Prüfbericht-Nr.: *Test report No.:*	**50098579 001**	**Auftrags-Nr.:** *Order No.:*	164101620	Seite 1 von 22 *Page 1 of 22*
Kunden-Referenz-Nr.: *Client reference No.:*	N/A	**Auftragsdatum:** *Order date.:*	06.06.2017	
Auftraggeber: *Client:*	**Binatone Electronics International Ltd.** Floor 23A, 9 Des Voeux Road West, Sheung Wan, Hong Kong			
Prüfgegenstand: *Test item:*	Wi-Fi® Home Video Camera			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	FOCUS50-W, FOCUS66, FOCUS66-2, FOCUS66-3, FOCUS66-4, FOCUS66-B, FOCUS66-B2, FOCUS66-BLK2, FOCUS66-S, FOCUS66-S2, FOCUS66-W, FOCUS66-W2, FOCUS66-W3, FOCUS66-W4 (Trademark: motorola)			
Auftrags-Inhalt: *Order content:*	FCC and IC approval			
Prüfgrundlage: *Test specification:*	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209 CFR47 FCC Part 2: Section 2.1091		RSS-247 Issue 2 February 2017 RSS-Gen Issue 4 November 2014 RSS-102 Issue 5 March 2015	

Wareneingangsdatum: *Date of receipt:*	06.06.2017	Please refer to photo documents
Prüfmuster-Nr.: *Test sample No.:*	A000578372-005 A000578372-007	
Prüfzeitraum: *Testing period:*	06.06.2017 - 10.07.2017	
Ort der Prüfung: *Place of testing:*	EMTEK(Shenzhen) Co., Ltd.	
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.	
Prüfergebnis*: *Test result*:*	Pass	

geprüft von / *tested by:*

Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*
11.07.2017	Ryan Yang / Assistant Project Manager	

kontrolliert von / *reviewed by:*

Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*
11.07.2017	Owen Tian / Technical Certifier	

Sonstiges / *Other:*

FCC ID: VLJ-FOCUS66R
IC: 4522A-FOCUS66R HVIN: FOCUS66R

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged:*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhalt
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	1 = very good	2 = good	3 = satisfactory	4 = sufficient	5 = poor
	P(ass) = passed a.m. test specifications(s)		F(ail) = failed a.m. test specifications(s)	N/A = not applicable	N/T = not tested

Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER
RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY
RESULT: Pass

5.1.4 6DB BANDWIDTH
RESULT: Pass

5.1.5 99% BANDWIDTH
RESULT: Pass

5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH
RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION
RESULT: Pass

5.1.8 CONDUCTED EMISSION ON AC MAINS
RESULT: Pass

6.1.1 ELECTROMAGNETIC FIELDS
RESULT: Pass

Contents

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results of Conducted Testing

Appendix C: Test Results of Radiated Testing

2 Test Sites

2.1 Test Facilities

EMTEK(Shenzhen) Co., Ltd.
Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China
FCC Registration No.: 406365
Test site Industry Canada No.: 4480A-2

The tests at the test sites have been conducted under the supervision of a TÜV engineer.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

EMTEK(Shenzhen) Co., Ltd.

Radio Spectrum Testing				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
EMI Test Receiver	R&S	ESU	1302.6005.26	20.05.2018
Signal Analyzer	Agilent	N9010A	My53470879	20.05.2018
Power Analyzer	Agilent	PS-X10-200	N/A	20.05.2018
Test Accessories	Agilent	PS-X10-100	N/A	20.05.2018
Spurious Emission				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
EMI Test Receiver	R&S	ESU	1302.6005.26	20.05.2018
Pre-Amplifier	HP	8447D	2944A07999	20.05.2018
Bilog Antenna	Schwarzbeck	VULB9163	142	20.05.2018
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	20.05.2018
Horn Antenna	Schwarzbeck	BBHA 9120	D143	20.05.2018
Cable	Schwarzbeck	AK9513	ACRX1	20.05.2018
Cable	Rosenberger	N/A	FP2RX2	20.05.2018
Cable	Schwarzbeck	AK9513	CRPX1	20.05.2018
Cable	Schwarzbeck	AK9513	CRRX2	20.05.2018
Pre-Amplifier	LUNAR-EM	LNA30M3G-25	J10100000070	20.05.2018
Band reject Filter (50dB)	WI/DE	WRCGV2400 (2400-2485MHz)	2	20.05.2018
Conducted Emission on AC Mains				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
Test Receiver	R&S	ESCI	26115-010-0027	20.05.2018
L.I.S.N.	R&S	ENV216	101161	20.05.2018
50Ω Coaxial Switch	Anritsu	MP59B	6100175589	20.05.2018

