



FCC RADIO TEST REPORT

Applicant : Ubiik Inc.

Address : 19F., No. 17, Sec. 1, Chengde Rd., Datong Dist.,
Taipei City 103, Taiwan (R.O.C.)

Equipment : Weightless Base station

Model No. : WBUX8125-XF900

Trade Name : Ubiik

FCC ID. : 2AXTDWBUX8125-XF900

I HEREBY CERTIFY THAT :

The sample was received on Sep. 25, 2020 and the testing was completed on Mar. 11, 2021 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao / Supervisor

Laboratory Accreditation:

CerpPASS Technology Corporation Test Laboratory





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History of this test report

Report No.	Issue Date	Description
TEFW2009221	Mar. 17, 2021	Original



1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.247

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	PASS
15.207	. AC Power Line Conducted Emission	PASS
15.209 15.205	. Radiated Spurious Emission	PASS
15.247(d)	. Conducted Spurious Emission	PASS
15.247(a)(1)	. Channel Carrier Frequencies Separation	PASS
15.247(a)(1)	. 20dB Bandwidth	PASS
15.247(a)(1)	. Dwell Time	PASS
15.247(b)	. Number of Hopping Channels	PASS
15.247(b)	. Peak Output Power Measurement Data	PASS

*The lab has reduced the uncertainty risk factor from test equipment, environment and staff technicians which according to the standard on contract. Therefore, the test result will only be determined by standard requirement.

*This EUT has been also tested and compiled with the requirement of FCC Part 15, Subpart B, recorded in a separate test report(TEFV2009221).



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Frequency Range	902MHz~928MHz
Modulation Type	GMSK / 100Kbps
Antenna Type	Dipole Antenna
Antenna Gain	0.2dBi
Adapter	Brand:MEAN WELL Model:GST25A12
ROUND CABLE SUPPRESSION CORES	Brand:King Core Model:K5B RC 20X30X5-MB
Power cord	Brand: SHEE KINE Co., LTD Model: SL-2+SL-3

Note:

*The EUT is Professional installation.

*For more details, please refer to the User's manual of the EUT.



2.2 Carrier Frequency of Channes

Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
*1	902.2	26	904.7	51	907.2	76	909.7
2	902.3	27	904.8	52	907.3	77	909.8
3	902.4	28	904.9	53	907.4	78	909.9
4	902.5	29	905	54	907.5	79	910
5	902.6	30	905.1	55	907.6	80	910.1
6	902.7	31	905.2	56	907.7	81	910.2
7	902.8	32	905.3	57	907.8	82	910.3
8	902.9	33	905.4	58	907.9	83	910.4
9	903	34	905.5	59	908	84	910.5
10	903.1	35	905.6	60	908.1	85	910.6
11	903.2	36	905.7	61	908.2	86	910.7
12	903.3	37	905.8	62	908.3	87	910.8
13	903.4	38	905.9	63	908.4	88	910.9
14	903.5	39	906	64	908.5	89	911
15	903.6	40	906.1	65	908.6	90	911.1
16	903.7	41	906.2	66	908.7	91	911.2
17	903.8	42	906.3	67	908.8	92	911.3
18	903.9	43	906.4	68	908.9	93	911.4
19	904	44	906.5	69	909	94	911.5
20	904.1	45	906.6	70	909.1	95	911.6
21	904.2	46	906.7	71	909.2	96	911.7
22	904.3	47	906.8	72	909.3	97	911.8
23	904.4	48	906.9	73	909.4	98	911.9
24	904.5	49	907	74	909.5	99	912
25	904.6	50	907.1	75	909.6	100	912.1



Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
101	912.2	126	914.7	151	917.2	176	919.7
102	912.3	127	914.8	152	917.3	177	919.8
103	912.4	128	914.9	153	917.4	178	919.9
104	912.5	*129	915	154	917.5	179	920
105	912.6	130	915.1	155	917.6	180	920.1
106	912.7	131	915.2	156	917.7	181	920.2
107	912.8	132	915.3	157	917.8	182	920.3
108	912.9	133	915.4	158	917.9	183	920.4
109	913	134	915.5	159	918	184	920.5
110	913.1	135	915.6	160	918.1	185	920.6
111	913.2	136	915.7	161	918.2	186	920.7
112	913.3	137	915.8	162	918.3	187	920.8
113	913.4	138	915.9	163	918.4	188	920.9
114	913.5	139	916	164	918.5	189	921
115	913.6	140	916.1	165	918.6	190	921.1
116	913.7	141	916.2	166	918.7	191	921.2
117	913.8	142	916.3	167	918.8	192	921.3
118	913.9	143	916.4	168	918.9	193	921.4
119	914	144	916.5	169	919	194	921.5
120	914.1	145	916.6	170	919.1	195	921.6
121	914.2	146	916.7	171	919.2	196	921.7
122	914.3	147	916.8	172	919.3	197	921.8
123	914.4	148	916.9	173	919.4	198	921.9
124	914.5	149	917	174	919.5	199	922
125	914.6	150	917.1	175	919.6	200	922.1



Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
201	922.2	226	924.7	251	927.2
202	922.3	227	924.8	252	927.3
203	922.4	228	924.9	253	927.4
204	922.5	229	925	254	927.5
205	922.6	230	925.1	255	927.6
206	922.7	231	925.2	256	927.7
207	922.8	232	925.3	*257	927.8
208	922.9	233	925.4		
209	923	234	925.5		
210	923.1	235	925.6		
211	923.2	236	925.7		
212	923.3	237	925.8		
213	923.4	238	925.9		
214	923.5	239	926		
215	923.6	240	926.1		
216	923.7	241	926.2		
217	923.8	242	926.3		
218	923.9	243	926.4		
219	924	244	926.5		
220	924.1	245	926.6		
221	924.2	246	926.7		
222	924.3	247	926.8		
223	924.4	248	926.9		
224	924.5	249	927		
225	924.6	250	927.1		

Note: Channels remarked * are selected to perform test.



2.3 Test Mode & Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.10
- The complete test system included Notebook and EUT for RF test.
- An executive program, "Admin-Config-Tool ver.v1_0_10_0" & "BSHopping.exe ver.1.0.0.0" under Windows OS system was executed to transmit and receive data via WLAN.
- The following test modes were performed for the test:
Test Mode 1. GMSK (100Kbps)

2.4 Description of Test System

RF Conducted				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
RJ45 Cable	Cerpass	CAT5E	0.9m / NS	N/A
microSDHC	TOSHIBA	M203	N/A	N/A
Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
RJ45 Cable	Cerpass	CAT5E	0.9m / NS	N/A
microSDHC	TOSHIBA	M203	N/A	N/A
AC Power Line Conducted Emission				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
RJ45 Cable	Cerpass	CAT5E	0.9m / NS	N/A
MicroSDHC	TOSHIBA	M203	N/A	N/A



2.5 General Information of Test

Test Site	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881	
	FCC	TW1439, TW1079
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication test C-4663 for Conducted emission test R-4218 for Radiated emission test G-10812, G-10813 for radiated disturbance above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 10,000MHz	
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.	

Test Item	Test Site	Test period	Environmental Conditions	Tested By
RF Conducted	RFCON01-NK	2021/03/09~2021/03/11	23.4~24.6℃ / 53~57%	Nick Guan
Radiated Emissions	3M02-NK	2021/03/03~2021/03/04	22℃ / 53%	Leon Huang
AC Power Line Conducted Emission	CON01-NK	2021/01/20	22℃ / 47%	Leon Huang

2.6 Measurement Uncertainty

Measurement Item	Uncertainty
AC Power Line Conduction(150K~30MHz)	±3.63dB
Radiated Spurious Emission(9KHz~30MHz)	±3.404dB
Radiated Spurious Emission(30MHz~1GHz)	±5.686dB
Radiated Spurious Emission(1GHz~25GHz)	±6.597dB
Conducted Spurious Emission	±2.022dB
20dB Bandwidth	±4.40%
Peak Output Power(Conducted Power Meter)	±1.02dB
Dwell Time	±3.49%
Duty Cycle	±3.47%



3. Test Equipment and Ancillaries Used for Tests

Test Item	Radiated Emissions				
Test Site	Semi Anechoic Room(3M02-NK)				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
Bilog Antenna	Schwarzbeck	VULB9168	369	2020/04/10	2021/04/09
Active Loop Antenna	EMCO	6507	40855	2020/05/21	2021/05/20
Horn Antenna	EMCO	3115	31601	2020/10/16	2021/10/15
Horn Antenna	EMCO	3116	31970	2020/03/26	2021/03/25
EMI Receiver	ROHDE & SCHWARZ	ESCI	101423	2020/06/23	2021/06/22
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	102151	2020/08/03	2021/08/02
Preamplifier	EM Electronics corp.	EM330	60660	2020/03/16	2021/03/15
Preamplifier	Agilent	8449B	3008A01954	2020/03/16	2021/03/15
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2020/11/06	2021/11/05
Bluetooth Tester	ROHDE & SCHWARZ	CBT	101133	2020/04/07	2021/04/06
Cable-3in1(30M-1G)	HARBOUR INDUSTRIES	LL142	CCE1315	2020/04/09	2021/04/08
Cable-0.5m(1G-18G)	HUBER SUHNER	SUCOFLEX 100	805443/4	2020/05/27	2021/05/26
Cable-3m(1G-18G)	HUBER SUHNER	SUCOFLEX 100	805796/4	2020/05/27	2021/05/26
Cable-8m(1G-18G)	HUBER SUHNER	SUCOFLEX 100	805795/4	2020/05/27	2021/05/26
Cable-0.5m(30M-40G)	HUBER SUHNER	SUCOFLEX 102	28420/2	2020/04/01	2021/03/31
Cable-3m(30M-40G)	HUBER SUHNER	SUCOFLEX 102	MY2608/2	2020/04/01	2021/03/31
Cable-0.5m(1G-40G)	Rapidtek	40GHZ 50CM	38MS-38MS50314	2020/04/09	2021/04/08
Cable-6m(9k~300M)	NA	EMC5D-BM-BM-6	130605	2020/09/18	2021/09/17
E3	AUDIX	v8.2014-8-6	RK-000529	NA	NA

