

FCC Test Report

Report No.: RF150116D04-1

FCC ID: P27DLC200SUS

Test Model: DLC-200SUS

Series Model: DLC-200Sxxx (where "x" is blank, number or any characters)

Received Date: Jan. 16, 2015

Test Date: Jan. 26 ~ Mar. 17, 2015

Issued Date: Mar. 23, 2015

Applicant: Sercomm Corp.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Release Control Record

Issue No.	Description	Date Issued
RF150116D04-1	Original release.	Mar. 23, 2015



1 Certificate of Conformity

Product: Digital Life Controller

Brand: Sercomm

Test Model: DLC-200SUS

Series Model: DLC-200Sxxx (where "x" is blank, number or any characters)

Sample Status: Engineering sample

Applicant: Sercomm Corp.

Test Date: Jan. 26 ~ Mar. 17, 2015

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2009

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Celia Chen , **Date:** Mar. 23, 2015
Celia Chen / Senior Specialist

Approved by : Rex Lai , **Date:** Mar. 23, 2015
Rex Lai / Assistant Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -12.04dB at 0.20477MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.1dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is I-PEX.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.43 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	4.00 dB
Radiated Emissions above 1 GHz	1GHz ~ 40GHz	3.36 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Digital Life Controller
Brand	Sercomm
Test Model	DLC-200SUS
Series Model	DLC-200Sxxx (where "x" is blank, number or any characters)
Model Difference	Marketing Differentiation
Status of EUT	Engineering sample
Power Supply Rating	55Vdc or 56Vdc from PoE or 7.4Vdc from battery
Modulation Type	OQPSK
Transfer Rate	250Kbps/ 500Kbps/ 1Mbps/ 2Mbps
Operating Frequency	2405 ~ 2475MHz
Number of Channel	15
Output Power	39.628mW
Antenna Type	Dipole antenna with 3.27dBi gain
Antenna Connector	I-PEX
Accessory Device	Refer to note below
Data Cable Supplied	N/A

Note:

1. The EUT uses following PoE (support unit provided by client) or battery (accessory device).

Support unit		
PoE 1	Brand	Microsemi
	Model	PD-9001GR/AT/AC
	Input Power	100-240V, 50/60Hz, 0.67A
	Output Power	55V, 0.6A
PoE 2	Brand	PHIHONG
	Model	POE31U-1AT(SC)-R
	Input Power	100-240V, 0.8A, 50-60Hz
	Output Power	56V, 0.536A
Accessory device		
Battery	Brand	Simplo
	Model	DLC-200S
	Rating	7.4V, 8100mAh, 59.9Wh

After pre-tested above power source, the **PoE 2** was the worst case, therefore, only its test data was recorded in this report.

2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

15 channels are provided to this EUT:

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
11	2405MHz	19	2445MHz
12	2410MHz	20	2450MHz
13	2415MHz	21	2455MHz
14	2420MHz	22	2460MHz
15	2425MHz	23	2465MHz
16	2430MHz	24	2470MHz
17	2435MHz	25	2475MHz
18	2440MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE [≥] 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE[≥]1G: Radiated Emission above 1GHz & Bandedge Measurement
 RE<1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission
 APCM: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Above 1GHz):

- 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).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Kbps)
-	11 to 25	11, 18, 25	OQPSK	250

Radiated Emission Test (Below 1GHz):

- 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).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Kbps)
-	11 to 25	11	OQPSK	250

Power Line Conducted Emission Test:

- 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).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Kbps)
-	11 to 25	11	OQPSK	250

Antenna Port Conducted Measurement:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- 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).
- Following channel(s) was (were) selected for the final test as listed below.

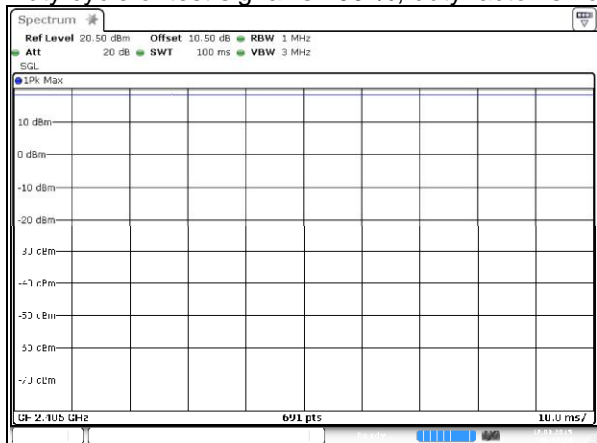
EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Kbps)
-	11 to 25	11, 18, 25	OQPSK	250

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (PoE)	TESTED BY
RE ³ 1G	21deg. C, 74%RH	120Vac, 60Hz	Dalen Dai
RE<1G	21deg. C, 70%RH	120Vac, 60Hz	Dalen Dai
PLC	22deg. C, 78%RH	120Vac, 60Hz	Justin Liu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Saxon Lee

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.