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Item		Extended Uncertainty
Conducted Emission		± 3.0 dB
Radiated Emission (30-1000MHz)	Field strength (dBμV/m)	± 6.0 dB
Radiated Emission (above 1000MHz)	Field strength (dBμV/m)	± 6.0 dB
Radio Spectrum		± 1.5 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B & C of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The EMTEK(Shenzhen) Co., Ltd. Test facility located at Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a Wi-Fi® Home Video Camera which supports Wi-Fi 802.11 b/g/n wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	Wi-Fi® Home Video Camera
Type Designation	FOCUS50-W, FOCUS66, FOCUS66-2, FOCUS66-3, FOCUS66-4, FOCUS66-B, FOCUS66-B2, FOCUS66-BLK2, FOCUS66-S, FOCUS66-S2, FOCUS66-W, FOCUS66-W2, FOCUS66-W3, FOCUS66-W4
Trade Mark	motorola
FCC ID	VLJ-FOCUS66R
IC	4522A-FOCUS66R
HVIN	FOCUS66R
Operating Voltage	DC 5.0V 1000mA input via AC/DC adapter
Testing Voltage	AC 120V, 60Hz
AC/DC Adapter #1	Model: S006AKU0500100 Input: AC 100-240V~50/60Hz, 200mA Output: DC 5.0V~1000mA
AC/DC Adapter #2	Model: BLJ06W050150P1-U Input: AC 100-240V~50/60Hz, 0.2A Output: DC 5.0V~1000mA
Technical Specification of Wi-Fi 802.11 b/g/n	
Operating Frequency	2412 - 2462 MHz for 802.11b/g/n(HT20) 2422 - 2452 MHz for 802.11n(HT40)
Type of Modulation	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM)
Data Rate	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n
Channel Number	11 channels for 802.11b/g/n(HT20) 7 channels for 802.11n(HT40)
Channel Separation	5 MHz
Antenna Type	Integral Antenna
Gain	0 dBi

Table 3: RF Channel and Frequency of Wi-Fi 802.11 b/g/n

RF Channel	802.11 b/g/n(HT20)	802.11 n(HT40)
	Frequency (MHz)	Frequency (MHz)
01	**2412**	/
02	2417	/
03	2422	**2422**
04	2427	2427
05	2432	2432
06	**2437**	**2437**
07	2442	2442
08	2447	2447
09	2452	**2452**
10	2457	/
11	**2462**	/

Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)

Test frequencies are lowest channel: 2422 MHz, middle channel: 2437 MHz and highest channel: 2452 MHz for 802.11n(HT40)

3.3 Independent Operation Modes

The basic operation modes are:

A. On, Wi-Fi 802.11 b/g/n wireless transmitting mode
    1. Low channel
    2. Middle channel
    3. High channel

B. On, Normal operation with wireless mode

C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Block Diagram
- FCC/IC Label and Location Info
- Operation Description
- Photo Document
- Schematics
- User Manual

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model FOCUS66R in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 4: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Notebook	HP	Compaq 6515b	SS05538914	N/A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

