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

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TEST REPORT

Application No.:	SZEM1706006801CR
Applicant:	Creative Labs Inc.
Address of Applicant:	31 International Business Park #03-01 CREATIVE RESOURCE SINGAPORE 609921
Manufacturer:	Creative Labs Pte. Ltd.
Address of Manufacturer:	31 International Business Park #03-01 CREATIVE RESOURCE SINGAPORE 609921
Equipment Under Test (EUT):	
EUT Name:	Creative X-Fi Sonic Carrier
Model No.:	MF8235
FCC ID:	IBAMF8235
Trade mark:	CREATIVE
Standards:	47 CFR Part 15, Subpart E 15.407(2016)
Date of Receipt:	2017-07-03
Date of Test:	2017-07-11 to 2017-07-18
Date of Issue:	2017-07-21
Test Result :	**Pass***

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

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Jack Zhang
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**
01		2017-07-21		Original

Authorized for issue by:				
				
		Vincent 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 E 15.407	N/A	47 CFR Part 15, Subpart C 15.203	Pass

N/A: Not applicable

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207 & 15.407 b(6)	Pass
Duty Cycle	47 CFR Part 15, Subpart E 15.407	KDB 789033 II B 1	KDB 789033 D02 II B 1	Pass
99% Bandwidth	47 CFR Part 15, Subpart E 15.407	KDB 789033 II D	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Minimum 6 dB bandwidth (5.725-5.85 GHz band)	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II C 2	47 CFR Part 15, Subpart C 15.407 (e)	Pass
Maximum Conducted output power	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II E	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Peak Power spectrum density	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II F	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Radiated Emissions	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & 15.407(b)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & 15.407(b)	Pass
Frequency Stability	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2013) Section 6.8	47 CFR Part 15, Subpart C 15.407 (g)	Pass

N/A: Not applicable

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	AC 120V/60Hz
Cable:	AC cable for MF8235: 162cm unshielded with on ferrite core
Frequency range	5736 MHz -5814 MHz
Channel Numbers:	Define 5.8GHz
Modulation Type	DSSS
Sample Type:	Fixed production
Antenna type:	internal
Antenna gain:	3dBi

Note:

In FCC 15.31, for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

Frequency Range of Operation Operating Frequency Range (in each Band)	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre

Mode	Channel	Frequency(MHz)
TX	The Lowest channel	5736
	The Middle channel	5762
	The Highest channel	5814

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25×10^{-8}
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	2.84dB
6	Conducted Spurious emissions	0.75dB
7	RF Radiated power	4.5dB (below 1GHz)
		4.8dB (above 1GHz)
8	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-18GHz)
9	Temperature test	1℃
10	Humidity test	3%
11	Supply voltages	1.5%
12	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

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017-05-10	2018-05-10
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
LISN	Rohde & Schwarz	ENV216	SEM007-01	2016-10-09	2017-10-09
LISN	ETS-LINDGREN	3816/2	SEM007-02	2017-04-14	2018-04-13
8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2016-09-28	2017-09-28
4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2016-09-28	2017-09-28
2 Line ISN	Fischer Custom	FCC-TLISN-T2-02	EMC0122	2016-09-28	2017-09-28

RF Conducted					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2017-04-14	2018-04-13
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

Radiated Emissions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-10	2018-05-10
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017-03-05	2020-03-05
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-14	2017-06-16	2020-06-15
Pre-amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
Pre-amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2016-10-17	2017-10-17
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2017-04-14	2018-04-13
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14
Band filter	N/A	N/A	SEM023-01	N/A	N/A

Frequency Stability					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2017-04-14	2018-04-13
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2016-10-12	2017-10-12
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2017-04-18	2018-04-18

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

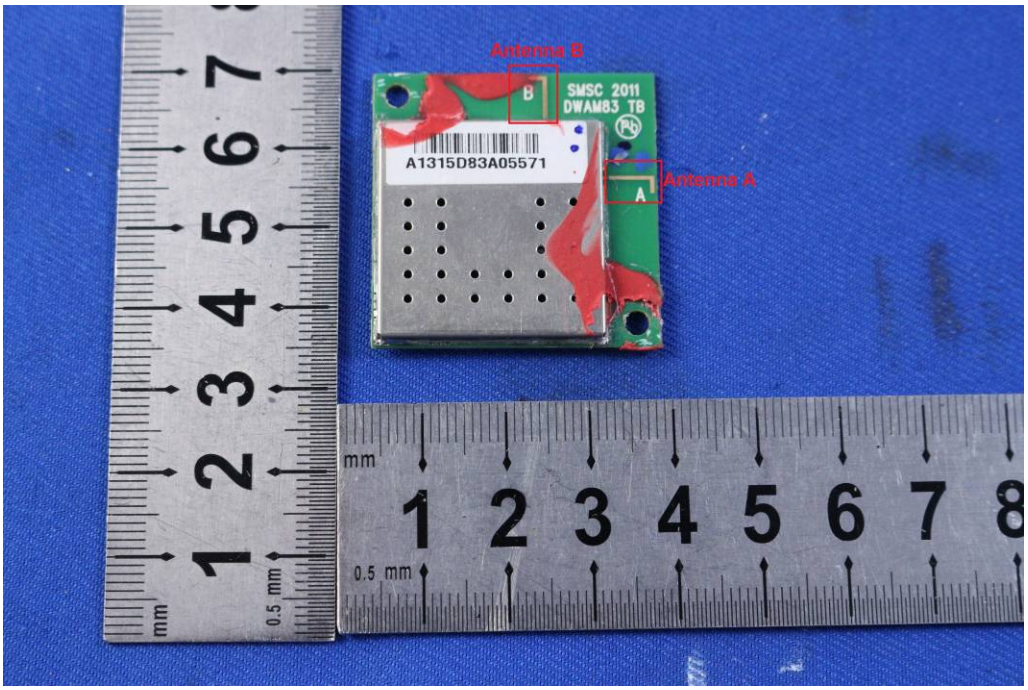
Standard Requirment:

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.

EUT Antenna:



The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3.0dBi.

The two antennas and match circuit are the same and only one antenna is selected for use at any one time, through the on-board Transmit-receive/Diversity RF switch. So, Only the antenna A test data is recorded in the report.

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 & 15.407 b(6)
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

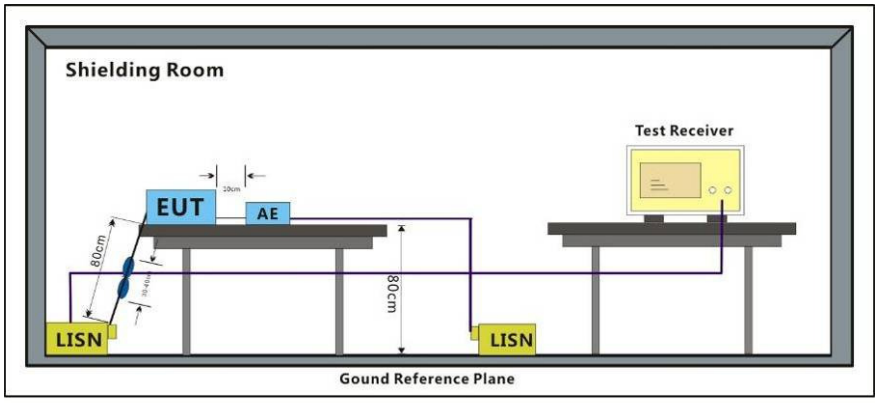
Operating Environment:

Temperature: 25 °C Humidity: 56 % RH Atmospheric Pressure: 1005 mbar

Pretest these mode to find the worst case: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

The worst case for final test: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with 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.

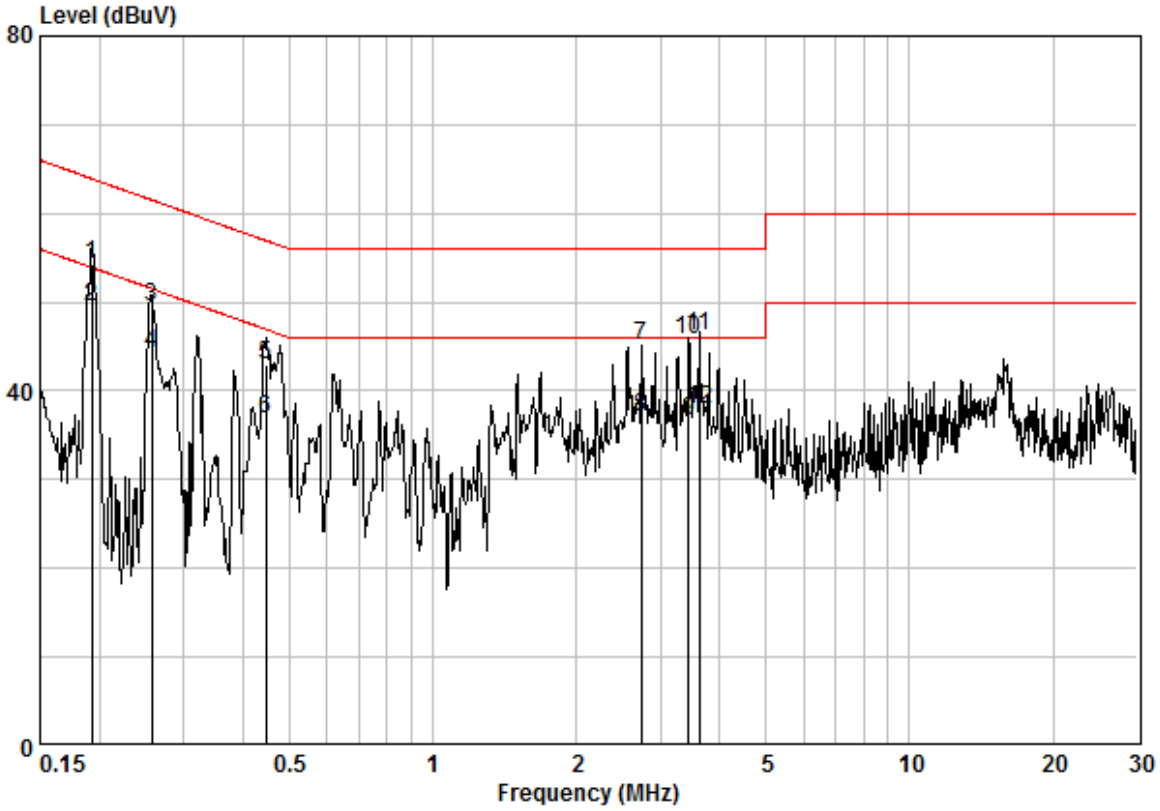
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

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

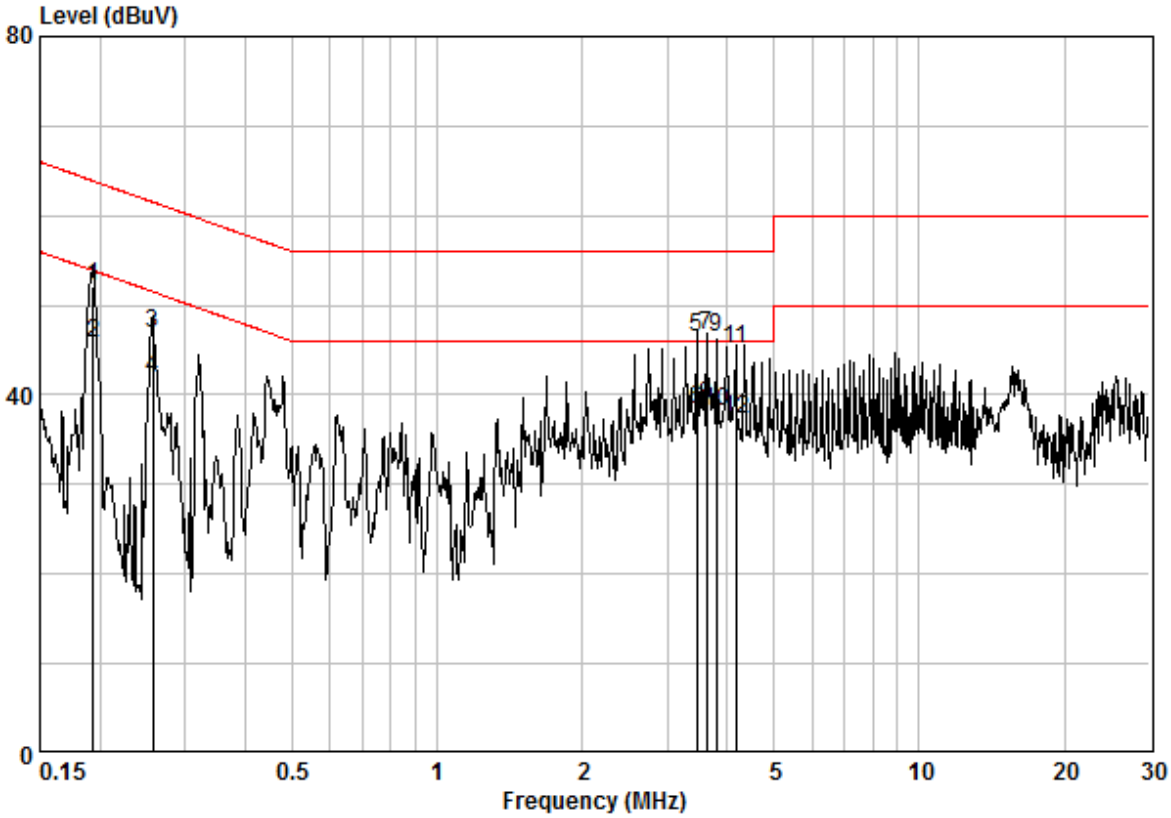
Line:Live Line



Site : Shielding Room
Condition : CE LINE
Job No. : 06801CR
Test Mode : TX

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 @	0.19242	0.02	9.64	44.72	54.38	63.93	-9.55	QP
2 @	0.19242	0.02	9.64	39.89	49.55	53.93	-4.38	AVERAGE
3	0.25751	0.02	9.64	39.78	49.44	61.51	-12.07	QP
4 @	0.25751	0.02	9.64	34.54	44.20	51.51	-7.32	AVERAGE
5	0.44679	0.02	9.64	33.30	42.96	56.93	-13.97	QP
6 @	0.44679	0.02	9.64	27.20	36.86	46.93	-10.07	AVERAGE
7	2.736	0.03	9.68	35.50	45.21	56.00	-10.79	QP
8 @	2.736	0.03	9.68	27.30	37.01	46.00	-8.99	AVERAGE
9 @	3.436	0.02	9.70	26.90	36.63	46.00	-9.37	AVERAGE
10 @	3.436	0.02	9.70	36.12	45.85	56.00	-10.15	QP
11 @	3.623	0.02	9.70	36.50	46.23	56.00	-9.77	QP
12 @	3.623	0.02	9.70	28.30	38.03	46.00	-7.97	AVERAGE

Line:Neutral Line



Site : Shielding Room
Condition : CE NEUTRAL
Job No. : 06801CR
Test Mode : TX

		Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
		MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1		0.19344	0.02	9.63	42.44	52.09	63.89	-11.79	QP
2	@	0.19344	0.02	9.63	36.05	45.70	53.89	-8.19	AVERAGE
3		0.25751	0.02	9.63	37.16	46.81	61.51	-14.71	QP
4	@	0.25751	0.02	9.63	32.13	41.78	51.51	-9.73	AVERAGE
5	@	3.454	0.02	9.68	36.80	46.50	56.00	-9.50	QP
6	@	3.454	0.02	9.68	28.60	38.30	46.00	-7.70	AVERAGE
7	@	3.623	0.02	9.68	37.00	46.71	56.00	-9.29	QP
8	@	3.623	0.02	9.68	29.10	38.81	46.00	-7.19	AVERAGE
9	@	3.799	0.02	9.69	36.80	46.51	56.00	-9.49	QP
10	@	3.799	0.02	9.69	28.50	38.21	46.00	-7.79	AVERAGE
11		4.158	0.02	9.69	35.50	45.22	56.00	-10.78	QP
12	@	4.158	0.02	9.69	27.60	37.32	46.00	-8.68	AVERAGE

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

7.2 Duty Cycle

Test Requirement KDB 789033 D02 II B 1

Test Method: KDB 789033 II B 1

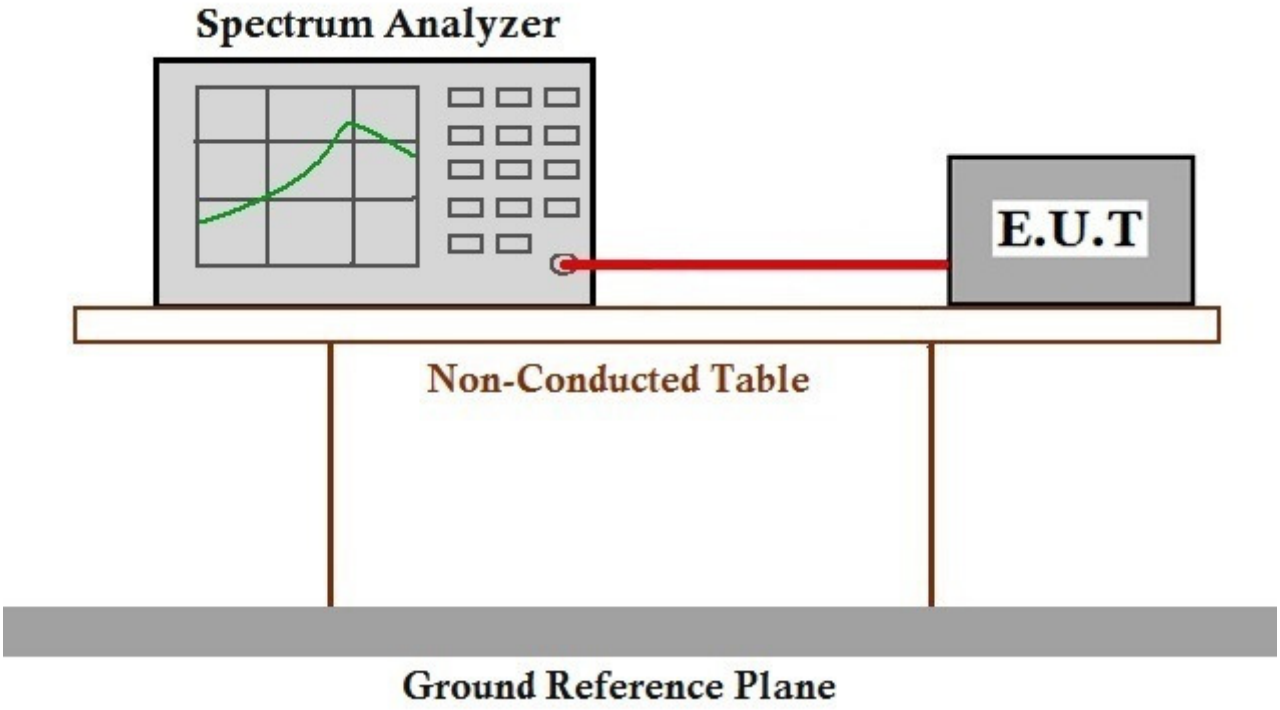
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Test mode Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407

7.3 99% Bandwidth

Test Requirement N/A

Test Method: KDB 789033 II D

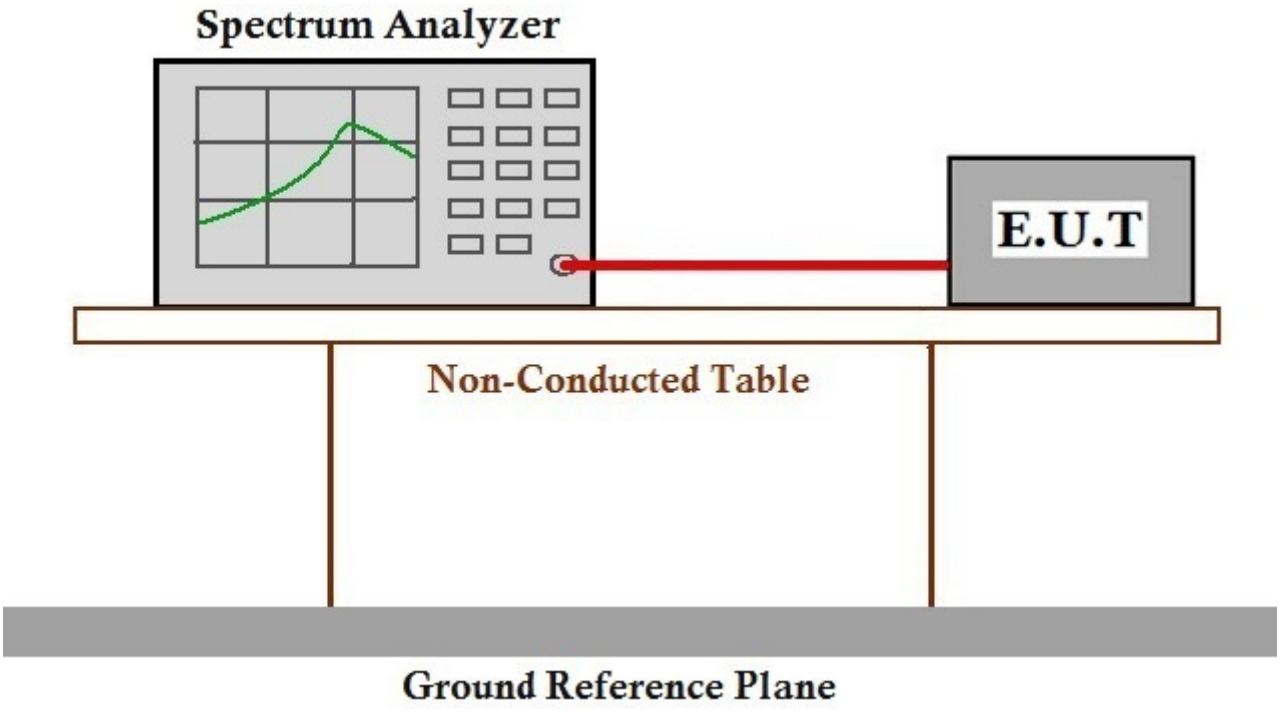
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Pretest these mode to find the worst case: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407

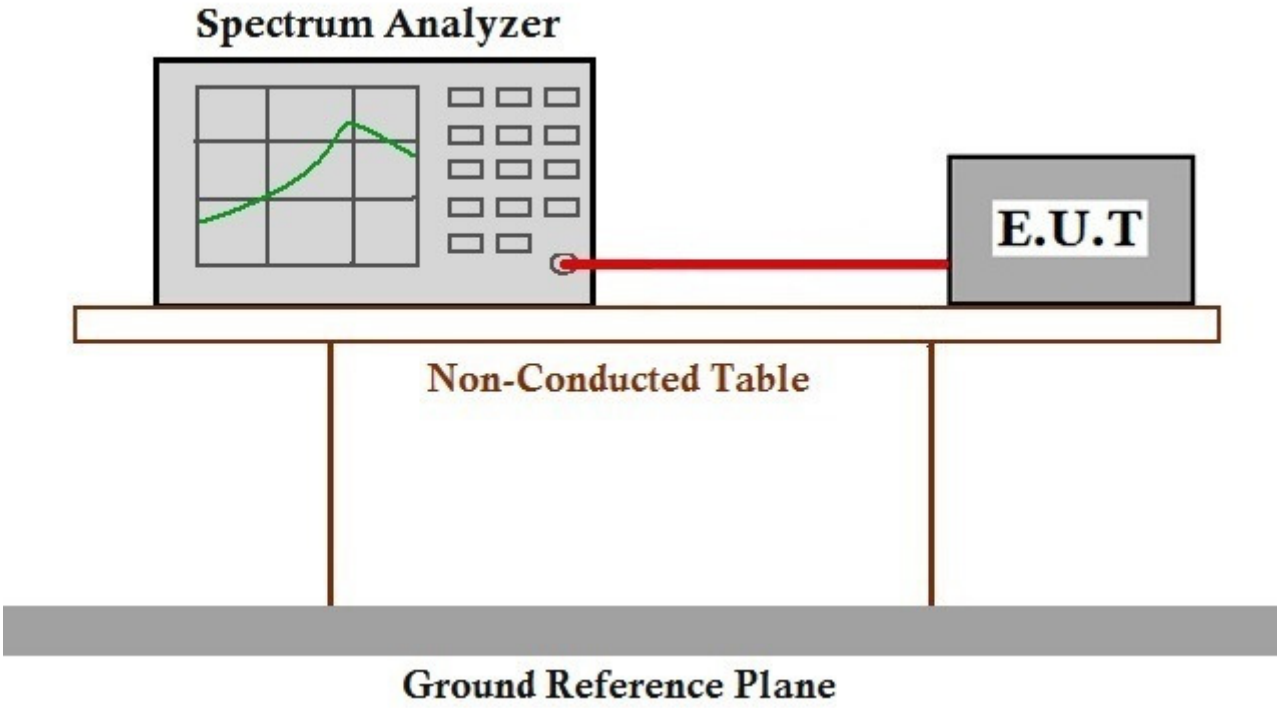
7.4 Minimum 6 dB bandwidth (5745-5825 MHz band)

Test Requirement 47 CFR Part 15, Subpart C 15.407 (e)
Test Method: KDB 789033 D02 II C 2
Limit: ≥500 kHz

7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar
Test mode Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407

7.5 Maximum Conducted output power

Test Requirement 47 CFR Part 15, Subpart C 15.407 (a)
Test Method: KDB 789033 D02 II E
Limit:

Frequency band(MHz)	Limit
5150-5250	≤1W(30dBm) for master device
	≤250mW(24dBm) for client device
5250-5350	≤250mW(24dBm) for client device or 11dBm+10logB*
5470-5725	≤250mW(24dBm) for client device or 11dBm+10logB*
5725-5850	≤1W(30dBm)
Remark: *Where B is the 26dB emission bandwidth in MHz. The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.	

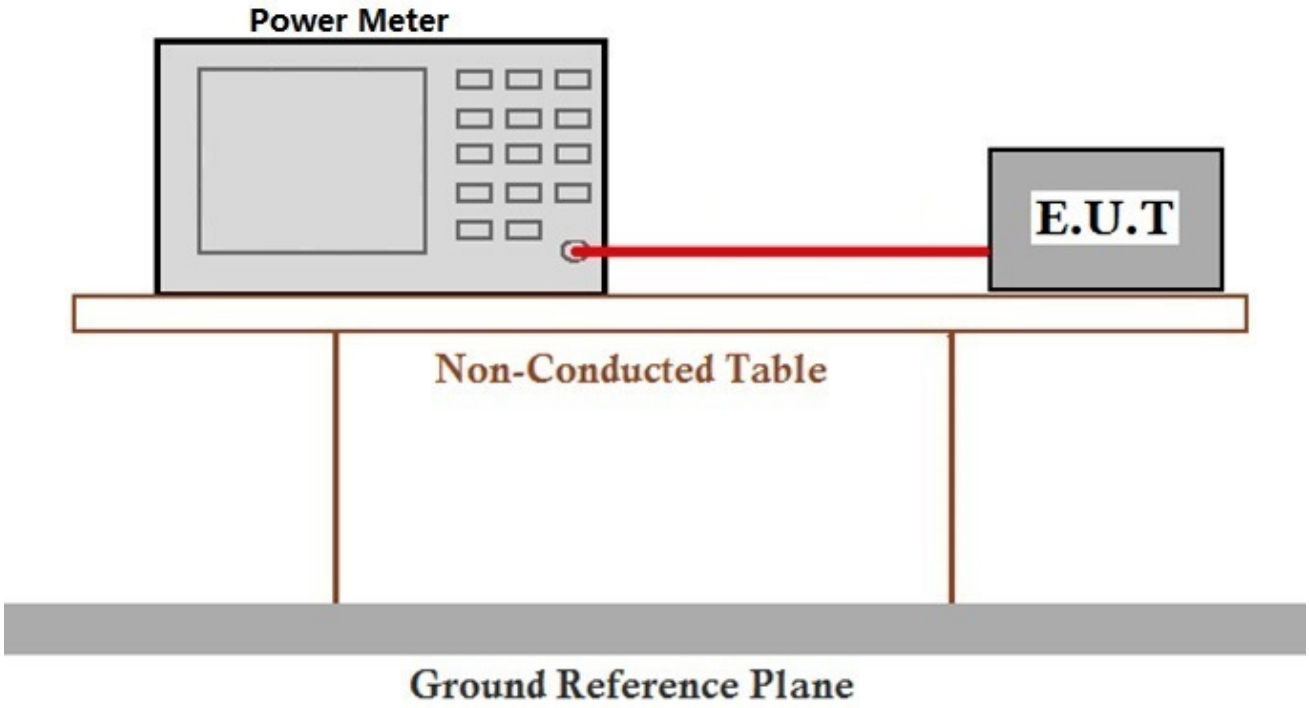
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Pretest these mode to find the worst case: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407

7.6 Peak Power spectrum density

Test Requirement 47 CFR Part 15, Subpart C 15.407 (a)
Test Method: KDB 789033 D02 II F
Limit:

Frequency band(MHz)	Limit
5150-5250	≤17dBm in 1MHz for master device
	≤11dBm in 1MHz for client device
5250-5350	≤11dBm in 1MHz for client device
5470-5725	≤11dBm in 1MHz for client device
5725-5850	≤30dBm in 500 kHz
Remark: The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.	

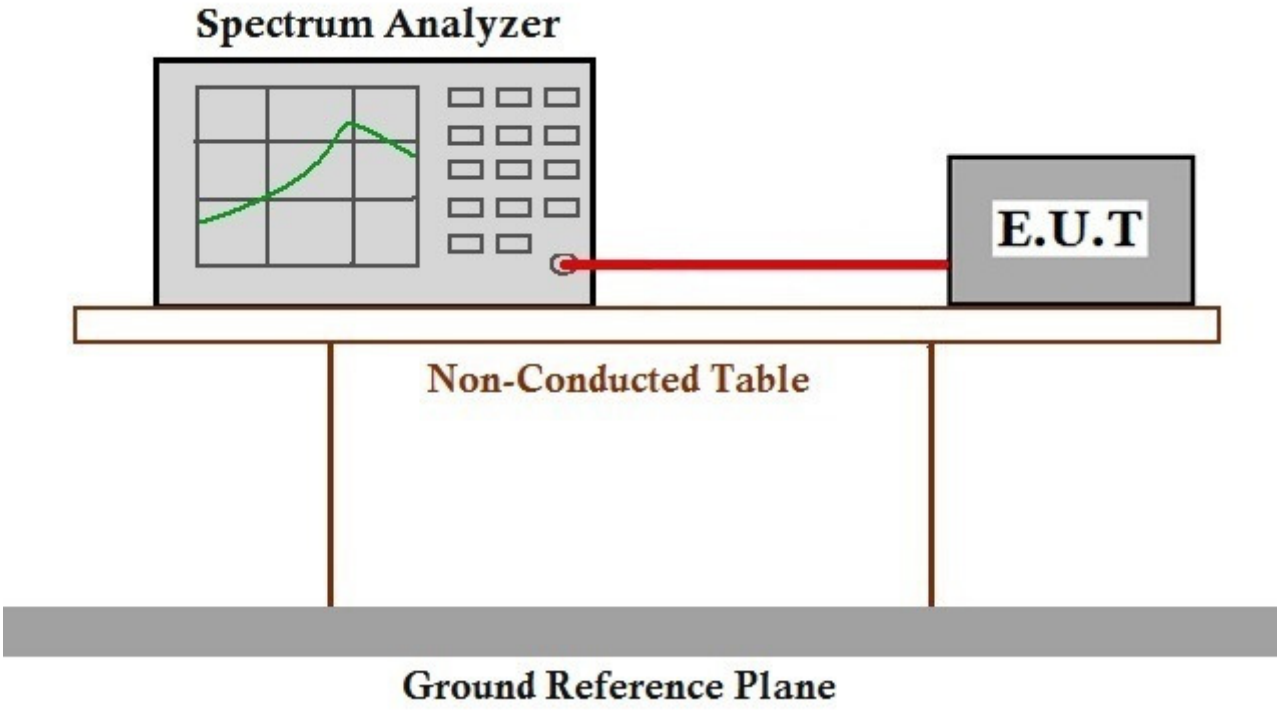
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Pretest these mode to find the worst case: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

7.6.2 Test Setup Diagram



7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407

7.7 Radiated Emissions

Test Requirement: 47 CFR Part 15, Subpart C 15.209 & 15.407(b)
Test Method: KDB 789033 D02 II G
Measurement Distance: 10m

7.7.1 E.U.T. Operation

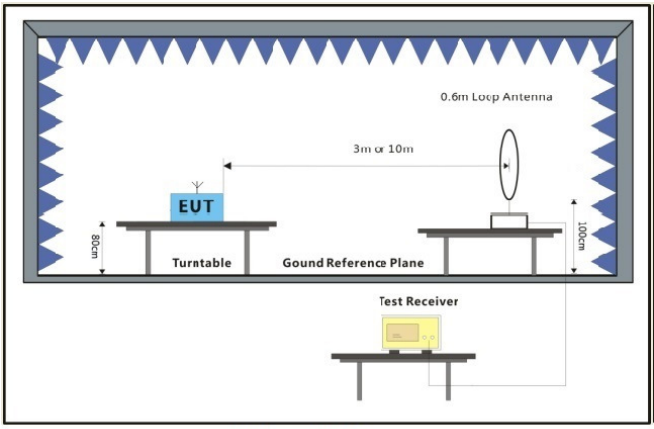
Operating Environment:

Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1005 mbar

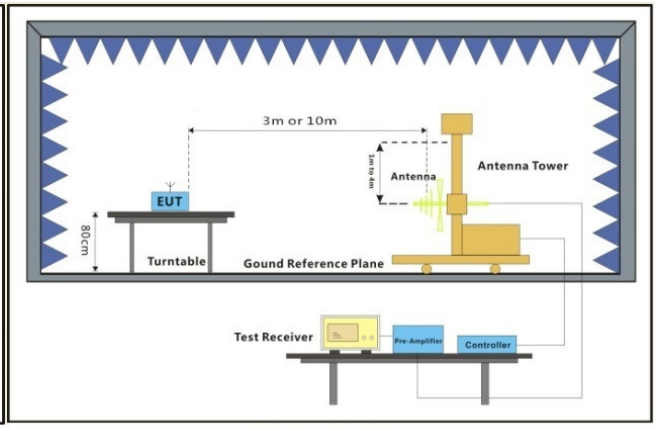
Pretest these mode to find the worst case: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

The worst case for final test: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

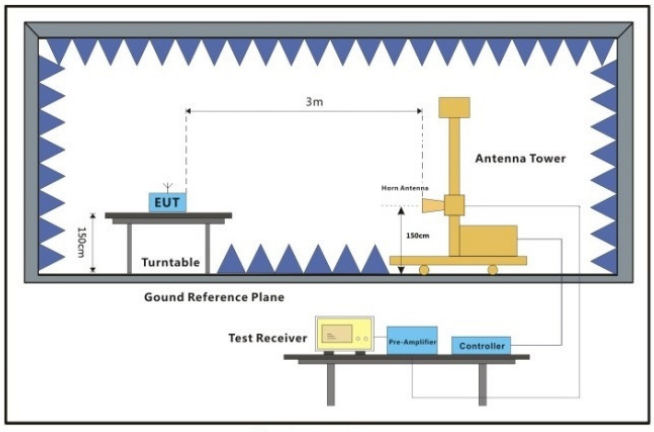
7.7.2 Test Setup Diagram



Below 30MHz



30MHz-1GHz



Above 1GHz

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.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Radiated Emission below 1GHz:

The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

$L_3 / L_{10} = D_{10} / D_3$

Note:

L_3: Level @ 3m distance. Unit: uV/m;

L_{10}: Level @ 10m distance. Unit: uV/m;

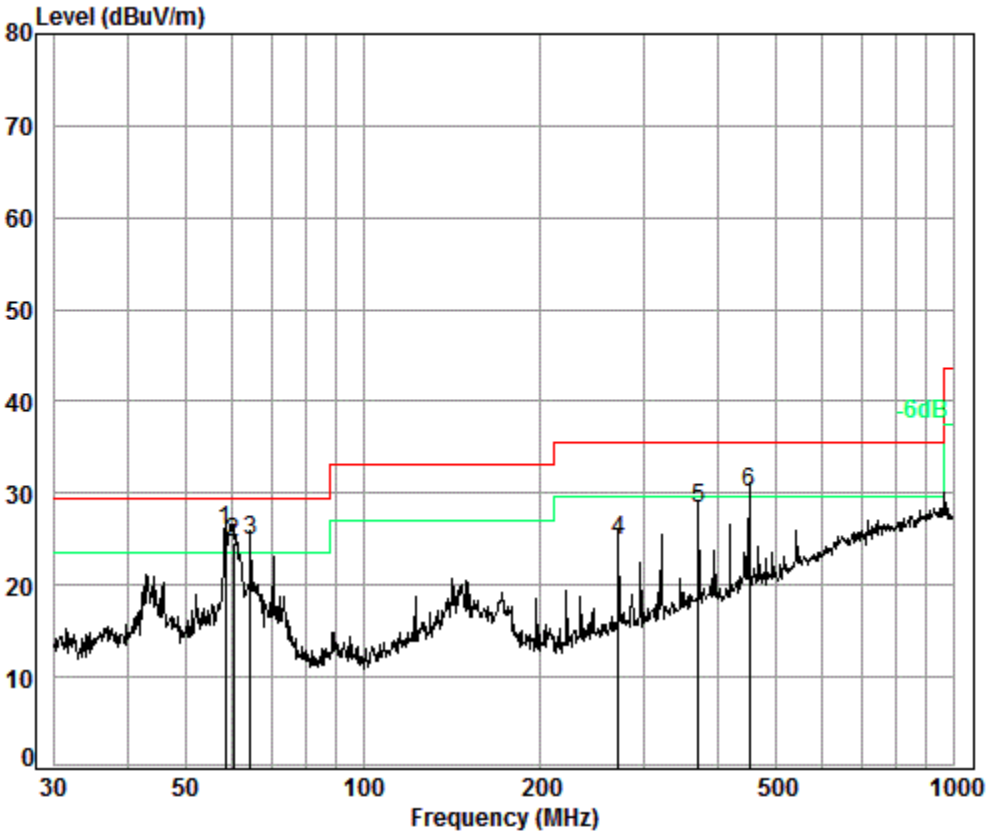
D_3: 3m distance. Unit: m

D_{10}: 10m distance. Unit: m

The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
58.41	26.01	19.98	66.60	36.47	40.00	-3.53	H
60.49	24.66	17.10	57.0	35.12	40.00	-4.88	H
64.43	24.90	17.58	58.6	35.36	40.00	-4.64	H
270.37	24.86	17.50	58.30	35.31	46.00	-10.69	H
369.40	28.31	26.03	86.77	38.77	46.00	-7.23	H
451.14	30.12	32.06	106.87	40.58	46.00	-5.42	H
61.78	20.15	10.17	33.90	30.60	40.00	-9.40	V
122.83	21.88	12.42	41.40	32.34	43.50	-11.16	V
270.37	23.30	14.62	48.73	33.76	46.00	-12.24	V
319.94	32.47	42.02	140.07	42.93	46.00	-3.07	V
369.40	32.36	41.50	138.33	42.82	46.00	-3.18	V
467.24	28.42	26.36	87.87	38.88	46.00	-7.12	V

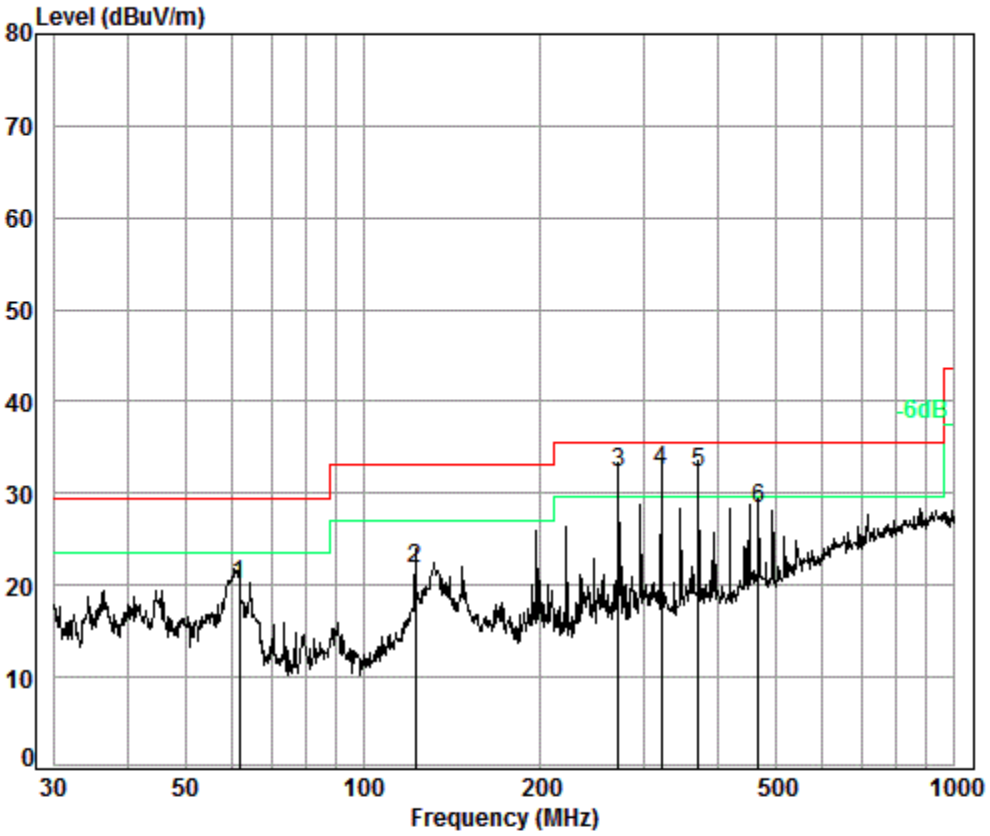
Radiated Emission below 1GHz		
30MHz~1GHz (QP)		
Test mode:	Transmitting	Horizontal



Condition: 10m HORIZONTAL
Job No. : 06801CR
Test Mode: TX

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	58.41	7.00	12.12	32.96	39.85	26.01	29.50	-3.49
2	60.49	7.00	11.90	32.95	38.71	24.66	29.50	-4.84
3	64.43	7.00	11.11	32.93	39.72	24.90	29.50	-4.60
4	270.37	7.95	11.86	32.63	37.68	24.86	35.60	-10.74
5	369.40	8.30	14.27	32.60	38.34	28.31	35.60	-7.29
6	451.14	8.43	16.19	32.60	38.10	30.12	35.60	-5.48

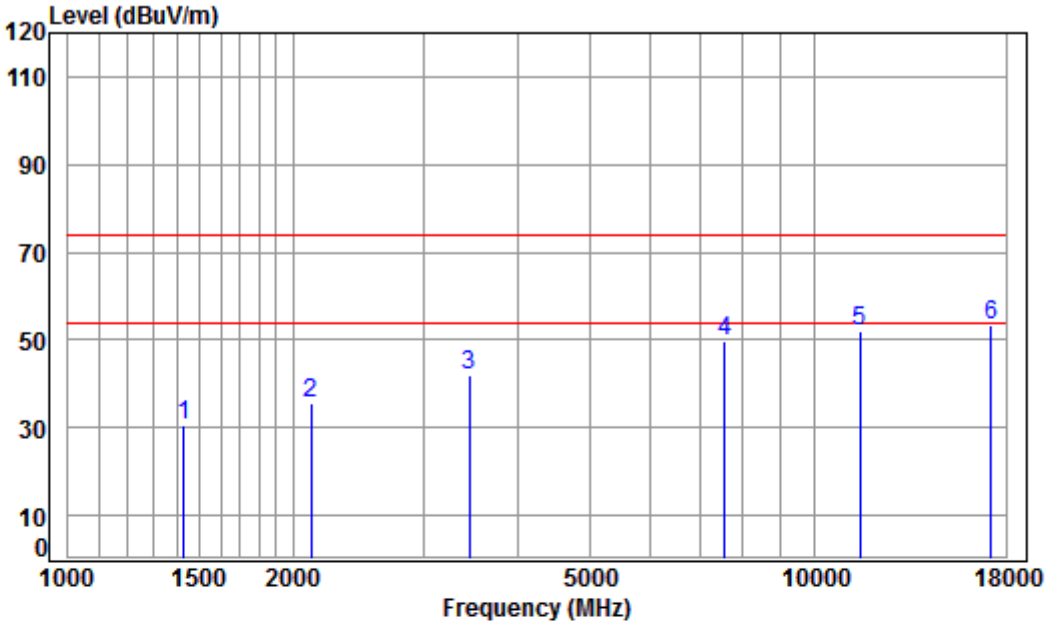
Radiated Emission below 1GHz		
30MHz~1GHz (QP)		
Test mode:	Transmitting	Vertical



Condition: 10m VERTICAL
Job No. : 06801CR
Test Mode: TX

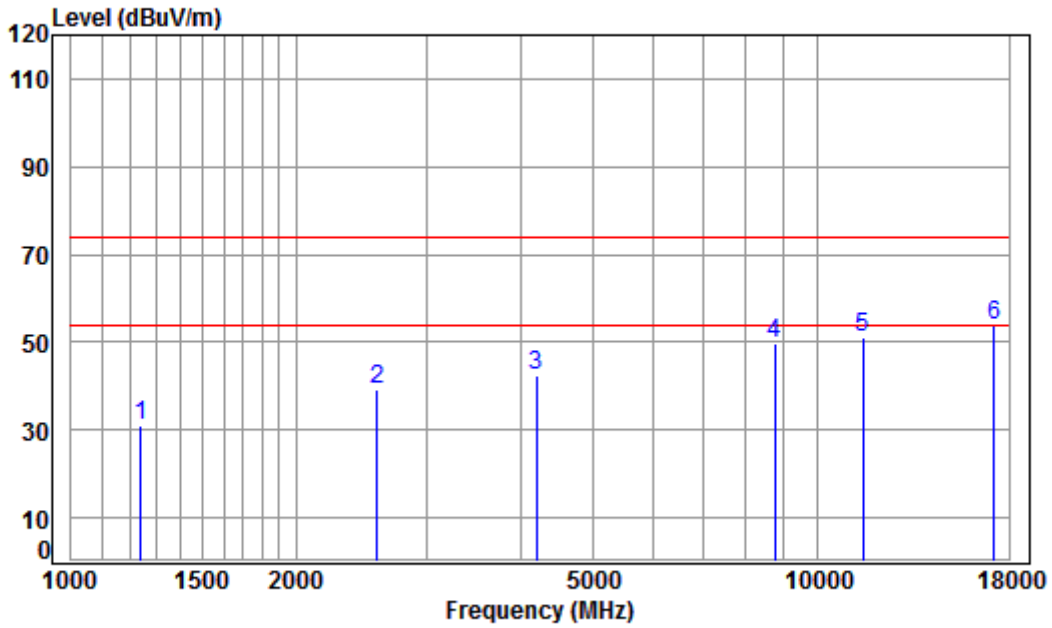
	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	61.78	7.00	11.63	32.94	34.46	20.15	29.50	-9.35
2	122.83	7.32	11.65	32.77	35.68	21.88	33.10	-11.22
3	270.37	7.95	11.86	32.63	45.12	32.30	35.60	-3.30
4 pp	319.94	8.10	13.23	32.60	43.74	32.47	35.60	-3.13
5	369.40	8.30	14.27	32.60	42.39	32.36	35.60	-3.24
6	467.24	8.47	16.37	32.60	36.18	28.42	35.60	-7.18

Radiated Emission above 1GHz:



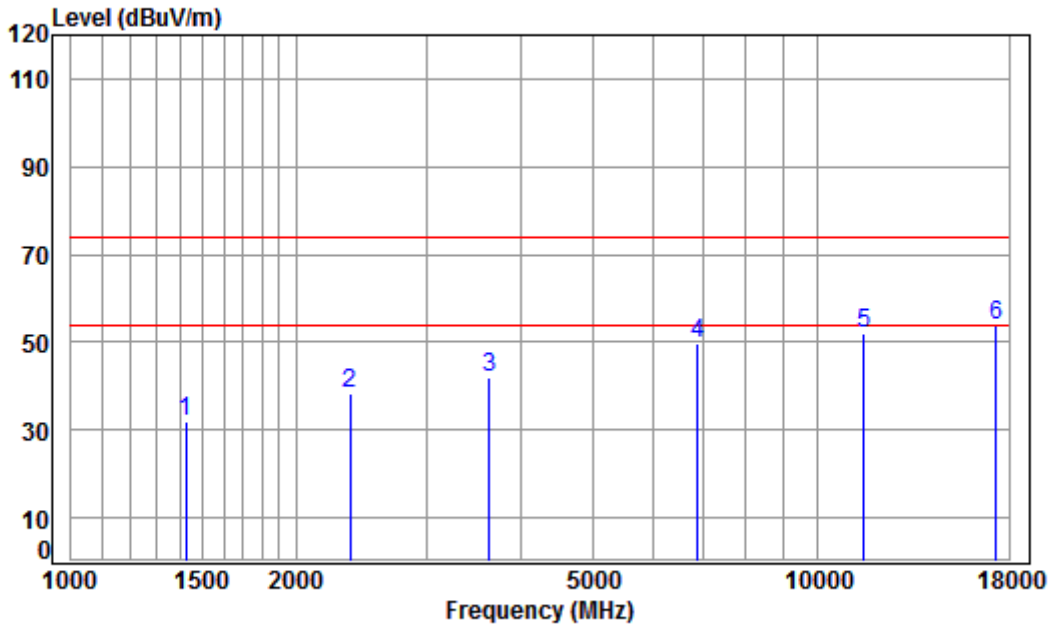
Condition: 3m HORIZONTAL
Job No : 06801CR
Mode : 5736 TX SE
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1431.047	4.39	25.52	38.06	38.82	30.67	74.00	-43.33	Peak
2	2114.052	5.11	28.20	37.99	40.25	35.57	74.00	-38.43	Peak
3	3445.535	6.26	32.11	37.94	41.73	42.16	74.00	-31.84	Peak
4	7562.942	9.87	36.34	36.79	40.21	49.63	74.00	-24.37	Peak
5	11472.000	12.33	38.07	35.49	36.95	51.86	74.00	-22.14	Peak
6	pp17208.000	17.47	43.03	36.21	28.96	53.25	74.00	-20.75	Peak



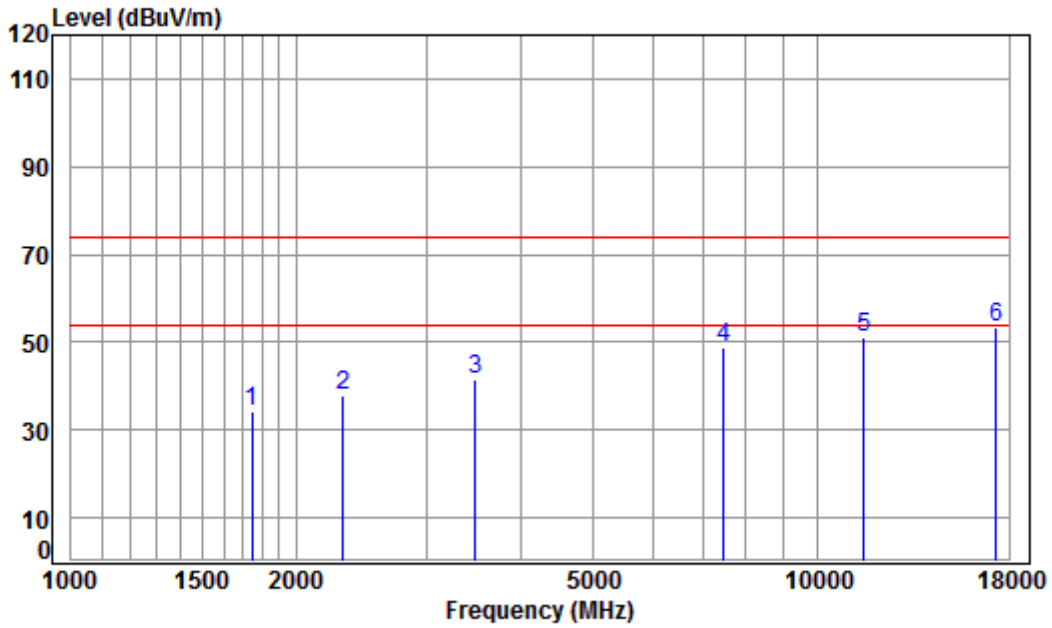
Condition: 3m VERTICAL
Job No : 06801CR
Mode : 5736 TX SE
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1238.483	4.13	24.67	38.08	40.50	31.22	74.00	-42.78	Peak
2	2565.777	5.49	29.67	37.94	42.08	39.30	74.00	-34.70	Peak
3	4193.872	6.93	33.60	38.10	40.11	42.54	74.00	-31.46	Peak
4	8738.852	10.49	36.29	35.66	38.68	49.80	74.00	-24.20	Peak
5	11472.000	12.33	38.07	35.49	36.29	51.20	74.00	-22.80	Peak
6	pp17208.000	17.47	43.03	36.21	29.53	53.82	74.00	-20.18	Peak



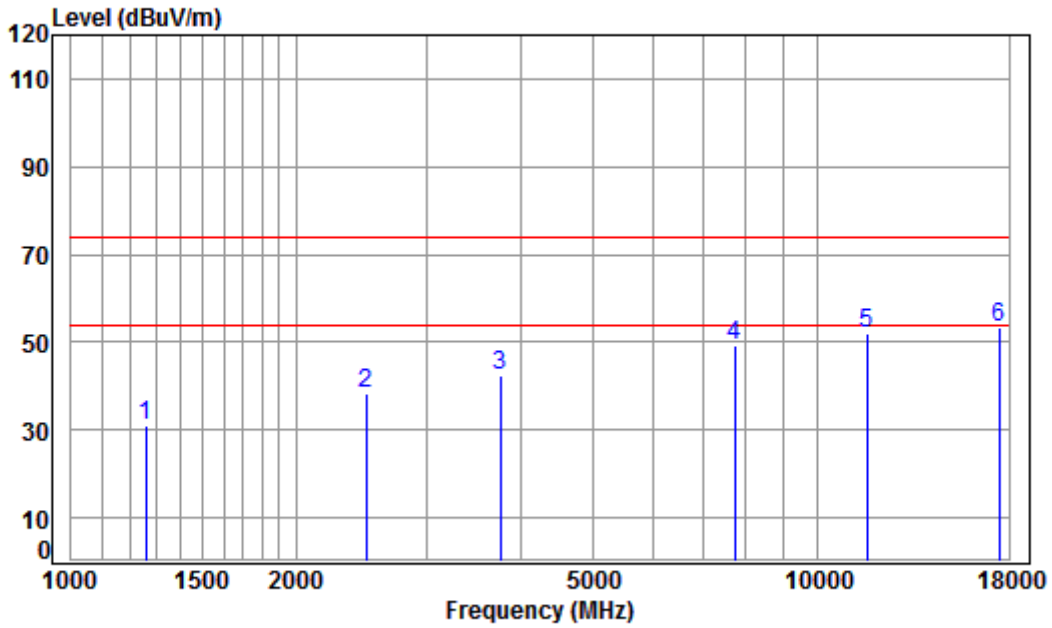
Condition: 3m HORIZONTAL
Job No : 06801CR
Mode : 5762 TX SE
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1426.916	4.38	25.50	38.06	39.96	31.78	74.00	-42.22	Peak
2	2366.308	5.32	29.01	37.96	42.04	38.41	74.00	-35.59	Peak
3	3629.540	6.41	32.58	37.96	40.92	41.95	74.00	-32.05	Peak
4	6894.806	9.42	36.21	37.41	41.46	49.68	74.00	-24.32	Peak
5	11524.000	12.34	38.13	35.51	36.95	51.91	74.00	-22.09	Peak
6	pp17286.000	17.74	43.15	36.16	29.16	53.89	74.00	-20.11	Peak



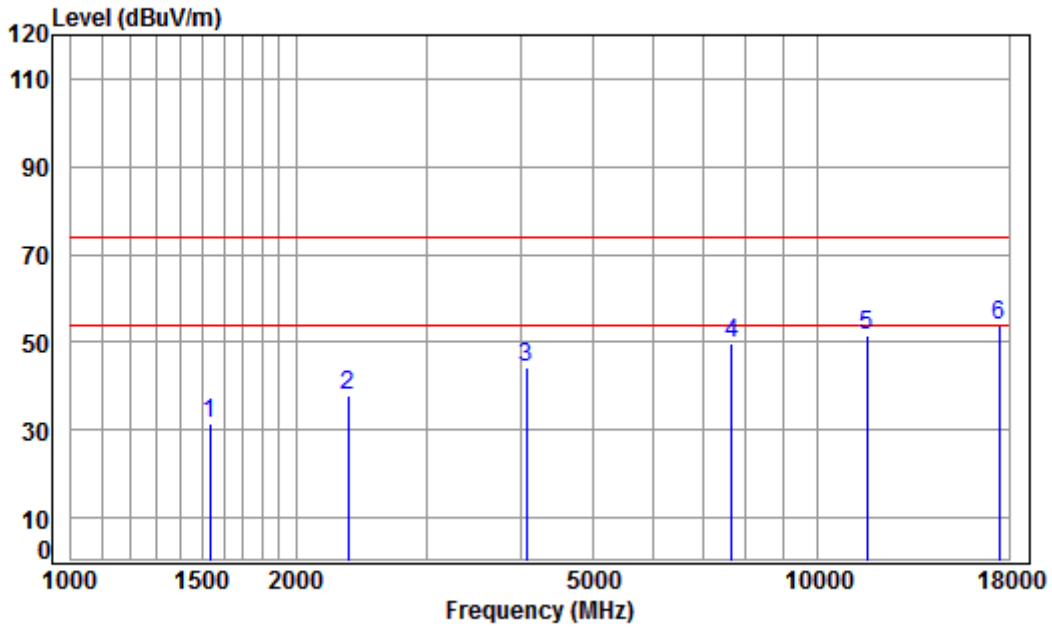
Condition: 3m VERTICAL
Job No : 06801CR
Mode : 5762 TX SE
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1746.898	4.76	26.86	38.03	40.52	34.11	74.00	-39.89	Peak
2	2312.219	5.28	28.84	37.97	41.68	37.83	74.00	-36.17	Peak
3	3475.541	6.28	32.16	37.95	41.22	41.71	74.00	-32.29	Peak
4	7476.006	9.83	36.31	36.87	39.55	48.82	74.00	-25.18	Peak
5	11524.000	12.34	38.13	35.51	36.31	51.27	74.00	-22.73	Peak
6	pp17286.000	17.74	43.15	36.16	28.83	53.56	74.00	-20.44	Peak



Condition: 3m HORIZONTAL
Job No : 06801CR
Mode : 5814 TX SE
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1260.149	4.16	24.77	38.07	40.35	31.21	74.00	-42.79	Peak
2	2485.483	5.41	29.36	37.95	41.42	38.24	74.00	-35.76	Peak
3	3757.637	6.51	32.94	37.98	40.95	42.42	74.00	-31.58	Peak
4	7739.857	9.94	36.45	36.63	39.69	49.45	74.00	-24.55	Peak
5	11628.000	12.35	38.24	35.53	36.73	51.79	74.00	-22.21	Peak
6	pp17442.000	18.14	43.33	36.08	27.84	53.23	74.00	-20.77	Peak



Condition: 3m VERTICAL
Job No : 06801CR
Mode : 5814 TX SE
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1533.841	4.51	25.96	38.05	38.97	31.39	74.00	-42.61	Peak
2	2352.668	5.31	28.96	37.96	41.68	37.99	74.00	-36.01	Peak
3	4074.388	6.79	33.60	38.04	41.89	44.24	74.00	-29.76	Peak
4	7673.034	9.92	36.41	36.69	39.90	49.54	74.00	-24.46	Peak
5	11628.000	12.35	38.24	35.53	36.31	51.37	74.00	-22.63	Peak
6	pp17442.000	18.14	43.33	36.08	28.55	53.94	74.00	-20.06	Peak

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .

3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, 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. So, only the peak measurements were shown in the report.

7.8 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.407(b)
Test Method: KDB 789033 D02 II G
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

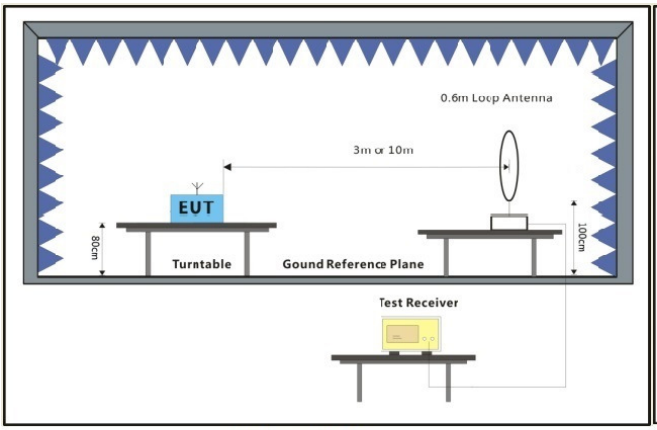
Operating Environment:

Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1005 mbar

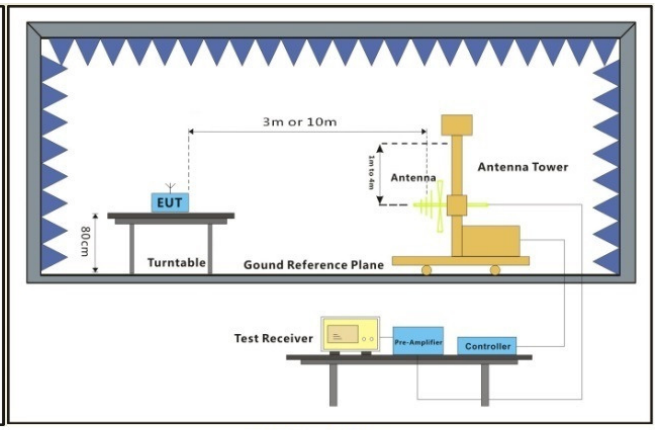
Pretest these mode to find the worst case: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

The worst case for final test: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

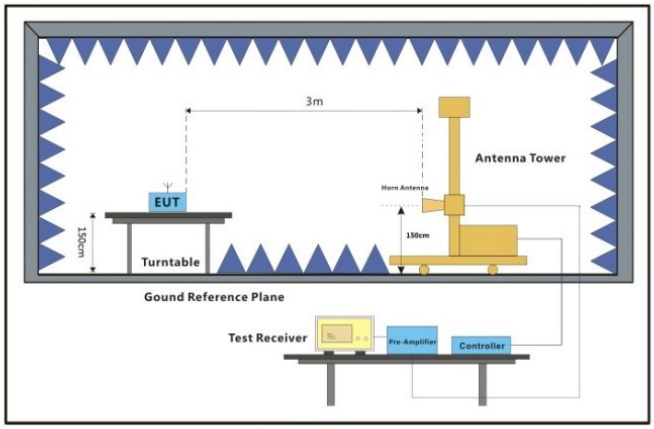
7.8.2 Test Setup Diagram



Below 30MHz



30MHz-1GHz



Above 1GHz

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.

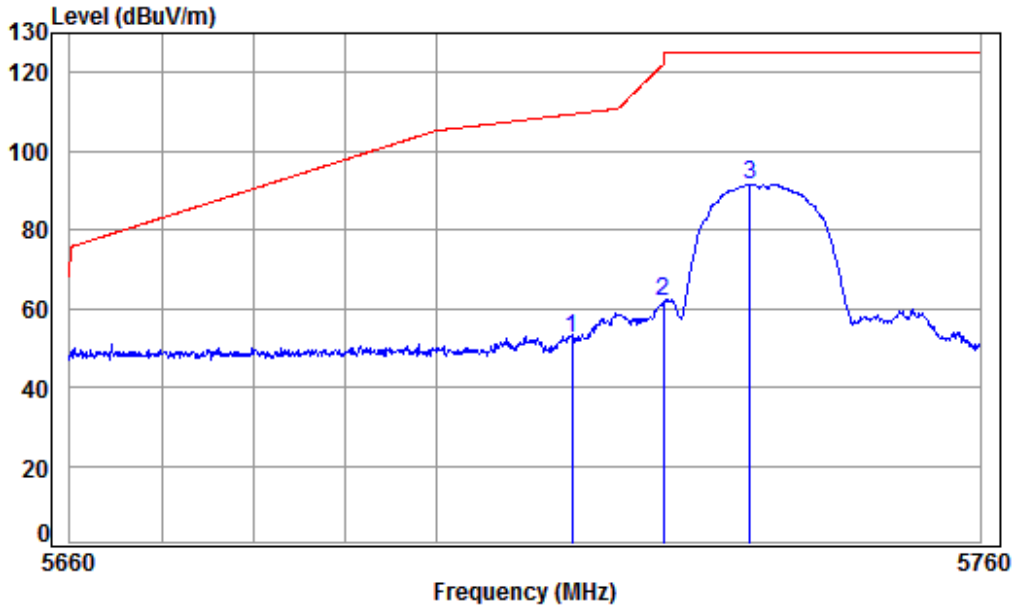
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified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

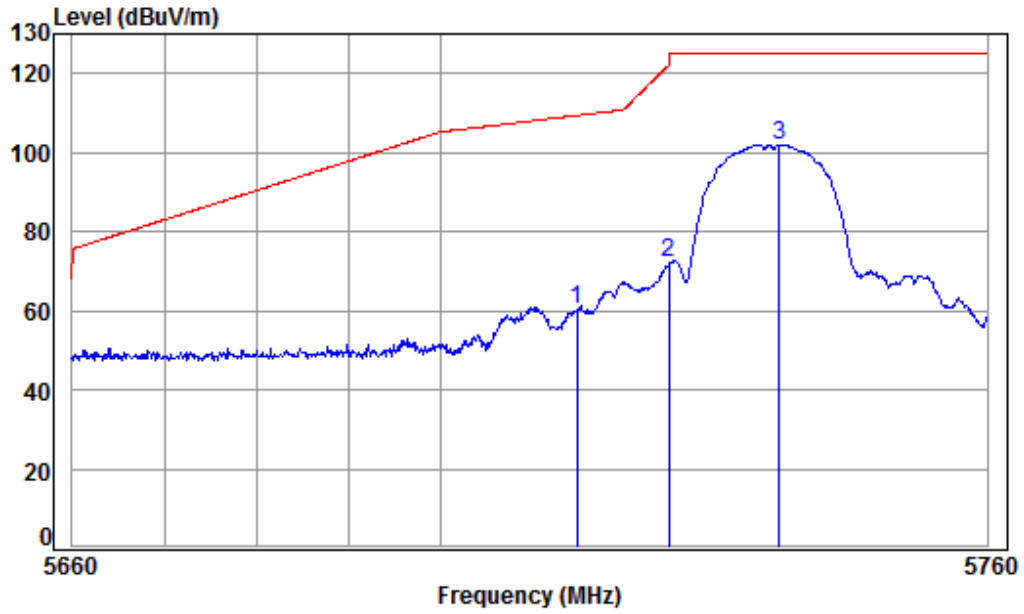
j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



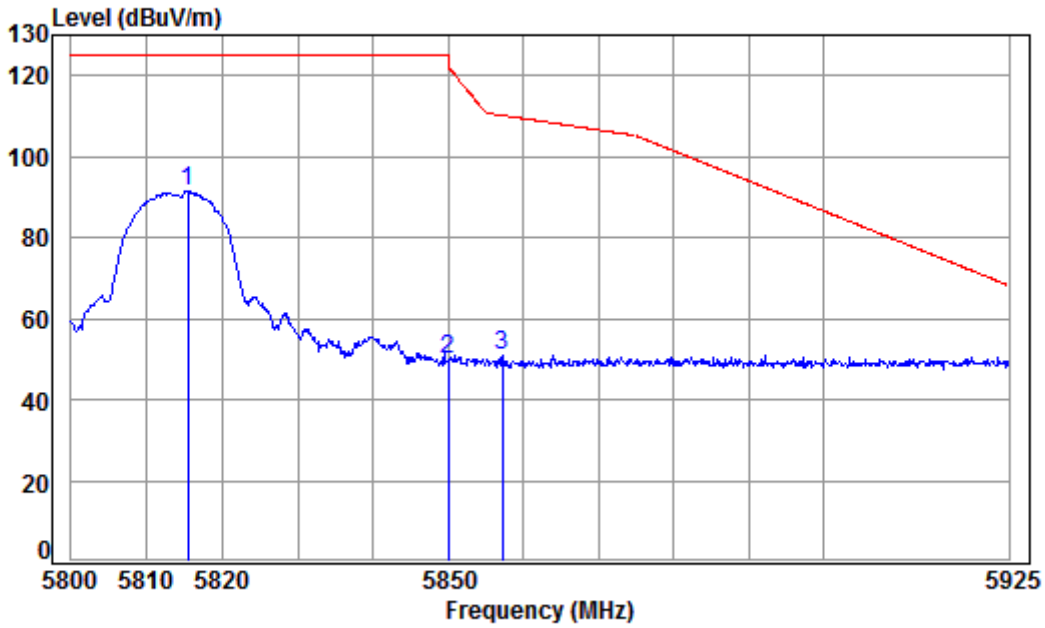
Condition: 3m HORIZONTAL
Job No : 06801CR
Mode : 5736 Band edge
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5715.000	8.47	34.53	38.36	47.97	52.61	109.40	-56.79	peak
2	5725.000	8.48	34.54	38.35	57.18	61.85	122.20	-60.35	peak
3 pp	5734.534	8.49	34.54	38.35	86.86	91.54	125.20	-33.66	Peak



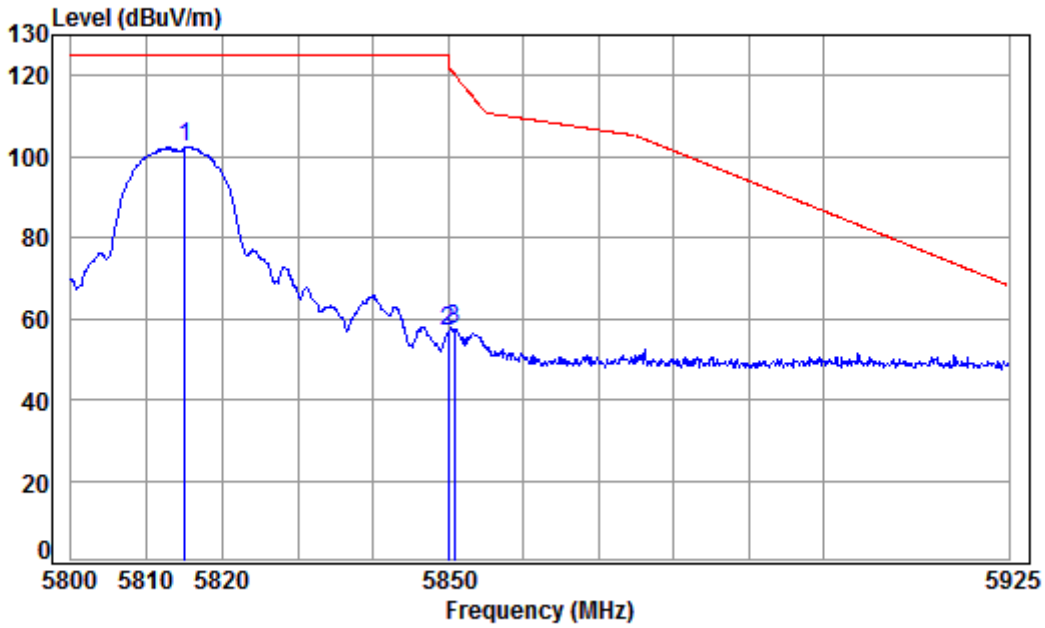
Condition: 3m VERTICAL
Job No : 06801CR
Mode : 5736 Band edge
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5715.000	8.47	34.53	38.36	55.45	60.09	109.40	-49.31	peak
2	5725.000	8.48	34.54	38.35	67.42	72.09	122.20	-50.11	peak
3 pp	5737.146	8.49	34.55	38.35	97.38	102.07	125.20	-23.13	Peak



Condition: 3m HORIZONTAL
Job No : 06801CR
Mode : 5814 Band edge
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	pp 5815.479	8.57	34.59	38.34	86.54	91.36	125.20	-33.84	Peak
2	5850.000	8.60	34.61	38.33	44.99	49.87	122.08	-72.21	Peak
3	5857.169	8.61	34.62	38.33	45.99	50.89	110.19	-59.30	Peak



Condition: 3m VERTICAL
Job No : 06801CR
Mode : 5814 Band edge
Note : MF8235

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	5815.107	8.57	34.59	38.34	97.57	102.39	125.20	-22.81	Peak
2	5850.000	8.60	34.61	38.33	51.87	56.75	122.08	-65.33	Peak
3	5850.803	8.61	34.61	38.33	52.55	57.44	120.37	-62.93	Peak

7.9 Frequency Stability

Test Requirement	47 CFR Part 15, Subpart C 15.407 (g)
Test Method:	ANSI C63.10 (2013) Section 6.8
Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

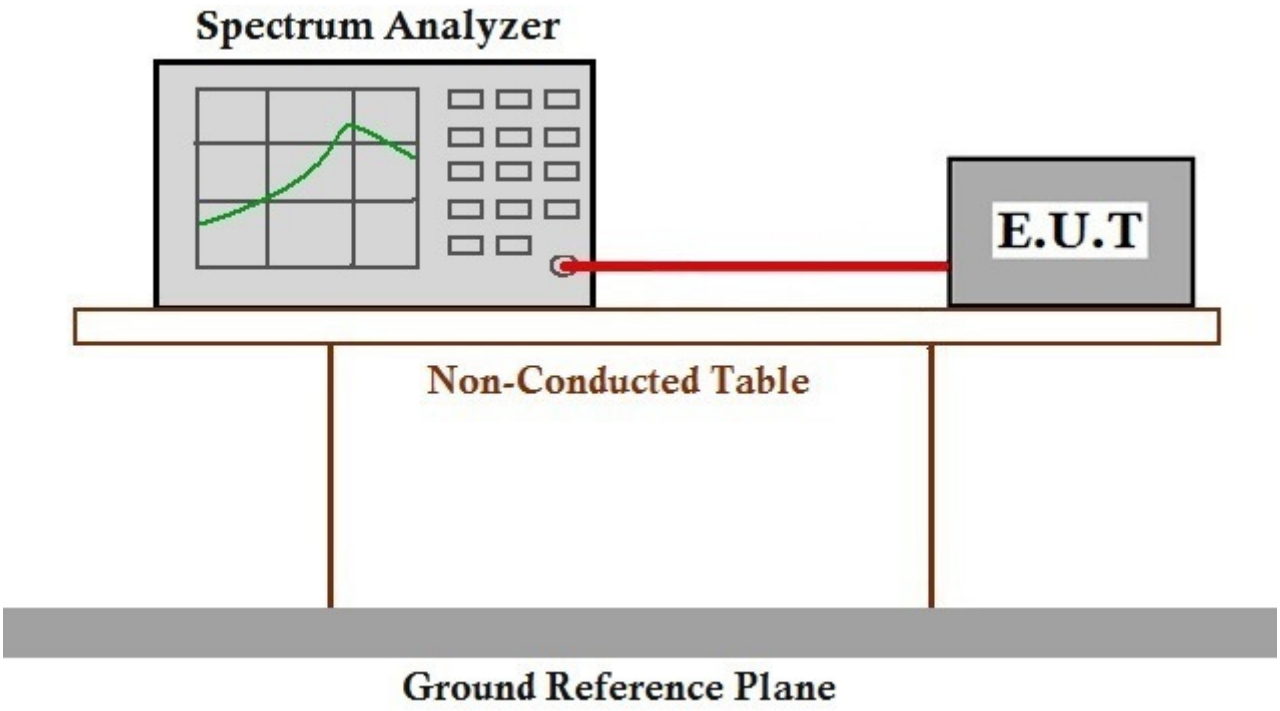
7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Pretest these mode to find the worst case: Define 5.8GHz TX mode(MF8235)_Keep the EUT in continuously transmitting mode with modulation.

7.9.2 Test Setup Diagram



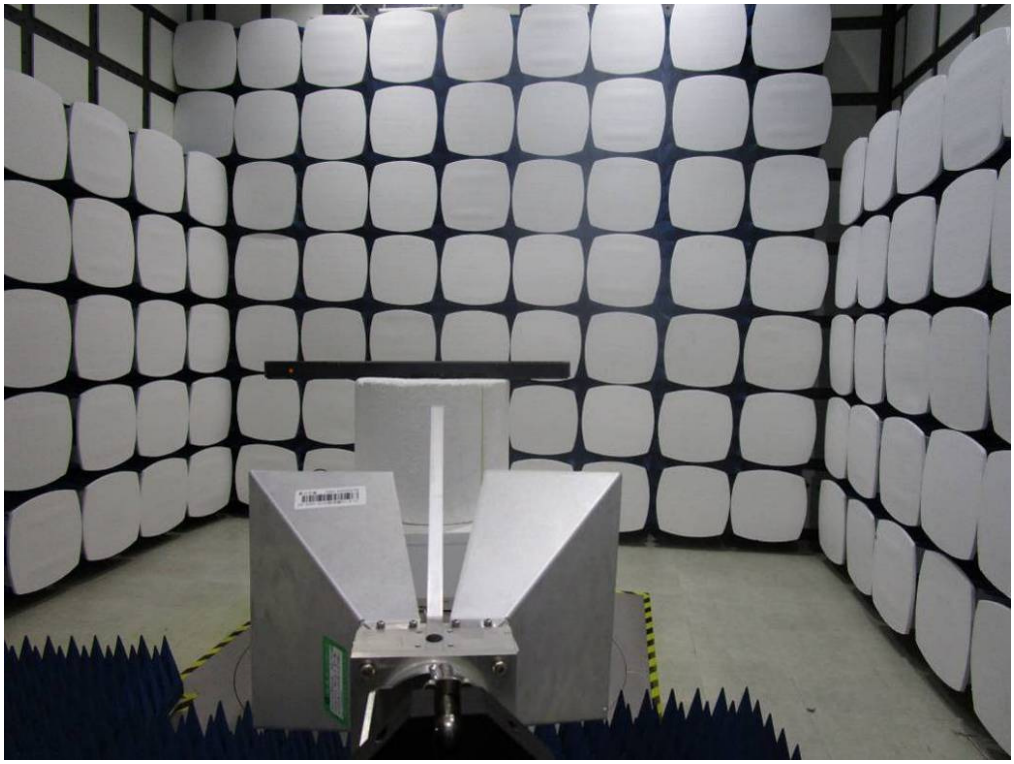
7.9.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407

8 Photographs

8.1 Conducted Disturbance at AC Power Line(150kHz-30MHz) Test Setup

8.2 Radiated Emissions Test Setup



8.3 EUT Constructional Details

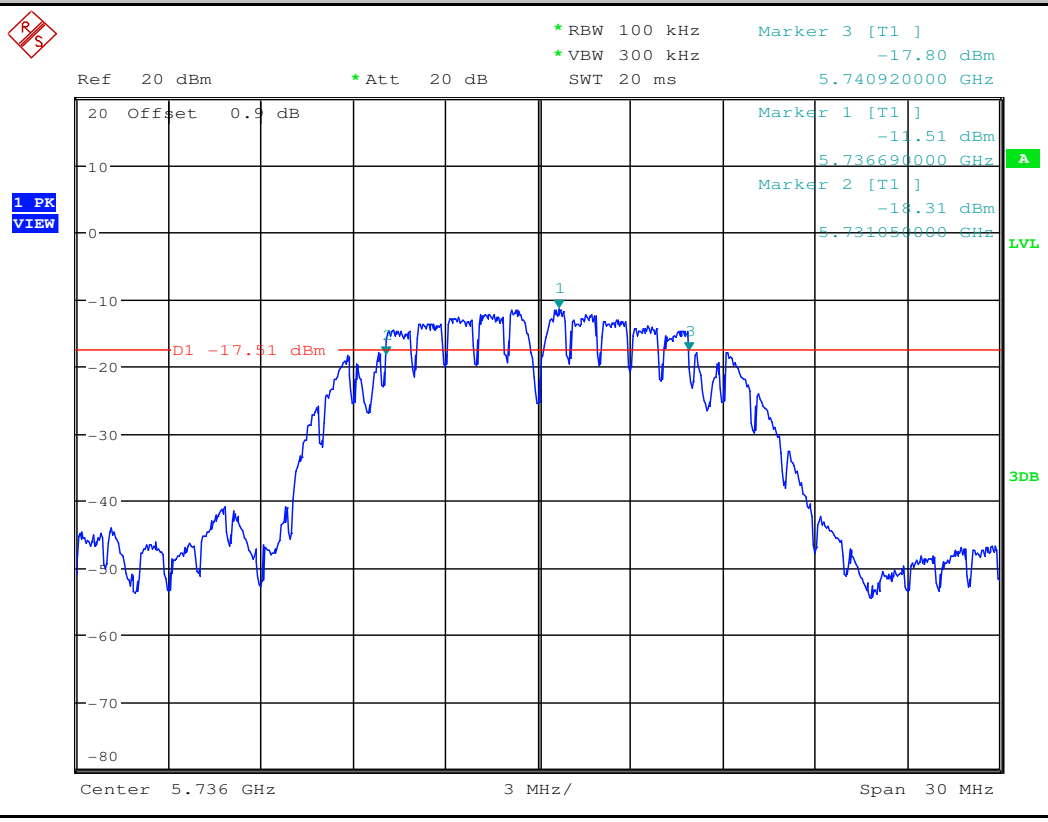
Refer to Appendix B - Photographs of EUT Constructional Details for SZEM1706006801CR.

9 Appendix

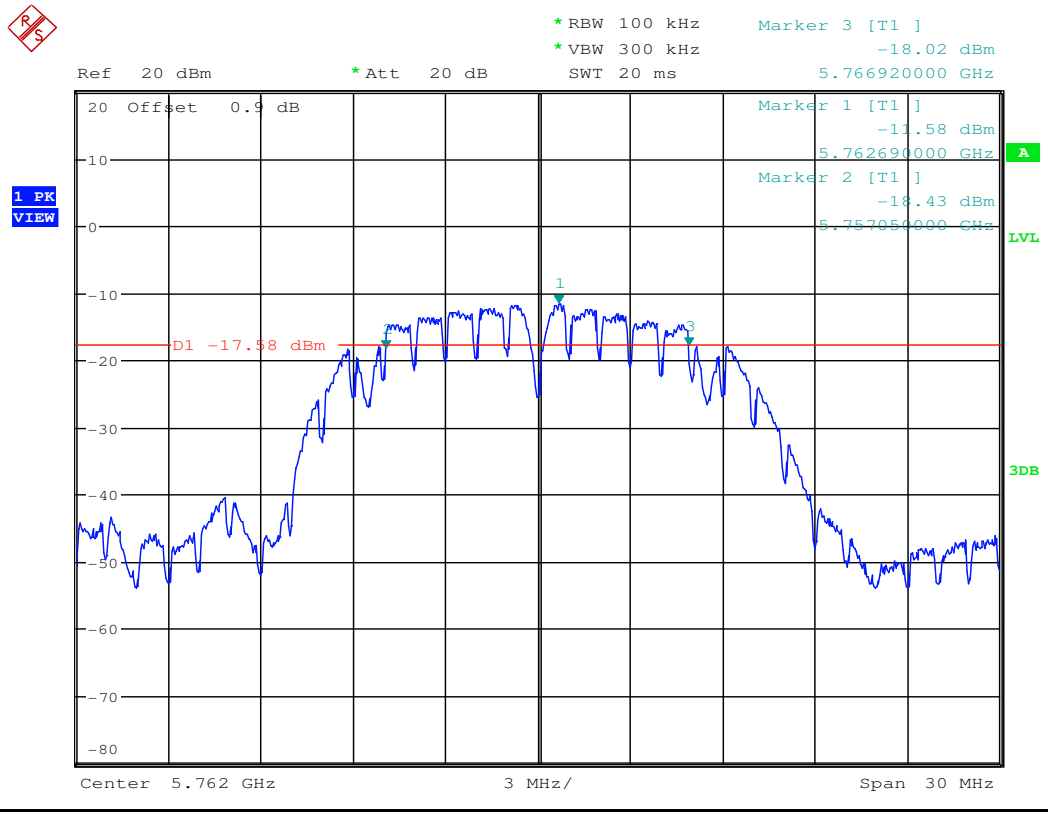
1.Emission Bandwidth Measurement

Test Mode	Test Channel	EBW[MHz]	Limit[MHz]	Verdict
TX	5736	9.870	>=0.5	PASS
TX	5762	9.870	>=0.5	PASS
TX	5814	9.870	>=0.5	PASS

