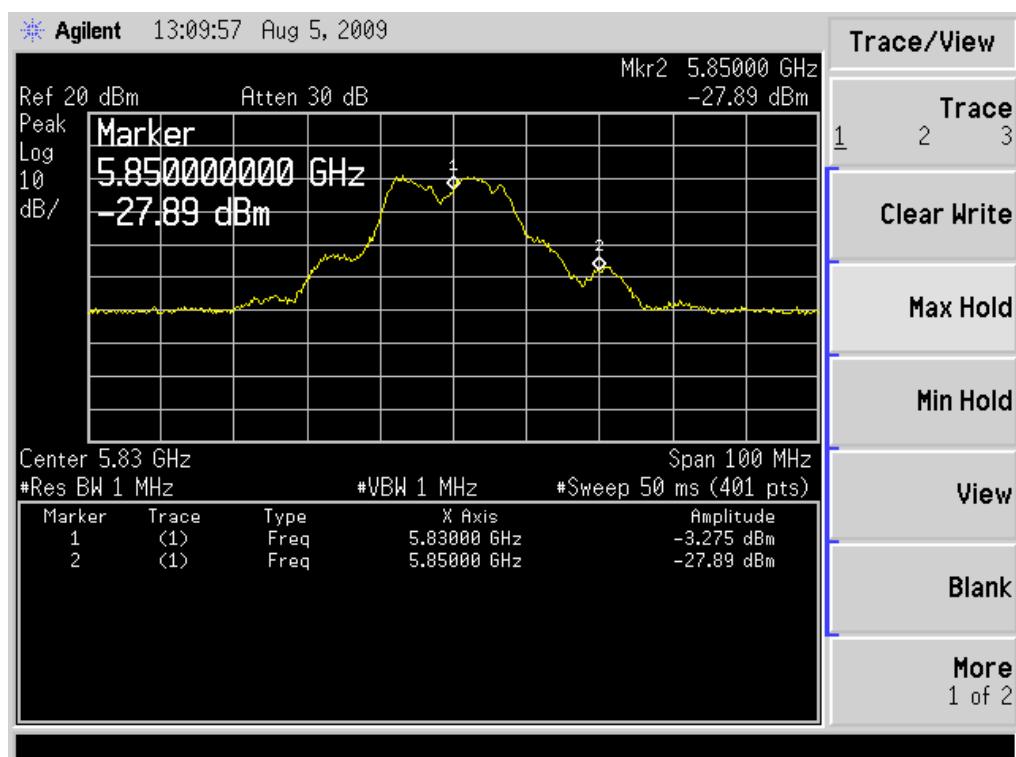
Band-Edge Compliance at 5745 MHz – Antenna 2



