

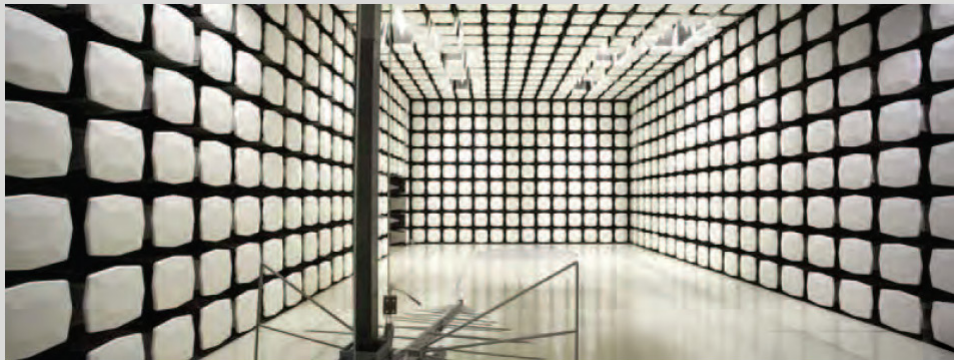


AMPAK Technologies

GT9664A1

FCC 15.247:2013

Report #: INTE5362



Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

Last Date of Test: January 9, 2013
AMPAK Technologies
Model: GT9664A1

Emissions

Test Description	Specification	Test Method	Pass/Fail
Spurious Radiated Emissions	FCC 15.247:2013	ANSI C63.10:2009	Pass

Deviations From Test Standards

None

Approved By:



Tim O'Shea, Operations Manager



NVLAP Lab Code: 200630-0

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.; 22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834D-1).

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC Guide 65 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

KCC / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Hong Kong

OFTA – Recognized by OFTA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

Russia

GOST – Accredited by Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC to perform EMC and Hygienic testing for Information Technology products to GOST standards.

SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

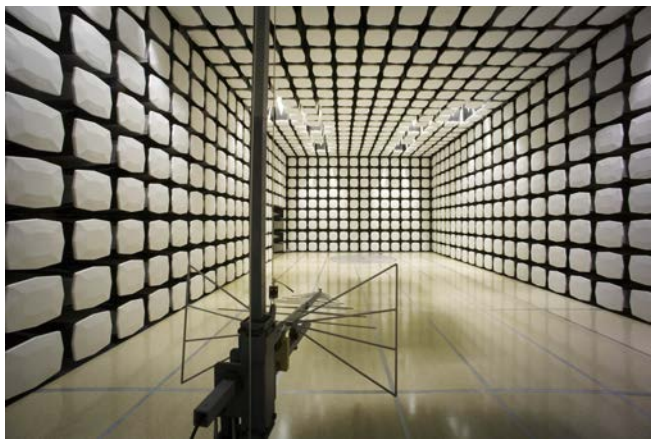
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-1 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy (Hz)	0.12	-0.01
Amplitude Accuracy (dB)	0.49	-0.49
Conducted Power (dB)	0.41	-0.41
Radiated Power via Substitution (dB)	0.69	-0.68
Temperature (degrees C)	0.81	-0.81
Humidity (% RH)	2.89	-2.89
Field Strength (dB)	4.00	-4.00
AC Powerline Conducted Emissions (dB)	2.70	-2.70



<p>Oregon Labs EV01-EV12 22975 NW Evergreen Pkwy, #400 Hillsboro, OR 97124 (503) 844-4066</p>	<p>California Labs OC01-OC13 41 Tesla Irvine, CA 92618 (949) 861-8918</p>	<p>New York Labs WA01-WA04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796</p>	<p>Minnesota Labs MN01-MN08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281</p>	<p>Washington Labs SU01-SU07 14128 339th Ave. SE Sultan, WA 98294 (360) 793-8675</p>
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-2	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1





WTD 12.5.23

PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	AMPAK Technologies
Address:	No. 1 Jen Ai Road Hsinchu Industrial Park
City, State, Zip:	Hukou, Hsinchu, Taiwan 30352
Test Requested By:	Kyle Tsai
Model:	GT9664A1
First Date of Test:	December 18, 2012
Last Date of Test:	January 9, 2013
Receipt Date of Samples:	December 18, 2012
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Bluetooth Module
Testing Objective:
To demonstrate compliance of a new antenna under FCC 15.247.

Configuration INTE5362- 1

EUT						
Description	Manufacturer	Model/Part Number			Serial Number	
Bluetooth Module	AMPAK Technologies	GT9664A1			FPLM23500037	
Peripherals in test setup boundary						
Description	Manufacturer	Model/Part Number			Serial Number	
Monitor	BENQ	FP241W			ETD6701608SL0	
Remote Equipment Outside of Test Setup Boundary						
Description	Manufacturer	Model/Part Number			Serial Number	
Wireless Router	Cisco	Linksys E2500			10A10C68234624	
Cables						
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2	
AC Power Cable	No	3m	No	Monitor	AC Mains	
HDMI Cable	Yes	1m	No	Monitor	EUT	
Micro USB Adapter	No	.1m	No	EUT	USB Cable	
USB Cable	No	.5m	No	USB Adapter	Not Terminated	
AC/DC Power Adapter Cable	No	3m	No	EUT	AC Mains	
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.						

