Shenzhen General Testing & Inspection Technology Co.,Ltd.
1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China
Tel: +86-755- 27521059 Fax: +86-755- 27521011 Http://www.sz-ctc.com.cn

TEST REPORT

Product Name	:	WIRELESS CHARGING MOUSE
Trademark	:	/
Model/Type reference	:	WM-786C
Listed Model(s)	:	/
FCC ID	:	2AB75-WM786C
Test Standards	:	**FCC Part 15.249:Operation within the bands 902-928 MHz,2400-2483.5MHz,5725-5875MHZ, and 24.0-24.25 GHz**
Report No		***GTI20182161F***
Applicant	:	Wintop Electronics Co., Ltd
Address of applicant	:	Unit 04 7/F, Bright Way Tower 33, Mong Kok RD, KL, Hong Kong
Date of Receipt	:	Dec. 01, 2018
Date of Test Date	:	Dec. 02, 2018 to Dec. 05, 2018
Data of issue.	:	Dec. 05, 2018

Test result	**Pass ***

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

GENERAL DESCRIPTION OF EUT	
Equipment:	WIRELESS CHARGING MOUSE
Model Name:	WM-786C
Adding Model(s):	/
Model difference:	/
Manufacturer:	Wintop Electronics Co., Ltd
Manufacturer Address:	Unit 04 7/F, Bright Way Tower 33, Mong Kok RD, KL, Hong Kong
Factory:	Shenzhen Wintop Electronics Co.,Ltd
Address:	No.46 Xinhe Road Shangmugu Pinghu Town Longgang District Shenzhen China
Power Rating:	Battery: DC 3.7V 600mAh

Compiled By: Torny Fang

(Torny Fang)

Reviewed By: cary luo

(Cary Luo)

Approved By: walter chen

(Walter Chen)

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1. SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.249: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz,2400-2483.5MHz,5725-5875MHZ, and 24.0-24.25 GHz

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

1.2. Test Description

FCC PART 15 15.249		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.249 (a) (d) /15.209	Radiated Emissions	PASS
FCC Part 15.249 (a)	Spurious RF Conducted Emission	N/A
FCC Part 15.215(c)	20dB Occupied Band Width	PASS
FCC Part 15.249 (d)	Band edge Test	PASS
FCC Part 15.203	Antenna requirement	PASS

1.3. Test Facility

Address of the test laboratory

Shenzhen General Testing & Inspection Technology Co., Ltd.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Laboratory accreditation

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

CNAS-Lab Code: L5365
Shenzhen General Testing & Inspection Technology Co.,Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: CN1208
Shenzhen General Testing & Inspection Technology Co.,Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9783A-1

The 3m alternate test site of Shenzhen General Testing & Inspection Technology Co.,Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC-Registration No.: 951311

Shenzhen General Testing & Inspection Technology Co.,Ltd. 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 951311, Aug 26, 2017

1.4. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements and is documented in the Shenzhen General Testing & Inspection Technology Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for General Testing & Inspection laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emission 1~18GHz	5.16 dB	(1)
Radiated Emission 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~75 %
Air Pressure:	950~1050mba

2.2. General Description of EUT

Product Name:	WIRELESS CHARGING MOUSE
Model/Type reference:	WM-786C
Power supply:	Battery: DC 3.7V 600mAh
Hardware version:	V1.0
Software version:	V1.0
ANT+:	
Supported type:	ANT+
Modulation:	GFSK
Operation frequency:	2405MHz.2430MHz.2470MHz
Antenna type:	PCB Antenna
Antenna gain:	1.6dBi

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.3. Description of Test Modes

Peripherals Devices:

OUTSIDE SUPPORT EQUIPMENT						
No.	Equipment	Model	Serial No.	Manufacture	Trade name	Remark
						N.A
						N.A
						N.A

Note: All the above equipment /cable were placed in worse case position to maximize emission signals during emission test.

Operation Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) mode for testing.

ANT+

Channel	Frequency (MHz)
01	**2405**
02	**2430**
03	**2470**

2.4.Measurement Instruments List

Maximum Conducted Output Power					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Power Meter	Anritsu	ML2487B	110553	Jan. 04,2019
2	Power Sensor	Anritsu	MA2411B	100345	Jan. 04,2019
3	Spectrum Analyzer	R&S	FSU26	100105	Jan. 04,2019

1.

Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSU26	100105	Jan. 04,2019

2.

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrate until
1	LISN	R&S	ENV216	101112	Jan. 04,2019
2	LISN	R&S	ENV216	101113	Jan. 04,2019
3	EMI Test Receiver	R&S	ESCI	100920	Jan. 04,2019
4	Cable	Schwarzbeck	AK9515E	33156	Jan. 04,2019

3.

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100658	Jan. 04,2019
2	High pass filter	micro-tranics	HPM50111	34202	Jan. 04,2019
3	Log-Bicon Antenna	Schwarzbeck	CBL6141A	4180	Jan. 04,2019
4	Ultra-Broadband Antenna	ShwarzBeck	BBHA9170	25841	Jan. 04,2019
5	Loop Antenna	LAPLAC	RF300	9138	Jan. 04,2019
6	Spectrum Analyzer	Rohde & Schwarz	FSU	100105	Jan. 04,2019
7	Horn Antenna	Schwarzbeck	BBHA 9120D	647	Jan. 04,2019
8	Pre-Amplifier	HP	8447D	1937A03050	Jan. 04,2019
9	Pre-Amplifier	EMCI	EMC051835	980075	Jan. 04,2019
10	Antenna Mast	UC	UC3000	N/A	N/A
11	Turn Table	UC	UC3000	N/A	N/A
12	Cable Below 1GHz	Schwarzbeck	AK9515E	33155	Jan. 04,2019
13	Cable Above 1GHz	Hubersuhner	SUCOFLEX102	DA1580	Jan. 04,2019

Note: 1. The Cal.Interval was one year.
2. The cable loss has calculated in test result which connection between each test instruments.