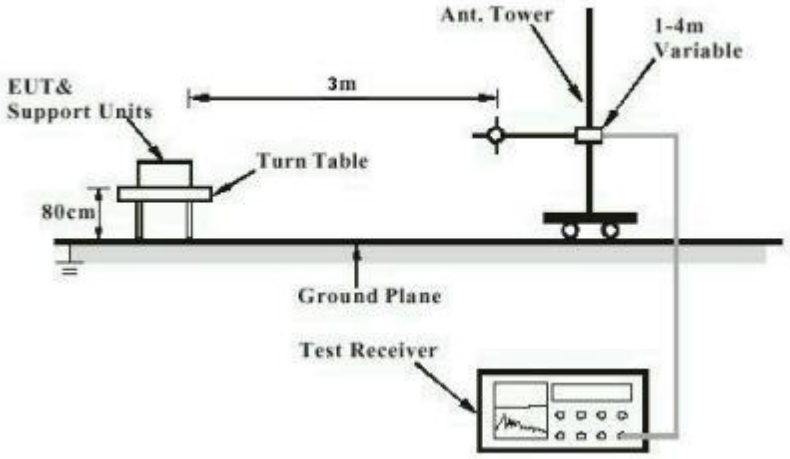


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

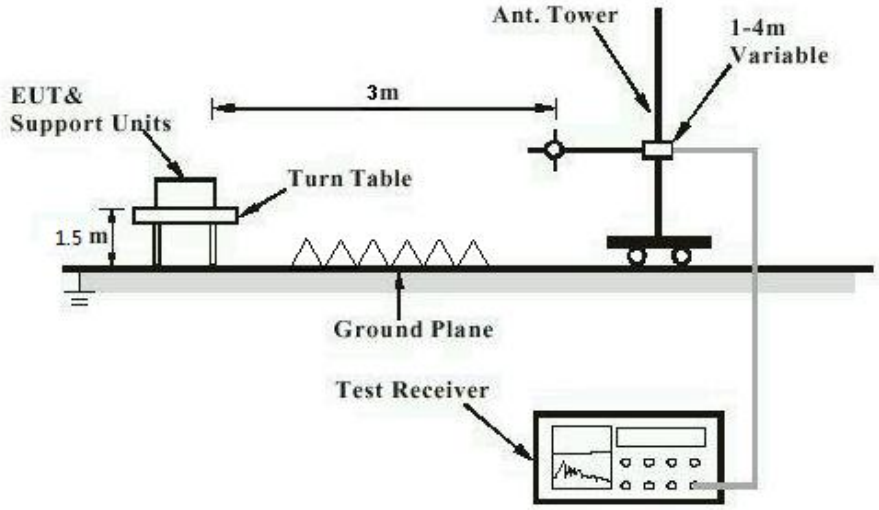


Diagram of Measurement Configuration for Mains Conduction Measurement

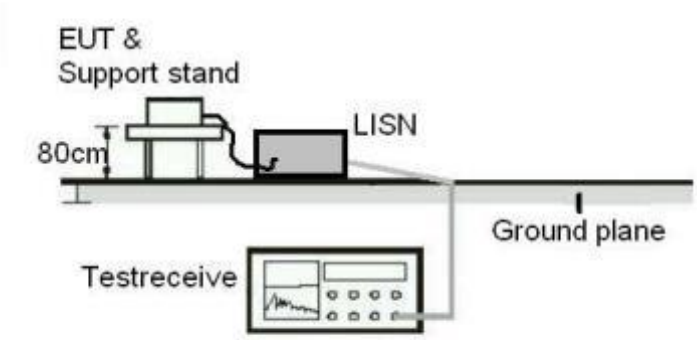
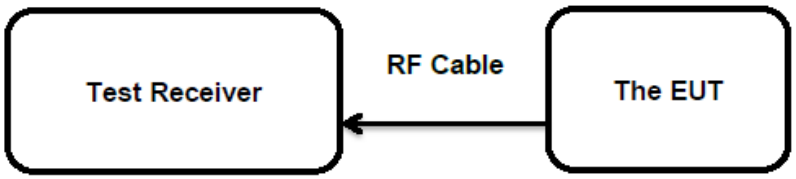


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 0 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(b)(3) RSS-247 Clause 5.4(4)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 1.0 Watts
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	06.07.2017
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

For details refer to following test result.

Table 5: Test Result of Maximum Peak Conducted Output Power

Test Mode	Data Rate	Frequency (MHz)	Measured Power		Limit (W)
			dBm	W	
802.11b	1 Mbps	2412	18.53	0.07129	< 1.0
		2437	19.17	0.08260	
		2462	19.95	0.09886	
802.11g	6 Mbps	2412	19.30	0.08511	
		2437	20.19	0.10447	
		2462	20.91	0.12331	
802.11n (HT20)	MCS0	2412	19.60	0.09120	
		2437	20.20	0.10471	
		2462	20.98	0.12531	
802.11n (HT40)	MCS0	2422	19.13	0.08185	
		2437	19.55	0.09016	
		2452	20.00	0.10000	
Maximum Measured Value			20.98	0.12531	

Note: The cable loss is taken into account in results.

5.1.3 Conducted Power Spectral Density

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(e) RSS-247 Clause 5.2(2)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 8 dBm / 3kHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	06.07.2017
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

For details refer to following test result.

