



FCC RADIO TEST REPORT

Applicant : Ubiquiti Inc.
Address : 685 Third Avenue, 27th Floor New York, New York
10017, USA
Equipment : UniFi Intercom
Model No. : UA-Intercom
Trade Name : UBIQUITI
FCC ID : SWX-UAINT

I HEREBY CERTIFY THAT :

The sample was received on Jul. 23, 2024 and the testing was completed on Aug.12, 2024 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao / Supervisor

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory





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History of this test report

Report No.	Issued Date	Description
23090223-TRFCC02	Oct. 13, 2023	Original
24070445-TRFCC02	Aug.26, 2024	1. NFC chipset NXP 7161 changed to NXP 7160 2. eMCP size changed from 2GB to 3GB



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

*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,

The difference is list below:

1. NFC chipset NXP 7161 changed to NXP 7160
2. eMCP size changed from 2GB to 3GB

After engineering evaluation, the following item need to (retested / verified):

- 1.AC Power Line Conducted Emission
- 2.Radiated Spurious Emission

note:

- 1) The new chip component is pin-for-pin compatible.
- 2) The new chip has the same basic function as the old chip, from an external perspective (internal circuitry may differ).
- 3) No change in radio parameters has occurred.
- 4) The same conditions apply when a small area (approximately the same area as the chip) of the PCB is replaced with an equivalent chip.



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Operation Frequency Range	NFC: 13.553MHz~13.567MHz BLE: 2400-2483.5MHz
Center Frequency Range	NFC: 13.56MHz BLE: 2402MHz-2480MHz
Modulation Type	NFC: ASK BLE: GFSK
Modulation Technology	BLE:DTS
Data Rate	BLE: GFSK: 1Mbps
Antenna Type	NFC: Loop Antenna BLE: PIFA Antenna
Antenna Gain	NFC: 0dBi BLE: 4dBi

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



2.2 Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
*00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	*19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	*39	2480
12	2426	26	2454	--	--
13	2428	27	2456	--	--

Note: Channels remarked * are selected to perform test.



2.3 Test Mode and 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," QRCT ver. 4.0.00192.0" under Windows OS system was executed to transmit and receive data via Bluetooth.
- The following test modes were performed for the test:

Conducted Emissions from the AC mains power ports	
Test Mode	Operating Description
1	GFSK (1Mbps), From POE (120V/60Hz)
2	GFSK (1Mbps), From POE (240V/60Hz)
caused "Test Mode 2" generated the worst case, it was reported as the final data.	
Radiation Emissions (Below1GHz)	
Test Mode	Operating Description
1	GFSK (1Mbps), From POE (120V/60Hz)
2	GFSK (1Mbps), From POE (240V/60Hz)
caused "Test Mode 2" generated the worst case, it was reported as the final data.	

Modulation Type	TX CONFIGURATION
GFSK (1Mbps)	1TX
GFSK (2Mbps)	1TX



2.4 Description of Test System

Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	DELL	Latitude E5470	N/A	Adapter / 1.8m / NS
POE	UBIQUITI	GP-C500-120G	N/A	0.6m / NS
RJ45 Cable*2	TE CONNECTIVITY	CAT5E	1.2m / NS	N/A

AC Power Line Conducted Emission				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
POE	UBIQUITI	GP-V480-032G	N/A	0.6m / NS
RJ45 Cable*2	TE CONNECTIVITY	CAT5E	1.2m / NS	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
Frequency Range Investigated	Conducted: from 150kHz to 30 MHz Radiation: from 9 kHz to 40,000MHz	
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
Radiated Emissions	3M02-NK	2024/08/12	24.3°C / 47%	Park Chen
AC Power Line Conducted Emission	CON02-NK	2024/08/12	24.6°C / 59%	Leon Huang



2.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$))

Measurement Item	Uncertainty
AC Power Line Conduction(150K~30MHz)	$\pm 3.12\text{dB}$
Radiated Spurious Emission(9KHz~30MHz)	$\pm 3.5\text{dB}$
Radiated Spurious Emission(30MHz~1GHz)	$\pm 5.1\text{dB}$