3. TEST CONDITIONS AND RESULTS

3.1. CONDUCTED EMISSION MEASUREMENT

Limit

POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quas□-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

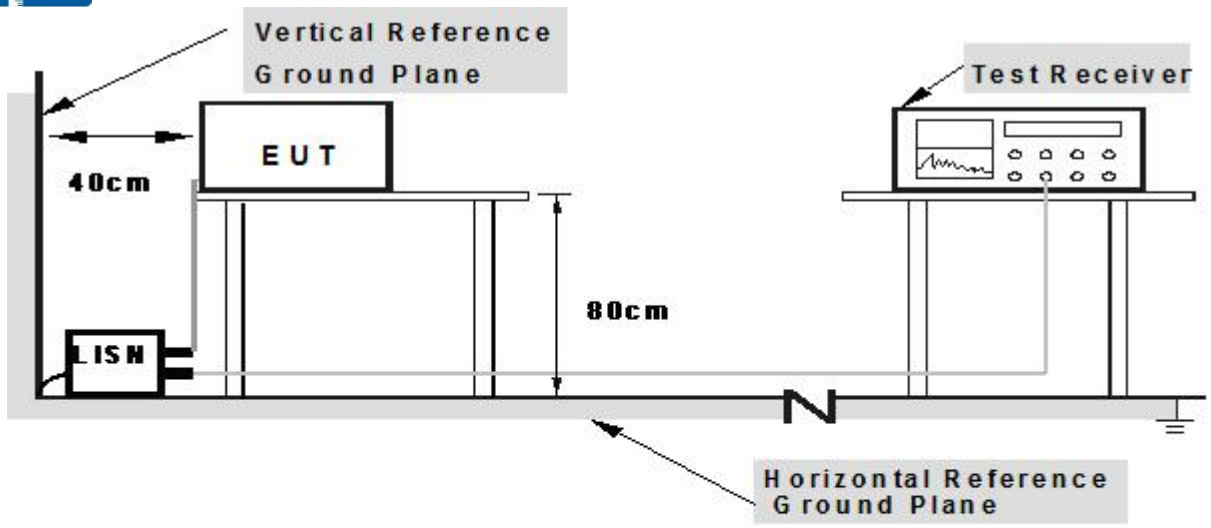
Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

Test Procedure

1. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
2. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
3. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.Repeat above procedures until all frequency measurements have been completed.
4. LISN at least 80 cm from nearest part of EUT chassis.
5. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Test Configuration

For the actual test configuration, please refer to the related Item –EUT Test Photos.



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

TEST RESULTS

For the mouse, battery powered, no testing required.

3.2. Radiated Emission

Limit

For intentional device, according to§ 15.209(a), § 15.249(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table.

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz, VBW=3MHz for Peak Detector while the RBW=1MHz, VBW=10Hz for Average Detector, Readings are both peak and average values. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dBuV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

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

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

Test Procedure

1. The EUT was placed on a turn table which is 0.8m(below 1GHz)or1.5m(above 1GHz) above ground plane.
6. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
7. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. Repeat above procedures until all frequency measurements have been completed.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL – AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

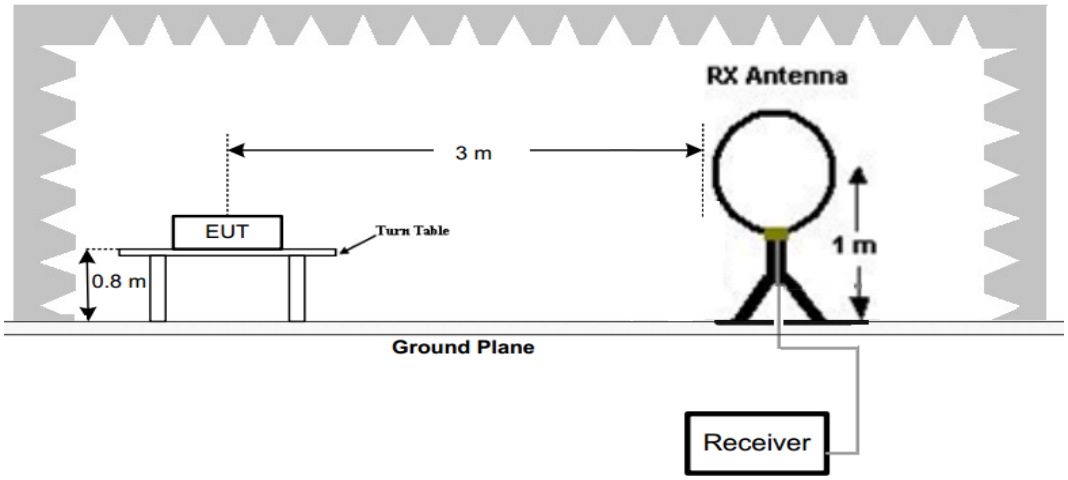
Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
150.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

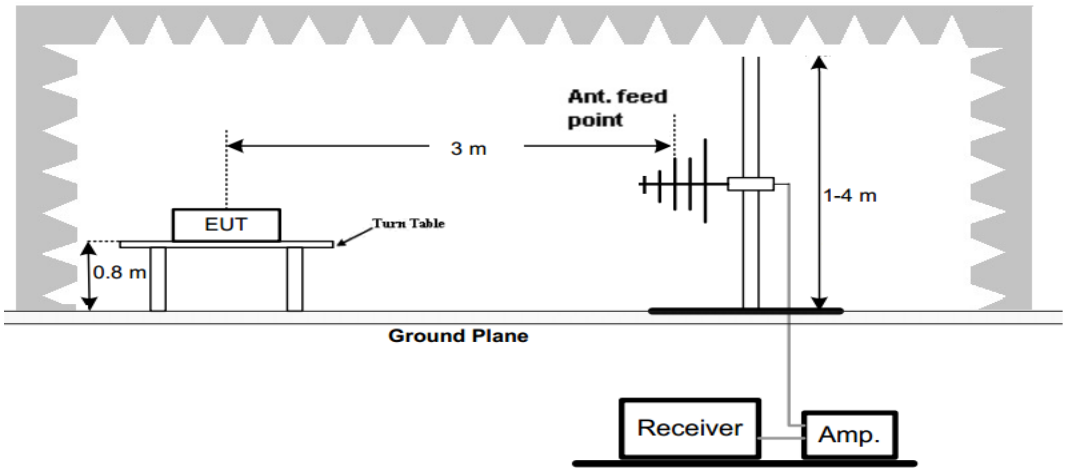
Test Configuration

For the actual test configuration, please refer to the related Item –EUT Test Photos.

