



RADIO TEST REPORT

Report No: STS1807020W01

Issued for

ZHEJIANG UNIVIEW TECHNOLOGIES CO LTD
88 JIANGLING RD, BINJIANG DISTRICT HANGZHOU,
ZHEJIANG 310051, P.R. CHINA

Product Name:	IP Camera
Brand Name:	N/A
Model Name:	IPC322SR3-VSF28W-D
Series Model:	IPC322SR3-VSF28W-D-NB, IPC322SR3-VSF40W-D, IPC322SR3-VSF40W-D-NB
FCC ID:	2AL8S-0211C2W3
Test Standard:	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209 CFR47 FCC Part 15: Subpart B Section 15.107 CFR47 FCC Part 15: Subpart B Section 15.109

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TEST RESULT CERTIFICATION

Applicant's name: ZHEJIANG UNIVIEW TECHNOLOGIES CO LTD
Address: 88 JIANGLING RD, BINJIANG DISTRICT HANGZHOU, ZHEJIANG 310051, P.R. CHINA
Manufacture's Name: 1. Zhejiang Uniview Technologies Co., Ltd.
2. Suzhou Qiaoxin Electronic Technology Co., Ltd.
3. TDG TECHNOLOGY CO LTD
4. ZHE JIANG RAYSOAR ELECTRONICS CO LTD
Address: 1. A Zone, Building 2, Wanlun Science Park, 88 Jiangling Road, Hangzhou, P.R. China
2. No. 77, Yitang Road, Economic Development Zone, Wujiang District, Suzhou City, Jiangsu Province, China 215200
3. YATAI ROAD NO.1, SOUTH LAKE DISTRICT, JIAXING, ZHEJIANG, PROVINCE, 314050, P.R. CHINA.
4. No. 367 Weizhong Road, Weitang Street, Jiashan County, Jiaxing, Zhejiang

Product description

Product Name: IP Camera
Brand Name: N/A
Model Name: IPC322SR3-VSF28W-D
Series Model: IPC322SR3-VSF28W-D-NB, IPC322SR3-VSF40W-D, IPC322SR3-VSF40W-D-NB
Test Standards: CFR47 FCC Part 15: Subpart C Section 15.247
CFR47 FCC Part 15: Subpart C Section 15.207
CFR47 FCC Part 15: Subpart C Section 15.209
CFR47 FCC Part 15: Subpart B Section 15.107
CFR47 FCC Part 15: Subpart B Section 15.109

Test procedure: ANSI C63.10: 2013, ANSI C63.4: 2014

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/IC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests: 01 Jul. 2018 ~ 26 Jul. 2018

Date of Issue: 27 Jul. 2018

Test Result: **Pass**



Testing Engineer : Chris Chen

(Chris Chen)

Technical Manager : Sean She

(Sean She)

Authorized Signatory : Vita Li

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	27 Jul. 2018	STS1807020W01	ALL	Initial Issue





1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

KDB 558074 D01 DTS Meas Guidance v04

FCC Part 15, Subpart C			
Standard Section	Test Item	Judgment	Remark
FCC Part 15.207(a)	Conducted Emission	PASS	
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS	
FCC Part 15.247(b)(3)	Output Power	PASS	
FCC Part 15.247(d)	Radiated Spurious Emission	PASS	
FCC Part 15.247(d)	Conducted Spurious & Band Edge Emission	PASS	
FCC Part 15.247(e)	Power Spectral Density	PASS	
FCC Part 15.205	Restricted Band Edge Emission	PASS	
FCC Part 15.247(d) & 15.209(a)	Band Edge Emission	PASS	
FCC Part 15.247(b)(4) & 15.203	Antenna Requirement	PASS	

FCC Part 15, Subpart B			
Standard Section	Test Item	Judgment	Remark
FCC Part 15.107(a)	Conducted Emission	PASS	Class B limit
FCC Part 15.109(a)	Radiated Emission	PASS	Class B limit

NOTE:

- 1) 'N/A' denotes test is not applicable in this test report
- 2) All tests were performed according to the procedures in ANSI C63.10: 2013 and ANSI C63.4: 2014.



1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.

Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

CNAS Registration No.: L7649; FCC Registration No.: 625569

IC Registration No.: 12108A; A2LA Certificate No.: 4338.01;

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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	Conducted Emission (9KHz-150KHz)	$\pm 2.88\text{dB}$
2	Conducted Emission (150KHz-30MHz)	$\pm 2.67\text{dB}$
3	RF power,conducted	$\pm 0.71\text{dB}$
4	Spurious emissions,conducted	$\pm 0.63\text{dB}$
5	All emissions,radiated (9KHz-30MHz)	$\pm 3.02\text{dB}$
6	All emissions,radiated (30MHz-200MHz)	$\pm 3.80\text{dB}$
7	All emissions,radiated (200MHz-1000MHz)	$\pm 3.97\text{dB}$
8	All emissions,radiated(>1G)	$\pm 3.03\text{dB}$



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name	IP Camera	
Trade Name	N/A	
Model Name	IPC322SR3-VSF28W-D	
Series Model	IPC322SR3-VSF28W-D-NB, IPC322SR3-VSF40W-D, IPC322SR3-VSF40W-D-NB	
Model Difference	All models are identical except the model number.	
Product Description	The EUT is IP Camera which supports Wi-Fi 802.11 b/g/n wireless technology.	
	Operation Frequency:	2412 - 2462 MHz for 802.11b/g/n(HT20)
	Modulation Type:	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM)
	Bit Rate of Transmitter:	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n
	Number Of Channel:	11 channels for 802.11b/g/n(HT20)
	Antenna Designation:	Please see Note 4
	Antenna Gain (dBi):	2.4dBi
	Duty Cycle:	>98%
Channel List	Please refer to the Note 2.	
Adapter	Adapter Model: ADS-12FB-12 12012EPCU (HONOR) Input: AC 100-240V~50/60Hz, 0.3A Output: DC 12.0V@1000mA	
Battery	N/A	
Hardware version	N/A	
Software version	N/A	
Radio Hardware version	N/A	
Radio Software version	N/A	
Test Software	SecureCRT	
RF Power Setting TEST Software (power class)	default	
Connecting I/O Port(s)	Please refer to the User's Manual	



Note:

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

2

RF Channel and Frequency of Wi-Fi 802.11 b/g/n			
802.11b/g/n (HT20)			
RF Channel	Freq.(MHz)		
01	2412		
02	2417		
03	2422		
04	2427		
05	2432		
06	2437		
07	2442		
08	2447		
09	2452		
10	2457		
11	2462		

3 Note:

- 1) 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;
- 2) Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)

4

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	IPC322SR3-VSF 28W-D	Integral Antenna	N/A	2.4	WLAN Antenna



2.2 DESCRIPTION OF TEST MODES

Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate
Mode 1	TX IEEE 802.11b CH1	1 Mbps
Mode 2	TX IEEE 802.11b CH6	1 Mbps
Mode 3	TX IEEE 802.11 b CH11	1 Mbps
Mode 4	TX IEEE 802.11g CH1	6 Mbps
Mode 5	TX IEEE 802.11g CH6	6 Mbps
Mode 6	TX IEEE 802.11g CH11	6 Mbps
Mode 7	TX IEEE 802.11n HT20 CH1	MCS 0
Mode 8	TX IEEE 802.11n HT20 CH6	MCS 0
Mode 9	TX IEEE 802.11n HT20 CH11	MCS 0
Mode10	Wi-Fi transmitting mode	/
Mode 11	Recording+Replay+Download mode	/
Mode 12	Local Recording mode	/

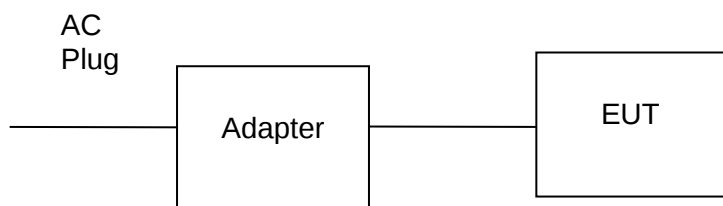
Note:

- 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) Controlled using a bespoke application on the laptop PC supplied by the customer. The application was used to enable a continuous transmission mode and to select the test channels, data rates and modulation schemes as required.
- 4) According to the model differences description, we choose model: IPC322SR3-VSF28W-D to perform all tests.

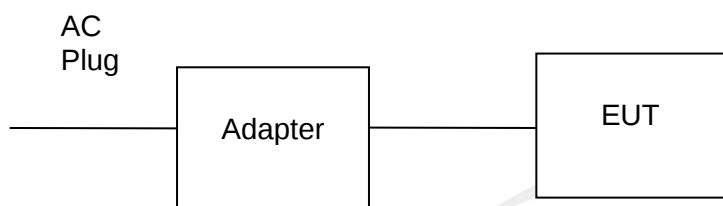


2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiation Test Set



Conduction Test Set



2.4 DESCRIPTION OF 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.	Serial No.	Note
1	Adapter	HONOR	ADS-12FB-12 12012EPCU	N/A	Accessory equipment
2	Personal computer	HP	500-320cx	4CV428DQYN	Provided by lab
3	TF card	Kingston	32GB	N/A	
4	Honor 8	HUAWEI	FRD-AL00	N/A	
5	iPhone 7	Apple	A1661	N/A	
6	Mouse	MOTOSPEED	F66	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
1	RJ45 cable*2	NO	200cm	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.
- 3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESCI	102086	2017.10.15	2018.10.14
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2018.11.01
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1343	2017.10.27	2018.10.26
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	N/A	2018.03.11	2019.03.10
Temperature & Humidity	HH660	Mieo	N/A	2017.10.15	2018.10.14
Temperature & Humidity	HH660	Mieo	N/A	2017.10.15	2018.10.14
Pre-mpifier (0.1M-3GHz)	EM	EM330	60538	2018.03.11	2019.03.10
PreAmplifier (1G-26.5GHz)	Agilent	8449B	60538	2017.10.15	2018.10.14
Passive Loop (9K--30MHz)	ZHNAN	ZN3090C	16035	2018.03.11	2019.03.10
Low frequency cable	EM	R01	N/A	2018.03.11	2019.03.10
Low frequency cable	EM	R06	N/A	2018.03.11	2019.03.10
High frequency cable	SCHWARZBECK	R04	N/A	2018.03.11	2019.03.10
High frequency cable	SCHWARZBECK	R02	N/A	2018.03.11	2019.03.10
Semi-anechoic chamber	Changling	966	N/A	2017.10.15	2018.10.14
trun table	EM	SC100_1	60531	N/A	N/A
Antnna mast	EM	SC100	N/A	N/A	N/A
Max-full Antenna Corp	MF	MFA-440H	N/A	N/A	N/A

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2017.10.15	2018.10.14
LISN	R&S	ENV216	101242	2017.10.15	2018.10.14
conduction Cable	EM	C01	N/A	2018.03.11	2019.03.10
Temperature & Humidity	Mieo	HH660	N/A	2017.10.15	2018.10.14



RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2017.10.15	2018.10.14
Power Meter	R&S	NRP	100510	2017.10.15	2018.10.14
Spectrum Analyzer	Agilent	N9020A	MY51110105	2018.03.08	2019.03.07
Signal Analyzer	Agilent	N9020A	MY49100060	2017.10.15	2018.10.14

Note:

The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.





