HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:
NEC CASIO Mobile Communications, Ltd.

Address:
1753 Shimonumabe, Nakahara-ku, Kawasaki,
Kanagawa 211-8666 Japan

Date of Issue:
August 06, 2012

Test Site/Location:
HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon,
Icheon-si, Kyunggi-Do, Korea

Report No.: HCTR1208FR06

HCT FRN: 0005866421

FCC ID	**: TYK-JDS9507**
APPLICANT	**: NEC CASIO Mobile Communications, Ltd.**

FCC Model(s):	C811
EUT Type:	CDMA/GSM/WCDMA/LTE Phone with Bluetooth/WLAN/NFC
Max. RF Output Power:	Wi-Fi 802.11b(23.94 dBm) / Wi-Fi 802.11g (22.62 dBm) / Wi-Fi 802.11n (21.70 dBm)
Frequency Range:	2412 MHz -2462 MHz
Modulation type	CCK/DSSS/OFDM
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Jong Seok Lee

Report prepared by
: Jong Seok Lee
Test engineer of RF Team

Approved by
: Sang Jun Lee
Manager of RF Team

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1208FR06	August 06, 2012	- First Approval Report

Table of Contents

1. GENERAL INFORMATION

Applicant:	NEC CASIO Mobile Communications, Ltd.
Address:	1753 Shimonumabe, Nakahara-ku, Kawasaki, Kanagawa 211-8666 Japan
FCC ID:	TYK-JDS9507
EUT Type:	CDMA/GSM/WCDMA/LTE Phone with Bluetooth/WLAN/NFC
Model name(s):	C811
Date(s) of Tests:	July 03, 2012 ~ July 19, 2012
Place of Tests:	HCT Co., Ltd. 105-1, Jangam-ri , Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, KOREA.

2. EUT DESCRIPTION

EUT Type	CDMA/GSM/WCDMA/LTE Phone with Bluetooth/WLAN/NFC	
FCC Model Name	C811	
Power Supply	DC 3.7 V	
Battery type	Li-ion Battery(Standard)	
Frequency Range	TX: 2412 MHz ~ 2462 MHz RX: 2412 MHz ~ 2462 MHz	
Max. RF Output Power	Peak	Wi-Fi 802.11b(23.94 dBm) / Wi-Fi 802.11g (22.62 dBm) / Wi-Fi 802.11n (21.70 dBm)
	Average	Wi-Fi 802.11b(17.10 dBm) / Wi-Fi 802.11g (13.98 dBm) / Wi-Fi 802.11n (13.08 dBm)
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11g, 802.11n)	
Antenna Specification	Manufacturer: ARRO Antenna type: SUB Antenna Peak Gain : -0.6 dBi	

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.10-2009) and FCC KDB 558074 D01 DTS Meas Guidance V01 dated January 18, 2012 entitled “Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) Operating Under §15.247” were used in the measurement.

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2009) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.3 of ANSI C63.10. (Version: 2009).

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated March 02, 2011 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

7. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	CONDUCTED	PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	§15.247(d)	Conducted < 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 8.6		PASS
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 8.5.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.5.2		PASS

8. TEST RESULT

8.1 6dB BANDWIDTH (802.11b/g/n)

Test Requirements and limit, §15.247(a)(2)

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

▣ TEST CONFIGURATION

▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW = 1 – 5 % of the EBW

VBW = 3 * RBW

SPAN = 5 MHz

Detector = Peak

Trace mode = max hold

Sweep = auto couple

▣ TEST RESULTS

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	9.150	0.500	Pass
2437	6	8.747	0.500	Pass
2462	11	8.751	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.570	0.500	Pass
2437	6	16.740	0.500	Pass
2462	11	16.540	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.740	0.500	Pass
2437	6	17.770	0.500	Pass
2462	11	17.810	0.500	Pass

▣ RESULT PLOTS

6dB Bandwidth plot (802.11b-CH 1)

6dB Bandwidth plot (802.11b-CH 6)

6dB Bandwidth plot (802.11b-CH 11)

6dB Bandwidth plot (802.11g-CH 1)

6dB Bandwidth plot (802.11g-CH 6)

6dB Bandwidth plot (802.11g-CH 11)

6dB Bandwidth plot (802.11n-CH 1)

6dB Bandwidth plot (802.11n-CH 6)

6dB Bandwidth plot (802.11n-CH 11)

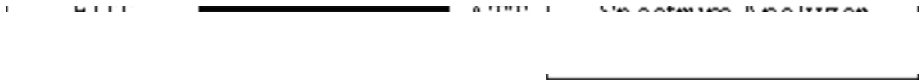
8.2 OUTPUT POWER (802.11b/g/n)

Test Requirements and limit, §15.247(b)(3)

A transmitter antenna terminal of EUT is connected to the input of a Spectrum Analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

The maximum permissible conducted output power is 1 Watt.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We use the spectrum analyzer's integrated band power measurement function. We tested according to KDB 558074(issued 1/18/2012).

This EUT TX condition is actual operating mode(not near 100 % duty cycle) by WLAN test program.

The Spectrum Analyzer is set to

- Peak Power(Measurement Procedure PK2 in KDB 558074)

RBW = 1 MHz

VBW = 3 MHz

SPAN = 5 – 30 % greater than the EBW

Detector Mode = Peak

Integrated bandwidth = EBW

Sweep = auto couple

Trace Mode = max hold

- Average Power(Measurement Procedure AVG2 in KDB 558074)

RBW = 1 MHz

VBW = 3 MHz

SPAN = 5 – 30 % greater than the EBW

Detector Mode = power averaging(RMS) or sample

Integrated bandwidth = EBW

Sweep = auto couple

Sweep Point = 1001

Trace average at least 100 traces in power averaging(RMS) mode

▣ Sample Calculation

Output Power = Reading Value + ATT loss + Cable loss(1 ea)

= 10 dBm + 10 dB + 0.8 dB = 20.8 dBm

Note :

1. Spectrum reading values are not plot data. The power results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the Attenuator and cable combination is 11 dB at 2.4 GHz. We used the particular cable type that is supported by manufacture.

▣ TEST RESULTS-Peak

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	1 Mbps	20.14	30
		2 Mbps	20.42	30
		5.5 Mbps	22.28	30
		11 Mbps	23.94	30
2437	6	1 Mbps	20.02	30
		2 Mbps	20.32	30
		5.5 Mbps	22.07	30
		11 Mbps	23.72	30
2462	11	1 Mbps	20.05	30
		2 Mbps	20.35	30
		5.5 Mbps	22.13	30
		11 Mbps	23.70	30

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6 Mbps	21.84	30
		9 Mbps	21.80	30
		12 Mbps	21.50	30
		18 Mbps	21.61	30
		24 Mbps	22.01	30
		36 Mbps	22.18	30
		48 Mbps	22.09	30
		54 Mbps	21.97	30
2437	6	6 Mbps	22.49	30
		9 Mbps	22.62	30
		12 Mbps	22.14	30
		18 Mbps	22.26	30
		24 Mbps	22.55	30
		36 Mbps	22.60	30
		48 Mbps	22.53	30
		54 Mbps	22.43	30
2462	11	6 Mbps	22.09	30
		9 Mbps	21.97	30
		12 Mbps	21.74	30
		18 Mbps	21.73	30
		24 Mbps	22.13	30
		36 Mbps	22.06	30
		48 Mbps	22.17	30
		54 Mbps	22.13	30

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6.5 Mbps	20.82	30
		13 Mbps	20.71	30
		19.5 Mbps	20.62	30
		26 Mbps	21.06	30
		39 Mbps	20.94	30
		52 Mbps	21.04	30
		58.5 Mbps	21.07	30
		65 Mbps	20.96	30
2437	6	6.5 Mbps	21.34	30
		13 Mbps	21.31	30
		19.5 Mbps	21.23	30
		26 Mbps	21.54	30
		39 Mbps	21.56	30
		52 Mbps	21.53	30
		58.5 Mbps	21.51	30
		65 Mbps	21.62	30
2462	11	6.5 Mbps	21.7	30
		13 Mbps	20.85	30
		19.5 Mbps	20.81	30
		26 Mbps	21.19	30
		39 Mbps	21.11	30
		52 Mbps	21.48	30
		58.5 Mbps	21.16	30
		65 Mbps	21.05	30

▣ TEST RESULTS-Average

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	1 Mbps	17.07	30
		2 Mbps	17.01	30
		5.5 Mbps	16.92	30
		11 Mbps	16.51	30
2437	6	1 Mbps	17.04	30
		2 Mbps	17.00	30
		5.5 Mbps	16.92	30
		11 Mbps	16.42	30
2462	11	1 Mbps	17.10	30
		2 Mbps	16.99	30
		5.5 Mbps	16.91	30
		11 Mbps	16.44	30

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6 Mbps	13.43	30
		9 Mbps	13.15	30
		12 Mbps	12.95	30
		18 Mbps	12.51	30
		24 Mbps	12.13	30
		36 Mbps	11.48	30
		48 Mbps	10.92	30
		54 Mbps	10.70	30
2437	6	6 Mbps	13.98	30
		9 Mbps	13.74	30
		12 Mbps	13.50	30
		18 Mbps	13.08	30
		24 Mbps	12.70	30
		36 Mbps	11.99	30
		48 Mbps	11.49	30
		54 Mbps	11.31	30
2462	11	6 Mbps	13.57	30
		9 Mbps	13.38	30
		12 Mbps	13.16	30
		18 Mbps	12.72	30
		24 Mbps	12.31	30
		36 Mbps	11.61	30
		48 Mbps	11.12	30
		54 Mbps	10.91	30