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	2024/02/19	2025/02/18
Active Loop Antenna	Schwarzbeck	FMZB 1513	414	2024/01/16	2025/01/15
Horn Antenna	EMCO	3115	31589	2024/02/26	2025/02/25
Horn Antenna	EMCO	3116	31974	2023/10/16	2024/10/15
EMI Receiver	ROHDE & SCHWARZ	ESR 7	101906	2024/05/13	2025/05/12
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	101329	2024/07/16	2025/07/15
Preamplifier	Agilent	8449B	3008A01954	2024/03/01	2025/02/28
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2023/10/13	2024/10/12
Preamplifier	EM Electronics corp.	EM330	60659	2024/02/17	2025/02/16
Cable-6m(9k~300M)	N/A	EMC5D-BM-BM-6	130606	2024/03/13	2025/03/12
Cable-3in1(30M-1G)	HARBOUR INDUSTRIES	LL142	CCE1315	2024/02/23	2025/02/22
Cable-0.5m(1G-40G)	HUBER SUHNER	SUCOFLEX 104	805443/4	2024/03/05	2025/03/04
Cable-3m(1G-40G)	HUBER SUHNER	SUCOFLEX 104	805796/4	2024/03/05	2025/03/04
Cable-8m(1G-26.5G)	WOKEN	WCBA-WCA203SM	CCE1374	2024/03/05	2025/03/04
Cable-1m(1G-40G)	HUBER SUHNER	HUBER SUHNER / SF102	804398/2	2023/10/12	2024/10/11
Cable-3m(1G-40G)	HUBER SUHNER	HUBER SUHNER / SF102	804619/2	2023/10/12	2024/10/11
E3	AUDIX	v8.2014-8-6	RK-000529	NA	NA
Highpass Filter	WOKEN	WFIL-H3000-18000F-03	WR377WC2B1	2023/08/17	2024/08/16
Notch Filter	Warison	WFIL-N5925-7125F-04	WRQ4BFWC4M1	2024/03/11	2025/03/10
Hipass Filter	Warison	WFIL-H7500-18000F	WRQ4BFWC2J1	2024/03/11	2025/03/10

Test Item	AC Power Line Conducted Emission				
Test Site	CON02-NK				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
EMI Receiver	ROHDE & SCHWARZ	ESR 7	101906	2024/05/13	2025/05/12
Line Impedance Stabilization Network	Schwarzbeck	NSLK 8127	8127516	2023/10/03	2024/10/02
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	101934	2024/03/01	2025/02/28
Cable-6m(9k~300M)	N/A	EMC5D-BM-BM-6	130606	2024/03/13	2025/03/12
E3	AUDIX	v8.2014-8-6	RK-000536	NA	NA



4. Antenna Requirements

4.1 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.

And 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 Type	PIFA Antenna
Antenna Gain	4dBi



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 C63.10-2013. 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

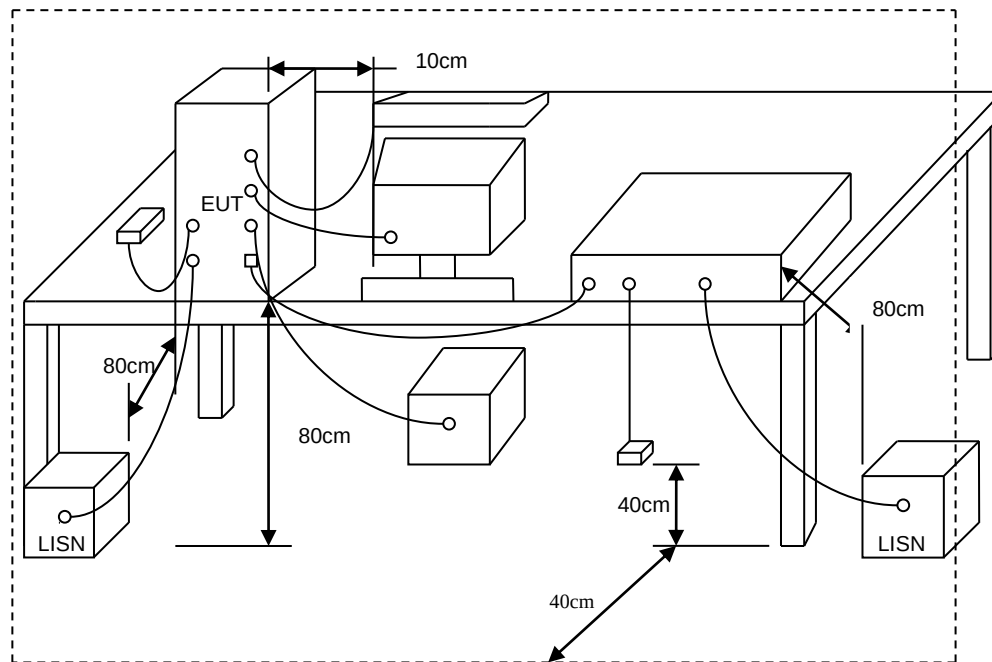
*Decreases with the logarithm of the frequency.