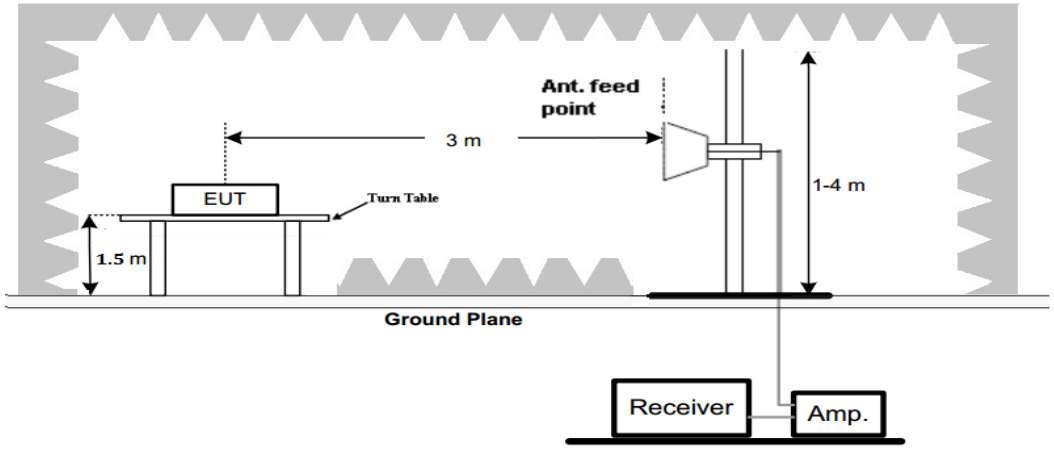
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



MEASURING SETTING

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/T for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/T for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB 100kHz for QP

Test Results

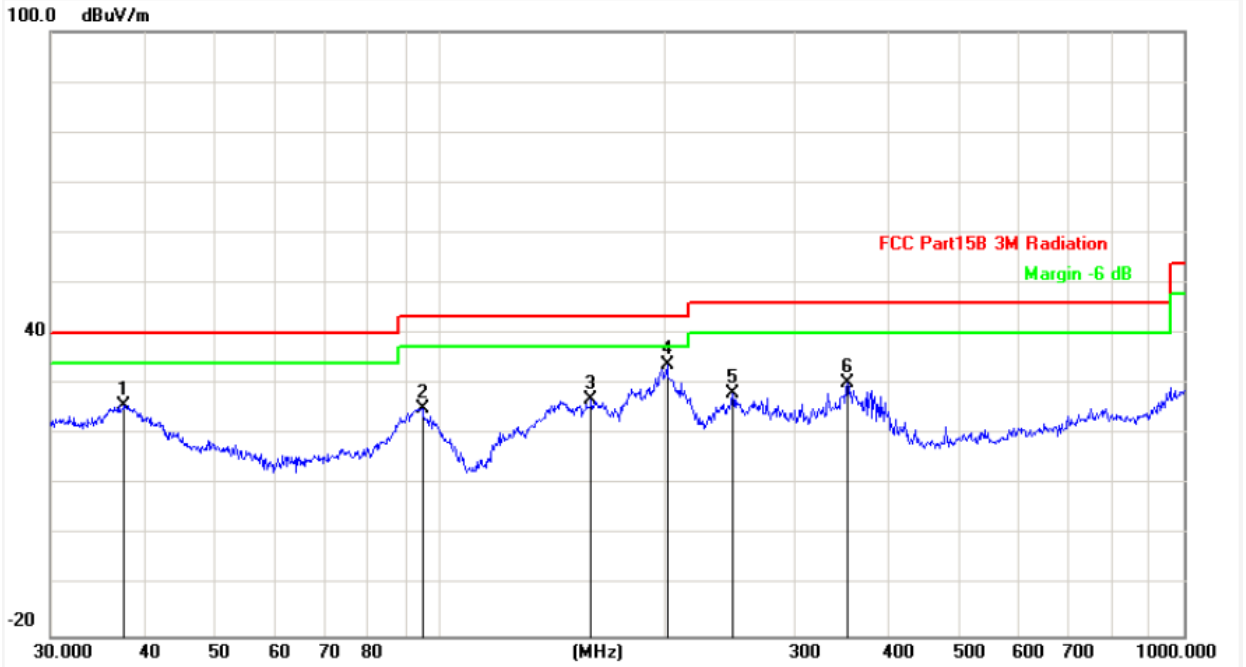
Remark:

For 9 KHz-30MHz

The test results of 9kHz-30MHz is attenuated more than 20dB below the permissible limits, so the results don't record in the report.