3.4 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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	EUT	Sercomm	DLC-200SUS	-	-	-
B.	PoE	PHIHONG	POE31U-1AT(SC)-R	N/A	N/A	Supplied by client
C.	Notebook	DELL	E5410	BW33YM1	FCC DoC Approved	Provided by Lab

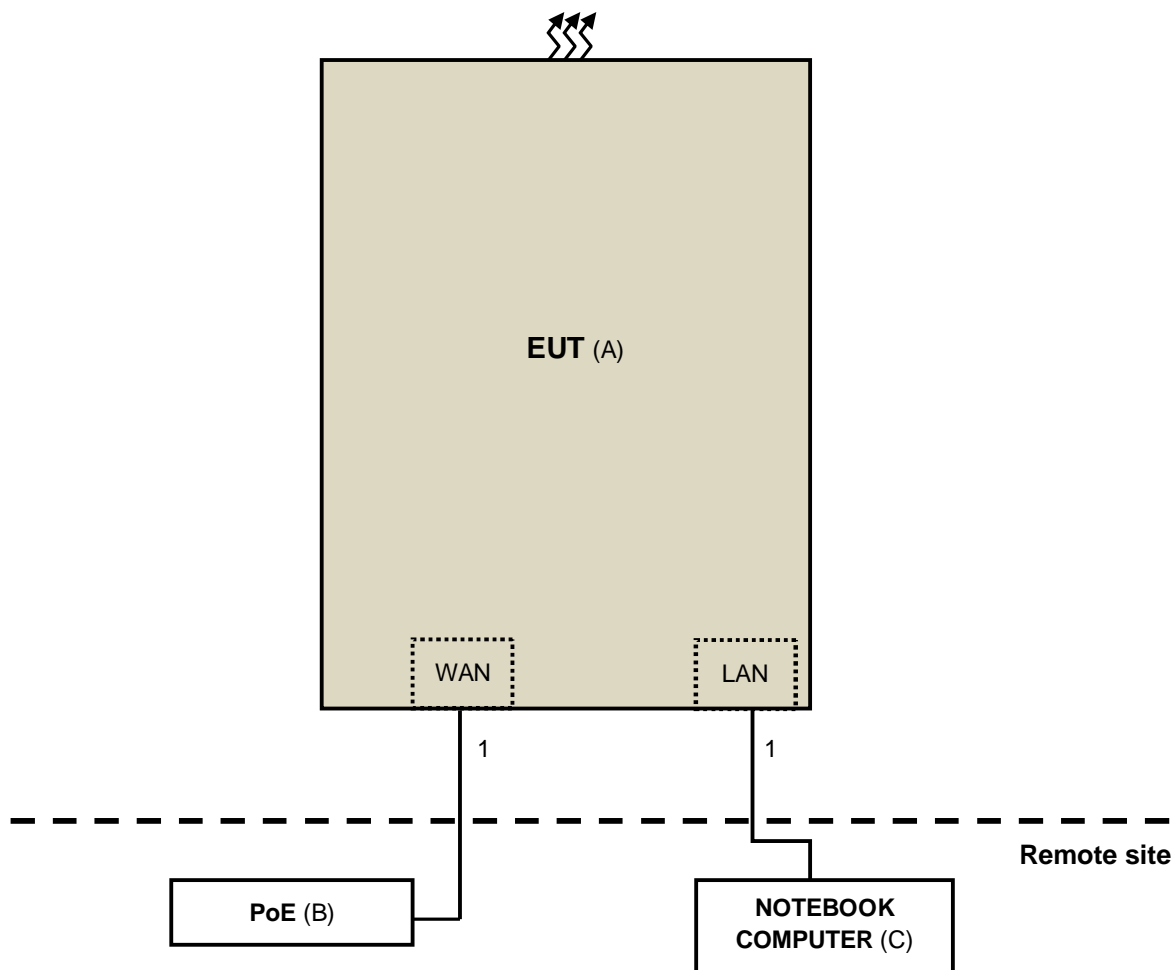
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items B-C acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	2	10	N	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r02

ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2015	Feb. 25, 2016
HP Preamplifier	8449B	3008A01201	Feb. 26, 2015	Feb. 25, 2016
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2015	Feb. 28, 2016
Agilent Spectrum	E4446A	MY51100050	Oct. 24, 2014	Oct. 23, 2015
Agilent TEST RECEIVER	N9038A	MY51210129	Jan. 20, 2015	Jan. 19, 2016
Schwarzbeck Antenna	VULB 9168	139	Feb. 04, 2015	Feb. 03, 2016
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2013	May 28, 2015
Schwarzbeck Horn Antenna	BBHA-9170	212	Feb. 09, 2015	Feb. 08, 2016
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Feb. 10, 2015	Feb. 09, 2016
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V7.6.15.9.4	NA	NA	NA
SUHNER RF cable	SF104	CABLE-CH6	Aug. 15, 2014	Aug. 14, 2015
SUHNER RF cable	SF102	Cable-CH8-3.6m	Aug. 15, 2014	Aug. 14, 2015
EMCO Horn Antenna	3115	00028257	Feb. 05, 2015	Feb. 04, 2016
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 29, 2014	Sep. 28, 2015
Anritsu Power Sensor	MA2411B	0738404	Apr. 21, 2014	Apr. 20, 2015
Anritsu Power Meter	ML2495A	0842014	Apr. 21, 2014	Apr. 20, 2015

- NOTE:**
1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
 2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The test was performed in Chamber No. 6.
 4. The Industry Canada Reference No. IC 7450E-6.
 5. The FCC Site Registration No. is 447212.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

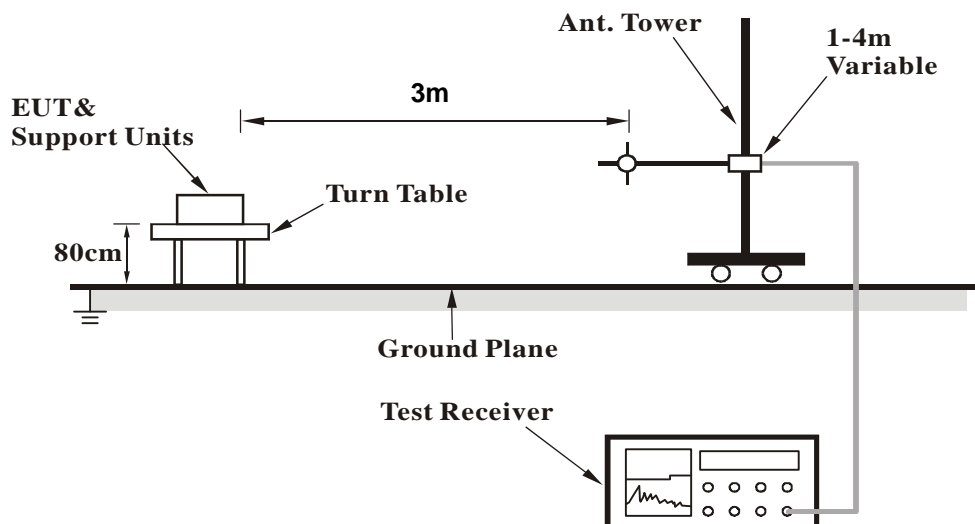
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

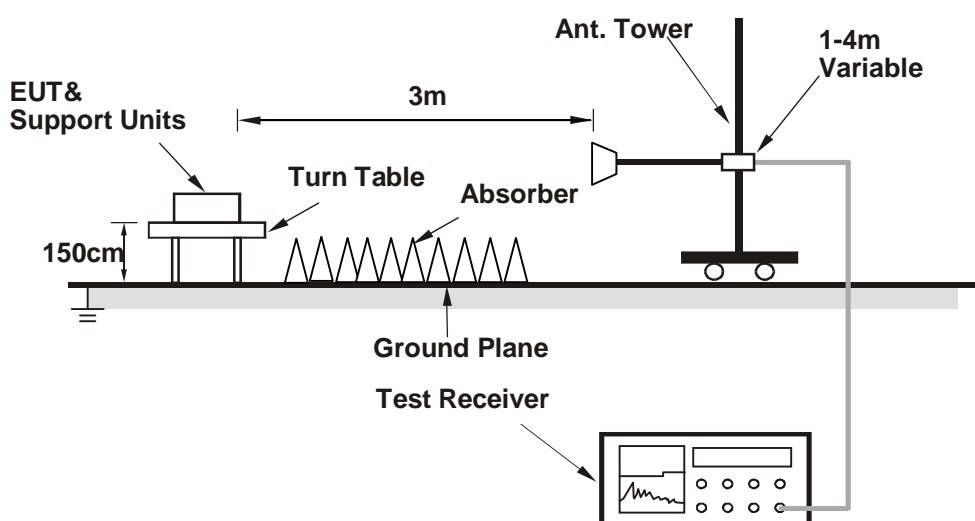
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- a. Placed the EUT on the testing table.
- b. Prepared notebooks to act as communication partner and placed it outside of testing area.
- c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The necessary accessories enable the system in full functions.