3 EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

operating frequency band. In case the emission fall within the restricted band specified on Part 15.207(a), 107(a) limit in the table below has to be followed.

This item was performed according to the procedures in ANSI C63.10: 2013 and ANSI C63.4: 2014.

FREQUENCY (MHz)	Conducted Emission limit (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.

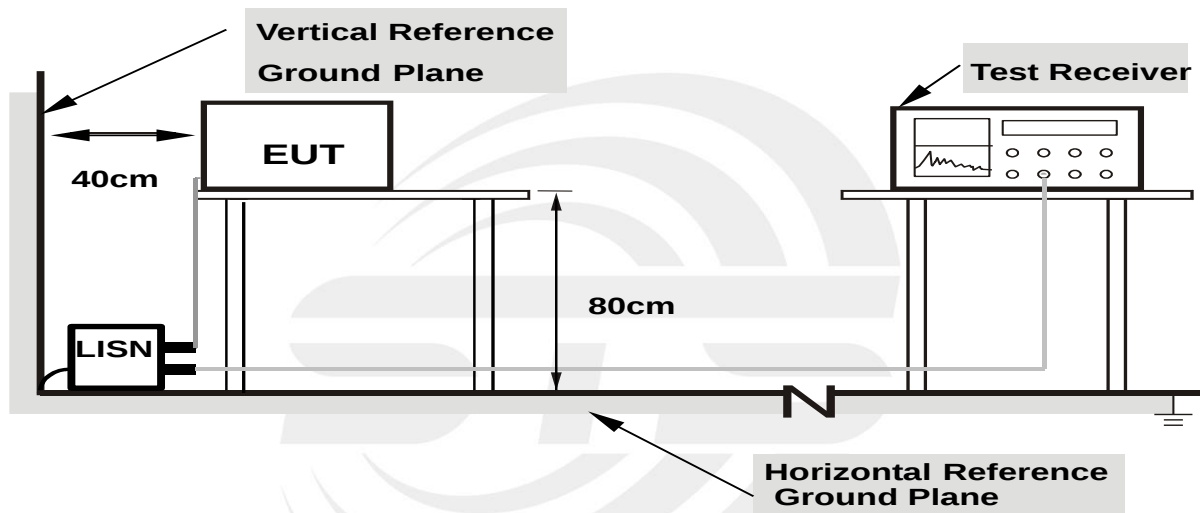
The following table is the setting of the receiver

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

3.1.2 TEST PROCEDURE

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

3.1.3 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 from other units and other metal planes**

3.1.4 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.



3.1.5 TEST RESULT

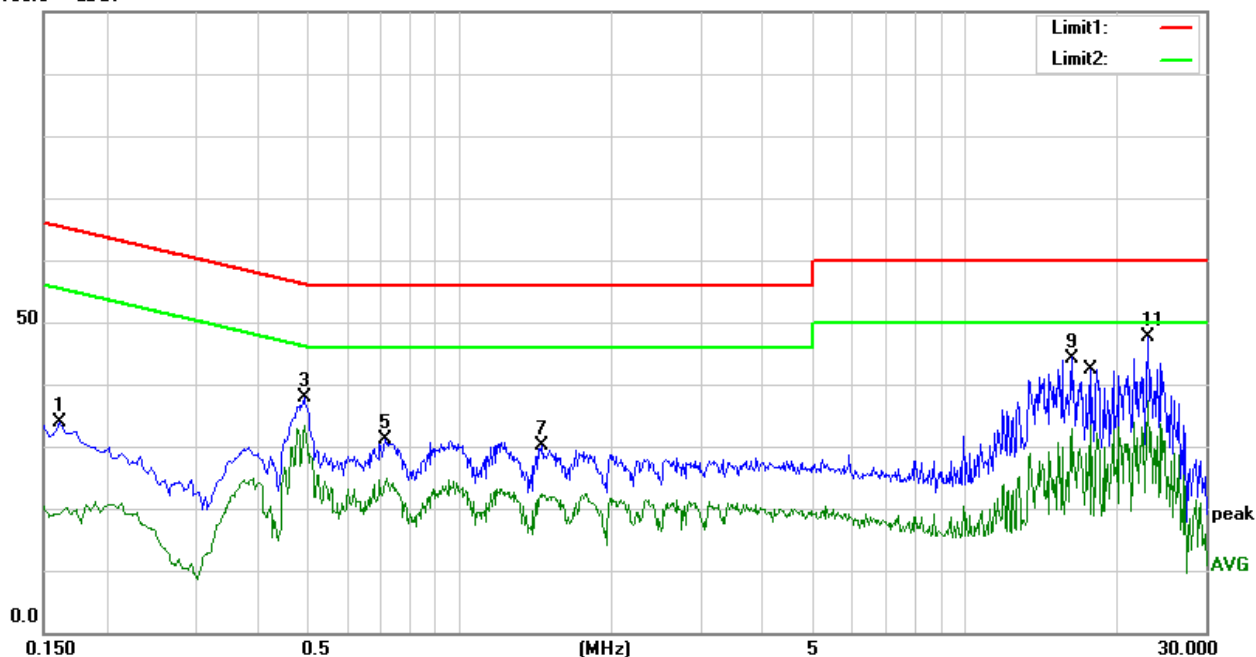
Temperature:	25 °C	Relative Humidity:	61%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 10		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1620	23.98	9.79	33.77	65.36	-31.59	QP
0.1620	9.43	9.79	19.22	55.36	-36.14	AVG
0.4940	27.93	10.03	37.96	56.10	-18.14	QP
0.4940	23.36	10.03	33.39	46.10	-12.71	AVG
0.7140	21.36	9.84	31.20	56.00	-24.80	QP
0.7180	15.11	9.84	24.95	46.00	-21.05	AVG
1.4580	20.22	9.79	30.01	56.00	-25.99	QP
1.4700	12.40	9.79	22.19	46.00	-23.81	AVG
16.2300	33.96	10.29	44.25	60.00	-15.75	QP
17.6940	23.12	10.35	33.47	50.00	-16.53	AVG
23.1300	37.31	10.27	47.58	60.00	-12.42	QP
23.1300	27.22	10.27	37.49	50.00	-12.51	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) – Limit

100.0 dBuV



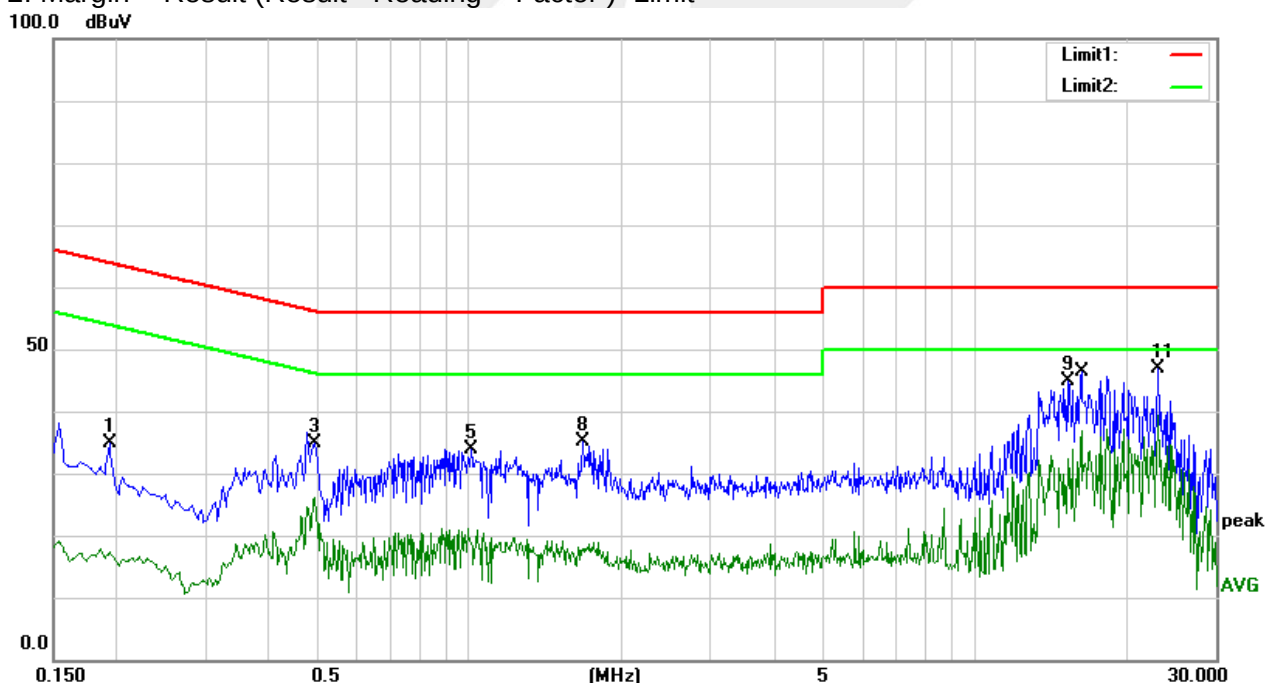


Temperature:	25 °C	Relative Humidity:	61%
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 10		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1940	24.96	9.86	34.82	63.86	-29.04	QP
0.1955	7.09	9.86	16.95	53.80	-36.85	AVG
0.4940	24.84	9.98	34.82	56.10	-21.28	QP
0.4940	16.09	9.98	26.07	46.10	-20.03	AVG
1.0100	24.03	9.80	33.83	56.00	-22.17	QP
1.0100	9.06	9.80	18.86	46.00	-27.14	AVG
1.6660	7.49	9.85	17.34	46.00	-28.66	QP
1.6780	25.21	9.85	35.06	56.00	-20.94	AVG
15.2500	34.86	10.10	44.96	60.00	-15.04	QP
16.2300	26.61	10.17	36.78	50.00	-13.22	AVG
23.1300	36.54	10.35	46.89	60.00	-13.11	QP
23.1300	28.99	10.35	39.34	50.00	-10.66	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) – Limit





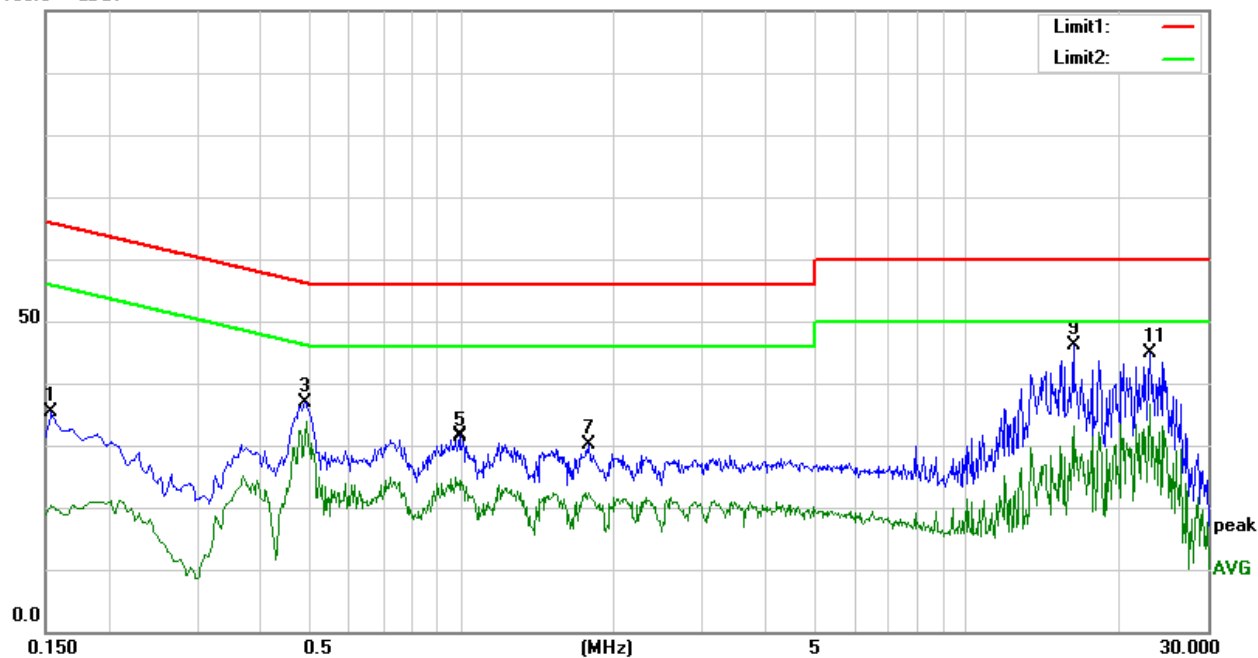
Temperature:	25 °C	Relative Humidity:	61%
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 11 (Part 15B)		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1540	25.51	9.79	35.30	65.78	-30.48	QP
0.1547	10.45	9.79	20.24	55.74	-35.50	AVG
0.4900	26.91	10.03	36.94	56.17	-19.23	QP
0.4940	23.80	10.03	33.83	46.10	-12.27	AVG
0.9900	21.70	9.80	31.50	56.00	-24.50	QP
1.0020	14.36	9.80	24.16	46.00	-21.84	AVG
1.7860	20.25	9.78	30.03	56.00	-25.97	QP
1.8020	11.94	9.78	21.72	46.00	-24.28	AVG
16.2300	35.75	10.29	46.04	60.00	-13.96	QP
16.2300	22.95	10.29	33.24	50.00	-16.76	AVG
23.1300	34.72	10.27	44.99	60.00	-15.01	QP
23.1300	26.35	10.27	36.62	50.00	-13.38	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit

100.0 dBuV



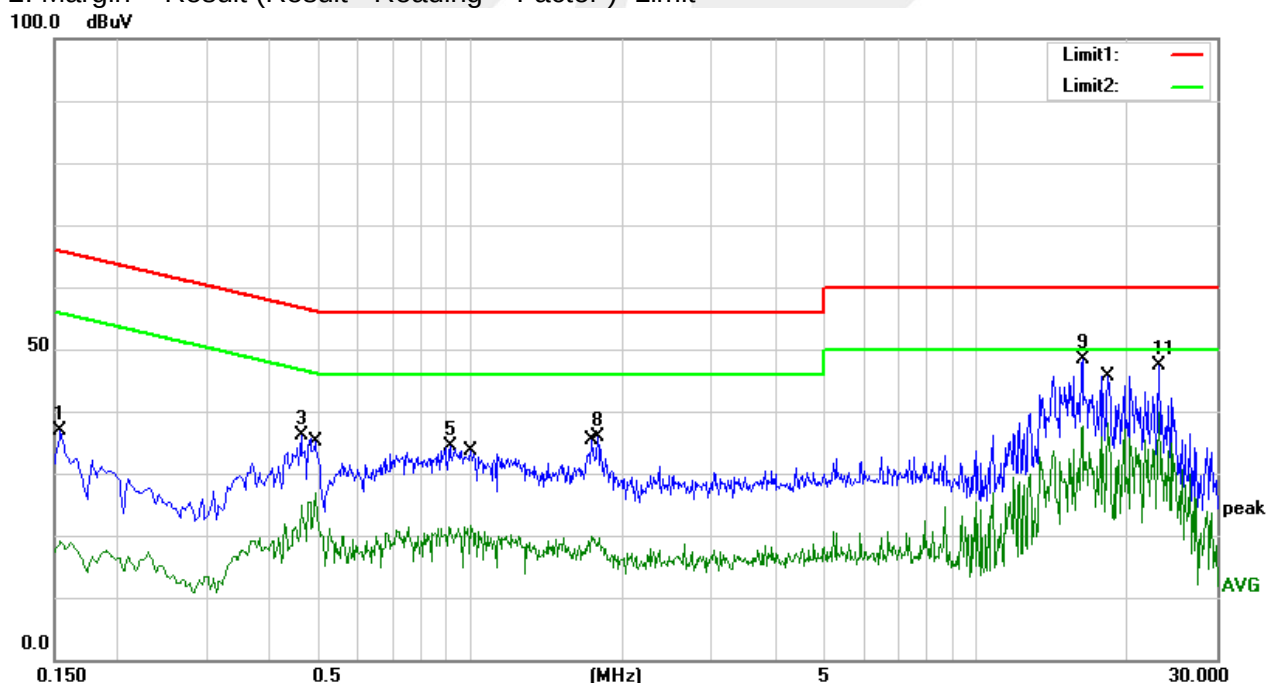


Temperature:	25 °C	Relative Humidity:	61%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 11 (Part 15B)		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1540	27.11	9.76	36.87	65.78	-28.91	QP
0.1540	9.30	9.76	19.06	55.78	-36.72	AVG
0.4620	26.08	10.01	36.09	56.66	-20.57	QP
0.4940	16.90	9.98	26.88	46.10	-19.22	AVG
0.9100	24.47	9.82	34.29	56.00	-21.71	QP
1.0020	11.78	9.80	21.58	46.00	-24.42	AVG
1.7420	10.10	9.85	19.95	46.00	-26.05	QP
1.7860	26.09	9.86	35.95	56.00	-20.05	AVG
16.2300	38.27	10.17	48.44	60.00	-11.56	QP
18.2460	27.85	10.33	38.18	50.00	-11.82	AVG
23.1300	36.99	10.35	47.34	60.00	-12.66	QP
23.1300	29.44	10.35	39.79	50.00	-10.21	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) – Limit