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6.5 Mbps	12.52	30
		13 Mbps	12.05	30
		19.5 Mbps	11.64	30
		26 Mbps	11.24	30
		39 Mbps	10.60	30
		52 Mbps	10.12	30
		58.5 Mbps	9.92	30
		65 Mbps	9.73	30
2437	6	6.5 Mbps	13.08	30
		13 Mbps	12.61	30
		19.5 Mbps	12.19	30
		26 Mbps	11.79	30
		39 Mbps	11.15	30
		52 Mbps	10.67	30
		58.5 Mbps	10.46	30
		65 Mbps	10.26	30
2462	11	6.5 Mbps	12.73	30
		13 Mbps	12.21	30
		19.5 Mbps	11.82	30
		26 Mbps	11.37	30
		39 Mbps	10.79	30
		52 Mbps	10.29	30
		58.5 Mbps	10.10	30
		65 Mbps	9.88	30

▣ RESULT PLOTS-Peak

Conducted Output Power (802.11b-CH 1) 1Mbps

Conducted Output Power (802.11b-CH 1) 2Mbps

Conducted Output Power (802.11b-CH 1) 5.5Mbps

Conducted Output Power (802.11b-CH 1) 11Mbps

Conducted Output Power (802.11b-CH 6) 1Mbps

Conducted Output Power (802.11b-CH 6) 2Mbps

Conducted Output Power (802.11b-CH 6) 5.5Mbps

Conducted Output Power (802.11b-CH 6) 11Mbps

Conducted Output Power (802.11b-CH 11) 1Mbps

Conducted Output Power (802.11b-CH 11) 2Mbps

Conducted Output Power (802.11b-CH 11) 5.5Mbps

Conducted Output Power (802.11b-CH 11) 11Mbps

Conducted Output Power (802.11g-CH 1) 6Mbps

Conducted Output Power (802.11g-CH 1) 9Mbps

Conducted Output Power (802.11g-CH 1) 12Mbps

Conducted Output Power (802.11g-CH 1) 18Mbps

Conducted Output Power (802.11g-CH 1) 24Mbps

Conducted Output Power (802.11g-CH 1) 36Mbps

Conducted Output Power (802.11g-CH 1) 48Mbps

Conducted Output Power (802.11g-CH 1) 54Mbps

Conducted Output Power (802.11g-CH 6) 6Mbps

Conducted Output Power (802.11g-CH 6) 9Mbps

Conducted Output Power (802.11g-CH 6) 12Mbps

Conducted Output Power (802.11g-CH 6) 18Mbps

Conducted Output Power (802.11g-CH 6) 24Mbps

Conducted Output Power (802.11g-CH 6) 36Mbps

Conducted Output Power (802.11g-CH 6) 48Mbps

Conducted Output Power (802.11g-CH 6) 54Mbps

Conducted Output Power (802.11g-CH 11) 6Mbps

Conducted Output Power (802.11g-CH 11) 9Mbps

Conducted Output Power (802.11g-CH 11) 12Mbps

Conducted Output Power (802.11g-CH 11) 18Mbps

Conducted Output Power (802.11g-CH 11) 24Mbps

Conducted Output Power (802.11g-CH 11) 36Mbps

Conducted Output Power (802.11g-CH 11) 48Mbps

Conducted Output Power (802.11g-CH 11) 54Mbps

Conducted Output Power (802.11n-CH 1) 6.5Mbps

Conducted Output Power (802.11n-CH 1) 13Mbps

Conducted Output Power (802.11n-CH 1) 19.5Mbps

Conducted Output Power (802.11n-CH 1) 26Mbps

Conducted Output Power (802.11n-CH 1) 39Mbps

Conducted Output Power (802.11n-CH 1) 52Mbps

Conducted Output Power (802.11n-CH 1) 58.5Mbps

Conducted Output Power (802.11n-CH 1) 65Mbps

Conducted Output Power (802.11n-CH 6) 6.5Mbps

Conducted Output Power (802.11n-CH 6) 13Mbps

Conducted Output Power (802.11n-CH 6) 19.5Mbps

Conducted Output Power (802.11n-CH 6) 26Mbps

Conducted Output Power (802.11n-CH 6) 39Mbps

Conducted Output Power (802.11n-CH 6) 52Mbps

Conducted Output Power (802.11n-CH 6) 58.5Mbps

Conducted Output Power (802.11n-CH 6) 65Mbps

Conducted Output Power (802.11n-CH 11) 6.5Mbps

Conducted Output Power (802.11n-CH 11) 13Mbps

Conducted Output Power (802.11n-CH 11) 19.5Mbps

Conducted Output Power (802.11n-CH 11) 26Mbps

Conducted Output Power (802.11n-CH 11) 39Mbps

Conducted Output Power (802.11n-CH 11) 52Mbps

Conducted Output Power (802.11n-CH 11) 58.5Mbps

Conducted Output Power (802.11n-CH 11) 65Mbps

▣ RESULT PLOTS-Average

Conducted Output Power (802.11b-CH 1) 1Mbps

Conducted Output Power (802.11b-CH 1) 2Mbps

Conducted Output Power (802.11b-CH 1) 5.5Mbps

Conducted Output Power (802.11b-CH 1) 11Mbps

Conducted Output Power (802.11b-CH 6) 1Mbps

Conducted Output Power (802.11b-CH 6) 2Mbps

Conducted Output Power (802.11b-CH 6) 5.5Mbps

Conducted Output Power (802.11b-CH 6) 11Mbps

Conducted Output Power (802.11b-CH 11) 1Mbps

Conducted Output Power (802.11b-CH 11) 2Mbps

Conducted Output Power (802.11b-CH 11) 5.5Mbps

Conducted Output Power (802.11b-CH 11) 11Mbps

Conducted Output Power (802.11g-CH 1) 6Mbps

Conducted Output Power (802.11g-CH 1) 9Mbps

Conducted Output Power (802.11g-CH 1) 12Mbps

Conducted Output Power (802.11g-CH 1) 18Mbps

Conducted Output Power (802.11g-CH 1) 24Mbps

Conducted Output Power (802.11g-CH 1) 36Mbps

Conducted Output Power (802.11g-CH 1) 48Mbps

Conducted Output Power (802.11g-CH 1) 54Mbps

Conducted Output Power (802.11g-CH 6) 6Mbps

Conducted Output Power (802.11g-CH 6) 9Mbps

Conducted Output Power (802.11g-CH 6) 12Mbps

Conducted Output Power (802.11g-CH 6) 18Mbps

Conducted Output Power (802.11g-CH 6) 24Mbps

Conducted Output Power (802.11g-CH 6) 36Mbps

Conducted Output Power (802.11g-CH 6) 48Mbps

Conducted Output Power (802.11g-CH 6) 54Mbps

Conducted Output Power (802.11g-CH 11) 6Mbps

Conducted Output Power (802.11g-CH 11) 9Mbps

Conducted Output Power (802.11g-CH 11) 12Mbps

Conducted Output Power (802.11g-CH 11) 18Mbps

Conducted Output Power (802.11g-CH 11) 24Mbps

Conducted Output Power (802.11g-CH 11) 36Mbps

Conducted Output Power (802.11g-CH 11) 48Mbps

Conducted Output Power (802.11g-CH 11) 54Mbps

Conducted Output Power (802.11n-CH 1) 6.5Mbps

Conducted Output Power (802.11n-CH 1) 13Mbps

Conducted Output Power (802.11n-CH 1) 19.5Mbps

Conducted Output Power (802.11n-CH 1) 26Mbps

Conducted Output Power (802.11n-CH 1) 39Mbps

Conducted Output Power (802.11n-CH 1) 52Mbps

Conducted Output Power (802.11n-CH 1) 58.5Mbps

Conducted Output Power (802.11n-CH 1) 65Mbps

Conducted Output Power (802.11n-CH 6) 6.5Mbps

Conducted Output Power (802.11n-CH 6) 13Mbps

Conducted Output Power (802.11n-CH 6) 19.5Mbps

Conducted Output Power (802.11n-CH 6) 26Mbps

Conducted Output Power (802.11n-CH 6) 39Mbps

Conducted Output Power (802.11n-CH 6) 52Mbps

Conducted Output Power (802.11n-CH 6) 58.5Mbps

Conducted Output Power (802.11n-CH 6) 65Mbps

Conducted Output Power (802.11n-CH 11) 6.5Mbps

Conducted Output Power (802.11n-CH 11) 13Mbps

Conducted Output Power (802.11n-CH 11) 19.5Mbps

Conducted Output Power (802.11n-CH 11) 26Mbps

Conducted Output Power (802.11n-CH 11) 39Mbps

Conducted Output Power (802.11n-CH 11) 52Mbps

Conducted Output Power (802.11n-CH 11) 58.5Mbps

Conducted Output Power (802.11n-CH 11) 65Mbps

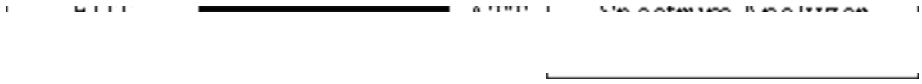
8.3 POWER SPECTRAL DENSITY (802.11b/g/n)

Test Requirements and limit, §15.247(e)

The peak power spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

Minimum Standard – 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 CONFIGURATION



▣ TEST PROCEDURE

We tested according to KDB 558074(issued 1/18/2012).