Test Item	RF Conducted				
Test Site	RFCON01-NK				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	101329	2020/07/07	2021/07/06
Bluetooth Tester	ROHDE & SCHWARZ	CBT	101133	2020/04/07	2021/04/06
CAX Signal Analyzer	KEYSIGHT	N9000B	MY57100339	2020/12/25	2021/12/24
Attenuator	KEYSIGHT	8491B	MY39250703	2020/04/17	2021/04/16
TEMP & HUMI CHAMBER	T-MACHINE	TMJ-9712	T-12-040111	2020/08/25	2021/08/24
Power Meter	Anritsu	ML2495A	1224005	2020/04/17	2021/04/16
Power Sensor	Anritsu	MA2411B	1207295	2020/04/17	2021/04/16



Test Item	AC Power Line Conducted Emission				
Test Site	CON01-NK				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
EMI Receiver	ROHDE & SCHWARZ	ESCI	100443	2020/05/25	2021/05/24
Line Impedance Stabilization Network	Schwarzbeck	NSLK 8127	8127-568	2020/03/12	2021/03/11
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	101934	2020/03/11	2021/03/10
Cable-6m(9k~300M)	NA	CFD300-NL	NA	2020/03/11	2021/03/10
E3	AUDIX	v8.2014-8-6	RK-000531	NA	NA



4. Antenna Requirements

4.1 Standard Applicable

according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2 Antenna Construction and Directional Gain

Antenna Brand	WHA YU Industrial Co., LTD
Antenna Model	C1991-510073-A
Antenna Type	Dipole Antenna
Antenna Gain	0.2 dBi



5. Test of AC Power Line Conducted Emission

5.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

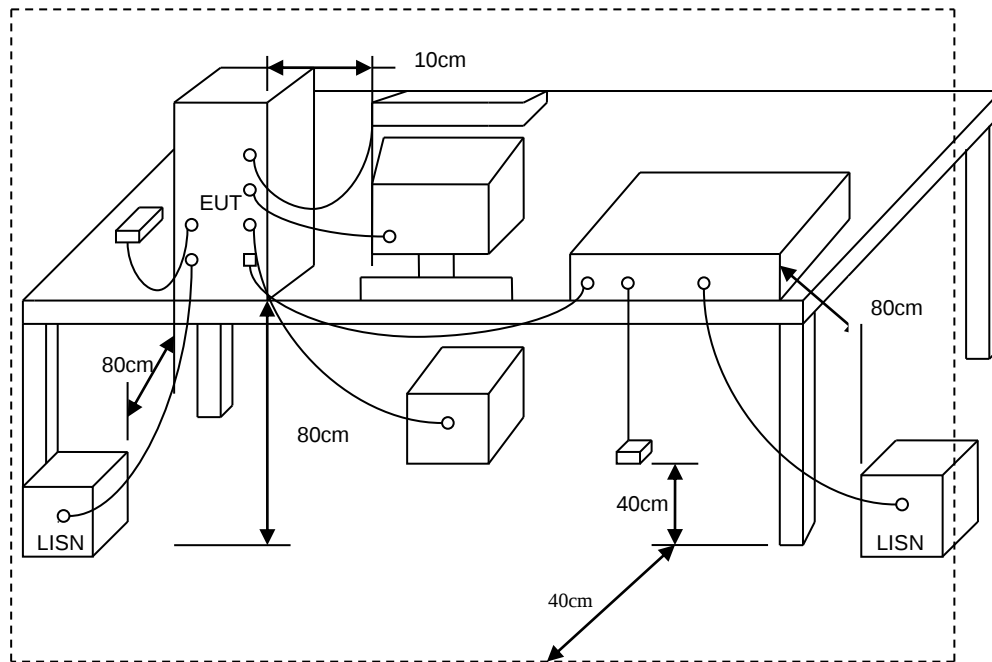
*Decreases with the logarithm of the frequency.

5.2 Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



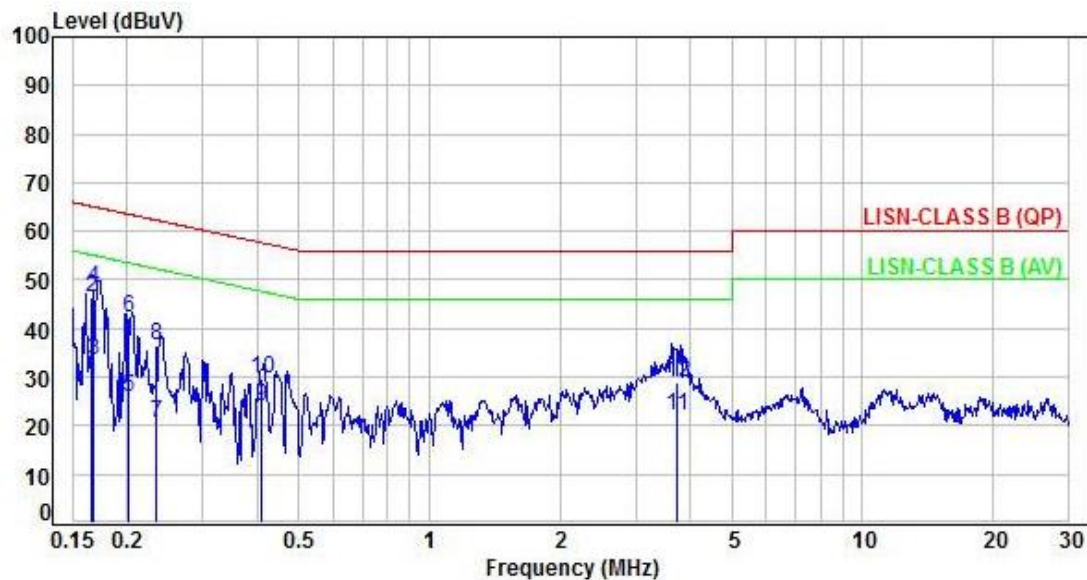
5.3 Typical Test Setup





5.4 Test Result and Data

Power	: AC 120V / 60Hz	Pol/Phase	: LINE
Test Mode	: Mode 1		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.17	10.03	18.60	28.63	55.19	-26.56	Average	P
2	0.17	10.03	36.22	46.25	65.19	-18.94	QP	P
3	0.17	10.03	23.54	33.57	55.05	-21.48	Average	P
4	0.17	10.03	38.18	48.21	65.05	-16.84	QP	P
5	0.20	10.03	15.75	25.78	53.57	-27.79	Average	P
6	0.20	10.03	32.10	42.13	63.57	-21.44	QP	P
7	0.23	10.03	10.48	20.51	52.30	-31.79	Average	P
8	0.23	10.03	26.55	36.58	62.30	-25.72	QP	P
9	0.41	10.05	13.88	23.93	47.69	-23.76	Average	P
10	0.41	10.05	19.77	29.82	57.69	-27.87	QP	P
11	3.72	10.28	11.91	22.19	46.00	-23.81	Average	P
12	3.72	10.28	18.44	28.72	56.00	-27.28	QP	P

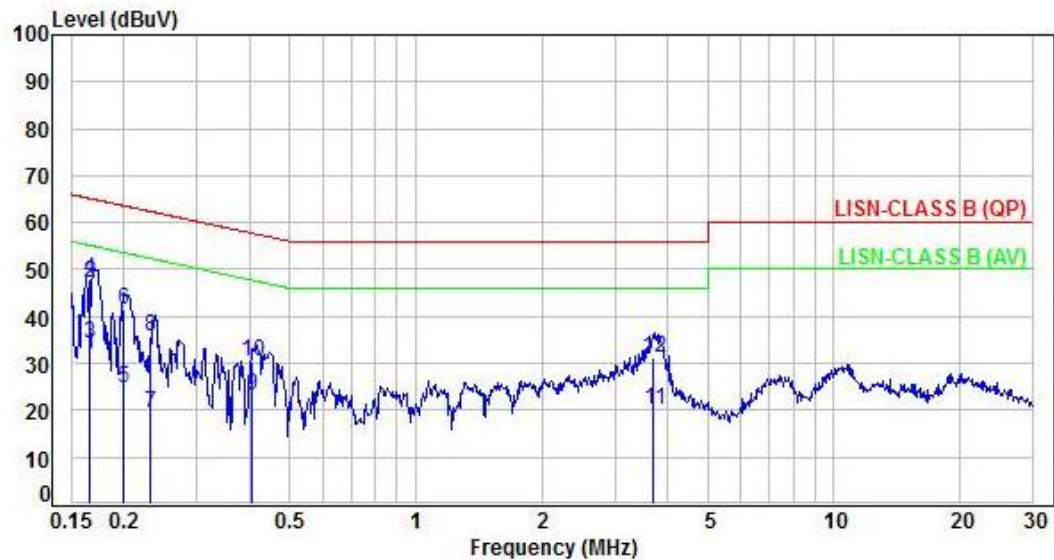
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



Power	: AC 120V / 60Hz	Pol/Phase	: NEUTRAL
Test Mode	: Mode 1		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV)	Limit (dBUV)	Margin (dB)	Detector	P/F
1	0.17	10.00	22.01	32.01	55.18	-23.17	Average	P
2	0.17	10.00	37.10	47.10	65.18	-18.08	QP	P
3	0.17	10.00	24.35	34.35	55.13	-20.78	Average	P
4	0.17	10.00	37.98	47.98	65.13	-17.15	QP	P
5	0.20	10.00	14.84	24.84	53.65	-28.81	Average	P
6	0.20	10.00	31.31	41.31	63.65	-22.34	QP	P
7	0.23	10.00	9.58	19.58	52.37	-32.79	Average	P
8	0.23	10.00	25.79	35.79	62.37	-26.58	QP	P
9	0.41	10.02	13.16	23.18	47.73	-24.55	Average	P
10	0.41	10.02	20.43	30.45	57.73	-27.28	QP	P
11	3.71	10.22	9.78	20.00	46.00	-26.00	Average	P
12	3.71	10.22	21.00	31.22	56.00	-24.78	QP	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



6. Test of Radiated Spurious Emission

6.1 Test Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

Frequency (MHz)	Field Strength (microvolt/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

6.2 Test Procedures

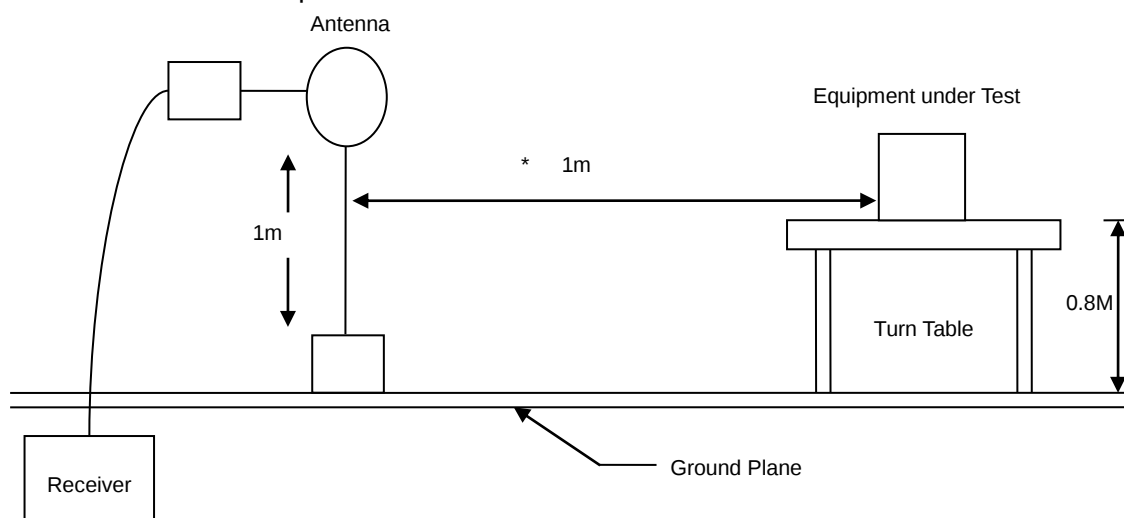
- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Note: The supporting fixture shall permit orientation of the EUT in each of three orthogonal axis positions such that emissions from the EUT are maximized.
(X-AXIS is the worst.)