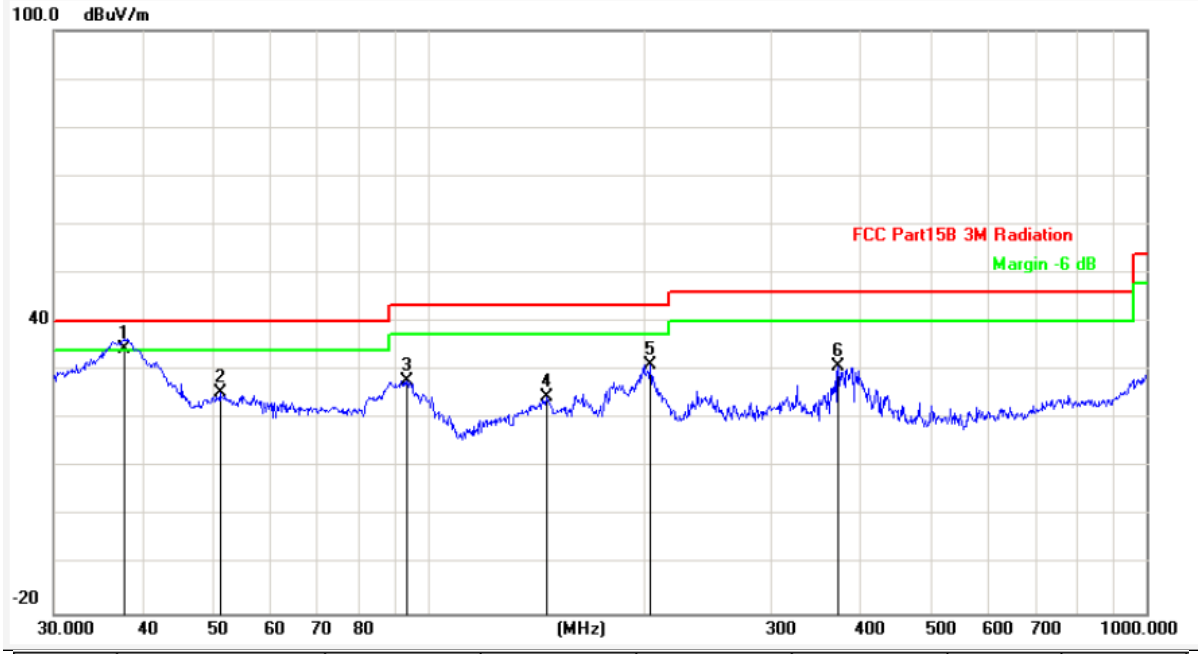
For 30MHz-1GHz

Horizontal



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	37.6797	-11.71	37.60	25.89	40.00	-14.11	QP
2	94.7600	-19.87	45.16	25.29	43.50	-18.21	QP
3	159.7844	-21.02	48.06	27.04	43.50	-16.46	QP
4	202.1004	-18.31	52.13	33.82	43.50	-9.68	QP
5	247.6818	-19.28	47.30	28.02	46.00	-17.98	QP
6	352.9433	-16.10	46.29	30.19	46.00	-15.81	QP

Vertical



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	37.6798	-11.71	46.21	34.50	40.00	-5.50	QP
2	51.1209	-15.84	41.21	25.37	40.00	-14.63	QP
3	93.1132	-20.01	47.99	27.98	43.50	-15.52	QP
4	145.8611	-19.63	44.16	24.53	43.50	-18.97	QP
5	203.5228	-18.27	49.38	31.11	43.50	-12.39	QP
6	372.0045	-15.19	46.19	31.00	46.00	-15.00	QP

Z

Polar	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector
(H/V)	(MHz)	(dBuV)	(dB	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Type
H	2405	70.13	39.1	4.25	30.1	65.38	114	-48.62	PK
H	2405	42.13	39.1	4.25	30.1	37.38	94	-56.62	AV
V	2405	69.24	39.1	4.25	30.1	64.49	114	-49.51	PK
V	2405	40.58	39.1	4.25	30.1	35.83	94	-58.17	AV

Polar	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector
(H/V)	(MHz)	(dBuV)	(dB	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Type
H	2430	61.98	39.3	4.25	30.1	57.03	114	-56.97	PK
H	2430	37.68	39.3	4.25	30.1	32.73	94	-61.27	AV
V	2430	63.68	39.3	4.25	30.1	58.73	114	-55.27	PK
V	2430	38.23	39.3	4.25	30.1	33.28	94	-60.72	AV

Polar	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector
(H/V)	(MHz)	(dBuV)	(dB	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Type
H	2470	61.98	40.5	4.25	30.1	55.83	114	-58.17	PK
H	2470	37.68	40.5	4.25	30.1	31.53	94	-62.47	AV
V	2470	63.68	40.5	4.25	30.1	57.53	114	-56.47	PK
V	2470	38.23	40.5	4.25	30.1	32.08	94	-61.92	AV

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

For 1 GHz to 26 GHz:

Sequence of testing 1 GHz to 26 GHz Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0°to 315°using 45°steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

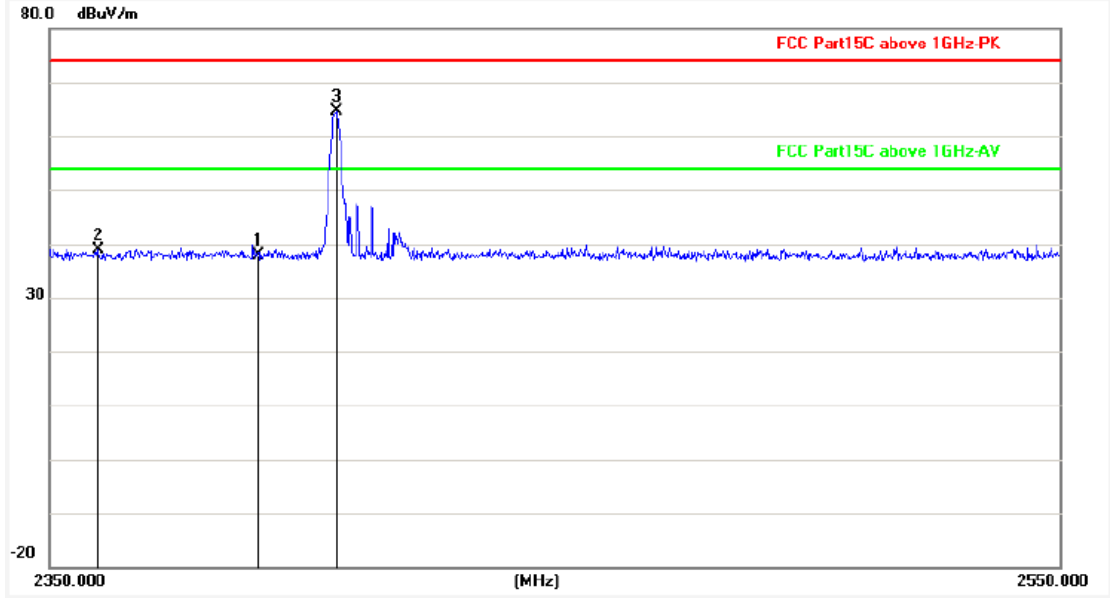
--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