The spectrum analyzer is set to :

1. Span = 5 – 30 % greater than the EBW
2. RBW = 100 kHz
3. VBW = 300 kHz
4. Sweep = Auto couple
5. Detector Mode = Peak
6. Trace Mode = Max hold
7. Search peak

▣ Sample Calculation

PSD = Reading Value + ATT loss + Cable loss(1 ea) + BWCF

Output Power = -5 dBm + 10 dB + 0.8 dB –15.2 dB= 0.6 dBm

Where: BWCF(Bandwidth Correction Factor) = 10log(3 kHz/100 kHz) = -15.2 dB

Note :

1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the Attenuator and cable combination is 11 dB at 2.4 GHz. We used the particular cable type that is supported by manufacture.

▣ TEST RESULTS

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Spectrum Value(dBm)	BWCF (dB)	PSD (dBm)	Limit (dBm)	Pass/ Fail
2412	1	802.11b	9.853	-15.2	-5.347	8	Pass
2437	6		8.721	-15.2	-6.479	8	Pass
2462	11		8.996	-15.2	-6.204	8	Pass
2412	1	802.11g	3.142	-15.2	-12.058	8	Pass
2437	6		3.624	-15.2	-11.576	8	Pass
2462	11		3.398	-15.2	-11.802	8	Pass
2412	1	802.11n	2.273	-15.2	-12.927	8	Pass
2437	6		2.744	-15.2	-12.456	8	Pass
2462	11		2.514	-15.2	-12.686	8	Pass

Note : PSD = Spectrum Value + BWCF

▣ RESULT PLOTS

Power Spectral Density (802.11b-CH 1)

Power Spectral Density (802.11b-CH 6)

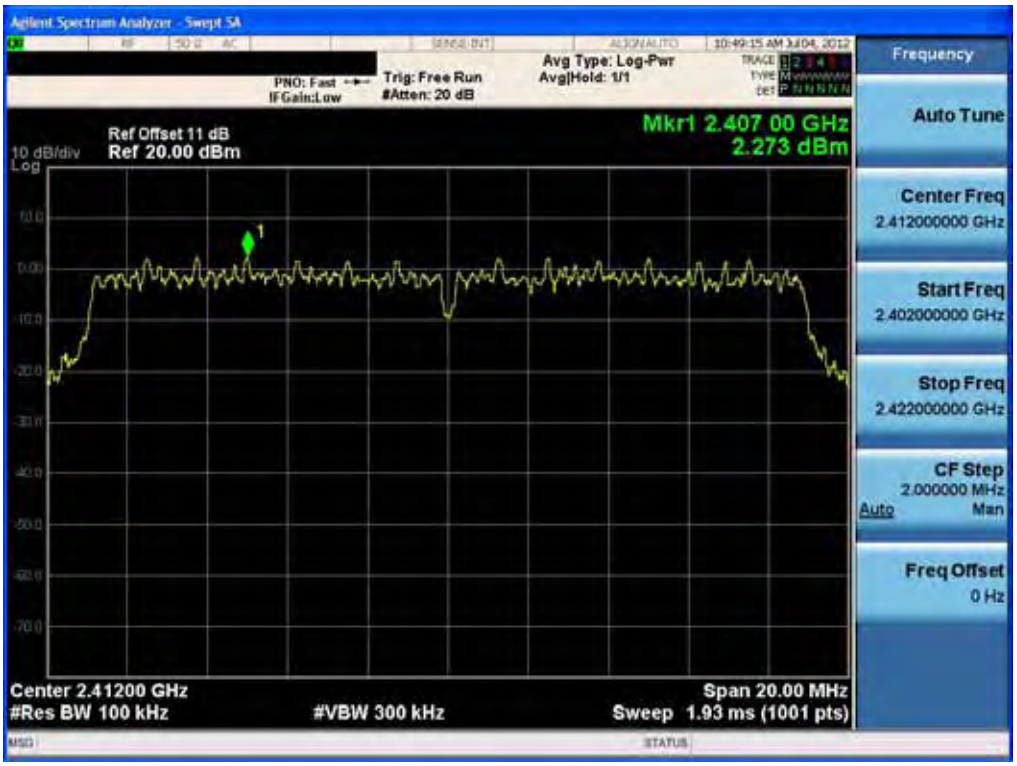
Power Spectral Density (802.11b-CH 11)

Power Spectral Density (802.11g-CH 1)

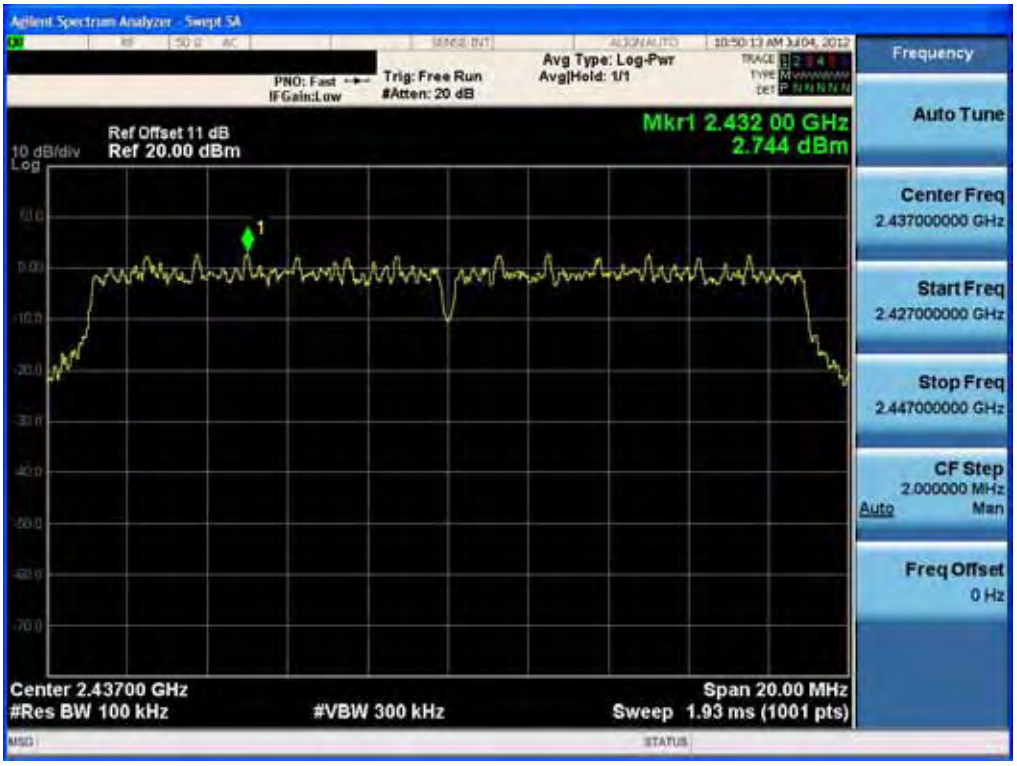
Power Spectral Density (802.11g-CH 6)

Power Spectral Density (802.11g-CH11)

Power Spectral Density (802.11n-CH 1)



Power Spectral Density (802.11n-CH 6)



Power Spectral Density (802.11n-CH11)

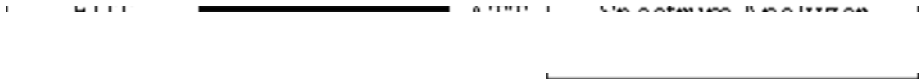
8.4 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit : 20 dBc

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer.

RBW = 100 kHz(Upon 1 GHz = 1 MHz)

VBW = 300 kHz(Upon 1 GHz = 1 MHz)

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep = auto couple

Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

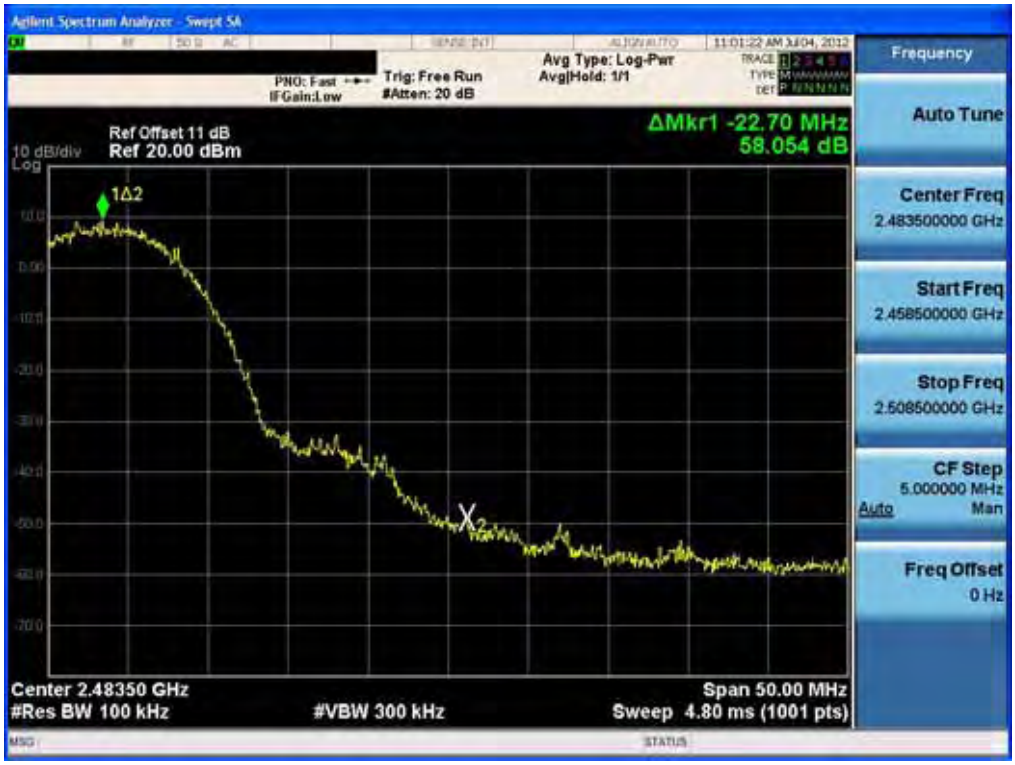
Note :

1. The band edge results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the Attenuator and cable combination is 11 dB at 2.4 GHz. We used the particular cable type that is supported by manufacture.
4. In case of conducted spurious emissions test, we applied the offset values at 2.4 GHz. Because we used the particular cable type that is supported by manufacture. So, we don't know exactly cable loss from 30 MHz to 26 GHz.

