SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057
Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

TEST REPORT

Application No.:	SZEM1712013028CR (SHEM1210006834CR)
FCC ID	XXMMCIMX8M-EVK
Applicant:	NXP SEMICONDUCTORS(SHANGHAI) CO., LTD.
Address of Applicant:	No. 192 Liangjing Rd., Pudong New Area, Shanghai 201303, P.R. China
Manufacturer:	NXP Semiconductor
Address of Manufacturer:	No. 192 Liangjing Rd., Pudong New Area, Shanghai 201303, P.R. China
Factory:	Trivo (Taicang) Technologies Co., Ltd.
Address of Factory:	Building No. 9, YuSheng Industry Park, No. 33 North Changsheng Road, Taicang, Jiangsu, China
Equipment Under Test (EUT):	
EUT Name:	MCIMX8M-EVK
Model No.:	MCIMX8M-EVK
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2017-10-12
Date of Test:	2017-12-08
Date of Issue:	2018-01-24
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		*2018-01-24*		*Original*

Authorized for issue by:				
				
		Foray Chen /Project Engineer		
				
		Eric Fu /Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207 Class B	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

3 Contents

4 General Information

4.1 Details of E.U.T. (MCIMX8M-EVK)

Power supply:	AC Adapter
	Manufacturer: EDAC POWER ELECTRONICS CO.,LTD
	Model NO.: EA10682N-120
	Input: AC100-240V 2.0A, 50-60Hz
	Output: DC 12V 5A
Test voltage:	AC 120V/60Hz
Cable:	AC Cable: 180cm
	DC Cable: 120cm
	Type C to USB cable: 15cm
Channel Spacing	2MHz
Modulation Type	GFSK
Number of Channels	40
Operation Frequency	2402MHz to 2480MHz
Antenna Type	Ceramic Antenna

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Fixed Frequency Software	/	/	QRCT3
Laptop	Lenovo	ThinkPad X100e	
Micro USB Cable	/	/	

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25 x 10-8
2	Timeout	2s
3	Duty cycle	0.37%
4	Occupied Bandwidth	3%
5	RF conducted power	0.75dB
6	RF power density	2.84dB
7	Conducted Spurious emissions	0.75dB
8	RF Radiated power	4.5dB (Below 1GHz)
		4.8dB (Above 1GHz)
9	Radiated Spurious emission test	4.2dB (Below 30MHz)
		4.4dB (30MHz-1GHz)
		4.6dB (1GHz-18GHz)
		5.2dB (Above 18GHz)
10	Temperature test	1°C
11	Humidity test	3%
12	Supply voltages	1.5%
13	Time	3%

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Conducted Emission at AC Power Line					
EMI test receiver	R&S	ESR7	SHEM162-1	2016-12-29	2017-12-28
LISN	Schwarzbeck	NSLK8127	SHEM061-1	2016-12-29	2017-12-28
LISN	EMCO	3816/2	SHEM019-1	2016-12-29	2017-12-28
Pulse limiter	R&S	ESH3-Z2	SHEM029-1	2016-12-29	2017-12-28
CE test Cable	/	CE01	/	2016-12-29	2017-12-28
Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2016-12-29	2017-12-28
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2017-09-26	2018-09-25
Power meter	R&S	NRP	SHEM057-1	2016-12-29	2017-12-28
Power Sensor	R&S	NRP-Z22	SHEM136-1	2017-07-22	2018-07-21
Power Sensor	R&S	NRP-Z91	SHEM057-2	2016-12-29	2017-12-28
Signal Generator	R&S	SMR40	SHEM058-1	2017-07-03	2018-07-02
Signal Generator	Agilent	N5182A	SHEM182-1	2017-09-26	2018-09-25
Communication Tester	R&S	CMW270	SHEM183-1	2017-10-22	2018-10-21
Switcher	Tonscend	JS0806	SHEM184-1	2017-09-26	2018-09-25
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2017-09-26	2018-09-25
AC Power Stabilizer	WOCEN	6100	SHEM045-1	2016-12-29	2017-12-28
DC Power Supply	QJE	QJ30003SII	SHEM046-1	2016-12-29	2017-12-28
Conducted test Cable	/	RF01, RF 02	/	2016-12-29	2017-12-28
Radiated Test					
EMI test receiver	R&S	ESU40	SHEM051-1	2016-12-29	2017-12-28
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2016-12-29	2017-12-28
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2017-04-10	2020-04-09
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2017-02-28	2020-02-27
Antenna (25MHz-3GHz)	Schwarzbeck	HL562	SHEM010-1	2017-02-28	2020-02-27
Horn Antenna (1-8GHz)	Schwarzbeck	HF906	SHEM009-1	2017-10-24	2020-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2017-01-14	2020-01-13
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2017-02-13	2018-01-15
Pre-amplifier (9KHz-2GHz)	CLAVIIO	BDLNA-0001-412010	SHEM164-1	2017-08-22	2018-08-21
Pre-amplifier (1-18GHz)	CLAVIIO	BDLNA-0118-352810	SHEM050-2	2017-08-22	2018-08-21
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2017-02-13	2018-01-15
Band filter	LORCH	9BRX-875/X150-SR	SHEM156-1	/	/
Band filter	LORCH	13BRX-1950/X500-SR	SHEM083-2	/	/
Band filter	LORCH	5BRX-2400/X200-SR	SHEM155-1	/	/
Band filter	LORCH	5BRX-5500/X1000-SR	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G-100SS	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700-3SS	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2017-07-22	2020-07-21
RE test Cable	/	RE01, RE02, RE06	/	2016-12-29	2017-12-28

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(c)

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.1.2 Conclusion

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3dBi.

EUT complies with FCC part 15.203 & 15.247(c) requirement.

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

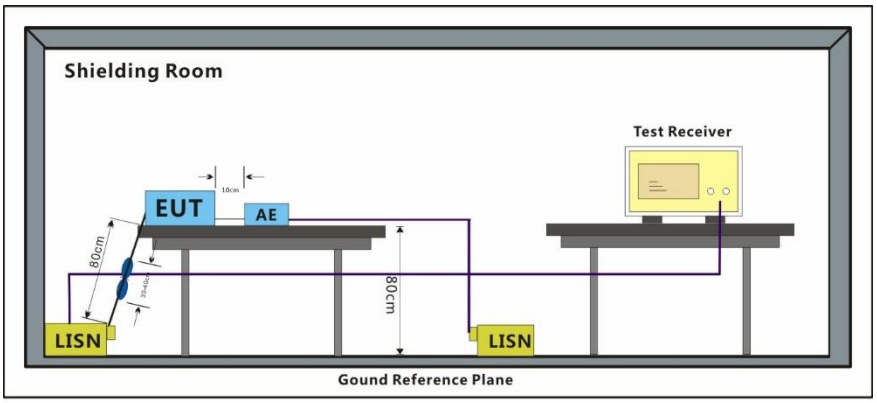
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