4.1.7 Test Results

BELOW 1GHz WORST-CASE DATA

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	34.66	28.9 QP	40.0	-11.1	1.42 H	79	44.03	-15.16
2	112.84	34.8 QP	43.5	-8.7	1.68 H	354	51.45	-16.63
3	205.28	31.4 QP	43.5	-12.1	1.75 H	120	47.56	-16.14
4	450.01	34.6 QP	46.0	-11.5	1.46 H	357	43.62	-9.07
5	499.96	37.6 QP	46.0	-8.4	1.00 H	87	45.97	-8.35
6	780.09	39.0 QP	46.0	-7.0	1.33 H	69	42.11	-3.11

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	34.66	33.2 QP	40.0	-6.8	1.65 V	170	48.34	-15.16
2	113.32	36.3 QP	43.5	-7.2	1.46 V	204	52.90	-16.61
3	331.14	31.2 QP	46.0	-14.8	1.53 V	265	42.66	-11.42
4	399.62	31.4 QP	46.0	-14.6	1.00 V	249	41.65	-10.21
5	499.98	30.7 QP	46.0	-15.3	1.39 V	220	39.07	-8.35
6	779.95	30.6 QP	46.0	-15.4	1.77 V	154	33.72	-3.11

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

ABOVE 1GHz DATA

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.2 PK	74.0	-8.8	1.33 H	31	69.58	-4.34
2	2390.00	50.8 AV	54.0	-3.2	1.33 H	31	55.16	-4.34
3	*2405.00	117.7 PK			1.33 H	31	121.93	-4.24
4	*2405.00	115.4 AV			1.33 H	31	119.67	-4.24
5	4810.00	59.1 PK	74.0	-14.9	1.22 H	257	56.17	2.92
6	4810.00	48.7 AV	54.0	-5.3	1.22 H	257	45.78	2.92
7	#7215.00	65.2 PK	97.7	-32.5	1.17 H	336	56.46	8.76
8	#7215.00	53.3 AV	95.4	-42.1	1.17 H	336	44.57	8.76
9	#9620.00	63.3 PK	97.7	-34.4	1.32 H	41	51.98	11.36
10	#9620.00	53.2 AV	95.4	-42.2	1.32 H	41	41.85	11.36

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.4 PK	74.0	-18.6	1.45 V	327	59.74	-4.34
2	2390.00	47.0 AV	54.0	-7.0	1.45 V	327	51.38	-4.34
3	*2405.00	107.4 PK			1.45 V	327	111.64	-4.24
4	*2405.00	105.6 AV			1.45 V	327	109.83	-4.24
5	4810.00	61.6 PK	74.0	-12.5	1.16 V	38	58.63	2.92
6	4810.00	52.2 AV	54.0	-1.8	1.16 V	38	49.27	2.92
7	#7215.00	66.9 PK	87.4	-20.5	1.00 V	113	58.17	8.76
8	#7215.00	56.9 AV	85.6	-28.7	1.00 V	113	48.15	8.76
9	#9620.00	65.1 PK	87.4	-22.3	1.00 V	28	53.74	11.36
10	#9620.00	55.0 AV	85.6	-30.6	1.00 V	28	43.62	11.36