Configuration INTE5367- 1

EUT						
Description	Manufacturer	Model/Part Number			Serial Number	
Bluetooth Module	AMPAK Technologies	GT9664A1			FPLM23500037	
Peripherals in test setup boundary						
Description	Manufacturer	Model/Part Number			Serial Number	
Monitor	BENQ	FP241W			ETD6701608SL0	
AC Adapter	Chicony Power Technology	W12-024N1A			None	
Remote Equipment Outside of Test Setup Boundary						
Description	Manufacturer	Model/Part Number			Serial Number	
Wireless Router	Cisco	Linksys E2500			10A10C68234624	
Cables						
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2	
AC Power Cable	No	2.2m	No	Monitor	AC Mains	
HDMI Cable	Yes	1.3m	No	Monitor	Bluetooth Module	
Micro USB Adapter	Yes	0.1m	No	Bluetooth Module	USB	
USB Cable	Yes	0.9m	No	Micro USB Adapter	Unterminated	
DC Power Cable	No	1.4m	PA	Bluetooth Module	AC Adapter	
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.						

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	12/18/2012	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	1/9/2013	Spurious Radiated Emissions	Tested as delivered to Test Station.	Scheduled testing was completed.	Scheduled testing was completed.

Spurious Radiated Emissions

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Simultaneous transmission of Bluetooth and 802.11 on Ch. 8 (2437MHz)

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

INTE5362 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency 26000 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAQ	2/7/2012	12 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2/28/2012	12 mo
Antenna, Horn	ETS	3160-08	AHV	NCR	0 mo
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	2/28/2012	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2/28/2012	12 mo
Antenna, Horn	ETS	3160-07	AHU	NCR	0 mo
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	6/27/2012	12 mo
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	6/27/2012	12 mo
Antenna, Horn	ETS	3115	AIZ	1/24/2011	24 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

TEST DESCRIPTION

The Bluetooth antenna was measured at all data rates listed in the datasheet. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT antenna, and adjusting the measurement antenna height and polarization (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

Simultaneous Transmission: The Bluetooth radio is co-located with an 802.11 radio. During testing, the 802.11 radio was set to transmit on channel 8 while the Bluetooth radio transmitted on either the lowest, a middle, or the highest channels.

The radios do not share an antenna

A duty cycle correction factor applied to Average measurements as taken from the test report for original FCC 15.247 grant test report.



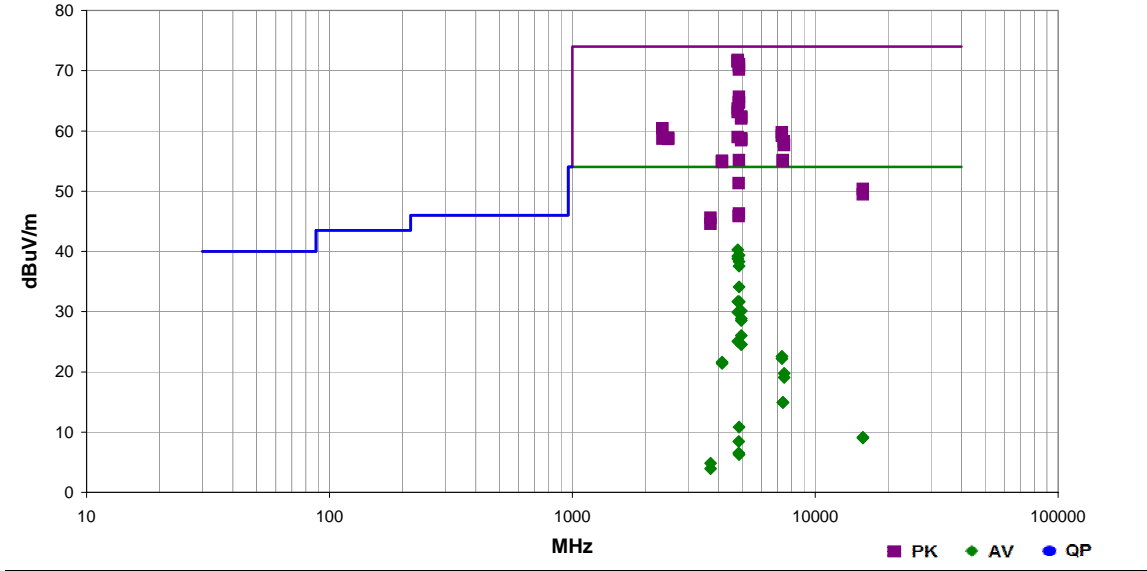
Spurious Radiated Emissions

PSA-ESCI 2012.12.14
PSA-ESCI Version 2011.12.21

Work Order:	INTE5362	Date:	12/18/12	<i>Brandon Hobbs</i> <i>Rod Peloquin</i>
Project:	None	Temperature:	22 °C	
Job Site:	EV01	Humidity:	45% RH	
Serial Number:	None	Barometric Pres.:	1013 mbar	
EUT:	GT9664A1			
Configuration:	1			
Customer:	AMPAK Technologies			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Simultaneous transmission of Bluetooth and 802.11 on Ch. 8 (2437MHz). Duty cycle correction factor applied to Average measurements as taken from test report for original grant.			
Deviations:	None			
Comments:	Please reference the points on the datasheet for frequency and orientation			