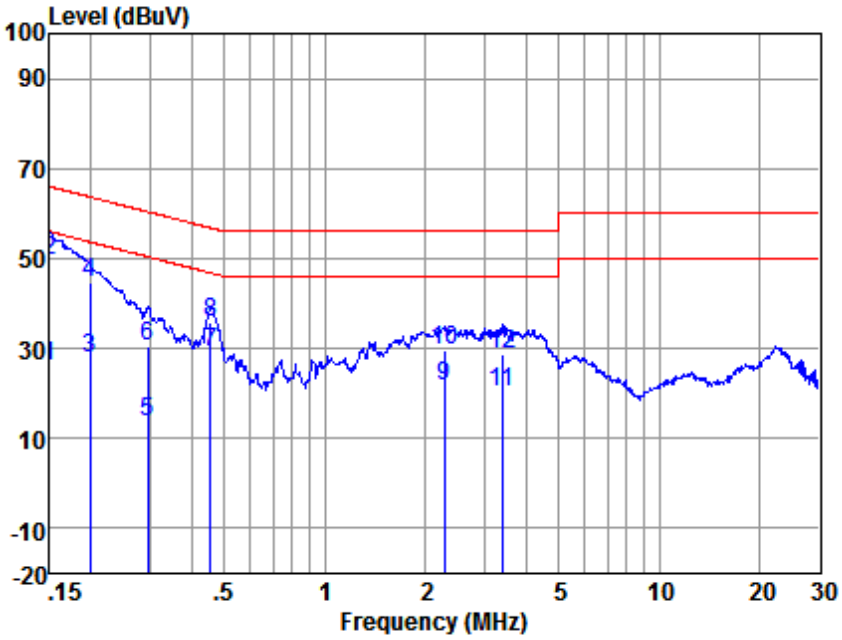
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

7.1.4 Conclusion

EUT complies with FCC class B limit.

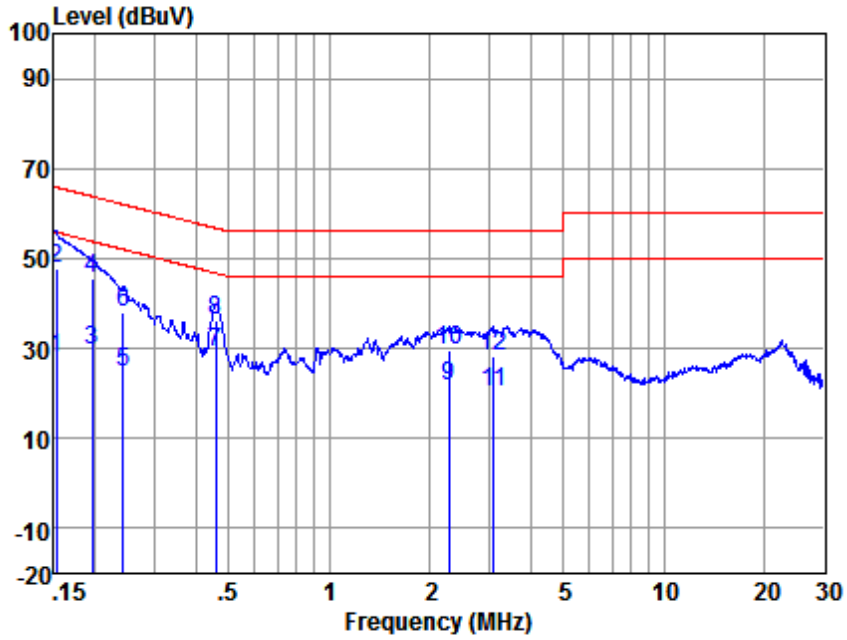
Mode:c; Line:Live Line



Site : chamber
Condition : LISN-L-2017
Project No: 6834CR
Test mode : c

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	16.24	0.11	9.81	26.16	56.00	-29.84	Average
2	0.150	39.42	0.11	9.81	49.34	66.00	-16.66	QP
3	0.199	17.78	0.11	9.81	27.70	53.67	-25.97	Average
4	0.199	34.56	0.11	9.81	44.48	63.67	-19.19	QP
5	0.296	3.94	0.11	9.81	13.86	50.37	-36.51	Average
6	0.296	20.77	0.11	9.81	30.69	60.37	-29.68	QP
7	0.456	19.15	0.11	9.82	29.08	46.76	-17.68	Average
8	0.456	25.68	0.11	9.82	35.61	56.76	-21.15	QP
9	2.273	11.49	0.12	9.85	21.46	46.00	-24.54	Average
10	2.273	19.73	0.12	9.85	29.70	56.00	-26.30	QP
11	3.399	10.42	0.12	9.85	20.39	46.00	-25.61	Average
12	3.399	18.69	0.12	9.85	28.66	56.00	-27.34	QP

Mode:c; Line:Neutral Line



Site : chamber
Condition : LISN-N-2017
Project No: 6834CR
Test mode : c

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.152	18.06	0.12	9.81	27.99	55.87	-27.88	Average
2	0.152	37.63	0.12	9.81	47.56	65.87	-18.31	QP
3	0.195	19.59	0.12	9.81	29.52	53.80	-24.28	Average
4	0.195	35.44	0.12	9.81	45.37	63.80	-18.43	QP
5	0.242	14.81	0.11	9.81	24.73	52.04	-27.31	Average
6	0.242	27.93	0.11	9.81	37.85	62.04	-24.19	QP
7	0.459	19.20	0.11	9.82	29.13	46.71	-17.58	Average
8	0.459	26.27	0.11	9.82	36.20	56.71	-20.51	QP
9	2.273	11.50	0.12	9.85	21.47	46.00	-24.53	Average
10	2.273	19.59	0.12	9.85	29.56	56.00	-26.44	QP
11	3.107	10.46	0.13	9.85	20.44	46.00	-25.56	Average
12	3.107	18.17	0.13	9.85	28.15	56.00	-27.85	QP

