TEST REPORT

Applicant:	CC LAB-La Boite concept
Address of Applicant:	41 rue Sedaine 75011 Paris FRANCE
Manufacturer:	CC LAB-La Boite concept
Address of Manufacturer:	41 rue Sedaine 75011 Paris FRANCE
Product name:	2.1 Active speaker
Model:	CUBE
Rating(s):	100-240V~, 50-60Hz, 200W
Trademark:	LA BOITE
Standards:	FCC Part 15.247 :2013
FCC ID:	2AC8ECUBE
Date of Receipt:	2015-03-27
Date of Test:	2015-03-27~2015-06-08
Date of Issue:	2015-06-10
Test Result	**Pass***

* In the configuration tested, the test item complied with the standards specified above.

Authorized for issue by:

Test by:	Jumy qiu		***Reviewed by:***	Pauler Li	
Jun.10.2015	Jumy Qiu Project Engineer		Jun.10.2015	Pauler Li Project Manager	
Date	*Name/Position*	*Signature*	*Date*	*Name/Position*	*Signature*

Possible test case verdicts:	
test case does not apply to the test object ..:	N/A
test object does meet the requirement .....:	P (Pass)
test object does not meet the requirement ..:	F (Fail)

Testing Laboratory information:	
Testing Laboratory Name ..... :	I-Test Laboratory
Address:	1-2 floor, South Block, Building A2 , No 3 Keyan Lu, Science City, Guangzhou, Guangdong Province, P.R. China
Testing location :	Same as above
Tel :	0086-20-32209330
Fax :	0086-20-62824387
E-mail :	itl@i-testlab.com

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report would be invalid test report without all the signatures of testing technician and approver.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

General product information:

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1 Test Summary

Test	Test Requirement	Test method	Result
Radiated Spurious Emission (9 kHz to 1 GHz)	FCC PART 15 C section 15.247(d);	ANSI C63.10:2009 Clause 6.4, 6.5 and 6.6 & DA 00-705	PASS
Conducted Emissions at Mains Terminals	FCC PART 15 C section 15.207;	ANSI C63.10:2009 Clause 6.2 & DA 00-705	PASS
Remark:			
N/A: not applicable. Refer to the relative section for the details. EUT: In this whole report EUT means Equipment Under Test. Tx: In this whole report Tx (or tx) means Transmitter. Rx: In this whole report Rx (or rx) means Receiver. RF: In this whole report RF means Radio Frequency. ANSI C63.10: the detail version is ANSI C63.10:2009 in the whole report. DA 00-705: “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems”			

2 Contents

3 General Information

3.1 Client Information

Applicant:	CC LAB-La Boite concept
Address of Applicant:	41 rue Sedaine 75011 Paris FRANCE

3.2 General Description of E.U.T.

Name:	2.1 Active speaker
Model No.:	CUBE
Trade Mark:	LA BOITE
Operating Frequency:	2402 MHz to 2480 MHz for Bluetooth.
Channels:	79 channels with 1MHz step for Bluetooth
Bluetooth Version:	3.0
Modulation Technique:	Frequency Hopping Spread Spectrum (FHSS)
Type of Modulation	GFSK, (π/4) DQPSK, 8DPSK for Bluetooth
Dwell time	Per channel is less than 0.4s.
Antenna Type	PCB Antenna
Antenna gain:	0dBi max
Function:	Bluetooth speaker

3.3 Details of E.U.T.

EUT Power Supply:	AC for power supply
Test mode:	The program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel lowest (2402MHz), middle (2441MHz) and highest (2480MHz) are chosen for Bluetooth full testing. Normal mode: the Bluetooth has been tested on the Modulation of GFSK; EDR mode: the Bluetooth has been tested on the Modulation of (π/4)DQPSK and 8DPSK, compliance test and record the worst case on (π/4)DQPSK and 8DPSK
Power cord:	1.5m*2 AC power cord

3.4 Description of Support Units

The EUT has been tested as an independent unit for fixed frequency by testing lab.

3.5 Test Location

All tests were performed at:

I-Test Laboratory

1-2 floor, South Block, Building A2 , No 3 Keyan Lu, Science City, Guangzhou, Guangdong Province, P.R. China

0086-20-32209330

itl@i-testlab.com

No tests were sub-contracted.

3.6 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

3.7 Abnormalities from Standard Conditions

None.

3.8 Other Information Requested by the Customer

None.

3.9 Test Facility

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

- **CNAS(Lab code:L4957)**
- **FCC (Registration No.:935596)**
- **IC (Registration NO.:8368A)**

3.10 Measurement Uncertainty

The below measurement uncertainties given below are based on a 95% confidence level (base on a coverage factor (k=2).)

Parameter	Uncertainty
Radio frequency	$\pm 1.06 \times 10^{-7}$
total RF power, conducted	1.37 dB
RF power density , conducted	2.89 dB
All emissions, radiated	±3.35 dB
Temperature	±0.23 °C
Humidity	±0.3 %
DC and low frequency voltages	±0.3 %