Test Specifications	Test Method
FCC 15.247:2012	ANSI C63.10:2009

Run #	13	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Duty Cycle Correction (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4804.227	61.6	10.2	1.0	25.0	3.0	0.0	Horz	PK	0.0	71.8	74.0	-2.2	Ch 0 (2402MHz), 2DH5, EUT Horz
4804.287	61.4	10.2	1.0	24.0	3.0	0.0	Horz	PK	0.0	71.6	74.0	-2.4	Ch 0 (2402MHz), DH5, EUT Horz
4804.227	61.3	10.2	1.0	25.0	3.0	0.0	Horz	PK	0.0	71.5	74.0	-2.5	Ch 0 (2402MHz), 3DH5, EUT Horz
4863.693	60.7	10.4	1.0	28.0	3.0	0.0	Horz	PK	0.0	71.1	74.0	-2.9	Ch 30 (2432MHz), 3DH5, EUT Horz
4863.607	60.4	10.4	1.0	20.0	3.0	0.0	Horz	PK	0.0	70.8	74.0	-3.2	Ch 30 (2432MHz), DH5, EUT Horz
4864.193	59.8	10.4	1.1	35.0	3.0	0.0	Horz	PK	0.0	70.2	74.0	-3.8	Ch 30 (2432MHz), 2DH5, EUT Horz
4864.260	55.3	10.4	2.3	318.0	3.0	0.0	Vert	PK	0.0	65.7	74.0	-8.3	Ch 30 (2432MHz), DH5, EUT Horz
4863.647	54.4	10.4	1.0	355.0	3.0	0.0	Vert	PK	0.0	64.8	74.0	-9.2	Ch 30 (2432MHz), 3DH5, EUT Horz
4864.247	54.3	10.4	1.0	346.0	3.0	0.0	Vert	PK	0.0	64.7	74.0	-9.3	Ch 30 (2432MHz), 2DH5, EUT Horz
4804.247	53.5	10.2	1.0	284.0	3.0	0.0	Vert	PK	0.0	63.7	74.0	-10.3	Ch 0 (2402MHz), DH5, EUT Horz
4803.973	52.9	10.2	1.2	284.0	3.0	0.0	Vert	PK	0.0	63.1	74.0	-10.9	Ch 0 (2402MHz), 3DH5, EUT Horz
4960.280	51.6	10.7	0.8	26.0	3.0	0.0	Horz	PK	0.0	62.3	74.0	-11.7	Ch 79 (2480MHz), DH5, EUT Horz
4960.067	51.5	10.7	1.0	38.0	3.0	0.0	Horz	PK	0.0	62.2	74.0	-11.8	Ch 79 (2480MHz), 3DH5, EUT Horz
4960.220	51.3	10.7	1.0	37.0	3.0	0.0	Horz	PK	0.0	62.0	74.0	-12.0	Ch 79 (2480MHz), 2DH5, EUT Horz
2355.844	38.8	1.6	1.0	229.0	3.0	20.0	Vert	PK	0.0	60.4	74.0	-13.6	Ch 0 (2402MHz), DH5, EUT Horz
4803.940	60.2	10.2	1.0	24.0	3.0	0.0	Horz	AV	-30.1	40.3	54.0	-13.7	Ch 0 (2402MHz), DH5, EUT Horz
7295.840	40.9	18.9	2.2	135.0	3.0	0.0	Horz	PK	0.0	59.8	74.0	-14.2	Ch 30 (2432MHz), DH5, EUT Horz
4863.960	59.1	10.4	1.0	20.0	3.0	0.0	Horz	AV	-30.1	39.4	54.0	-14.6	Ch 30 (2432MHz), DH5, EUT Horz
7296.067	40.3	18.9	2.9	336.0	3.0	0.0	Vert	PK	0.0	59.2	74.0	-14.8	Ch 30 (2432MHz), DH5, EUT Horz
4804.167	59.1	10.2	1.0	25.0	3.0	0.0	Horz	AV	-30.1	39.2	54.0	-14.8	Ch 0 (2402MHz), 2DH5, EUT Horz
4804.253	48.8	10.2	1.8	282.0	3.0	0.0	Vert	PK	0.0	59.0	74.0	-15.0	Ch 0 (2402MHz), 2DH5, EUT Horz
2486.173	37.0	1.9	3.4	121.0	3.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	Band Edge (2483.5MHz), DH5, EUT Horz
4804.000	58.7	10.2	1.0	25.0	3.0	0.0	Horz	AV	-30.1	38.8	54.0	-15.2	Ch 0 (2402MHz), 3DH5, EUT Horz
4959.807	48.0	10.7	1.1	281.0	3.0	0.0	Vert	PK	0.0	58.7	74.0	-15.3	Ch 79 (2480MHz), 3DH5, EUT Horz
2355.280	37.1	1.6	2.4	247.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	Ch 0 (2402MHz), DH5, EUT Horz
2483.637	36.8	1.9	2.5	214.0	3.0	20.0	Vert	PK	0.0	58.7	74.0	-15.3	Band Edge (2483.5MHz), DH5, EUT Horz
4959.593	47.9	10.7	1.0	210.0	3.0	0.0	Vert	PK	0.0	58.6	74.0	-15.4	Ch 79 (2480MHz), DH5, EUT Horz
4960.293	47.7	10.7	1.0	209.0	3.0	0.0	Vert	PK	0.0	58.4	74.0	-15.6	Ch 79 (2480MHz), 2DH5, EUT Horz
4864.000	58.0	10.4	1.0	28.0	3.0	0.0	Horz	AV	-30.1	38.3	54.0	-15.7	Ch 30 (2432MHz), 3DH5, EUT Horz
7439.373	38.8	19.5	1.5	236.0	3.0	0.0	Vert	PK	0.0	58.3	74.0	-15.7	Ch 79 (2480MHz), DH5, EUT Horz
7440.027	38.2	19.5	1.1	155.0	3.0	0.0	Horz	PK	0.0	57.7	74.0	-16.3	Ch 79 (2480MHz), DH5, EUT Horz
4864.180	57.3	10.4	1.1	35.0	3.0	0.0	Horz	AV	-30.1	37.6	54.0	-16.4	Ch 30 (2432MHz), 2DH5, EUT Horz
4852.493	44.8	10.3	1.0	21.0	3.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	Ch 0 (2402MHz), DH5, EUT Horz
7352.720	36.0	19.1	1.0	121.0	3.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	Ch 79 (2480MHz), DH5, EUT Horz