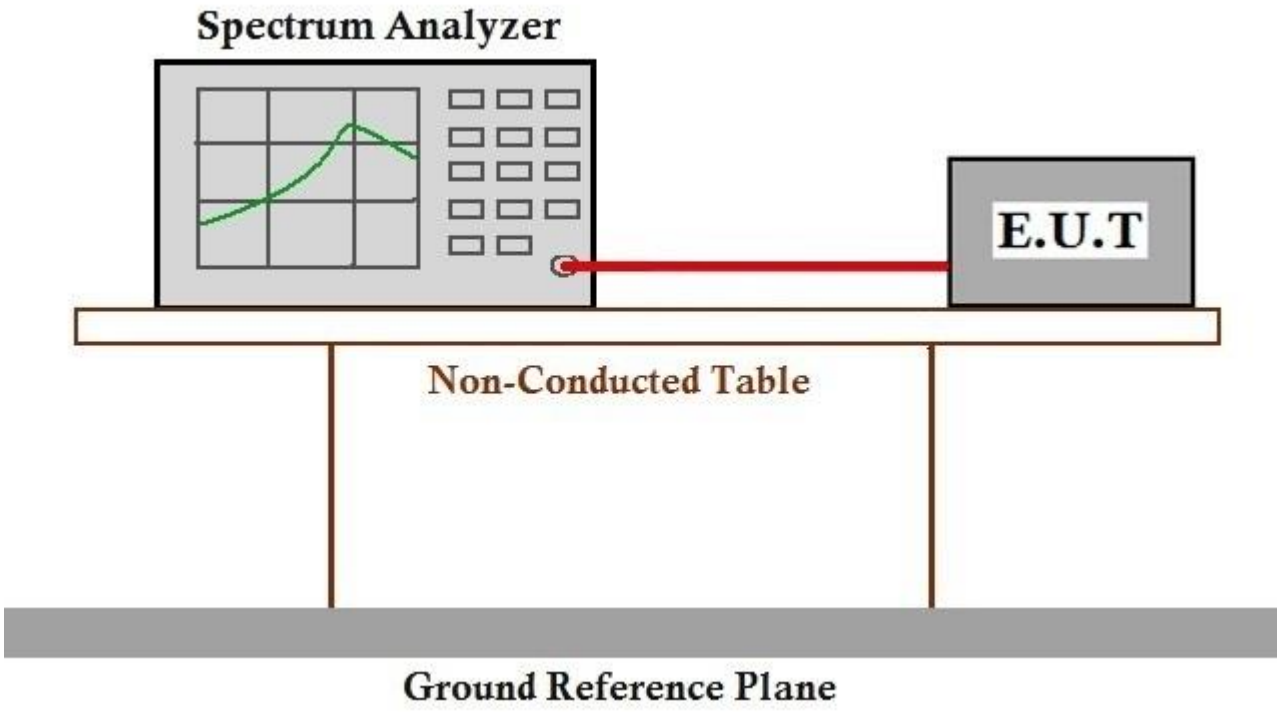
7.2 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1
Limit: ≥500 kHz

7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar
Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix SZEM171201302802 BLE

7.2.4 Conclusion

EUT complies with FCC Part 15.247 (a)(2) limit.

7.3 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

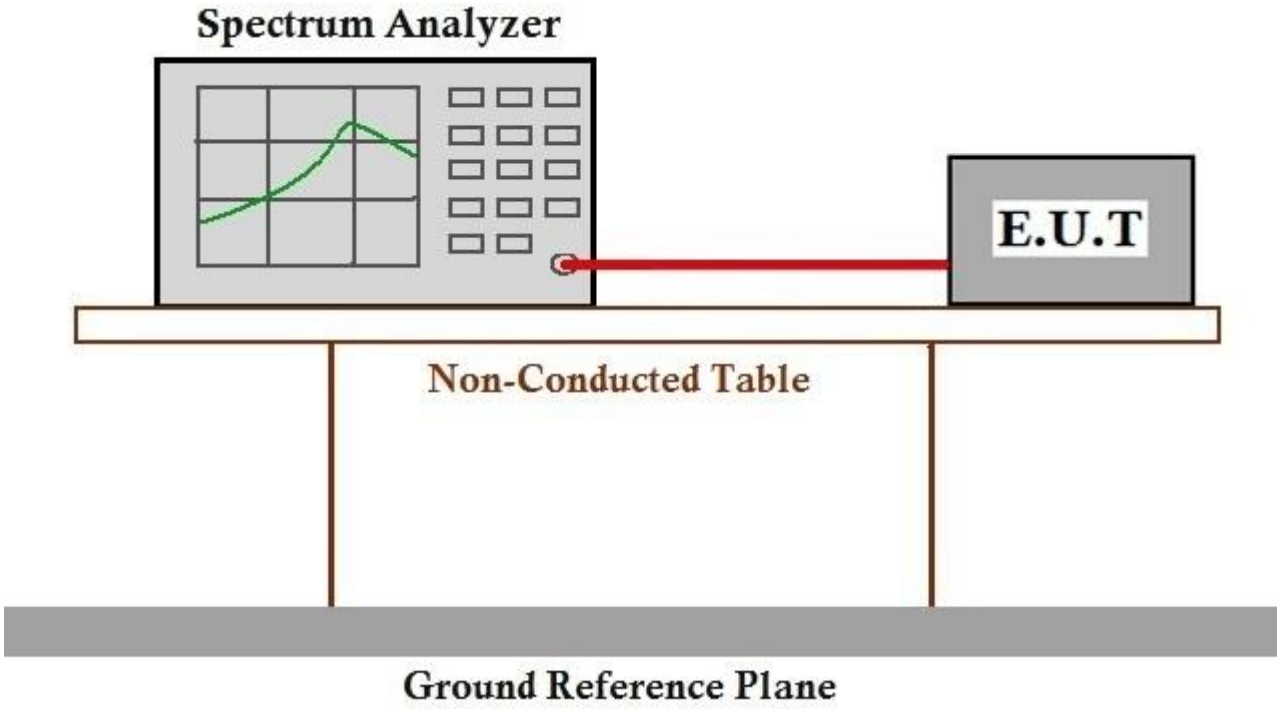
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix SZEM171201302802 BLE

7.3.4 Conclusion

EUT complies with FCC Part 15. 247(b)(3) limit.

7.4 Power Spectrum Density

Test Requirement	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2
Limit:	≤8dBm in any 3 kHz band during any time interval of continuous transmission

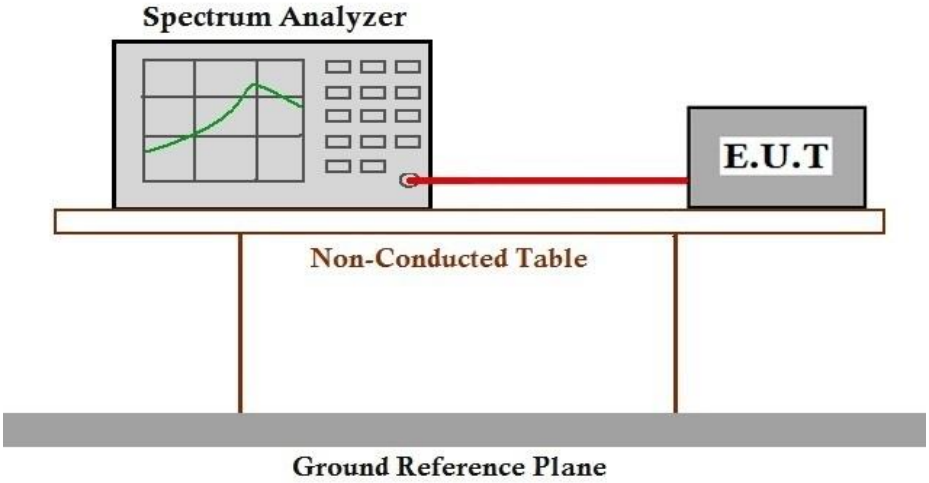
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix SZEM171201302802 BLE

7.4.4 Conclusion

EUT complies with FCC Part 15. 247(e) limit.

7.5 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit: 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)

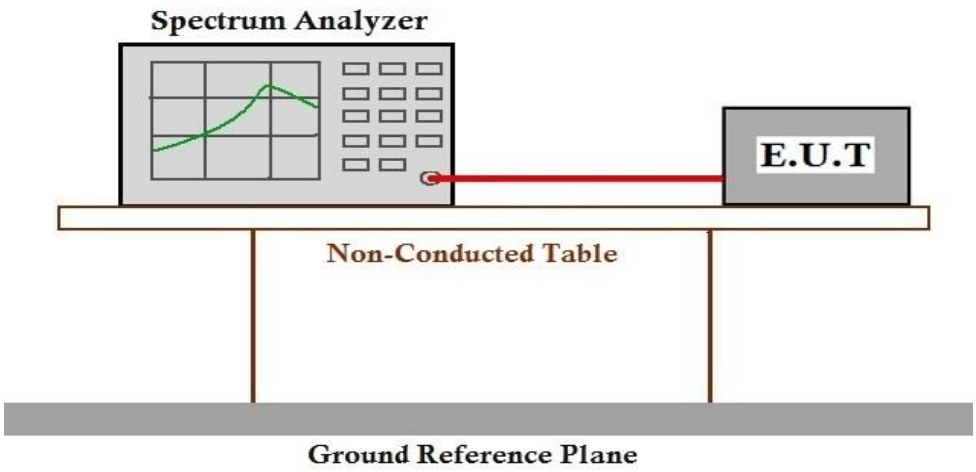
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

7.5.4 Conclusion

EUT complies with FCC Part 15. 247(d) limit.

7.6 Conducted Spurious Emissions

Test Requirement: 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.11

Limit: 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)

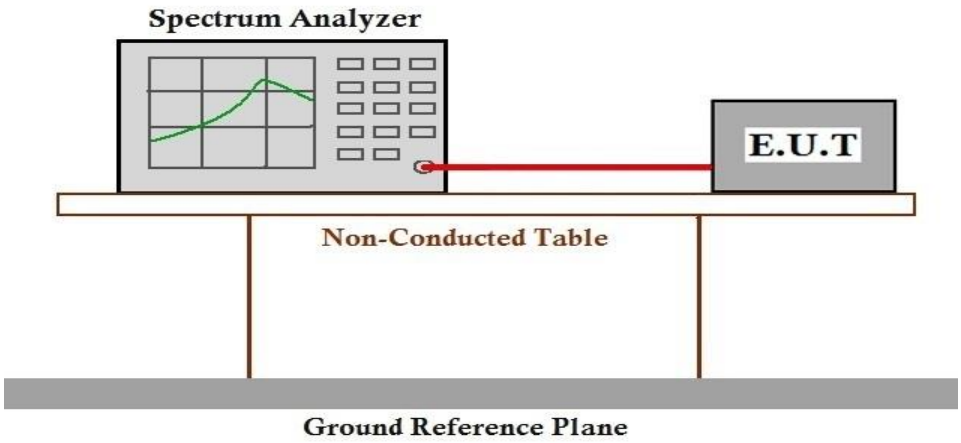
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode: c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.6.2 Test Setup Diagram



7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

7.6.4 Conclusion

EUT complies with FCC Part 15. 247(d) limit.

7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.10.5
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.7.2 Test Setup Diagram