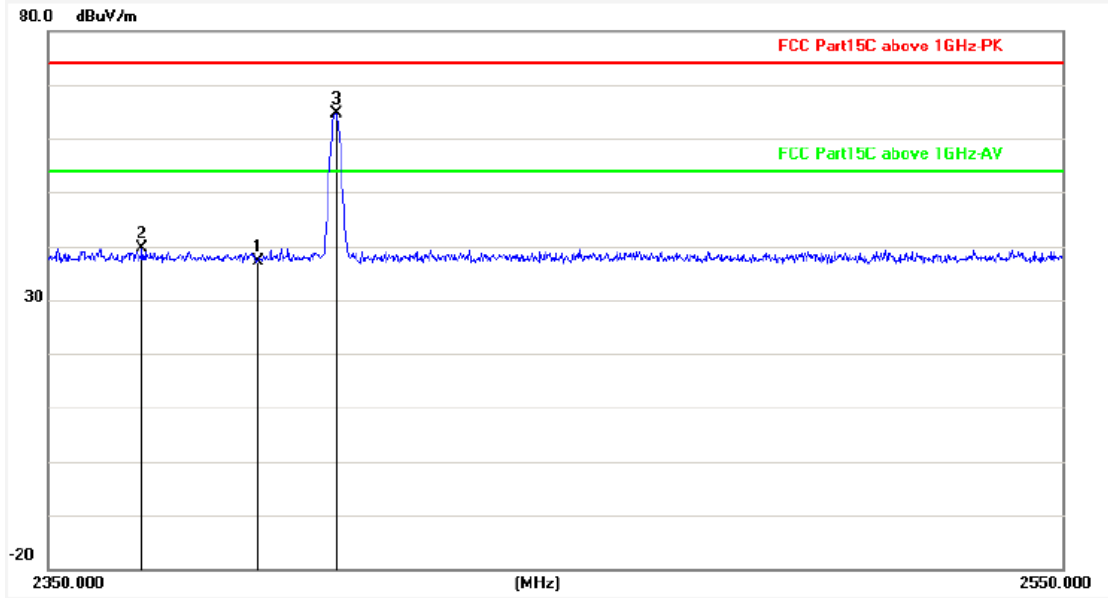
Test Results

Ant. Pol.	Horizontal
Test Mode:	2405MHz



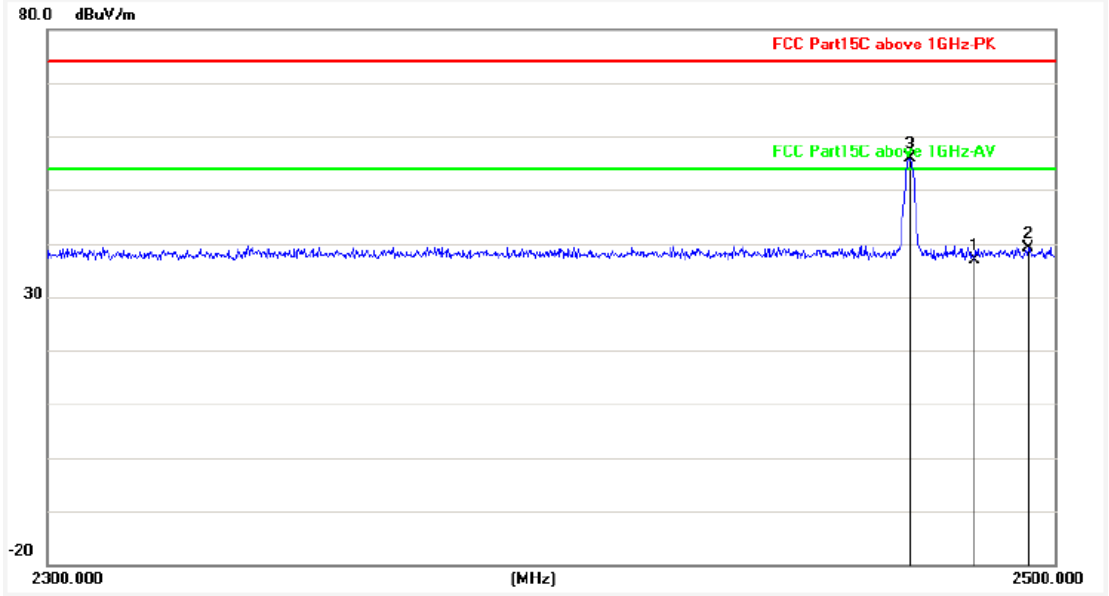
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.000	-5.98	43.88	37.90	74.00	-36.10	peak
2	2359.400	-6.01	44.96	38.95	74.00	-35.05	peak
3	2405.200	-5.97	70.48	64.51	74.00	-9.49	peak