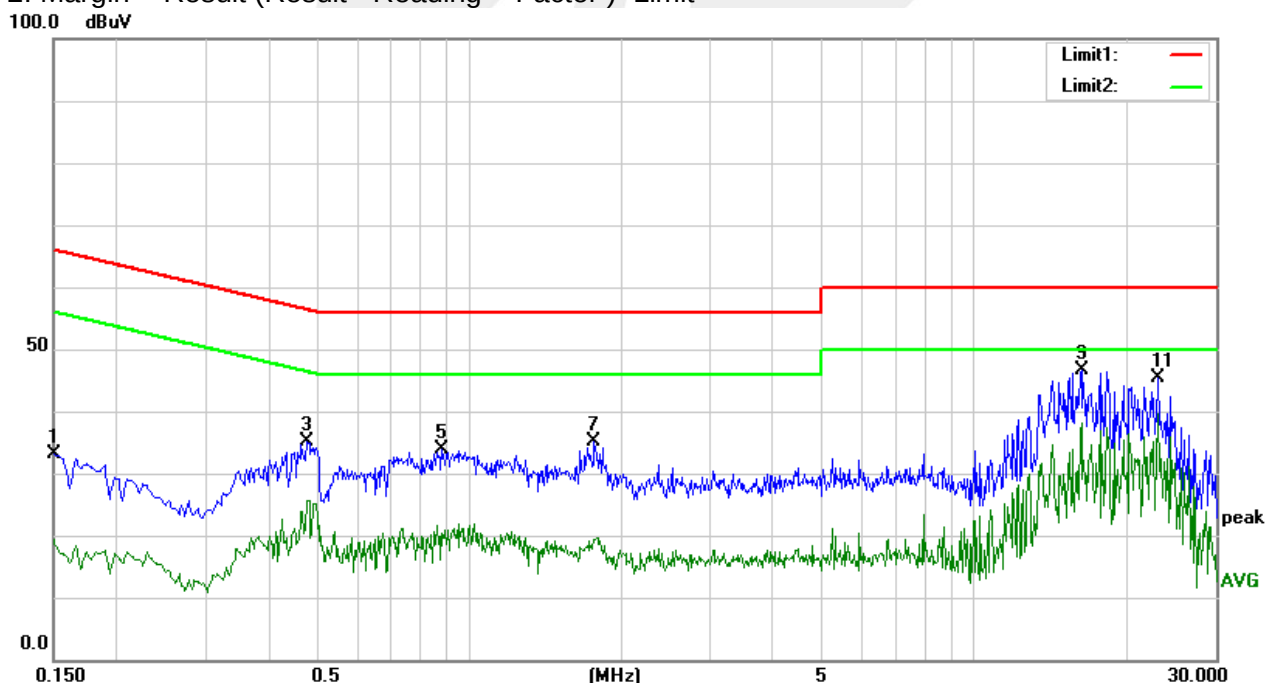


Temperature:	25 °C	Relative Humidity:	61%
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 12 (Part 15B)		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1500	23.38	9.75	33.13	66.00	-32.87	QP
0.1500	9.55	9.75	19.30	56.00	-36.70	AVG
0.4780	25.21	10.00	35.21	56.37	-21.16	QP
0.4780	15.59	10.00	25.59	46.37	-20.78	AVG
0.8820	24.00	9.83	33.83	56.00	-22.17	QP
0.8860	9.84	9.83	19.67	46.00	-26.33	AVG
1.7700	25.39	9.85	35.24	56.00	-20.76	QP
1.7700	9.55	9.85	19.40	46.00	-26.60	AVG
16.2260	36.34	10.17	46.51	60.00	-13.49	QP
16.2260	27.90	10.17	38.07	50.00	-11.93	AVG
23.1300	35.07	10.35	45.42	60.00	-14.58	QP
23.1300	29.34	10.35	39.69	50.00	-10.31	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) – Limit





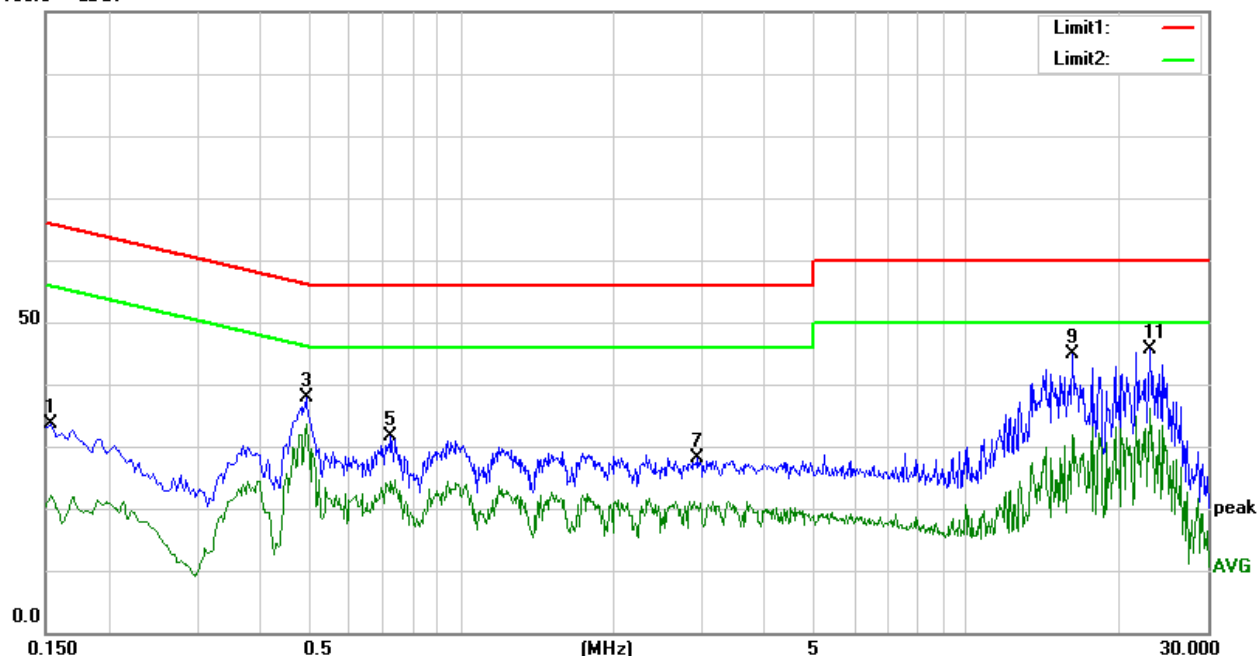
Temperature:	25 °C	Relative Humidity:	61%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 12 (Part 15B)		

Frequency (MHz)	Reading (dBUV)	Correct Factor(dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Remark
0.1540	23.78	9.79	33.57	65.78	-32.21	QP
0.1540	12.42	9.79	22.21	55.78	-33.57	AVG
0.4940	27.90	10.03	37.93	56.10	-18.17	QP
0.4940	23.55	10.03	33.58	46.10	-12.52	AVG
0.7260	21.88	9.84	31.72	56.00	-24.28	QP
0.7300	13.79	9.83	23.62	46.00	-22.38	AVG
2.9340	18.32	9.81	28.13	56.00	-27.87	QP
2.9340	10.55	9.81	20.36	46.00	-25.64	AVG
16.1660	34.53	10.28	44.81	60.00	-15.19	QP
16.1660	21.60	10.28	31.88	50.00	-18.12	AVG
23.1260	35.36	10.27	45.63	60.00	-14.37	QP
23.1260	25.93	10.27	36.20	50.00	-13.80	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) – Limit

100.0 dBUV





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

Frequencies (MHz)	Class A (at 10m) dBuV/m	Class B (at 3m) dBuV/m
30~88	39.0	40.0
88~216	43.5	43.5
216~960	46.5	46.0
Above 960	49.5	54.0

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Note:

- 1) The tighter limit applies at the band edges.
- 2) Emission level (dBuV/m)=20log Emission level (uV/m).

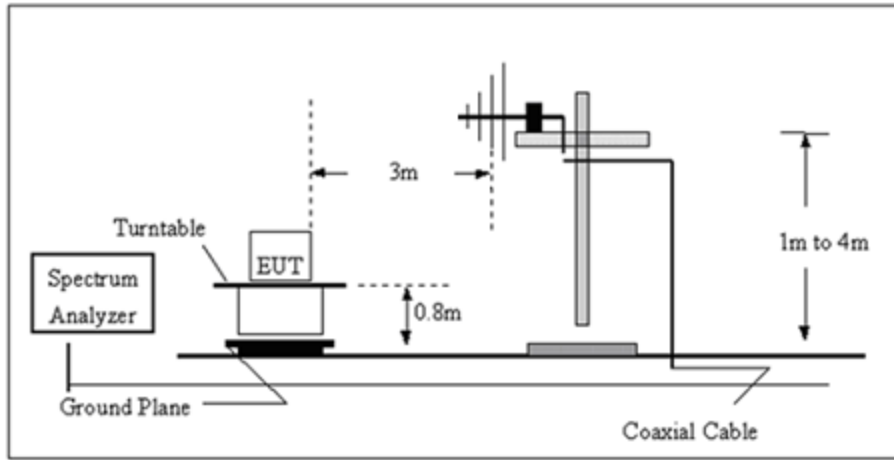
3.2.2 TEST PROCEDURE

- a) The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c) The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 0.8 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f) For the actual test configuration, please refer to the related Item –EUT Test Photos.

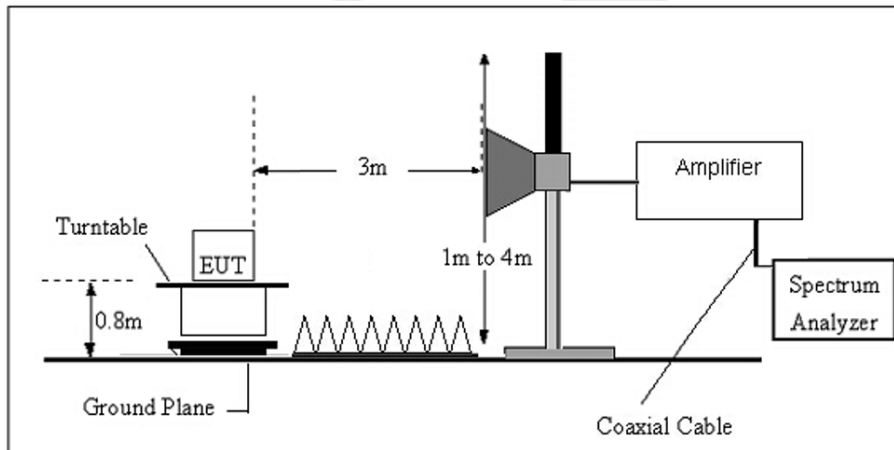
Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 TEST SETUP

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



b) Radiated Emission Test-Up Frequency Above 1GHz



3.2.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



3.2.5 TEST RESULTS

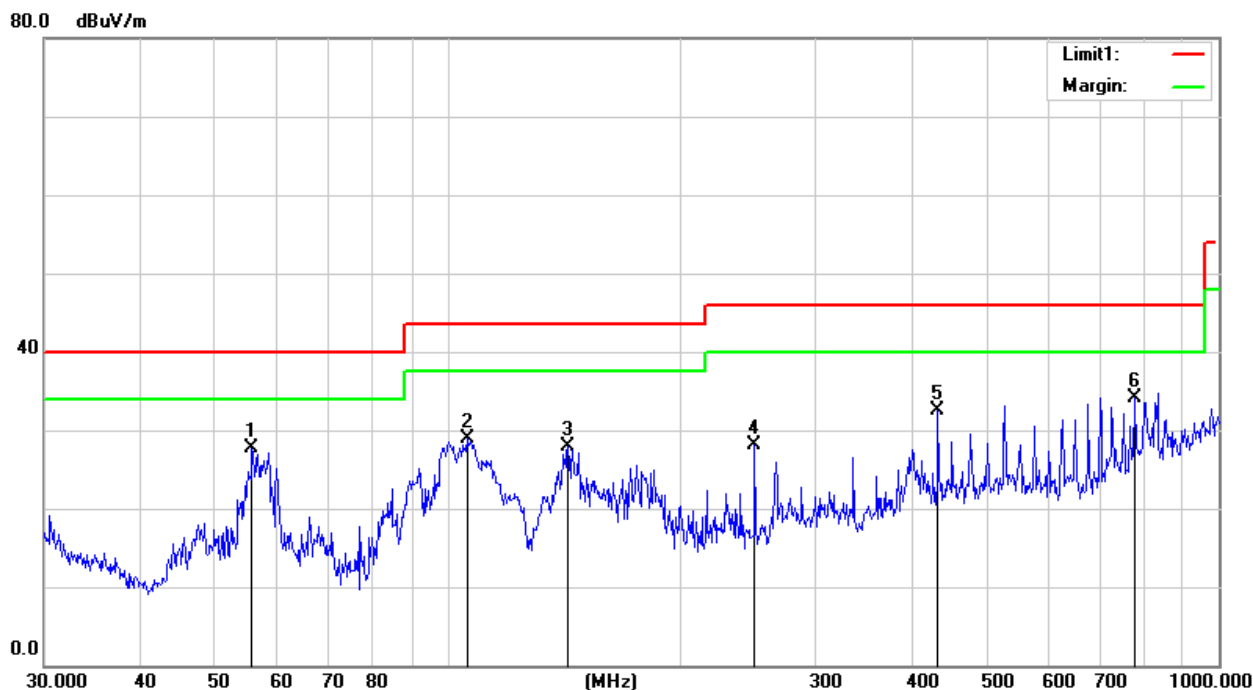
Between 30-1000MHz:

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 11 (part 15B)

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	55.8047	50.78	-23.13	27.65	40.00	-12.35	QP
2	106.0126	47.67	-18.68	28.99	43.50	-14.51	QP
3	143.3261	45.66	-17.67	27.99	43.50	-15.51	QP
4	250.3012	44.33	-16.29	28.04	46.00	-17.96	QP
5	432.5457	43.44	-10.89	32.55	46.00	-13.45	QP
6	776.8778	37.29	-3.18	34.11	46.00	-11.89	QP

Remark:

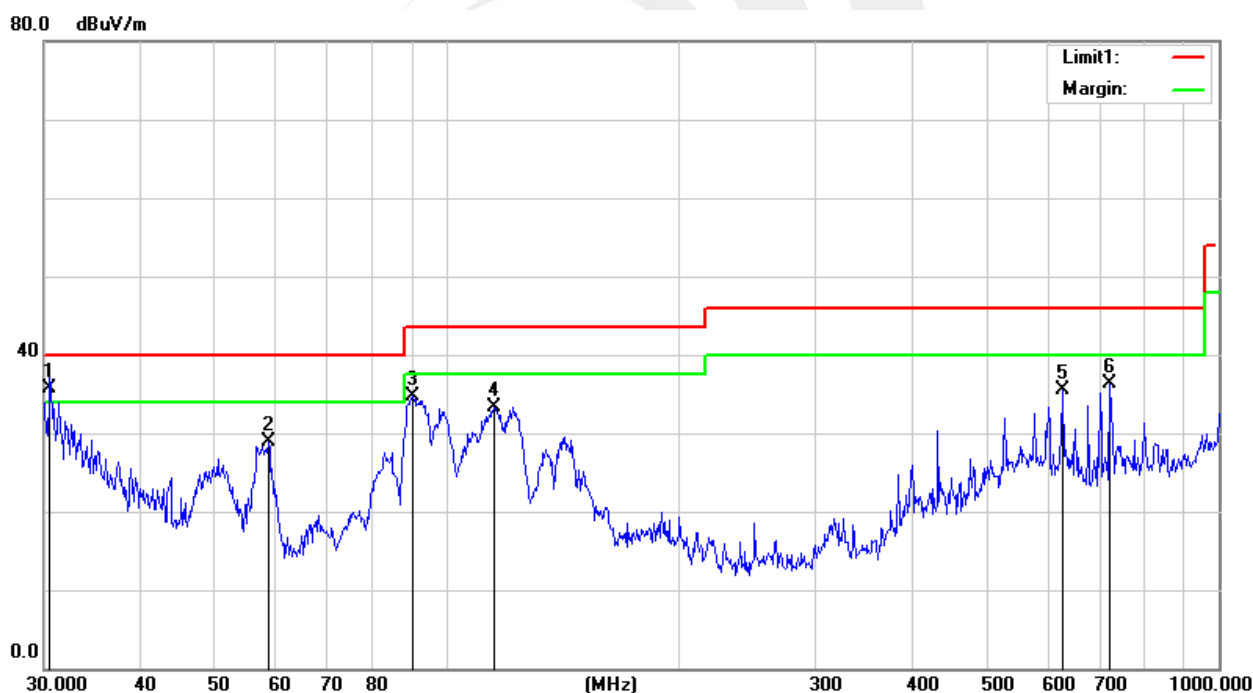
1. All readings are Quasi-Peak .
2. Margin = Result (Result =Reading + Factor)-Limit





Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 11 (part 15B)

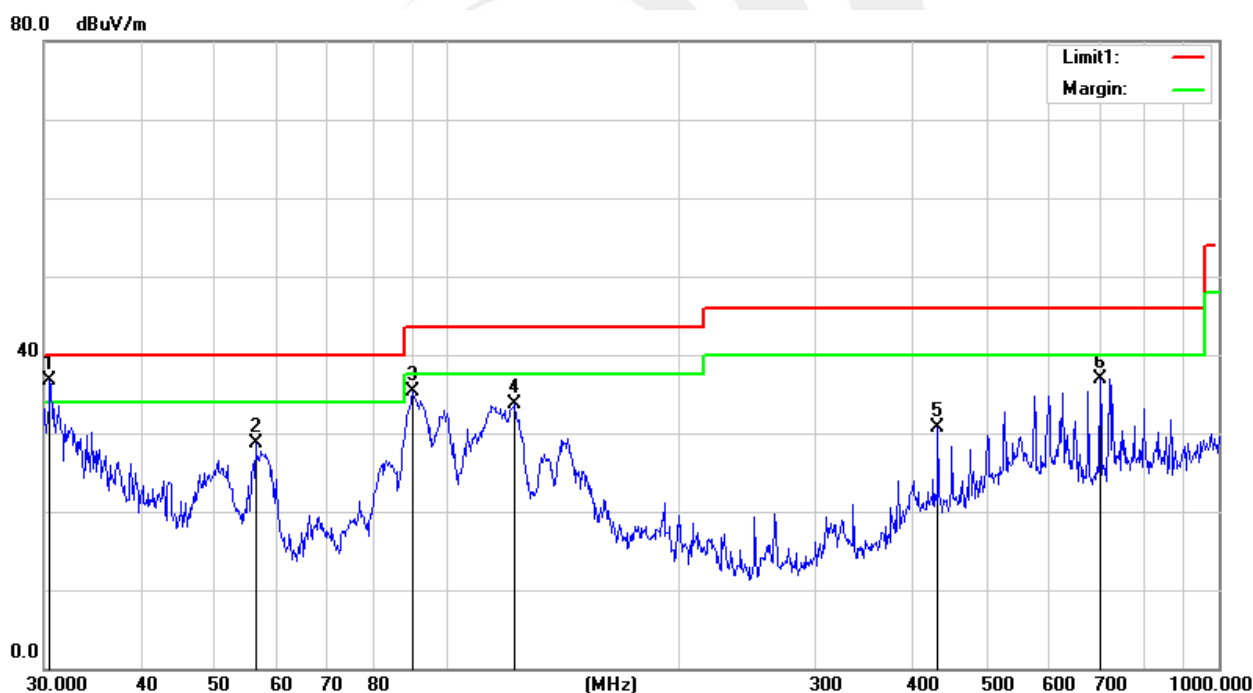
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.5306	47.12	-11.47	35.65	40.00	-4.35	QP
2	58.6126	52.90	-23.94	28.96	40.00	-11.04	QP
3	90.2205	54.83	-20.18	34.65	43.50	-8.85	QP
4	114.9170	51.30	-18.02	33.28	43.50	-10.22	QP
5	627.2738	41.87	-6.42	35.45	46.00	-10.55	QP
6	721.7260	40.87	-4.54	36.33	46.00	-9.67	QP

Remark:**1. All readings are Quasi-Peak .****2. Margin = Result (Result =Reading + Factor)-Limit**



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 12 (part 15B)

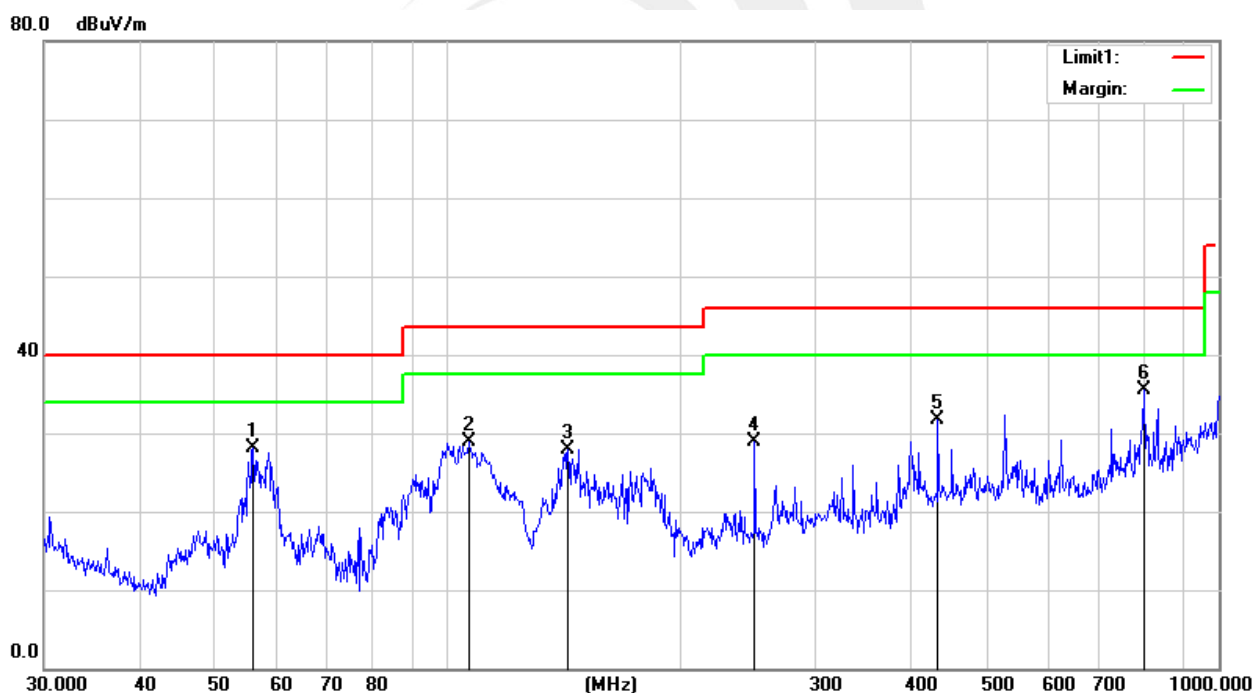
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.5306	48.15	-11.47	36.68	40.00	-3.32	QP
2	56.3948	52.03	-23.30	28.73	40.00	-11.27	QP
3	90.2205	55.42	-20.18	35.24	43.50	-8.26	QP
4	122.4040	51.41	-17.66	33.75	43.50	-9.75	QP
5	432.5457	41.68	-10.89	30.79	46.00	-15.21	QP
6	701.7610	42.25	-5.29	36.96	46.00	-9.04	QP