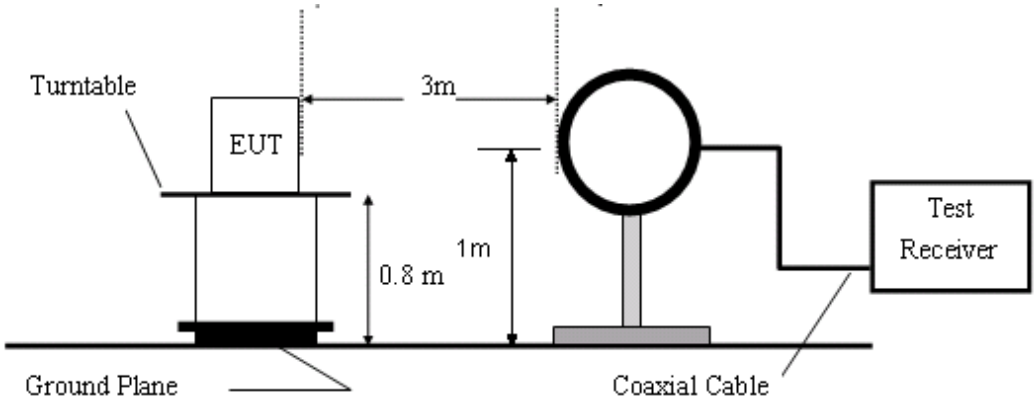


Figure1. Below 30MHz radiated emissions test configuration

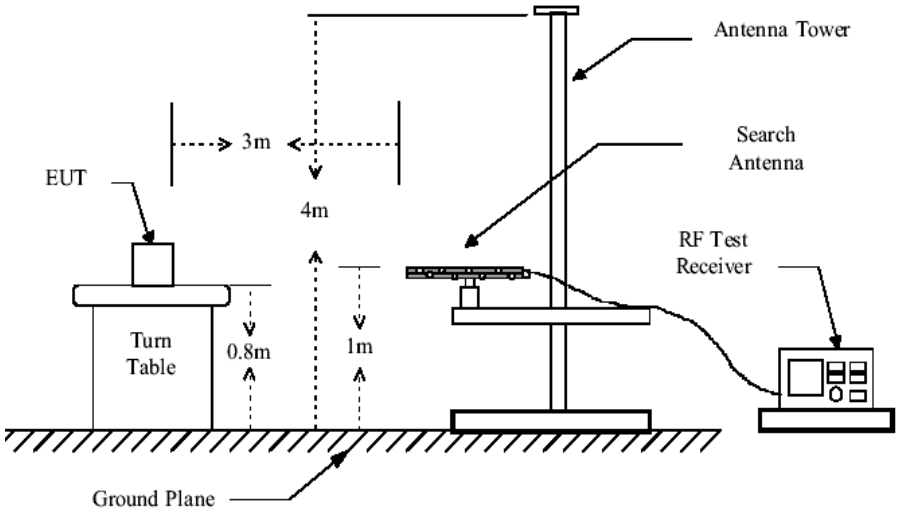


Figure2. 30MHz to 1GHz radiated emissions test configuration

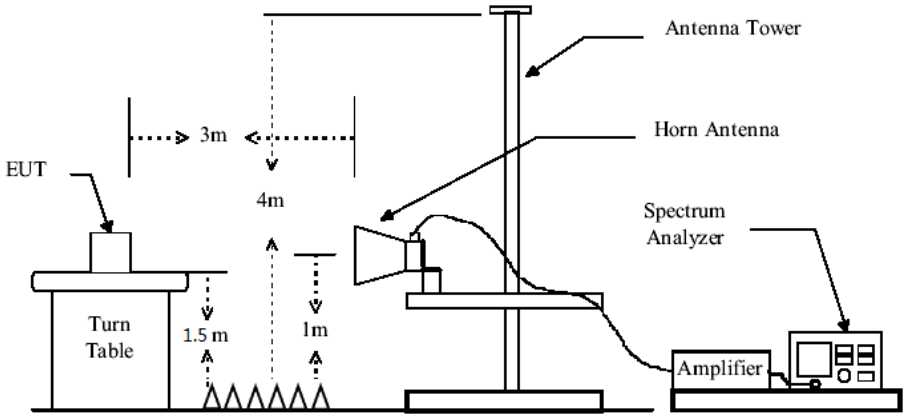


Figure3. Above 1GHz radiated emissions test configuration

7.7.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna 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.

e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

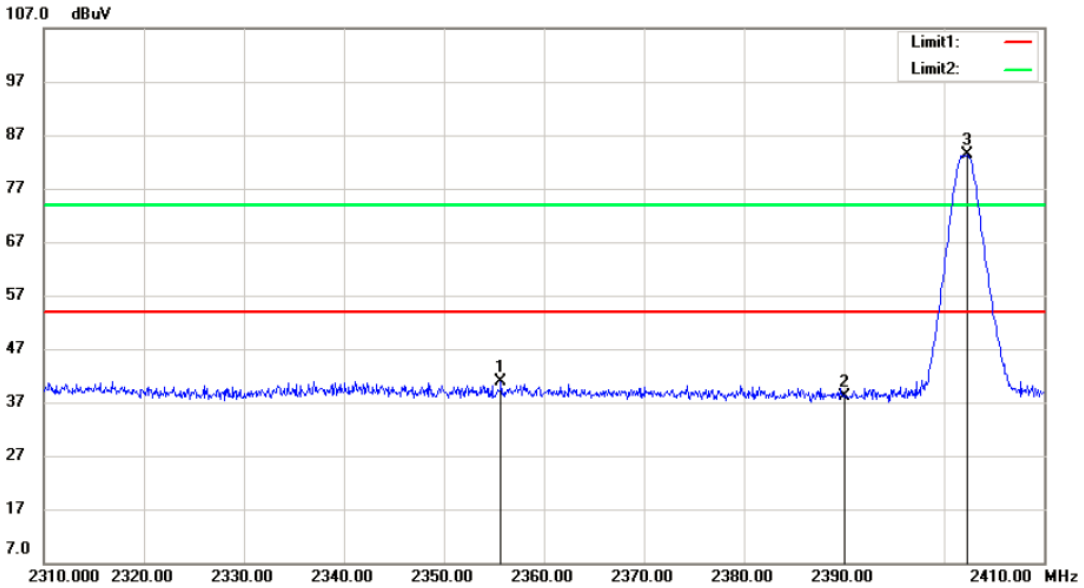
7.7.4 Conclusion

EUT complies with FCC Part 15.209 & 15.247(d) limit.

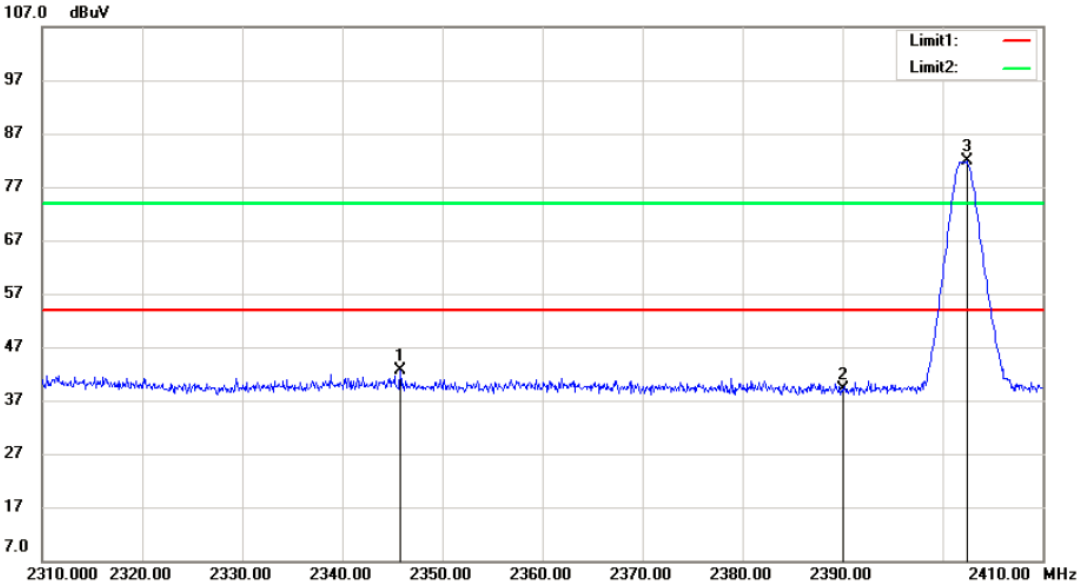
Lowest Channel (2402MHz)

MK.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	2355.7	44.71	-3.79	40.92	54	-13.08	Peak	Horizontal
2	2390	42.13	-3.89	38.24	54	-15.76	Peak	Horizontal
3	2402.3	87.22	-3.92	83.3	54	29.3	Peak	Horizontal
1	2345.8	46.38	-3.76	42.62	54	-11.38	Peak	Vertical
2	2390	43.07	-3.89	39.18	54	-14.82	Peak	Vertical
3	2402.4	85.69	-3.92	81.77	54	27.77	Peak	Vertical

Horizontal:



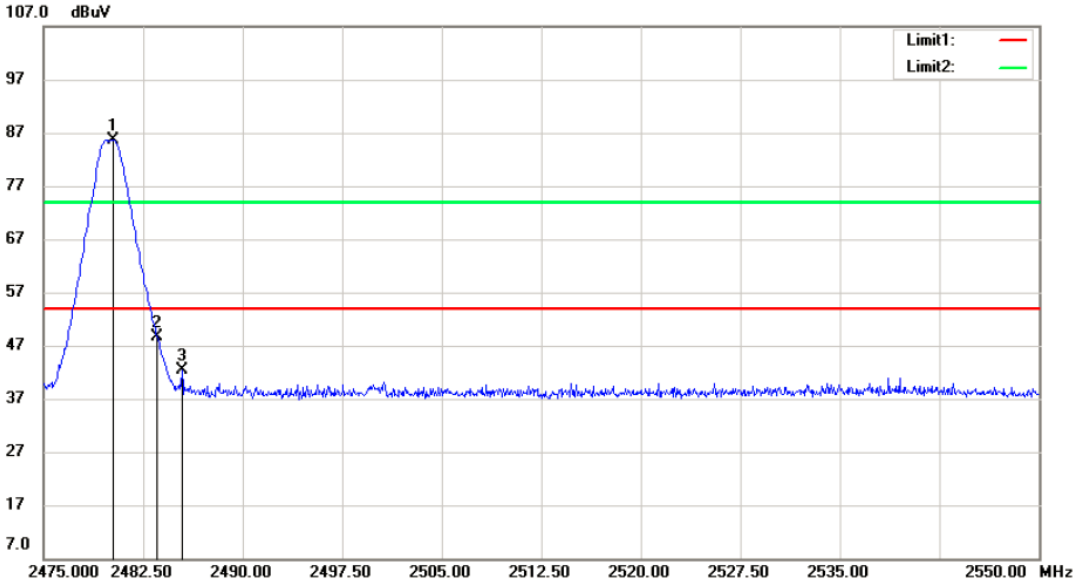
Vertical:



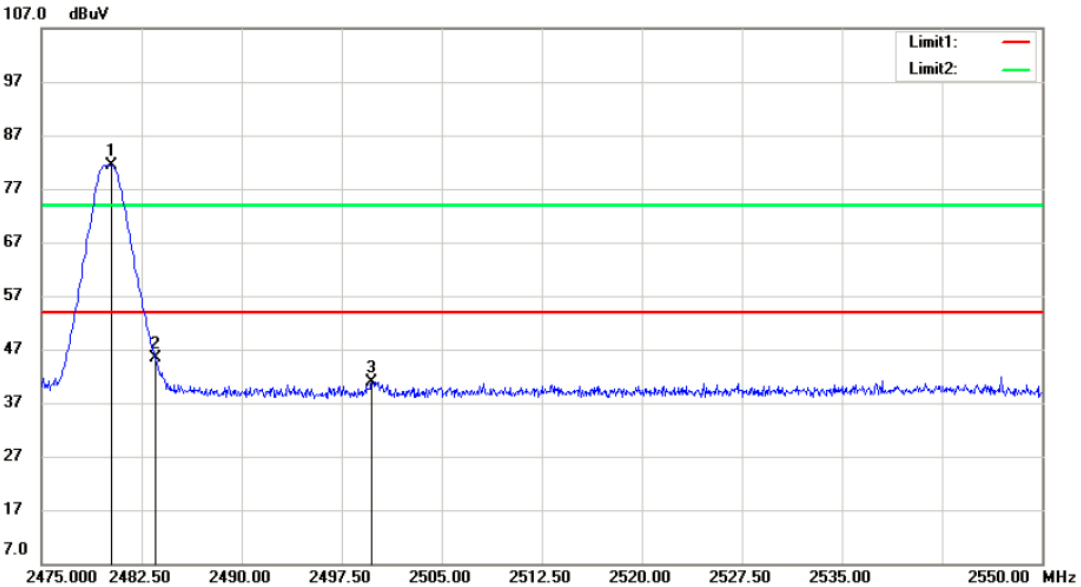
Highest Channel (2480MHz)

MK.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	2480.25	89.64	-4	85.64	54	31.64	Peak	Horizontal
2	2483.5	52.63	-4.01	48.62	54	-5.38	Peak	Horizontal
3	2485.425	46.33	-4.01	42.32	54	-11.68	Peak	Horizontal
1	2480.25	85.44	-4	81.44	54	27.44	Peak	Vertical
2	2483.5	49.28	-4.01	45.27	54	-8.73	Peak	Vertical
3	2499.75	44.88	-4.03	40.85	54	-13.15	Peak	Vertical

Horizontal:



Vertical:



Remark: 1). Test Level = Receiver Reading + Corrected factor

Corrected factor = Antenna Factor + Cable Loss- Preamplifier Factor

2). If the Peak value below the AV Limit, the AV test doesn't perform for this submission.

All frequencies within the “Restricted bands” have been evaluated to compliance. Except as shown in paragraph of this section, only spurious emissions are permitted in any of the frequency bands listed below:

a. FCC Part 15, Subpart C Section 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
[1]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	10.5 - 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	2655 - 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			