▣ RESULT PLOTS

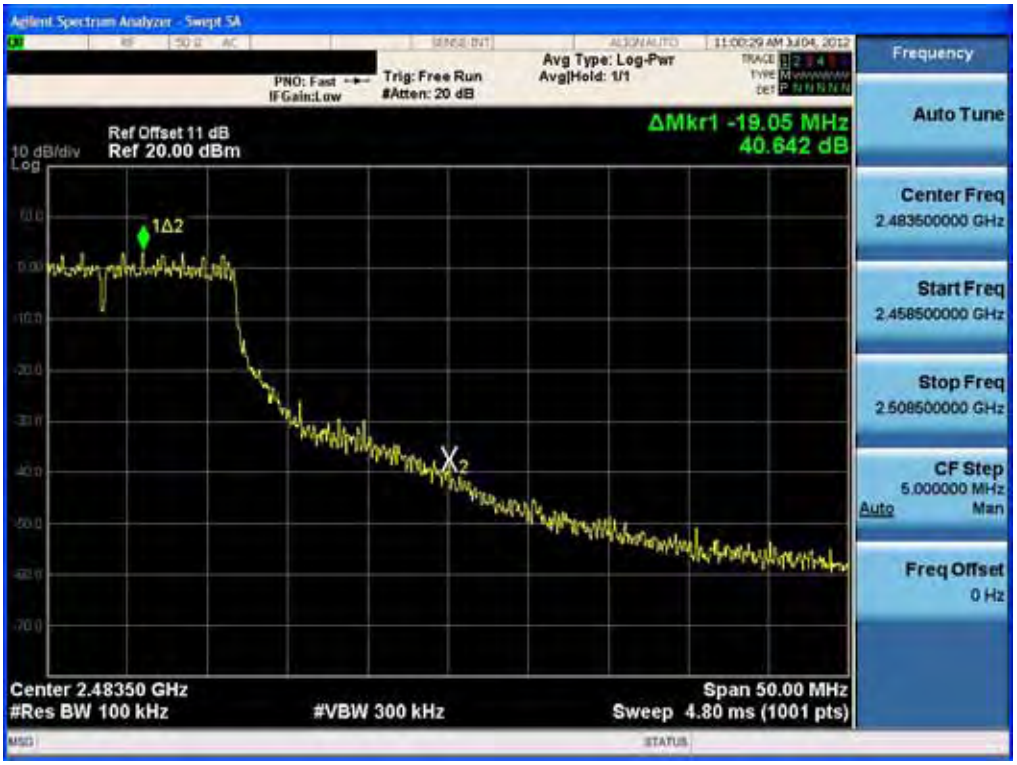
BandEdge (802.11b-CH1)

BandEdge (802.11b-CH11)

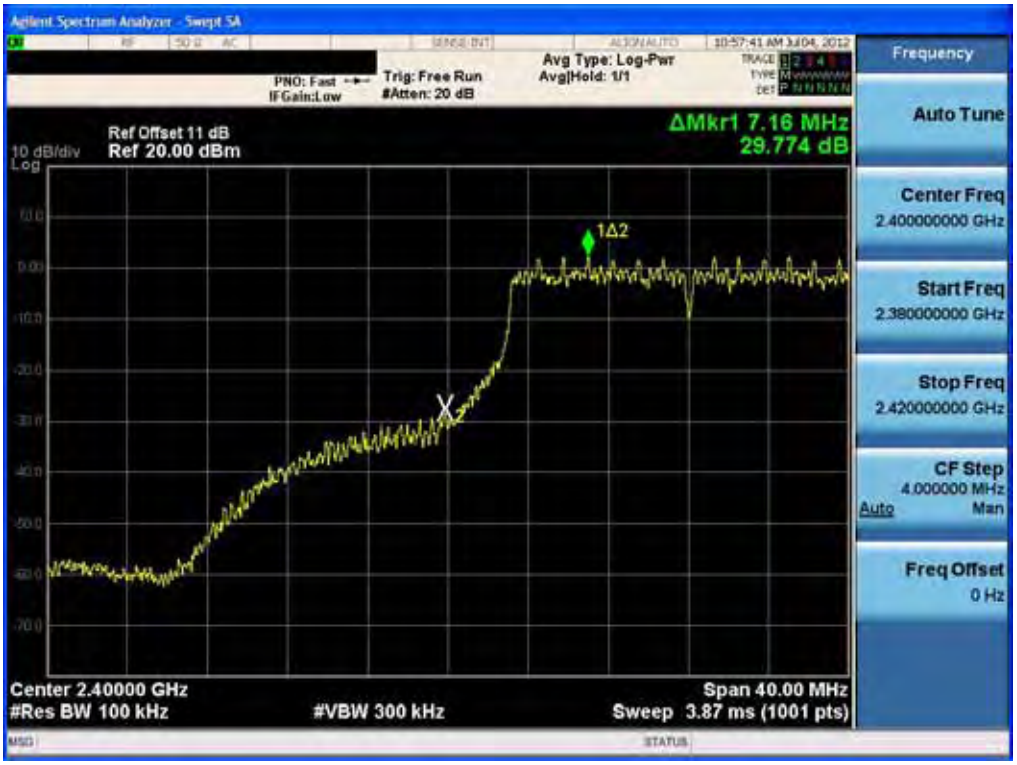


BandEdge (802.11g-CH1)

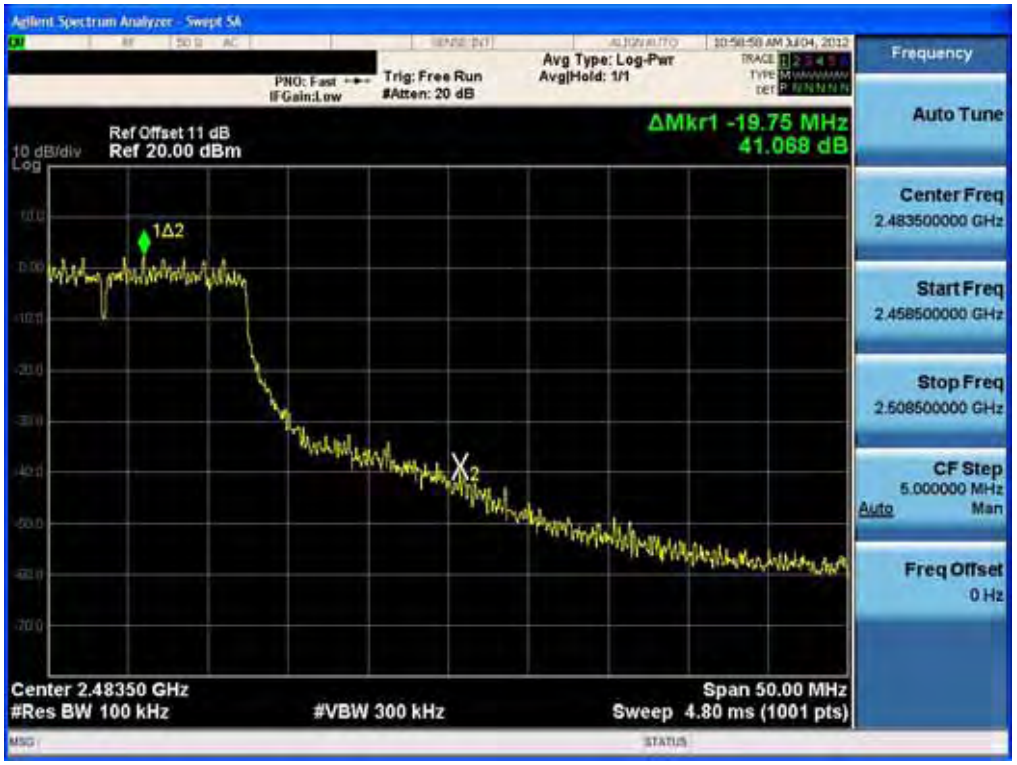
BandEdge (802.11g-CH11)



BandEdge (802.11n-CH1)

