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

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TEST REPORT

Application No.:	SZEM1703001463CR(GZEM1702000942CR)
Applicant:	Kysho Multimedia Ltd.
Address of Applicant:	Flat F, 5/F Valiant Industrial Centre, 2-12 Au Pui Wan ST, Fo Tan, Shatin
Manufacturer:	Kysho Multimedia Ltd.
Address of Manufacturer:	Flat F, 5/F Valiant Industrial Centre, 2-12 Au Pui Wan ST, Fo Tan, Shatin
Factory:	1. Huizhou Shenke XinFei Technology Co., Ltd. 2. Dongguan Longyi Electronics Co., Ltd
Address of Factory:	1. Building C Tangxia Area, Chanjing Village Xinxu Town, Huiyang District, Huizhou, Guangdong Province, China 2. Jieling Industrial Zone No. 8, GuanJingTou Village, Fenggang, Dongguan, 523690
Equipment Under Test (EUT):	
EUT Name:	BLUETOOTH SPEAKER
Model No.:	IMT802
Trade mark:	ALTEC LANSING
FCC ID:	SP9-00011A
Standards:	47 CFR Part 15, Subpart E (2016)
Date of Receipt:	2017-03-06
Date of Test:	2017-03-10 to 2017-04-14
Date of Issue:	2017-04-27
Test Result :	**Pass***

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

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.

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Revision Record				
Version	***Chapter***	***Date***	***Modifier***	***Remark***
01		*2017-03-29*		*Original*

Authorized for issue by:				
Tested By		Bin Chen **Benson Wang /Project Engineer**		2017-04-14 **Date**
Checked By		Eric Fu **Eric Fu /Reviewer**		2017-04-27 **Date**

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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 E 15.203	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Disturbance 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 E 15.207 & 15.407 b(6)	Pass
26 dB Emission Bandwidth & 99% Occupied Bandwidth	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II C 1	47 CFR Part 15, Subpart E 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 E 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 E 15.407 (a)	Pass
Equivalent Isotropic Radiated Power (e.i.r.p.)	47 CFR Part 15 Section 15.407	KDB 789033 D02 II E	47 CFR Part 15, Subpart E 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 E 15.407 (a)	Pass
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart E 15.209 & 15.407(b)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart E 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 E 15.407 (g)	Pass

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4 General Information

4.1 Details of E.U.T.

Power supply:	Test voltage:120V 60Hz
	Rechargeable battery:DC 11.1V 4000mAh 44.4Wh
	DC input:DC 12V
Cable:	DC cable:285cm Unshielded
	AC cable:140cm Unshielded
Operation Frequency:	5727MHz-5800MHz
Channel number:	16
Type of Modulation:	FSK
Antenna type:	PIFA
Antenna gain:	4dBi

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	5727MHz	4	5749MHz	8	5767MHz	12	5778MHz
1	5731MHz	5	5753MHz	9	5771MHz	13	5789MHz
2	5734MHz	6	5756MHz	10	5773MHz	14	5796MHz
3	5738MHz	7	5760MHz	11	5774MHz	15	5780MHz

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel (CH0)	5727MHz
The middle channel (CH7)	5760MHz
The highest channel (CH15)	5800MHz

4.2 Description of Support Units

The EUT has been tested as an independent unit.

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4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25 x 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%

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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 – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

• **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

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5 Equipment List

Conducted Disturbance 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	2016-05-13	2017-05-13
LISN	Rohde & Schwarz	ENV216	SEM007-01	2016-10-09	2017-10-09
LISN	ETS-LINDGREN	3816/2	SEM007-02	2016-04-25	2017-04-25
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

RE in Chamber					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (yyyy-mm-dd)**	**Cal. Due date (yyyy-mm-dd)**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2016-05-13	2017-05-13
EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-09	2016-07-19	2017-07-19
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15
Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
Horn Antenna (18-26GHz)	ETS-Lindgren	3160	SEM003-12	2014-11-24	2017-11-24
Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A

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RE in Chamber					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (yyyy-mm-dd)**	**Cal. Due date (yyyy-mm-dd)**
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2016-05-13	2017-05-13
EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2016-10-09	2017-10-09
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2014-11-01	2017-11-01
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2017-04-25	2018-04-25

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
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
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	2016-05-18	2017-05-18

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15C Section 15.203

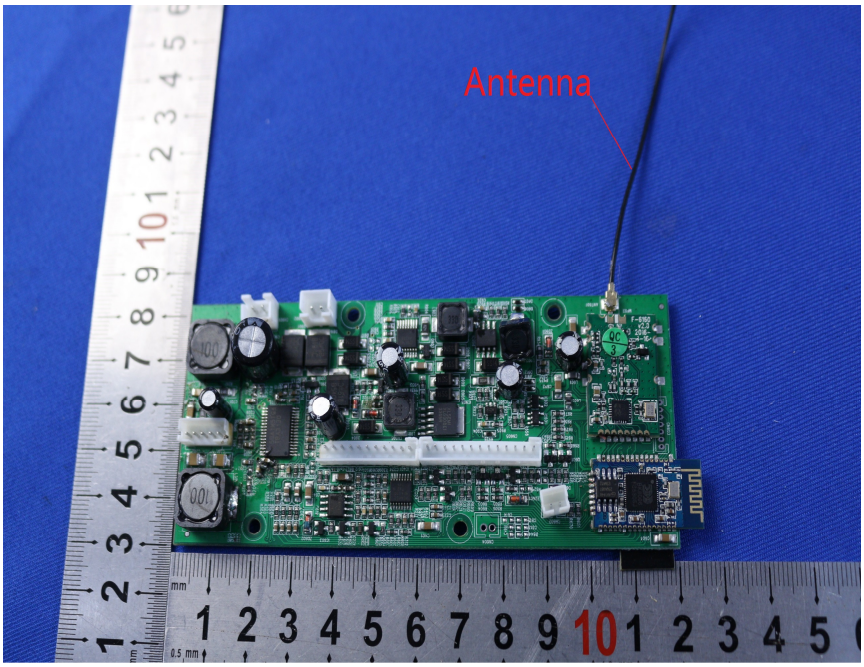
6.1.2 Conclusion

15.203 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.

EUT Antenna:

The antenna uses a unique coupling to the intentional radiator and no consideration of replacement.The best case gain of the antenna is 4dBi.



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7 Radio Spectrum Matter Test Results

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

Test Requirement 47 CFR Part 15, Subpart E 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.		

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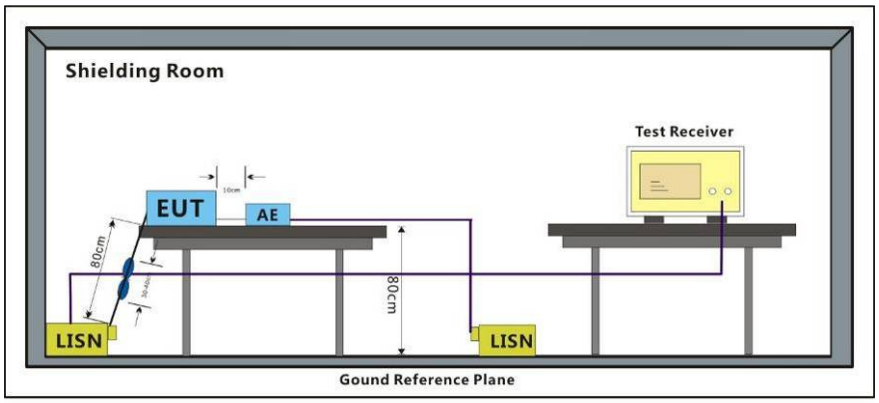
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar

Test mode: f:TX+Charge mode:Keep the EUT in transmitting mode and being charged

7.1.2 Test Setup Diagram



7.1.3 Measurement 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.

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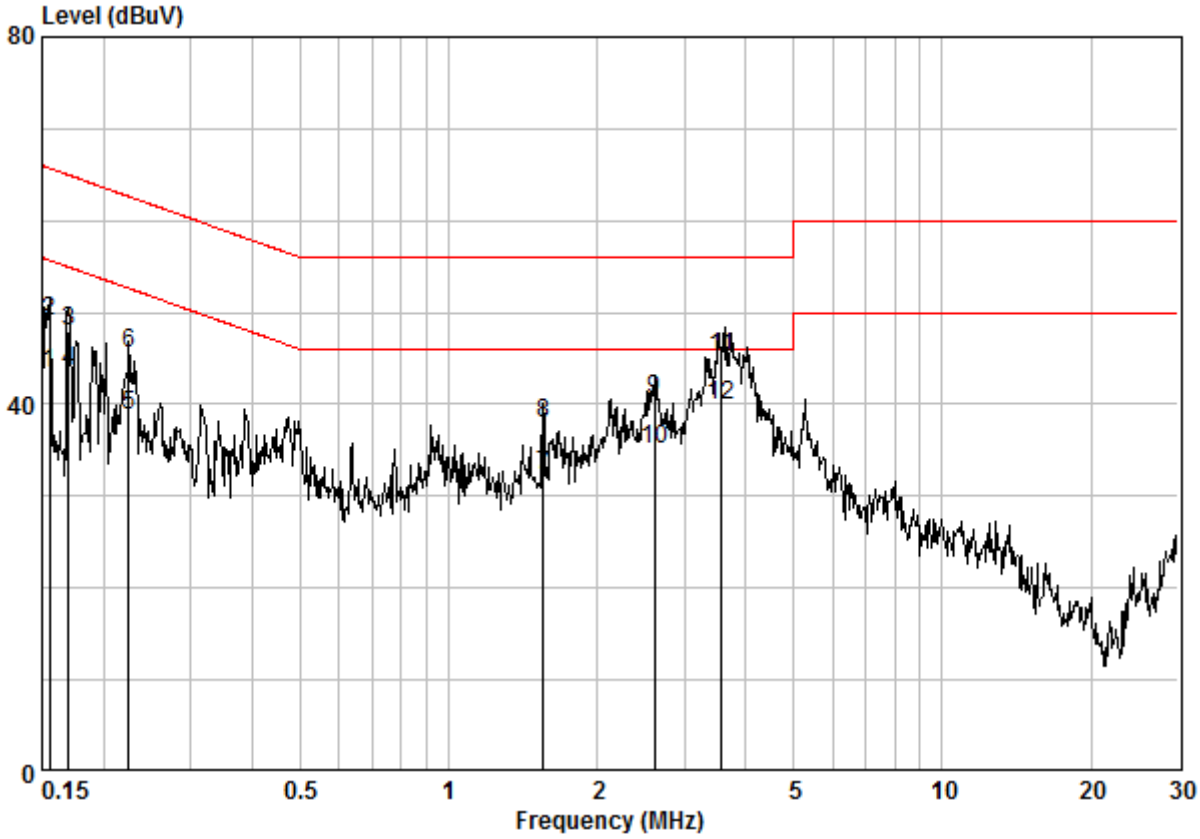
Mode:f; Line:Live Line



Site : Shielding Room
Condition : CE LINE
Job No. : 01463CR
Test Mode : TX + Charge

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.15567	0.02	9.64	33.70	43.36	55.69	-12.33	Average
2	0.15567	0.02	9.64	39.35	49.01	65.69	-16.68	QP
3	0.16944	0.02	9.64	38.34	48.00	64.99	-16.99	QP
4	0.16944	0.02	9.64	33.90	43.56	54.99	-11.43	Average
5	0.22437	0.02	9.64	29.17	38.83	52.66	-13.82	Average
6	0.22437	0.02	9.64	35.85	45.51	62.66	-17.15	QP
7	1.552	0.03	9.66	22.46	32.15	46.00	-13.85	Average
8	1.552	0.03	9.66	28.21	37.90	56.00	-18.10	QP
9	2.608	0.03	9.68	30.91	40.62	56.00	-15.38	QP
10	2.608	0.03	9.68	25.44	35.15	46.00	-10.85	Average
11	3.569	0.02	9.70	35.50	45.23	56.00	-10.77	QP
12 @	3.569	0.02	9.70	30.10	39.83	46.00	-6.17	Average