7.8 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.8.2 Test Setup Diagram

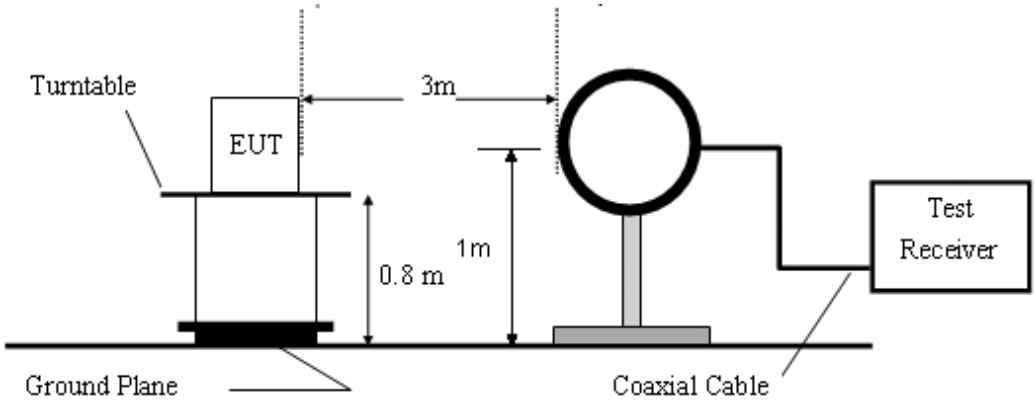


Figure1. Below 30MHz radiated emissions test configuration

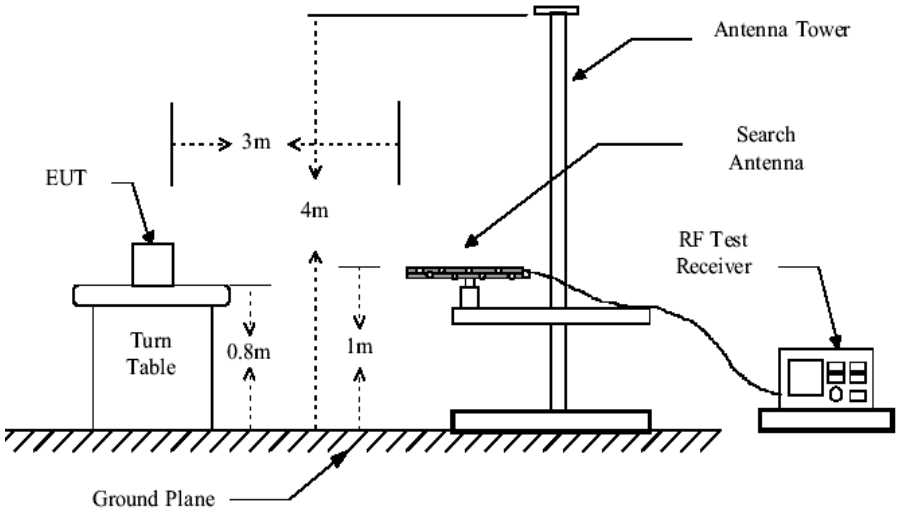


Figure2. 30MHz to 1GHz radiated emissions test configuration

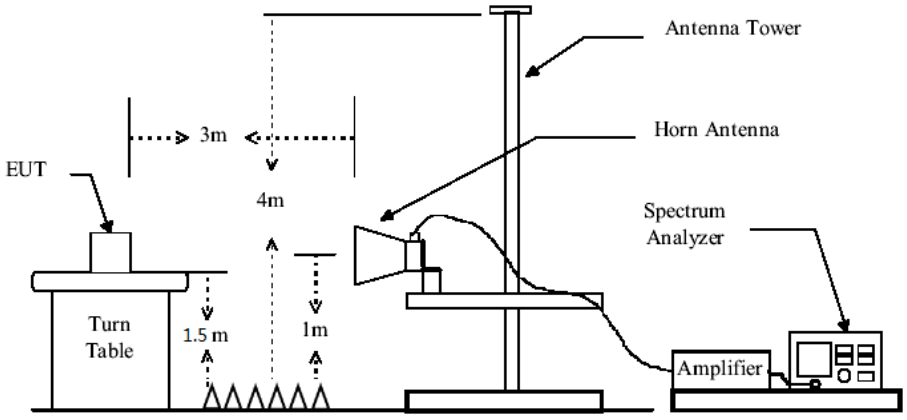


Figure3. Above 1GHz radiated emissions test configuration

7.8.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna 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.

e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark: 1) Emission = Receiver Reading + Factor

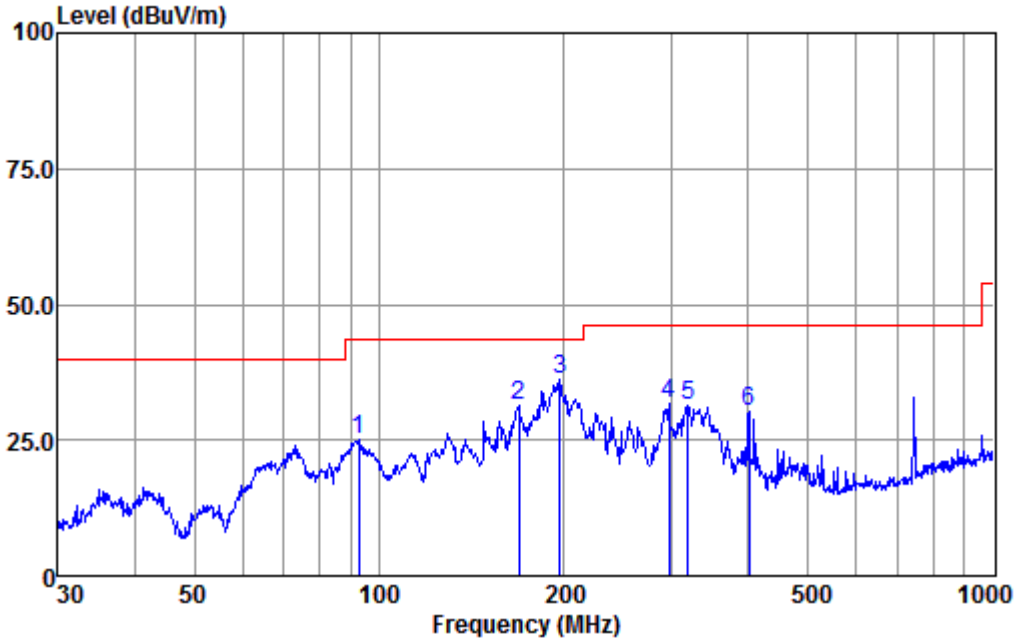
2) Factor = Antenna Factor + Cable Loss + Pre-amplifier Factor.

3) If the Peak value below the AV Limit, the AV test doesn't perform for this submission.

7.8.4 Conclusion

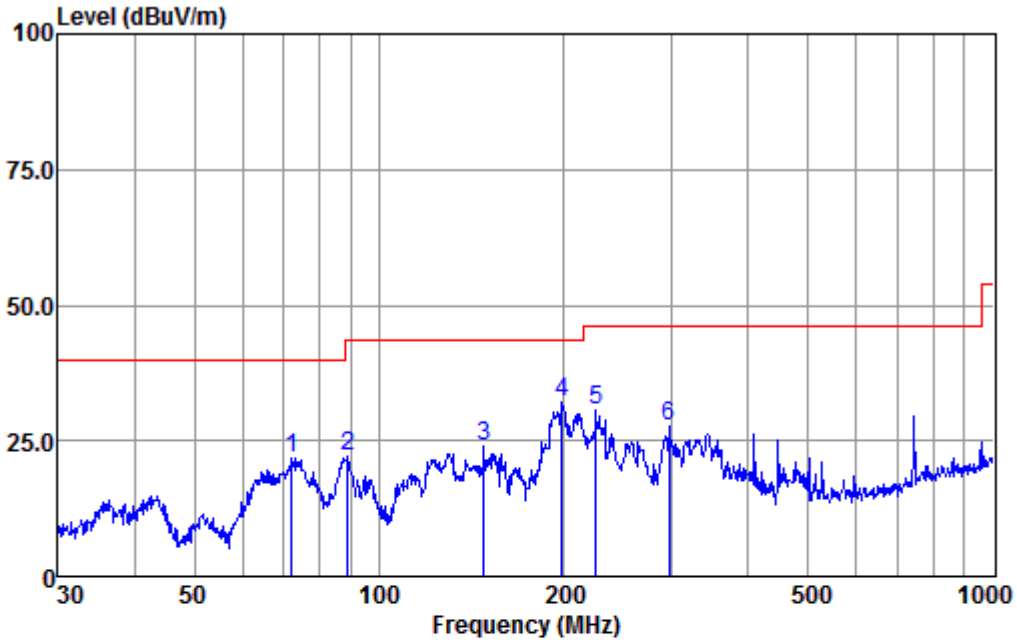
EUT complies with FCC Part 15.209 & 15.247(d) limit.