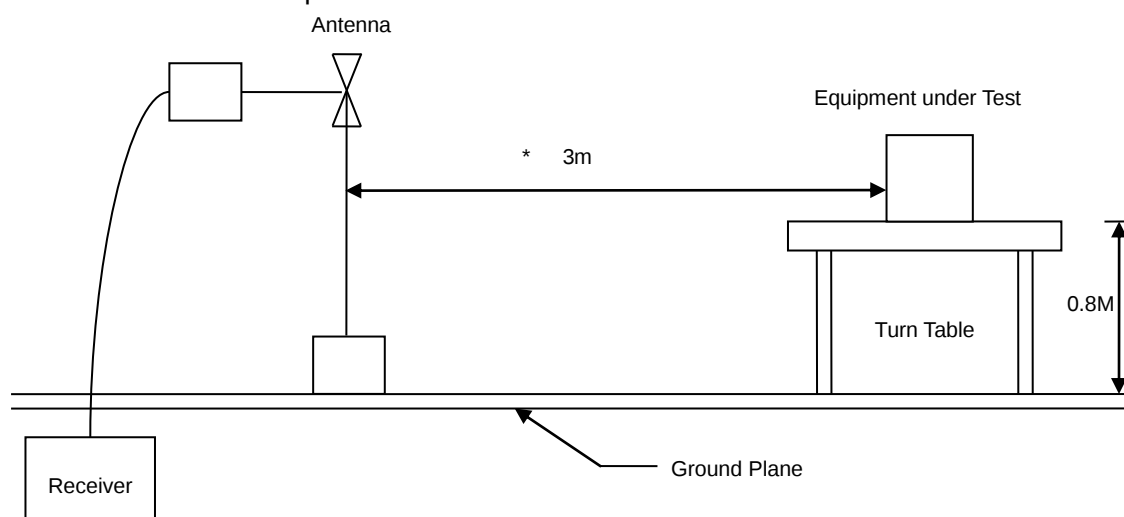


6.3 Typical Test Setup

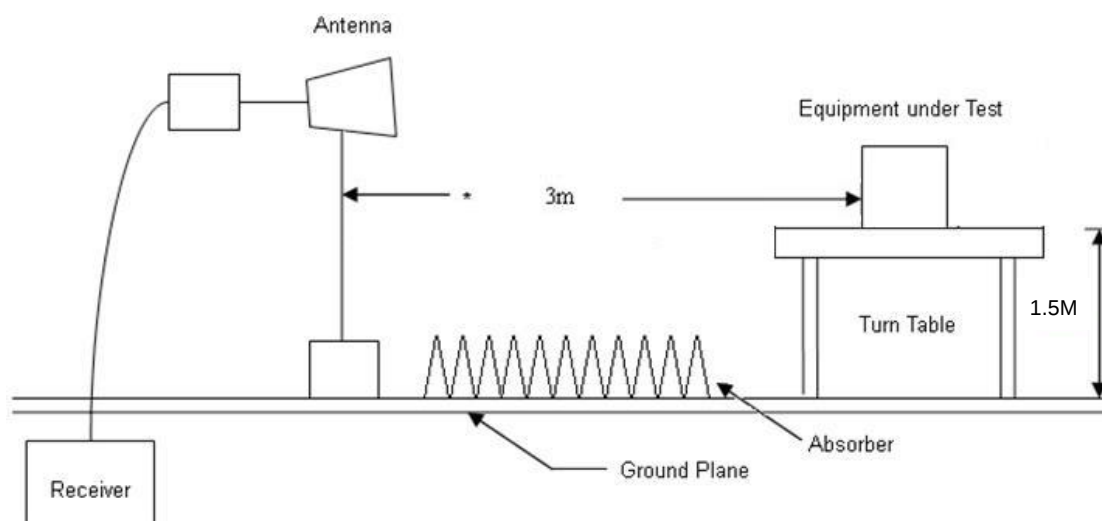
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



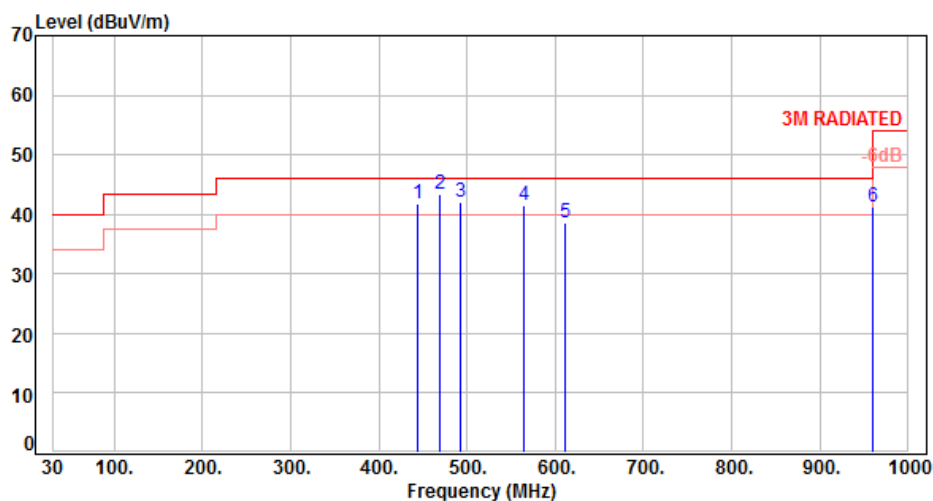


6.4 Test Result and Data (9kHz ~ 30MHz)

The 9kHz-30MHz spurious emission is under limit 20dB more.

6.5 Test Result and Data (30MHz ~ 1GHz)

Power	: AC 120V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH01		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	444.19	25.68	16.08	41.76	46.00	-4.24	Peak	400	0	P
2	468.44	26.04	17.40	43.44	46.00	-2.56	QP	100	150	P
3	491.72	26.37	15.72	42.09	46.00	-3.91	Peak	400	0	P
4	564.47	27.89	13.55	41.44	46.00	-4.56	Peak	400	0	P
5	612.00	29.10	9.46	38.56	46.00	-7.44	Peak	400	0	P
6	960.23	33.78	7.58	41.36	54.00	-12.64	Peak	400	0	P

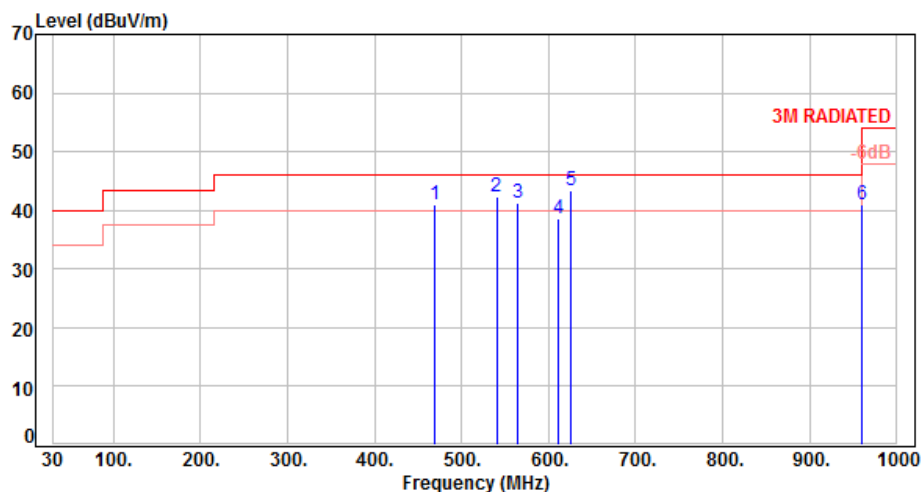
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH01		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	468.44	26.04	14.90	40.94	46.00	-5.06	QP	100	360	P
2	540.22	27.26	14.98	42.24	46.00	-3.76	Peak	100	0	P
3	564.47	27.89	13.44	41.33	46.00	-4.67	Peak	100	0	P
4	612.00	29.10	9.46	38.56	46.00	-7.44	Peak	100	0	P
5	625.58	29.09	14.40	43.49	46.00	-2.51	QP	155	265	P
6	960.23	33.78	7.24	41.02	54.00	-12.98	Peak	100	0	P