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Duty Cycle Correction (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4132.993	45.2	9.8	1.2	-1.0	3.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	Ch 79 (2480MHz), DH5, EUT Horz
7352.207	35.9	19.1	2.4	352.0	3.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	Ch 79 (2480MHz), DH5, EUT Horz
4133.413	45.0	9.8	1.5	31.0	3.0	0.0	Horz	PK	0.0	54.8	74.0	-19.2	Ch 79 (2480MHz), DH5, EUT Horz
4863.953	53.8	10.4	2.3	318.0	3.0	0.0	Vert	AV	-30.1	34.1	54.0	-19.9	Ch 30 (2432MHz), DH5, EUT Horz
4803.933	51.6	10.2	1.0	284.0	3.0	0.0	Vert	AV	-30.1	31.7	54.0	-22.3	Ch 0 (2402MHz), DH5, EUT Horz
4864.187	51.4	10.4	1.0	346.0	3.0	0.0	Vert	AV	-30.1	31.7	54.0	-22.3	Ch 30 (2432MHz), 2DH5, EUT Horz
4864.033	51.3	10.4	1.0	355.0	3.0	0.0	Vert	AV	-30.1	31.6	54.0	-22.4	Ch 30 (2432MHz), 3DH5, EUT Horz
4846.987	41.0	10.3	1.0	348.0	3.0	0.0	Horz	PK	0.0	51.3	74.0	-22.7	Ch 0 (2402MHz), DH5, EUT Horz
15705.390	39.5	10.8	1.0	216.0	3.0	0.0	Vert	PK	0.0	50.3	74.0	-23.7	Ch 79 (2480MHz), DH5, EUT Horz
4959.933	49.5	10.7	0.8	26.0	3.0	0.0	Horz	AV	-30.1	30.1	54.0	-23.9	Ch 79 (2480MHz), DH5, EUT Horz
4804.000	49.8	10.2	1.2	284.0	3.0	0.0	Vert	AV	-30.1	29.9	54.0	-24.1	Ch 0 (2402MHz), 3DH5, EUT Horz
15704.200	38.6	10.8	3.5	290.0	3.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	Ch 79 (2480MHz), DH5, EUT Horz
4960.013	48.2	10.7	1.0	38.0	3.0	0.0	Horz	AV	-30.1	28.8	54.0	-25.2	Ch 79 (2480MHz), 3DH5, EUT Horz
4960.220	47.9	10.7	1.0	37.0	3.0	0.0	Horz	AV	-30.1	28.5	54.0	-25.5	Ch 79 (2480MHz), 2DH5, EUT Horz
4852.833	35.9	10.3	2.4	160.0	3.0	0.0	Vert	PK	0.0	46.2	74.0	-27.8	Ch 0 (2402MHz), DH5, EUT Horz
4959.953	45.4	10.7	1.0	210.0	3.0	0.0	Vert	AV	-30.1	26.0	54.0	-28.0	Ch 79 (2480MHz), DH5, EUT Horz
4846.547	35.5	10.3	1.0	3.0	3.0	0.0	Vert	PK	0.0	45.8	74.0	-28.2	Ch 0 (2402MHz), DH5, EUT Horz
3709.027	37.6	8.0	1.0	215.0	3.0	0.0	Vert	PK	0.0	45.6	74.0	-28.4	Ch 30 (2432MHz), DH5, EUT Horz
4804.193	45.0	10.2	1.8	282.0	3.0	0.0	Vert	AV	-30.1	25.1	54.0	-28.9	Ch 0 (2402MHz), 2DH5, EUT Horz
3708.027	36.6	7.9	1.0	117.0	3.0	0.0	Horz	PK	0.0	44.5	74.0	-29.5	Ch 30 (2432MHz), DH5, EUT Horz
4960.213	43.9	10.7	1.0	209.0	3.0	0.0	Vert	AV	-30.1	24.5	54.0	-29.5	Ch 79 (2480MHz), 2DH5, EUT Horz
4960.007	43.9	10.7	1.1	281.0	3.0	0.0	Vert	AV	-30.1	24.5	54.0	-29.5	Ch 79 (2480MHz), 3DH5, EUT Horz
7295.887	33.8	18.9	2.2	135.0	3.0	0.0	Horz	AV	-30.1	22.6	54.0	-31.4	Ch 30 (2432MHz), DH5, EUT Horz
7295.887	33.4	18.9	2.9	336.0	3.0	0.0	Vert	AV	-30.1	22.2	54.0	-31.8	Ch 30 (2432MHz), DH5, EUT Horz
4133.280	41.9	9.8	1.2	-1.0	3.0	0.0	Vert	AV	-30.1	21.6	54.0	-32.4	Ch 79 (2480MHz), DH5, EUT Horz
4133.293	41.7	9.8	1.5	31.0	3.0	0.0	Horz	AV	-30.1	21.4	54.0	-32.6	Ch 79 (2480MHz), DH5, EUT Horz
7439.687	30.4	19.5	1.5	236.0	3.0	0.0	Vert	AV	-30.1	19.8	54.0	-34.2	Ch 79 (2480MHz), DH5, EUT Horz
7439.927	29.7	19.5	1.1	155.0	3.0	0.0	Horz	AV	-30.1	19.1	54.0	-34.9	Ch 79 (2480MHz), DH5, EUT Horz
7352.953	25.9	19.1	2.4	352.0	3.0	0.0	Vert	AV	-30.1	14.9	54.0	-39.1	Ch 79 (2480MHz), DH5, EUT Horz
7351.480	25.9	19.1	1.0	121.0	3.0	0.0	Horz	AV	-30.1	14.9	54.0	-39.1	Ch 79 (2480MHz), DH5, EUT Horz
4851.827	30.6	10.3	1.0	21.0	3.0	0.0	Horz	AV	-30.1	10.8	54.0	-43.2	Ch 0 (2402MHz), DH5, EUT Horz
15704.590	28.4	10.8	1.0	216.0	3.0	0.0	Vert	AV	-30.1	9.1	54.0	-44.9	Ch 79 (2480MHz), DH5, EUT Horz
15703.090	28.3	10.8	3.5	290.0	3.0	0.0	Horz	AV	-30.1	9.0	54.0	-45.0	Ch 79 (2480MHz), DH5, EUT Horz
4847.433	28.2	10.3	1.0	348.0	3.0	0.0	Horz	AV	-30.1	8.4	54.0	-45.6	Ch 0 (2402MHz), DH5, EUT Horz
4847.713	26.3	10.3	1.0	3.0	3.0	0.0	Vert	AV	-30.1	6.5	54.0	-47.5	Ch 0 (2402MHz), DH5, EUT Horz
4852.920	26.0	10.3	2.4	160.0	3.0	0.0	Vert	AV	-30.1	6.2	54.0	-47.8	Ch 0 (2402MHz), DH5, EUT Horz
3708.907	27.0	8.0	1.0	215.0	3.0	0.0	Vert	AV	-30.1	4.9	54.0	-49.1	Ch 30 (2432MHz), DH5, EUT Horz
3708.707	26.1	8.0	1.0	117.0	3.0	0.0	Horz	AV	-30.1	4.0	54.0	-50.0	Ch 30 (2432MHz), DH5, EUT Horz
2354.600	26.7	1.6	1.0	229.0	3.0	20.0	Vert	AV	-30.1	-1.8	54.0	-55.8	Ch 0 (2402MHz), DH5, EUT Horz
2486.487	26.4	1.9	3.4	121.0	3.0	20.0	Horz	AV	-30.1	-1.8	54.0	-55.8	Band Edge (2483.5MHz), DH5, EUT Horz
2486.067	26.3	1.9	2.5	214.0	3.0	20.0	Vert	AV	-30.1	-1.9	54.0	-55.9	Band Edge (2483.5MHz), DH5, EUT Horz
2356.267	26.4	1.6	2.4	247.0	3.0	20.0	Horz	AV	-30.1	-2.1	54.0	-56.1	Ch 0 (2402MHz), DH5, EUT Horz