4 Instruments Used during Test

No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
ITL-114	Spectrum Analyzer	Agilent	N9010A	MY51250936	2015/01/19	2016/01/19
ITL-116	Pre Amplifier	HP	8447F	3113A05905	2015/01/19	2016/01/19
ITL-117	Wideband Amplifier Super Ultra	Mini-circuits	ZVA-183-S+	469101134	2015/01/19	2016/01/19
ITL-105	Biconilog Antenna	ETS•Lindgren	3142D	00108096	2015/01/24	2018/01/24
ITL-110	Horn Antenna	A-INFOMW	JXTXLB-10180-N	J2031090612133	2015/01/24	2018/01/24
ITL-102	EMI Test receiver	R&S	ESCI	100910	2014/06/17	2015/06/17
ITL-103	Two-line v-network	R&S	ENV216	100120	2014/06/17	2015/06/17
ITL-115	50Ω Coaxial Cable	Mini-circuits	CBL	C001	2014/09/07	2015/09/07
ITL-100	Semi-Anechoic chamber	ETS•Lindgren	FACT3 2.0	CT09015	2013/06/17	2016/06/17
ITL-145	Loop Antenna	ZHINAN	ZN30900A	002489	2015/01/19	2016/01/19
ITL-146	Horn Antenna	Schwarzbeck	BBHA 9170	B09806543	2015/06/08	2016/06/08
ITL-101	Shielded Room	ETS•Lindgren	8*4*3	CT09010	2015/03/09	2018/03/09

5 Test Results

5.1 E.U.T. test conditions

Test Voltage: Input: AC 120V, 60 Hz

Temperature: 20.0 -25.0 °C

Humidity: 38-50 % RH

Atmospheric Pressure: 1000 -1010 mbar

Test frequencies and frequency range: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which	Number of	Location in frequency range
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Frequency range of radiated emission measurements

Lowest frequency generated	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz,
At or above 10 GHz to below	5th harmonic of highest fundamental frequency or to 100 GHz,
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz,

EUT channels and frequencies list for bluetooth:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	11	2413	22	2424
1	2403	12	2414	23	2425
2	2404	13	2415	24	2426
3	2405	14	2416	25	2427
4	2406	15	2417	26	2428
5	2407	16	2418	27	2429
6	2408	17	2419	28	2430
7	2409	18	2420	29	2431
8	2410	19	2421	30	2432
9	2411	20	2422	31	2433
10	2412	21	2423	32	2434
33	2435	49	2451	65	2467
34	2436	50	2452	66	2468
35	2437	51	2453	67	2469
36	2438	52	2454	68	2470
37	2439	53	2455	69	2471
38	2440	54	2456	70	2472
39	2441	55	2457	71	2473
40	2442	56	2458	72	2474
41	2443	57	2459	73	2475
42	2444	58	2460	74	2476
43	2445	59	2461	75	2477
44	2446	60	2462	76	2478
45	2447	61	2463	77	2479
46	2448	62	2464	78	2480
47	2449	63	2465		
48	2450	64	2466		

Test frequencies are the lowest channel: 0 channel (2402 MHz), middle channel: 39 channel (2441MHz) and highest channel: 78 channel (2480 MHz)

5.2 Antenna requirement

Standard requirement

15.203 requirement:

For intentional device. According to 15.203. an intentional radiator shall be designed to Ensure that no antenna other than that furnished by the responsible party shall be used with the device.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna

The antenna is a PCB antenna and no consideration of replacement. The best case gain of the antenna is 0dBi.

Test result: The unit does meet the FCC requirements.

5.3 Radiated Spurious Emissions

Test Requirement: FCC Part15 C section 15.247

(d) In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that Contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, and provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Method: ANSI C63.10:2009 Clause 6.4, 6.5 and 6.6 & DA 00-705

Test Status: Pre-test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data packet. Compliance test in continuous transmitting mode with normal mode (DH5) as the worst case was found.

Detector: For PK value:

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz, 9kHz for <30MHz

VBW ≥ RBW

Sweep= auto

Detector function = peak

Trace = max hold

For AV value:

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz, 9kHz for <30MHz

VBW =10 Hz

Sweep = auto

Detector function = peak

Trace = max hold

15.209 Limit: 40.0 dBµV/m between 30MHz & 88MHz

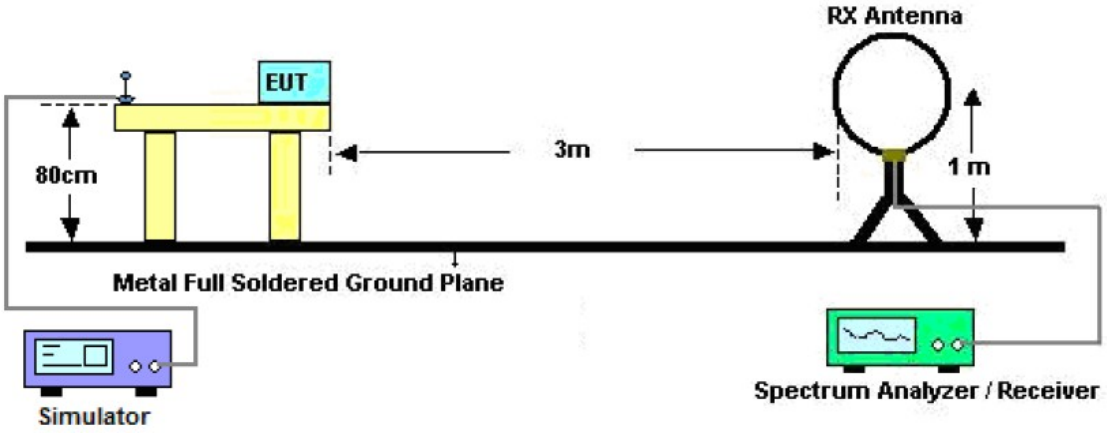
43.5 dBµV/m between 88MHz & 216MHz

46.0 dBµV/m between 216MHz & 960MHz

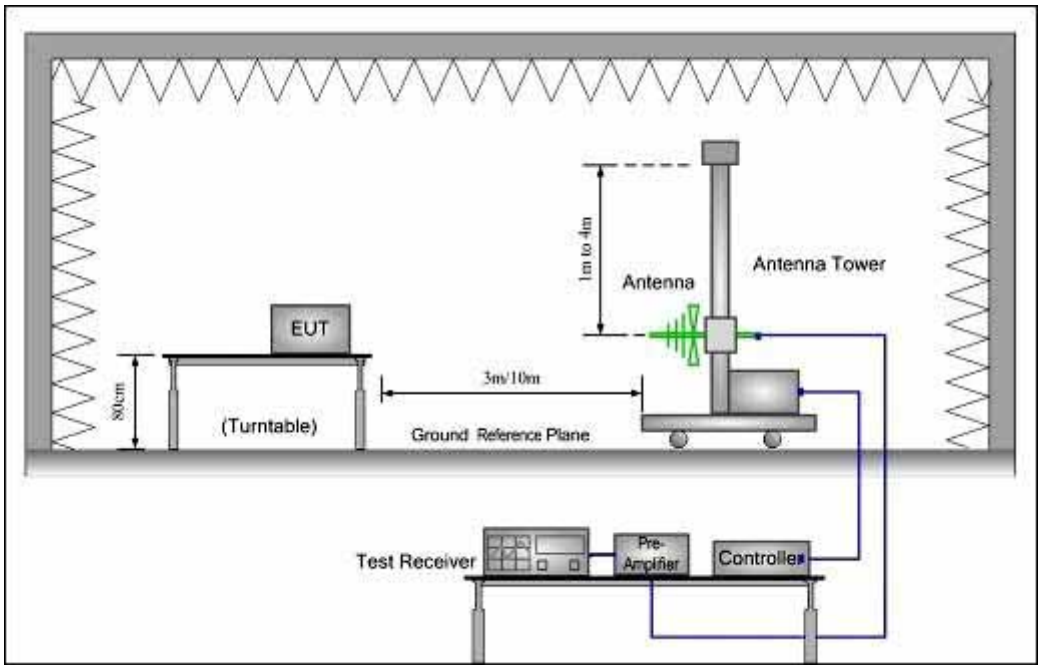
54.0 dBµV/m above 960MHz

Test Configuration:

1) 9kHz to 30MHz emissions:



2) 30 MHz to 1 GHz emissions:



Test Procedure: The procedure used was ANSI Standard C63.4:2003. The receiver was scanned from 30MHz to 25GHz.When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. After pre-test, it was found that the worse radiation emission was get at the X position. So the data shown was the X position only. The worst case emissions were reported.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log (dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

5.3.1 Harmonic and other spurious emissions

Test at low Channel in transmitting status

9kHz~30MHz Test result

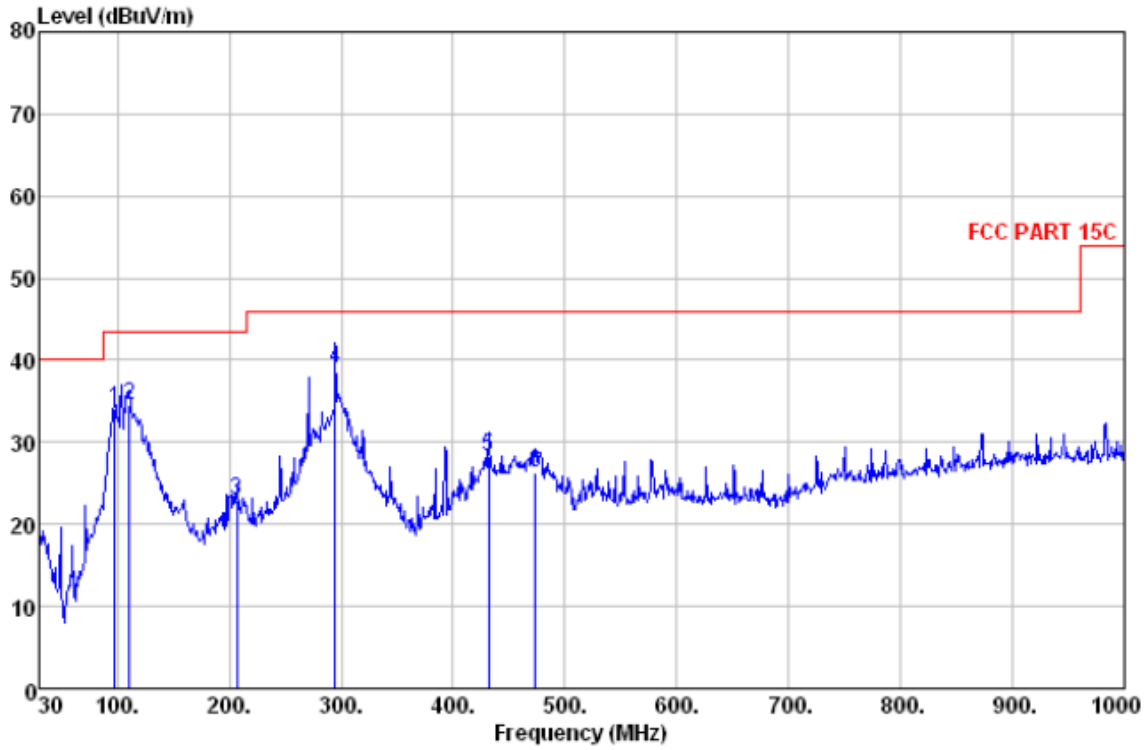
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	34.00	QP	8.58	1.16	43.50	-9.50	100	23
2	110.510	34.43	QP	8.47	1.24	43.50	-9.07	100	86
3	206.540	22.86	QP	9.13	1.73	43.50	-20.64	100	53
4	294.810	39.08	QP	13.68	2.10	46.00	-6.92	200	142
5	431.580	28.24	QP	16.60	2.57	46.00	-17.76	200	236
6	473.290	26.22	QP	18.00	2.70	46.00	-19.78	200	321

Level=Read Level + Antenna Factor + Cable Loss

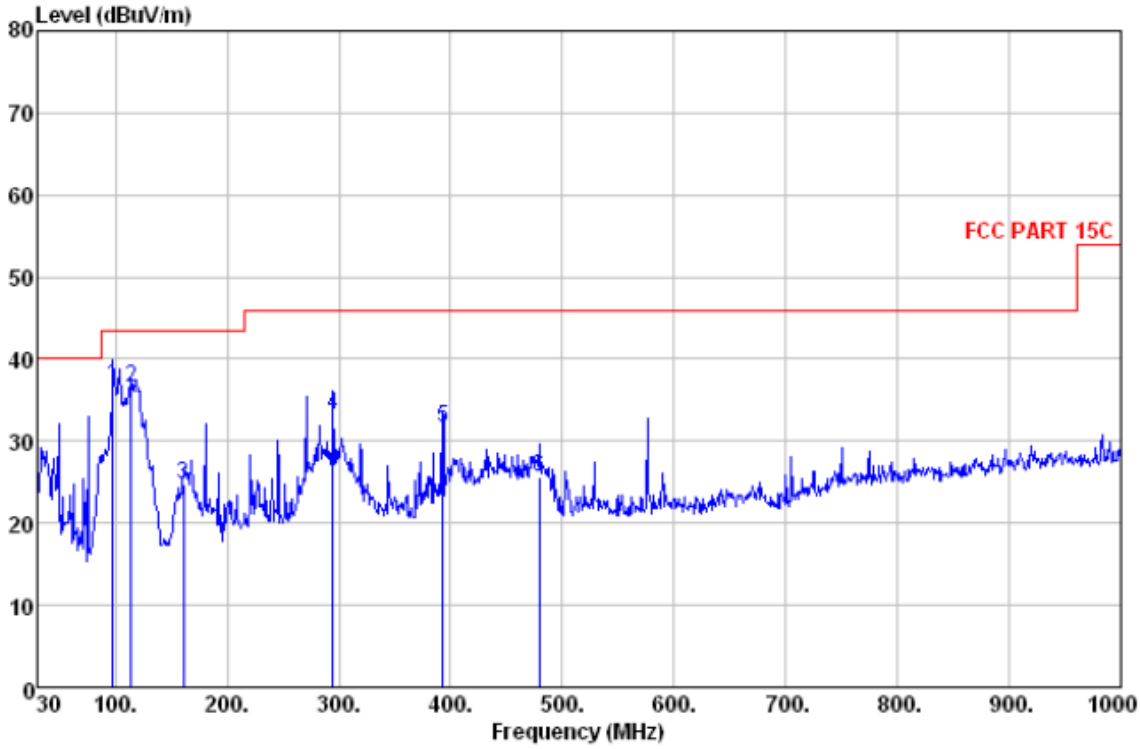
Test at low Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	36.80	QP	8.58	1.16	43.50	-6.70	100	232
2	114.390	36.64	QP	8.24	1.26	43.50	-6.86	100	95
3	160.950	24.70	QP	7.74	1.51	43.50	-18.80	100	87
4	294.810	33.15	QP	13.68	2.10	46.00	-12.85	200	35
5	392.780	31.55	QP	15.71	2.42	46.00	-14.45	200	23
6	479.110	25.68	QP	18.00	2.72	46.00	-20.32	200	14

Level=Read Level + Antenna Factor + Cable Loss

Test at Middle Channel in transmitting status

9kHz~30MHz Test result

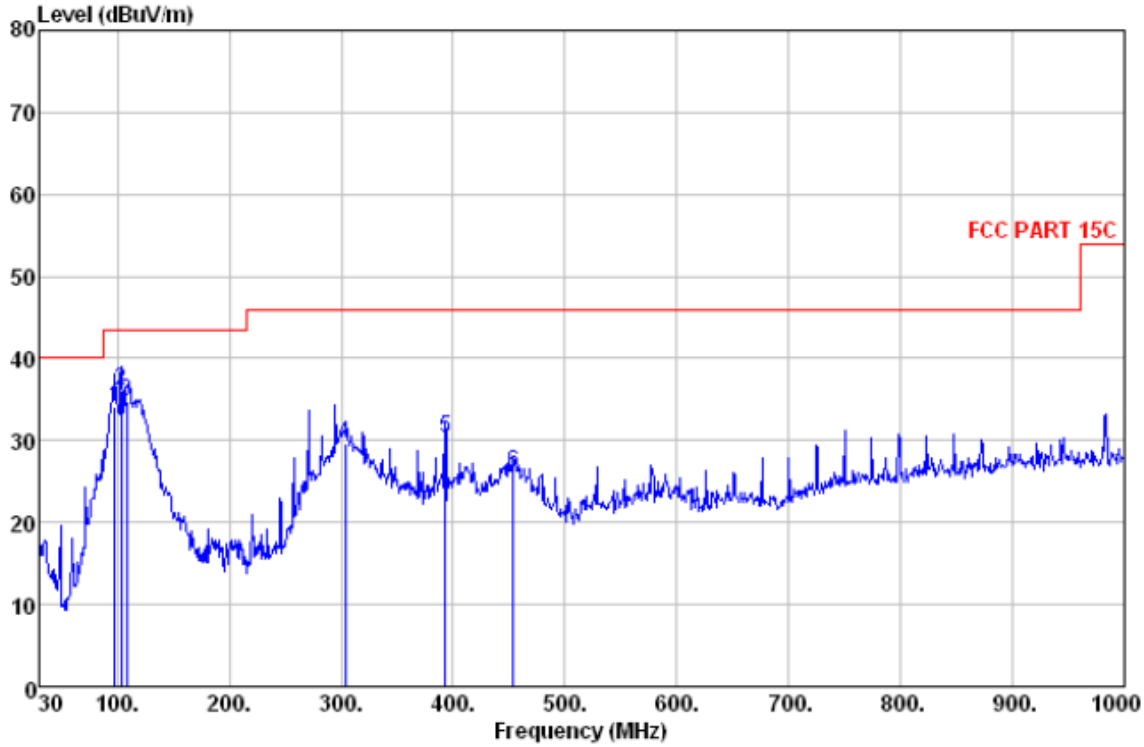
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	34.17	QP	8.58	1.16	43.50	-9.33	100	13
2	103.720	36.09	QP	8.55	1.19	43.50	-7.41	100	213
3	108.570	34.82	QP	8.50	1.22	43.50	-8.68	100	25
4	303.540	29.69	QP	13.73	2.14	46.00	-16.31	200	32
5	392.780	30.23	QP	15.71	2.42	46.00	-15.77	200	86
6	453.890	25.99	QP	17.00	2.64	46.00	-20.01	200	72

Level=Read Level + Antenna Factor + Cable Loss

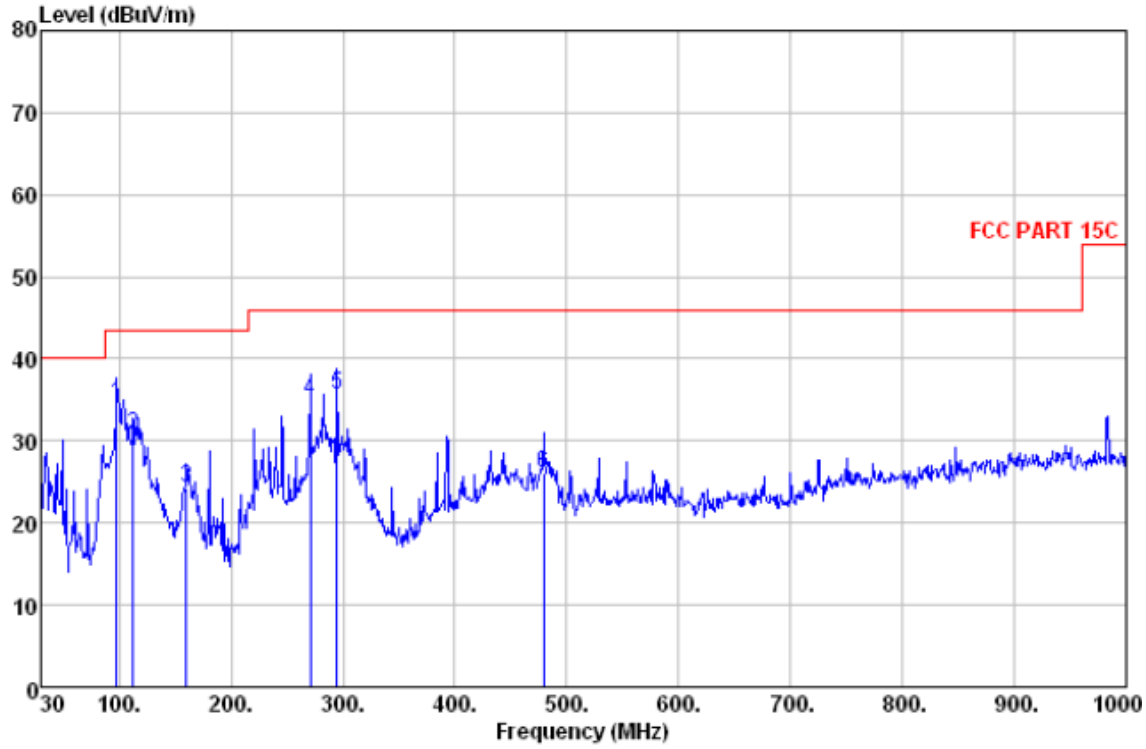
Test at Middle Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	34.63	QP	8.58	1.16	43.50	-8.87	100	23
2	112.450	30.85	QP	8.35	1.25	43.50	-12.65	100	58
3	159.980	24.26	QP	7.80	1.51	43.50	-19.24	100	86
4	270.560	35.10	QP	12.95	2.01	46.00	-10.90	200	36
5	294.810	35.71	QP	13.68	2.10	46.00	-10.29	200	30
6	479.110	26.05	QP	18.00	2.72	46.00	-19.95	200	124