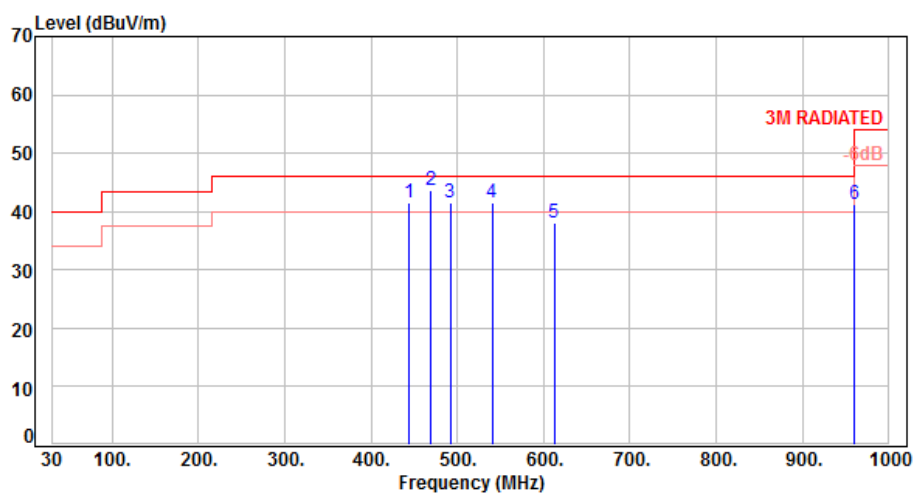
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1, CH129		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	444.32	25.68	15.97	41.65	46.00	-4.35	Peak	400	0	P
2	468.40	26.04	17.60	43.64	46.00	-2.36	QP	100	143	P
3	491.63	26.37	15.22	41.59	46.00	-4.41	Peak	400	0	P
4	540.21	27.26	14.14	41.40	46.00	-4.60	Peak	400	0	P
5	612.15	29.10	8.83	37.93	46.00	-8.07	Peak	400	0	P
6	960.39	33.78	7.46	41.24	54.00	-12.76	Peak	400	0	P

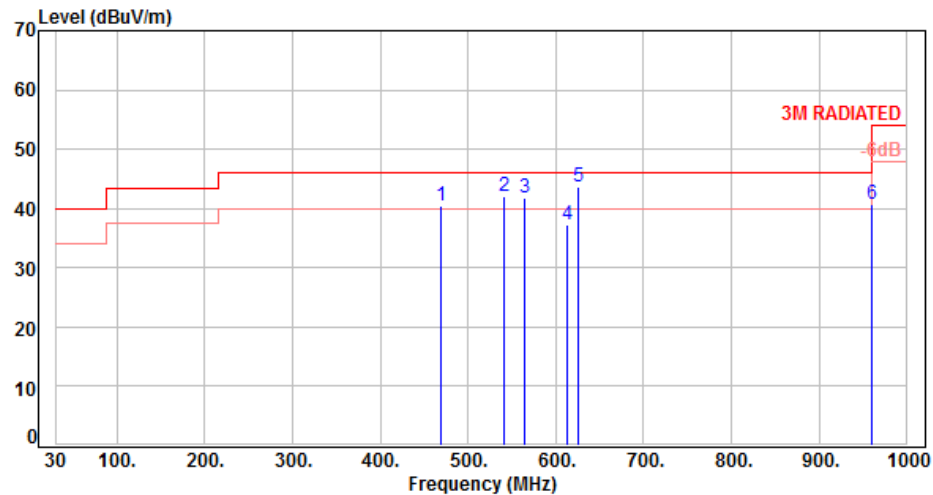
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH129		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	468.38	26.04	14.40	40.44	46.00	-5.56	QP	100	352	P
2	540.53	27.27	14.85	42.12	46.00	-3.88	Peak	100	0	P
3	564.50	27.89	13.89	41.78	46.00	-4.22	Peak	100	0	P
4	612.35	29.09	8.25	37.34	46.00	-8.66	Peak	100	0	P
5	625.17	29.08	14.59	43.67	46.00	-2.33	QP	150	265	P
6	960.41	33.78	7.07	40.85	54.00	-13.15	Peak	100	0	P

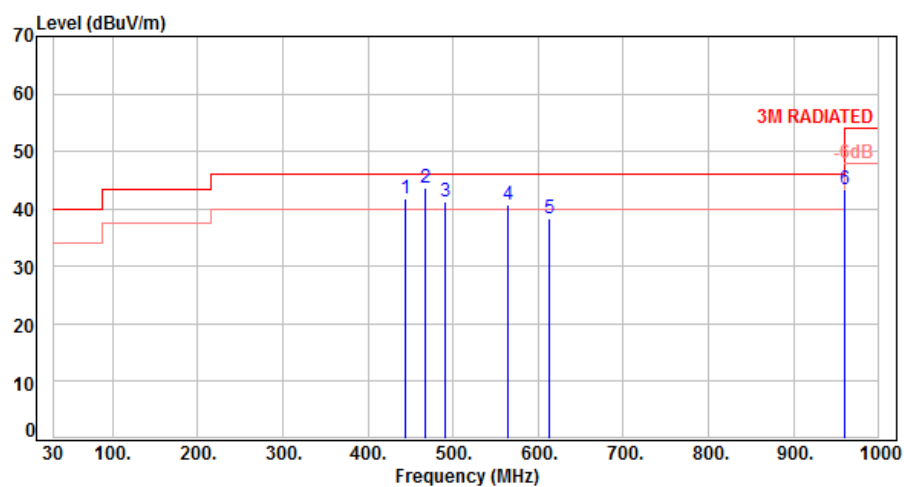
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1, CH257		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	444.31	25.68	16.03	41.71	46.00	-4.29	Peak	400	0	P
2	468.08	26.03	17.50	43.53	46.00	-2.47	QP	100	148	P
3	491.61	26.37	14.79	41.16	46.00	-4.84	Peak	400	0	P
4	564.35	27.88	12.85	40.73	46.00	-5.27	Peak	400	0	P
5	612.38	29.09	9.28	38.37	46.00	-7.63	Peak	400	0	P
6	960.29	33.78	9.66	43.44	54.00	-10.56	Peak	400	0	P

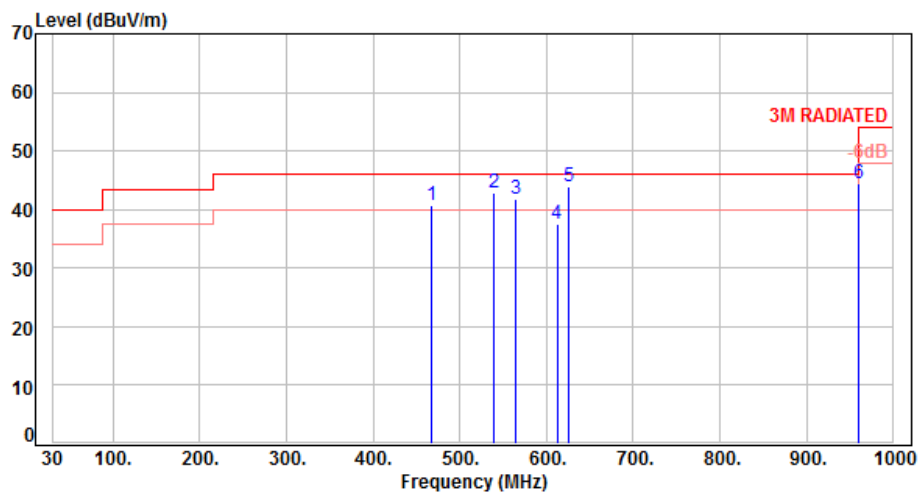
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH257		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	467.56	26.02	14.80	40.82	46.00	-5.18	QP	110	355	P
2	540.13	27.26	15.54	42.80	46.00	-3.20	Peak	100	0	P
3	564.66	27.90	13.76	41.66	46.00	-4.34	Peak	100	0	P
4	612.14	29.10	8.41	37.51	46.00	-8.49	Peak	100	0	P
5	625.70	29.10	14.69	43.79	46.00	-2.21	QP	135	270	P
6	960.25	33.78	10.54	44.32	54.00	-9.68	Peak	100	0	P

Note: Level=Reading+Factor

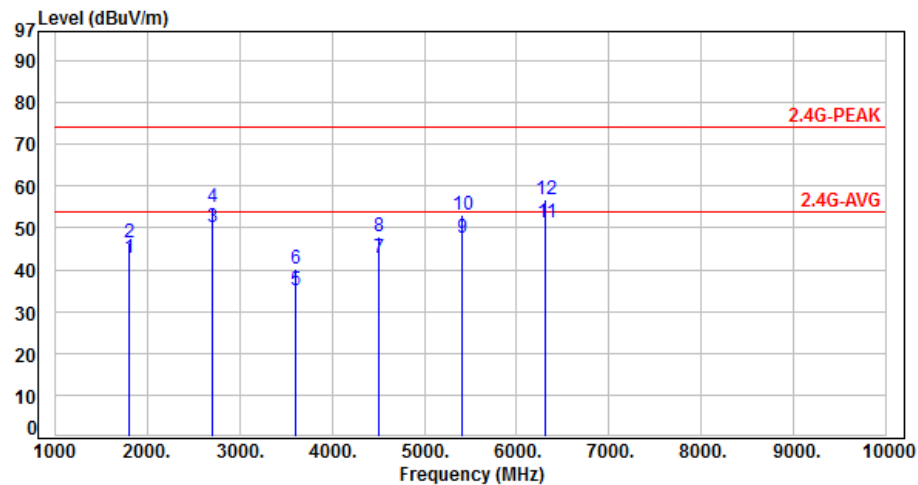
Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



6.6 Test Result and Data (1GHz ~ 25GHz)

Power	: AC 120V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH01		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1804.40	-5.71	48.45	42.74	54.00	-11.26	Average	180	30	P
2	1804.40	-5.71	52.23	46.52	74.00	-27.48	Peak	180	30	P
3	2706.60	-1.86	51.86	50.00	54.00	-4.00	Average	125	205	P
4	2706.60	-1.86	56.82	54.96	74.00	-19.04	Peak	125	205	P
5	3608.80	1.71	33.30	35.01	54.00	-18.99	Average	100	75	P
6	3608.80	1.71	38.65	40.36	74.00	-33.64	Peak	100	75	P
7	4511.00	3.73	39.03	42.76	54.00	-11.24	Average	100	24	P
8	4511.00	3.73	44.11	47.84	74.00	-26.16	Peak	100	24	P
9	5413.20	6.21	41.53	47.74	54.00	-6.26	Average	100	43	P
10	5413.20	6.21	46.89	53.10	74.00	-20.90	Peak	100	43	P
11	6315.40	7.26	43.92	51.18	54.00	-2.82	Average	120	300	P
12	6315.40	7.26	49.48	56.74	74.00	-17.26	Peak	120	300	P