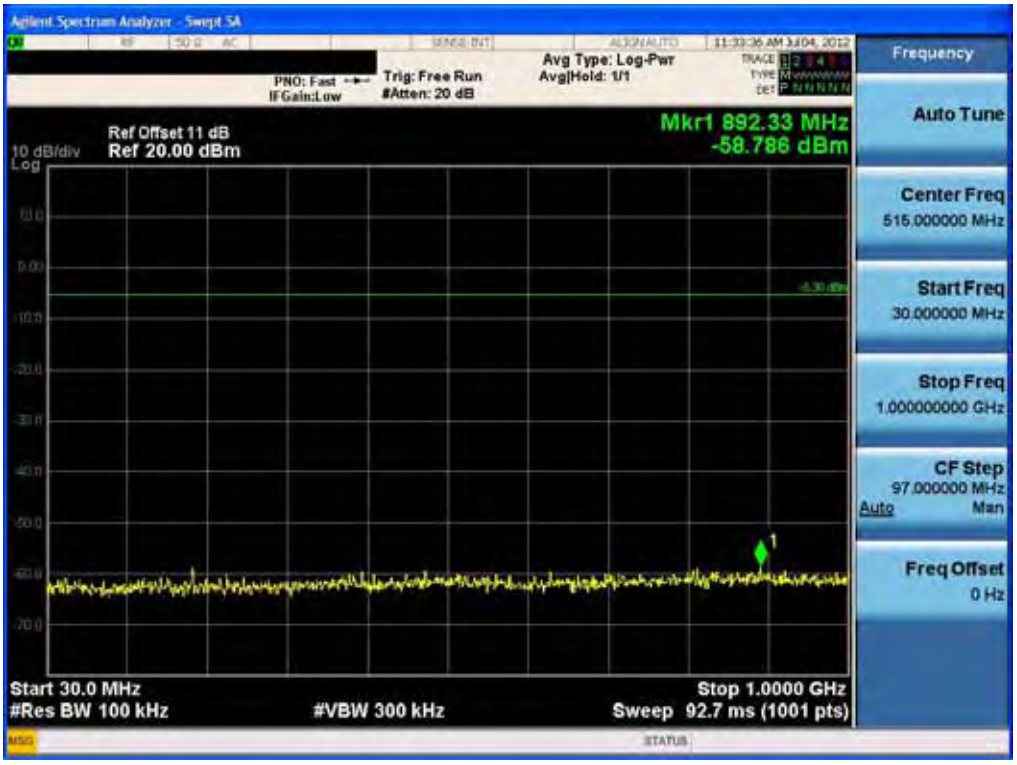


BandEdge (802.11n-CH11)

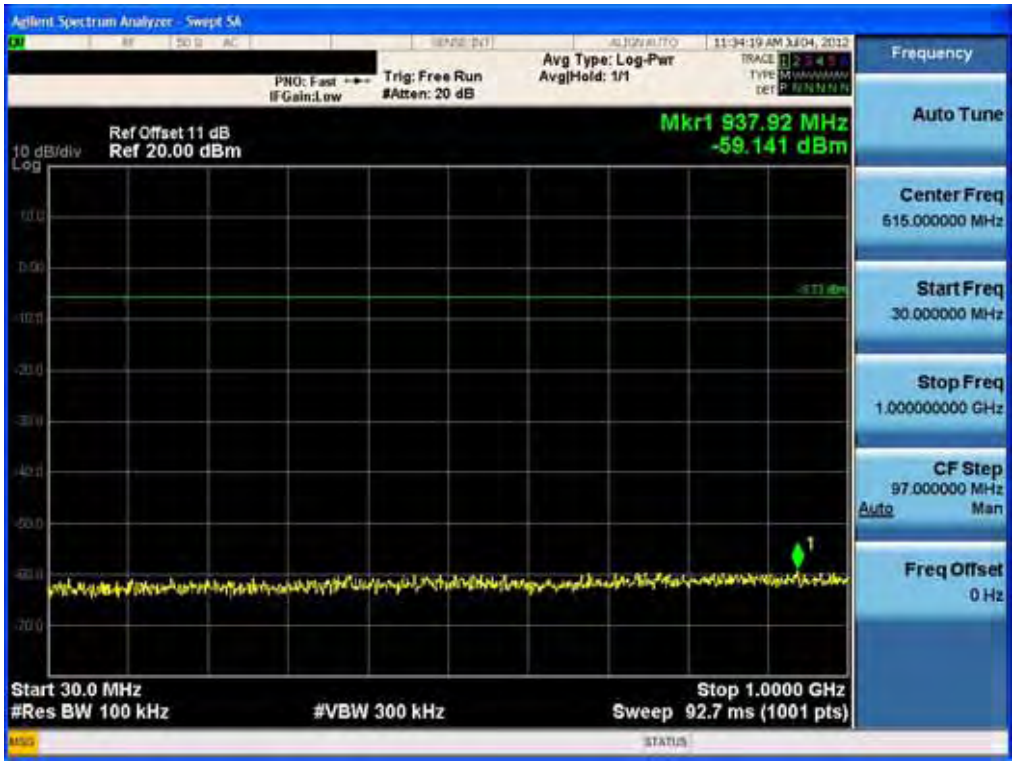


30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b-CH1)



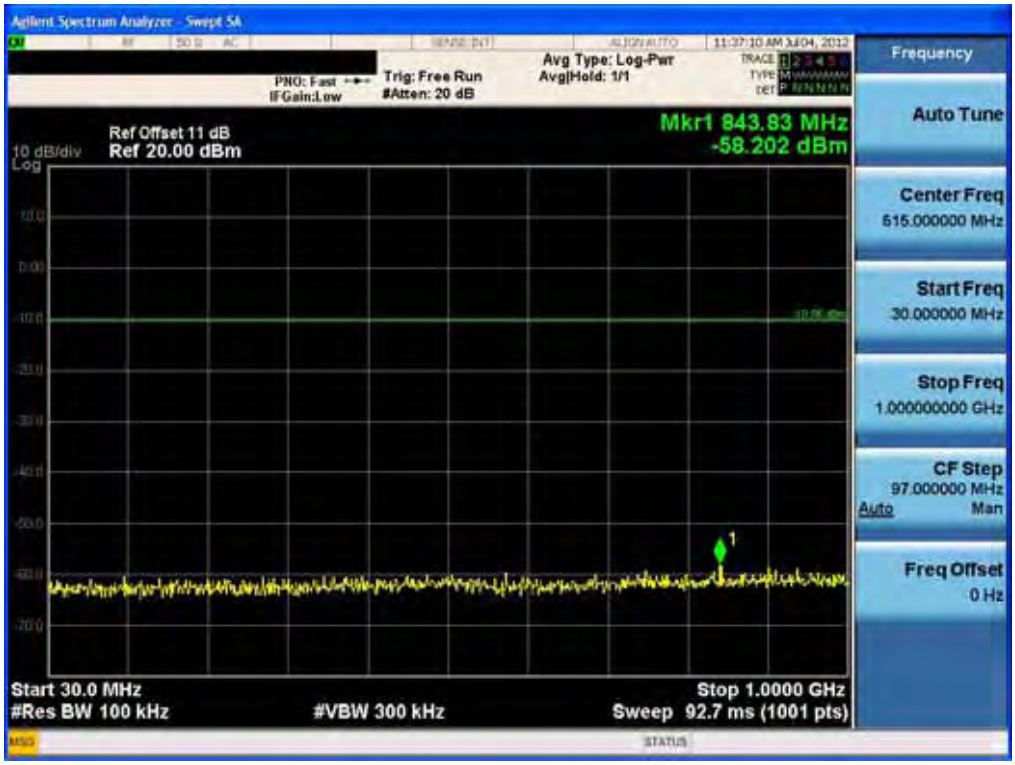
Conducted Spurious Emission (802.11b-CH6)



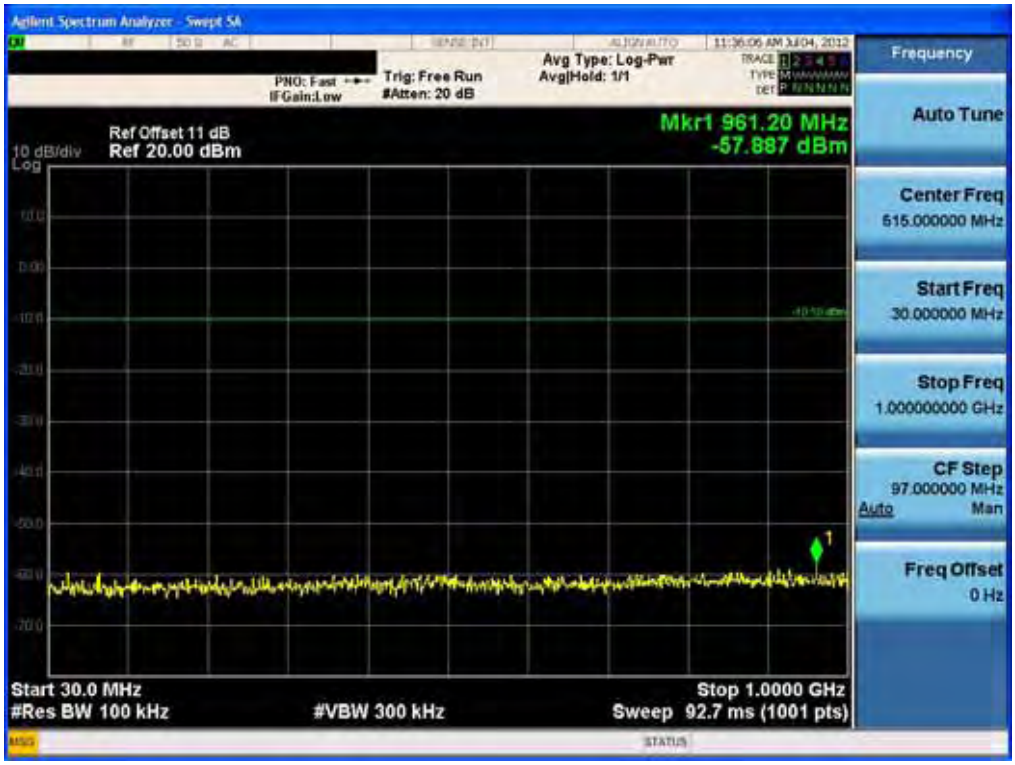
Conducted Spurious Emission (802.11b-CH11)

Conducted Spurious Emission (802.11g-CH1)

Conducted Spurious Emission (802.11g-CH6)

