EUROFINS ELECTRICAL TESTING SERVICE (SHENZHEN) CO., LTD.

RADIO TEST - REPORT

FCC & ISED Compliance Test Report for

Product name: Smart Module

Model name: SNM909

FCC ID: 2APJ4-SNM909
IC: 23860-SNM909

Test Report Number: EFGX24110058-IE-01-E04

Eurofins Electrical Testing Service (Shenzhen) Co., Ltd.
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Content

1 General Information

1.1 Notes

The results of this test report relate exclusively to the item tested as specified in chapter “Description of test item” and are not transferable to any other test items.

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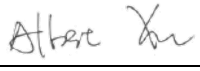
Operator:

2024-11-07		Bruce Zheng / Project Engineer	
Date	Eurofins-Lab.	Name / Title	Signature

Technical responsibility for area of testing:

2024-11-07		Albert Xu / Lab Manager	
Date	Eurofins-Lab.	Name / Title	Signature

1.2 Testing laboratory

Eurofins Electrical Testing Service (Shenzhen) Co., Ltd.
1st Floor, Building 2, Chungu, Meisheng Huigu Science and Technology Park, No. 83 Dabao Road, Bao'an District, Shenzhen. P.R.China.
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The Laboratory has passed the Accreditation by the American Association for Laboratory Accrediation (A2LA). The Accreditation number is 5376.01. The FCC Designation Number is CN1265.
The Laboratory has been listed by industry Canada to perform electromagnetic emission measurements, The CAB identifier is CN0088

1.3 Details of applicant

Name	:	MeiG Smart Technology Co., Ltd
Address	:	2nd Floor,Office Building,No.5 Lingxia Road,Fenghuang, Fuyong Street,Bao'an District,Shenzhen City.
Telephone	:	./.
Fax	:	./.

1.4 Details of manufacturer

Name	:	MeiG Smart Technology Co., Ltd
Address	:	2nd Floor,Office Building,No.5 Lingxia Road,Fenghuang, Fuyong Street,Bao'an District,Shenzhen City.
Telephone	:	./.
Fax	:	./.

1.5 Application details

Date of receipt of application	:	2024-11-04
Date of receipt of test item	:	2024-11-04
Date of test	:	2024-11-04 to 2024-11-07
Date of issue	:	2024-11-07

1.6 Test item

Product type	:	Smart Module
Model name	:	SNM909
Brand	:	240604-25-005
Sample ID	:	MEIGLink
Serial number	:	./.
Ratings	:	DC 4V
Test voltage	:	DC 4V
Hardware Version	:	V1.00
Software / Firmware Version	:	T16
PMN	:	Smart Module
HVIN	:	SNM909
RadioTechnical data		
Radio Tech.	:	WLAN (IEEE 802.11 a,n,ac)
Frequency Range	:	5 180 ㎒ ~ 5 240 ㎒ (U-NII-1 Band) 5 260 ㎒ ~ 5 320 ㎒ (U-NII-2A Band) 5 500 ㎒ ~ 5 720 ㎒ (U-NII-2C Band) 5 745 ㎒ ~ 5 825 ㎒ (U-NII-3 Band)
Modulation	:	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Spacing	:	802.11a/n(HT20)/ac(VHT20): 20 ㎒ 802.11n(HT40)/ac(VHT40): 40 ㎒ 802.11ac(VHT80): 80 ㎒
Antenna type	:	External antenna
Antenna gain	:	2.07 ㏈i
Additional information	:	./.

The above sample(s) and sample information was/were submitted and identified on behalf of the applicant.
Eurofins assures objectivity and impartiality of the test, and fulfills the obligation of confidentiality for applicant's commercial information and technical documents.

1.7 Test standards

Test Standards	
FCC Part 15 Subpart E	Subpart E—Unlicensed National Information Infrastructure Devices
RSS-247	RSS-247 — Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN	RSS-Gen — General Requirements for Compliance of Radio Apparatus

Test Method
1: ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
2: ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices.
3: KDB789033 D02 General UNII Test Procedures New Rules v02r01

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified were ascertained in the course of the tests performed. ☐