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

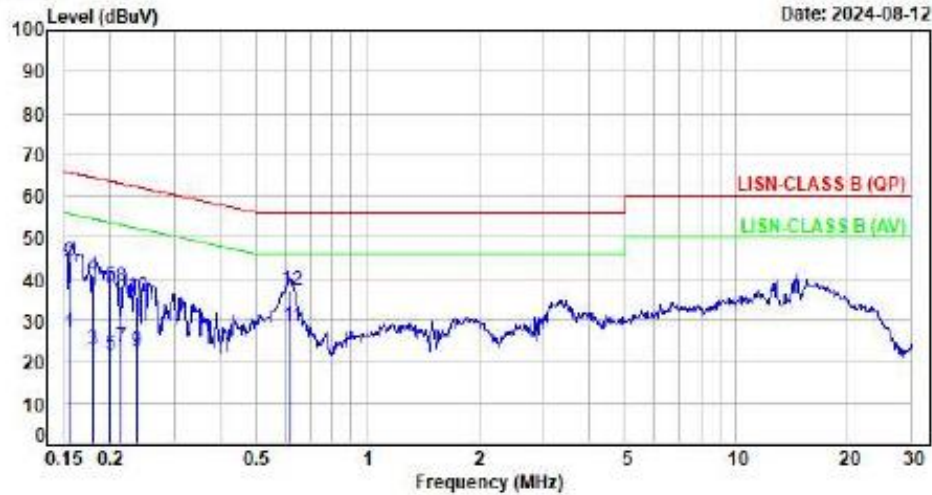




5.4 Test Result and Data

Test Mode : BLE 1TX CH19 1Mbps
Voltage : From POE(AC 240V/60Hz)
Phase : Line

Data: 9



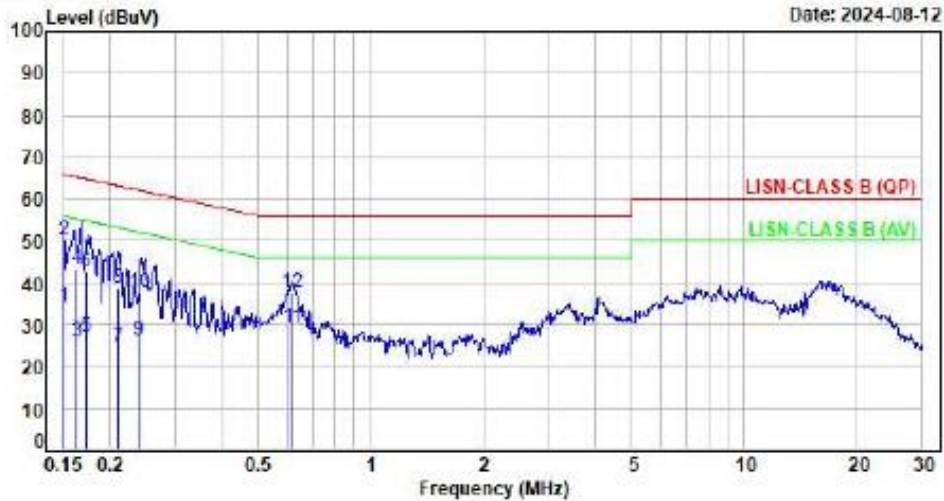
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1550	9.92	16.94	26.86	55.73	-28.87	Average	P
2	0.1550	9.92	34.22	44.14	65.73	-21.59	QP	P
3	0.1795	9.92	12.70	22.62	54.51	-31.89	Average	P
4	0.1795	9.92	30.82	40.74	64.51	-23.77	QP	P
5	0.2004	9.92	11.82	21.74	53.59	-31.85	Average	P
6	0.2004	9.92	28.39	38.31	63.59	-25.28	QP	P
7	0.2137	9.92	13.60	23.52	53.06	-29.54	Average	P
8	0.2137	9.92	28.12	38.04	63.06	-25.02	QP	P
9	0.2354	9.92	12.66	22.58	52.26	-29.68	Average	P
10	0.2354	9.92	25.99	35.91	62.26	-26.35	QP	P
11	0.6213	9.94	18.61	28.55	46.00	-17.45	Average	P
12	0.6213	9.94	27.32	37.26	56.00	-18.74	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