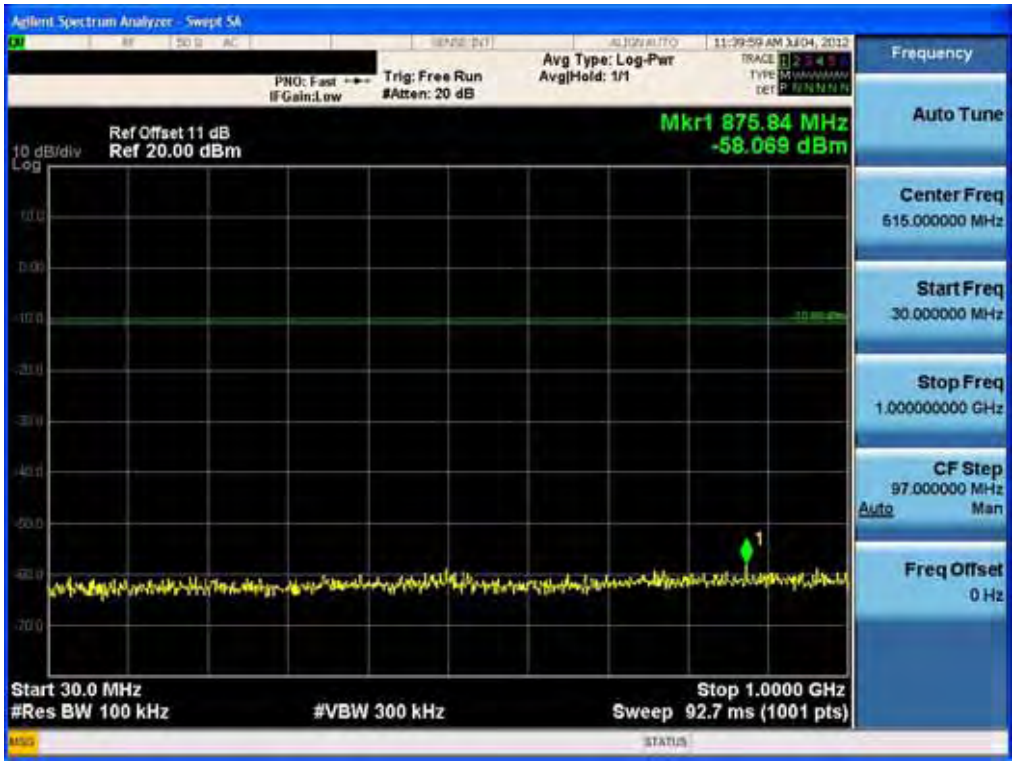


Conducted Spurious Emission (802.11g-CH11)

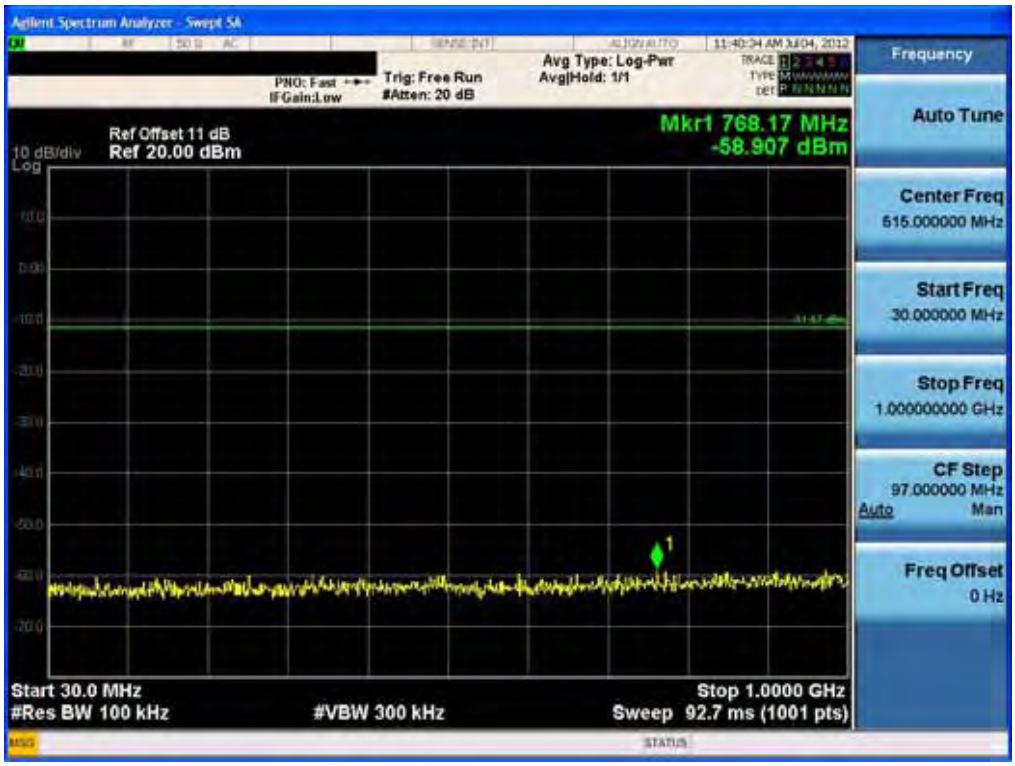


Conducted Spurious Emission (802.11n-CH1)

Conducted Spurious Emission (802.11n-CH6)



Conducted Spurious Emission (802.11n-CH11)



1 GHz ~ 26 GHz

Conducted Spurious Emission (802.11b-CH1)

Conducted Spurious Emission (802.11b-CH6)

Conducted Spurious Emission (802.11b-CH11)

Conducted Spurious Emission (802.11g-CH1)

Conducted Spurious Emission (802.11g-CH6)

Conducted Spurious Emission (802.11g-CH11)

Conducted Spurious Emission (802.11n-CH1)

Conducted Spurious Emission (802.11n-CH6)

Conducted Spurious Emission (802.11n-CH11)

8.5 RADIATED MEASUREMENT.

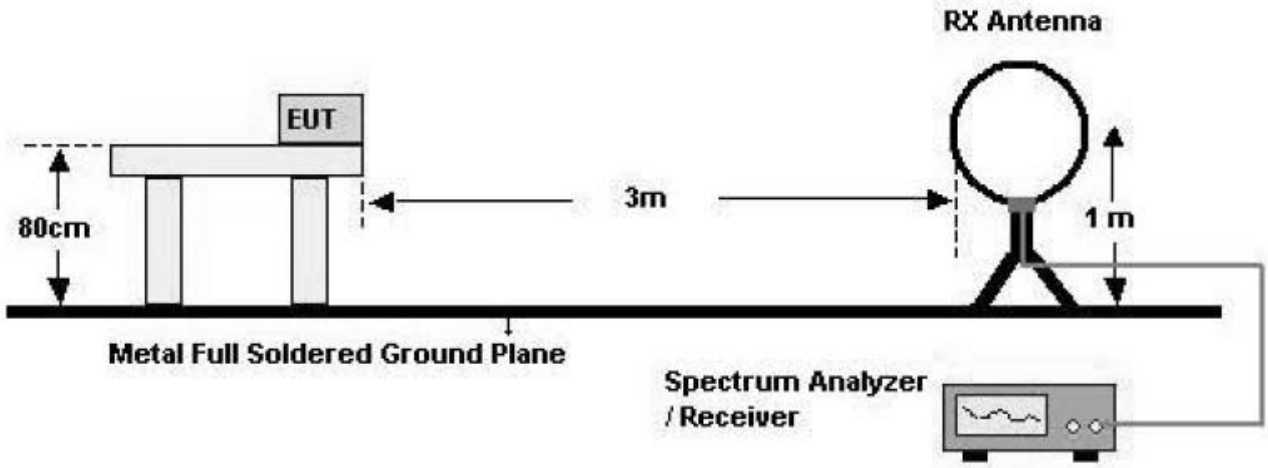
8.5.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209

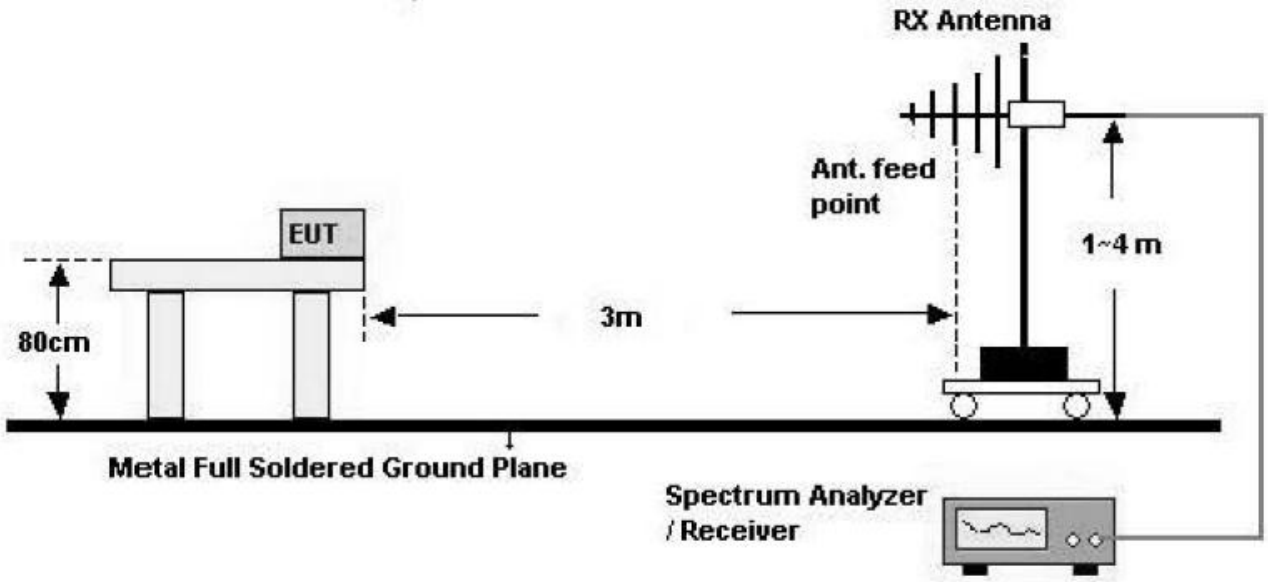
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

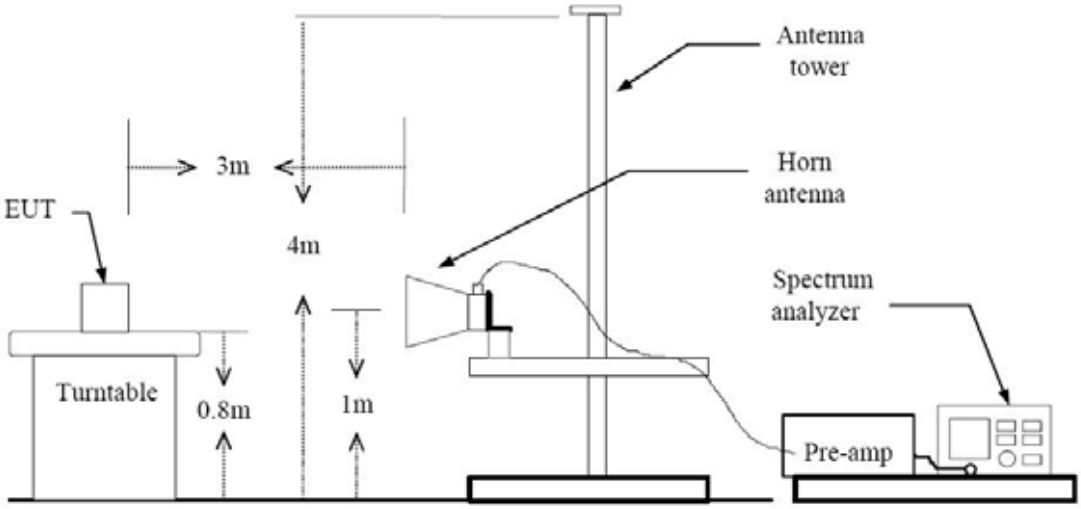
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
㎒	dB㎶	dB /m	dB	(H/V)	dB㎶/m	dB㎶/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
㎒	dB㎶	dB /m	dB	(H/V)	dB㎶/m	dB㎶/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Normal Battery Cover

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4824	51.67	-0.1	V	51.57	74	22.43	PK
4824	40.82	-0.1	V	40.72	54	13.28	AV
7236	49.45	10.13	V	59.58	74	14.42	PK
7236	37.08	10.13	V	47.21	54	6.79	AV
4824	51.00	-0.1	H	50.9	74	23.1	PK
4824	38.52	-0.1	H	38.42	54	15.58	AV
7236	49.77	10.13	H	59.9	74	14.1	PK
7236	36.95	10.13	H	47.08	54	6.92	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
6. We have done 802.11b/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	50.23	0.13	V	50.36	74	23.64	PK
4874	38.78	0.13	V	38.91	54	15.09	AV
7311	49.12	10.01	V	59.13	74	14.87	PK
7311	37.13	10.01	V	47.14	54	6.86	AV
4874	50.81	0.13	H	50.94	74	23.06	PK
4874	38.89	0.13	H	39.02	54	14.98	AV
7311	49.94	10.01	H	59.95	74	14.05	PK
7311	38.65	10.01	H	48.66	54	5.34	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
6. We have done 802.11b/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4924	50.32	0.45	V	50.77	74	23.23	PK
4924	38.80	0.45	V	39.25	54	14.75	AV
7386	50.30	10.17	V	60.47	74	13.53	PK
7386	37.34	10.17	V	47.51	54	6.49	AV
4924	50.63	0.45	H	51.08	74	22.92	PK
4924	39.18	0.45	H	39.63	54	14.37	AV
7386	49.18	10.17	H	59.35	74	14.65	PK
7386	37.37	10.17	H	47.54	54	6.46	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
6. We have done 802.11b/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Extended Battery Cover

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4824	51.39	-0.1	V	51.29	74	22.71	PK
4824	39.69	-0.1	V	39.59	54	14.41	AV
7236	50.28	10.13	V	60.41	74	13.59	PK
7236	38.19	10.13	V	48.32	54	5.68	AV
4824	51.25	-0.1	H	51.15	74	22.85	PK
4824	38.98	-0.1	H	38.88	54	15.12	AV
7236	49.14	10.13	H	59.27	74	14.73	PK
7236	37.02	10.13	H	47.15	54	6.85	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
6. We have done 802.11b/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	50.86	0.13	V	50.99	74	23.01	PK
4874	39.45	0.13	V	39.58	54	14.42	AV
7311	49.13	10.01	V	59.14	74	14.86	PK
7311	36.67	10.01	V	46.68	54	7.32	AV
4874	50.75	0.13	H	50.88	74	23.12	PK
4874	39.05	0.13	H	39.18	54	14.82	AV
7311	49.40	10.01	H	59.41	74	14.59	PK
7311	37.55	10.01	H	47.56	54	6.44	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
6. We have done 802.11b/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4924	50.78	0.45	V	51.23	74	22.77	PK
4924	39.98	0.45	V	40.43	54	13.57	AV
7386	49.80	10.17	V	59.97	74	14.03	PK
7386	37.08	10.17	V	47.25	54	6.75	AV
4924	50.75	0.45	H	51.20	74	22.80	PK
4924	39.05	0.45	H	39.50	54	14.50	AV
7386	49.43	10.17	H	59.60	74	14.40	PK
7386	37.03	10.17	H	47.20	54	6.80	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
6. We have done 802.11b/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Wireless Battery Cover

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4824	50.40	-0.1	V	50.30	74	23.70	PK
4824	36.96	-0.1	V	36.86	54	17.14	AV
7236	49.30	10.13	V	59.43	74	14.57	PK
7236	37.37	10.13	V	47.50	54	6.50	AV
4824	50.85	-0.1	H	50.75	74	23.25	PK
4824	40.61	-0.1	H	40.51	54	13.49	AV
7236	49.88	10.13	H	60.01	74	13.99	PK
7236	37.72	10.13	H	47.85	54	6.15	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
6. We have done 802.11b/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	49.72	0.13	V	49.85	74	24.15	PK
4874	36.98	0.13	V	37.11	54	16.89	AV
7311	49.54	10.01	V	59.55	74	14.45	PK
7311	37.88	10.01	V	47.89	54	6.11	AV
4874	49.82	0.13	H	49.95	74	24.05	PK
4874	36.64	0.13	H	36.77	54	17.23	AV
7311	48.77	10.01	H	58.78	74	15.22	PK
7311	36.55	10.01	H	46.56	54	7.44	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
6. We have done 802.11b/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4924	49.06	0.45	V	49.51	74	24.49	PK
4924	36.36	0.45	V	36.81	54	17.19	AV
7386	50.72	10.17	V	60.89	74	13.11	PK
7386	39.02	10.17	V	49.19	54	4.81	AV
4924	49.84	0.45	H	50.29	74	23.71	PK
4924	37.21	0.45	H	37.66	54	16.34	AV
7386	50.56	10.17	H	60.73	74	13.27	PK
7386	38.01	10.17	H	48.18	54	5.82	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
6. We have done 802.11b/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

8.5.2 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d) §15.205, §15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. Attenuation below the general limits specified in Section 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) (See section 15.205(c)).

Normal Battery Cover

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading dBuV	AN.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.0	31.32	33.86	H	65.18	74	8.82	PK
2390.0	13.33	33.86	H	47.19	54	6.81	AV
2390.0	31.31	33.86	V	65.17	74	8.83	PK
2390.0	13.27	33.86	V	47.13	54	6.87	AV
2483.5	37.84	34.02	H	71.86	74	2.14	PK
2483.5	17.07	34.02	H	51.09	54	2.91	AV
2483.5	37.52	34.02	V	71.54	74	2.46	PK
2483.5	17.08	34.02	V	51.10	54	2.90	AV

Extended Battery Cover

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading dBuV	AN.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.0	28.96	33.86	H	62.82	74	11.18	PK
2390.0	13.35	33.86	H	47.21	54	6.79	AV
2390.0	31.91	33.86	V	65.77	74	8.23	PK
2390.0	13.55	33.86	V	47.41	54	6.59	AV
2483.5	35.46	34.02	H	69.48	74	4.52	PK
2483.5	17.43	34.02	H	51.45	54	2.55	AV
2483.5	35.57	34.02	V	69.59	74	4.41	PK
2483.5	16.84	34.02	V	50.86	54	3.14	AV

Wireless Battery Cover

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading dBuV	AN.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.0	29.49	33.86	H	63.35	74	10.65	PK
2390.0	13.28	33.86	H	47.14	54	6.86	AV
2390.0	31.15	33.86	V	65.01	74	8.99	PK
2390.0	13.25	33.86	V	47.11	54	6.89	AV
2483.5	36.99	34.02	H	71.01	74	2.99	PK
2483.5	17.62	34.02	H	51.64	54	2.36	AV
2483.5	34.19	34.02	V	68.21	74	5.79	PK
2483.5	16.96	34.02	V	50.98	54	3.02	AV

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss
2. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.

b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

3. We have done 802.11b/g/n mode test. . Worst case of EUT is 6 Mbps in 802.11g

4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

8.6 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.
5. We are performed the AC Power Line Conducted Emission test for 11 Mbps, Ch.1 and 802.11b. Because 802.11b mode is worst case.