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Simultaneous transmit, Bluetooth LE and 802.11 on CH 8 (2447MHz).

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

INTE5367 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26.5 GHz
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SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	ESM Cable Corp.	KMKM-72	EVY	9/11/2012	12 mo
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	9/11/2012	12 mo
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2/28/2012	12 mo
Antenna, Horn	ETS	3160-08	AHV	NCR	0 mo
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	2/28/2012	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2/28/2012	12 mo
Antenna, Horn	ETS	3160-07	AHU	NCR	0 mo
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	6/27/2012	12 mo
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	6/27/2012	12 mo
Antenna, Horn	ETS	3115	AIZ	1/24/2011	24 mo
EV01 Cables	N/A	Bilog Cables	EVA	6/26/2012	12 mo
Spectrum Analyzer	Agilent	E4446A	AAQ	2/7/2012	24 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity. A -20dB correction factor was used as an estimation based on the -30dB correction utilized in the BR/EDR operating portion of the testing. The correction factor was taken from the original FCC 15.247 grant test report.

Simultaneous Transmission: For co-located radios, it is necessary to measure the field strength of spurious emissions, while co-located radios are transmitting simultaneously. The following is an excerpt from the FCC/TCB training Q & A, October 2002, Day 2, Question 7:

Assuming that the radios do not share an antenna, only radiated tests for simultaneous transmission is required. If the radios share an antenna, antenna conducted measurements would also be required. Only one set of worst case simultaneous transmission data is going to be requested to be submitted at this time. The test engineer should indicate the worst case condition and provide justification as to why the worst case condition was chosen. The grantee should be reminded that even if the FCC requests one set of data, they are responsible for compliance for all modes of simultaneous transmission.



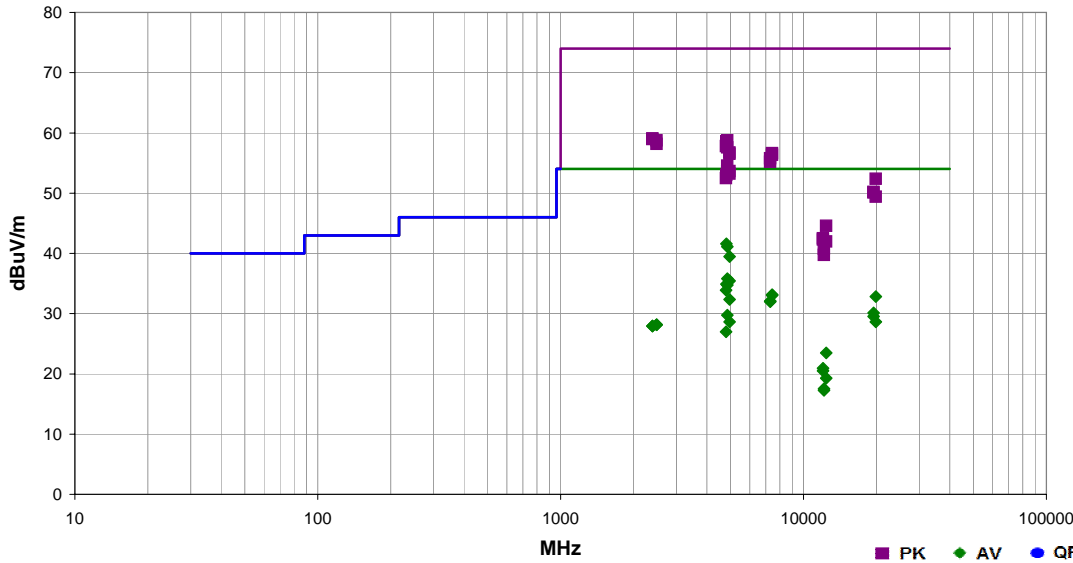
SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2012.12.14
PSA-ESCI Version 2011.12.21

Work Order:	INTE5367	Date:	01/09/13	<i>Carl Engholm</i>
Project:	None	Temperature:	22 °C	
Job Site:	EV01	Humidity:	36% RH	
Serial Number:	FPLM23500037	Barometric Pres.:	1009 mbar	
EUT:	GT9664A1			
Configuration:	1			
Customer:	AMPAK Technologies			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Simultaneous transmit, Bluetooth LE and 802.11 on CH 8 (2447MHz). Duty cycle correction factor applied to average measurements as taken from test report for original grant.			
Deviations:	None			
Comments:	See comments below for channel (frequency), BLE mode, and EUT orientation.			