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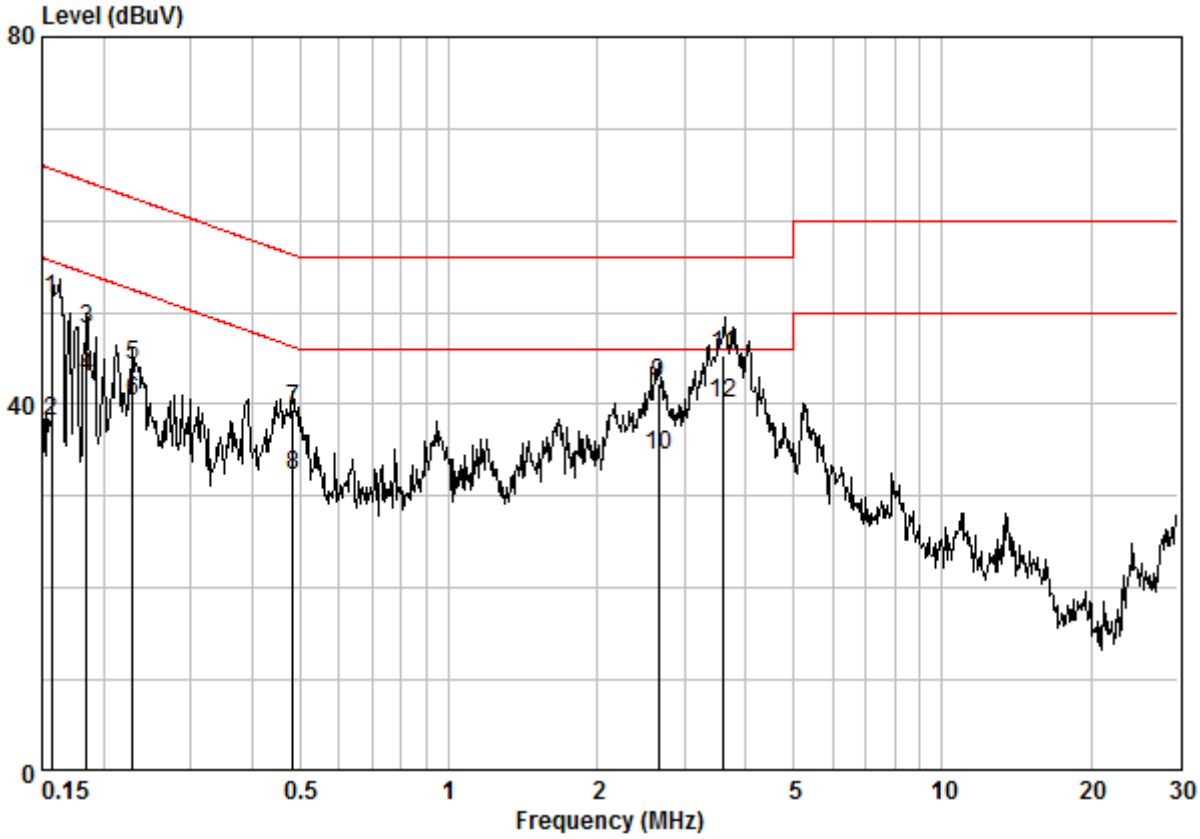
Mode:f; Line:Neutral Line



Site : Shielding Room
Condition : CE NEUTRAL
Job No. : 01463CR
Test Mode : TX + Charge

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.15649	0.02	9.64	41.80	51.46	65.65	-14.19	QP
2	0.15649	0.02	9.64	28.50	38.16	55.65	-17.49	Average
3	0.18443	0.02	9.63	38.47	48.12	64.28	-16.16	QP
4	0.18443	0.02	9.63	33.34	42.99	54.28	-11.29	Average
5	0.22918	0.02	9.63	34.57	44.22	62.48	-18.26	QP
6	0.22918	0.02	9.63	30.58	40.23	52.48	-12.25	Average
7	0.48375	0.02	9.63	29.84	39.49	56.27	-16.78	QP
8	0.48375	0.02	9.63	22.66	32.31	46.27	-13.96	Average
9	2.664	0.03	9.66	32.66	42.35	56.00	-13.65	QP
10	2.664	0.03	9.66	24.71	34.40	46.00	-11.60	Average
11	3.606	0.02	9.68	35.70	45.41	56.00	-10.59	QP
12 @	3.606	0.02	9.68	30.40	40.11	46.00	-5.89	Average

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7.2 26dB Emission bandwidth and 99% Occupied Bandwidth

Test Requirement	47 CFR Part 15, Subpart E 15.407 (a)
Test Method:	KDB 789033 D02 II C 1
Limit:	N/A

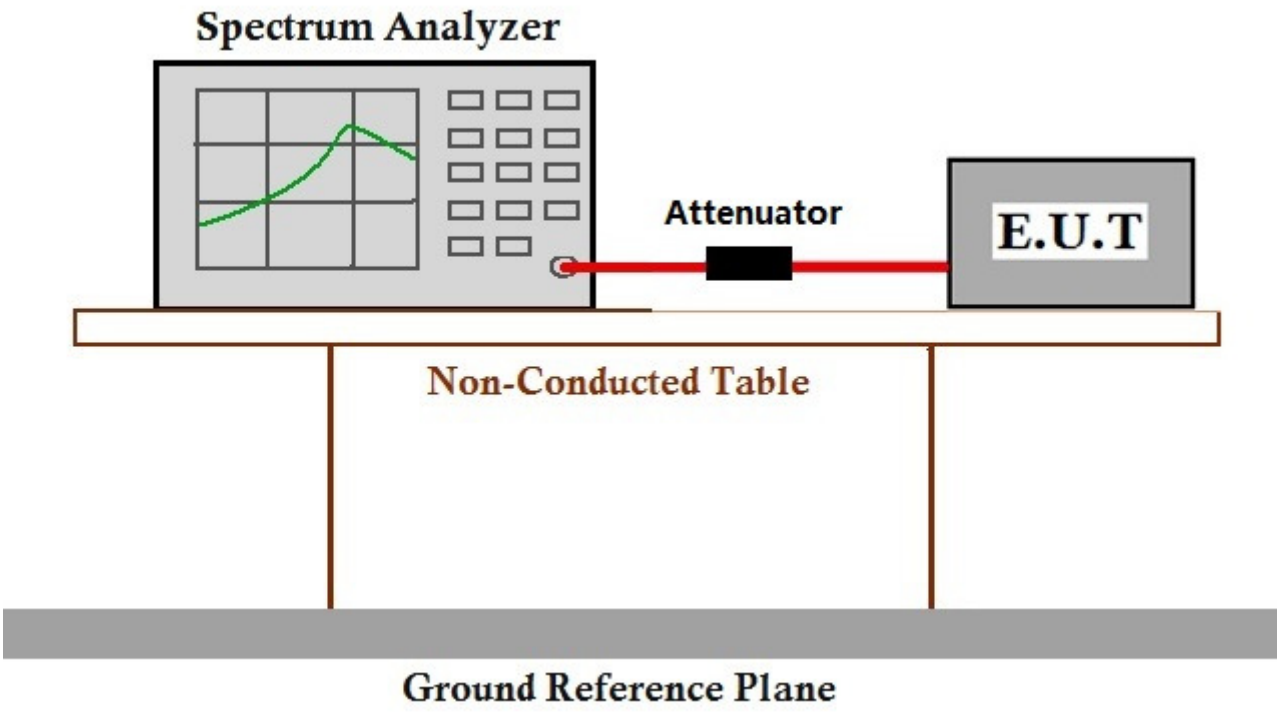
7.2.1 E.U.T. Operation

Operating Environment:

Temperature:	25.0 °C	Humidity:	52 % RH	Atmospheric Pressure:	1015	mbar

Pretest these mode to find the worst case:	e:TX mode:Keep the EUT in transmitting mode f:TX+Charge mode:Keep the EUT in transmitting mode and being charged
The worst case for final test:	e:TX mode:Keep the EUT in transmitting mode Only the worst case is recorded in the report.

7.2.2 Test Setup Diagram



7.2.3 Measurement Data

The detailed test data see: Appendix 15.407

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7.3 Minimum 6 dB bandwidth (5.725-5.85 GHz band)

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

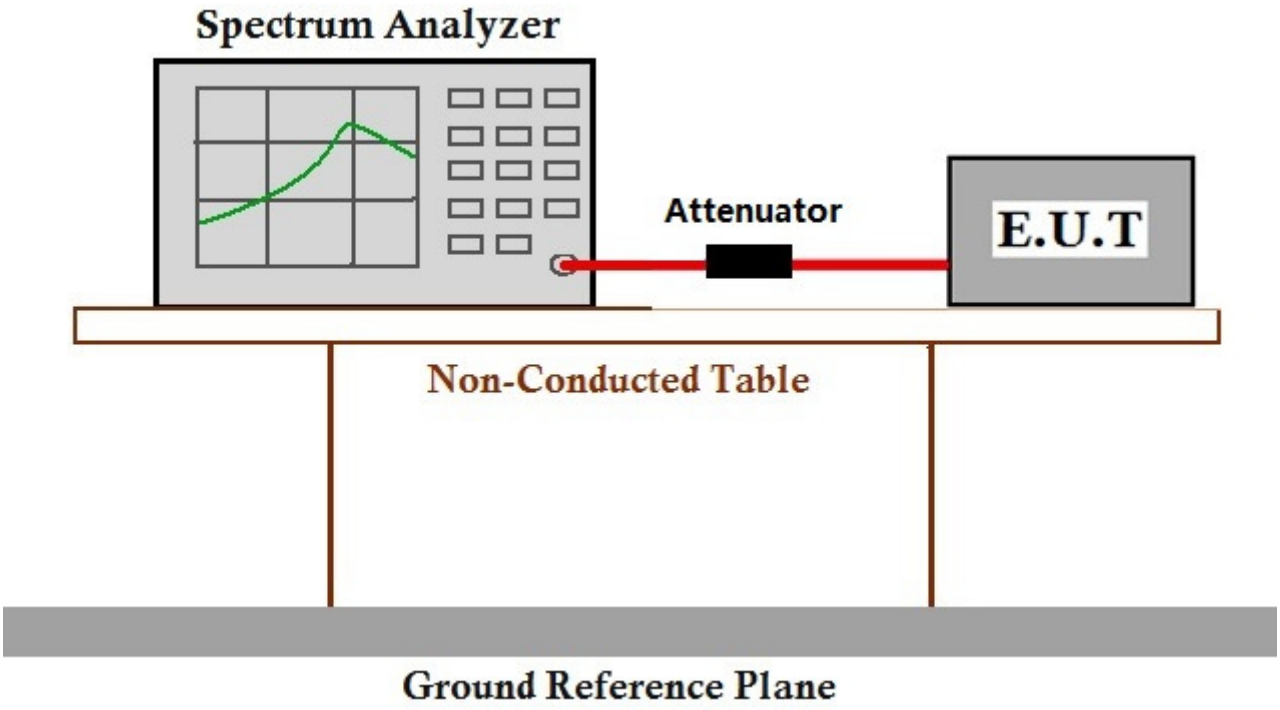
7.3.1 E.U.T. Operation

Operating Environment:

Temperature:	25.0 °C	Humidity:	52 % RH	Atmospheric Pressure:	1015	mbar

Pretest these mode to find the worst case:	e:TX mode:Keep the EUT in transmitting mode f:TX+Charge mode:Keep the EUT in transmitting mode and being charged
The worst case for final test:	e:TX mode:Keep the EUT in transmitting mode Only the worst case is recorded in the report.

7.3.2 Test Setup Diagram



7.3.3 Measurement Data

The detailed test data see: Appendix 15.407

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7.4 Maximum Conducted output power

Test Requirement 47 CFR Part 15, Subpart E 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.	

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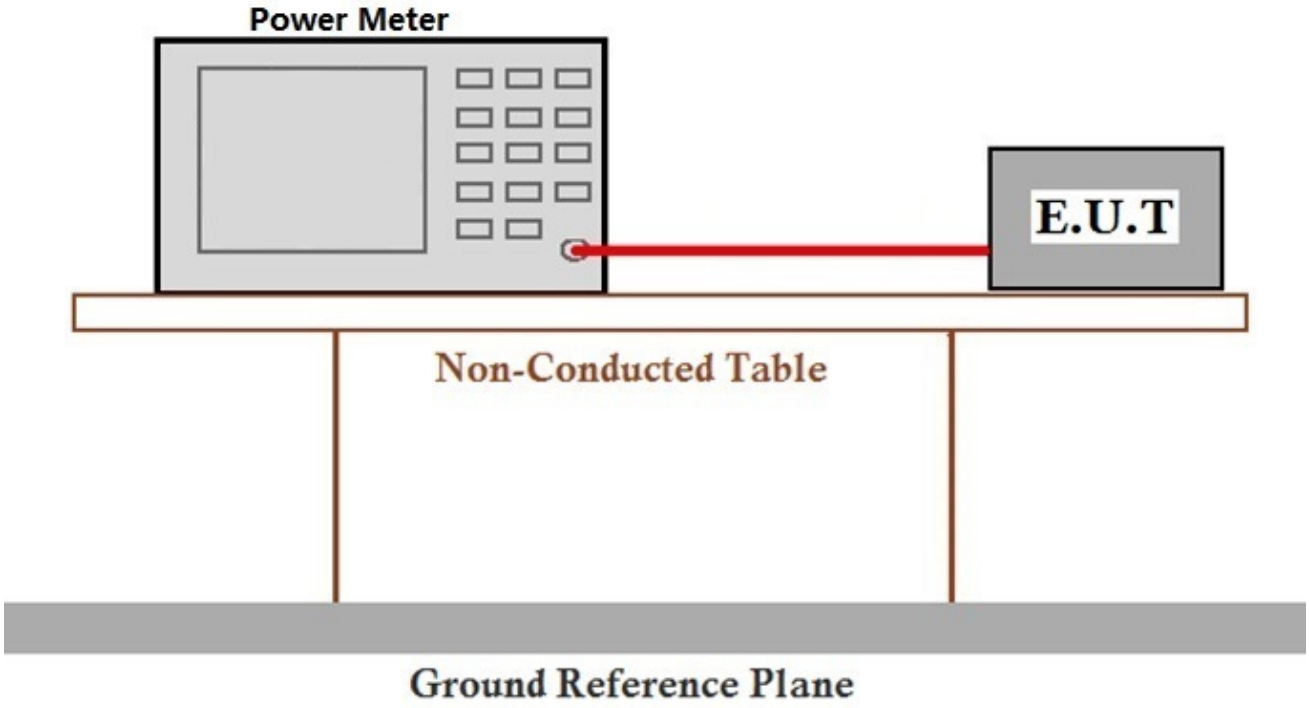
7.4.1 E.U.T. Operation

Operating Environment:

Temperature:	23.0 °C	Humidity:	56 % RH	Atmospheric Pressure:	1020	mbar

Pretest these mode to find the worst case:	e:TX mode:Keep the EUT in transmitting mode f:TX+Charge mode:Keep the EUT in transmitting mode and being charged
The worst case for final test:	e:TX mode:Keep the EUT in transmitting mode Only the worst case is recorded in the report.