Ant. Pol.	Vertical
Test Mode:	2405MHz



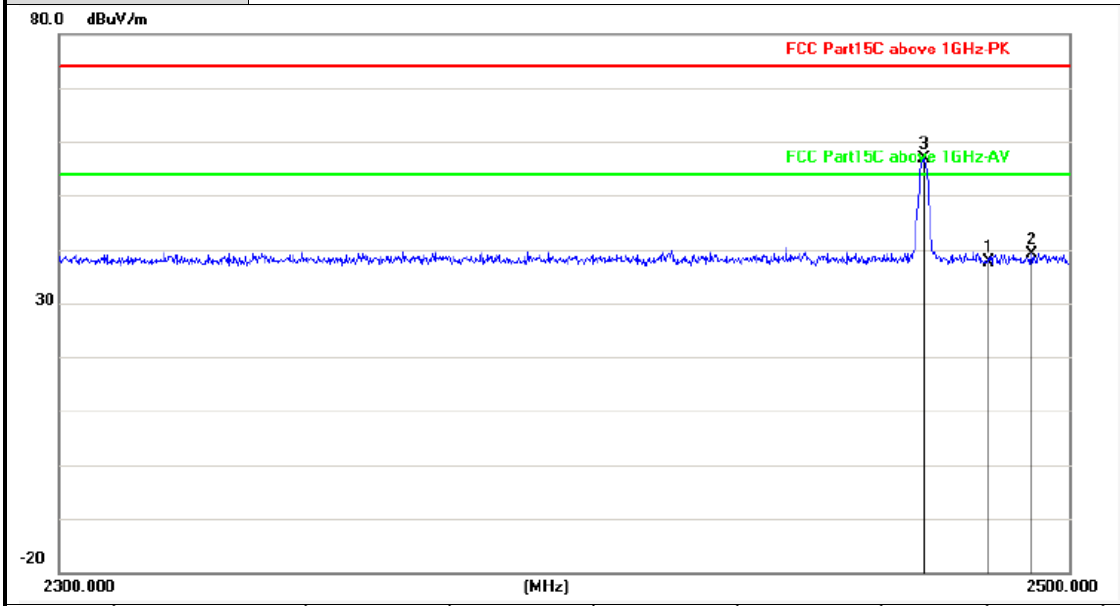
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.000	-5.98	43.11	37.13	74.00	-36.87	peak
2	2368.000	-6.01	45.53	39.52	74.00	-34.48	peak
3	2405.200	-5.97	70.52	64.55	74.00	-9.45	peak

Ant. Pol.	Horizontal
Test Mode:	2470MHz



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.500	-5.78	42.72	36.94	74.00	-37.06	peak
2	2494.600	-5.75	44.76	39.01	74.00	-34.99	peak
3	2470.200	-5.81	61.77	55.96	74.00	-18.04	peak

Ant. Pol.	Vertical
Test Mode:	2470MHz



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.500	-5.78	43.36	37.58	74.00	-36.42	peak
2	2492.400	-5.76	44.91	39.15	74.00	-34.85	peak
3	2470.200	-5.81	62.75	56.94	74.00	-17.06	peak

Remark:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

3.3.20dB Bandwidth

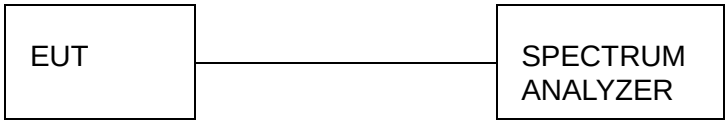
Limit

unwanted emissions outside of the frequency bands shown in these alternative provisions must be attenuated to the emission limits shown in §15.209.

Test Procedure

1. The transmitter output was connected to the spectrum analyzer.
2. Set SA as follow:
   a) RBW: 100 kHz.
   b) VBW: ≥ 3 × RBW.
   c) Detector: Peak.
   d) Trace mode: max hold.
   e) Sweep: auto couple.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Configuration



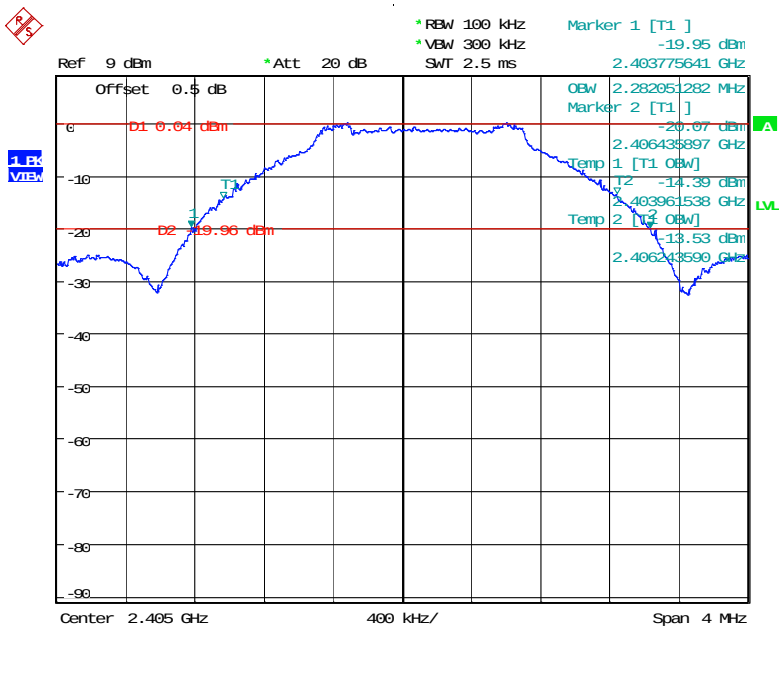
Test Results

ANT+

Type	Channel	20dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
GFSK	01	2.6603	2.2821	Pass
GFSK	02	2.5962	2.2692	Pass
GFSK	03	2.6154	2.2756	Pass