Test Specifications	Test Method
FCC 15.247:2013	ANSI C63.10:2009

Run #	18	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Duty Cycle Correction Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4851.940	44.4	10.3	1.0	3.0	3.0	0.0	Horz	AV	-20.0	34.7	54.0	-19.3	CH 12 (2426MHz), ADV mode, EUT Horiz
4808.020	44.2	10.2	1.0	4.0	3.0	0.0	Horz	AV	-12.8	41.6	54.0	-12.4	CH 1 (2404MHz), DATA mode, EUT Horiz
4804.007	43.7	10.2	1.0	4.0	3.0	0.0	Horz	AV	-20.0	33.9	54.0	-20.1	CH 0 (2402MHz), ADV mode, EUT Horiz
4863.993	43.5	10.4	1.0	7.0	3.0	0.0	Horz	AV	-12.8	41.1	54.0	-12.9	CH 18 (2432MHz), DATA mode, EUT Horiz
4959.913	41.6	10.7	1.0	9.0	3.0	0.0	Horz	AV	-20.0	32.3	54.0	-21.7	CH 39 (2480MHz), ADV mode, EUT Horiz
4955.967	41.5	10.7	1.0	10.0	3.0	0.0	Horz	AV	-12.8	39.4	54.0	-14.6	CH 38 (2478MHz), DATA mode, EUT Horiz
4851.900	39.4	10.3	1.4	266.0	3.0	0.0	Vert	AV	-20.0	29.7	54.0	-24.3	CH 12 (2426MHz), ADV mode, EUT Horiz
4959.820	37.9	10.7	1.1	265.0	3.0	0.0	Vert	AV	-20.0	28.6	54.0	-25.4	CH 39 (2480MHz), ADV mode, EUT Horiz
4864.027	38.2	10.4	1.0	266.0	3.0	0.0	Vert	AV	-12.8	35.8	54.0	-18.2	CH 18 (2432MHz), DATA mode, EUT Horiz
4955.980	37.5	10.7	1.0	267.0	3.0	0.0	Vert	AV	-12.8	35.4	54.0	-18.6	CH 38 (2478MHz), DATA mode, EUT Horiz
2484.750	26.3	1.9	1.0	207.0	3.0	20.0	Horz	AV	-20.0	28.2	54.0	-25.8	CH 39 (2480MHz), ADV mode, EUT Horiz
2484.327	26.3	1.9	1.0	24.0	3.0	20.0	Vert	AV	-20.0	28.2	54.0	-25.8	CH 39 (2480MHz), ADV mode, EUT Horiz
2388.513	26.4	1.6	1.0	349.0	3.0	20.0	Vert	AV	-20.0	28.0	54.0	-26.0	CH 0 (2402MHz), ADV mode, EUT Horiz
2389.247	26.4	1.5	1.0	283.0	3.0	20.0	Horz	AV	-20.0	27.9	54.0	-26.1	CH 0 (2402MHz), ADV mode, EUT Horiz
4808.033	37.5	10.2	1.0	348.0	3.0	0.0	Vert	AV	-12.8	34.9	54.0	-19.1	CH 1 (2404MHz), DATA mode, EUT Horiz
4803.953	36.8	10.2	1.0	348.0	3.0	0.0	Vert	AV	-20.0	27.0	54.0	-27.0	CH 0 (2402MHz), ADV mode, EUT Horiz
7433.680	26.5	19.4	1.0	254.0	3.0	0.0	Vert	AV	-12.8	33.2	54.0	-20.8	CH 38 (2478MHz), DATA mode, EUT Horiz
7433.407	26.4	19.4	1.0	148.0	3.0	0.0	Horz	AV	-12.8	33.1	54.0	-20.9	CH 38 (2478MHz), DATA mode, EUT Horiz
19825.600	49.4	-3.8	1.0	19.0	3.0	0.0	Vert	AV	-12.8	32.8	54.0	-21.2	CH 39 (2480MHz), ADV mode, EUT Horiz
7296.553	26.0	18.9	1.3	69.0	3.0	0.0	Vert	AV	-12.8	32.1	54.0	-21.9	CH 18 (2432MHz), DATA mode, EUT Horiz
7295.320	25.9	18.9	1.0	147.0	3.0	0.0	Horz	AV	-12.8	32.0	54.0	-22.0	CH 18 (2432MHz), DATA mode, EUT Horiz
19453.910	46.7	-3.8	1.0	20.0	3.0	0.0	Vert	AV	-12.8	30.1	54.0	-23.9	CH 18 (2432MHz), DATA mode, EUT Horiz
19453.910	46.1	-3.8	1.0	115.0	3.0	0.0	Horz	AV	-12.8	29.5	54.0	-24.5	CH 18 (2432MHz), DATA mode, EUT Horiz
19825.600	45.2	-3.8	1.0	3.0	3.0	0.0	Horz	AV	-12.8	28.6	54.0	-25.4	CH 38 (2478MHz), DATA mode, EUT Horiz
2389.080	37.5	1.5	1.0	283.0	3.0	20.0	Horz	PK	0.0	59.0	74.0	-15.0	CH 0 (2402MHz), ADV mode, EUT Horiz
2389.737	37.4	1.5	1.0	349.0	3.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	CH 0 (2402MHz), ADV mode, EUT Horiz
2483.637	36.9	1.9	1.0	24.0	3.0	20.0	Vert	PK	0.0	58.8	74.0	-15.2	CH 39 (2480MHz), ADV mode, EUT Horiz
4852.480	48.4	10.3	1.0	3.0	3.0	0.0	Horz	PK	0.0	58.7	74.0	-15.3	CH 12 (2426MHz), ADV mode, EUT Horiz
4808.440	48.4	10.2	1.0	4.0	3.0	0.0	Horz	PK	0.0	58.6	74.0	-15.4	CH 1 (2404MHz), DATA mode, EUT Horiz
2484.397	36.3	1.9	1.0	207.0	3.0	20.0	Horz	PK	0.0	58.2	74.0	-15.8	CH 39 (2480MHz), ADV mode, EUT Horiz
4804.433	47.6	10.2	1.0	4.0	3.0	0.0	Horz	PK	0.0	57.8	74.0	-16.2	CH 0 (2402MHz), ADV mode, EUT Horiz
4864.380	47.2	10.4	1.0	7.0	3.0	0.0	Horz	PK	0.0	57.6	74.0	-16.4	CH 18 (2432MHz), DATA mode, EUT Horiz
4960.247	46.0	10.7	1.0	9.0	3.0	0.0	Horz	PK	0.0	56.7	74.0	-17.3	CH 39 (2480MHz), ADV mode, EUT Horiz
7432.307	37.2	19.4	1.0	148.0	3.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4	CH 38 (2478MHz), DATA mode, EUT Horiz