Level=Read Level + Antenna Factor + Cable Loss

Test at high Channel in transmitting status

9kHz~30MHz Test result

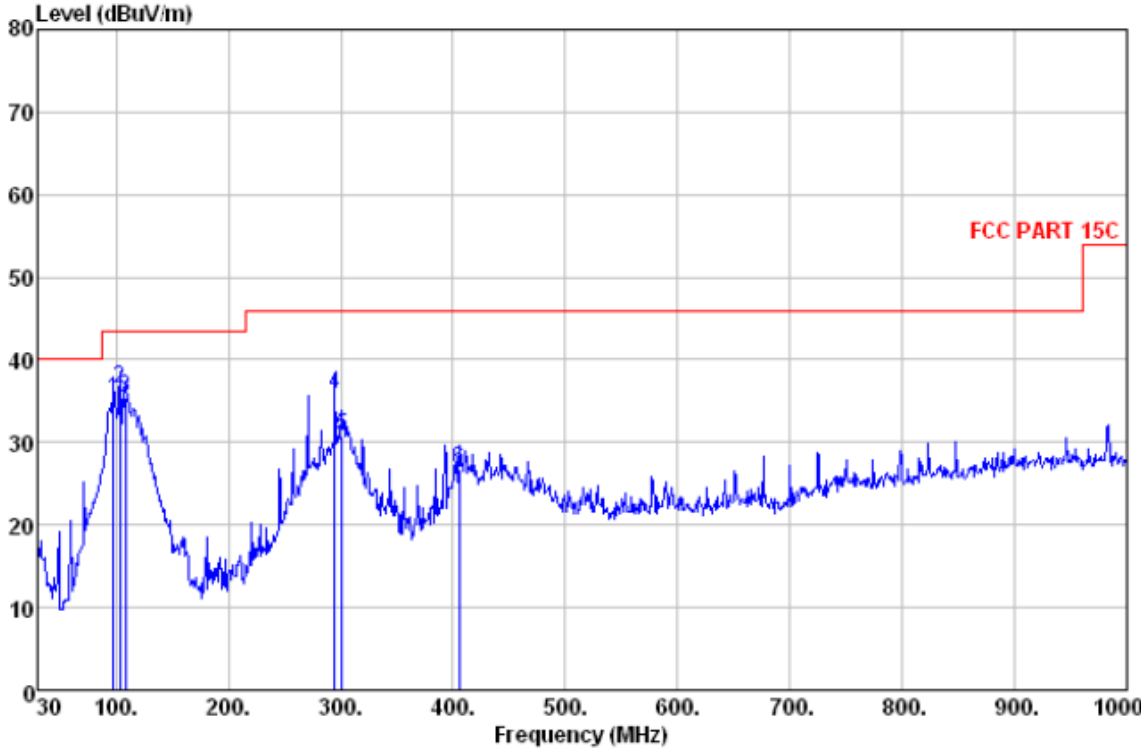
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	35.12	QP	8.58	1.16	43.50	-8.38	100	23
2	103.720	36.57	QP	8.55	1.19	43.50	-6.93	100	98
3	108.570	35.34	QP	8.50	1.22	43.50	-8.16	100	63
4	294.810	35.93	QP	13.68	2.10	46.00	-10.07	200	35
5	301.600	30.82	QP	13.77	2.13	46.00	-15.18	200	351
6	405.390	26.71	QP	16.05	2.47	46.00	-19.29	200	135

Level=Read Level + Antenna Factor + Cable Loss

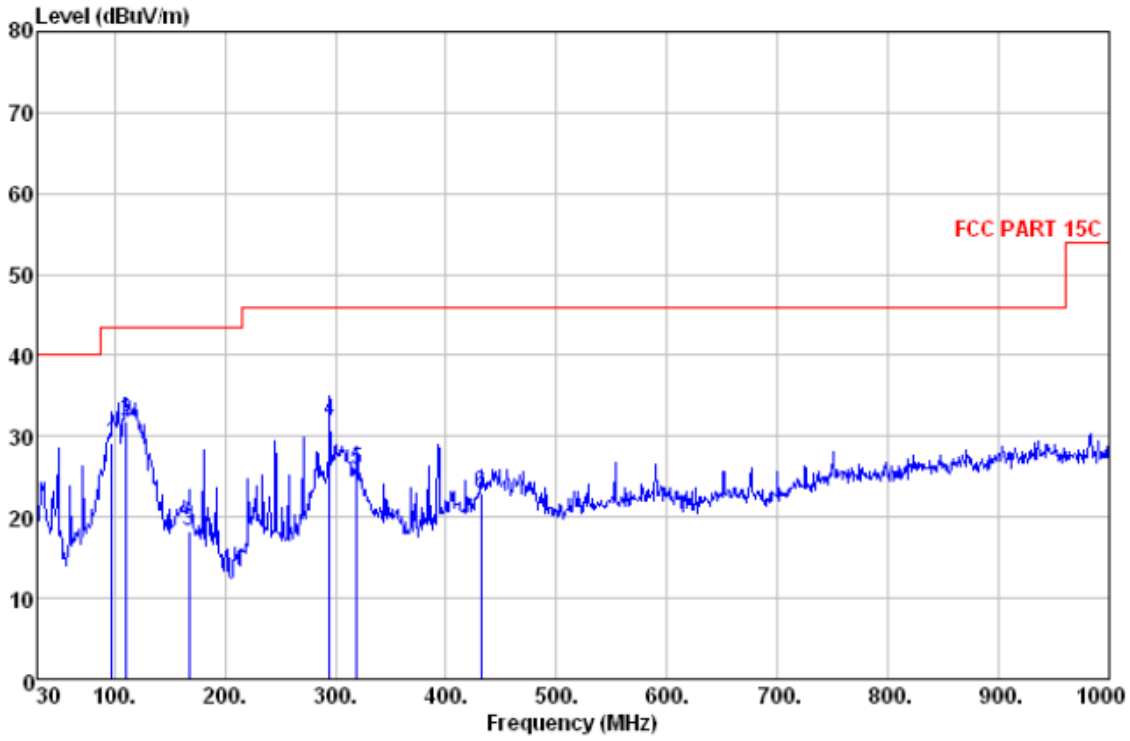
Test at High Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	29.08	QP	8.58	1.16	43.50	-14.42	100	23
2	110.510	31.86	QP	8.47	1.24	43.50	-11.64	100	26
3	167.740	18.29	QP	8.00	1.55	43.50	-25.21	100	63
4	294.810	31.89	QP	13.68	2.10	46.00	-14.11	200	123
5	319.060	25.80	QP	13.96	2.19	46.00	-20.20	200	138
6	431.580	22.93	QP	16.60	2.57	46.00	-23.07	200	344