Test Mode : BLE 1TX CH19 1Mbps
Voltage : From POE(AC 240V/60Hz)
Phase : Neutral

Data: 10



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1510	9.94	24.37	34.31	55.94	-21.63	Average	P
2	0.1510	9.94	40.38	50.32	65.94	-15.62	QP	P
3	0.1630	9.94	16.04	25.98	55.31	-29.33	Average	P
4	0.1630	9.94	33.23	43.17	65.31	-22.14	QP	P
5	0.1725	9.94	17.24	27.18	54.84	-27.66	Average	P
6	0.1725	9.94	32.76	42.70	64.84	-22.14	QP	P
7	0.2092	9.94	14.69	24.63	53.24	-28.61	Average	P
8	0.2092	9.94	28.76	38.70	63.24	-24.54	QP	P
9	0.2397	9.94	16.46	26.40	52.11	-25.71	Average	P
10	0.2397	9.94	27.86	37.80	62.11	-24.31	QP	P
11	0.6138	9.97	19.41	29.38	46.00	-16.62	Average	P
12	0.6138	9.97	27.68	37.65	56.00	-18.35	QP	P

Note: Level=Reading+Factor

Margin=Level-Limit

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



6. Test of Spurious Emission (Radiated)

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

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. 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.
- e. 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.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. 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.
- h. 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.
- i. "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

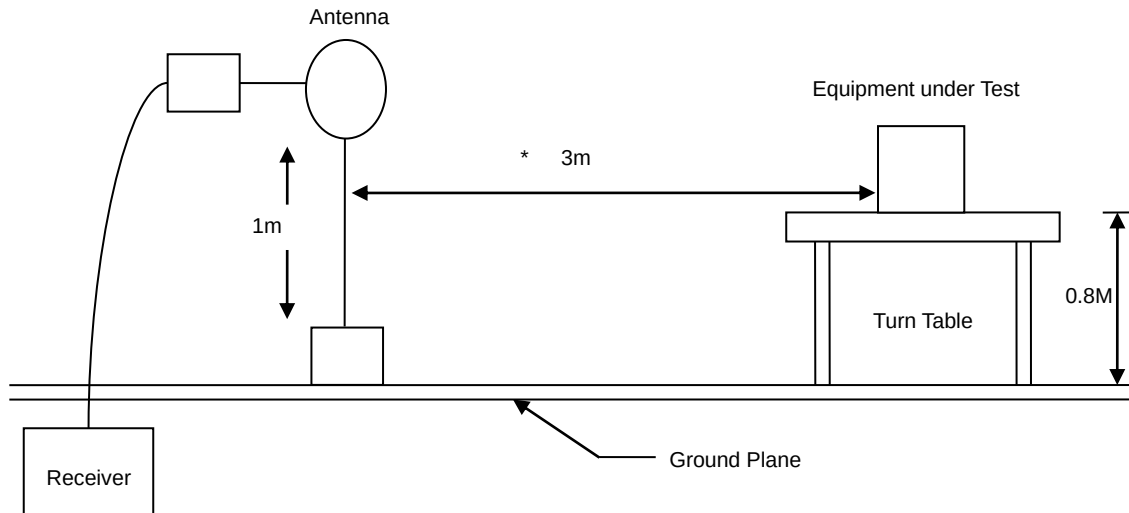
Note:

- 1.The supporting fixture shall permit orientation of the EUT in each of three orthogonal axis positions such that emissions from the EUT are maximized.
(Y-AXIS is the worst.)
- 2.Due to the test software function limit the operation band setting(200dBuV/m).
There's no corresponding limitation in the actual test item.