7.4.2 Test Setup Diagram



7.4.3 Measurement Data

The detailed test data see: Appendix 15.407

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7.5 Peak Power spectrum density

Test Requirement 47 CFR Part 15, Subpart E 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.	

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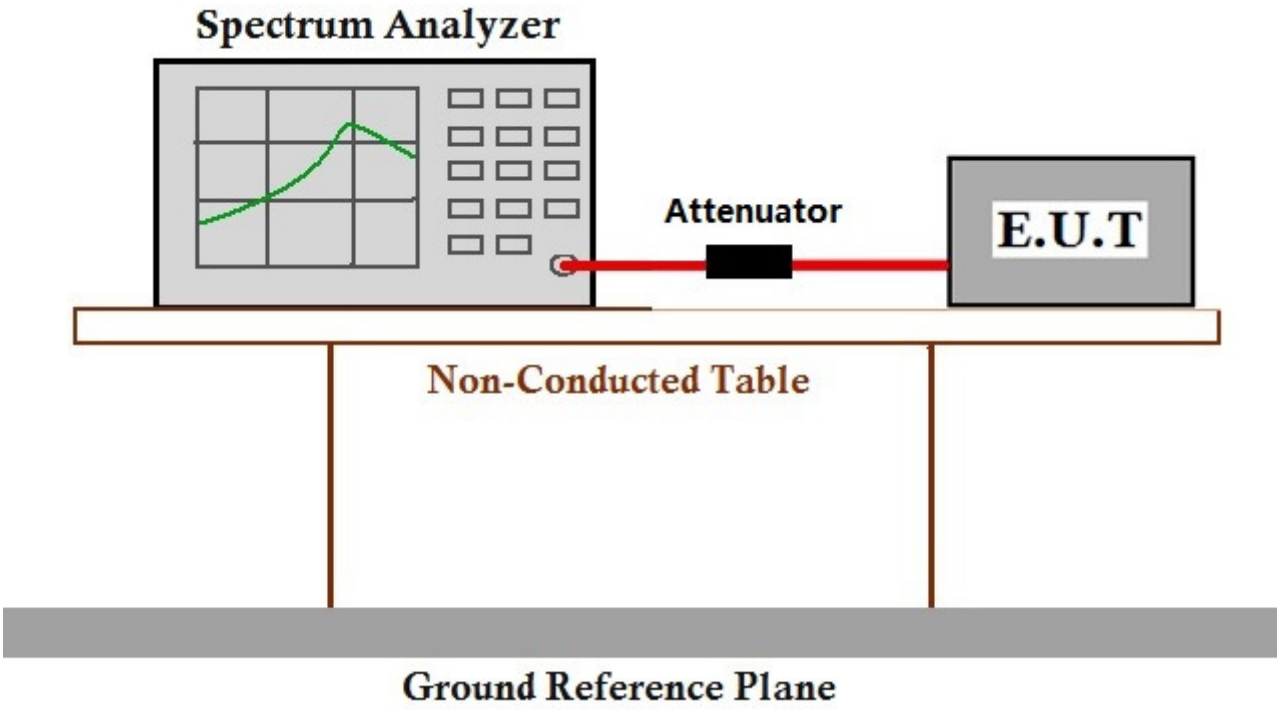
7.5.1 E.U.T. Operation

Operating Environment:

Temperature:	23	°C	Humidity:	56	% RH	Atmospheric Pressure:	1020 mbar

Pretest these mode to find the worst case:	e:TX mode:Keep the EUT in transmitting mode f:TX+Charge mode:Keep the EUT in transmitting mode and being charged
The worst case for final test:	e:TX mode:Keep the EUT in transmitting mode Only the worst case is recorded in the report.

7.5.2 Test Setup Diagram



7.5.3 Measurement Data

The detailed test data see: Appendix 15.407

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7.6 Restricted bands around fundamental frequency (Radiated Emission)

Test Requirement 47 CFR Part 15 Section 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.		

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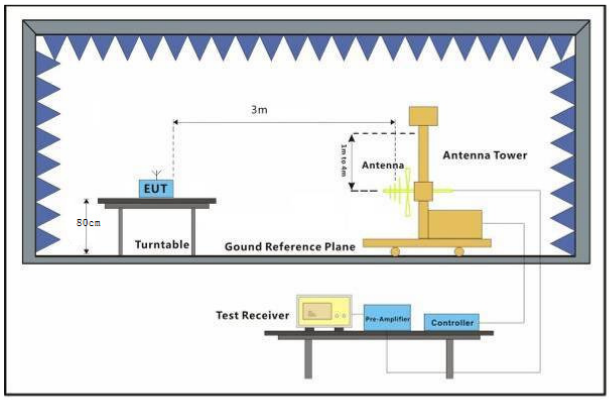
7.6.1 E.U.T. Operation

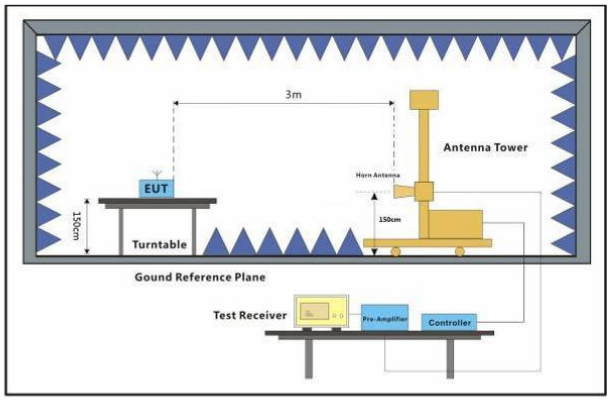
Operating Environment:

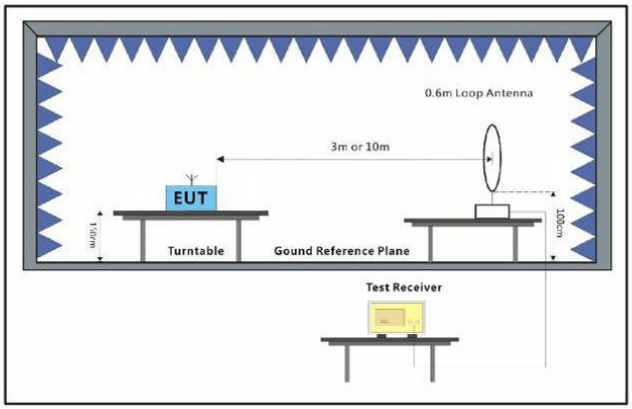
Temperature:	24.0 °C	Humidity:	54 % RH	Atmospheric Pressure:	1020	mbar

Pretest these mode to find the worst case:	e:TX mode:Keep the EUT in transmitting mode f:TX+Charge mode:Keep the EUT in transmitting mode and being charged
The worst case for final test:	f:TX+Charge mode:Keep the EUT in transmitting mode and being charged Only the worst case is recorded in the report.

7.6.2 Test Setup Diagram







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7.6.3 Measurement 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 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.

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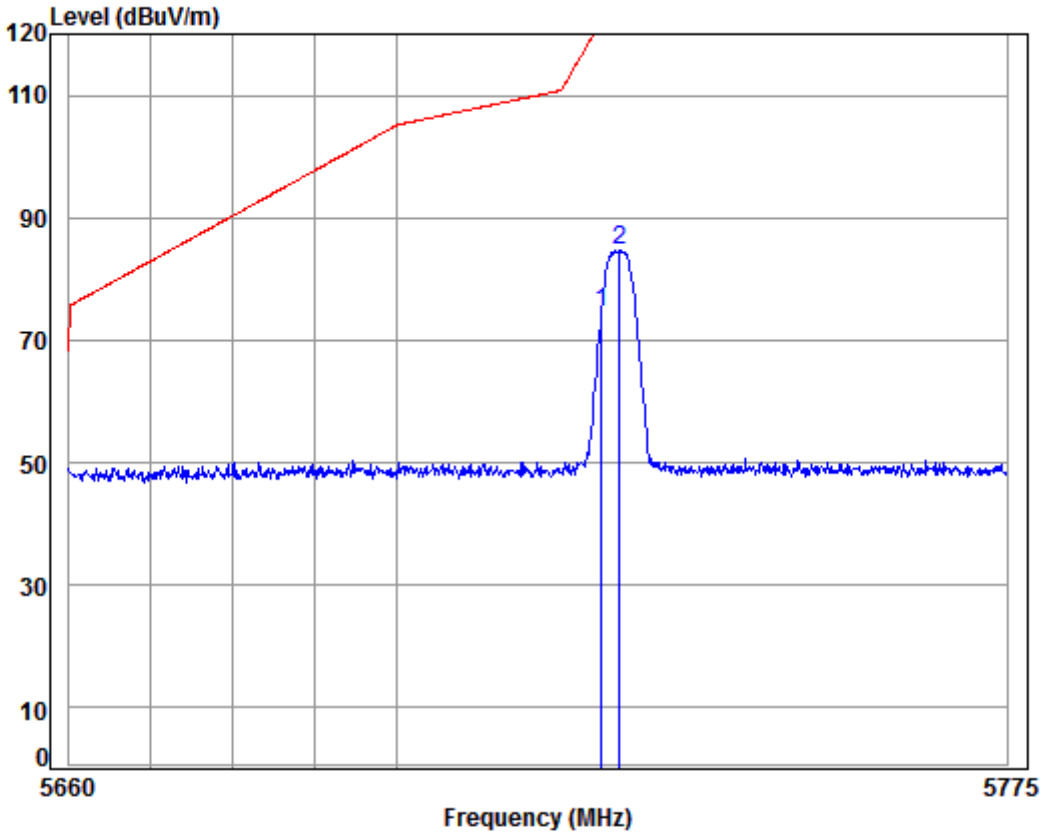
Mode:f; Polarization:Horizontal; Channel:Low



Condition: 3m HORIZONTAL
Job No: : 01463CR
Mode: : 5727 Bandedge

	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	5725.000	8.48	34.54	38.35	69.86	74.53	125.20	-50.67	Peak
2 pp	5727.225	8.48	34.54	38.35	79.94	84.61	125.20	-40.59	Peak

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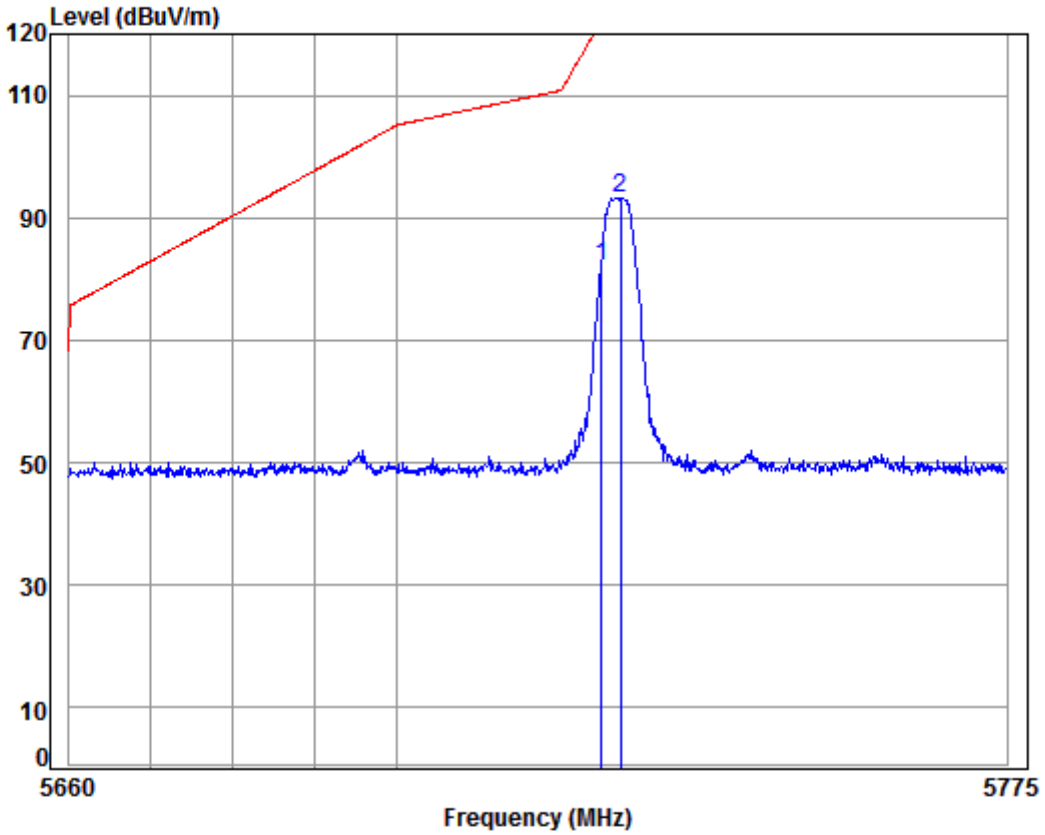
Mode:f; Polarization:Vertical; Channel:Low



Condition: 3m VERTICAL
Job No: : 01463CR
Mode: : 5727 Bandedge

	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	5725.000	8.48	34.54	38.35	77.34	82.01	125.20	-43.19	Peak
2 pp	5727.340	8.48	34.54	38.35	88.65	93.32	125.20	-31.88	Peak

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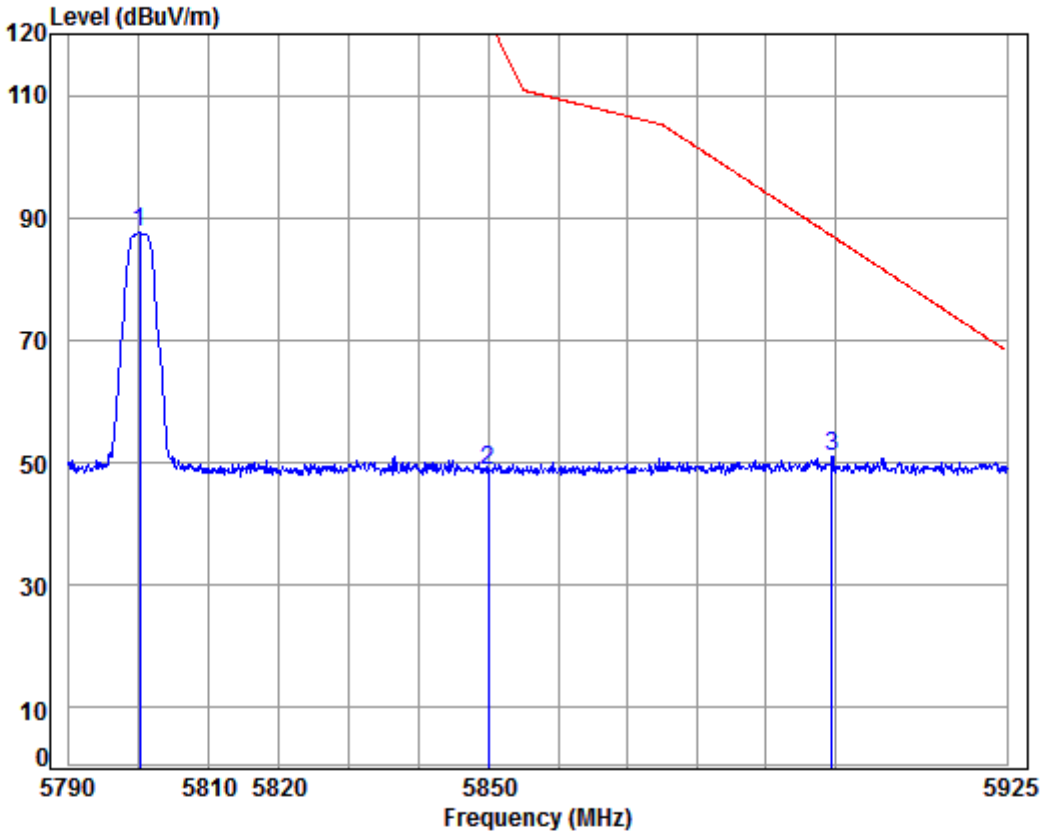
Mode:f; Polarization:Horizontal; Channel:High



Condition: 3m Horizontal
Job No: : 01463CR
Mode: : 5800 Bandedge

	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	5800.151	8.56	34.58	38.34	82.94	87.74	125.20	-37.46	Peak
2	5850.000	8.60	34.61	38.33	43.92	48.80	125.20	-76.40	Peak
3 pp	5899.518	8.65	34.64	38.32	46.18	51.15	87.06	-35.91	Peak

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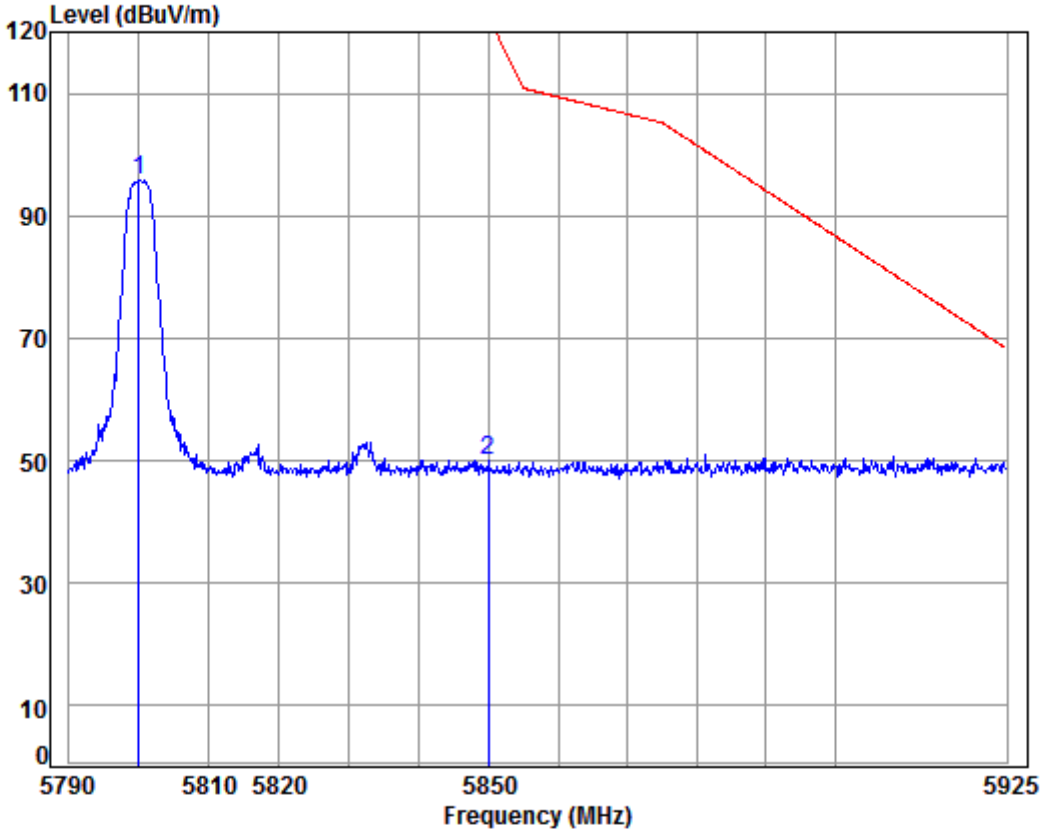
Mode:f; Polarization:Vertical; Channel:High



Condition: 3m VERTICAL
Job No: : 01463CR
Mode: : 5800 Bandedge

	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	5799.884	8.56	34.58	38.34	90.99	95.79	125.20	-29.41	Peak
2	5850.000	8.60	34.61	38.33	45.10	49.98	125.20	-75.22	Peak

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7.7 Frequency Stability

Test Requirement	47 CFR Part 15, Subpart E 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.

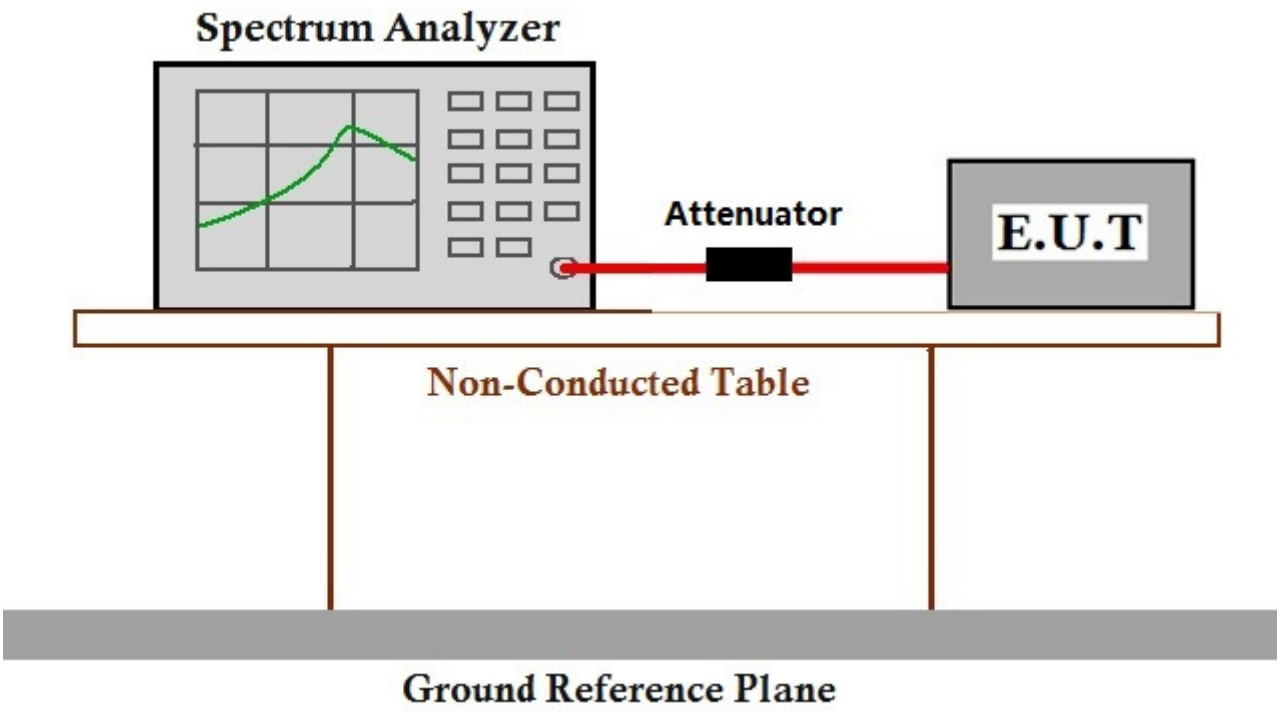
7.7.1 E.U.T. Operation

Operating Environment:

Temperature:	23.0 °C	Humidity:	56 % RH	Atmospheric Pressure:	1020	mbar

Pretest these mode to find the worst case:	e:TX mode:Keep the EUT in transmitting mode f:TX+Charge mode:Keep the EUT in transmitting mode and being charged
The worst case for final test:	f:TX+Charge mode:Keep the EUT in transmitting mode and being charged Only the worst case is recorded in the report.

7.7.2 Test Setup Diagram



7.7.3 Measurement Data

The detailed test data see: Appendix 15.407

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7.8 Radiated Spurious Emissions

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

7.8.1 E.U.T. Operation

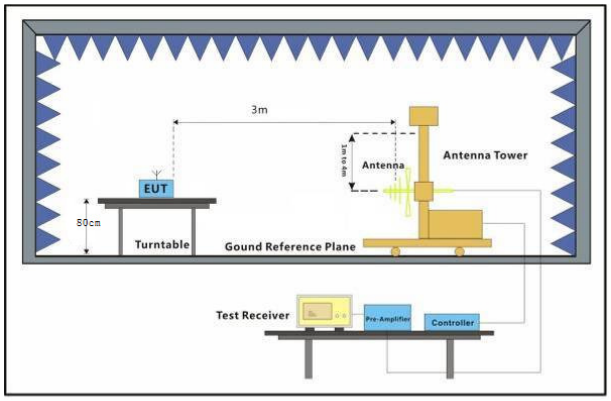
Operating Environment:

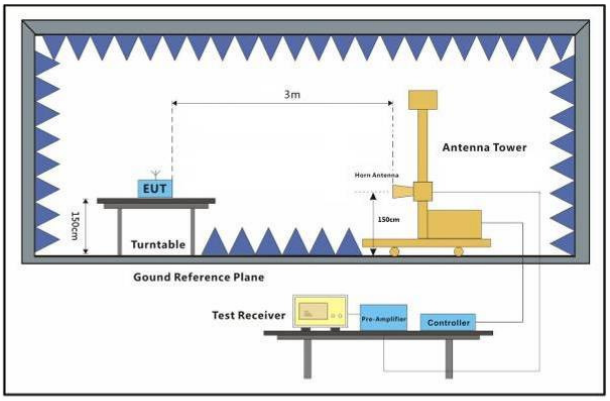
Temperature: 24.0 °C Humidity: 54 % RH Atmospheric Pressure: 1020 mbar

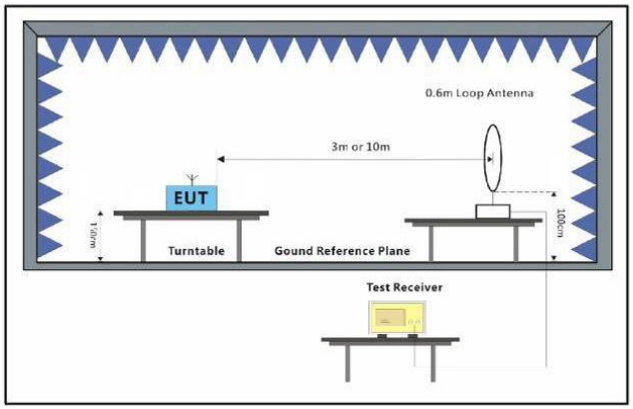
Pretest these mode to find the worst case: e:TX mode:Keep the EUT in transmitting mode
f:TX+Charge mode:Keep the EUT in transmitting mode and being charged

The worst case for final test: f:TX+Charge mode:Keep the EUT in transmitting mode and being charged
Only the worst case is recorded in the report.

7.8.2 Test Setup Diagram







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7.8.3 Measurement 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 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.

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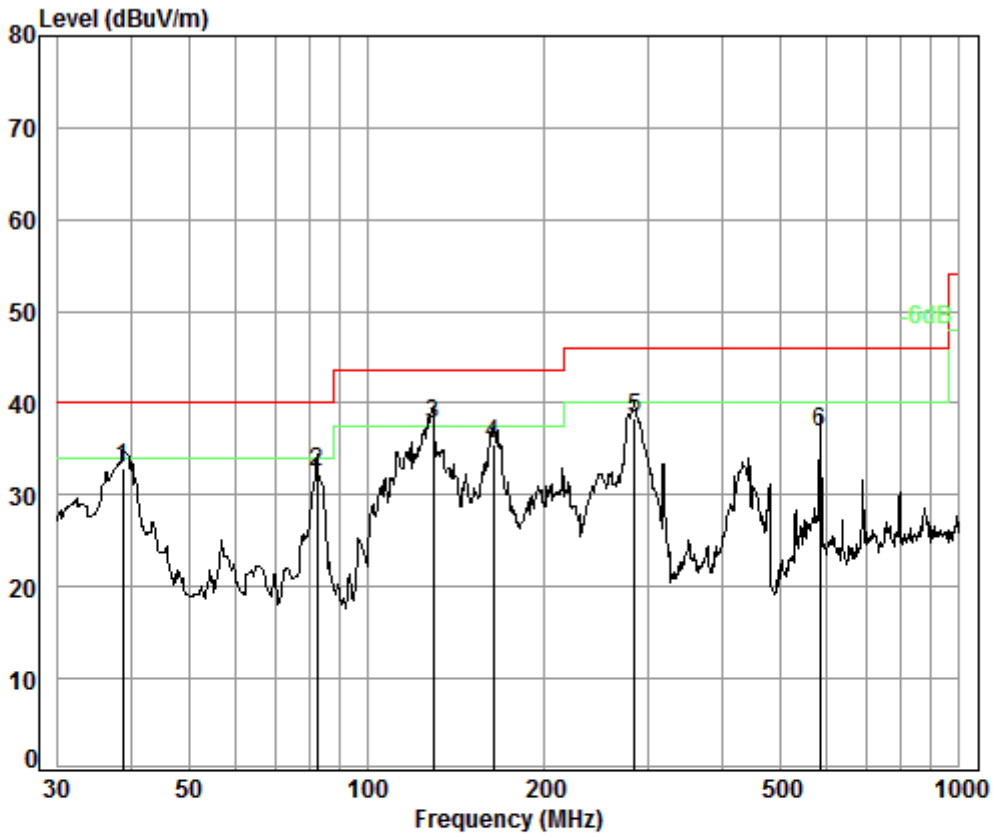
30MHz~1GHz (QP)		
Test mode:	f	Vertical



Condition: 3m Vertical
Job No. : 01463CR
Test mode: TX+Charge

	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	38.75	0.60	13.80	27.32	45.86	32.94	40.00	-7.06
2	82.36	1.10	7.94	27.23	50.65	32.46	40.00	-7.54
3 pp	129.47	1.27	7.71	27.01	55.78	37.75	43.50	-5.75
4	163.76	1.34	9.56	26.84	51.50	35.56	43.50	-7.94
5	283.98	1.83	13.20	26.44	49.69	38.28	46.00	-7.72
6	582.74	2.68	19.32	27.57	42.43	36.86	46.00	-9.14

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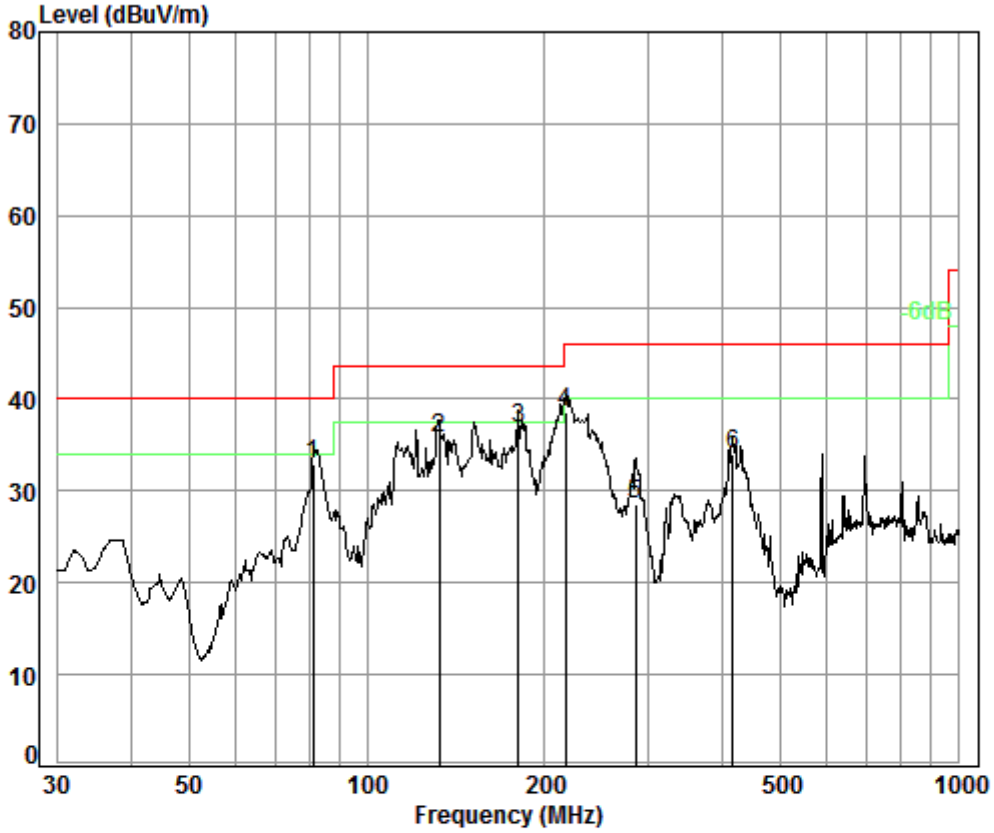
Test mode:	f	Horizontal



Condition: 3m Horizontal
Job No. : 01463CR
Test mode: TX+Charge

	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	81.21	1.10	7.82	27.23	51.24	32.93	40.00	-7.07
2	132.69	1.28	7.81	26.99	53.58	35.68	43.50	-7.82
3 pp	180.65	1.37	9.91	26.77	52.28	36.79	43.50	-6.71
4	216.78	1.50	11.07	26.64	52.59	38.52	46.00	-7.48
5	284.98	1.84	13.24	26.44	39.87	28.51	46.00	-17.49
6	414.72	2.26	16.36	27.23	42.62	34.01	46.00	-11.99

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Radiated Emission above 1GHz

Mode:f; Polarization:Horizontal; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dB V)	Level (dB V/m)	Limit (dB V/m)	Over limit (dB)
1439.343	25.56	4.40	38.06	43.45	35.71	74.00	-38.29
2176.047	28.40	5.17	37.98	43.90	39.98	74.00	-34.02
3396.098	32.02	6.23	37.94	44.39	45.12	74.00	-28.88
7807.262	36.49	9.97	36.57	41.64	52.11	74.00	-21.89
11454.000	38.07	12.33	35.49	36.63	52.23	74.00	-21.77
17181.000	43.03	17.47	36.21	28.12	53.17	74.00	-20.83

Mode:f; Polarization:Vertical; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dB V)	Level (dB V/m)	Limit (dB V/m)	Over limit (dB)
1520.598	25.89	4.50	38.05	43.76	36.49	74.00	-37.51
2207.723	28.51	5.19	37.98	45.16	41.37	74.00	-32.63
3845.537	33.19	6.58	37.98	45.03	47.19	74.00	-26.81
7179.527	36.43	9.63	37.14	42.89	52.44	74.00	-21.56
11454.000	38.07	12.33	35.49	36.92	52.52	74.00	-21.48
17181.000	43.03	17.47	36.21	28.40	53.45	74.00	-20.55

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Mode:f; Polarization:Horizontal; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dB V)	Level (dB V/m)	Limit (dB V/m)	Over limit (dB)
1168.920	24.32	4.03	38.08	44.84	35.46	74.00	-38.54
2001.084	27.80	5.01	38.00	43.92	39.24	74.00	-34.76
3308.894	31.87	6.17	37.93	44.38	44.94	74.00	-29.06
6815.551	36.00	9.35	37.48	44.23	52.86	74.00	-21.14
11520.000	38.13	12.34	35.51	36.97	52.64	74.00	-21.36
17280.000	43.15	17.74	36.16	28.23	53.69	74.00	-20.31

Mode:f; Polarization:Vertical; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dB V)	Level (dB V/m)	Limit (dB V/m)	Over limit (dB)
1658.337	26.50	4.66	38.03	43.63	37.21	74.00	-36.79
2742.143	30.36	5.68	37.93	44.76	43.38	74.00	-30.62
3629.540	32.58	6.41	37.96	44.40	45.81	74.00	-28.19
7898.049	36.54	10.00	36.49	39.63	50.26	74.00	-23.74
11520.000	38.20	12.35	35.52	36.98	52.74	74.00	-21.26
17280.000	43.27	18.01	36.11	27.83	53.71	74.00	-20.29

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Mode:f; Polarization:Horizontal; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dB V)	Level (dB V/m)	Limit (dB V/m)	Over limit (dB)
1460.295	25.64	4.42	38.05	43.68	36.04	74.00	-37.96
2176.047	28.40	5.17	37.98	44.29	40.37	74.00	-33.63
3661.149	32.67	6.43	37.97	44.29	45.80	74.00	-28.20
7200.309	36.42	9.65	37.12	43.07	52.64	74.00	-21.36
11600.000	38.20	12.35	35.52	35.45	51.21	74.00	-22.79
17400.000	43.27	18.01	36.11	27.15	53.03	74.00	-20.97

Mode:f; Polarization:Vertical; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dB V)	Level (dB V/m)	Limit (dB V/m)	Over limit (dB)
1731.816	26.80	4.74	38.03	43.54	37.49	74.00	-36.51
2947.623	31.12	5.88	37.91	44.58	44.17	74.00	-29.83
3981.257	33.55	6.69	38.00	44.18	46.79	74.00	-27.21
7829.860	36.50	9.98	36.55	42.57	53.08	74.00	-20.92
11600.000	38.20	12.35	35.52	36.51	52.27	74.00	-21.73
17400.000	43.27	18.01	36.11	27.58	53.46	74.00	-20.54

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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.

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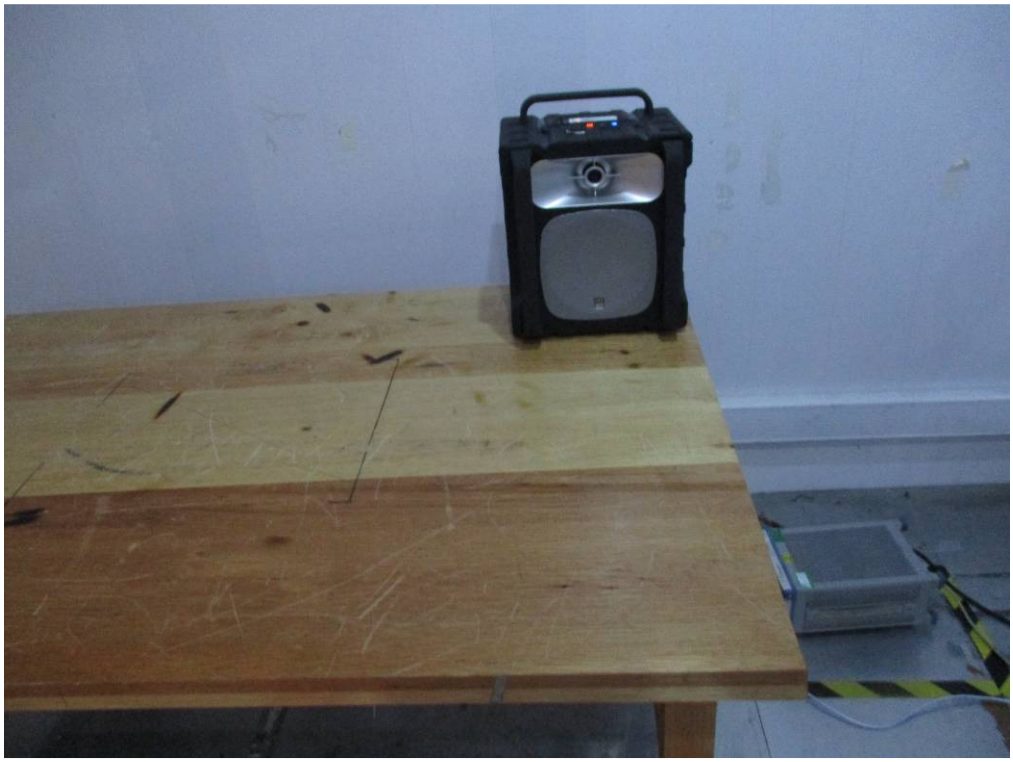
8 Photographs