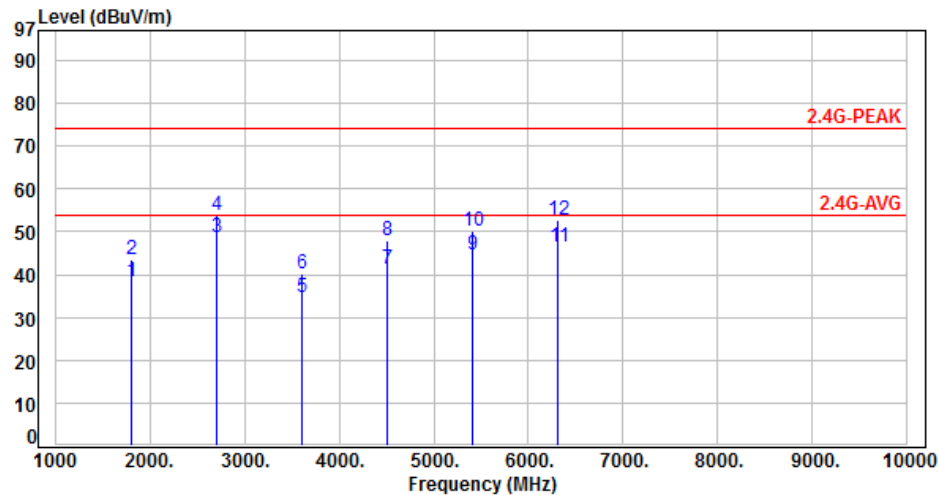
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH01		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1804.40	-5.71	43.91	38.20	54.00	-15.80	Average	100	325	P
2	1804.40	-5.71	49.30	43.59	74.00	-30.41	Peak	100	325	P
3	2706.60	-1.86	50.67	48.81	54.00	-5.19	Average	100	170	P
4	2706.60	-1.86	55.53	53.67	74.00	-20.33	Peak	100	170	P
5	3608.80	1.71	32.99	34.70	54.00	-19.30	Average	100	94	P
6	3608.80	1.71	38.41	40.12	74.00	-33.88	Peak	100	94	P
7	4511.00	3.73	37.44	41.17	54.00	-12.83	Average	100	202	P
8	4511.00	3.73	44.04	47.77	74.00	-26.23	Peak	100	202	P
9	5413.20	6.21	38.37	44.58	54.00	-9.42	Average	100	81	P
10	5413.20	6.21	43.98	50.19	74.00	-23.81	Peak	100	81	P
11	6315.40	7.26	39.09	46.35	54.00	-7.65	Average	130	25	P
12	6315.40	7.26	45.45	52.71	74.00	-21.29	Peak	130	25	P

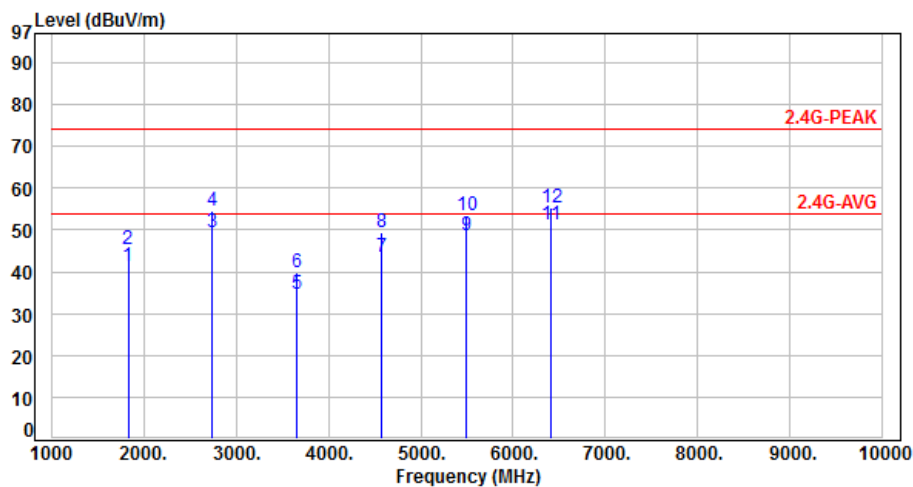
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	AC 120V / 60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1, CH129		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1830.00	-5.40	46.85	41.45	54.00	-12.55	Average	145	20	P
2	1830.00	-5.40	50.78	45.38	74.00	-28.62	Peak	145	20	P
3	2745.00	-1.90	51.28	49.38	54.00	-4.62	Average	100	12	P
4	2745.00	-1.90	56.35	54.45	74.00	-19.55	Peak	100	12	P
5	3660.00	1.95	32.55	34.50	54.00	-19.50	Average	110	134	P
6	3660.00	1.95	38.06	40.01	74.00	-33.99	Peak	110	134	P
7	4575.00	3.85	39.58	43.43	54.00	-10.57	Average	100	219	P
8	4575.00	3.85	45.68	49.53	74.00	-24.47	Peak	100	219	P
9	5490.00	6.35	42.50	48.85	54.00	-5.15	Average	100	39	P
10	5490.00	6.35	47.05	53.40	74.00	-20.60	Peak	100	39	P
11	6405.00	7.26	43.89	51.15	54.00	-2.85	Average	112	343	P
12	6405.00	7.26	48.14	55.40	74.00	-18.60	Peak	112	343	P

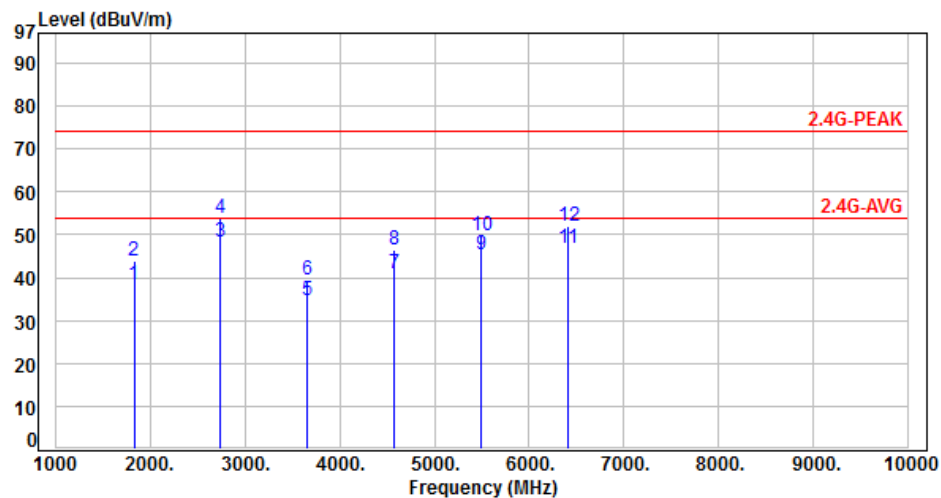
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH129		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1830.00	-5.40	43.65	38.25	54.00	-15.75	Average	100	133	P
2	1830.00	-5.40	49.28	43.88	74.00	-30.12	Peak	100	133	P
3	2745.00	-1.90	50.30	48.40	54.00	-5.60	Average	100	147	P
4	2745.00	-1.90	55.59	53.69	74.00	-20.31	Peak	100	147	P
5	3660.00	1.95	32.63	34.58	54.00	-19.42	Average	100	255	P
6	3660.00	1.95	37.42	39.37	74.00	-34.63	Peak	100	255	P
7	4575.00	3.85	37.25	41.10	54.00	-12.90	Average	100	340	P
8	4575.00	3.85	42.52	46.37	74.00	-27.63	Peak	100	340	P
9	5490.00	6.35	39.18	45.53	54.00	-8.47	Average	100	72	P
10	5490.00	6.35	43.50	49.85	74.00	-24.15	Peak	100	72	P
11	6405.00	7.26	39.41	46.67	54.00	-7.33	Average	100	195	P
12	6405.00	7.26	44.87	52.13	74.00	-21.87	Peak	100	195	P

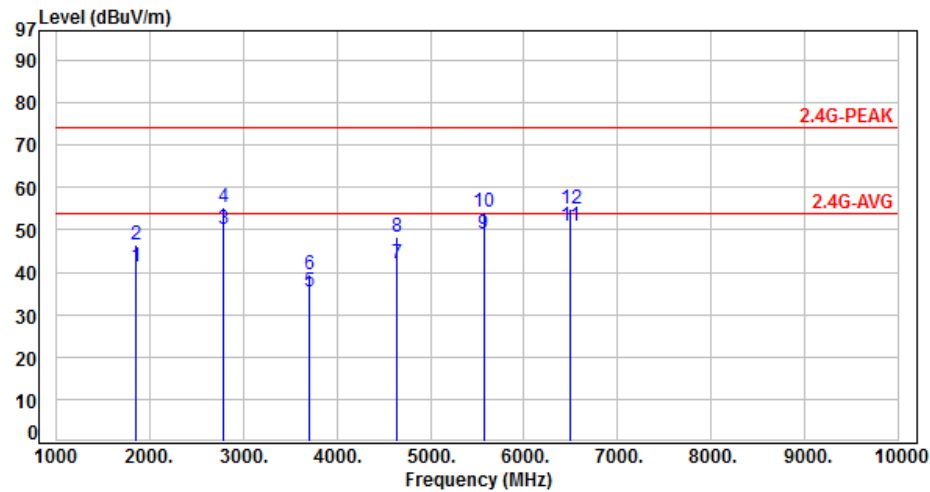
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH257		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1855.60	-5.07	46.49	41.42	54.00	-12.58	Average	150	40	P
2	1855.60	-5.07	51.61	46.54	74.00	-27.46	Peak	150	40	P
3	2783.40	-1.79	51.80	50.01	54.00	-3.99	Average	100	200	P
4	2783.40	-1.79	57.28	55.49	74.00	-18.51	Peak	100	200	P
5	3711.20	2.50	32.87	35.37	54.00	-18.63	Average	100	88	P
6	3711.20	2.50	37.14	39.64	74.00	-34.36	Peak	100	88	P
7	4639.00	4.05	38.16	42.21	54.00	-11.79	Average	175	30	P
8	4639.00	4.05	44.08	48.13	74.00	-25.87	Peak	175	30	P
9	5566.80	6.38	42.71	49.09	54.00	-4.91	Average	100	40	P
10	5566.80	6.38	47.81	54.19	74.00	-19.81	Peak	100	40	P
11	6494.60	7.40	43.56	50.96	54.00	-3.04	Average	150	310	P
12	6494.60	7.40	47.71	55.11	74.00	-18.89	Peak	150	310	P