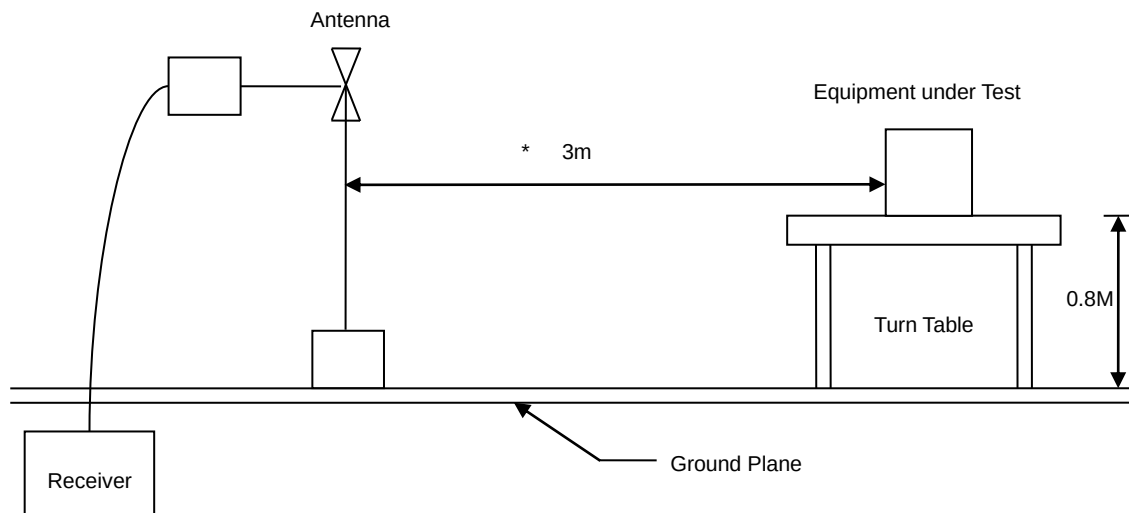


6.3 Typical Test Setup

Below 30MHz test setup

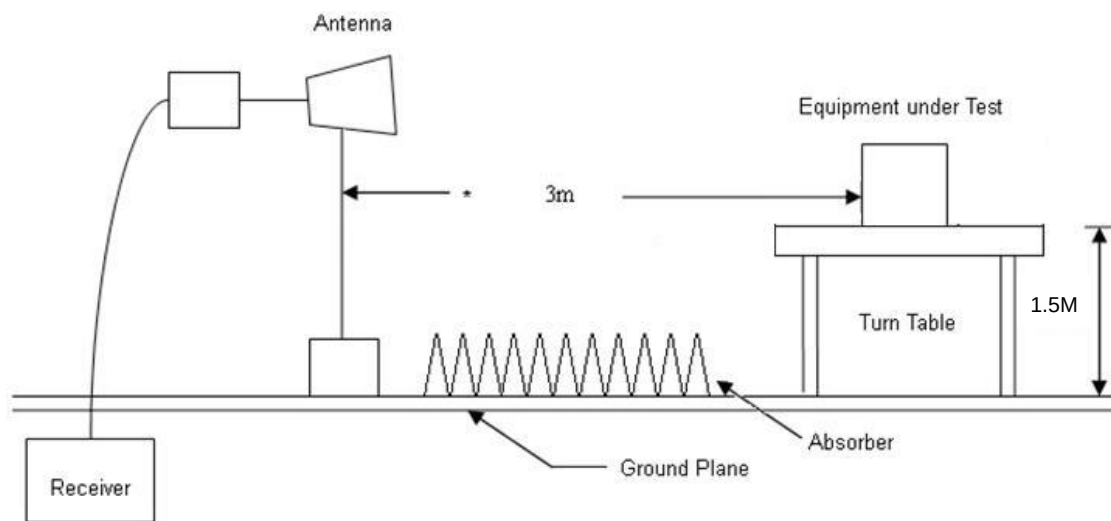


30MHz- 1GHz Test Setup





Above 1GHz Test Setup



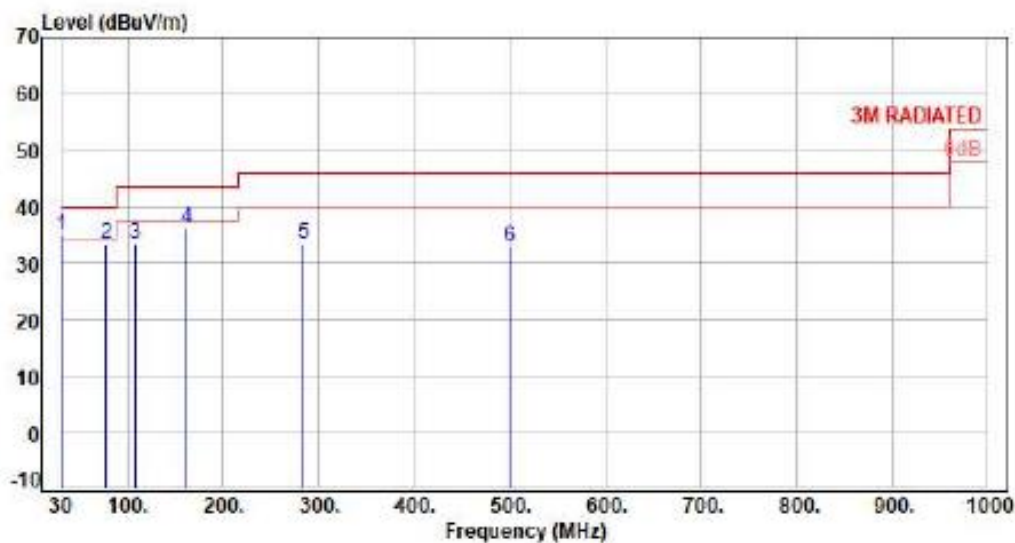


6.4 Test Result and Data (9kHz ~ 30MHz)

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

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

Test Mode : BLE 1TX CH19 1Mbps
Voltage : From POE(AC240V/60Hz)
Pol : Vertical



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	30.00	-10.01	45.01	35.00	40.00	-5.00	Peak	400	0	P
2	76.56	-13.75	47.29	33.54	40.00	-6.46	Peak	400	0	P
3	107.60	-13.28	46.66	33.38	43.50	-10.12	Peak	400	0	P
4	161.92	-9.47	45.58	36.11	43.50	-7.39	Peak	400	0	P