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



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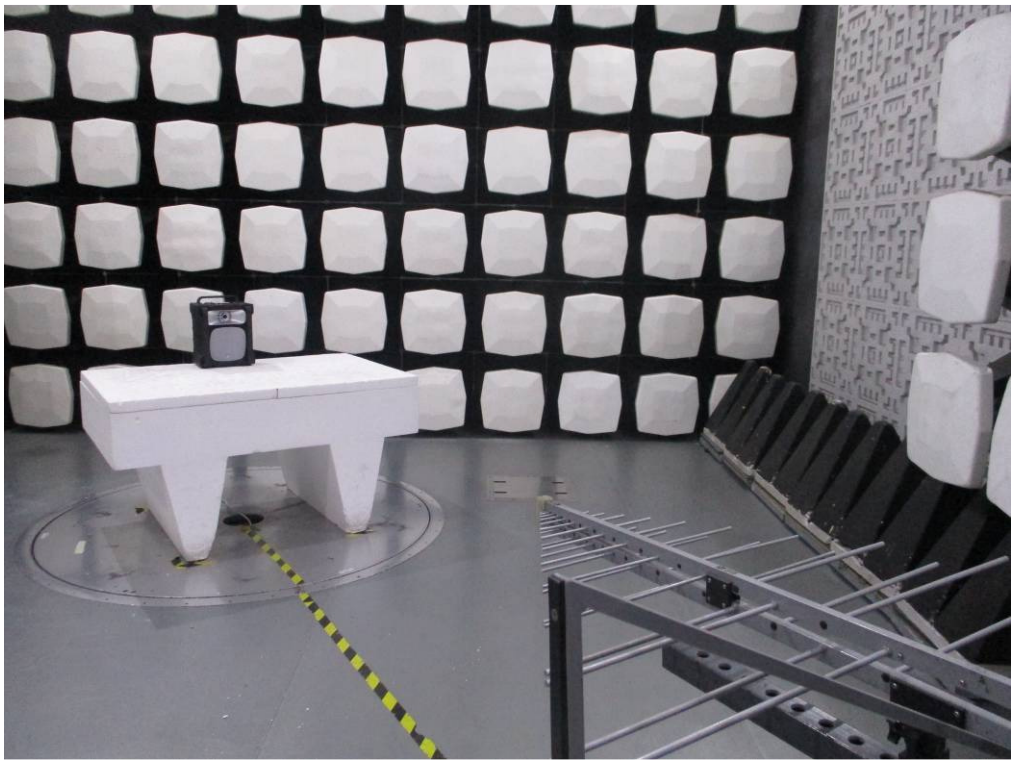
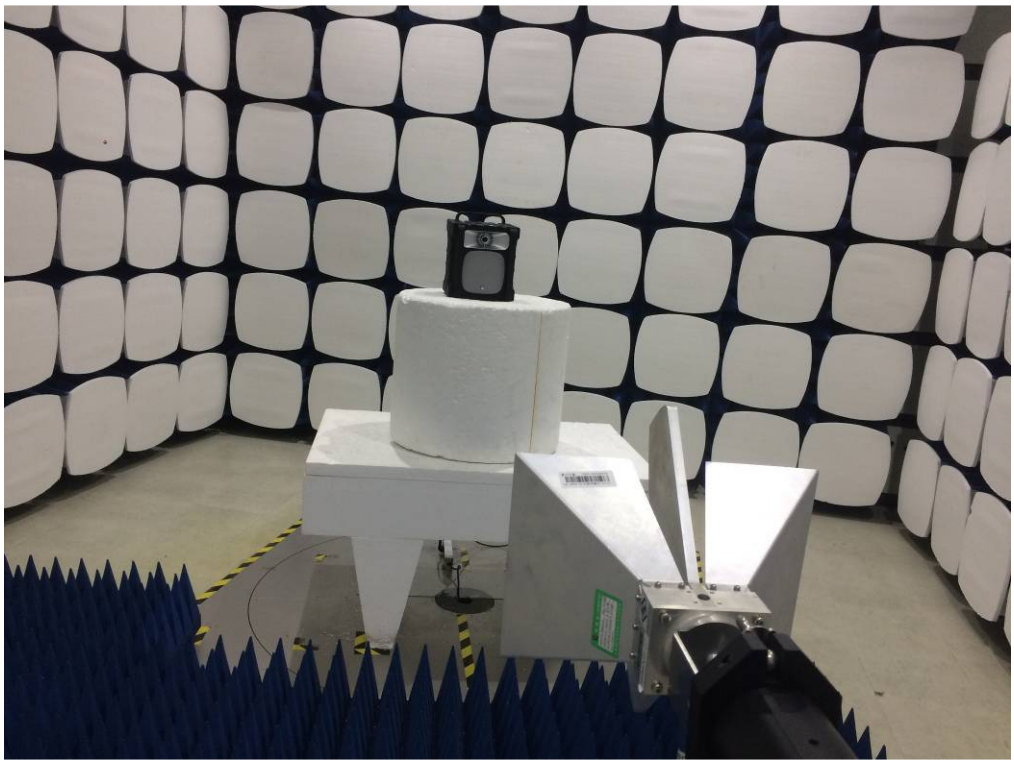
8.2 Radiated Emissions Test Setup





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8.3 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1703001463CR.

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9 Appendix

9.1 Appendix 15.247

1. 6dBm Emission Bandwidth Measurement

Test Channel	Ant	EBW[MHz]	Limit[MHz]	Verdict
5727	Ant1	2.160	>=0.5	PASS
5785	Ant1	2.220	>=0.5	PASS
5825	Ant1	2.100	>=0.5	PASS

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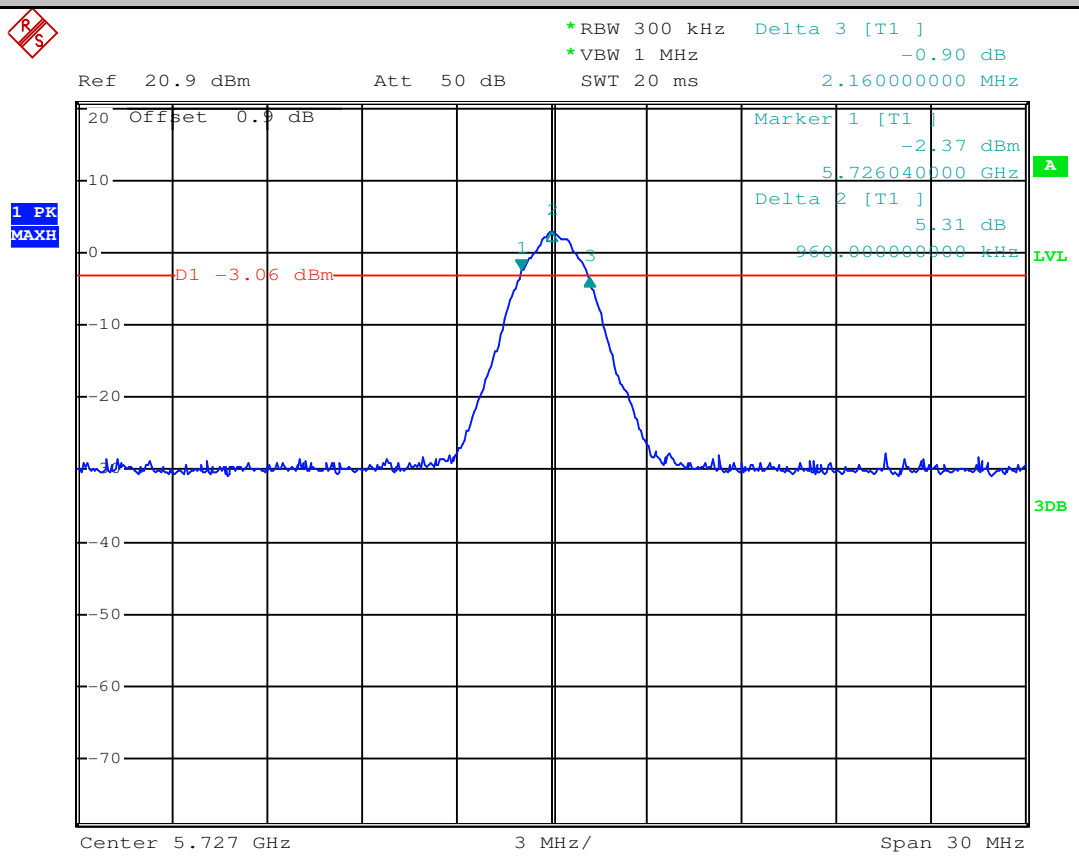
TEST PLOT

Emission Bandwidth Measurement_5727_Ant1



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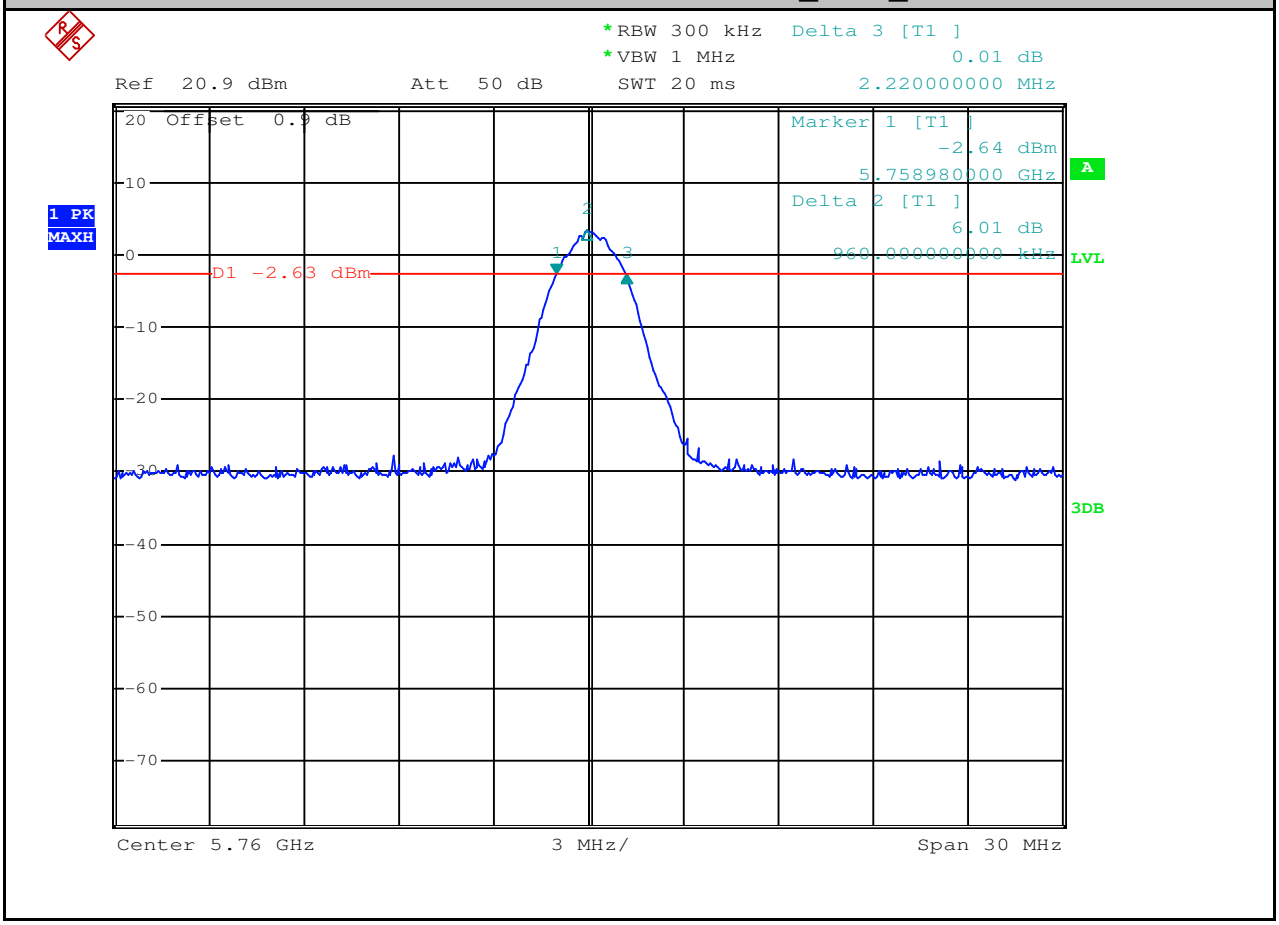
Emission Bandwidth Measurement_5760_Ant1



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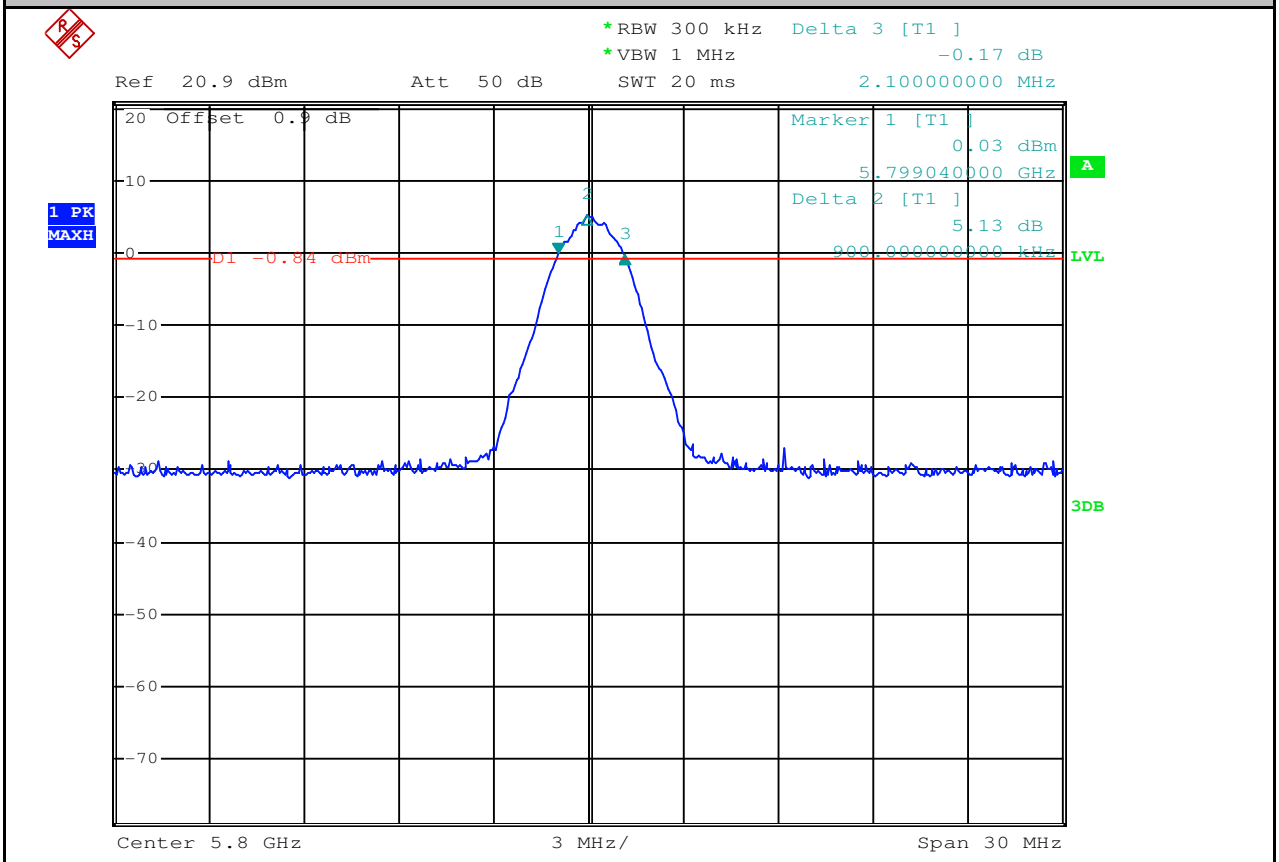
Emission Bandwidth Measurement 5780_Ant1