Remark:**1. All readings are Quasi-Peak .****2. Margin = Result (Result =Reading + Factor)-Limit**



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 12 (part 15B)

No.	Frequency (MHz)	Reading (dBUV)	Factor (dB)	Results (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	56.0007	51.21	-23.19	28.02	40.00	-11.98	QP
2	106.7587	47.53	-18.61	28.92	43.50	-14.58	QP
3	143.3261	45.60	-17.67	27.93	43.50	-15.57	QP
4	250.3012	45.24	-16.29	28.95	46.00	-17.05	QP
5	432.5457	42.69	-10.89	31.80	46.00	-14.20	QP
6	798.9797	38.97	-3.45	35.52	46.00	-10.48	QP

Remark:**1. All readings are Quasi-Peak .****2. Margin = Result (Result =Reading + Factor)-Limit**



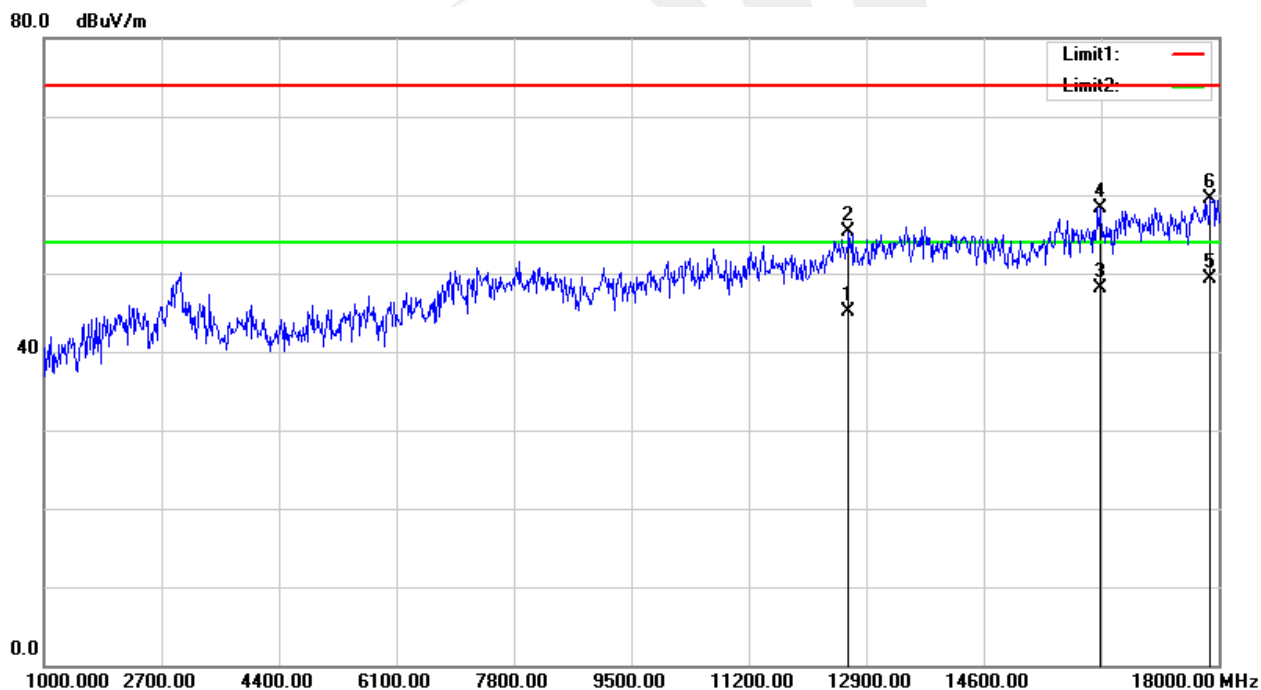
Between 1GHz-18GHz:

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 11 (part 15B)

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	12645.000	41.25	3.77	45.02	54.00	-8.98	AVG
2	12645.000	51.50	3.77	55.27	74.00	-18.73	peak
3	16283.000	43.17	4.86	48.03	54.00	-5.97	AVG
4	16283.000	53.42	4.86	58.28	74.00	-15.72	peak
5	17881.000	41.54	7.77	49.31	54.00	-4.69	AVG
6	17881.000	51.81	7.77	59.58	74.00	-14.42	peak

Remark:

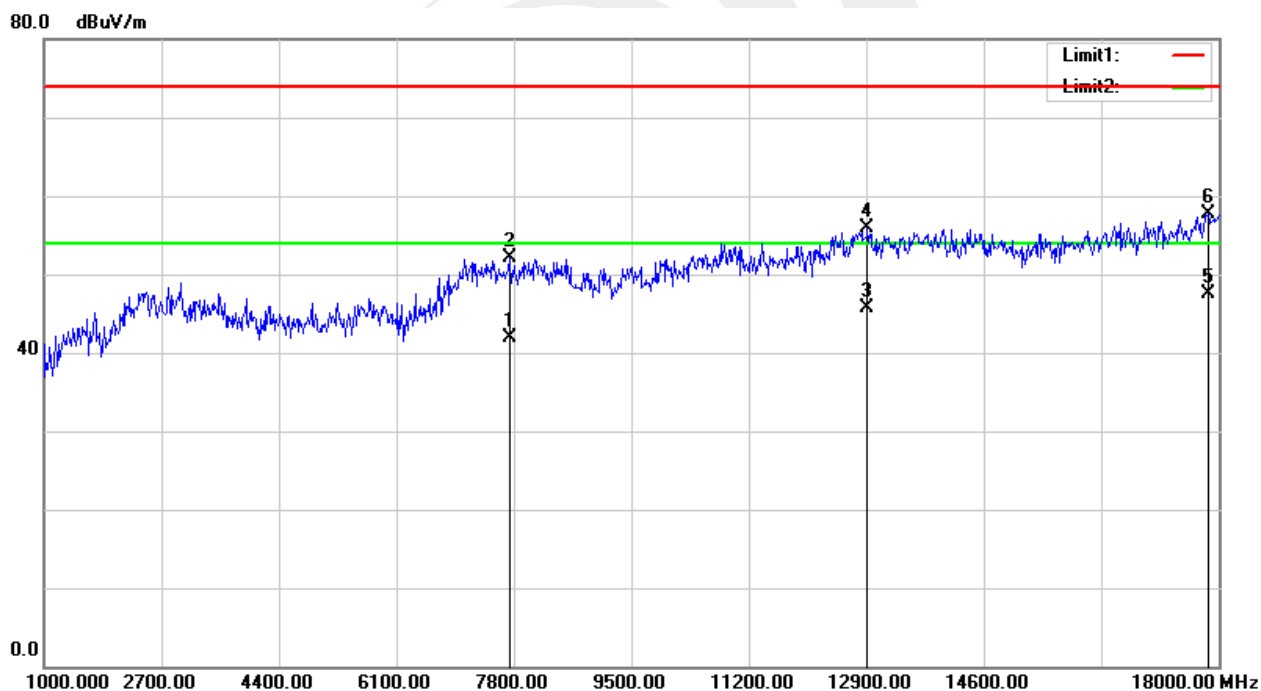
1. Margin = Result (Result = Reading + Factor) - Limit





Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 11 (part 15B)

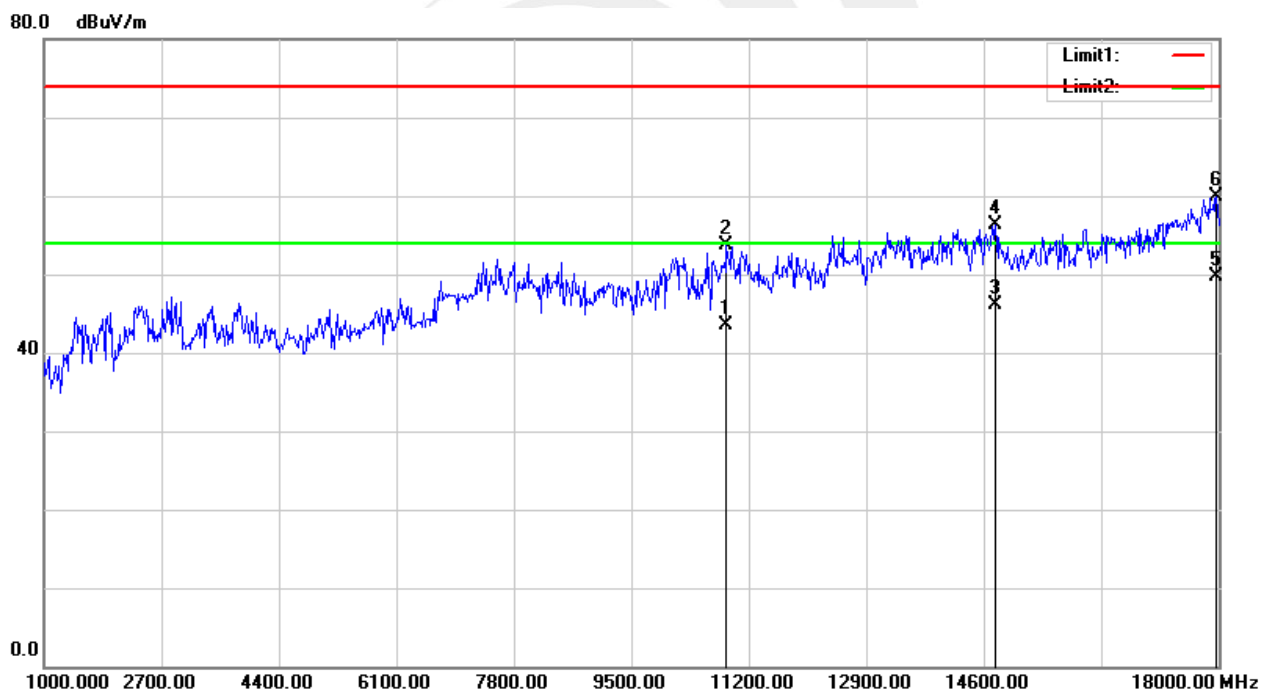
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	7732.000	42.94	-1.05	41.89	54.00	-12.11	AVG
2	7732.000	53.13	-1.05	52.08	74.00	-21.92	peak
3	12917.000	42.15	3.58	45.73	54.00	-8.27	AVG
4	12917.000	52.38	3.58	55.96	74.00	-18.04	peak
5	17847.000	39.84	7.67	47.51	54.00	-6.49	AVG
6	17847.000	50.10	7.67	57.77	74.00	-16.23	peak