5	284.14	-9.00	42.54	33.54	46.00	-12.46	Peak	400	0	P
6	499.48	-3.55	36.39	32.84	46.00	-13.16	Peak	400	0	P

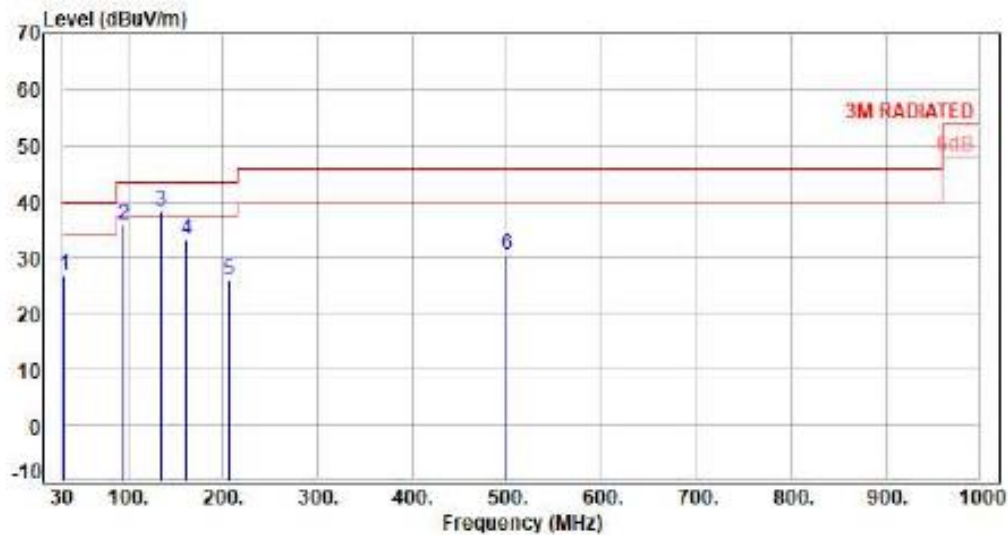
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Test Mode : BLE ITX CH19 1Mbps
Voltage : From POE(AC240V/60Hz)
Pol : Horizontal



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	31.94	-10.04	36.73	26.69	40.00	-13.31	Peak	400	0	P
2	95.96	-15.13	51.20	36.07	43.50	-7.43	Peak	400	0	P
3	134.76	-10.61	48.91	38.30	43.50	-5.20	Peak	400	0	P
4	161.92	-9.47	42.61	33.14	43.50	-10.36	Peak	400	0	P
5	206.54	-12.27	38.09	25.82	43.50	-17.68	Peak	400	0	P
6	499.48	-3.55	33.97	30.42	46.00	-15.58	Peak	400	0	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor