
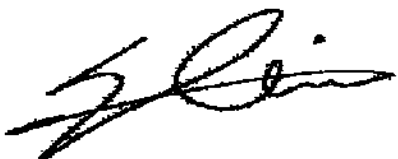


RF TEST REPORT

Test Report No. : TK-FR11022 / TK-IR11023
Standards : Part 15 Subpart C 15.247 / IC RSS-210 Issue 8
FCC ID : U7XMC-7100S
IC Certification : 7670A-MC7100S
Description of Product : M3 SKY
Applicant : M3 Mobile Co., Ltd.
Manufacturer : M3 mobile Co., Ltd.
Model Name : MC-7100S
Date of test(s) : 2011.04.27 ~ 2011.04.28
Date of issue : 2011.05.02

The test results relate only to the items tested.

Test and Report Completed by :	Report Approval by :
	
Jeff Do Test Engineer	Gyu-cheol Shin Technical Manager

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Revision history

Revision	Date of issue	Test report No.	Description
-	2011.05.01	TK-FR11022 / TK-IR11023	Initial

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1.0 General product description

Equipment model name : MC-7100S
WLAN Module FCC ID : TWG-SDMCF10G
WLAN Module IC Certification : 6616A-SDMCF10G
Serial number : Prototype
EUT condition : Pre-production, not damaged
Antenna type : PCB antenna
Frequency Range : 2412 ~ 2462 MHz(11b/g)
Number of channels : 11(11b/g)
Type of Modulation : DSSS, OFDM
Power Source : DC 3.7 V

1.1 Test frequency

	Low channel	Middle channel	High channel
Frequency (MHz)	2412	2437	2462

1.2 Test mode

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

1.3 Model differences

Not applicable

1.4 Device modifications

The following modifications were necessary for compliance: Not applicable manufacturer

1.5 Peripheral devices




Device	Manufacturer	Model No.	Serial No.
N/A			

1.6 Test facility

The measurement facility is located at 477-6, Hageo-ri, Yeosu-eup, Yeosu-gun, Gyeonggi-do, 469-803, Korea. Tel: +82-31-883-5092/Fax: +82-31-883-5169.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.7 Laboratory accreditations and listings

Country	Agency	Scope of accreditation	Logo
USA	FCC	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	 343818
KOREA	KCC	EMI (10 meter Open Area Test Site and two conducted sites) Radio (3 & 10 meter Open Area Test Sites and one conducted site)	 KR0100
Canada	IC	3 & 10 meter Open Area Test Sites and one conducted site	 4769B-1

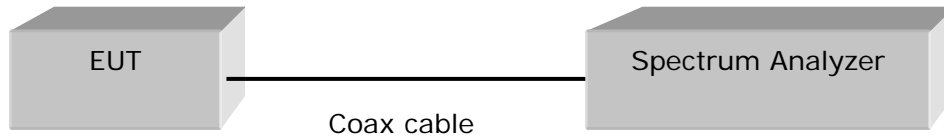
2.0 Summary of tests

FCC section(s)	RSS section(s)	Parameter	Status
15.205 15.249 15.247(d)	RSS-210 A8.5	Radiated spurious emission & band edge	C
15.247(b)	RSS-201 A8.4	Transmitter output power	C
N/A	RSS-Gen 6	Receiver radiated spurious emission	C
Note 1: C=Complies NC=Not complies NT=Not tested NA=Not applicable			
Note 2: The data in this test report are traceable to the national or international standards.			
Note 3: The sample was tested according to the following specification: FCC Part 15.249, ANSI C63.4-2003			

2.1 Technical characteristic test

2.1.1 Transmitter output power

Test setup



Test procedure

Use the following spectrum analyzer setting

Center frequency: Lowest, middle and highest channels

Span = 20 MHz (Approximately 5 times the 20 dB bandwidth, centered on a hopping channel)

RBW = 1 MHz (the 20 dB bandwidth of the emission being measured)

VBW = 3 MHz (\geq RBW)