Band-Edge Compliance at 5830 MHz – Antenna 2



Band-Edge Compliance at 5745 MHz – Antenna Port 1 + Antenna Port 2



Band-Edge Compliance at 5830 MHz – Antenna Port 1 + Antenna Port 2

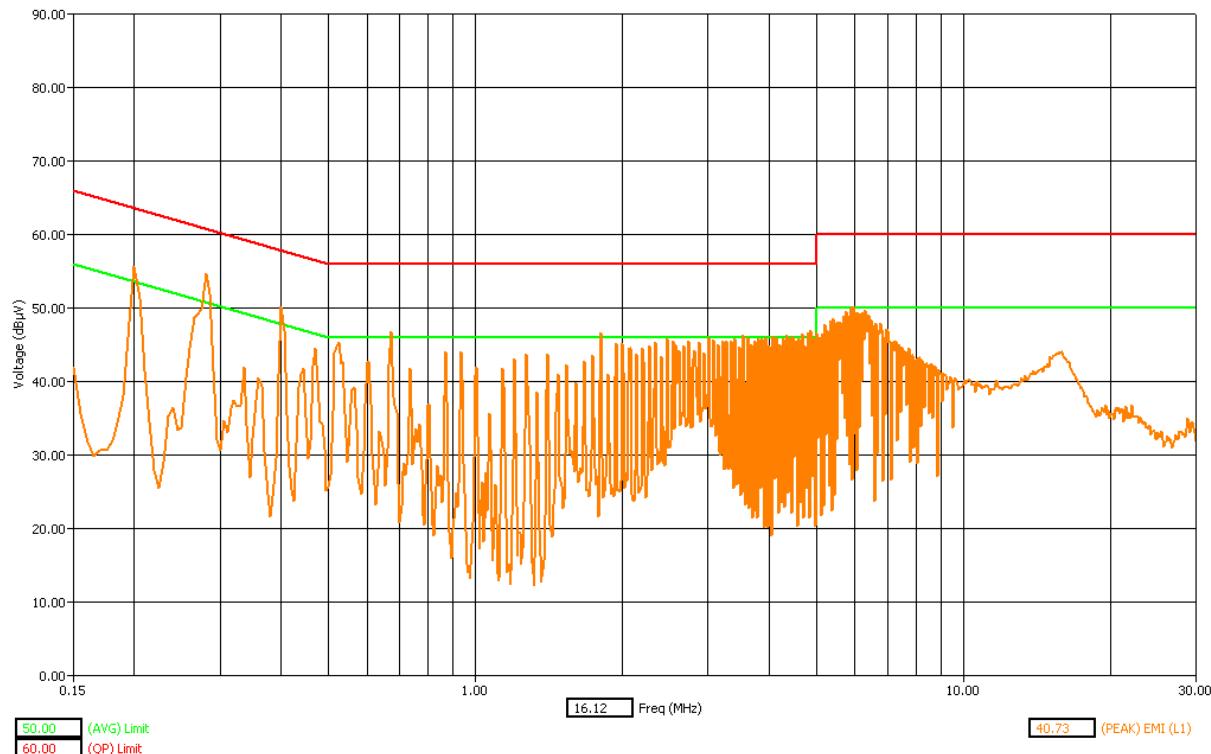
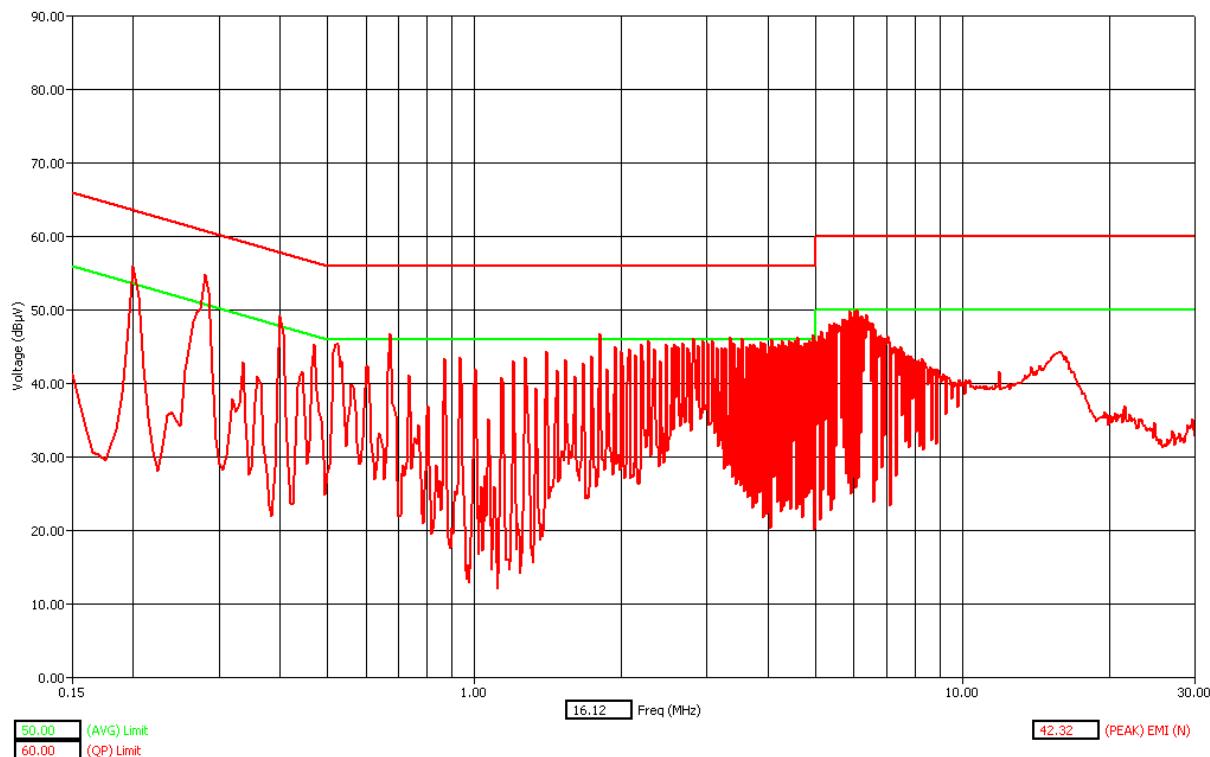
Conducted Emission Test on a.c. Power Line
Section 15.207
RESULT:
Pass

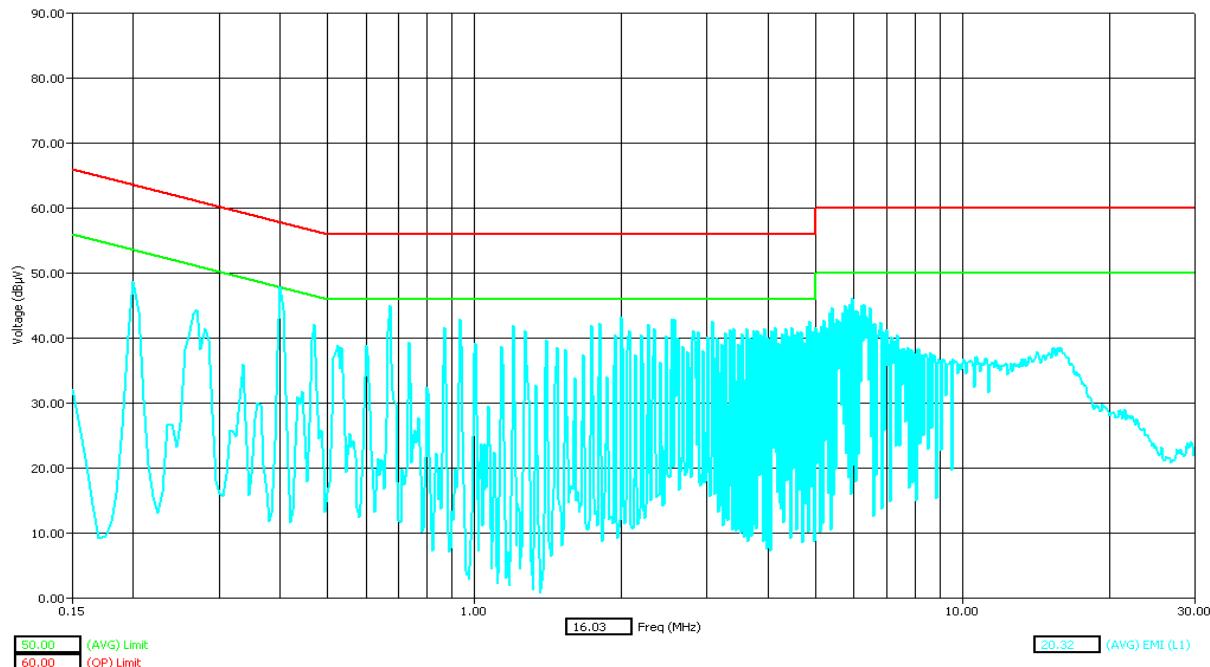
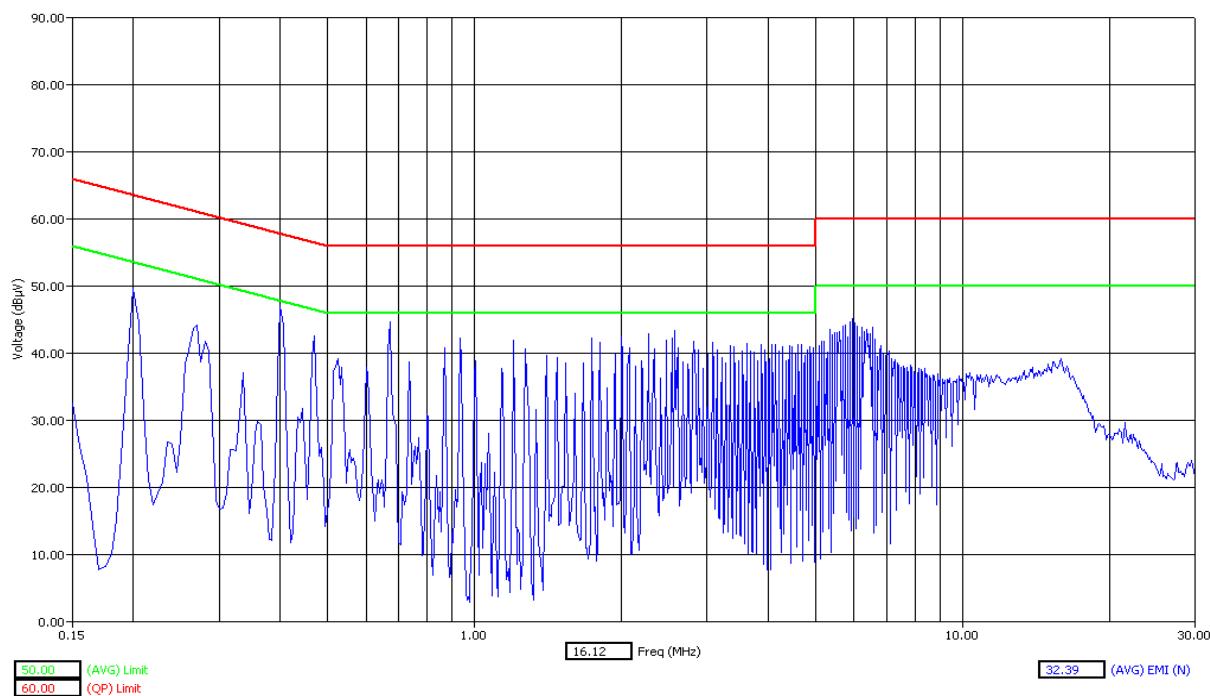
Test Specification : FCC Part 15 Section 15.207
 Test Method : ANSI C63.4-2003
 Testing Location : Screened room
 Measurement Bandwidth : 9kHz
 Frequency Range : 150kHz – 30MHz
 Supply Voltage : 120 Volt AC, 60 Hz