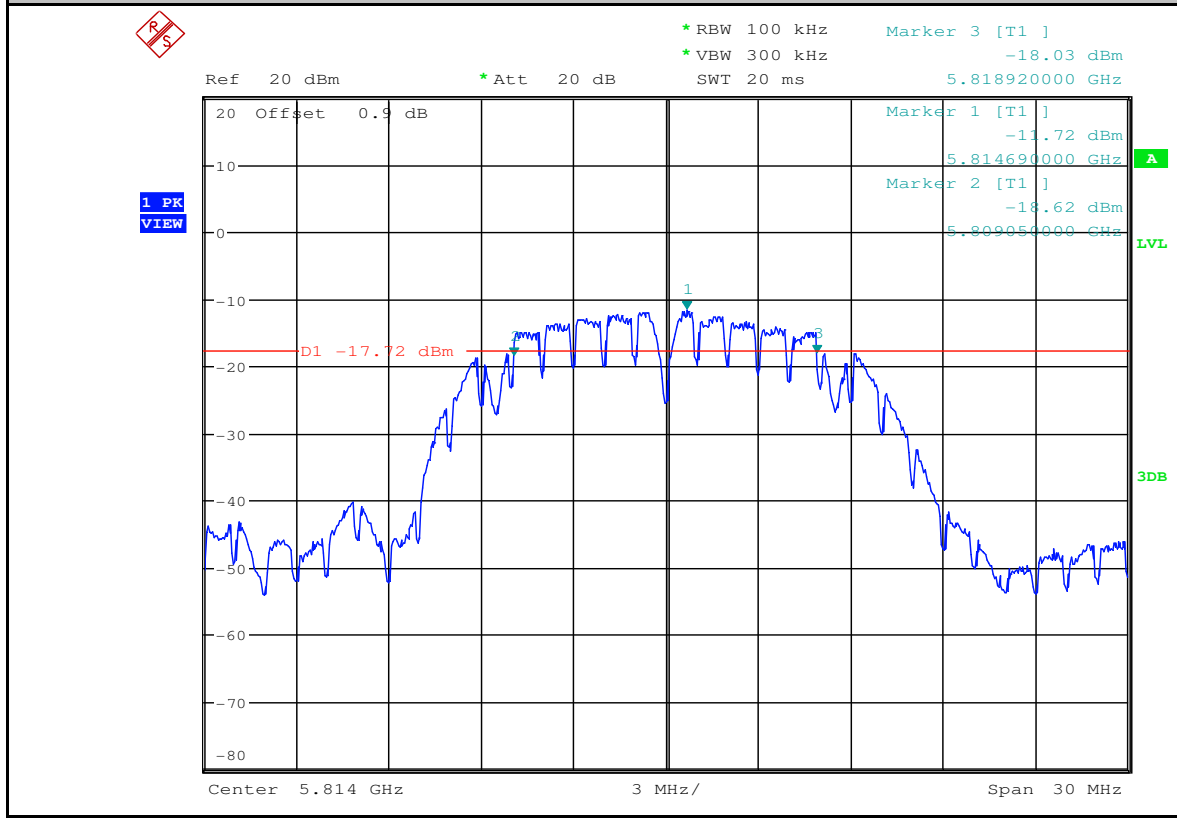
Emission Bandwidth Measurement_TX_5736



Emission Bandwidth Measurement_TX_5762



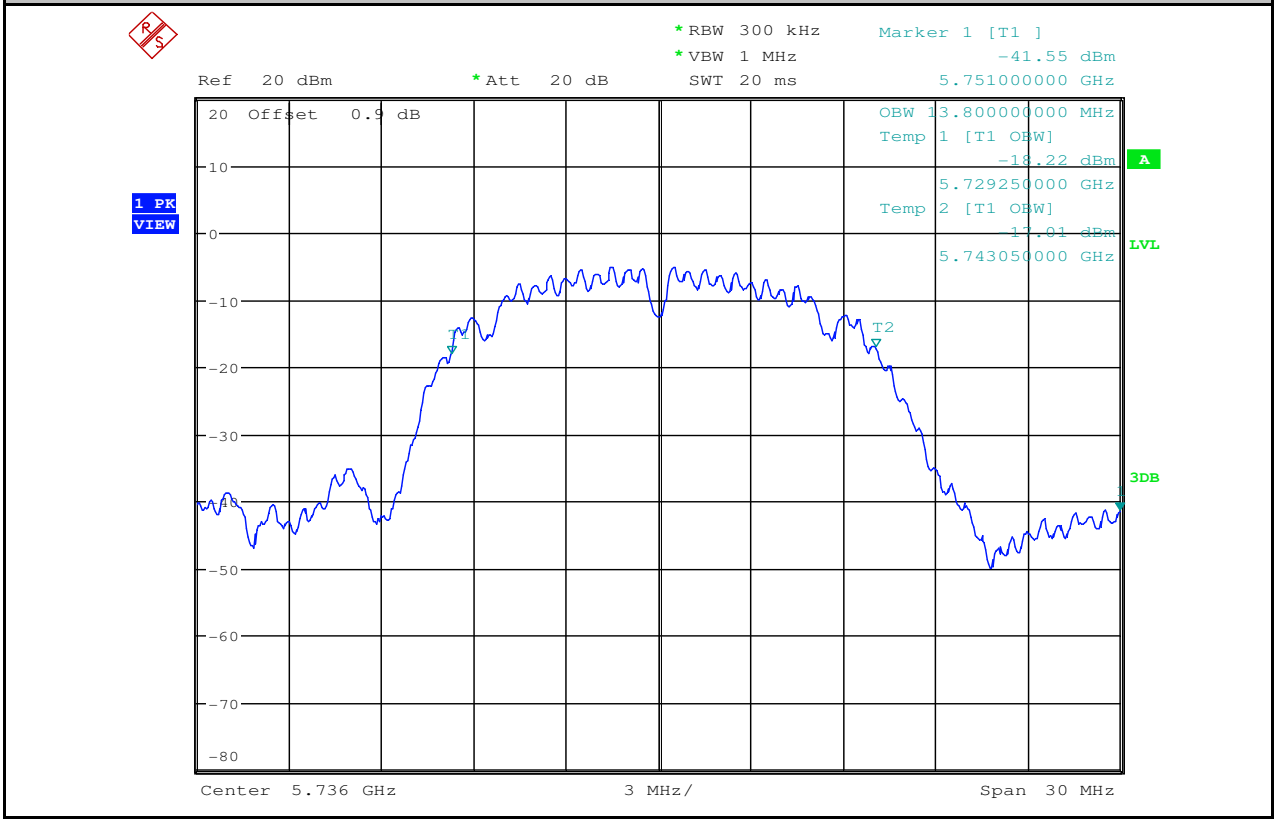
Emission Bandwidth Measurement_TX_5814



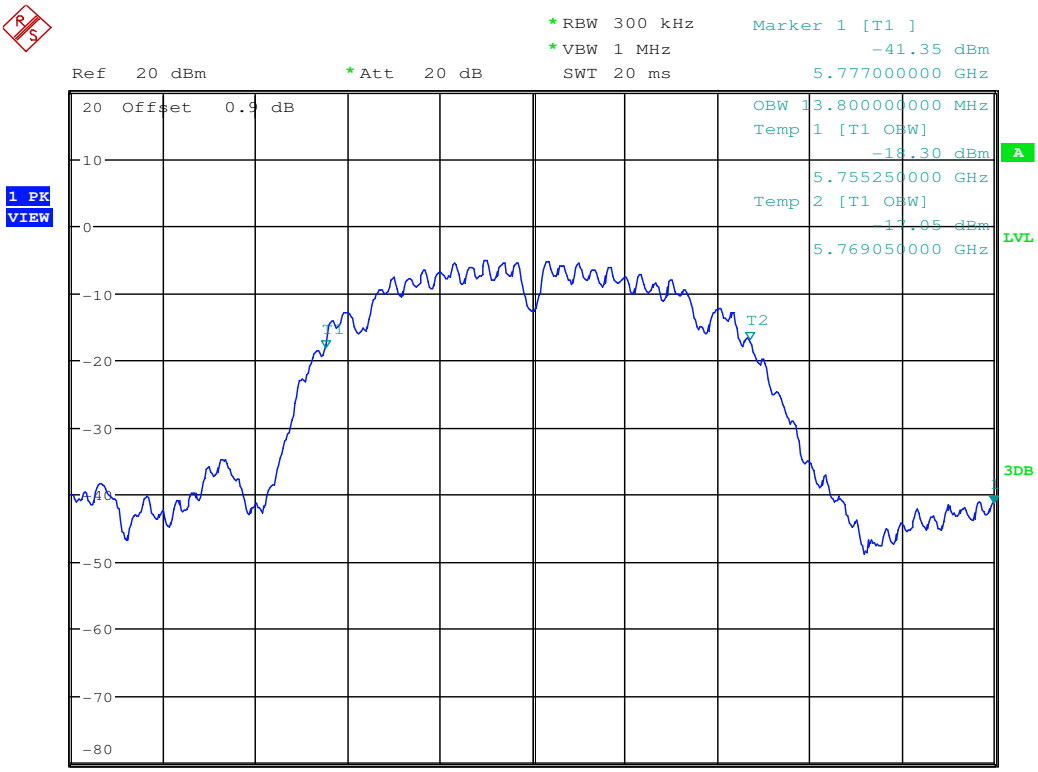
2.Occupied Bandwidth Measurement

Test Mode	Test Channel	OBW[MHz]	Limit[MHz]	Verdict
TX	5736	13.800	---	PASS
TX	5762	13.800	---	PASS
TX	5814	13.800	---	PASS

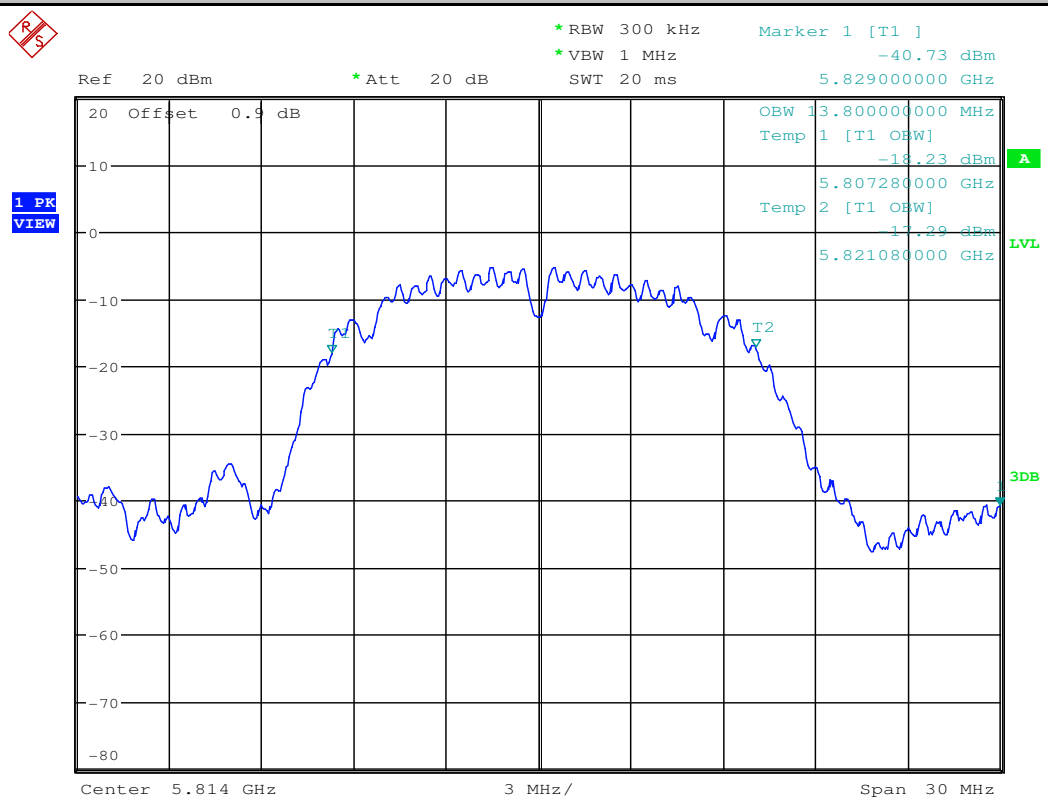
Occupied Bandwidth Measurement_TX_5736



Occupied Bandwidth Measurement_TX_5762



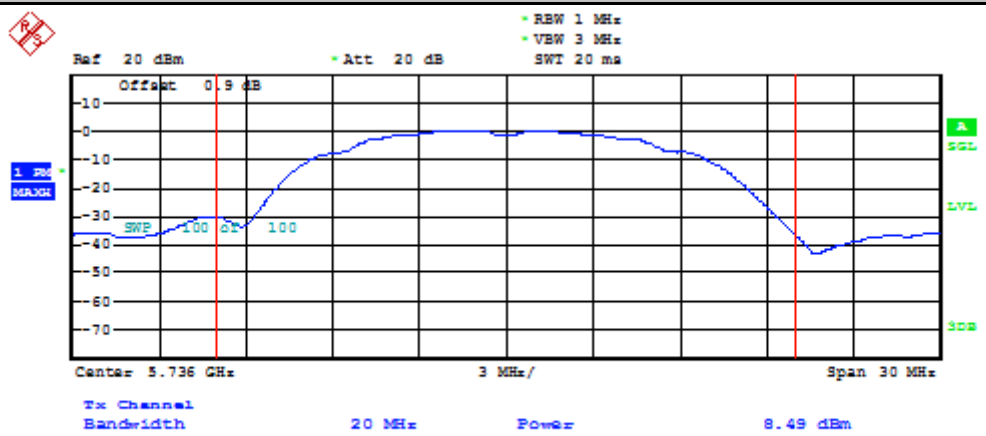
Occupied Bandwidth Measurement_TX_5814



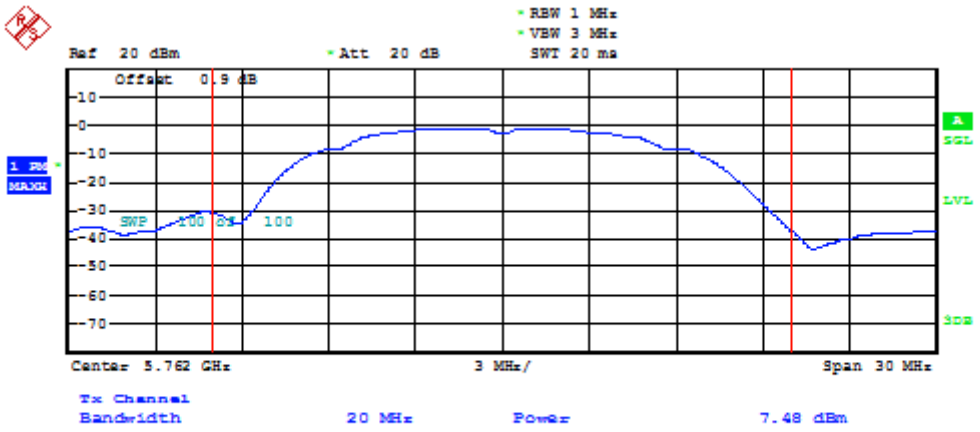
3. Maximum Conduct Output Power

Test Mode	Test Channel	Power[dBm]	Limit[dBm]	Verdict
TX	5736	8.49	<30	PASS
TX	5762	7.48	<30	PASS
TX	5814	4.58	<30	PASS