2.2 Test environment

Ac line conducted

Enviroment Parameter	Temperature	Relative Humidity
101.2kPa	23.7 ℃	61.3%

RF conducted

Enviroment Parameter	Temperature	Relative Humidity
101.2kPa	24.7 ℃	43.1%

Radiated

Enviroment Parameter	Temperature	Relative Humidity
101.2kPa	24.3 ℃	51.6%

2.3 Measurement uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty in conducted measurements	1.96dB
Uncertainty for Conducted RF test	RF Power Conducted: 1.16dB Frequency test involved: 1.05×10-7 or 1%
Uncertainty for Radiated Spurious Emission 25㎒-3000㎒	Horizontal: 4.46dB; Vertical: 4.54dB;
Uncertainty for Radiated Spurious Emission 3000㎒-18000㎒	Horizontal: 4.42dB; Vertical: 4.41dB;
Uncertainty for Radiated Spurious Emission 18000㎒-40000㎒	Horizontal: 4.63dB; Vertical: 4.62dB;

2.4 Test mode

Frequency band (MHz)		5150~5250	
802.11a / n HT20 / ac VHT20		802.11n HT40 / ac VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
36	5180	38	5190
40	5200	46	5230
44	5220	802.11ac VHT80	
48	5240	42	5210

Frequency band (MHz)		5250~5350	
802.11a / n HT20 / ac VHT20		802.11n HT40 / ac VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
52	5260	54	5270
56	5280	62	5310
60	5300	802.11ac VHT80	
64	5320	58	5290
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Frequency band (MHz)		5470~5725	
802.11a / n HT20 / ac VHT20		802.11n HT40 / ac VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
100	5500	102	5510
104	5520	110	5550
108	5540	118	5590
112	5560	126	5630
116	5580	134	5670
120	5600	142	5710
124	5620	802.11ac VHT80	
128	5640	106	5530
132	5660	122	5610
136	5680	138	5690
140	5700	--	--
144	5720	--	--

Frequency band (MHz)		5725~5850	
802.11a / n HT20 / ac VHT20		802.11n HT40 / ac VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
149	5745	151	5755
153	5765	159	5795
157	5785	802.11ac VHT80	
161	5805	155	5775
165	5825	--	--

The EUT was set at continuously transmitting mode during the test.

2.5 Test equipment utilized

EQUIPMENT ID	EQUIPMENT NAME	MODEL NO.	CAL. DUE DATE
23-2-13-05	EMI Test Receiver	ESR3	2025-03-25
23-2-13-06	LISN	NNLK 8127 RC	2025-03-25
23-2-10-16	Attenuator	VTSD 9561-F	2025-03-25
23-2-10-63	Temperature & Humidity Meter	COS-03	2025-03-25
23-2-10-65	Barometer	Baro	2025-03-25
23-2-13-12	Signal Analyzer	N9010B-544	2025-03-25
23-2-13-13	BT/WLAN Tester	CMW270	2025-03-25
23-2-13-14	Signal Generator	N5183B-520	2025-03-25
23-2-13-15	Vector Signal Generator	N5182B-506	2025-03-25
23-2-10-43	Switch and Control Unit	ERIT-E-JS0806-2	2025-03-25
23-2-10-44	DC power supply	E3642A	2025-03-25
23-2-10-45	Temperature test chamber	SG-80-CC-2	2025-03-25
23-2-10-50	Temperature & Humidity Meter	COS-03	2025-03-25
23-2-10-66	Barometer	Baro	2025-03-25
23-2-13-01	EMI Test Receiver	ESR7	2025-03-25
23-2-13-02	Signal Analyzer	N9020B-544	2025-03-25
23-2-12-01	Active Loop Antenna	FMZB 1519B	2025-06-02
23-2-12-02	TRILOG Broadband Antenna	VULB9168	2025-06-02
23-2-12-03	Horn Antenna	3117	2025-06-02
23-2-12-04	Horn Antenna	BBHA 9170	2025-06-02
23-2-10-01	Preamplifier	BBV9745	2025-03-25
23-2-10-02	Preamplifier	TAP01018048	2025-03-25
23-2-10-03	Preamplifier	TAP18040048	2025-03-25
23-2-10-62	Temperature & Humidity Meter	COS-03	2025-03-25
23-2-10-64	Barometer	Baro	2025-03-25
23-2-10-14	Switch and Control Unit	ERIT-E-JS0806-SF1	N/A
23-2-13-03	EMI Test Receiver	ESR7	2025-03-25
23-2-13-04	Signal Analyzer	N9020B-526	2025-03-25
23-2-10-61	Temperature & Humidity Meter	COS-03	2025-03-25
23-2-10-52	Barometer	Baro	2025-03-25
23-2-10-15	Switch and Control Unit	ERIT-E-JS0806-SF1	N/A