Channel BW= 99 %

Limit

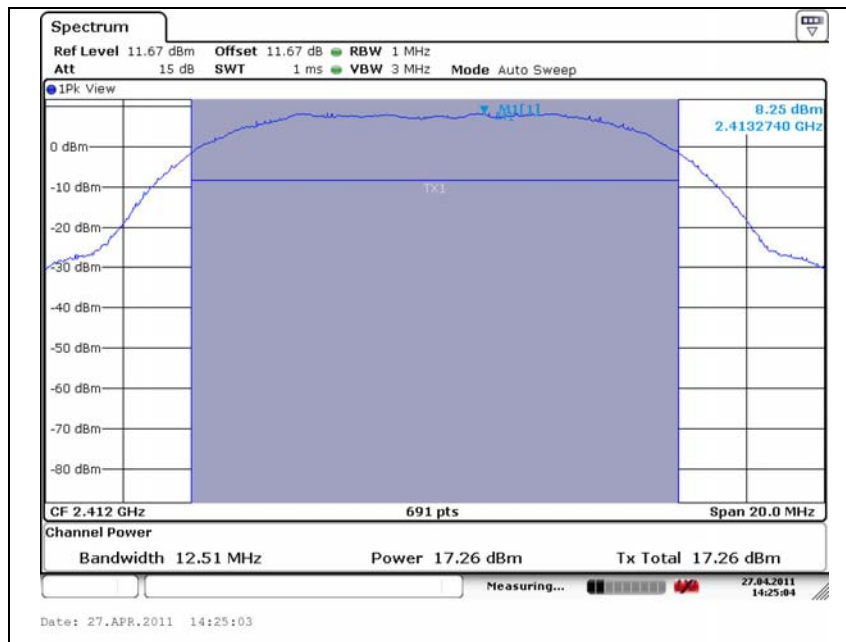
The transmitter output power of the intentional radiator shall not exceed the following:

According to 15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.

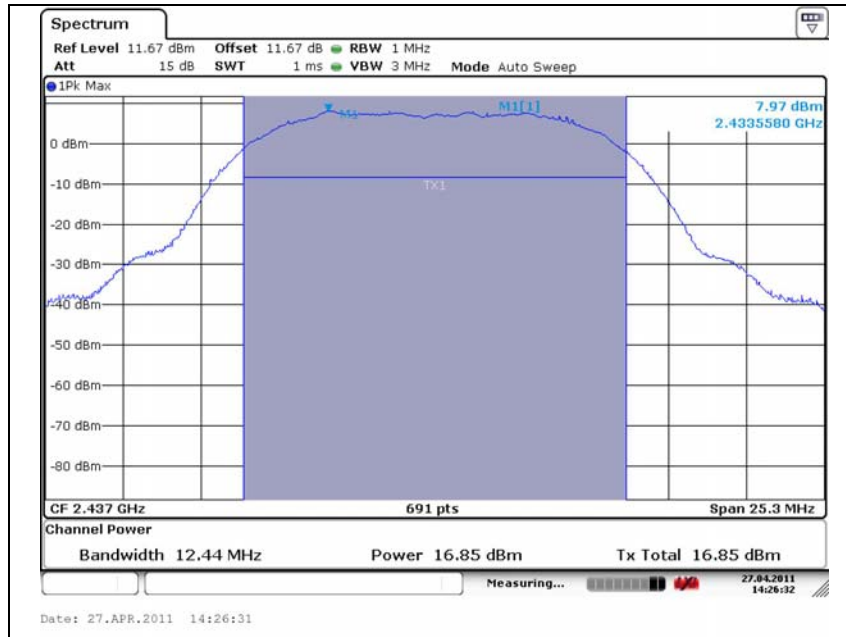
Test results

Operation mode	Frequency(MHz)	Output power (dBm)	Limit (dBm)
11b	2412	17.26	30
	2437	16.85	30
	2462	16.17	30
11g	2412	18.14	30
	2437	17.51	30
	2462	16.53	30

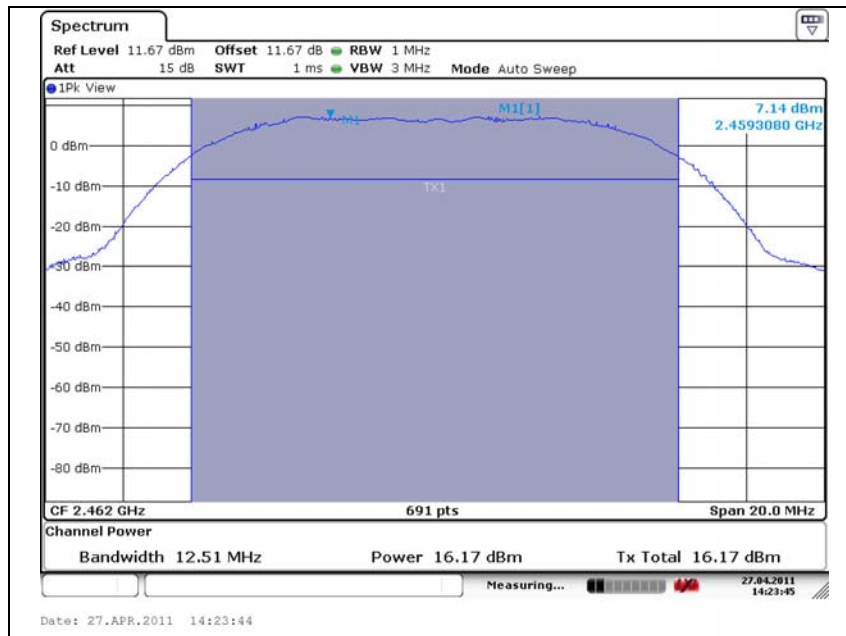
A. 11b: Low channel



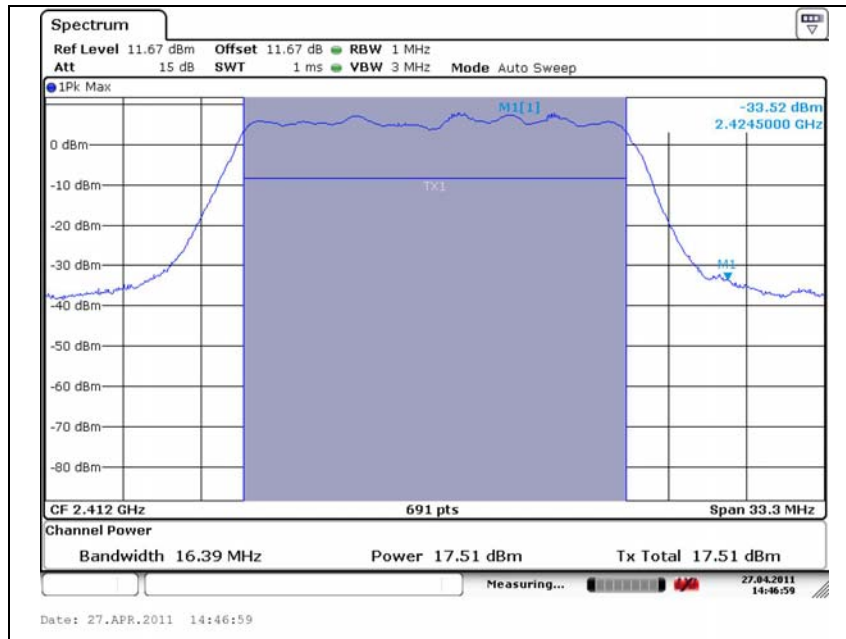
B. 11b: Middle channel



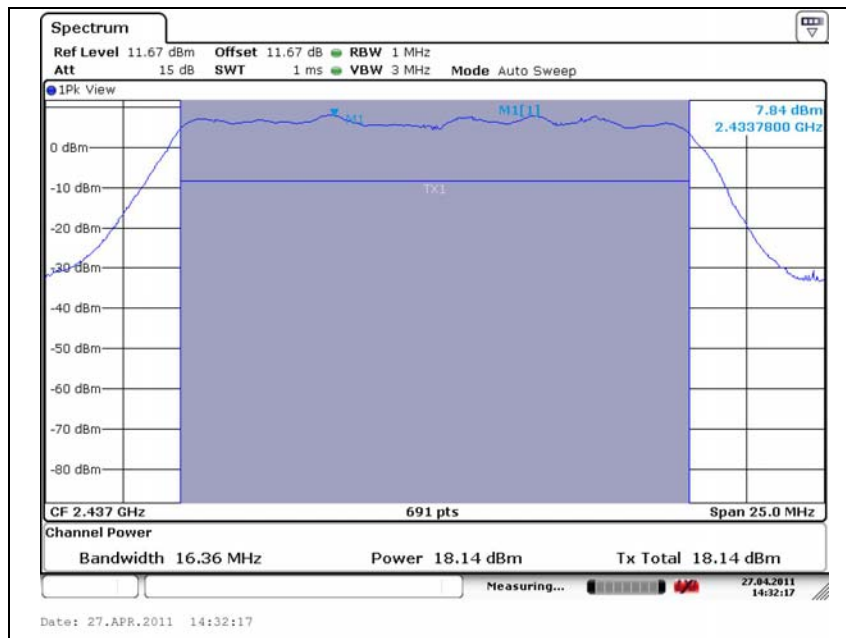
C. 11b: High channel



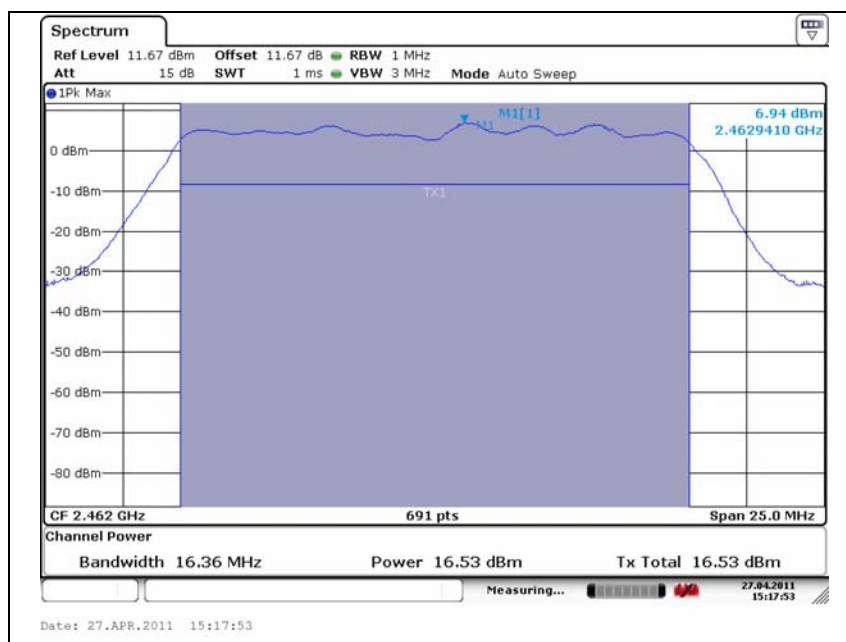
D. 11g: Low channel



E. 11g: Middle channel



F. 11g: Middle channel



2.1.2 Fundamental, spurious emission and band edge radiated emission

Test location

Testing was performed at a test distance of 3 meter Open Area Test Site

Test procedures

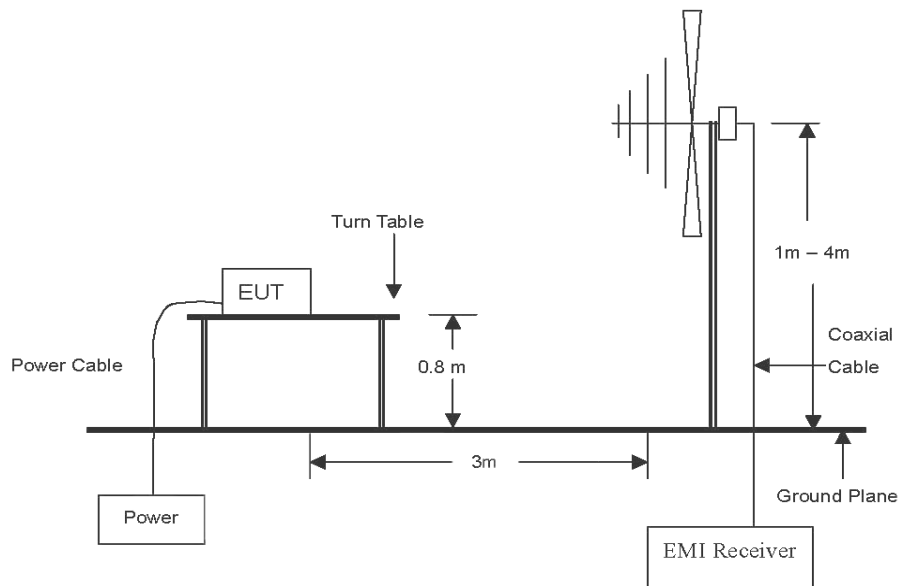
The height of the measuring antenna was varied between 1 to 4 m and the table was rotated a full revolution in order to obtain maximum values of the electric field intensity.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

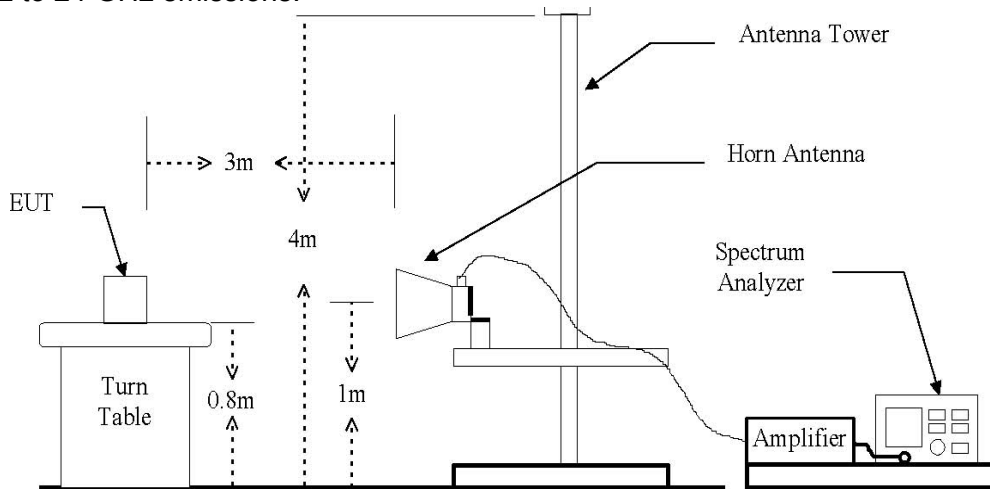
The spectrum analyzer is set to:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer 120 kHz for Peak detection (PK) or Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 24 GHz emissions.



Limit

1. According to 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

Frequency (MHz)	Radiated (uV/m)	Distance (m)
30 ~ 88	100*	3
88 ~ 216	150*	3
216 ~ 960	200*	3
Above 960	500	3

Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the emission table above, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30 ~ 88	100	40
88 ~ 216	150	43.5
216 ~ 960	200	46
Above 960	500	54

Test results (Below 1000 MHz) – Worst case configuration: 11g mode)

The frequency spectrum from 30 MHz to 1000 MHz was investigated. Emission levels are not reported much lower than the limits by over 20 dB.

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBuV/m)	Limit (dBuV/ m)	Margin (dB)
331.50	46.23	H	13.53	-30.31	29.45	46.00	16.55
380.71	45.33	V	14.42	-30.49	29.26	46.00	16.74
684.48	41.53	V	19.49	-30.01	31.01	46.00	14.99
726.50	45.94	V	19.99	-29.79	36.14	46.00	9.86

※ Remark

1. All spurious emission at channels are almost the same below 1 GHz, so that low channel was chosen at representative in final test.
2. Actual = Reading + Ant. factor + Amp + CL (Cable loss)
3. Detector mode: Quasi peak
4. To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes.