Remark:**1. Margin = Result (Result = Reading + Factor) - Limit**



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 12 (part 15B)

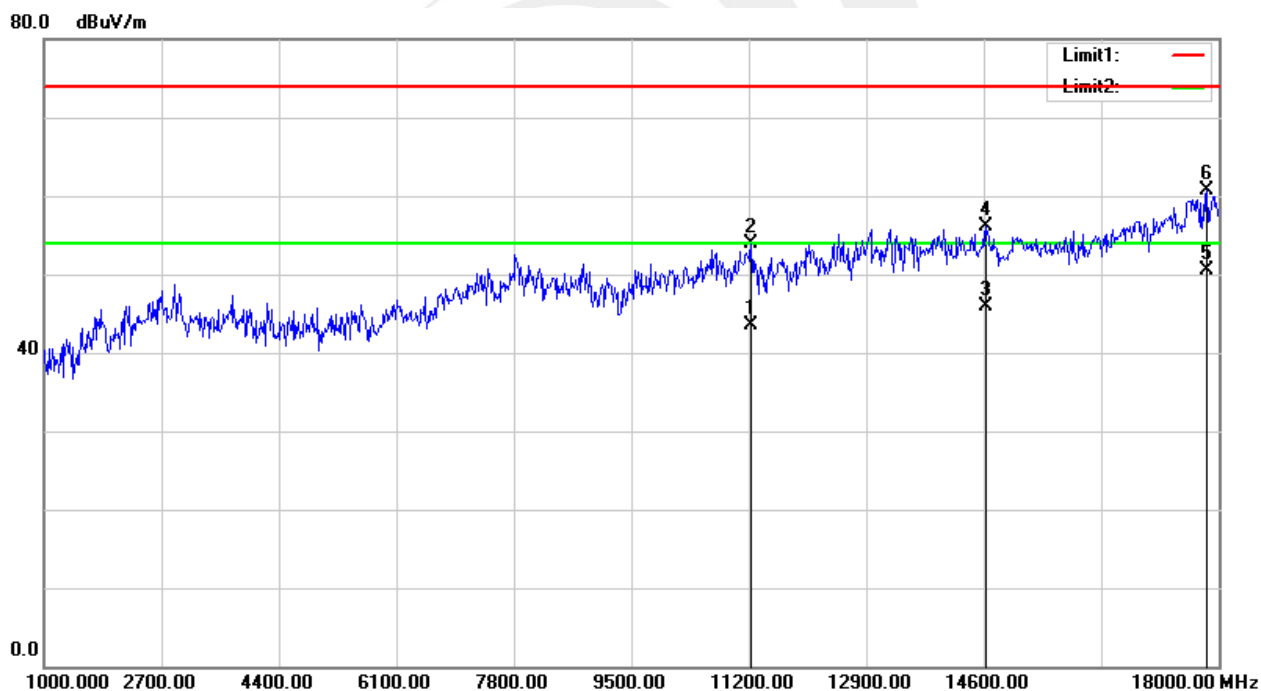
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10877.000	41.38	2.13	43.51	54.00	-10.49	AVG
2	10877.000	51.63	2.13	53.76	74.00	-20.24	peak
3	14770.000	42.20	3.81	46.01	54.00	-7.99	AVG
4	14770.000	52.43	3.81	56.24	74.00	-17.76	peak
5	17966.000	41.59	8.02	49.61	54.00	-4.39	AVG
6	17966.000	51.83	8.02	59.85	74.00	-14.15	peak

Remark:**1. Margin = Result (Result = Reading + Factor) – Limit**



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 12 (part 15B)

No.	Frequency (MHz)	Reading (dBUV)	Factor (dB)	Results (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	11234.000	41.28	2.23	43.51	54.00	-10.49	AVG
2	11234.000	51.59	2.23	53.82	74.00	-20.18	peak
3	14634.000	41.44	4.45	45.89	54.00	-8.11	AVG
4	14634.000	51.57	4.45	56.02	74.00	-17.98	peak
5	17830.000	42.80	7.61	50.41	54.00	-3.59	AVG
6	17830.000	53.07	7.61	60.68	74.00	-13.32	peak

Remark:**1. Margin = Result (Result = Reading + Factor) – Limit**



3.3 RADIATED SPURIOUS EMISSION MEASUREMENT

3.3.1 RADIATED EMISSION LIMITS

in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

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

LIMITS OF RADIATED EMISSION MEASUREMENT (1000MHz-25GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz /3MHz

For Band edge

Spectrum Parameter	Setting
Detector	Peak/AV
Start/Stop Frequency	Lower Band Edge: 2300 to 2422 MHz Upper Band Edge: 2452 to 2500 MHz
RB / VB (emission in restricted band)	1 MHz /3MHz



Receiver Parameter	Setting
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.3.2 TEST PROCEDURE

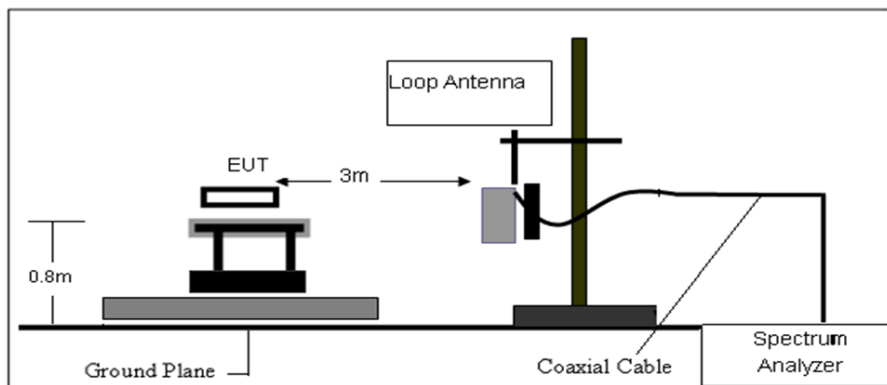
- The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarizations of the antenna are set to make the measurement
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

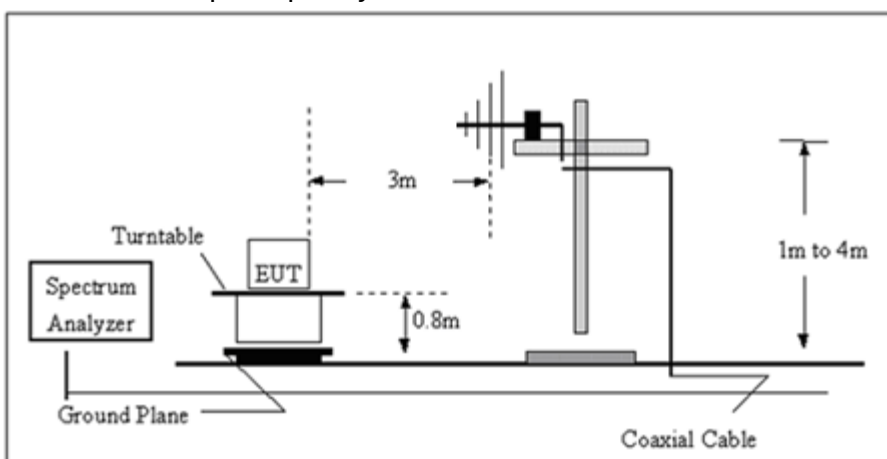
Both horizontal and vertical antenna polarities were tested and performed test to three orthogonal axis. The worst case emissions were reported

3.3.3 TEST SETUP

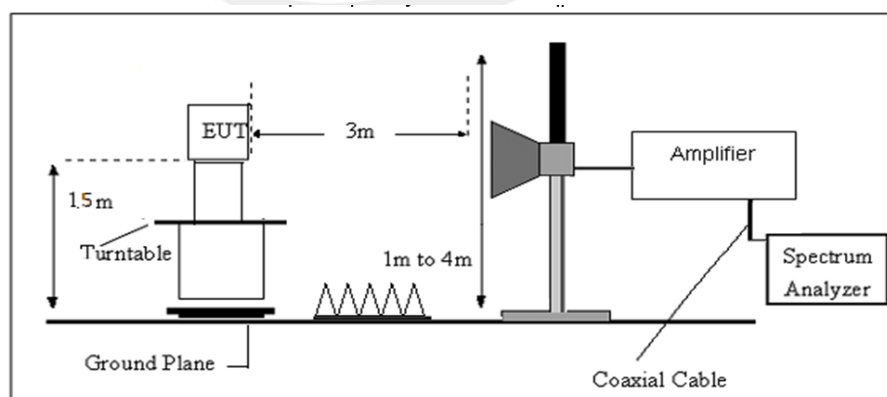
a) Radiated Emission Test-Up Frequency Below 30MHz



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



c) Radiated Emission Test-Up Frequency Above 1GHz



3.3.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



3.3.5 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)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

$$\text{Factor} = \text{AF} + \text{CL} - \text{AG}$$

3.3.6 TEST RESULT

9KHz-30MHz

Temperature:	25 °C	Relative Humidity:	61%
Test Voltage :	AC 120V/60Hz	Polarization :	--
Test Mode :	TX Mode		

Freq.	Reading	Limit	Margin	State	Test Result
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	P/F	
--	--	--	--	--	PASS
--	--	--	--	--	PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dB μ v) + distance extrapolation factor.