2.6 Auxiliary equipment used during test

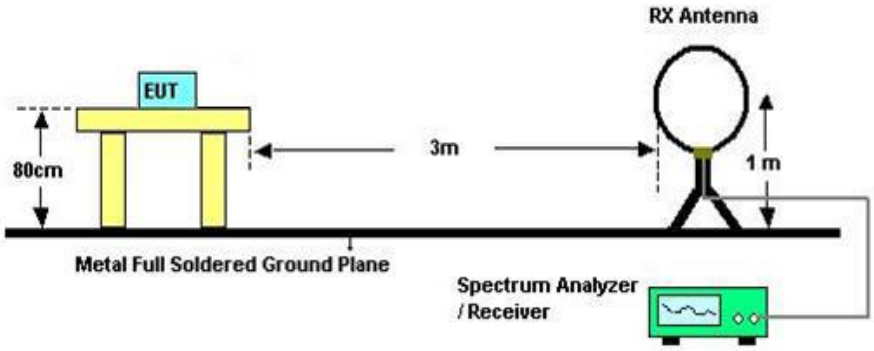
DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Laptop	LENOVO	TP00096A	PF-1QH0LV

2.7 Test software information

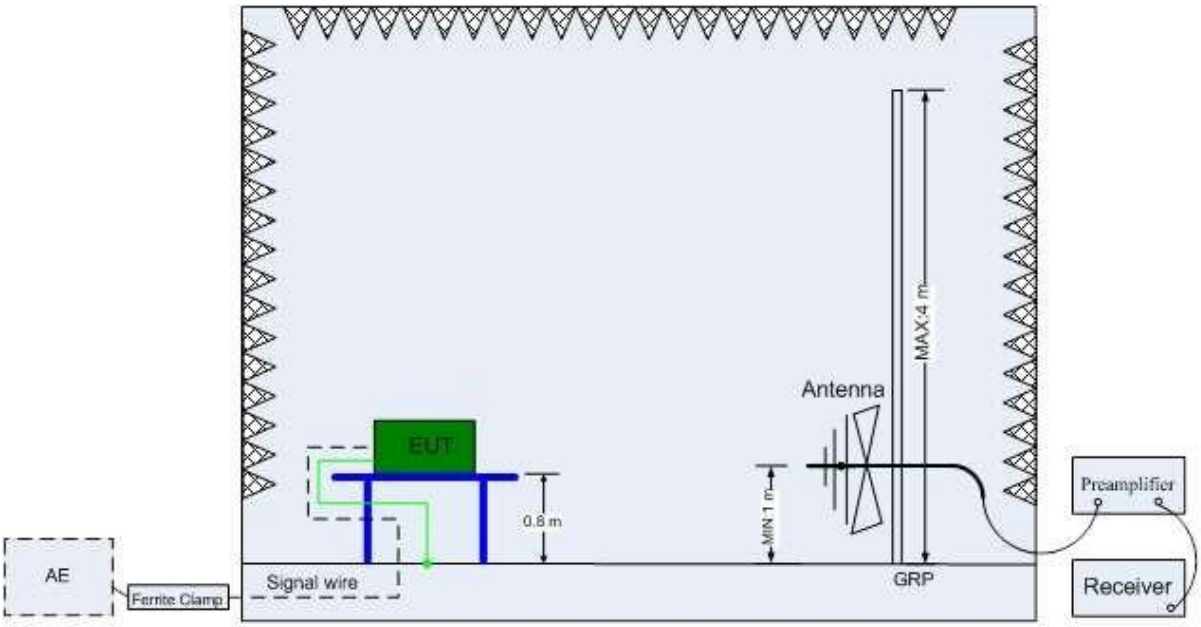
Test Software&Version	CMD	
Mode	Power setting	Rate
802.11a	12	6Mbit
802.11n HT20	12	MCS0
802.11n HT40	12	MCS0
802.11ac HT20	12	MCS0
802.11ac HT40	12	MCS0
802.11ac HT80	11	MCS0

2.8 Test setup

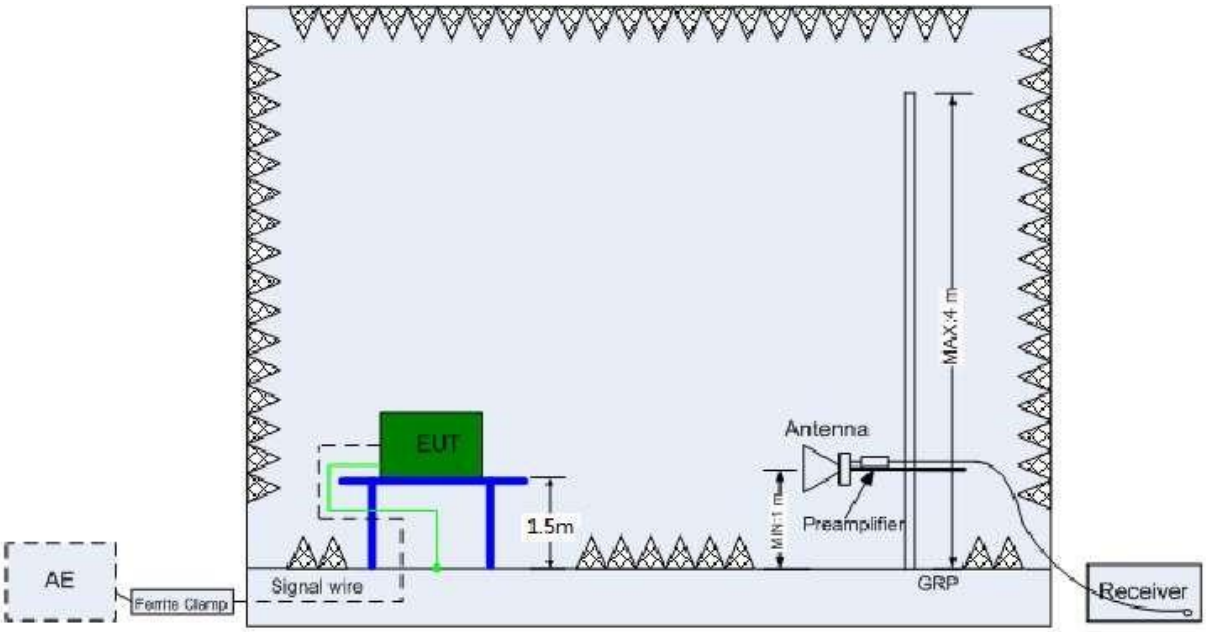
Radiated tests below 30 ㎒



Radiated tests below 1GHz



Radiated tests above 1GHz



2.9 Test results

☒ 1st test ☐ test after modification ☐ production test

Technical Requirements					
FCC Part 15 Subpart E/ RSS-247/ RSS-Gen					
Test Condition			Test Result	Ver-dict	Test Site
§15.205(a) §15.209(a) §15.407(b)(1) §15.407(b)(4)	RSS-Gen Issue 5 8.9 RSS-Gen Issue 5 8.10 RSS-247 Issue 2 6.2.1.2 RSS-247 Issue 2 6.2.4.2	Unwant Emissions	Appendix A	Pass	Site 1

3 Technical Requirement

3.1 Transmitter radiated spurious emissionsr

Test Method:
The test method was refered to the subclause G of KDB 789033 D02 General UNII Test Procedures New Rules v02r01 and ANSI C63.10-2013.

Test Procedures for emission below 30 MHz

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.

1. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
2. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
3. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum Hold Mode.

Test Procedures for emission from above 30 MHz

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site below 1 GHz and 1.5 meter above the ground at a 3 meter anechoic chamber test site above 1 GHz. The table was rotated 360 degrees to determine the position of the highest radiation.

1. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
2. The antenna is a bi-log antenna, a horn antenna and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note
All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

- II.G.4. Unwanted emissions measurements below 1 GHz
Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

- II.G.5. Unwanted maximum emissions measurements above 1GHz
Peak emission levels are measured by setting the analyzer as follows: Set to RBW = 1 MHz, VBW ≥ 3 MHz, Detector = Peak, Sweep time = auto, Trace mode= Max hold.

- II.G.6. Average unwanted emissions measurements above 1 GHz

Set to RBW = 1 MHz, VBW ≥ 3 MHz, Detector = power averaging (rms), Averaging type = power averaging (rms), Sweep time = auto, Perform a trace average of at least 100 traces If the transmission is continuous, If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50 % duty cycle, at least 200 traces shall be averaged.