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Duty Cycle Correction Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4955.500	45.8	10.7	1.0	10.0	3.0	0.0	Horz	PK	0.0	56.5	74.0	-17.5	CH 38 (2478MHz), DATA mode, EUT Horiz
7433.460	36.9	19.4	1.0	254.0	3.0	0.0	Vert	PK	0.0	56.3	74.0	-17.7	CH 38 (2478MHz), DATA mode, EUT Horiz
12388.760	39.2	-2.9	1.1	188.0	3.0	0.0	Vert	AV	-12.8	23.5	54.0	-30.5	CH 38 (2478MHz), DATA mode, EUT Horiz
7296.220	36.9	18.9	1.3	69.0	3.0	0.0	Vert	PK	0.0	55.8	74.0	-18.2	CH 18 (2432MHz), DATA mode, EUT Horiz
7296.853	36.3	18.9	1.0	147.0	3.0	0.0	Horz	PK	0.0	55.2	74.0	-18.8	CH 18 (2432MHz), DATA mode, EUT Horiz
4851.393	44.2	10.3	1.4	266.0	3.0	0.0	Vert	PK	0.0	54.5	74.0	-19.5	CH 12 (2426MHz), ADV mode, EUT Horiz
12018.770	39.1	-5.4	1.6	344.0	3.0	0.0	Horz	AV	-12.8	20.9	54.0	-33.1	CH 1 (2404MHz), DATA mode, EUT Horiz
4960.353	42.9	10.7	1.1	265.0	3.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	CH 39 (2480MHz), ADV mode, EUT Horiz
4864.220	43.2	10.4	1.0	266.0	3.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	CH 18 (2432MHz), DATA mode, EUT Horiz
12018.850	38.7	-5.4	1.0	175.0	3.0	0.0	Vert	AV	-12.8	20.5	54.0	-33.5	CH 1 (2404MHz), DATA mode, EUT Horiz
4956.540	42.5	10.7	1.0	267.0	3.0	0.0	Vert	PK	0.0	53.2	74.0	-20.8	CH 38 (2478MHz), DATA mode, EUT Horiz
4808.407	42.8	10.2	1.0	348.0	3.0	0.0	Vert	PK	0.0	53.0	74.0	-21.0	CH 1 (2404MHz), DATA mode, EUT Horiz
4803.567	42.3	10.2	1.0	348.0	3.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5	CH 0 (2402MHz), ADV mode, EUT Horiz
19825.680	56.2	-3.8	1.0	19.0	3.0	0.0	Vert	PK	0.0	52.4	74.0	-21.6	CH 38 (2478MHz), DATA mode, EUT Horiz
12388.740	35.0	-2.9	1.0	347.0	3.0	0.0	Horz	AV	-12.8	19.3	54.0	-34.7	CH 38 (2478MHz), DATA mode, EUT Horiz
12158.840	34.8	-4.5	1.3	158.0	3.0	0.0	Vert	AV	-12.8	17.6	54.0	-36.4	CH 18 (2432MHz), DATA mode, EUT Horiz
19453.710	54.0	-3.8	1.0	20.0	3.0	0.0	Vert	PK	0.0	50.2	74.0	-23.8	CH 18 (2432MHz), DATA mode, EUT Horiz
19457.600	53.9	-3.8	1.0	115.0	3.0	0.0	Horz	PK	0.0	50.1	74.0	-23.9	CH 18 (2432MHz), DATA mode, EUT Horiz
12158.810	34.5	-4.5	1.0	289.0	3.0	0.0	Horz	AV	-12.8	17.3	54.0	-36.7	CH 18 (2432MHz), DATA mode, EUT Horiz
19825.880	53.2	-3.8	1.0	3.0	3.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	CH 38 (2478MHz), DATA mode, EUT Horiz
12388.770	47.5	-2.9	1.1	188.0	3.0	0.0	Vert	PK	0.0	44.6	74.0	-29.4	CH 38 (2478MHz), DATA mode, EUT Horiz
12018.940	47.9	-5.4	1.6	344.0	3.0	0.0	Horz	PK	0.0	42.5	74.0	-31.5	CH 1 (2404MHz), DATA mode, EUT Horiz
12019.580	47.7	-5.4	1.0	175.0	3.0	0.0	Vert	PK	0.0	42.3	74.0	-31.7	CH 1 (2404MHz), DATA mode, EUT Horiz
12390.850	44.9	-2.9	1.0	347.0	3.0	0.0	Horz	PK	0.0	42.0	74.0	-32.0	CH 38 (2478MHz), DATA mode, EUT Horiz
12159.170	45.2	-4.5	1.0	289.0	3.0	0.0	Horz	PK	0.0	40.7	74.0	-33.3	CH 18 (2432MHz), DATA mode, EUT Horiz
12159.750	44.2	-4.5	1.3	158.0	3.0	0.0	Vert	PK	0.0	39.7	74.0	-34.3	CH 18 (2432MHz), DATA mode, EUT Horiz