Radio Test Report

Report No.:STS512328W04

Issued for

ShenZhen ZhongKeRui Electronics CO., LTD.

501, Building A, Nankeng 2nd Industrial Park, Bantian, Longgang, Shenzhen 518129, China

Product Name:	Bike Rear Light
Brand Name:	RAVEMEN
Model Name:	NT201
Series Model(s)	NT202, NT203, NT204, NT205
FCC ID:	2AYUF-25324
Test Standards:	FCC Part 15.245

TEST REPORT

Applicant's Name..... :	ShenZhen ZhongKeRui Electronics CO., LTD.
Address..... :	501, Building A, Nankeng 2nd Industrial Park, Bantian, Longgang, Shenzhen 518129, China
Manufacture's Name..... :	ShenZhen ZhongKeRui Electronics CO., LTD.
Address..... :	501, Building A, Nankeng 2nd Industrial Park, Bantian, Longgang, Shenzhen 518129, China

Product Description

Product Name .....:	Bike Rear Light
Brand Name .....:	RAVEMEN
Model Name.....:	NT201
Series Model .....:	NT202, NT203, NT204, NT205
Test Standards.....:	FCC Part 15.245
Test Procedure.....:	ANSI C63.4-2014 ANSI C63.10-2013

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

Date of Test.....:	
Date of receipt of test item.....:	24 Dec. 2024
Date of performance of tests ..:	24 Dec. 2024~21 Mar. 2025
Date of Issue.....:	21 Mar. 2025
Test Result .....:	**Pass**

Testing Engineer : Rain.Liu

(Rain Liu)

Technical Manager : Tony Liu

(Tony Liu)

Authorized Signatory : Bovey Yang

(Bovey Yang)

SHENZHEN STS TEST SERVICES CO., LTD. TESTING APPROVAL

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Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	21 Mar. 2025	STS2412328W04	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 15.245		
FCC standard	Test Item	Results
15.207	AC Conducted Emission	PASS
15.245(b)	Field strength of emissions (wanted signal)	PASS
15.215(c)	Occuoied Bandwidth	PASS
15.209(a) 15.245(b)(1)(2)(3)	Field Strength of Spurious Radiation	PASS
15.203	Antenna requirement	PASS

NOTE:

(1) “N/A” denotes test is not applicable in this Test Report.

(2) All tests are according to ANSI C63.4 and ANSI C63.10.

1.1 TEST FACILITY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : 101, Building B, Zhuoke Science Park, No.190 Chongqing Road, ZhanChengShequ, Fuhai Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.755dB
2	Unwanted Emissions, conducted	±2.874dB
3	All emissions, radiated 9K-30MHz	±3.80dB
4	All emissions, radiated 30M-1GHz	±4.18dB
5	All emissions, radiated 1G-6GHz	±4.90dB
6	All emissions, radiated 6G-18GHz	±5.24dB
7	All emissions, radiated 18G-40GHz	±5.42dB
8	All emissions, radiated >40GHz	±5.86dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name	Bike Rear Light
Brand Name	RAVEMEN
Model Name	NT201
Series Model(s)	NT202, NT203, NT204, NT205
Model Difference	Only the appearance and model are different, other circuits are the same
Operation Frequency	24075 - 24175 MHz
Modulation Type	FMCW
Antenna Type	Microstrip planar
Antenna Gain	13.03dBi
Test Channel	Please refer to the Note 3.
Power Rating	Input: DC 5V 0.8A Output: DC 3-3.3V 120mA
Adapter	N/A
Battery	Rated Voltage:3.7V Charge Limit Voltage:4.2V Capacity: 1400mAh
Hardware version number	V1
Software version number	1.1
Connecting I/O Port(s)	Please refer to the Note 1.

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	RAVEMEN	NT201	Microstrip planar	N/A	13.03	Antenna

The EUT antenna is External Antenna. No antenna other than that furnished by the responsible party shall be used with the device.

3

Channel List	
Channel	Frequency (MHz)
01	24125

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,please see the above listed frequency for testing.

2.2 EUT OPERATION MODE

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Mode	Description
Mode1	TX CH 01

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

(2) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V/60Hz is shown in the report.

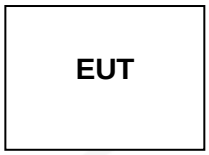
(3) The battery is fully-charged during the radited and RF conducted test.

For AC Conducted Emission

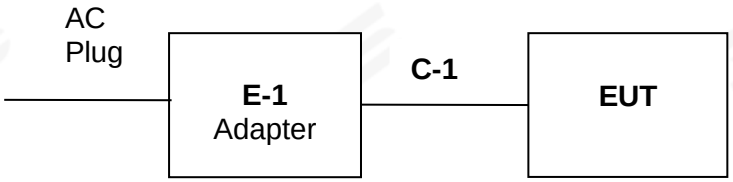
Test Case	
AC Conducted Emission	Mode 2 : Keeping TX

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Emission Test



2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Note
E-1	Adapter	ZTC	NB-A515A	N/A
C-1	USB Cable	ZTC	NB-A515A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
C-1	Shielded	NO	150cm	N/A

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.6 TEST EQUIPMENT

RF Radiation Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
Pre-Amplifier(0.1M-3GHz)	EM	EM330	60665	2025.02.22	2026.02.21
Pre-Amplifier(1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2025.02.22	2026.02.21
Pre-Amplifier(18G-40GHz)	SKET	LNPA_1840-50	SK2018101801	2025.02.22	2026.02.21
Active loop Antenna(9KHz-30MHz)	ZHINAN	ZN30900C	16035	2025.02.25	2026.02.24
Bilog Antenna(30-1000MHz)	TESEQ	CBL6111D	34678	2024.09.30	2025.09.29
Horn Antenna(1G-18GHz)	SCHWARZBECK	BBHA 9120D	2014	2023.09.24	2025.09.23
Horn Antenna(18G-40GHz)	A-INFOMW	LB-180400-KF	J211020657	2024.09.25	2025.09.24
Horn Antenna(40G-60GHz)	A-INFO	LB-19-25-A	2.02004E+12	2024.12.25	2025.12.24
Horn Antenna(50G-75GHz)	A-INFO	LB-15-25-A	2.02003E+12	2024.12.25	2025.12.24
Horn Antenna(75G-110GHz)	A-INFO	LB-10-25-A	2.02002E+12	2024.12.25	2025.12.24
Horn Antenna(110G-170GHz)	A-INFO	LB-6-25-A	2.02001E+12	2024.12.25	2025.12.24
Mixer(40-60GHz)	AT-Microwave	AT-SAX8-4060	N/A	2024.12.25	2025.12.24
Mixer(50-75GHz)	AT-Microwave	AT-SAXB-5075	N/A	2024.12.25	2025.12.24
Mixer(75-110GHz)	AT-Microwave	AT-SAX12-75110	N/A	2024.12.25	2025.12.24
Mixer(110-170GHz)	AT-Microwave	AT-SAX24-110170	N/A	2024.12.25	2025.12.24
Mixer(170-260GHz)	AT-Microwave	AT-SAX32-170260	N/A	2024.12.25	2025.12.24
Signal Analyzer	Keysight	N9020A	MY52440124	2025.02.22	2026.02.21
Positioning Controller	MF	MF-7802	MF-780208587	N/A	N/A
Signal Analyzer	R&S	FSV 40-N	101823	2024.09.23	2025.09.22
Switch Unit	BALUN Technology	SU319E	BL-SZ1530051	N/A	N/A
Antenna Mast	MF	MFA-440H	N/A	N/A	N/A
Turn Table	MF	SC100_1	60531	N/A	N/A
AC Power Source	APC	KDF-11010G	F214050035	N/A	N/A
DC power supply	HONGSHENGFENG	DPS-305AF	17064939	2024.09.23	2025.09.22
Test SW	EZ-EMC	Ver.STSLAB-03A1 RE			
Conduction Test equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2024.09.24	2025.09.23
Limtter	CYBERTEK	EM5010	N/A	2024.09.24	2025.09.23
LISN	R&S	ENV216	101242	2024.09.24	2025.09.23
LISN	EMCO	3810/2NM	23625	2024.09.24	2025.09.23
Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
Test SW	EZ-EMC	Ver.STSLAB-03A1 CE			

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	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.