If tests are performed with the EUT transmitting at a duty cycle less than 98 %, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle. The correction factor is computed as follows:

- If power averaging (rms) mode was used in II.G.6.c)(iv), the correction factor is 10 log (1 / x), where x is the duty cycle. For example, if the transmit duty cycle was 50 %, then 3 dBmust be added to the measured emission levels.

Limit:

FCC § 15.407(b)
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of －27 dB m/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dB m/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 m/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band:
(i) All emissions shall be limited to a level of -27 dB m/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dB m/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dB m/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dB m/MHz at the band edge.

RSS-247 Issue 3
6.2.1.2 Frequency band 5 150-5 250 MHz
For transmitters with operating frequencies in the band 5 150-5 250 MHz, all emissions outside the band 5 150-5 350 MHz shall not exceed -27 dB m/MHz e.i.r.p. Any unwanted emissions that fall into the band 5 250-5 350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5 % of the occupied bandwidth (i.e. 99% bandwidth), above 5 250 MHz. The 26 dB bandwidth may fall into the 5 250-5 350 MHz band; however, if the occupied bandwidth also falls within the 5 250- 5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5 250-5 350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5 250-5 350 MHz band.

6.2.1.2 Frequency band 5 250-5 350 MHz
Devices shall comply with the following:
All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or
All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device, except devices installed in vehicles, shall be labelled or include in the user manual the following text “for indoor use only.”

6.2.1.2 Frequency bands 5470-5600 MHz and 5650-5725 MHz

Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p.at 5850 MHz instead of 5725 MHz.

6.2.4.2 Frequency band 5 725-5 850 MHz

Devices operating in the band 5 725-5 850 MHz with antenna gain greater than 10 dB i can have unwanted emissions that comply with either the limits in this section or in section 5.5 until six (6) months after the publication date of this standard for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2018.

Devices operating in the band 5 725-5 850 MHz with antenna gain of 10 dB i or less can have unwanted emissions that comply with either the limits in this section or in section 5.5 until April 1, 2018 for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2020.

Devices operating in the band 5 725-5 850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

a) 27 dB m/MHz at frequencies from the band edges decreasing linearly to 15.6 dB m/MHz at 5 MHz above or below the band edges;

b) 15.6 dB m/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dB m/MHz at 25 MHz above or below the band edges;

c) 10 dB m/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dB m/MHz at 75 MHz above or below the band edges; and

d) -27 dB m/MHz at frequencies more than 75 MHz above or below the band edges.

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)):

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

FCC §15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75

4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	
13.36-13.41			

RSS-GEN 8.10

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	1660 - 1710	9.0 - 9.2
0.495 - 0.505	16.69475 - 16.69525	1718.8 - 1722.2	9.3 - 9.5
2.1735 - 2.1905	25.5 - 25.67	2200 - 2300	10.6 - 12.7
3.020 - 3.026	37.5 - 38.25	2310 - 2390	13.25 - 13.4
4.125 - 4.128	73 - 74.6	2483.5 - 2500	14.47 - 14.5
4.17725 - 4.17775	74.8 - 75.2	2655 - 2900	15.35 - 16.2
4.20725 - 4.20775	108 – 138	3260 – 3267	17.7 - 21.4
5.677 - 5.683	149.9 - 150.05	3332 - 3339	22.01 - 23.12
6.215 - 6.218	156.52475 - 156.52525	3345.8 - 3358	23.6 - 24.0
6.26775 - 6.26825	156.7 - 156.9	3500 - 4400	31.2 - 31.8
6.31175 - 6.31225	162.0125 - 167.17	4500 - 5150	36.43 - 36.5
8.291 - 8.294	167.72 - 173.2	5350 - 5460	Above 38.6
8.362 - 8.366	240 – 285	7250 - 7750	
8.37625 - 8.38675	322 - 335.4	8025 – 8500	
8.41425 - 8.41475	399.9 - 410		
12.29 - 12.293	608 - 614		
12.51975 - 12.52025	960 - 1427		
12.57675 - 12.57725	1435 - 1626.5		
13.36 - 13.41	1645.5 - 1646.5		

4 Test Setup Photos

Ref “EFGX24110058-IE-01_Setup_Photos.pdf”

5 Appendix

Ref “EFGX24110058-IE-01-E04_appendix.pdf”

--End of report--