▣ RESULT PLOTS

Conducted Emissions (Line 1)

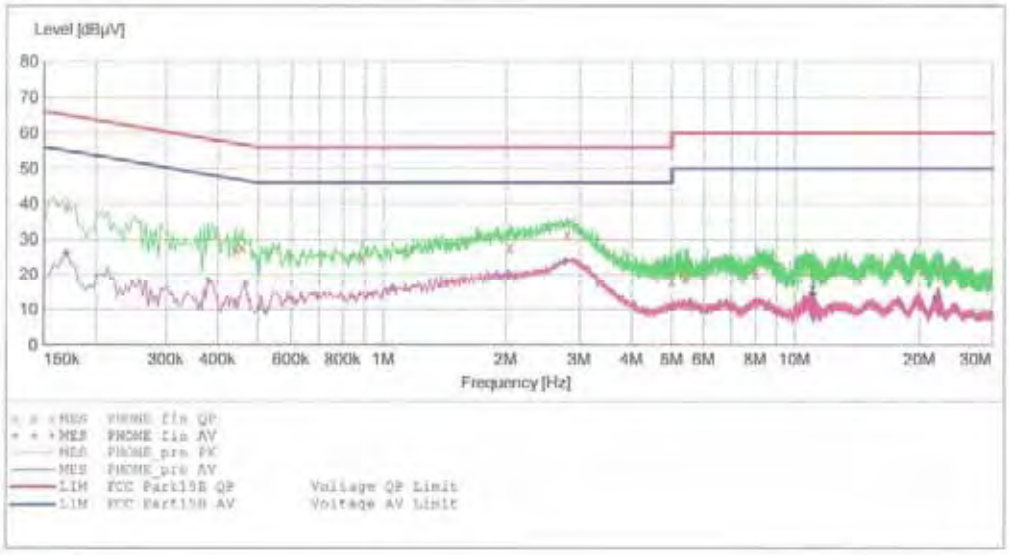
HCT

EMC

```
EUT:                  C811
Manufacturer:         NEC CASIO MOBILE COMMUNICATIONS
Operating Condition:  WLAN MODE
Test Site:            SHIELD ROOM
Operator:             JS LEE
Test Specification:   FCC PART15 CLASS B
Comment:              N
```

SCAN TABLE: "FCC PART 15 B(N)"

```
Short Description:                FCC PART 15 CLASS B
Start      Stop       Step        Detector   Meas.     IF       Transducer
Frequency  Frequency  Width                  Time      Bandw.
150.0 kHz  500.0 kHz  4.0 kHz     MaxPeak    10.0 ms   9 kHz    None
                                  Average
500.0 kHz  5.0 MHz    4.0 kHz     MaxPeak    10.0 ms   9 kHz    None
                                  Average
5.0 MHz    30.0 MHz   4.0 kHz     MaxPeak    10.0 ms   9 kHz    None
                                  Average
```



MEASUREMENT RESULT: "PHONE_fin QP"

7/11/2012 10:19AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.170010	39.00	9.9	65	25.9	---	---
0.442010	27.20	9.9	57	29.8	---	---
0.458010	27.70	9.9	57	29.0	---	---
0.888000	24.80	10.0	56	31.2	---	---
2.044000	27.90	10.0	56	28.1	---	---
2.808000	31.50	10.0	56	24.5	---	---
5.000000	18.30	10.2	56	37.7	---	---
5.404000	18.90	10.3	60	41.1	---	---
8.028000	20.00	10.4	60	40.0	---	---

Page 1/2 7/11/2012 10:19AM PHONE

MEASUREMENT RESULT: "PHONE_fin AV"

7/11/2012 10:19AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.170010	26.10	9.9	55	28.9	---	---
0.378010	18.10	9.9	48	30.2	---	---
0.466010	17.30	9.9	47	29.3	---	---
1.056000	16.40	10.0	46	29.6	---	---
2.028000	19.90	10.0	46	26.1	---	---
2.764000	23.70	10.0	46	22.3	---	---
11.024000	14.60	10.5	50	35.4	---	---
11.064000	16.40	10.5	50	33.6	---	---
22.128000	13.70	11.1	50	36.3	---	---

Page 2/2 7/11/2012 10:19AM PHONE

Conducted Emissions (Line 2)

HCT

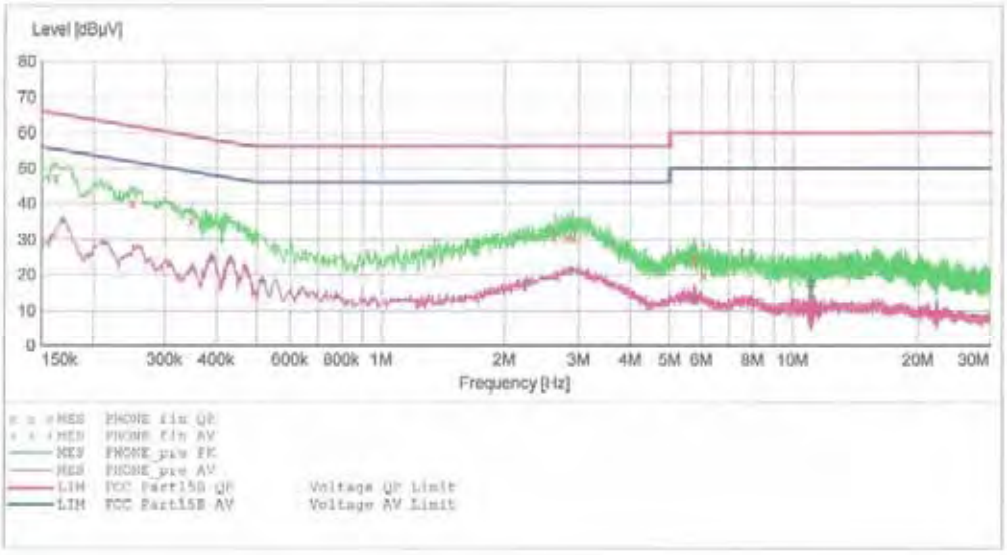
EMC

```
EUT:                  C811
Manufacturer:         NEC CASIO MOBILE COMMUNICATIONS
Operating Condition:  WLAN MODE
Test Site:            SHIELD ROOM
Operator:             JS LEE
Test Specification:   FCC PART15 CLASS B
Comment:              H
```

SCAN TABLE: "FCC PART 15 B(H)"

Short Description: FCC PART 15 CLASS B

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	1.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "PHONE_fin QP"

7/11/2012 10:05AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.162010	47.10	9.7	65	18.3	---	---
0.250010	40.20	9.7	62	21.6	---	---
0.348010	35.20	9.7	59	23.8	---	---
2.636000	30.90	9.8	56	25.1	---	---
2.824000	30.80	9.8	56	25.2	---	---
2.896000	30.80	9.9	56	25.2	---	---
5.728000	24.40	10.1	60	35.6	---	---
5.772000	24.50	10.1	60	35.5	---	---
6.084000	20.10	10.1	60	39.9	---	---

Page 1/2 7/11/2012 10:05AM PHONE

MEASUREMENT RESULT: "PHONE_fin AV"

7/11/2012 10:05AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.169010	35.10	9.7	55	19.9	---	---
0.388010	24.20	9.7	48	23.9	---	---
0.431010	24.30	9.7	47	22.9	---	---
0.516000	18.40	9.7	46	27.6	---	---
2.268000	18.20	9.8	46	27.8	---	---
2.896000	21.30	9.9	46	24.7	---	---
5.736000	13.70	10.1	50	36.3	---	---
11.084000	18.40	10.3	50	31.6	---	---
11.128000	17.10	10.3	50	32.9	---	---

Page 2/2 7/11/2012 10:05AM PHONE

9. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ENV216/ LISN	Annual	02/09/2013	100073
Schwarzbeck	VULB 9168/ TRILOG Antenna	Biennial	02/09/2013	200
Rohde & Schwarz	ESI 40 / EMI TEST RECEIVER	Annual	05/03/2013	831564103
Agilent	E4440A/ Spectrum Analyzer	Annual	05/02/2013	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	Annual	09/23/2012	MY51110020
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	Annual	09/19/2012	10094
MITEQ	AMF-6B-180265-35-10P / POWER AMP	Annual	04/16/2013	667624
CERNEX	CBL26405040 / POWER AMP	Annual	04/16/2013	19660
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	10/17/2013	937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	Biennial	10/26/2012	342
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	02/09/2013	839117/011
Agilent	E4416A /Power Meter	Annual	11/07/2012	GB41291412
Agilent	E9327A /POWER SENSOR	Annual	05/02/2013	MY4442009
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	05/02/2013	1
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	Annual	05/02/2013	1
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	Annual	05/02/2013	29
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	05/02/2013	1
Hewlett Packard	11636B/Power Divider	Annual	11/07/2012	11377
Hewlett Packard	11667B / Power Splitter	Annual	06/05/2013	05001
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	11/07/2012	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	11/07/2012	010002156287001199
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	11/14/2012	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	05/02/2013	100422
EMCO	6502.LOOP ANTENNA	Biennial	01/11/2014	9009-2536
MITEQ	AMF-6D-001180-35-20P/ POWER AMP	Annual	09/26/2012	990893
Agilent	8493C / Attenuator(10 dB)	Annual	09/23/2012	76649
WEINSCHEL	2-3 / Attenuator(3 dB)	Annual	11/07/2013	BR0617