Test Result:

Conductor	Frequency of Emission (MHz)	Emission Level (AV)	Emission Level Limit (AV)	Margin (dB)	Result
Line	0.20	48.91	53.56	-4.65	Pass
	0.28	41.72	50.80	-9.08	Pass
	0.67	45.08	46.00	-0.92	Pass
	3.35	42.50	46.00	-3.50	Pass
	1.80	41.30	46.00	-4.70	Pass
	4.88	41.64	46.00	-4.36	Pass
Neutral	0.20	49.49	53.58	-4.09	Pass
	0.28	42.14	50.75	-8.61	Pass
	3.36	42.29	46.00	-3.71	Pass
	1.80	41.74	46.00	-4.26	Pass
	4.95	40.45	46.00	-5.55	Pass

Conductor	Frequency of Emission (MHz)	Emission Level (QP)	Emission Level Limit (QP)	Margin (dB)	Result
Line	0.20	54.21	63.56	-9.35	Pass
	0.28	51.03	60.80	-9.77	Pass
	0.67	45.98	56.00	-10.02	Pass
	3.35	44.65	56.00	-11.35	Pass
	1.80	45.90	56.00	-10.10	Pass
	4.88	45.44	56.00	-10.56	Pass
Neutral	0.20	54.60	63.58	-8.98	Pass
	0.28	51.96	60.75	-8.79	Pass
	3.36	44.48	56.00	-11.52	Pass
	1.80	45.43	56.00	-10.57	Pass
	4.95	44.20	56.00	-11.80	Pass

PLOT : LINE - PEAK

PLOT : NEUTRAL - PEAK


PLOT : LINE – AVERAGE

PLOT : NEUTRAL – AVERAGE


Limit of section 15.207:

Frequency of emission (MHz)	QP Limit (dB μ V)	AV Limit (dB μ V/m)
0.15 – 0.5	66 – 56*	56 – 46*
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