(30MHz - 1000MHz)

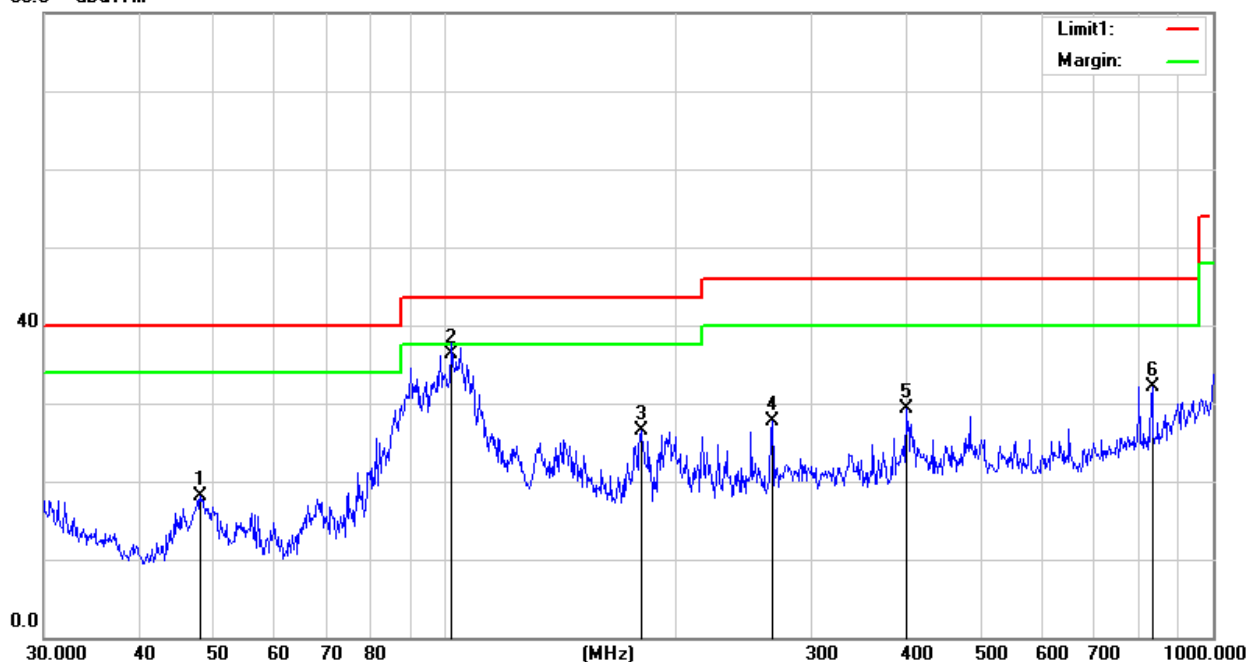
Temperature:	25.7 °C	Relative Humidity:	63%
Test Voltage :	AC 120V/60Hz	Polarization :	Horizontal
Test Mode :	Mode 1/2/3/4/5/6/7/8/9(Mode 2-1Mbps worst mode)		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
47.9940	38.55	-20.45	18.10	40.00	-21.90	QP
102.0014	55.32	-19.02	36.30	43.50	-7.20	QP
180.0165	45.87	-19.44	26.43	43.50	-17.07	QP
266.6090	42.96	-15.33	27.63	46.00	-18.37	QP
399.0302	40.58	-11.28	29.30	46.00	-16.70	QP
833.3171	35.21	-3.01	32.20	46.00	-13.80	QP

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit

80.0 dBuV/m





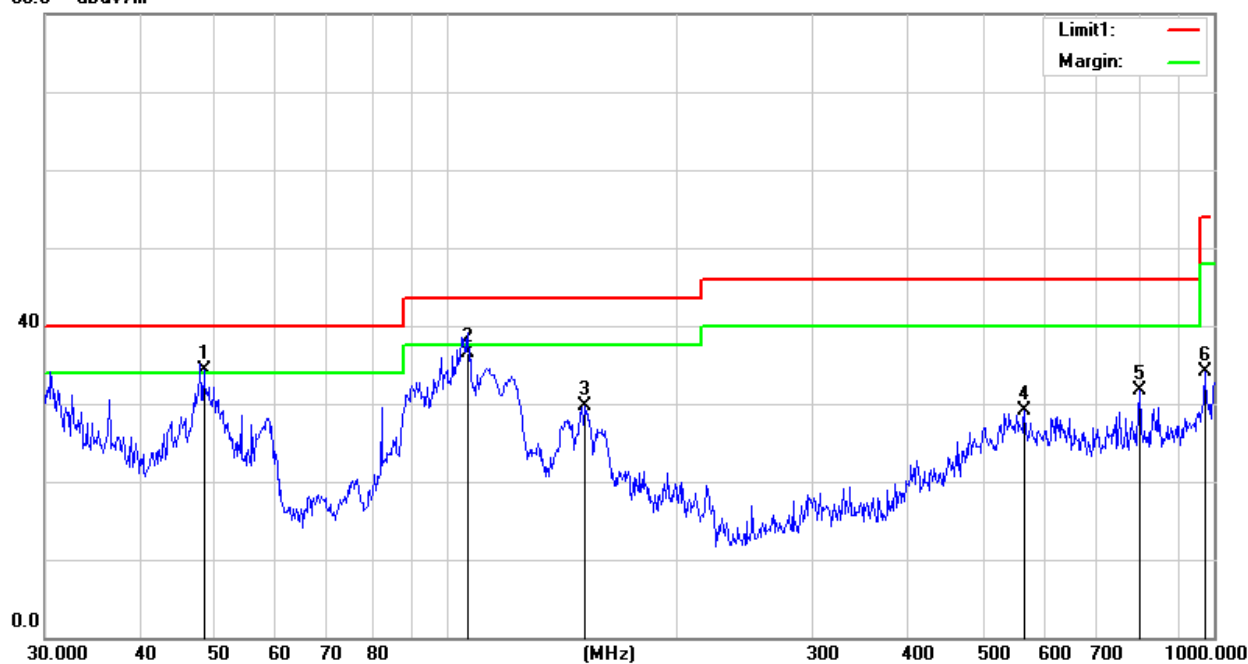
Temperature:	25.7 °C	Relative Humidity:	63%
Test Voltage :	AC 120V/60Hz	Polarization :	Vertical
Test Mode :	Mode 1/2/3/4/5/6/7/8/9 (Mode 2-1Mbps worst mode)		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
48.3318	54.90	-20.62	34.28	40.00	-5.72	QP
106.7187	55.04	-18.61	36.43	43.50	-7.07	QP
151.5972	47.77	-18.05	29.72	43.50	-13.78	QP
566.6223	35.71	-6.61	29.10	46.00	-16.90	QP
801.7863	35.22	-3.49	31.73	46.00	-14.27	QP
972.3374	34.23	-0.14	34.09	54.00	-19.91	QP

Remark:.

1. Margin = Result (Result =Reading + Factor)-Limit

80.0 dBuV/m





(1000MHz-25GHz) Restricted band and Spurious emission Requirements

802.11b Low Channel

Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	ANT	Verdict
3264.68	-9.80	39.15	74.00	-34.85	Peak	Vertical	Pass
3264.68	-9.80	29.78	54.00	-24.22	Average	Vertical	Pass
3264.84	-9.80	38.83	74.00	-35.17	Peak	Horizontal	Pass
3264.84	-9.80	28.68	54.00	-25.32	Average	Horizontal	Pass
4824.37	-3.56	55.07	74.00	-18.93	Peak	Vertical	Pass
4824.37	-3.56	35.81	54.00	-18.19	Average	Vertical	Pass
4824.57	-3.56	54.94	74.00	-19.06	Peak	Horizontal	Pass
4824.57	-3.56	34.95	54.00	-19.05	Average	Horizontal	Pass
5359.72	-2.34	43.46	74.00	-30.54	Peak	Vertical	Pass
5359.72	-2.34	35.53	54.00	-18.47	Average	Vertical	Pass
5359.58	-2.34	43.49	74.00	-30.51	Peak	Horizontal	Pass
5359.58	-2.34	35.88	54.00	-18.12	Average	Horizontal	Pass
7235.76	3.40	54.36	74.00	-19.64	Peak	Vertical	Pass
7235.76	3.40	37.01	54.00	-16.99	Average	Vertical	Pass
7235.72	3.40	54.26	74.00	-19.74	Peak	Horizontal	Pass
7235.85	3.40	34.95	54.00	-19.05	Average	Horizontal	Pass

**802.11b Mid Channel**

Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	ANT	Verdict
3264.72	-9.80	38.34	74.00	-35.66	Peak	Vertical	Pass
3264.72	-9.80	29.34	54.00	-24.66	Average	Vertical	Pass
3264.69	-9.80	38.72	74.00	-35.28	Peak	Horizontal	Pass
3264.69	-9.80	29.35	54.00	-24.65	Average	Horizontal	Pass
4874.39	-3.56	55.25	74.00	-18.75	Peak	Vertical	Pass
4874.39	-3.56	35.44	54.00	-18.56	Average	Vertical	Pass
4874.53	-3.56	54.73	74.00	-19.27	Peak	Horizontal	Pass
4874.53	-3.56	34.87	54.00	-19.13	Average	Horizontal	Pass
5359.61	-2.34	43.07	74.00	-30.93	Peak	Vertical	Pass
5359.61	-2.34	34.84	54.00	-19.16	Average	Vertical	Pass
5359.81	-2.34	44.02	74.00	-29.98	Peak	Horizontal	Pass
5359.81	-2.34	35.45	54.00	-18.55	Average	Horizontal	Pass
7310.75	3.40	55.17	74.00	-18.83	Peak	Vertical	Pass
7310.75	3.40	36.00	54.00	-18.00	Average	Vertical	Pass
7310.88	3.40	54.47	74.00	-19.53	Peak	Horizontal	Pass
7310.88	3.40	36.56	54.00	-17.44	Average	Horizontal	Pass