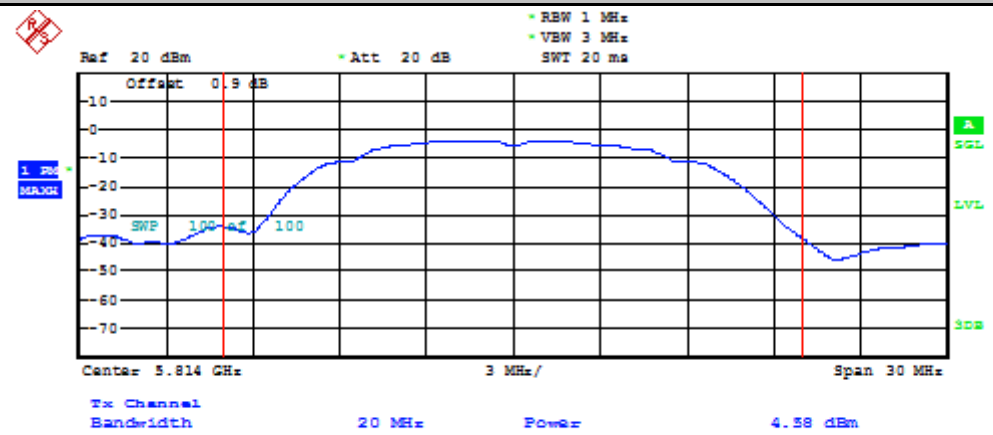
Maximum Conduct Output Power_TX_5736



Maximum Conduct Output Power_TX_5762



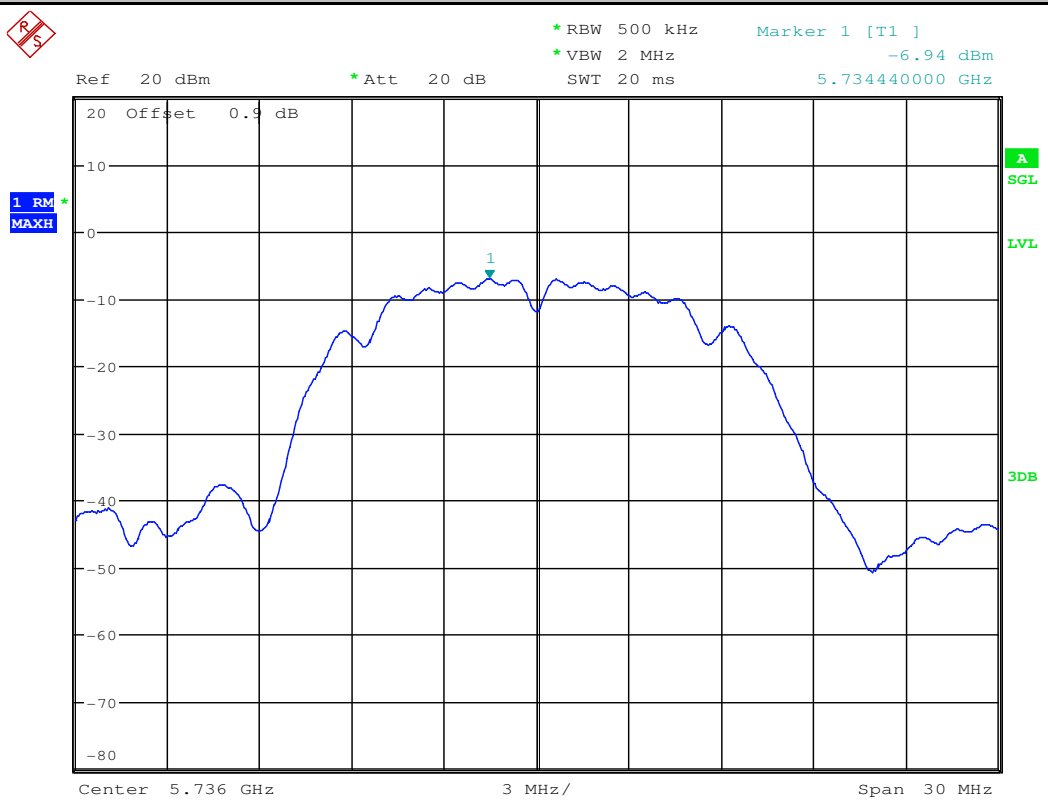
Maximum Conduct Output Power_TX_5814



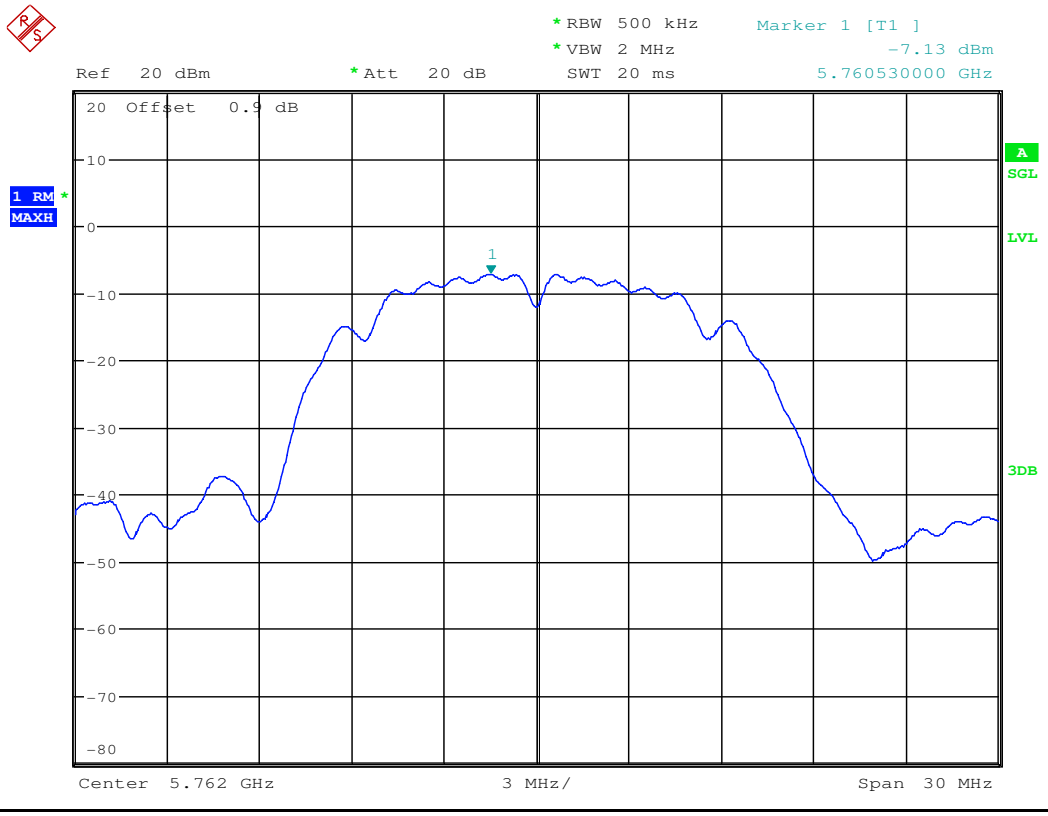
4. Maximum Power Spectral Density

Test Mode	Test Channel	Level [dBm/500kHz]	10log(1/x) Factor[dB]	10log(500kHz/RBW) Factor [dB]	PSD [dBm/500kHz]	Limit [dBm/500kHz]	Verdict
TX	5736	-6.94	0	0	-6.94	<17.00	PASS
TX	5762	-7.13	0	0	-7.13	<17.00	PASS
TX	5814	-7.33	0	0	-7.33	<17.00	PASS

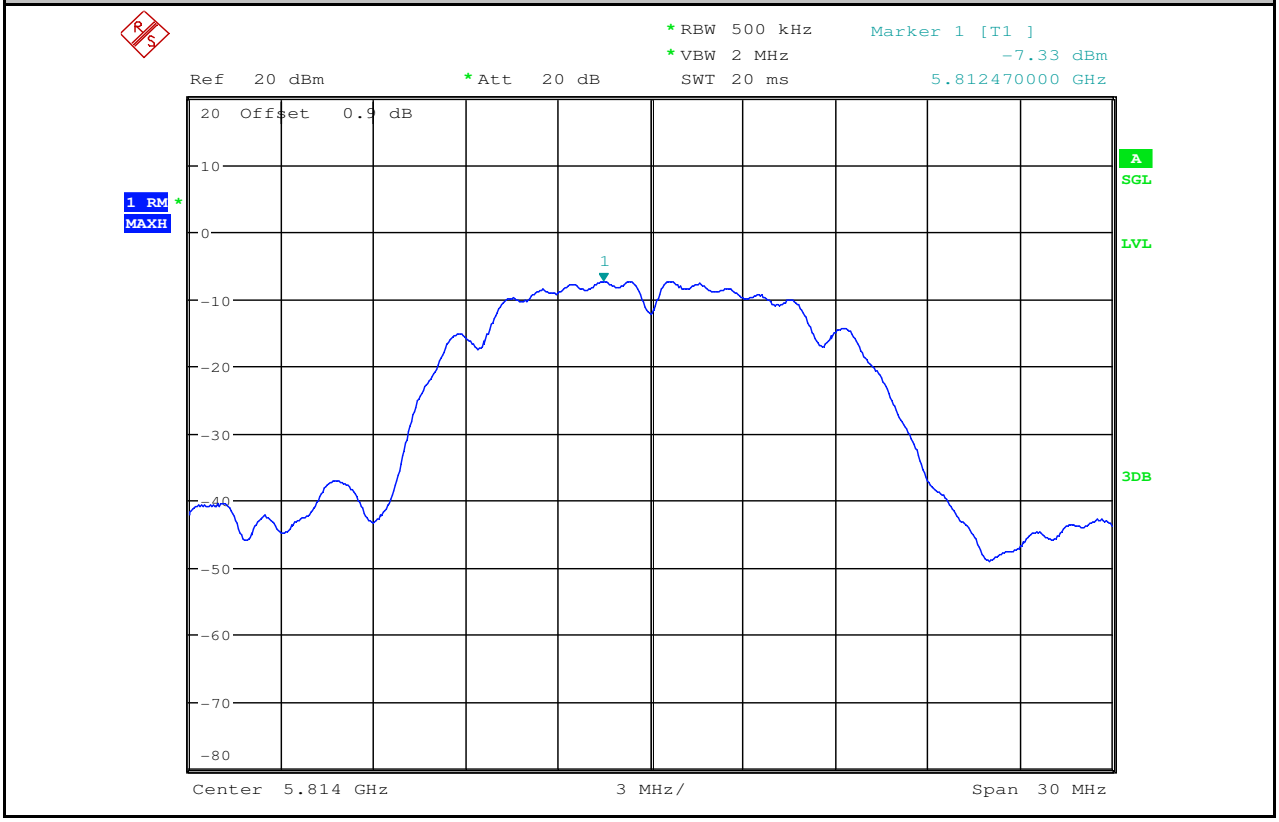
Maximum Power Spectral Density_TNVN_TX_5736



Maximum Power Spectral Density_TNVN_TX_5762



Maximum Power Spectral Density_TNVN_TX_5814



5. Frequency Stability

Test mode:	TX	Frequency(MHz):	5736	
Temperature (℃)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(kHz)	Result
45	120	5736.9232	-0.9232	Pass
35		5736.9231	-0.9231	Pass
25		5736.9321	-0.9321	Pass
15		5736.9654	-0.9654	Pass
5		5736.9233	-0.9233	Pass
0		5736.9432	-0.9432	Pass
20	138	5736.9534	-0.9534	Pass
	120	5736.9131	-0.9131	Pass
	102	5736.9534	-0.9534	Pass

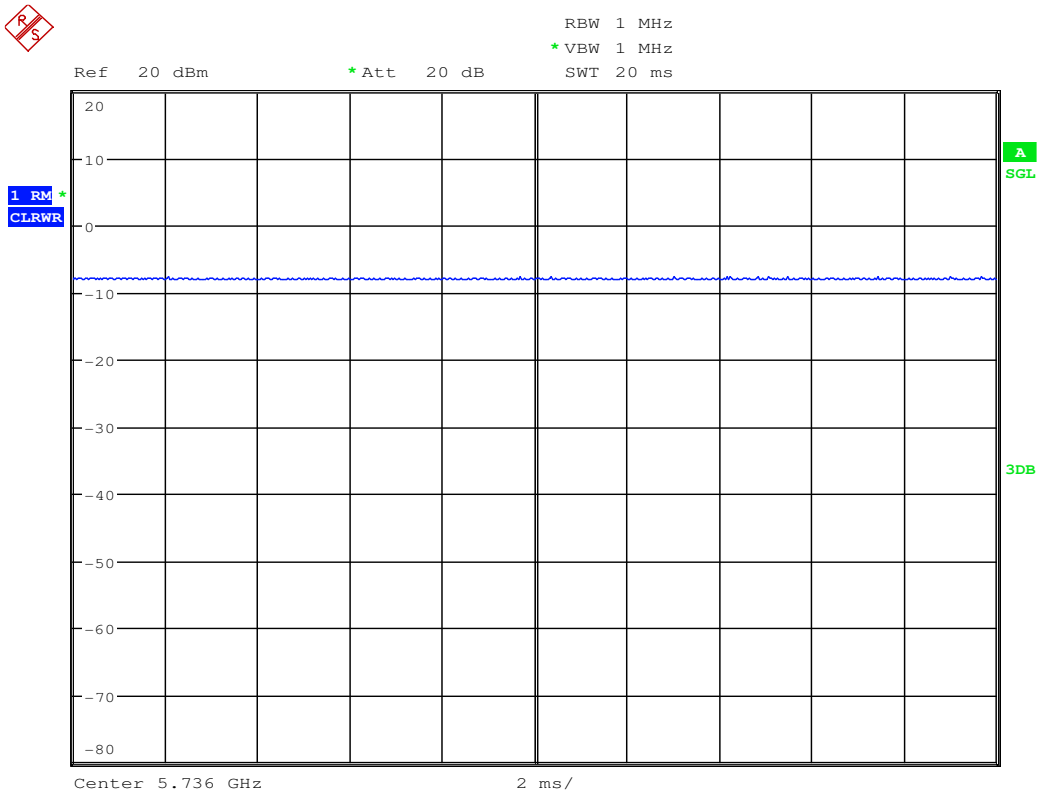
Test mode:	TX	Frequency(MHz):	5762	
Temperature (℃)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(kHz)	Result
45	120	5762.9012	-0.9012	Pass
35		5762.9013	-0.9013	Pass
25		5762.9021	-0.9021	Pass
15		5762.9544	-0.9544	Pass
5		5762.9017	-0.9017	Pass
0		5762.9032	-0.9032	Pass
20	138	5762.9015	-0.9015	Pass
	120	5762.9031	-0.9031	Pass
	102	5762.9030	-0.9030	Pass

Test mode:	TX	Frequency(MHz):	5814	
Temperature (℃)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(kHz)	Result
45	120	5815.2343	-1.2343	Pass
35		5815.2344	-1.2344	Pass
25		5815.2231	-1.2231	Pass
15		5815.2242	-1.2242	Pass
5		5815.2233	-1.2233	Pass
0		5815.2214	-1.2214	Pass
20	138	5815.2365	-1.2365	Pass
	120	5815.2177	-1.2177	Pass
	102	5815.2259	-1.2259	Pass

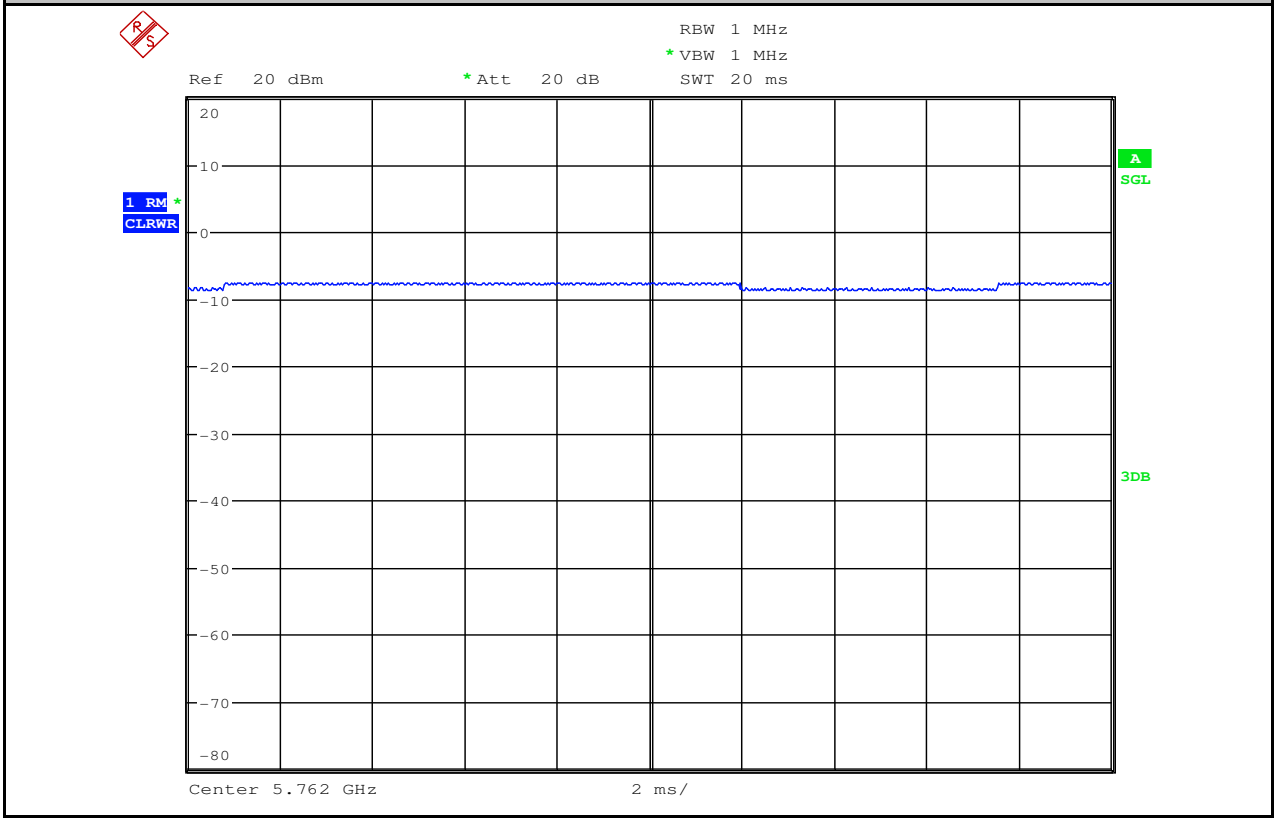
6. Duty Cycle (x)

Test Mode	Test Channel	Duty Cycle[%]	10log(1/x) Factor[dB]
TX	5736	100	0
TX	5762	100	0
TX	5814	100	0

Duty Cycle_TX_5736



Duty Cycle_TX_5762



Duty Cycle_TX_5814