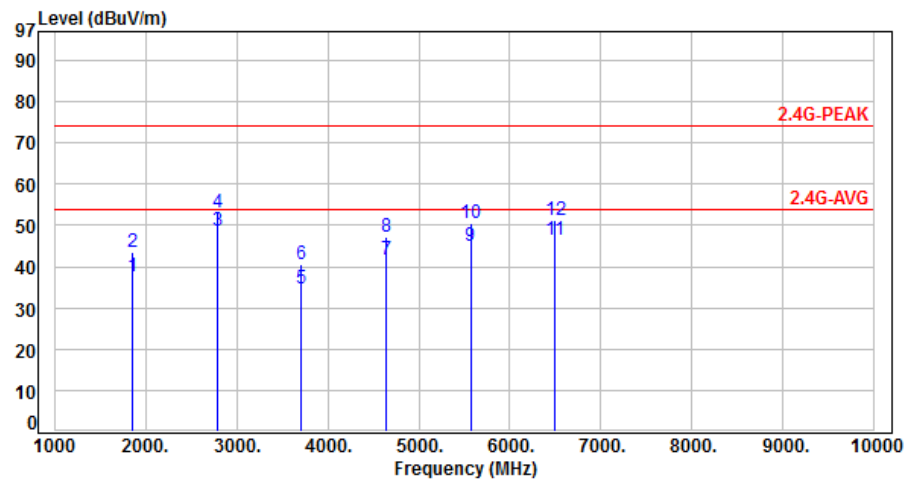
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	AC 120V / 60Hz	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1, CH257		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1855.60	-5.07	42.52	37.45	54.00	-16.55	Average	100	315	P
2	1855.60	-5.07	48.73	43.66	74.00	-30.34	Peak	100	315	P
3	2783.40	-1.79	50.31	48.52	54.00	-5.48	Average	100	153	P
4	2783.40	-1.79	54.88	53.09	74.00	-20.91	Peak	100	153	P
5	3711.20	2.50	32.15	34.65	54.00	-19.35	Average	100	87	P
6	3711.20	2.50	38.24	40.74	74.00	-33.26	Peak	100	87	P
7	4639.00	4.05	37.55	41.60	54.00	-12.40	Average	100	205	P
8	4639.00	4.05	43.08	47.13	74.00	-26.87	Peak	100	205	P
9	5566.80	6.38	38.58	44.96	54.00	-9.04	Average	100	74	P
10	5566.80	6.38	44.01	50.39	74.00	-23.61	Peak	100	74	P
11	6494.60	7.40	39.12	46.52	54.00	-7.48	Average	125	35	P
12	6494.60	7.40	44.02	51.42	74.00	-22.58	Peak	125	35	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



6.7 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz



7. Test of Conducted Spurious Emission

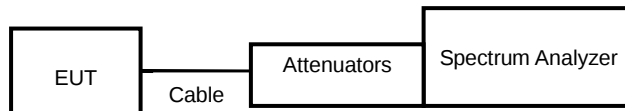
7.1 Test Limit

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

7.2 Test Procedure

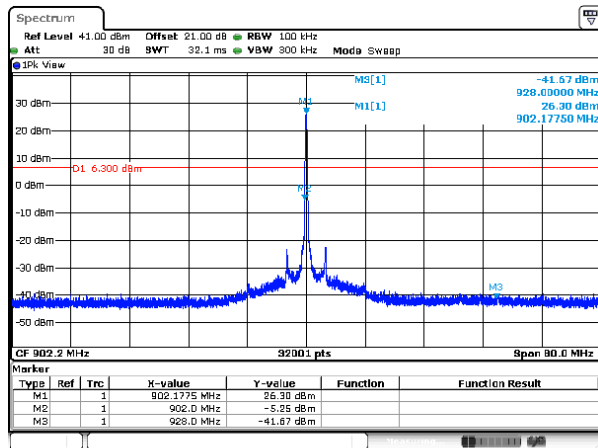
- The transmitter output was connected to the spectrum analyzer via a low loss cable.
- Set both RBW and VBW of spectrum analyzer to 100 KHz and 300KHz with convenient frequency span including 100 KHz bandwidth from band edge.
- The band edges was measured and recorded.

7.3 Test Setup Layout

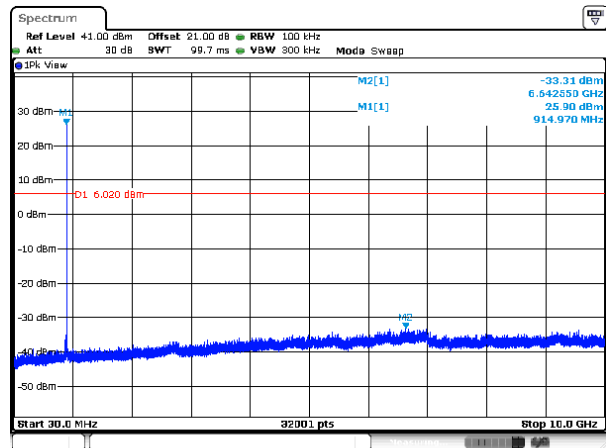
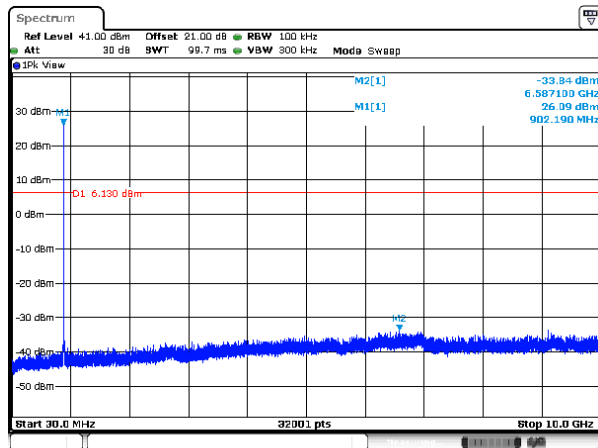
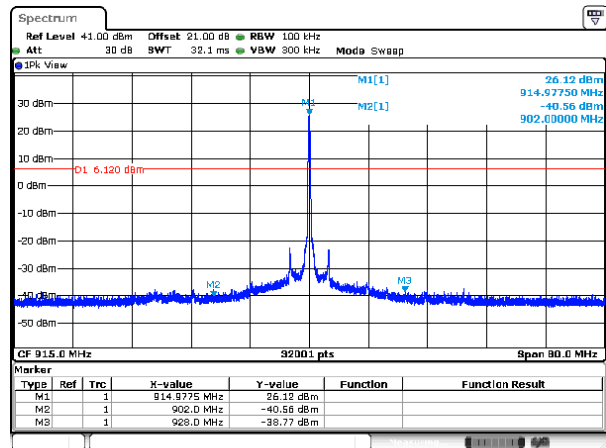


7.4 Test Result and Data

Note: Test plots refer to the following pages.

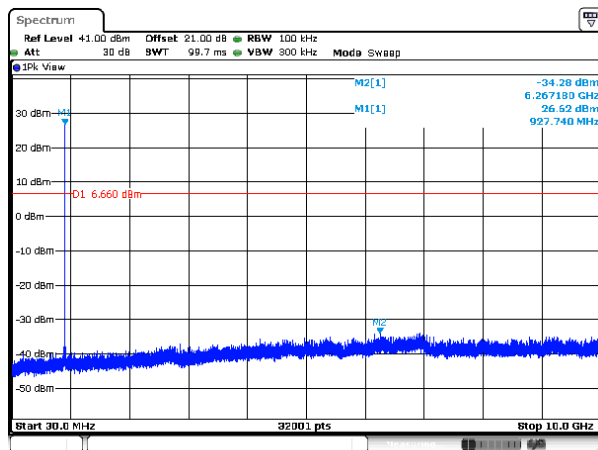
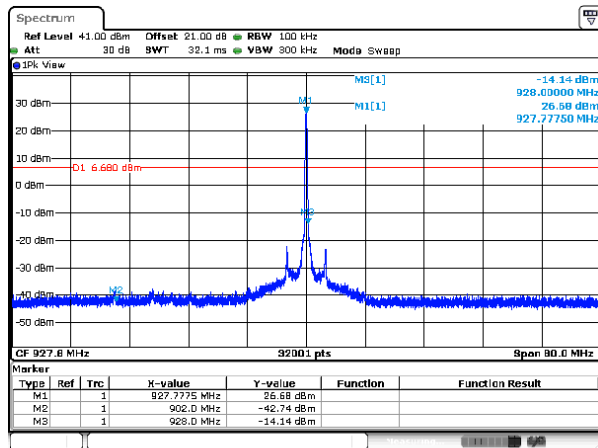
Modulation Type: GMSK
CH01

CH129



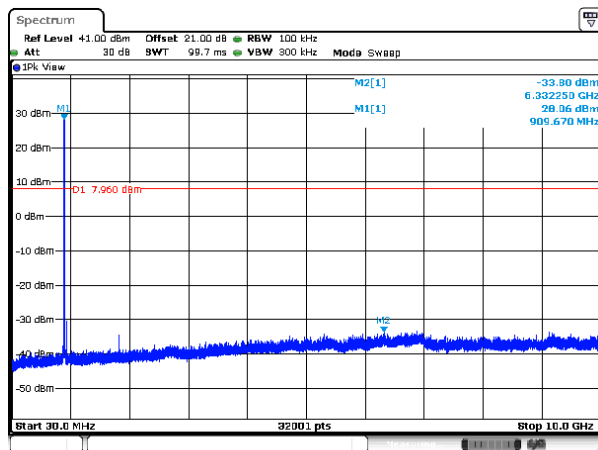
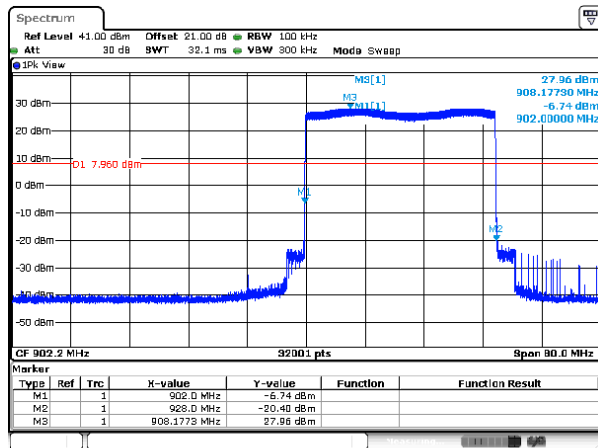


Modulation Type: GMSK
CH257





Modulation Type: GMSK Hopping





8. On Time, Duty Cycle and Measurement methods

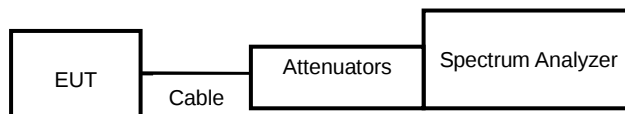
8.1 Test Limit

None; for reporting purposes only.