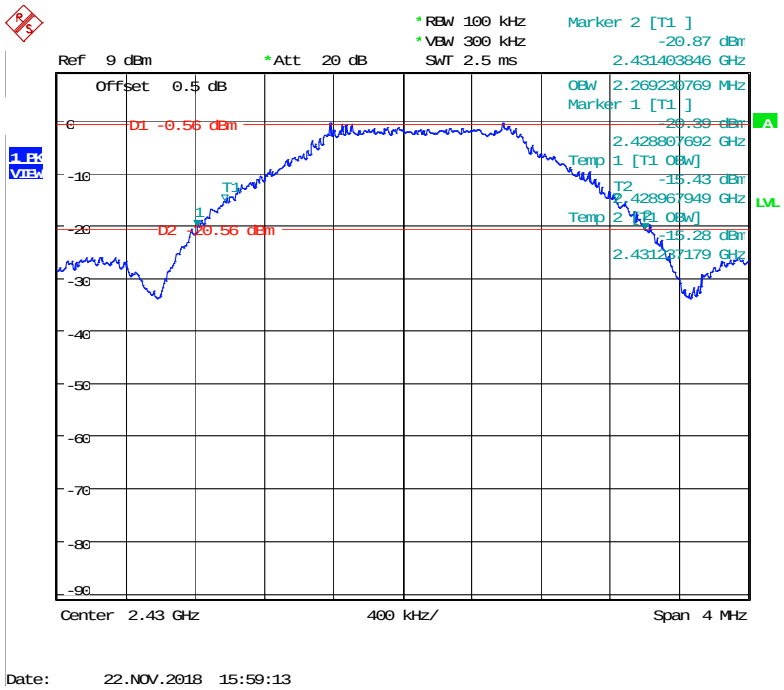
Test plot as follows:

2405MHz



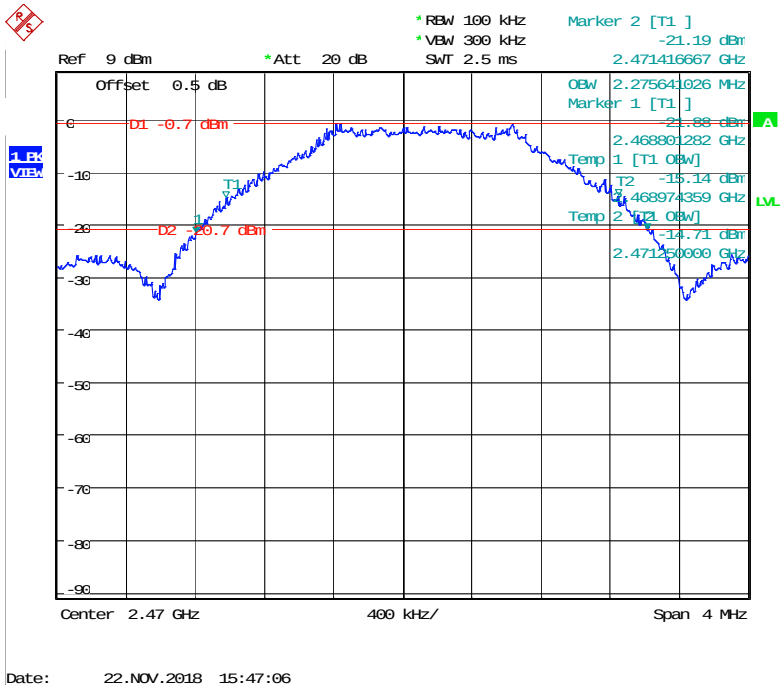
Date: 22.NOV.2018 16:09:38

2430MHz



Date: 22.NOV.2018 15:59:13

2470MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Marker 2 [T1]
-21.19 dBm
2.471416667 GHz
Ref 9 dBm
Att 20 dB
Offset 0.5 dB
OBW 2.275641026 MHz
Marker 1 [T1]
-21.88 dBm
2.468801282 GHz
Temp 1 [T1 OBW]
T2 -15.14 dBm
2.468974359 GHz
Temp 2 [T1 OBW]
-14.71 dBm
2.471250000 GHz
D1 -0.7 dBm
D2 -20.7 dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.47 GHz
400 kHz/
Span 4 MHz
Date: 22.NOV.2018 15:47:06

3.4. Band edge Test Test

Limit

For intentional device, according to§ 15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

Test Procedure

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz, VBW=3MHz for Peak Detector while the RBW=1MHz, VBW=10Hz for Average Detector, Readings are both peak and average values. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

1. The EUT was placed on a turn table which is 0.8m(below 1GHz)or1.5m(above 1GHz) above ground plane
2. . The table was rotated 360 degrees to determine the position of the highest radiation.
3. The EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. 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.
5. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
6. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel
8. Test the EUT in the lowest channel, the highest channel
9. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
10. Repeat above procedures until all frequencies measured was complete.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL – AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

For example

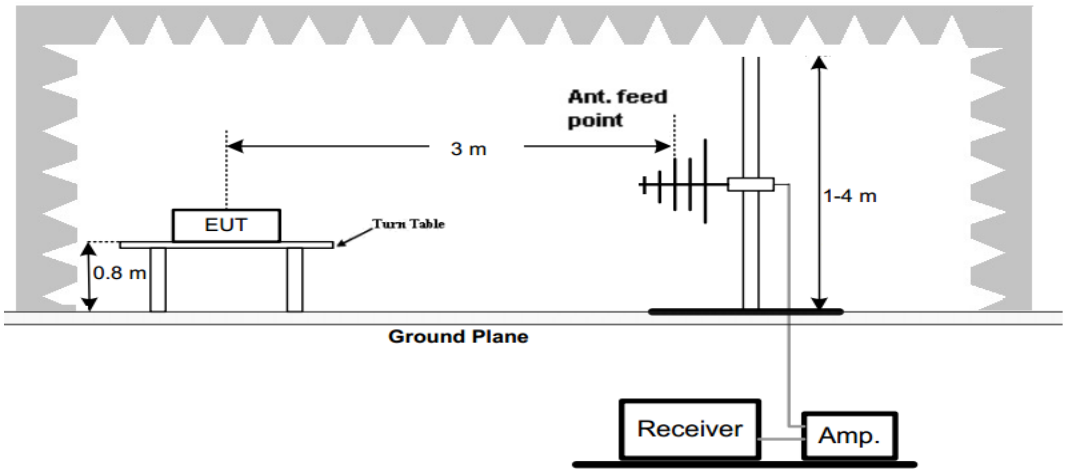
Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
150.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