Below 1GHz:



Condition : HORIZONTAL
EUT/Project: 6834CR
Test Mode : c

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	92.79	58.67	8.52	0.43	42.69	24.93	43.50	-18.57	QP
2	169.01	61.64	11.77	0.65	42.58	31.48	43.50	-12.02	QP
3 q	197.20	68.52	9.64	0.69	42.53	36.32	43.50	-7.18	QP
4	297.22	60.15	13.10	0.84	42.40	31.69	46.00	-14.31	QP
5	318.82	59.23	13.59	0.87	42.34	31.35	46.00	-14.65	QP
6	400.43	56.30	15.10	1.00	42.10	30.30	46.00	-15.70	QP



Condition : VERTICAL
EUT/Project: 6834CR
Test Mode : c

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	72.08	53.47	10.68	0.35	42.67	21.83	40.00	-18.17	QP
2	88.96	56.45	8.09	0.41	42.68	22.27	43.50	-21.23	QP
3	148.44	54.26	11.81	0.62	42.61	24.08	43.50	-19.42	QP
4 q	198.59	64.38	9.52	0.69	42.53	32.06	43.50	-11.44	QP
5	225.31	61.95	10.51	0.73	42.49	30.70	46.00	-15.30	QP
6	297.22	56.03	13.10	0.84	42.40	27.57	46.00	-18.43	QP

Above 1GHz:

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

Mark	Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Ant.Pos cm	
	4804	38.80	6.18	44.98	54	-9.02		peak
	7206	35.75	10.63	46.38	54	-7.62		peak
*	9608	36.39	14.38	50.77	54	-3.23		peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

Mark	Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Ant.Pos cm	
	4804	38.84	6.18	45.02	54	-8.98		peak
	7206	38.21	10.63	48.84	54	-5.16		peak
*	9608	37.77	14.38	52.15	54	-1.85		peak

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle

Mark	Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Ant.Pos cm	
	4880	39.03	6.97	46.00	54	-8.00		peak
	7320	34.42	11.12	45.54	54	-8.46		peak
*	9760	34.78	14.35	49.13	54	-4.87		peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:middle

Mark	Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Ant.Pos cm	
	4880	39.26	6.97	46.23	54	-7.77		peak
	7320	38.09	11.12	49.21	54	-4.79		peak
*	9760	36.47	14.35	50.82	54	-3.18		peak

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

Mark	Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Ant.Pos cm	
	4960	41.03	7.49	48.52	54	-5.48		peak
*	7440	39.03	11.65	50.68	54	-3.32		peak
	9920	37.26	14.40	51.66	54	-2.34		peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:High

Mark	Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Ant.Pos cm	
	4960	34.33	7.49	41.82	54	-12.18		peak
*	7440	36.14	11.65	47.79	54	-6.21		peak
	9920	33.44	14.40	47.84	54	-6.16		peak

8 Test Setup Photographs

8.1 Radiated Emission Test Setup

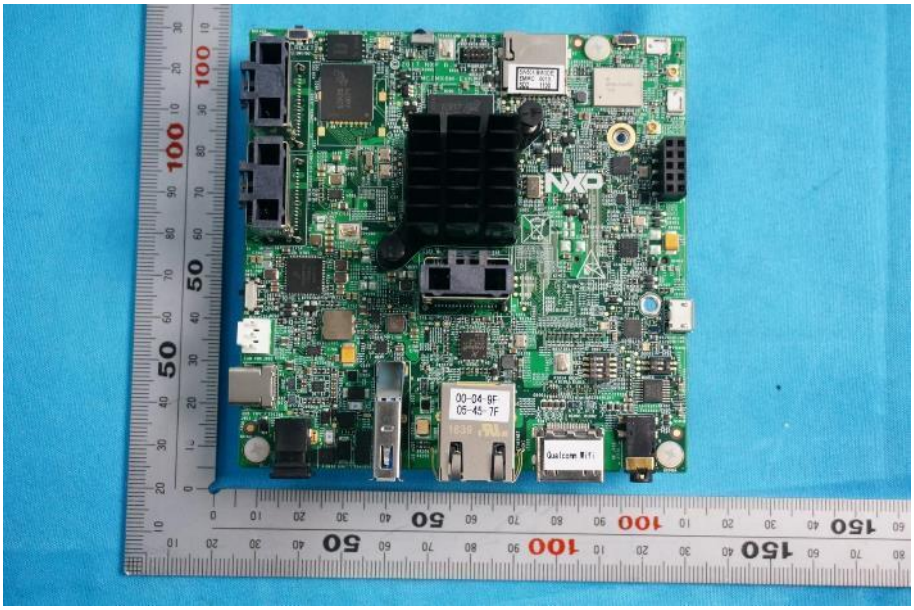
Below 30MHz

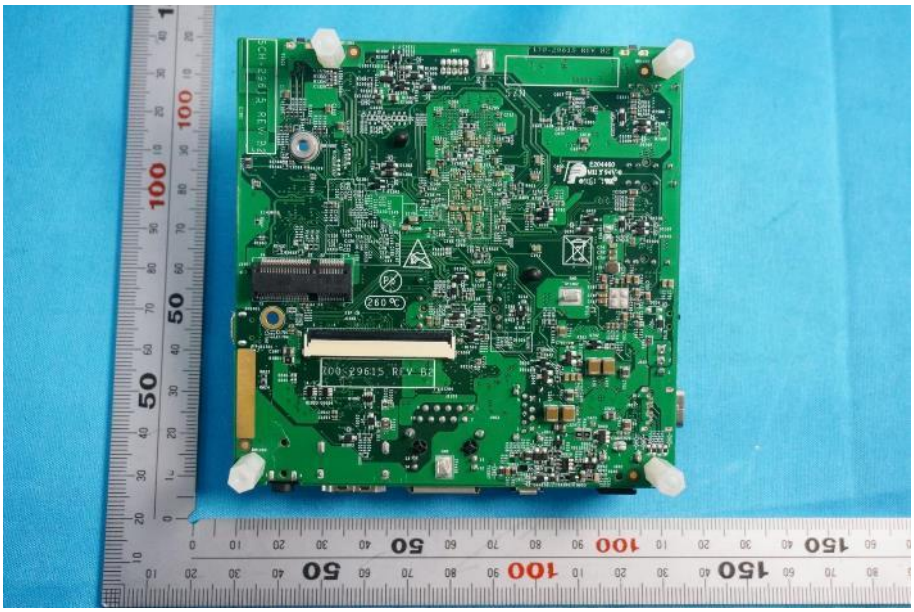
30MHz to 1GHz

Above 1GHz

8.2 Conducted Emission Test Setup

9 EUT Constructional Details





- End of the Report -