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 18	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	115.2 PK			1.00 H	0	119.27	-4.07
2	*2440.00	111.9 AV			1.00 H	0	115.96	-4.07
3	4880.00	52.8 PK	74.0	-21.3	1.81 H	158	49.67	3.08
4	4880.00	43.0 AV	54.0	-11.0	1.81 H	158	39.89	3.08
5	7320.00	53.6 PK	74.0	-20.4	1.16 H	337	44.56	9.08
6	7320.00	42.2 AV	54.0	-11.8	1.16 H	337	33.08	9.08
7	#9760.00	55.6 PK	95.2	-39.6	1.45 H	39	44.37	11.24
8	#9760.00	42.9 AV	91.9	-49.0	1.45 H	39	31.62	11.24

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	106.5 PK			1.43 V	277	110.57	-4.07
2	*2440.00	102.8 AV			1.43 V	277	106.84	-4.07
3	4880.00	58.3 PK	74.0	-15.7	1.63 V	132	55.26	3.08
4	4880.00	48.0 AV	54.0	-6.0	1.63 V	132	44.91	3.08
5	7320.00	57.8 PK	74.0	-16.2	1.30 V	123	48.72	9.08
6	7320.00	52.3 AV	54.0	-1.7	1.30 V	123	43.19	9.08
7	#9760.00	56.9 PK	86.5	-29.6	1.61 V	293	45.64	11.24
8	#9760.00	47.5 AV	82.8	-35.3	1.61 V	293	36.27	11.24

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 25	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2475.00	111.5 PK			1.00 H	346	115.36	-3.90
2	*2475.00	109.3 AV			1.00 H	346	113.18	-3.90
3	2483.50	66.1 PK	74.0	-7.9	1.00 H	346	69.98	-3.85
4	2483.50	52.9 AV	54.0	-1.1	1.00 H	346	56.71	-3.85
5	4950.00	56.2 PK	74.0	-17.8	1.54 H	318	52.93	3.28
6	4950.00	44.9 AV	54.0	-9.1	1.54 H	318	41.58	3.28
7	7425.00	53.6 PK	74.0	-20.4	1.36 H	277	44.61	8.97
8	7425.00	42.7 AV	54.0	-11.3	1.36 H	277	33.72	8.97
9	#9900.00	56.7 PK	91.5	-34.8	1.27 H	107	45.26	11.40
10	#9900.00	46.6 AV	89.3	-42.7	1.27 H	107	35.19	11.40

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2475.00	104.2 PK			1.00 V	218	108.09	-3.90
2	*2475.00	101.8 AV			1.00 V	218	105.67	-3.90
3	2483.50	59.3 PK	74.0	-14.7	1.00 V	218	63.16	-3.85
4	2483.50	46.9 AV	54.0	-7.1	1.00 V	218	50.75	-3.85
5	4950.00	59.4 PK	74.0	-14.6	1.63 V	299	56.13	3.28
6	4950.00	49.7 AV	54.0	-4.3	1.63 V	299	46.46	3.28
7	7425.00	54.7 PK	74.0	-19.3	1.06 V	70	45.74	8.97
8	7425.00	43.1 AV	54.0	-10.9	1.06 V	70	34.17	8.97
9	#9900.00	55.3 PK	84.2	-28.9	1.52 V	239	43.87	11.40
10	#9900.00	44.8 AV	81.8	-37.0	1.52 V	239	33.36	11.40

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- " # ": The radiated frequency is out of the restricted band.

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100292	Dec. 18, 2014	Dec. 17, 2015
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 04, 2014	Dec. 03, 2015
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 04, 2014	Dec. 03, 2015
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Oct. 21, 2014	Oct. 20, 2015
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 08, 2014	May 07, 2015
Software	ADT_Cond_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C09.01	Feb. 20, 2014	Feb. 19, 2015
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 20, 2014	May 19, 2015
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 20, 2014	Nov. 19, 2015
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 20, 2014	Nov. 19, 2015

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in Shielded Room No. 9.

3. The VCCI Site Registration No. C-1312.

4.2.3 Test Procedures

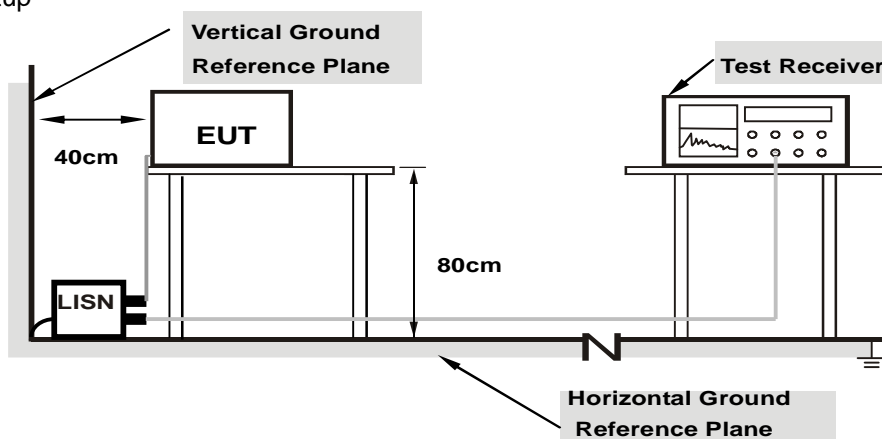
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