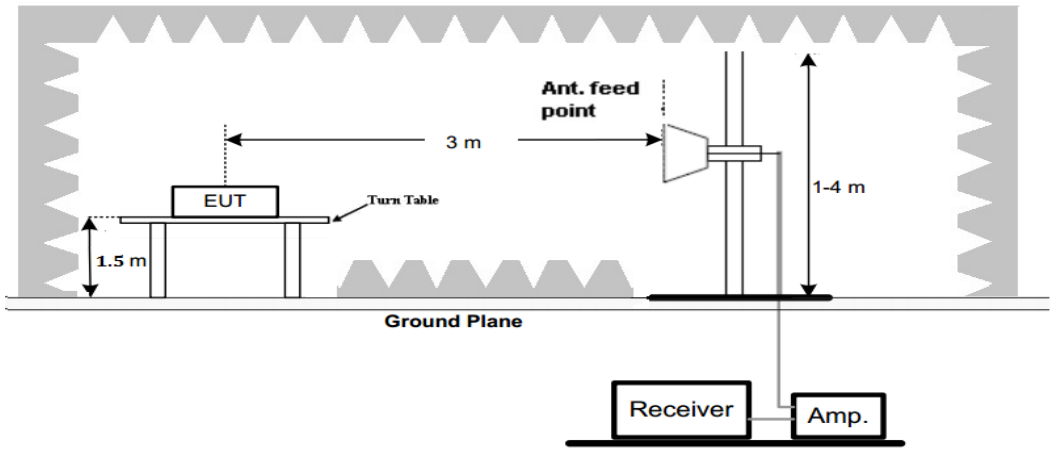
Test Configuration

For the actual test configuration, please refer to the related Item –EUT Test Photos.

Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



Test Results

Remark:

Polar	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector
(H/V)	(MHz)	(dBuV)	(dB	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Type
H	2390.00	59.63	36.12	3.32	27.5	54.33	74	-19.67	PK
H	2390.00	44.33	36.12	3.32	27.5	39.03	54	-14.97	AV
V	2390.00	53.15	36.12	3.32	27.5	47.85	74	-26.15	PK
V	2390.00	45.21	36.12	3.32	27.5	39.91	54	-14.09	AV

Polar	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector
(H/V)	(MHz)	(dBuV)	(dB	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Type
H	2483.50	52.36	36.55	3.38	27.5	46.69	74	-27.31	PK
H	2483.50	41.35	36.55	3.38	27.5	35.68	54	-18.32	AV
V	2483.50	53.26	36.55	3.38	27.5	47.59	74	-26.41	PK
V	2483.50	42.38	36.55	3.38	27.5	36.71	54	-17.29	AV

3.5. Antenna Requirement

Standard Applicable

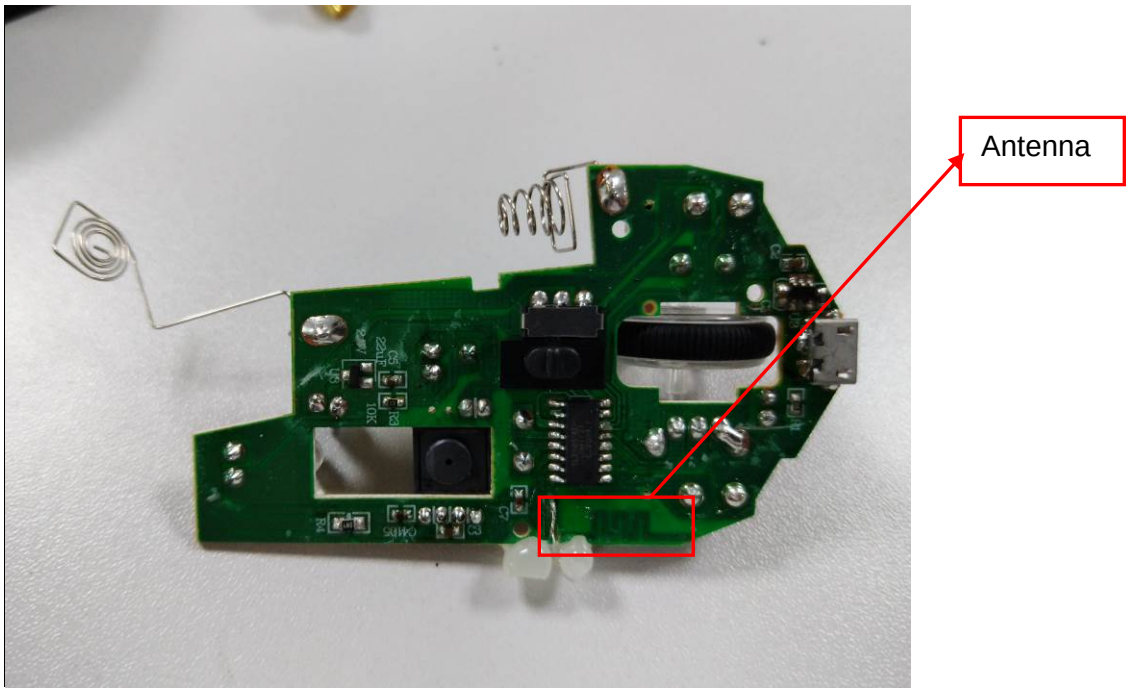
For intentional device, according to FCC 47 CFR Section 15.203:

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

Result

The EUT's antenna is soldered to the PCB. The gain of the antenna is 1.6dBi. meet the standards.

Test Result:



4. EUT TEST PHOTO

Please reference to the annex: Test Photo

5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

Please reference to the annex: Extra EUT Photo and Internal EUT Photo

**********THE END**********