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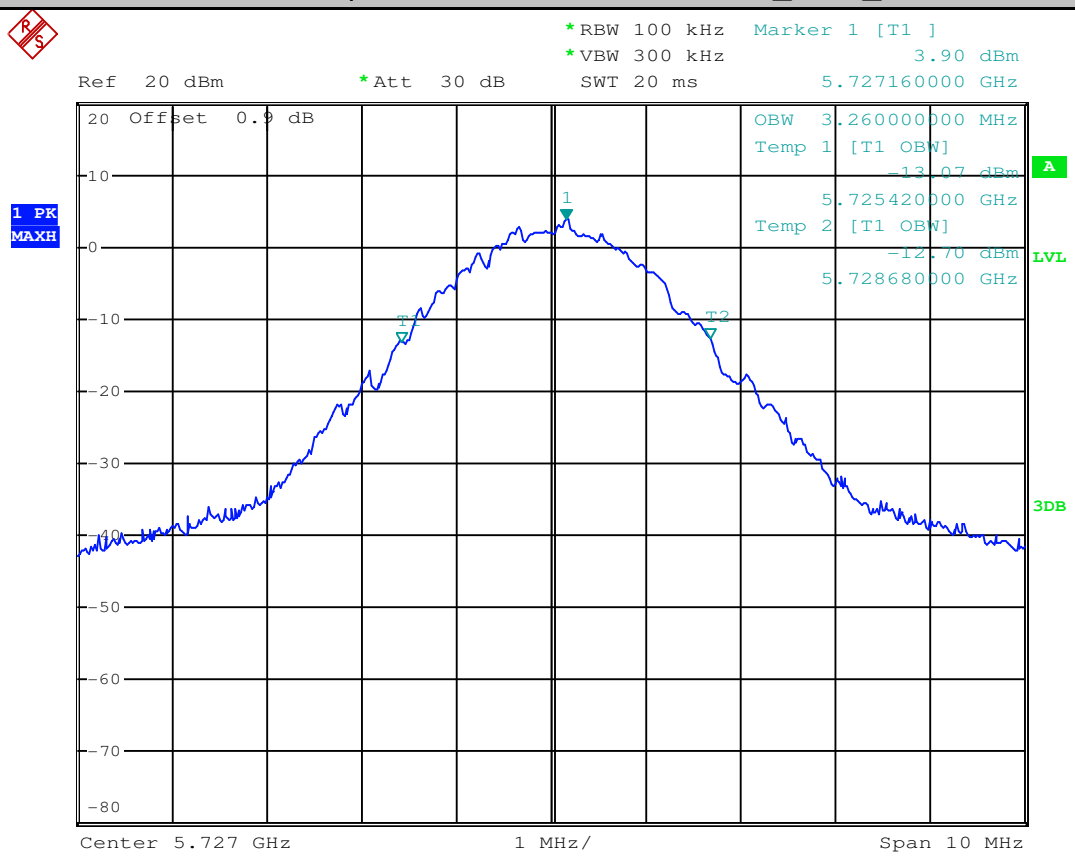
2.Occupied Bandwidth Measurement

Test Channel	Ant	OBW[MHz]	Limit[MHz]	Verdict
5727	Ant1	3.26	---	PASS
5760	Ant1	3.28	---	PASS
5800	Ant1	3.34	---	PASS

TEST PLOT

Occupied Bandwidth Measurement_5727_Ant1



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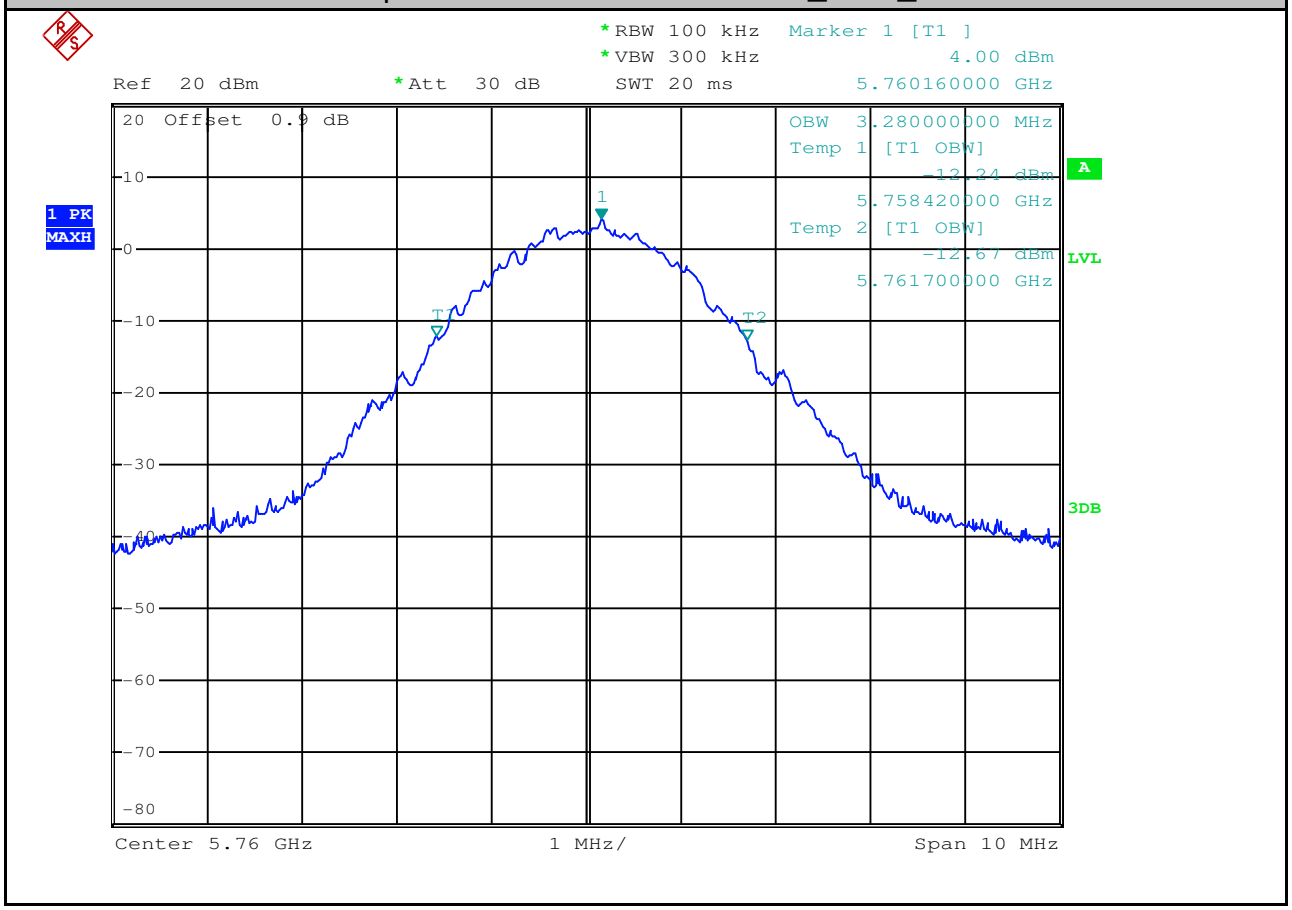
Occupied Bandwidth Measurement_5760_Ant1



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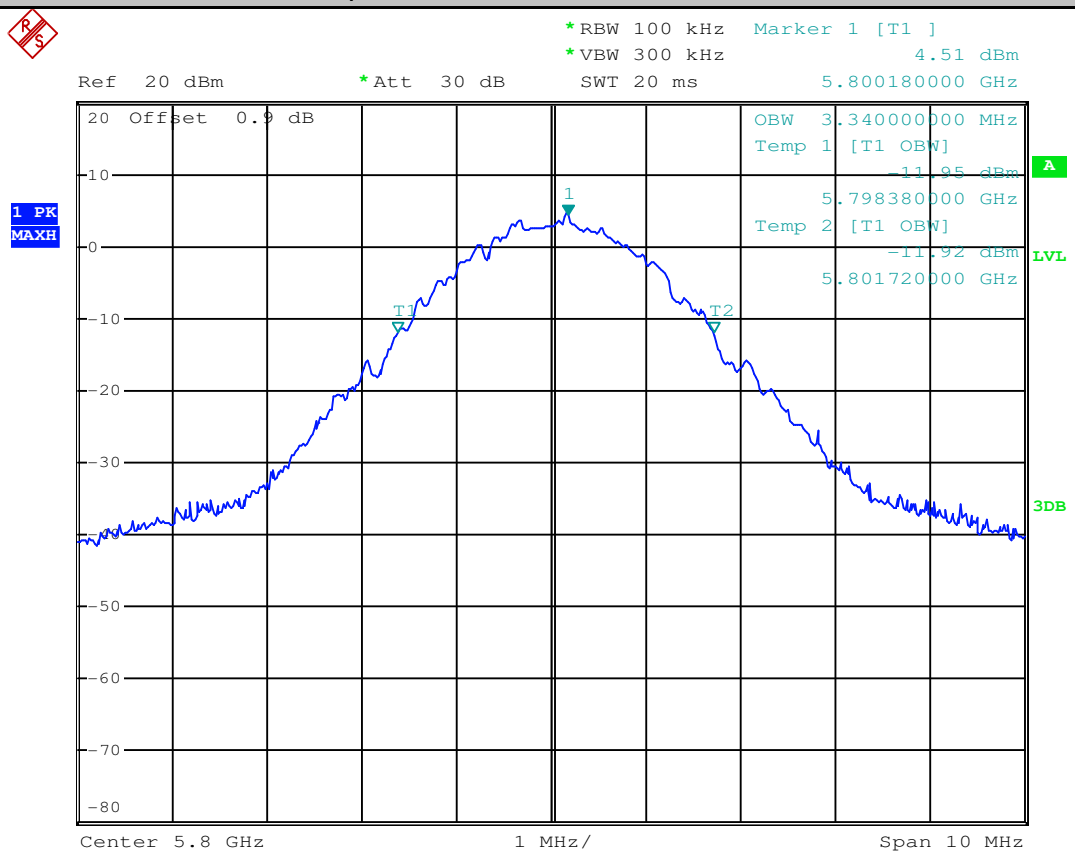
Occupied Bandwidth Measurement_5800_Ant1



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3.Maximum Conduct Output Power

Test Channel	Ant	Power [dBm]	Limit [dBm]	Verdict
5727	Ant1	6.79	<30.00	PASS
5760	Ant1	5.26	<30.00	PASS
5800	Ant1	5. 54	<30.00	PASS

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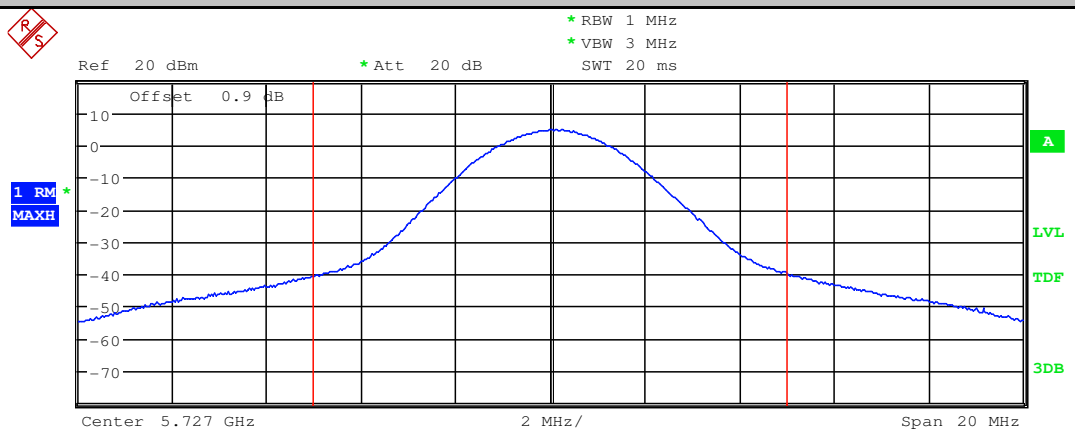
TEST PLOT