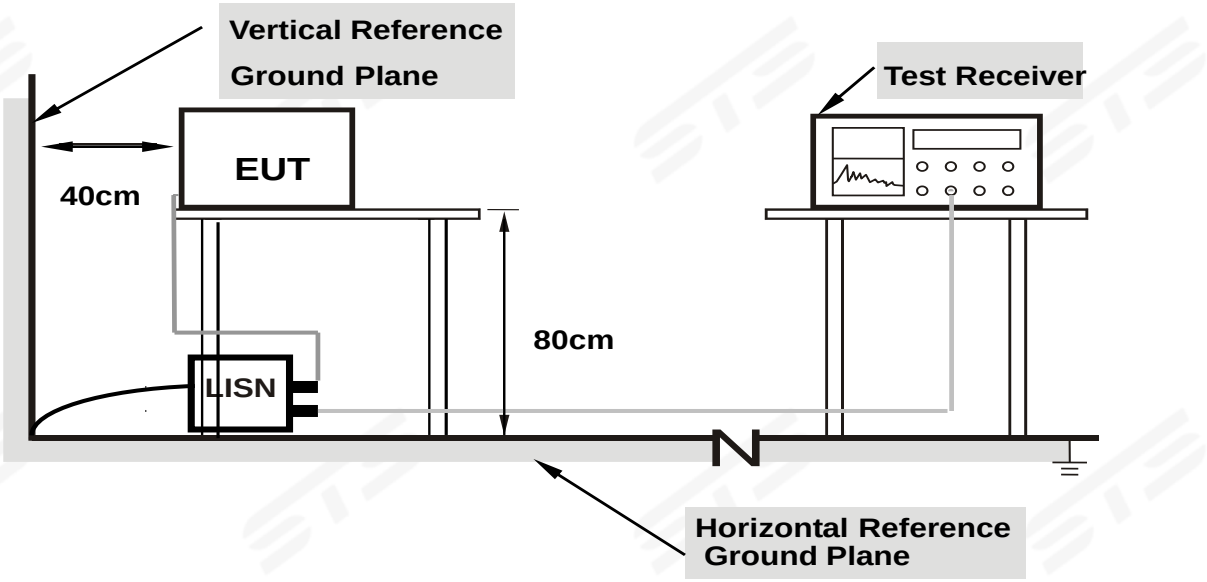
The following table is the setting of the receiver

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

3.2 TEST PROCEDURE

a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. 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.
c. 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.
d. LISN is at least 80 cm from the nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3 TEST SETUP



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

3.4 EUT OPERATING CONDITIONS

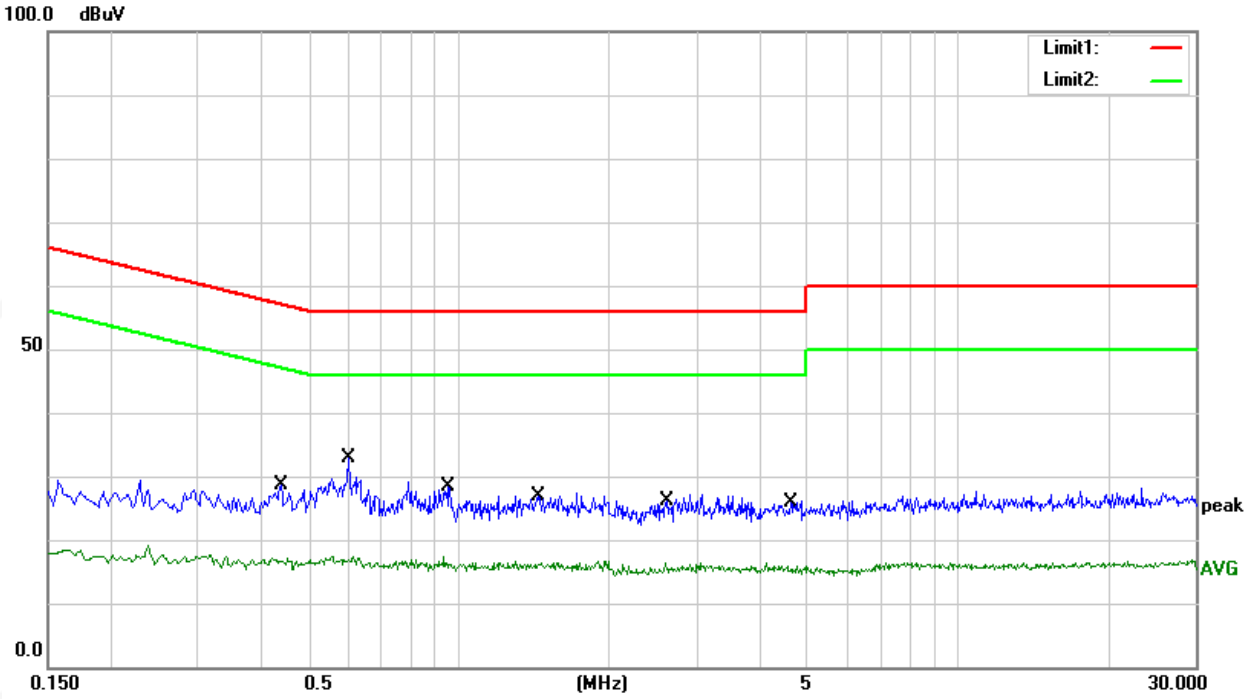
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.5 TEST RESULT

Temperature:	25.1℃	Relative Humidity:	59%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 2		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.4420	8.57	20.01	28.58	57.02	-28.44	QP
2	0.4420	-2.90	20.01	17.11	47.02	-29.91	AVG
3	0.6020	13.03	19.91	32.94	56.00	-23.06	QP
4	0.6020	-2.65	19.91	17.26	46.00	-28.74	AVG
5	0.9500	8.70	19.78	28.48	56.00	-27.52	QP
6	0.9500	-2.37	19.78	17.41	46.00	-28.59	AVG
7	1.4460	7.13	19.78	26.91	56.00	-29.09	QP
8	1.4460	-3.33	19.78	16.45	46.00	-29.55	AVG
9	2.6220	6.29	19.81	26.10	56.00	-29.90	QP
10	2.6220	-3.39	19.81	16.42	46.00	-29.58	AVG
11	4.6380	5.97	19.83	25.80	56.00	-30.20	QP
12	4.6380	-3.52	19.83	16.31	46.00	-29.69	AVG

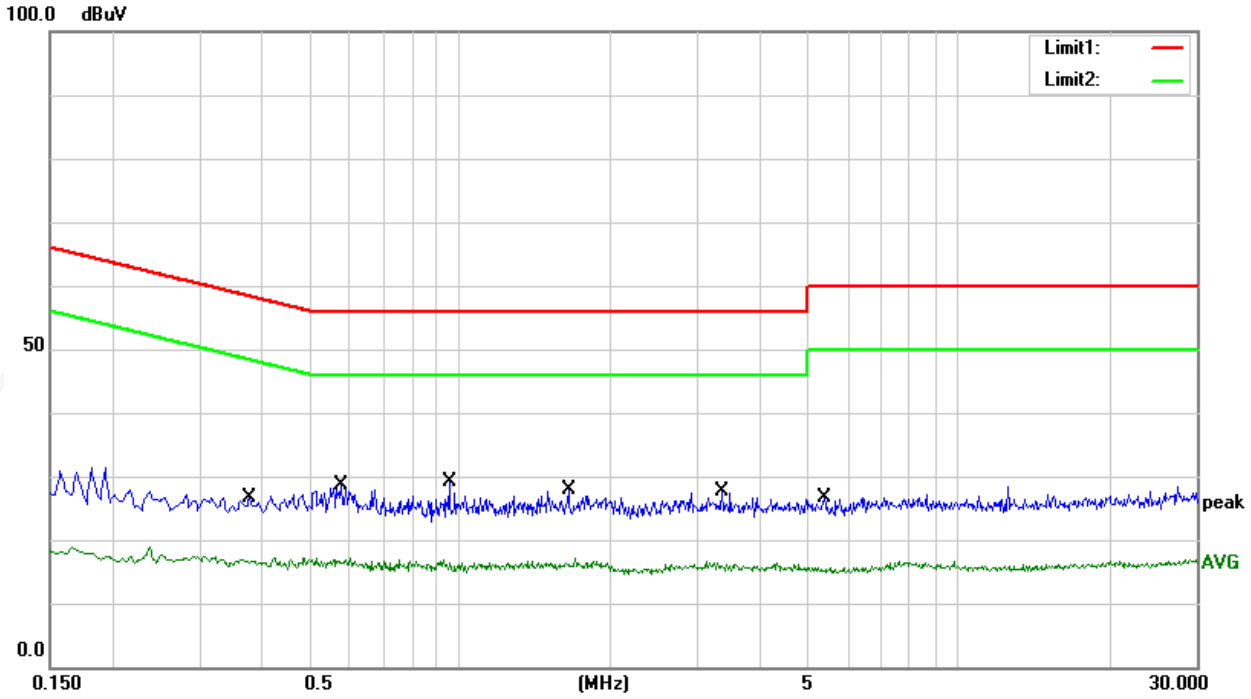
Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



Temperature:	25.1℃	Relative Humidity:	59%
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 2		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3780	6.56	20.09	26.65	58.32	-31.67	QP
2	0.3780	-3.26	20.09	16.83	48.32	-31.49	AVG
3	0.5780	8.83	19.91	28.74	56.00	-27.26	QP
4	0.5780	-2.89	19.91	17.02	46.00	-28.98	AVG
5	0.9500	9.26	19.78	29.04	56.00	-26.96	QP
6	0.9500	-2.98	19.78	16.80	46.00	-29.20	AVG
7	1.6500	7.94	19.85	27.79	56.00	-28.21	QP
8	1.6500	-2.82	19.85	17.03	46.00	-28.97	AVG
9	3.3580	7.57	19.94	27.51	56.00	-28.49	QP
10	3.3580	-3.40	19.94	16.54	46.00	-29.46	AVG
11	5.3780	6.84	19.86	26.70	60.00	-33.30	QP
12	5.3780	-3.68	19.86	16.18	50.00	-33.82	AVG

Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



4. Field Strength of Emissions

4.1 LIMIT

(a) According to § 15.245(b): The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (millivolts/meter)
902-928	500	1.6
2435-2465	500	1.6
5785-5815	500	1.6
10500-10550	2500	25.0
24075-24175	2500	25.0

(b) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7GHz, as specified in § 15.205, shall not exceed the field strength limits shown in § 15.209 and RSS-Gen. Harmonic emissions in the restricted bands at and above 17.7 GHz shall not exceed the following field strength limits:

(i) For the second and third harmonics of field disturbance sensors operating in the 24075-24175 MHzband and for other field disturbance sensors designed for use only within a building or to open building doors, 25.0 mV/m.

(ii) For all other field disturbance sensors, 7.5 mV/m.

(iii) Field disturbance sensors designed to be used in motor vehicles or aircraft must include features to prevent continuous operation unless their emissions in the restricted bands, other than the second and third harmonics from devices operating in the 24075-24175 MHz band, fully comply with the limits given in § 15.209. Continuous operation of field disturbance sensors designed to be used in farm equipment, vehicles such as fork lifts that are intended primarily for use indoors or for very specialized operations, or railroad locomotives, railroad cars and other equipment which travels on fixed tracks is permitted. A field disturbance sensor will be considered not to be operating in a continuous mode if its operation is limited to specific activities of limited duration (e.g., putting a vehicle into reverse gear, activating a turn signal, etc.).

Frequencies (MHz)	**Field Strength (micorvolts/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

(c) Field strength limits are specified at a distance of 3 meters.

(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.

(e) The emission limits shown above are based on measurement instrumentation employing an average detector. The provisions in § 15.35 and RSS-Gen for limiting peak emissions apply.

4.2 TEST PROCEDURE

4.2.1 Sequence of testing radiated spurious 9 KHz to 30 MHz

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 1.5 m height is used.
c. If the EUT is a floor standing device, it is placed directly on the turn table.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.4.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.4) – see test details.
g. EUT is set into operation.

Premeasurement

a. The turntable rotates from 0 degree to 360 degree.
b. The antenna height is 1.5m.
c. Set RBW = 200 Hz / VBW = 1 KHz, sweep time: Auto
d. At each turntable position the anzlyer sweeps with position-peak detector to find the maximum of all emissions.

Final measurement

a. Identified emissions during the premeaurement are maximized by the software by rotating the turntable from 0 degree to 360 degree.
b. The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
c. Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to The limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.2.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 0.8 m height is used, which is placed on the ground plance.
c. If the EUT is a floor standing device, it is placed directly on the ground plane.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.4.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.4) – see test details.
g. EUT is set into operation.

Premeasurement

a. The turntable rotates from 0 degree to 360 degree.
b. The antenna is polarized vertical and horizontal.
c. The antenna height changes from 1m to 4m.

d. Set RBW = 120 KHz / VBW = 1 MHz, sweep time: Auto
e. At each turntable position the anzlyer sweeps with position-peak detector to find the maximum of all emissions.

Final measurement

The final neasurement us perormed for at least six highest peaks according to the requirements of the ANSI C63.4.

Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable and antenna height between 1 and 4 m.

The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).

Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to the limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.2.3 Sequence of testing radiated spurious 1 GHz to 18 GHz

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 1.5 m height is used.
c. If the EUT is a floor standing device, it is placed directly on the turn table.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.4.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.4) – see test details.
g. EUT is set into operation.

Premeasurement

a. The turntable rotates from 0 degree to 360 degree.
b. The antenna is polarized vertical and horizontal.
c. The antenna height changes from 1m to 4m.
d. Set RBW = 1 MHz / VBW = 3 MHz, sweep time: Auto, detector: Peak for Peak, RBW = 1 MHz / VBW = 3MHz, sweep time: Auto, detector: Average for Average.
e. At each turntable position the anzlyer sweeps with position-peak detector to find the maximum of all emissions.

Final measurement

a. The final neasurement us perormed for at least six highest peaks according to the requirements of the ANSI C63.4.
b. Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable and antenna height between 1 and 4 m.
c. The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
d. The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing theheight emissions with Peak and Average detector (as described in ANSI C 63.4).
e. Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to the limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.2.4 Sequence of testing radiated spurious above 18 GHz

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 1.5 m height is used.

c. If the EUT is a floor standing device, it is placed directly on the turn table.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.4.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.4) – see test details.
g. EUT is set into operation.

Premeasurement

a. The turntable rotates from 0 degree to 360 degree.
b. The antenna is polarized vertical and horizontal.
c. The antenna height changes from 1m to 4m.
d. Set RBW = 1 MHz / VBW = 3 MHz, sweep time: Auto, detector: Peak for Peak, RBW = 1 MHz / VBW = 3MHz, sweep time: Auto, detector: Average for Average.
e. At each turntable position the anzlyer sweeps with position-peak detector to find the maximum of all emissions.

Final measurement

a. The final neasurement us perormed for at least six highest peaks according to the requirements of the ANSI C63.4.
b. Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable and antenna height between 1 and 4 m.
c. The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
d. All final levels should consider distance conversion factor as format: Final values (3 m) = Measurement values (1 m) + Distance conversion factor

Distance conversion factor = 20 x Log_{10} (d/3), where d = measurement distance in m

- Distance conversion factor = 20 x Log_{10} (1/3) = -10.0 [dB]

e. Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to the limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.2.5 Sequence of testing radiated spurious above 40 GHz with external mixers

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 1.5 m height is used.
c. If the EUT is a floor standing device, it is placed directly on the turn table.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.4.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.4) – see test details.
g. EUT is set into operation.

Premeasurement

a. The turntable rotates from 0 degree to 360 degree.
b. The antenna is polarized vertical and horizontal.
c. The antenna height changes from 1m to 4m.
d. Set RBW = 1 MHz / VBW = 3 MHz, sweep time: Auto, detector: Peak for Peak, RBW = 1 MHz / VBW = 3MHz, sweep time: Auto, detector: Average for Average.
e. At each turntable position the anzlyer sweeps with position-peak detector to find the maximum of all emissions.

Final measurement

a. The final neasurement us perormed for at least six highest peaks according to the requirements of the ANSI C63.4.

b. Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable and antenna height between 1 and 4 m.

c. The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).

d. All final levels should consider distance conversion factor as format: Final values (3 m) = Measurement values (1 m) + Distance conversion factor

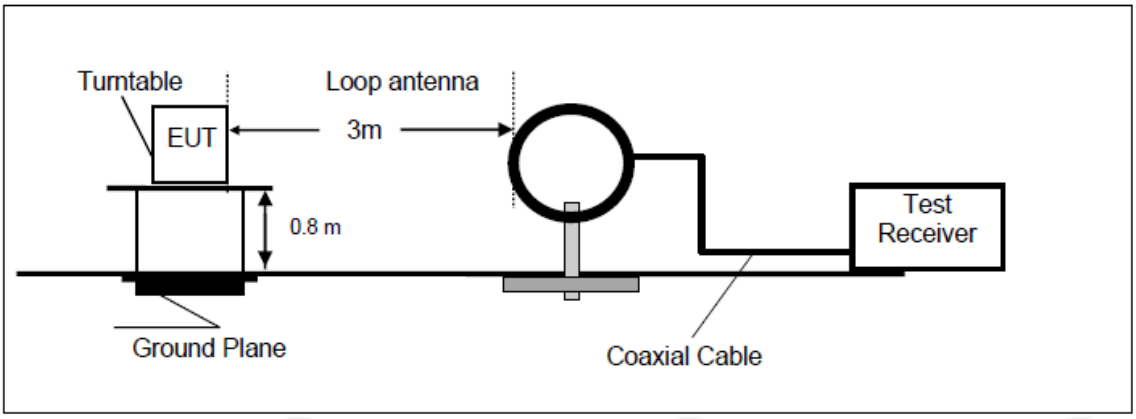
Distance conversion factor = 20 x Log_{10} (d/3), where d = measurement distance in m

- Distance conversion factor = 20 x Log_{10} (1/3) = -10.0 [dB]

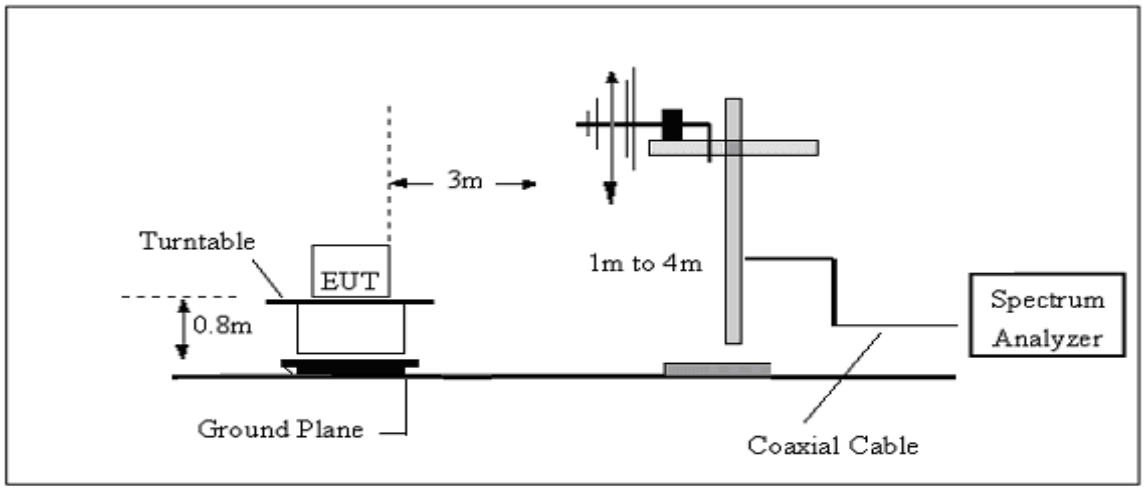
e. Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to the limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.3 TEST SETUP

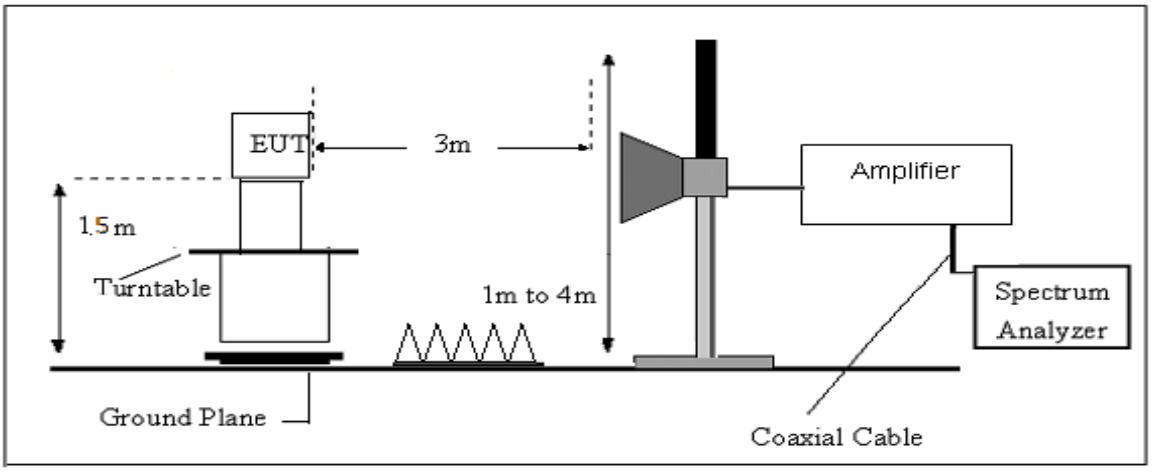
(A) Radiated Emission Test-Up Frequency 9 KHz – 30MHz



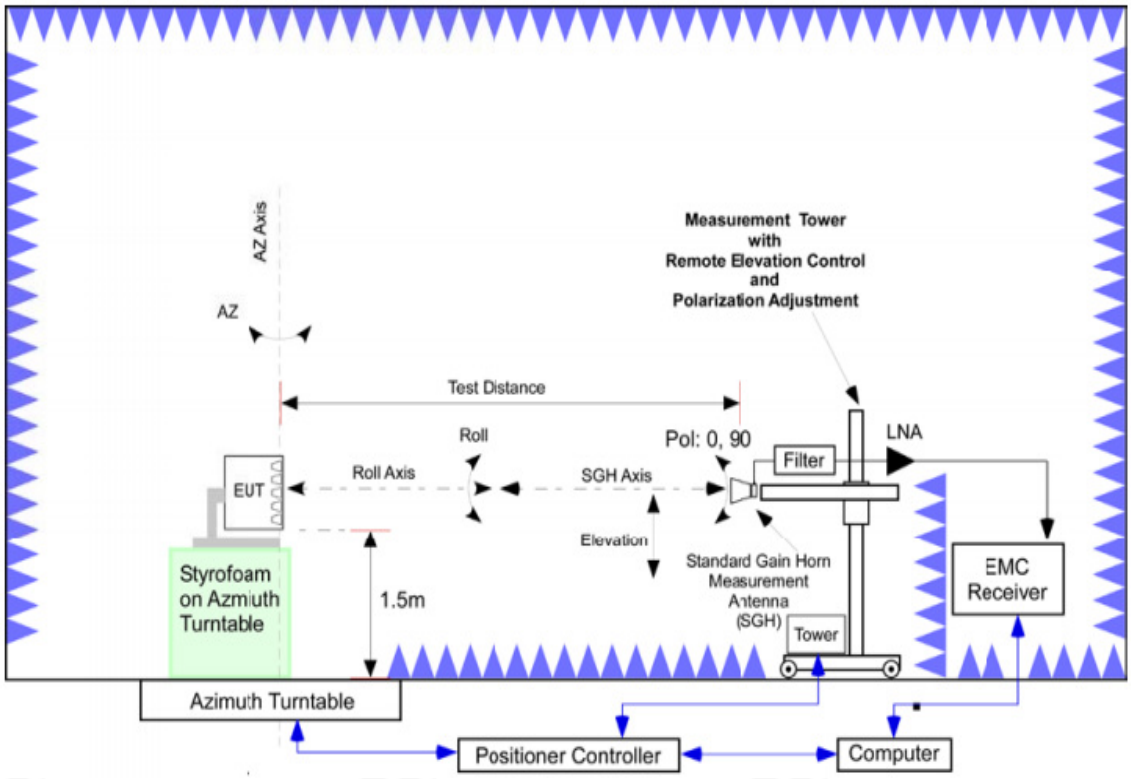
(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency 1GHz~18GHz



(D) Radiated Emission Test-Up Frequency 18GHz~200GHz



4.4 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	FS	RA	AF	CL	AG	Factor
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

Factor=AF+CL-AG

4.5 TEST RESULTS

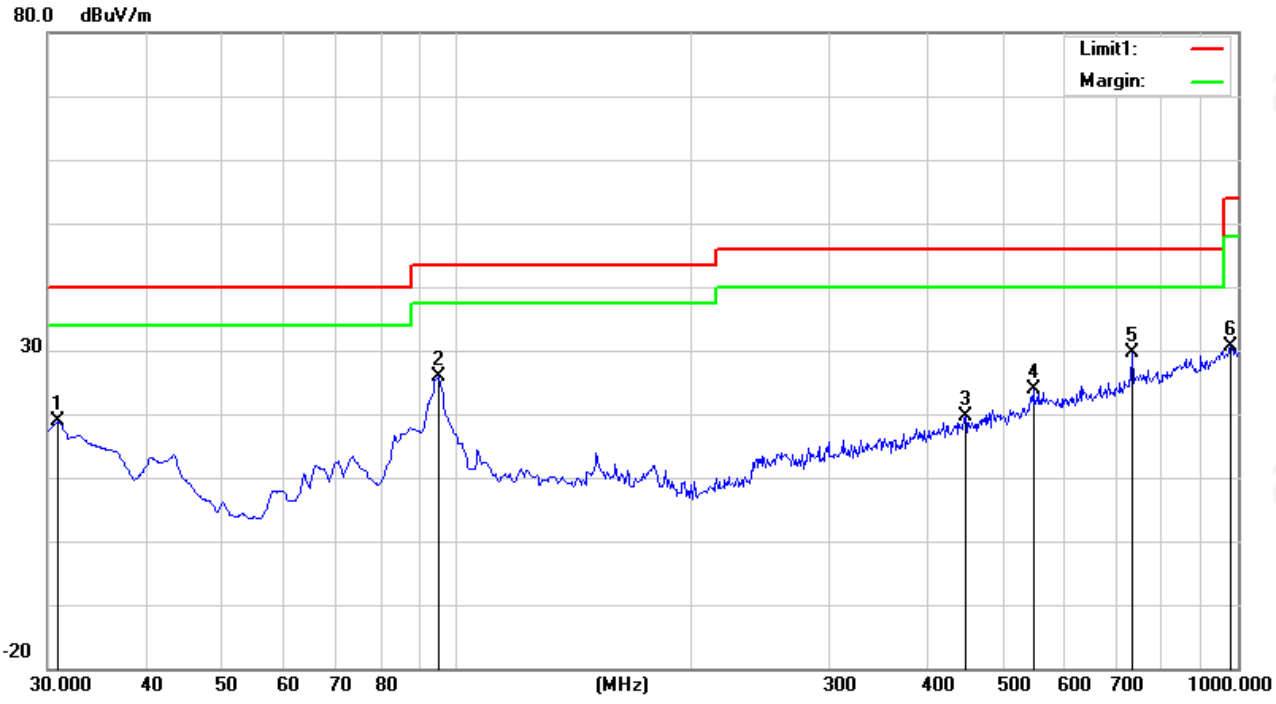
(30MHz -1000MHz)

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 1		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.9700	32.28	-13.35	18.93	40.00	-21.07	peak
2	94.9900	46.69	-20.78	25.91	43.50	-17.59	peak
3	448.0700	29.30	-9.76	19.54	46.00	-26.46	peak
4	547.9800	29.76	-5.99	23.77	46.00	-22.23	peak
5	733.2500	31.89	-2.35	29.54	46.00	-16.46	peak
6	981.5700	27.95	2.57	30.52	54.00	-23.48	peak

Remark:

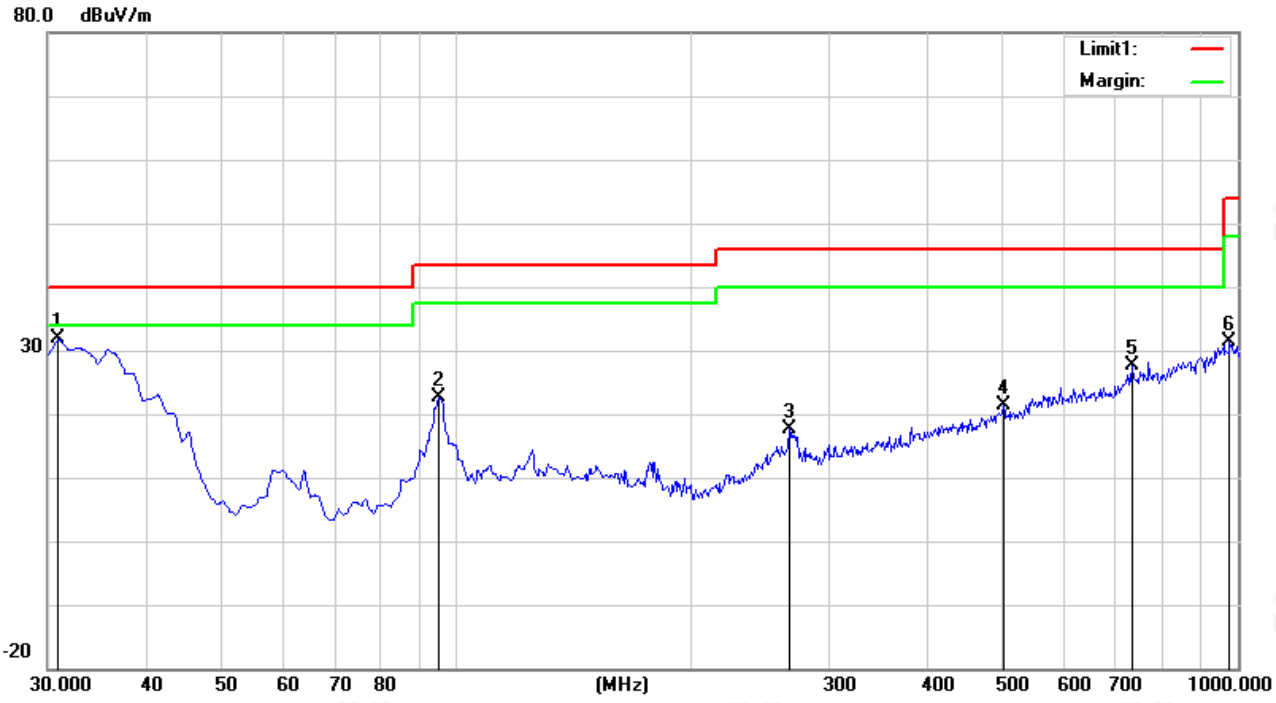
1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain
3. All modes have been tested,only show the worst case.



Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 1		

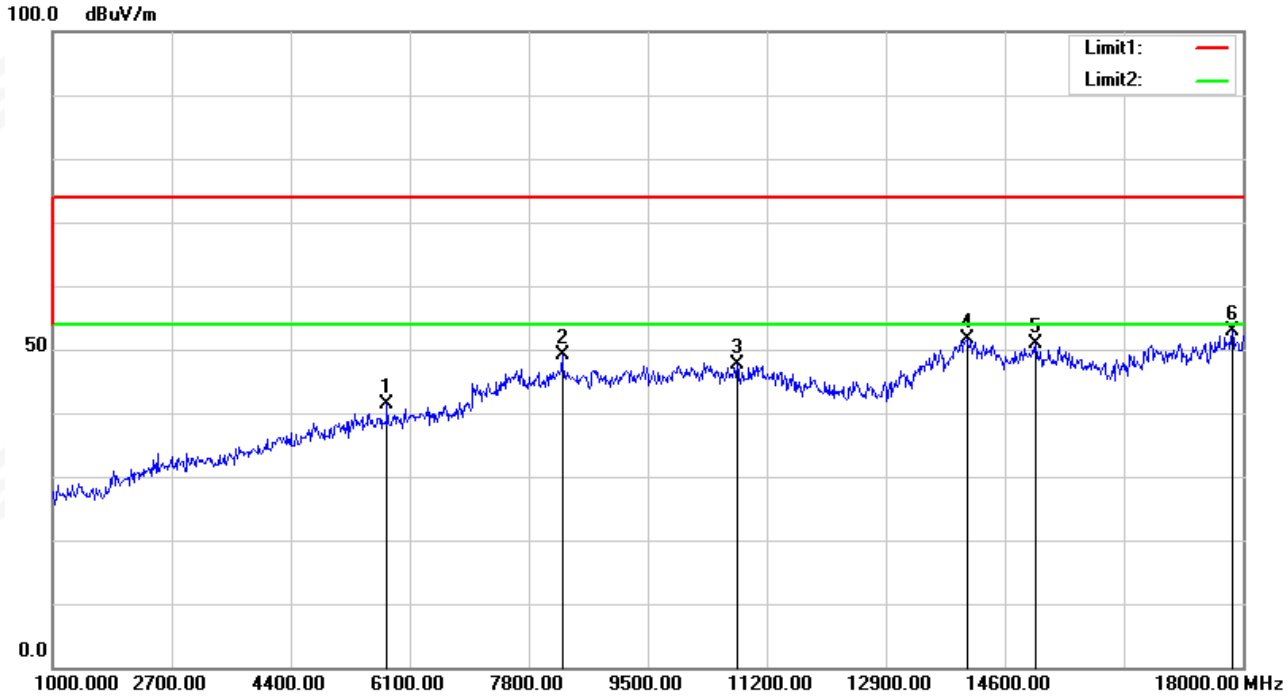
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	30.9700	45.27	-13.35	31.92	40.00	-8.08	peak
2	94.9900	43.53	-20.78	22.75	43.50	-20.75	peak
3	266.6800	32.56	-14.94	17.62	46.00	-28.38	peak
4	502.3900	29.43	-8.00	21.43	46.00	-24.57	peak
5	733.2500	29.95	-2.35	27.60	46.00	-18.40	peak
6	976.7200	29.00	2.45	31.45	54.00	-22.55	peak

Remark:
1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain
3. All modes have been tested,only show the worst case.



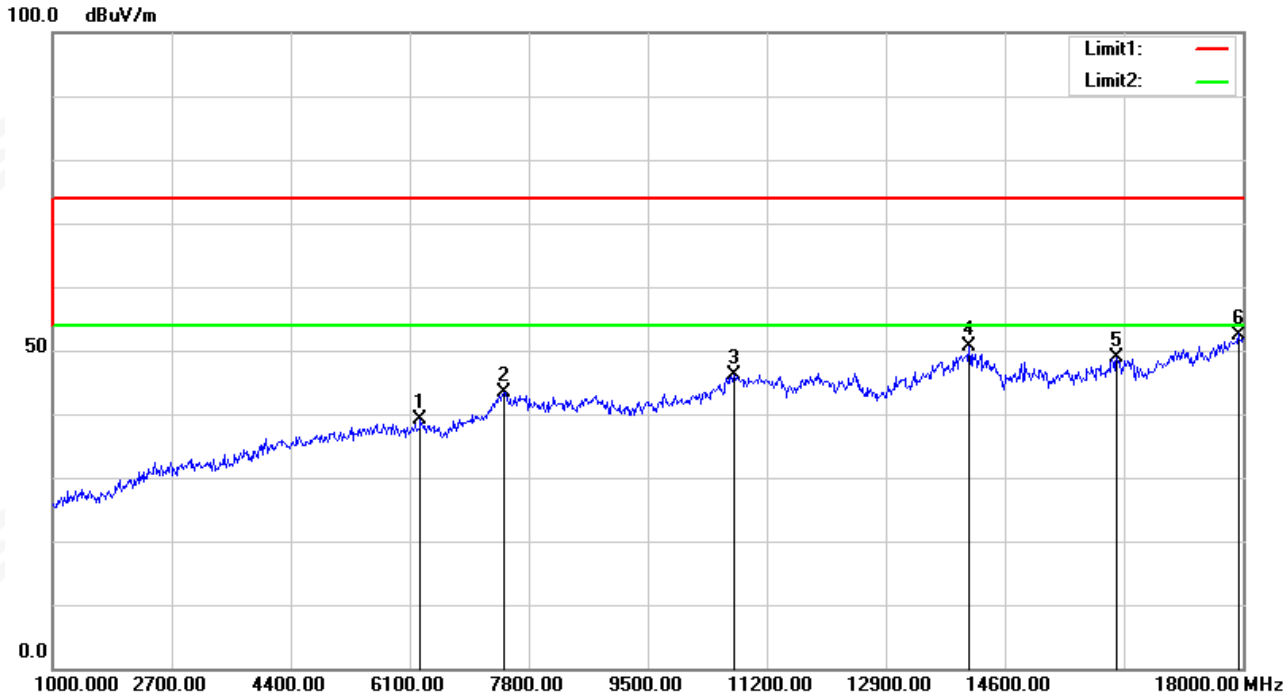
ABOVE 1G

RSE-1G-18G-H



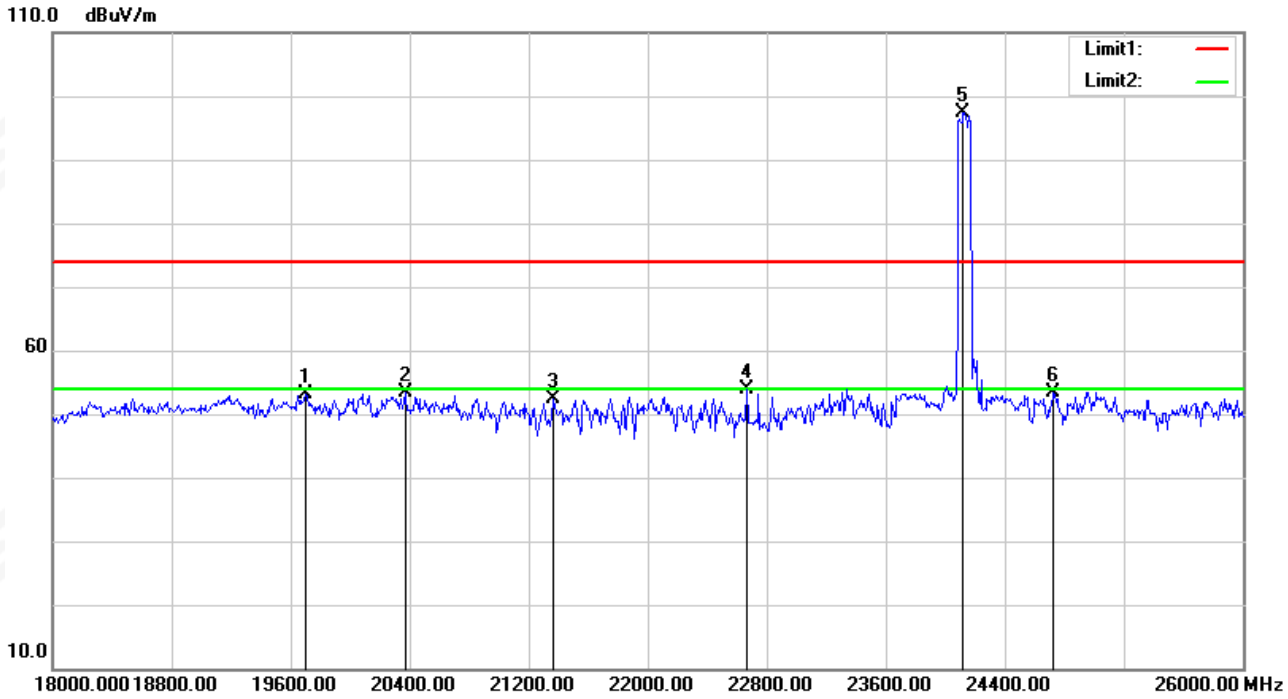
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5777.000	45.81	-4.40	41.41	74.00	-32.59	peak
2	8276.000	46.78	2.47	49.25	74.00	-24.75	peak
3	10775.000	41.93	5.70	47.63	74.00	-26.37	peak
4	14056.000	39.42	12.22	51.64	74.00	-22.36	peak
5	15042.000	40.90	10.03	50.93	74.00	-23.07	peak
6	17847.000	41.28	11.62	52.90	74.00	-21.10	peak

RSE-1G-18G-V



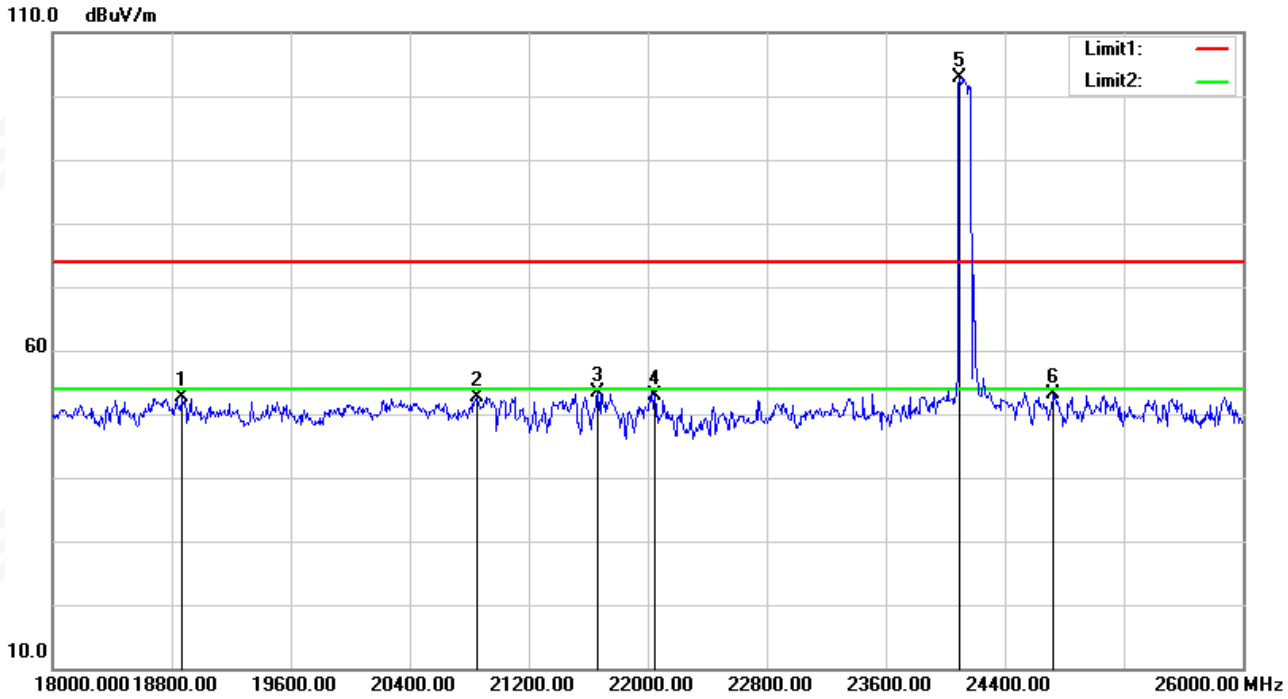
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	6253.000	42.05	-2.81	39.24	74.00	-34.76	peak
2	7443.000	42.07	1.42	43.49	74.00	-30.51	peak
3	10741.000	40.56	5.61	46.17	74.00	-27.83	peak
4	14090.000	38.36	12.15	50.51	74.00	-23.49	peak
5	16198.000	41.09	7.68	48.77	74.00	-25.23	peak
6	17932.000	40.64	11.86	52.50	74.00	-21.50	peak

RSE-18G-26G-H



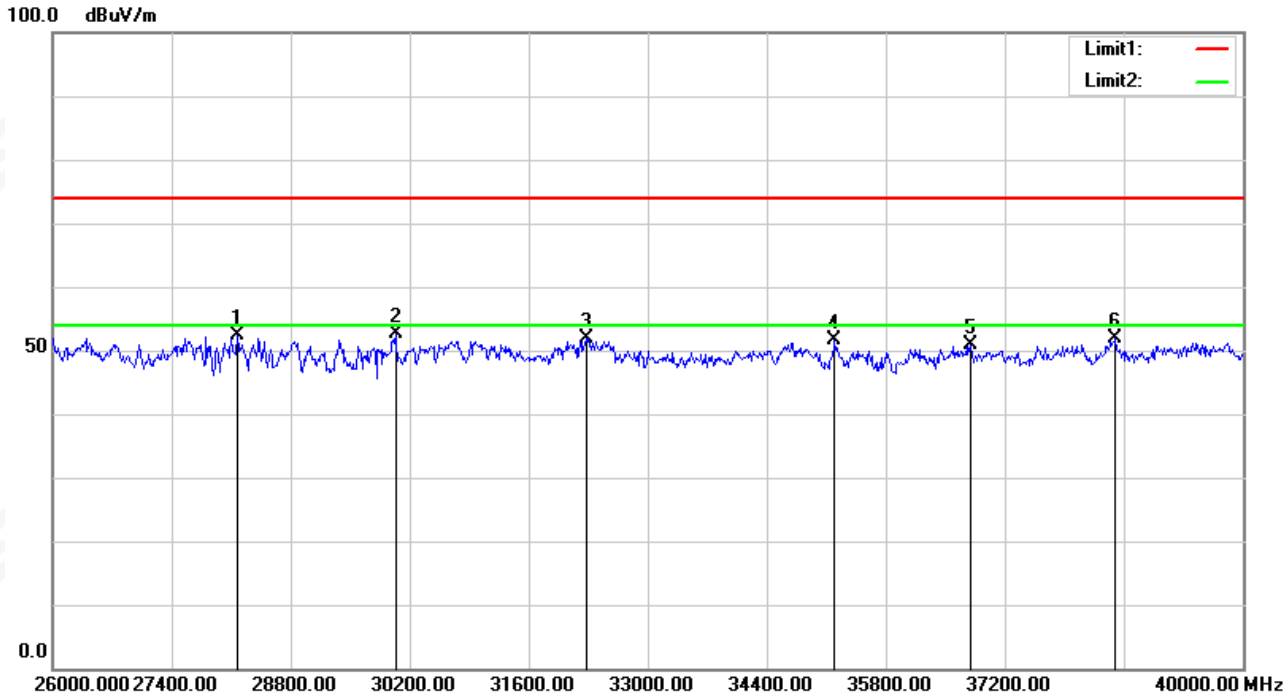
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	19696.000	64.95	-11.74	53.21	74.00	-20.79	peak
2	20368.000	65.53	-12.09	53.44	74.00	-20.56	peak
3	21368.000	65.43	-13.03	52.40	74.00	-21.60	peak
4	22664.000	66.76	-12.83	53.93	74.00	-20.07	peak
5	24120.000	110.09	-12.74	97.35	127.96	-30.61	peak
6	24728.000	66.37	-12.92	53.45	74.00	-20.55	peak

RSE-18G-26G-V



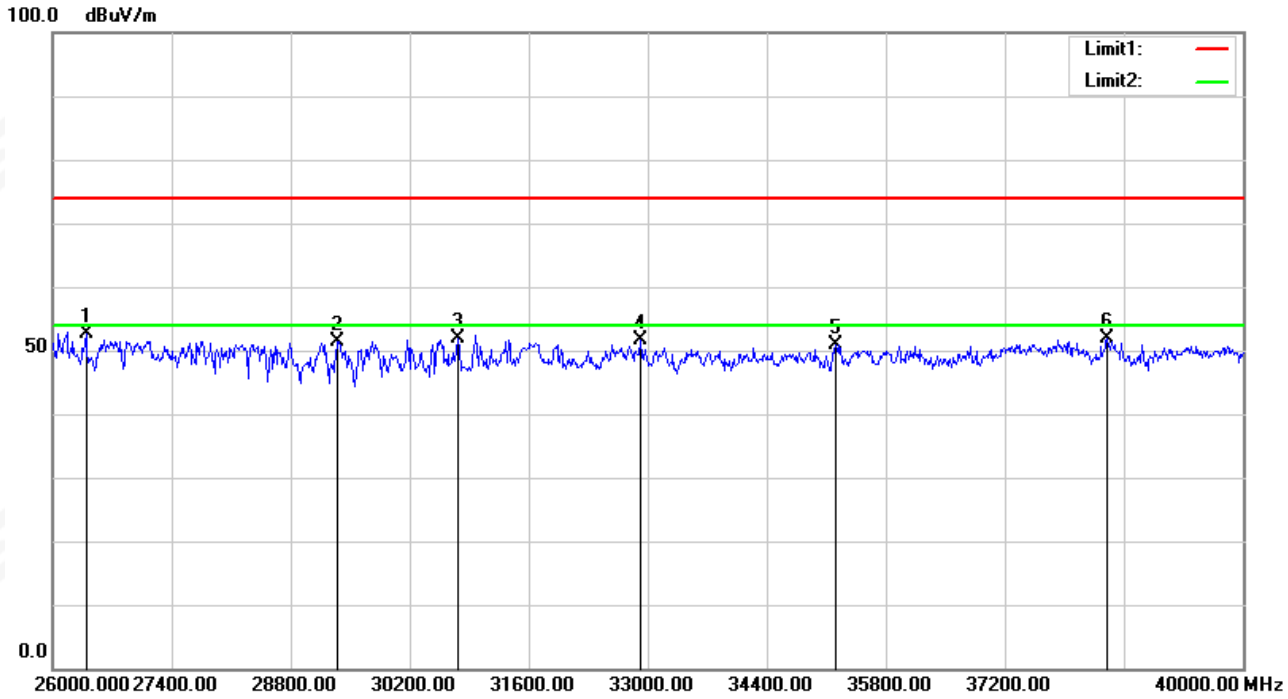
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18872.000	65.66	-12.94	52.72	74.00	-21.28	peak
2	20856.000	65.53	-12.87	52.66	74.00	-21.34	peak
3	21664.000	66.30	-12.97	53.33	74.00	-20.67	peak
4	22048.000	65.75	-12.90	52.85	74.00	-21.15	peak
5	24096.000	115.71	-12.73	102.98	127.96	-24.98	peak
6	24728.000	66.15	-12.92	53.23	74.00	-20.77	peak

RSE-26G-40G-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	28170.000	55.04	-2.73	52.31	74.00	-21.69	peak
2	30032.000	55.60	-2.91	52.69	74.00	-21.31	peak
3	32286.000	54.72	-2.89	51.83	74.00	-22.17	peak
4	35198.000	54.03	-2.50	51.53	74.00	-22.47	peak
5	36794.000	53.76	-3.00	50.76	74.00	-23.24	peak
6	38502.000	55.53	-3.68	51.85	74.00	-22.15	peak

RSE-26G-40G-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	26392.000	54.95	-2.38	52.57	74.00	-21.43	peak
2	29346.000	53.76	-2.47	51.29	74.00	-22.71	peak
3	30774.000	54.85	-3.07	51.78	74.00	-22.22	peak
4	32916.000	54.84	-3.16	51.68	74.00	-22.32	peak
5	35212.000	53.39	-2.50	50.89	74.00	-23.11	peak
6	38404.000	55.46	-3.51	51.95	74.00	-22.05	peak

RSE-40G-60G-H

RSE-40G-60G-V

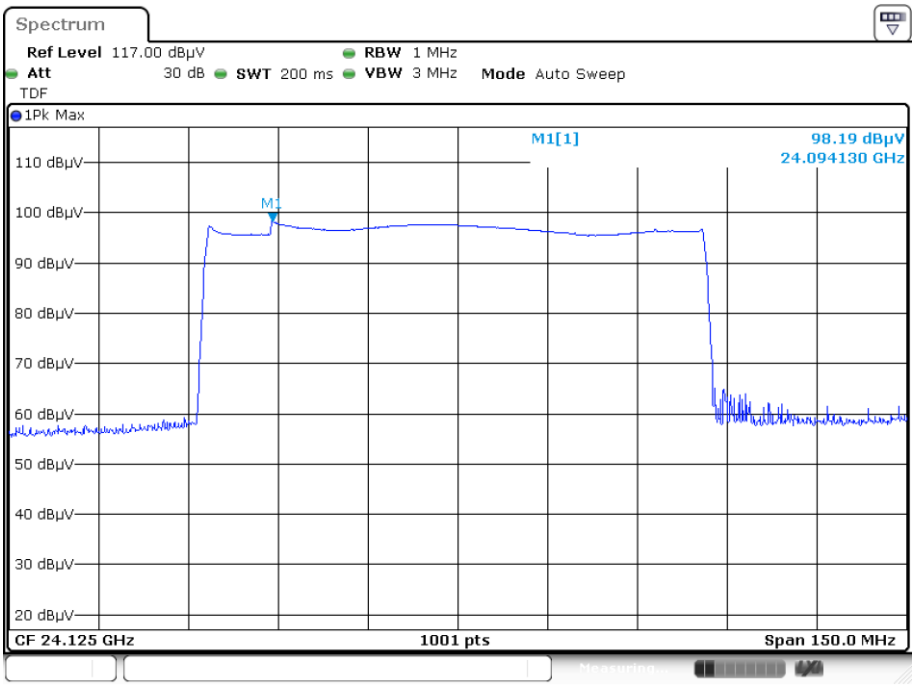
RSE-60G-90G-H

RSE-60G-90G-V

RSE-90G-120G-H

RSE-90G-120G-V

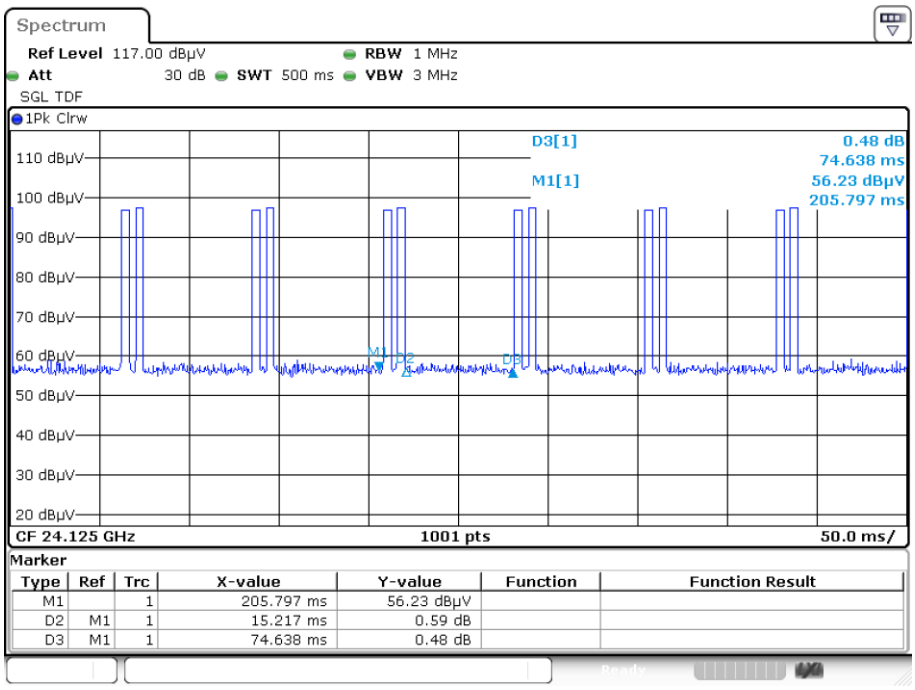
Radiation EIRP



Duty cycle

Ton (ms)	Tp (ms)	Duty cycle(%)	Duty Factor
15.217	74.638	20.39%	13.81

Note: Duty Factor=20*LOG10(1/(Ton/Tp))



5. OCCUPIED BANDWIDTH

5.1 LIMIT

The occupied bandwidth is defined as the 99% bandwidth.

According to § 2.1049: The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency,within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

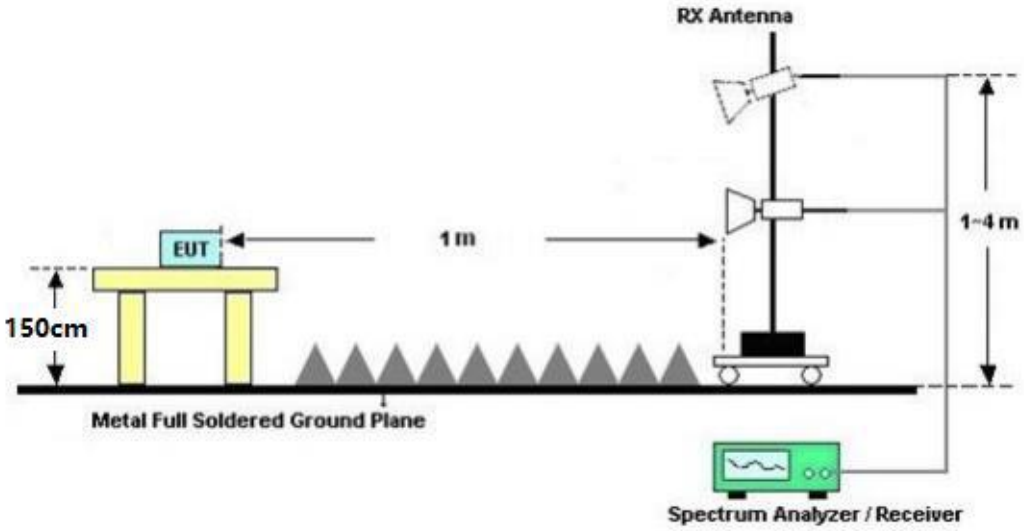
The occupied bandwidth is defined as the 20dB bandwidth.

According to § 15.215 (c): Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under
the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

5.2 TEST PROCEDURE

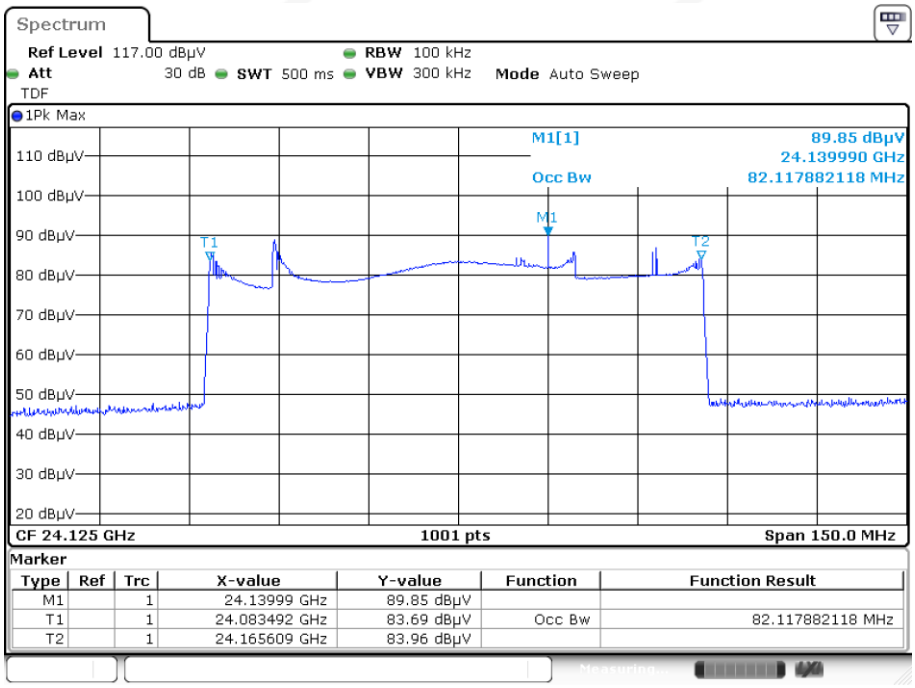
a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 1.5 m height is used.
c. If the EUT is a floor standing device, it is placed directly on the turntable.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described inANSI C63.4.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 1m (see ANSI C63.4) – see test details.
g. EUT is set into operation.
h. The turntable rotates from 0 degree to 360 degree.
i. The antenna with external mixer is polarized vertical and horizontal.
j. The antenna height changes from 1m to 4m.
k. Set the resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

5.3 TEST SETUP



5.4 TEST RESULT

Frequency (GHz)	99% Bandwidth (KHz)
24125	82.118



6. ANTENNA REQUIREMENT

6.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

6.2 EUT ANTENNA

The EUT antenna is Microstrip planar Antenna. It comply with the standard requirement.

7. PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※