Spurious Radiated Emissions**Section 15.205 / 15.209****RESULT:****Pass**

Test Specification	:	FCC Part 15 Section 15.205, 15.209 & 15.247(d)
Test Method	:	ANSI C63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Supply Voltage	:	120 Volt AC
Measuring Frequency Range	:	9.0kHz (Lowest internal oscillator frequency of 25.0MHz) – 40GHz (Up to 10 th harmonic of the highest fundamental frequency)
Antenna connected with EUT	:	30 dBi gain antenna provided by client.
Measuring Distance	:	3m
Detection	:	QP for frequency below 1GHz, Average for frequency above 1GHz
Requirement	:	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. Attenuation below the general limits specified in Sections 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test result:

Transmitting Mode – Antenna : Panel Model Name : MA-WA55-30 Gain 30 dBi

Channel	Fundamental Frequency (MHz)	Antenna Polarization	Spurious Emission (MHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Low	5745	V	42.15	33.47	40.00	-6.53
			56.05	36.06	40.00	-3.94
			58.70	28.98	40.00	-11.02
			67.55	27.67	40.00	-12.31
			77.25	33.43	40.00	-6.57
			* 5745.70	126.64	-	-
		H	30.10	29.45	40.00	-10.55
			250.05	41.42	46.00	-4.58
			533.35	41.66	46.00	-4.34
			625.05	43.57	46.00	-2.43
			800.00	38.85	46.00	-7.15
			* 5745.20	106.04	-	-
Middle	5785	V	50.50	34.16	40.00	-5.84
			56.00	34.57	40.00	-5.43
			58.70	36.10	40.00	-3.90
			64.80	30.36	40.00	-9.64
			625.05	40.96	40.00	-5.04
			* 5785.50	129.33	-	-
		H	625.05	43.08	46.00	-2.92
			680.00	36.68	46.00	-9.32
			807.20	31.24	46.00	-14.76
			866.70	37.68	46.00	-8.32
			875.05	38.27	46.00	-7.73
			* 5780.50	107.95	-	-
			38.95	33.93	40.00	-6.07
			54.00	37.33	40.00	-2.67
High	5830	V	58.75	37.30	40.00	-2.70
			64.85	35.54	40.00	-4.46
			76.60	30.32	40.00	-9.68
			* 5830.50	127.68	-	-
			625.05	43.43	46.00	-2.57
			792.05	24.04	46.00	-21.96
		H	802.25	32.48	46.00	-13.52
			850.05	33.39	46.00	-12.61
			866.70	38.42	46.00	-7.58
			* 5831.00	107.14	-	-

Transmitting Mode – Antenna : Sector
Model Name : MC55-DS17
Gain 17 dBi

Channel	Fundamental Frequency (MHz)	Antenna Polarization	Spurious Emission (MHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Low	5745	V	30.65	35.56	40.00	-4.44
			58.70	37.52	40.00	-2.48
			60.20	30.63	40.00	-9.37
			87.65	36.50	40.00	-3.50
			* 5745.70	116.02	-	-
		H	250.05	21.24	46.00	-24.76
			625.05	44.79	46.00	-1.21
			733.35	41.80	46.00	-4.20
			* 5745.20	114.51	-	-
Middle	5785	V	30.65	35.06	40.00	-4.94
			58.70	38.53	40.00	-1.47
			60.20	27.46	40.00	-12.54
			87.65	32.80	40.00	-7.20
			* 5785.50	117.40	-	-
		H	625.05	43.78	46.00	-2.22
			733.35	42.50	46.00	-3.50
			* 5785.50	114.56	-	-
High	5830	V	30.65	34.89	40.00	-5.11
			58.70	37.42	40.00	-2.58
			60.20	37.56	40.00	-2.44
			87.65	34.88	40.00	-5.12
			* 5830.50	116.64	-	-
		H	250.05	34.27	46.00	-11.73
			625.05	40.86	46.00	-5.14
			733.35	39.35	46.00	-6.65
			* 5831.00	114.15	-	-

* Operation Band

Spurious emissions that falls into the restricted band of Section 15.205.

Limit for Radiated Emission of Section 15.209:

Frequency (MHz)	Field strength (dB μ V) at 3m range	Field strength (dB μ V/m) at 3m range
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80 (300m range)*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00 (30m range)*
1.705-30	30 (30m range)*	29.5(30m range)*
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

Remark: * the limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz are at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 88,50 – 53.80, 53.80 – 43.00 and 49.5dB μ V/m at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shows in the table are based on measurements employing a CISPR quasi-peak detector and above 1000 MHz are based on the measurements employing an average detector.