Level=Read Level + Antenna Factor + Cable Loss

5.4 Conducted Emissions at Mains Terminals 150 kHz to 30 MHz

Test Requirement: FCC Part 15 C section 15.207

Test Method: ANSI C63.10:2009 Clause 6.2 & DA 00-705

Frequency Range: 150 kHz to 30 MHz

Detector: Peak for pre-scan (9 kHz Resolution Bandwidth)

Test Limit

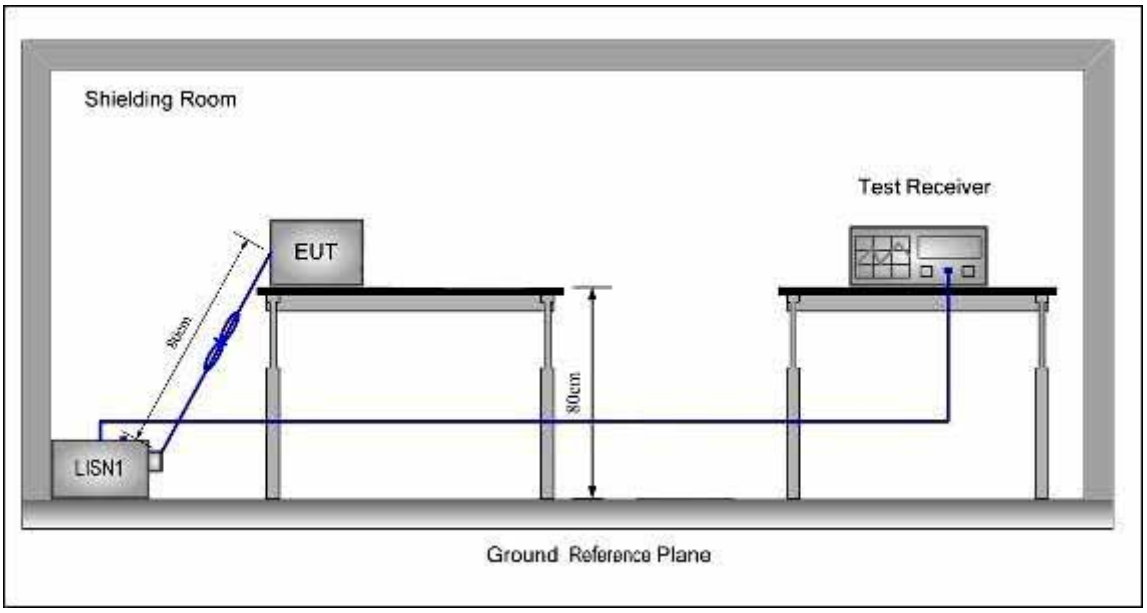
Limits for conducted disturbance at the mains ports of class B

Frequency Range	Class B Limit dB(µV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
NOTE 1 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

EUT Operation:

Test in normal operating mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Test Configuration:



Test procedure:

1. The mains terminal disturbance voltage test was conducted in a shielded room.

2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

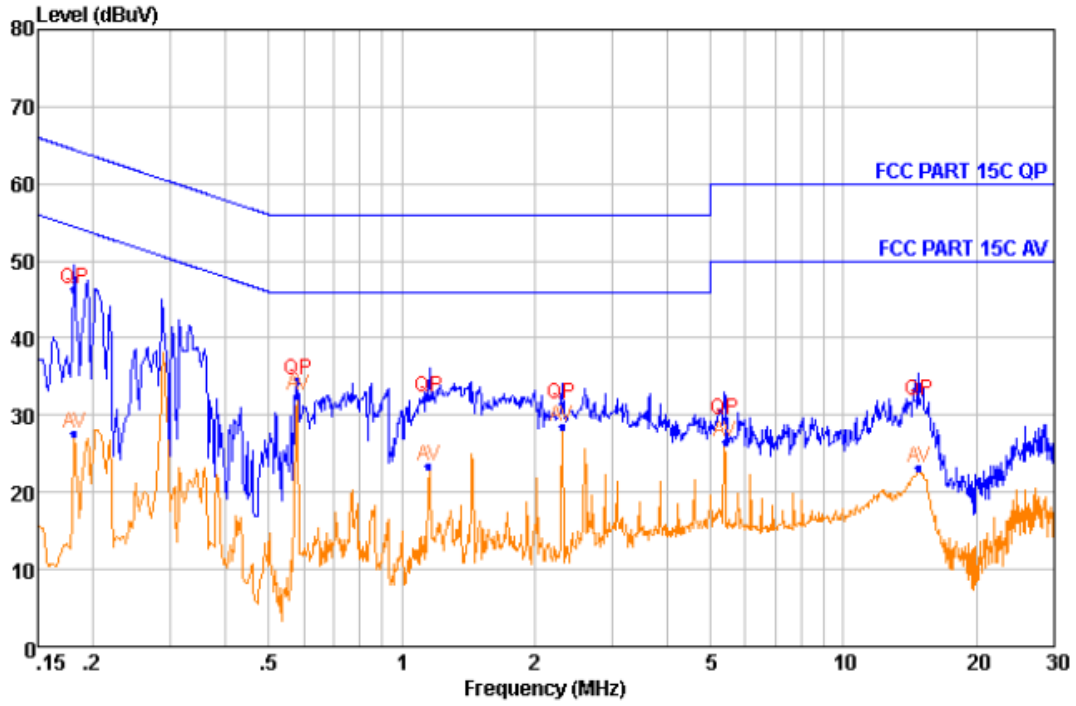
5.4.1 Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected. For EUT the communicating was worst case mode.