8.2 Test Procedure

Zero-Span Spectrum Analyzer Method.

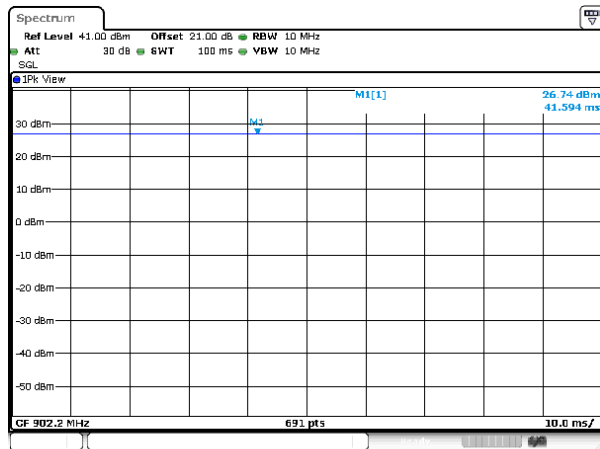
8.3 Test Setup Layout



8.4 Test Result and Data

Modulation Mode	On Time (ms)	Period Time (ms)	Duty Cycle (%)
GMSK	100.00	100.00	100.00%

Modulation Type: GMSK (100Kbps)





9. 20dB Bandwidth Measurement Data

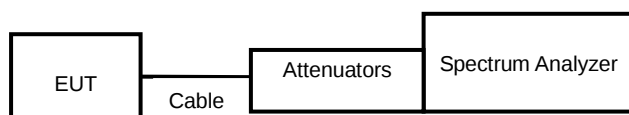
9.1 Test Limit

None; for reporting purposes only.

9.2 Test Procedures

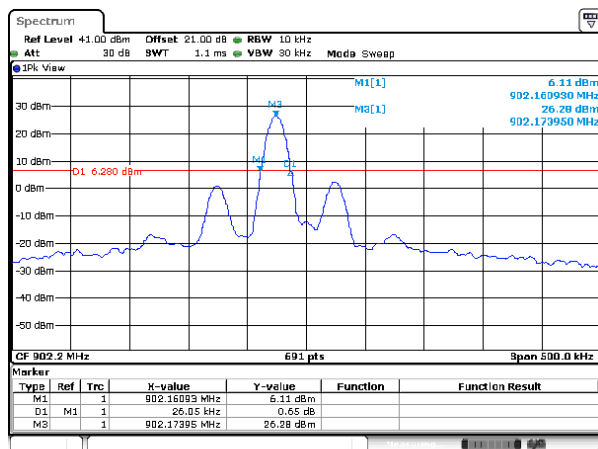
- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 10 KHz and VBW to 30 KHz.
- The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

9.3 Test Setup Layout

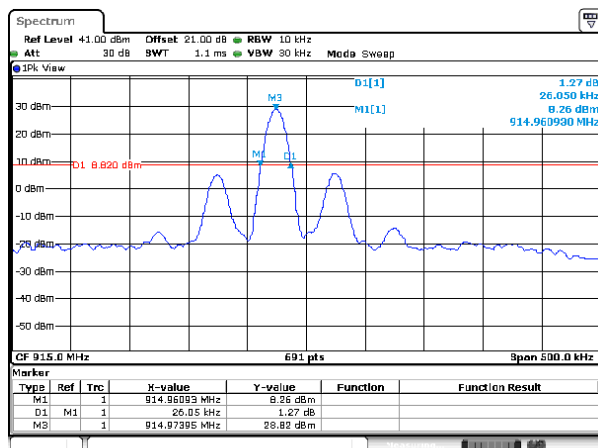


9.4 Test Result and Data

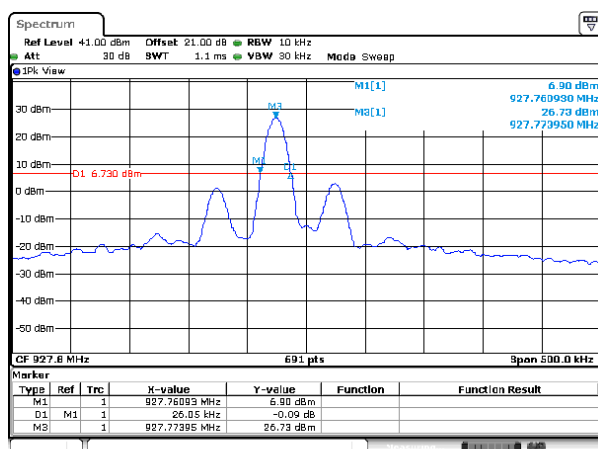
Modulation Type	Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)
GMSK / 100Kbps	1	902.2	0.026
	129	915	0.026
	257	927.8	0.026

Modulation Type: ASK
CH01

CH129



CH257





10. Frequencies Separation

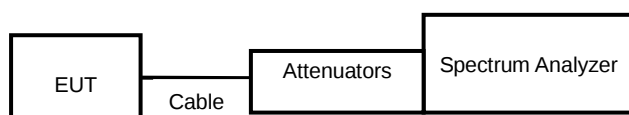
10.1 Test Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

10.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 10 KHz and VBW to 30 KHz.
- By using the MaxHold function record the separation of two adjacent channels.
- Measure the frequency difference of these two adjacent channels.

10.3 Test Setup Layout

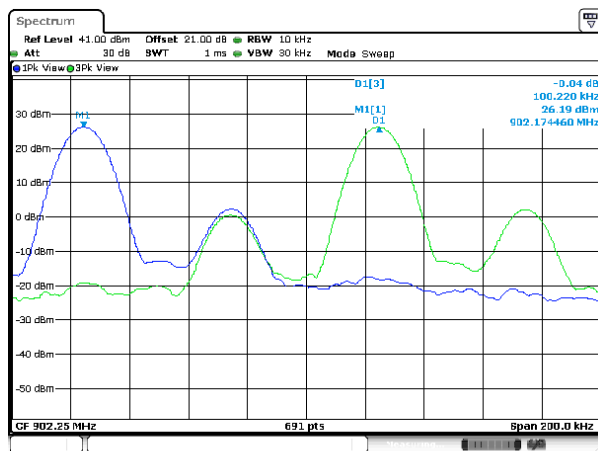


10.4 Test Result and Data

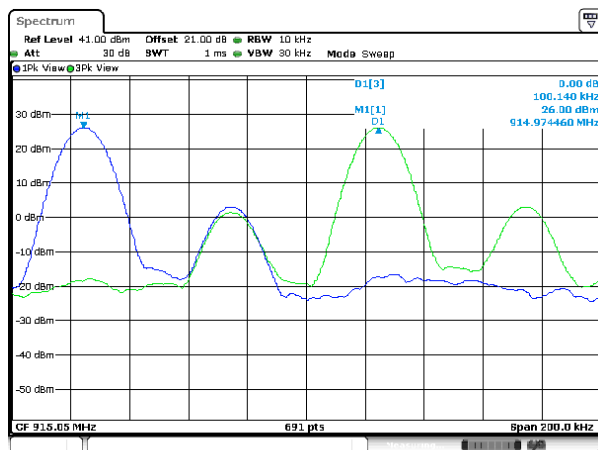
Modulation Type	Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
GMSK / 100Kbps	1	902.2	0.10	0.02605
	129	915	0.10	0.02605
	257	927.8	0.10	0.02605



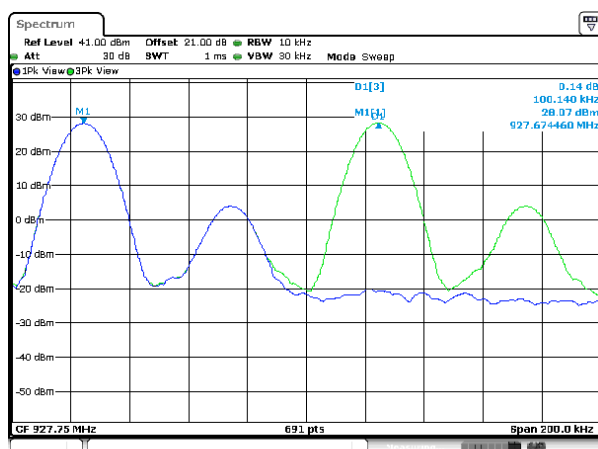
Modulation Type: GMSK
CH01



CH129



CH257





11. Dwell Time on each channel

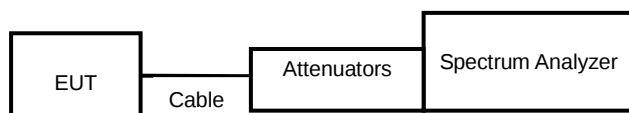
11.1 Test Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 20 seconds.

11.2 Test Procedures

1. The transmitter output was connected to the spectrum analyzer.
2. Adjust the center frequency to measure frequency, then set zero span mode.
2. Set RBW of spectrum analyzer to 100 KHz and VBW to 300 KHz.
4. Measure the time duration of one transmission on the measured frequency.