Test results (Above 1000 MHz)

A. 11b: Low channel (2412 MHz)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBuV/m)	Limit (dBuV/ m)	Margin (dB)
2390.0	46.12	P	H	28.31	-27.94	46.49	74.00	27.51
2390.0	46.84	P	V	28.31	-27.94	47.21	74.00	26.79
4824.0	32.51	P	H	33.97	-22.23	44.25	74.00	29.75
4824.0	32.16	P	V	33.97	-22.23	43.90	74.00	30.10

B. 11b: Middle channel (2437 MHz)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBuV/m)	Limit (dBuV/ m)	Margin (dB)
4874.0	31.08	P	H	34.14	-22.07	43.15	74.00	30.85
4874.0	32.75	P	V	34.14	-22.07	44.82	74.00	29.18

C. 11b: High channel (2462 MHz)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL(dB)	Actual (dBuV/m)	Limit (dBuV/ m)	Margin (dB)
2483.5	46.62	P	H	28.50	-27.85	47.27	74.00	26.73
2483.5	45.43	P	V	28.50	-27.85	46.08	74.00	27.92
4934.0	32.71	P	H	34.33	-21.88	45.16	74.00	28.84
4934.0	32.19	P	V	34.33	-21.88	44.64	74.00	29.36

D. 11g: Low channel (2412 MHz)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBuV/m)	Limit (dBuV/ m)	Margin (dB)
2390.0	45.43	P	H	28.31	-27.94	45.80	74.00	28.20
2390.0	46.78	P	V	28.31	-27.94	47.15	74.00	26.85
4824.0	32.86	P	H	33.97	-22.23	44.60	74.00	29.40
4824.0	32.69	P	V	33.97	-22.23	44.43	74.00	29.57

E. 11g: Middle channel (2437 MHz)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBuV/m)	Limit (dBuV/ m)	Margin (dB)
4874.0	31.72	P	H	34.14	-22.07	43.79	74.00	30.21
4874.0	31.29	P	V	34.14	-22.07	43.36	74.00	30.64

F. 11g: High channel (2462 MHz)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBuV/m)	Limit (dBuV/ m)	Margin (dB)
2483.5	46.27	P	H	28.50	-27.85	46.92	74.00	27.08
2483.5	46.14	P	V	28.50	-27.85	46.79	74.00	27.21
4934.0	32.37	P	H	34.33	-21.88	44.82	74.00	29.18
4934.0	32.50	P	V	34.33	-21.88	44.95	74.00	29.05

※ Remark

1. "*" means the restricted band.
2. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using peak/average detector mode.
4. Average test would be performed if the peak result were greater than the average limit.
5. Actual = Reading + Ant. factor + Amp + CL (Cable loss)
6. To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes.

2.1.3 Receiver radiated spurious emissions

Test location

Same as section 2.1.2

Test procedures

Same as section 2.1.2

Limit

According to RSS-Gen 6, the following receiver spurious emission limits shall be complied with:
Table 2 – Radiated limits of receiver spurious emission

Frequency (MHz)	Field Strength (microvolts/m at 3-meter)*
30 ~ 88	100
88 ~ 216	150
216 ~ 960	200
Above 960	500

*Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 7.2.7.

Test results (Below 1000 MHz) – Worst case configuration: 11g mode)

The frequency spectrum from 30 MHz to 1000 MHz was investigated. Emission levels are not reported much lower than the limits by over 20 dB.

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBuV/m)	Limit (dBuV/ m)	Margin (dB)
338.41	47.31	H	13.64	-30.34	30.61	46.00	15.39
422.94	46.87	V	15.33	-30.59	31.61	46.00	14.39
466.84	42.36	H	16.12	-30.63	27.85	46.00	18.15
674.85	44.84	H	19.40	-30.04	34.20	46.00	11.80
730.56	43.91	H	20.04	-29.77	34.18	46.00	11.82

※ Remark

1. All spurious emission at channels are almost the same below 1 GHz, so that low channel was chosen at representative in final test.
2. Actual = Reading + Ant. factor + Amp + CL (Cable loss)
3. Detector mode: Quasi peak
4. To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes.

Appendix A – Test equipment used for test

Equipment	Manufacturer	Model	Calibration due.
Spectrum Analyzer	R&S	FSV30	2012.01.07
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	2013.03.18
Horn Antenna	A.H. System	SAS-571	2013.03.22
High Pass Filter	Wainwright Instrument	WHJS3000-10TT	2012.01.07
Preamplifier	HP	8447F	2011.05.06
Preamplifier	HP	8449B	2011.07.27

Test setup photo and configuration

Radiated field emissions