The following Quasi-Peak and Average measurements were performed on the EUT
Live line

Peak Scan:

Level (dBμV)



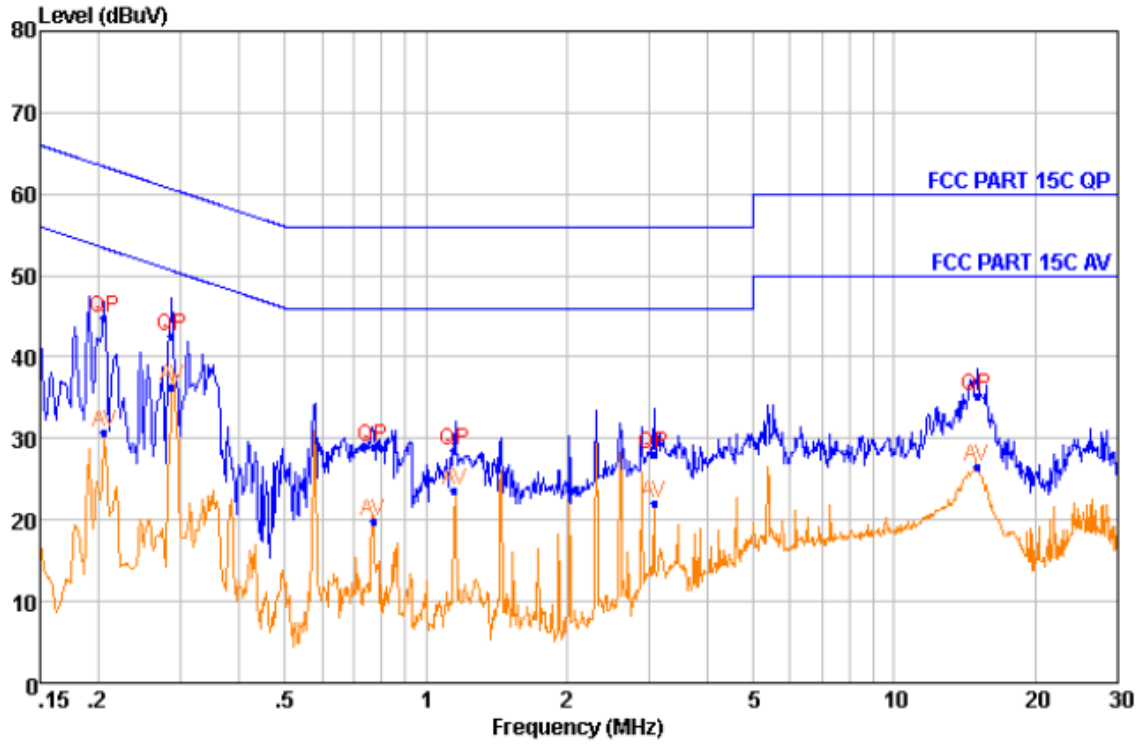
Quasi-peak and Average measurement

NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Over Limit dB
1	0.182	46.38	QP	9.49	0.40	64.42	-18.04
2	0.182	27.57	Average	9.49	0.40	54.42	-26.85
3	0.582	34.59	QP	9.30	0.44	56.00	-21.41
4	0.582	32.59	Average	9.30	0.44	46.00	-13.41
5	1.151	32.37	QP	9.28	0.47	56.00	-23.63
6	1.151	23.32	Average	9.28	0.47	46.00	-22.68
7	2.303	31.41	QP	9.32	0.50	56.00	-24.59
8	2.303	28.50	Average	9.32	0.50	46.00	-17.50
9	5.390	29.47	QP	9.29	0.53	60.00	-30.53
10	5.390	26.47	Average	9.29	0.53	50.00	-23.53
11	14.804	31.97	QP	9.36	0.57	60.00	-28.03
12	14.804	23.23	Average	9.36	0.57	50.00	-26.77

Neutral Line

Peak Scan:

Level (dBµV)



Quasi-peak and Average measurement

NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Over Limit dB
1	0.206	44.70	QP	9.37	0.40	63.36	-18.66
2	0.206	30.70	Average	9.37	0.40	53.36	-22.66
3	0.286	42.57	QP	9.37	0.42	60.63	-18.06
4	0.286	36.42	Average	9.37	0.42	50.63	-14.21
5	0.771	28.89	QP	9.36	0.46	56.00	-27.11
6	0.771	19.89	Average	9.36	0.46	46.00	-26.11
7	1.151	28.51	QP	9.37	0.47	56.00	-27.49
8	1.151	23.71	Average	9.37	0.47	46.00	-22.29
9	3.068	27.99	QP	9.41	0.51	56.00	-28.01
10	3.068	22.12	Average	9.41	0.51	46.00	-23.88
11	15.031	35.20	QP	9.66	0.57	60.00	-24.80
12	15.031	26.52	Average	9.66	0.57	50.00	-23.48

--End of Report--