Table 6: Test Result of Power Spectral Density

Test Mode	Data Rate	Frequency (MHz)	Measured Peak Power Spectral Density (dBm/3KHz)	Limit (dBm)
802.11b	1 Mbps	2412	-14.00	8 dBm / 3kHz
		2437	-13.34	
		2462	-12.60	
802.11g	6 Mbps	2412	-17.04	
		2437	-15.84	
		2462	-15.51	
802.11n (HT20)	MCS0	2412	-16.43	
		2437	-15.45	
		2462	-15.09	
802.11n (HT40)	MCS0	2422	-16.96	
		2437	-18.36	
		2452	-17.59	
Maximum Measured Value			-12.60	

Note: The cable loss is taken into account in results.

For the measurement records, refer to the appendix B.

5.1.4 6dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(2) RSS-247 Clause 5.2(1)
Basic standard	:	ANSI C63.10: 2013
Limits	:	> 500 KHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	06.07.2017
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

For details refer to following test result.

Table 7: Test Result of 6dB Bandwidth

Test Mode	Data Rate	Frequency (MHz)	-6dB Bandwidth (MHz)	Limit (kHz)
802.11b	1 Mbps	2412	10.10	> 500
		2437	10.10	
		2462	10.10	
802.11g	6 Mbps	2412	16.60	
		2437	16.60	
		2462	16.60	
802.11n (HT20)	MCS0	2412	17.80	
		2437	17.80	
		2462	17.80	
802.11n (HT40)	MCS0	2422	36.44	
		2437	36.43	
		2452	36.42	
Minimum Measured Value			10.10	

Note: The cable loss is taken into account in results.

For the measurement records, refer to the appendix B.

5.1.5 99% Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	RSS-Gen Clause 6.6
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	06.07.2017
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

For details refer to following test result.

Table 8: Test Result of 99% Bandwidth

Test Mode	Data Rate	Frequency (MHz)	99% Bandwidth (MHz)	Limit (kHz)
802.11b	1 Mbps	2412	15.03	/
		2437	15.01	
		2462	15.01	
802.11g	6 Mbps	2412	16.81	
		2437	16.81	
		2462	16.81	
802.11n (HT20)	MCS0	2412	17.85	
		2437	17.85	
		2462	17.84	
802.11n (HT40)	MCS0	2422	35.92	
		2437	35.91	
		2452	35.89	
Maximum Measured Value			35.92	

For the measurement records, refer to the appendix B.

5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	:	ANSI C63.10: 2013
Limits	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	06.07.2017
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix B.

5.1.7 Radiated Spurious Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to 15.209(a) of FCC part 15.247(d) RSS-Gen Issue 4 Table 4
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	10.07.2017
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	22 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

Remark:
Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix C.

5.1.8 Conducted Emission on AC Mains

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.207(a)
		RSS-Gen Clause 8.8
Basic standard	:	ANSI C63.10: 2013
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.207(a)
		RSS-Gen Table 3
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	09.07.2017
Input voltage	:	AC 120V, 60Hz
Operation mode	:	B
Earthing	:	Not connected
Ambient temperature	:	22 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix C.

6 Safety Human Exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT: **Pass**

Test Specification

Test standard : CFR47 FCC Part 2: Section 2.1091
CFR47 FCC Part 1: Section 1.1310
FCC KDB Publication 447498 v06
FCC KDB Publication 865664 D02 v01r02
OET Bulletin 65 (Edition 97-01)
RSS-102 Issue 5 March 2015

➢ **FCC requirements**

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to OET Bulletin 65

Power Density: $S_{(mW/cm^2)}= PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm^2)

P = power input to the antenna (mW)

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

R = distance to the center of radiation of the antenna (cm)

The nominal maximum conducted output power specified:

802.11b/g/n: 21.00 dBm

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (Max. 0.0 dBi for 802.11b/g/n), the RF power density can be calculated as below:

For 802.11b/g/n: $\mathbf{S_{(mW/cm^2)}= PG/4\pi R^2 =}$ 0.025 mW/cm^2

Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310:

1.0 mW/cm^2

➢ **IC requirements:** The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

- RF exposure evaluation exempted power for 802.11b/g/n: 2.684 W

The nominal maximum conducted output power specified:

802.11b/g/n: 21.00 dBm

Antenna Gain: 0.0 dBi for 802.11b/g/n

The Max. e.i.r.p. for 802.11b/g/n: 21.00 dBm = 0.126 W

Both e.i.r.p. for 802.11b/g/n are less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

"RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons."

7 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

8 List of Tables