Maximum Conduct Output Power 5727 Ant1



Tx Channel

Bandwidth	10 MHz	Power	6.79 dBm

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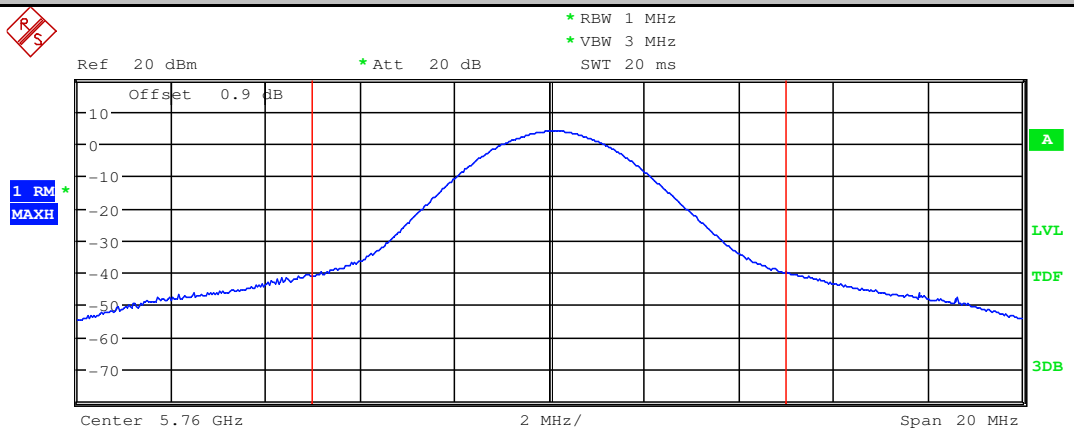
Maximum Conduct Output Power 5760_Ant1



Tx Channel

Bandwidth	10 MHz	Power	6.00 dBm

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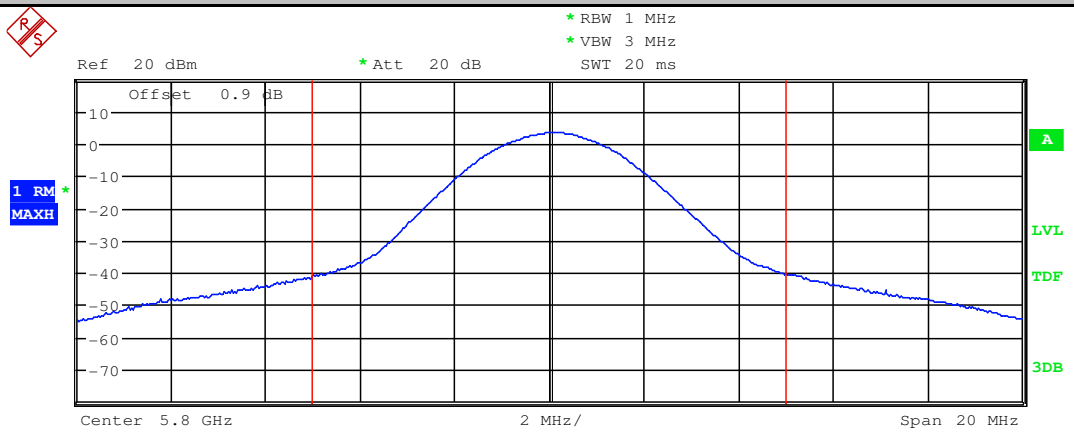
Maximum Conduct Output Power 5800 Ant1



Tx Channel

Bandwidth	10 MHz	Power	5.54 dBm

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4.Maximum Power Spectral Density

Test Channel	Ant	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
5727	Ant1	4.33	<11.00	PASS
5760	Ant1	5.05	<11.00	PASS
5800	Ant1	6.09	<11.00	PASS

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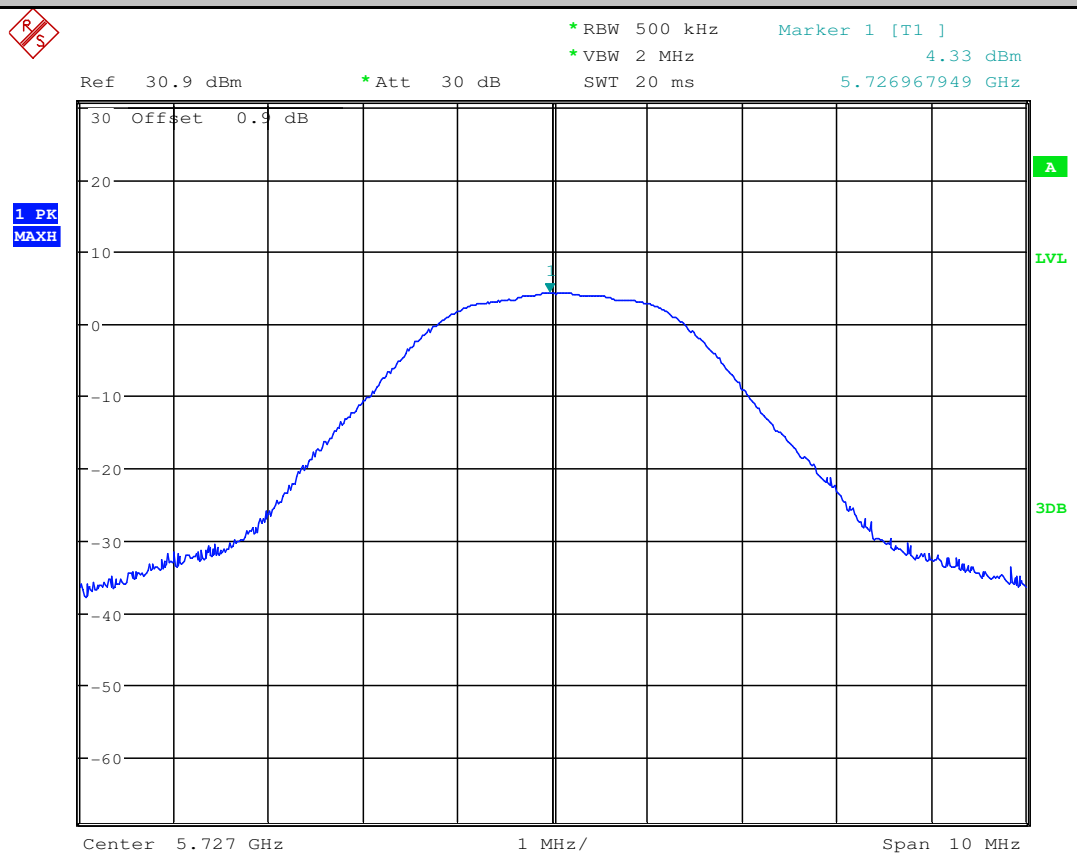
TEST PLOT

Maximum Conduct Output Power 5727 Ant1



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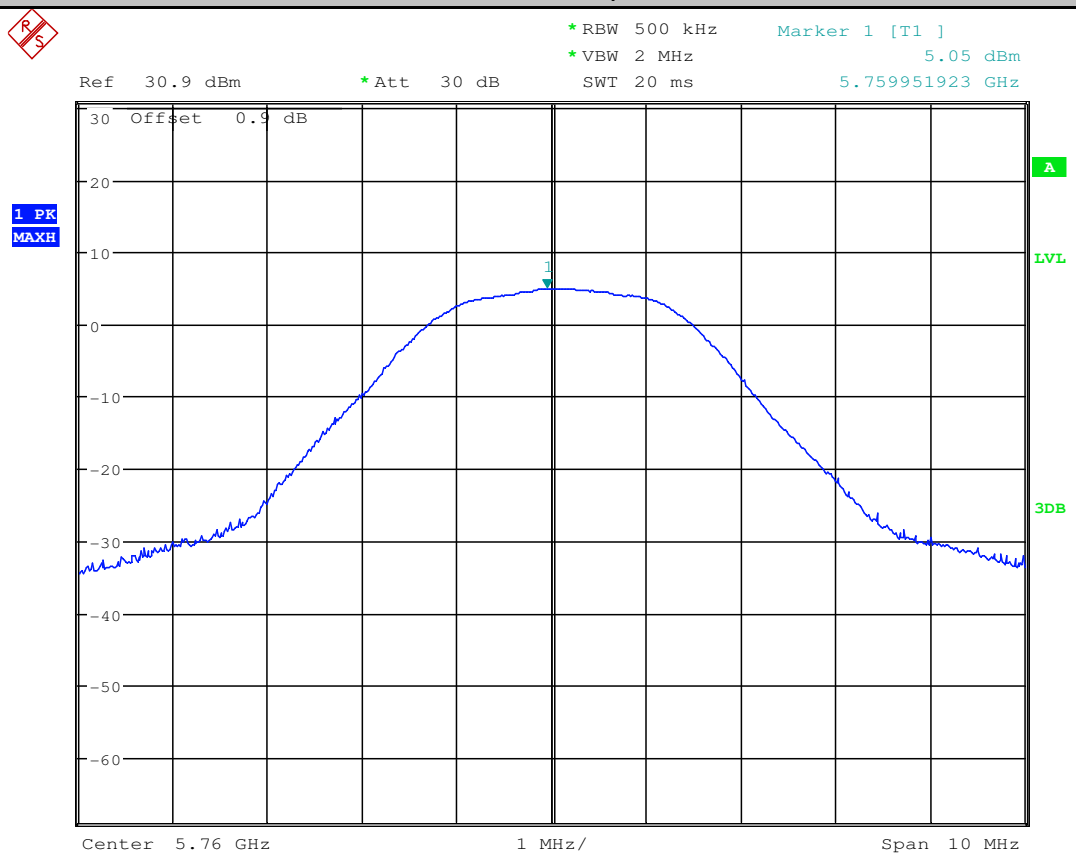
Maximum Conduct Output Power 5760 Ant1



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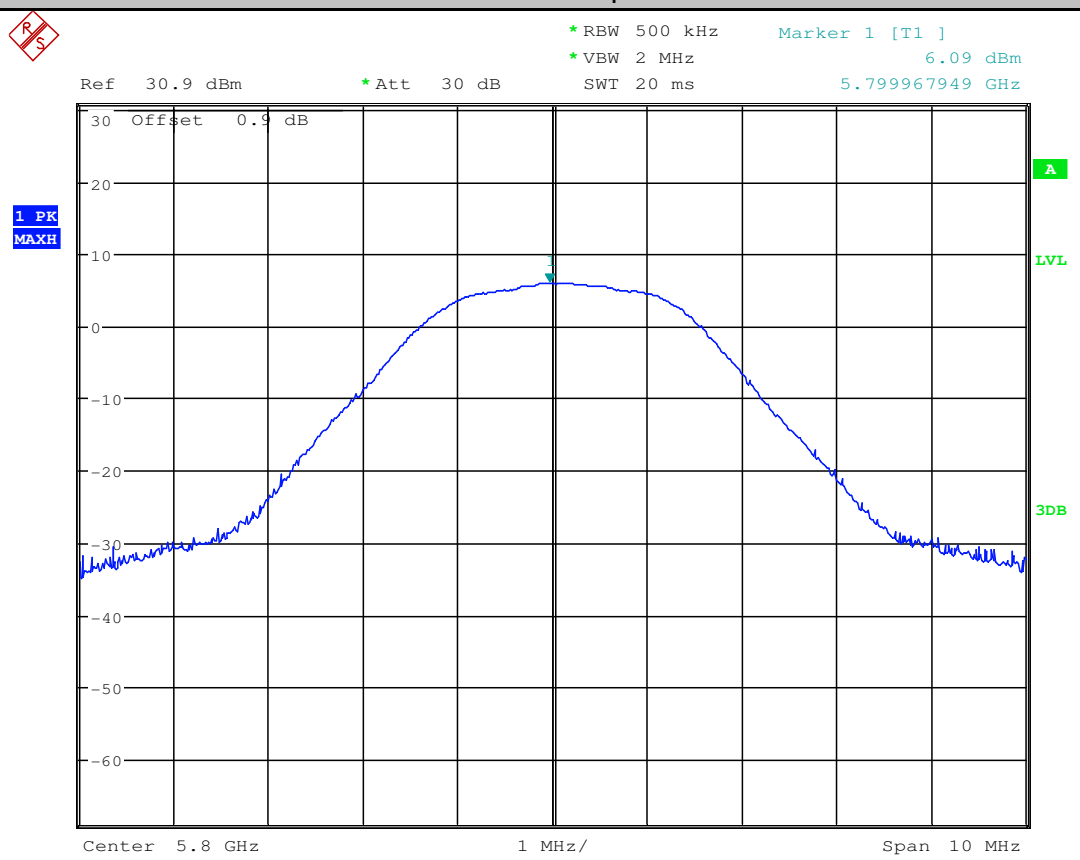
Maximum Conduct Output Power 5800 Ant1



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5.Frequency Stability

Test mode:	TX	Frequency(MHz):	5727

Temperature (℃)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(kHz)	Result
35	120	5727.7566	-0.7566	Pass
25		5727.7610	-0.7610	Pass
15		5727.7620	-0.7620	Pass
5		5727.7612	-0.7612	Pass
0		5727.7554	-0.7554	Pass
20	138	5727.7572	-0.7572	Pass
	120	5727.7601	-0.7601	Pass
	102	5727.7619	-0.7619	Pass

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Test mode:	TX	Frequency(MHz):	5760

Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(kHz)	Result
35	120	5760.5259	-0.5259	Pass
25		5760.5263	-0.5263	Pass
15		5760.5266	-0.5266	Pass
5		5760.5256	-0.5256	Pass
0		5760.5246	-0.5246	Pass
20	138	5760.5254	-0.5254	Pass
	120	5760.5263	-0.5263	Pass
	102	5760.5271	-0.5271	Pass

Test mode:	TX	Frequency(MHz):	5800

Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(kHz)	Result
35	120	5800.8075	-0.8075	Pass
25		5800.8084	-0.8084	Pass
15		5800.8086	-0.8086	Pass
5		5800.8080	-0.8080	Pass
0		5800.8073	-0.8073	Pass
20	138	5800.8080	-0.8080	Pass
	120	5800.8084	-0.8084	Pass
	102	5800.8087	-0.8087	Pass

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