11.3 Test Setup Layout

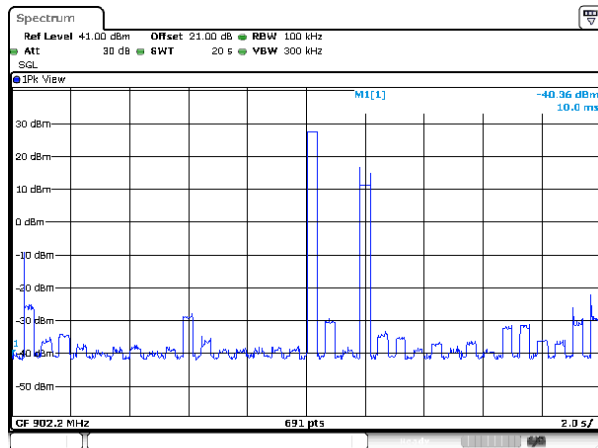


11.4 Test Result and Data

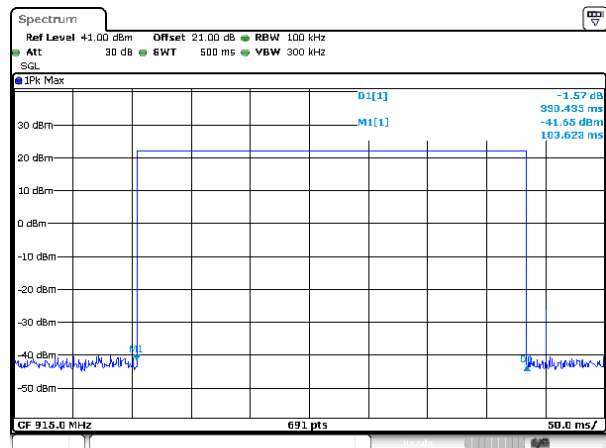
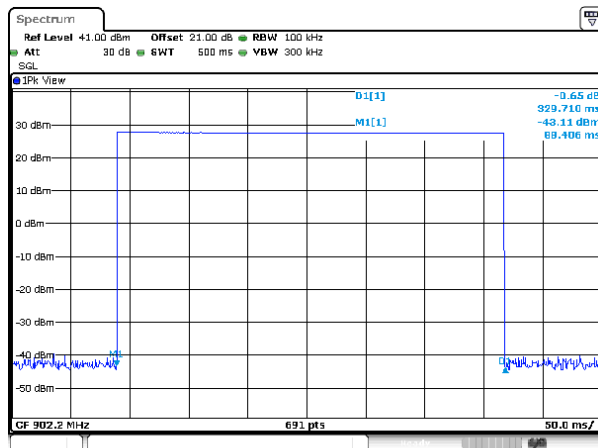
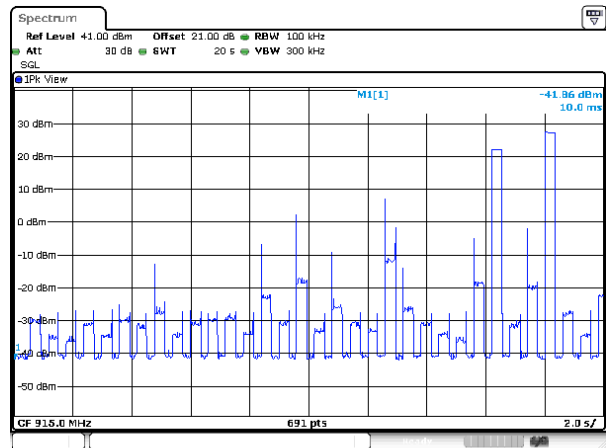
Channel	Channel Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 20 sec	Dwell Time (ms)	Limit (ms)
1	902.2	329.710	1.00	329.71	400
129	915	330.435	1.00	330.44	400
257	927.8	330.435	1.00	330.44	400



Modulation Type: GMSK
CH01

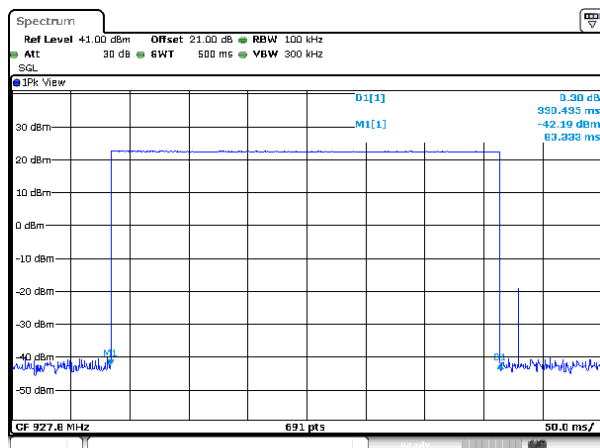
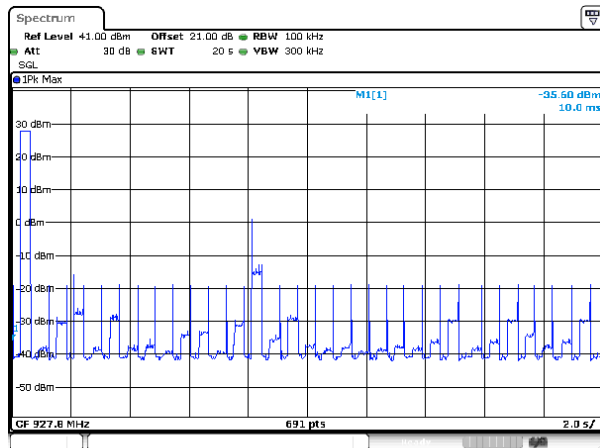


CH129





Modulation Type: GMSK
CH257





12. Number of Hopping Channels

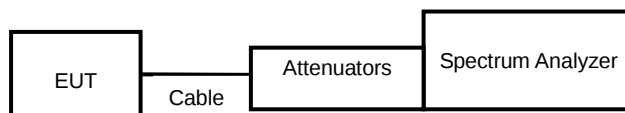
12.1 Test Limit

Frequency hopping systems in the 902 ~ 928MHz band shall use at least 50 channels.

12.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. 2. Set RBW of spectrum analyzer to 100 KHz and VBW to 100 KHz.
- c. 3. Set the MaxHold function, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been record.

12.3 Test Setup Layout

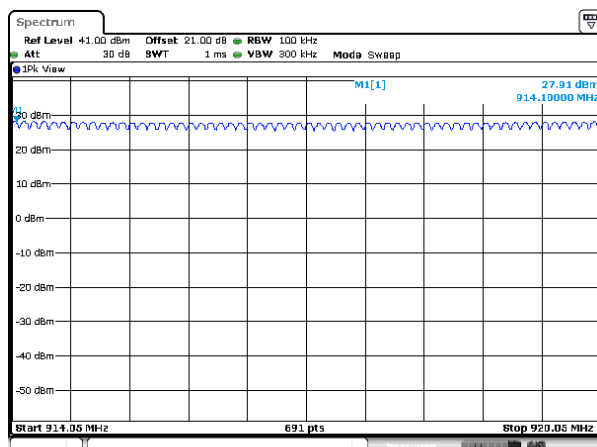
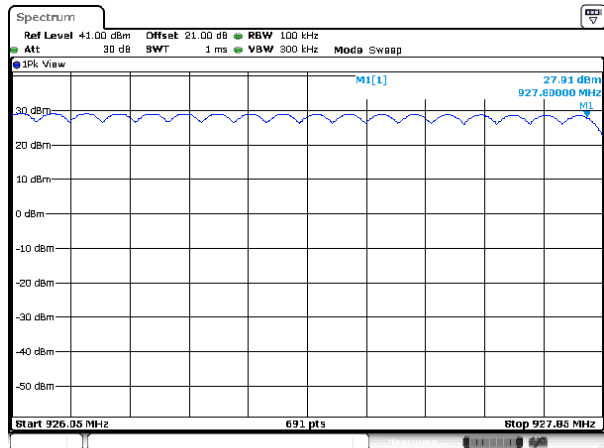
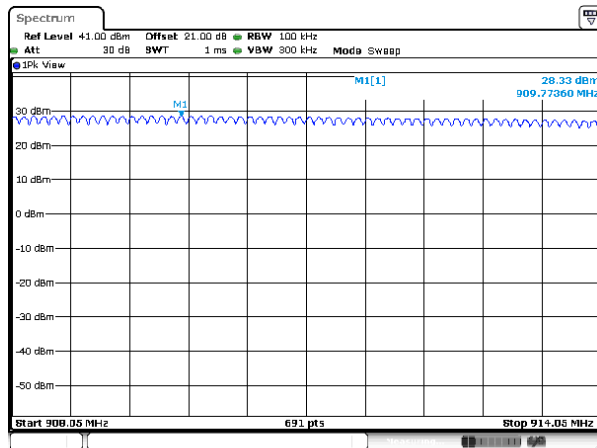
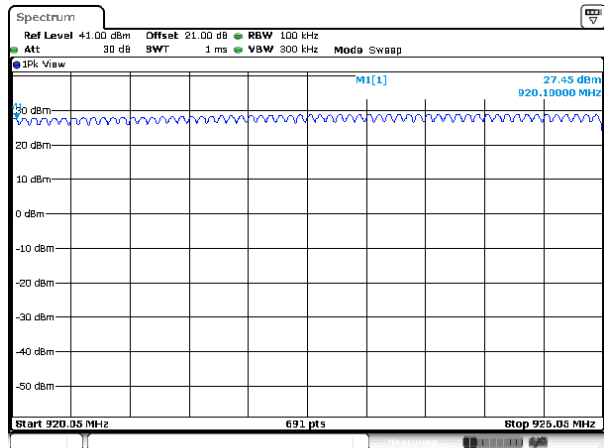
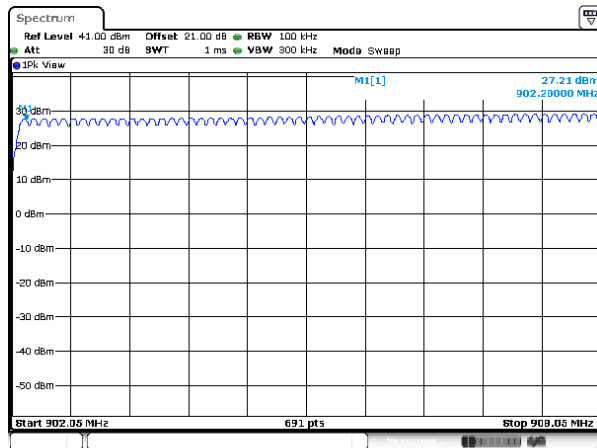


12.4 Test Result and Data

Modulation Type	Hopping Channels	Limit
GMSK / 100Kbps	257	50



Modulation Type: GMSK





13. Maximum Peak Output Power

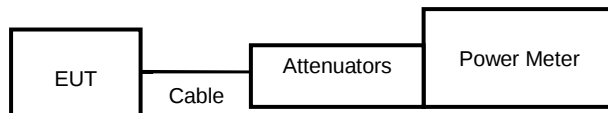
13.1 Test Limit

The Maximum Peak Output Power Measurement is 30dBm.

13.2 Test Procedures

The antenna port(RF output)of the EUT was connected to the input(RF input)of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

13.3 Test Setup Layout





13.4 Test Result and Data

Modulation Type	Setting	Channel	Channel Frequency (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Power Limit (dBm)
GMSK	default(27)	1	902.2	25.67	368.978	30.000
	default(27)	129	915	25.94	392.645	30.000
	default(27)	257	927.8	25.84	383.707	30.000

Modulation Type	Setting	Channel	Channel Frequency (MHz)	AV Output Power (dBm)	AV Output Power (mW)	Power Limit (dBm)
GMSK	default(27)	1	902.2	25.59	362.243	NA
	default(27)	129	915	25.88	387.258	NA
	default(27)	257	927.8	25.75	375.837	NA

Note: Average power is for reference only.