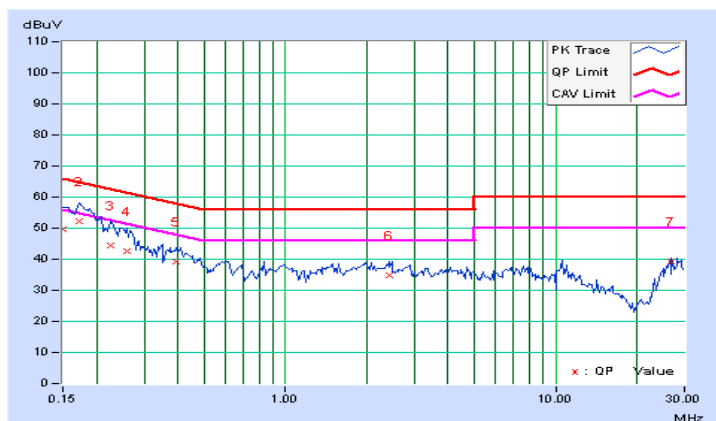
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.20	49.53	31.08	49.73	31.28	66.00	56.00	-16.27	-24.72
2	0.17344	0.20	51.99	30.02	52.19	30.22	64.79	54.79	-12.60	-24.57
3	0.22422	0.21	44.27	23.91	44.48	24.12	62.66	52.66	-18.18	-28.54
4	0.25938	0.22	42.29	25.15	42.51	25.37	61.45	51.45	-18.94	-26.08
5	0.39219	0.25	38.87	27.01	39.12	27.26	58.02	48.02	-18.90	-20.76
6	2.41406	0.40	34.57	23.20	34.97	23.60	56.00	46.00	-21.03	-22.40
7	26.60938	1.03	38.37	34.78	39.40	35.81	60.00	50.00	-20.60	-14.19

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

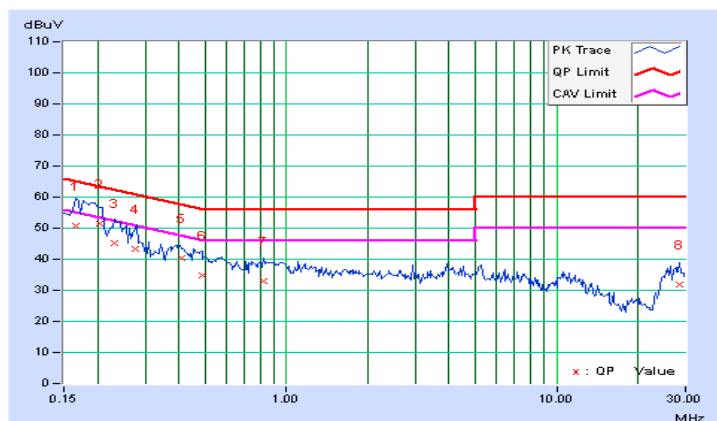


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.21	50.41	33.50	50.62	33.71	65.18	55.18	-14.56	-21.47
2	0.20477	0.22	51.15	31.45	51.37	31.67	63.41	53.41	-12.04	-21.74
3	0.23203	0.23	44.98	25.45	45.21	25.68	62.38	52.38	-17.17	-26.70
4	0.27509	0.24	43.13	27.74	43.37	27.98	60.96	50.96	-17.60	-22.99
5	0.41027	0.26	39.93	30.64	40.19	30.90	57.64	47.64	-17.45	-16.74
6	0.48594	0.27	34.37	22.38	34.64	22.65	56.24	46.24	-21.60	-23.59
7	0.82578	0.31	32.48	20.22	32.79	20.53	56.00	46.00	-23.21	-25.47
8	28.50391	0.50	31.47	26.19	31.97	26.69	60.00	50.00	-28.03	-23.31

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

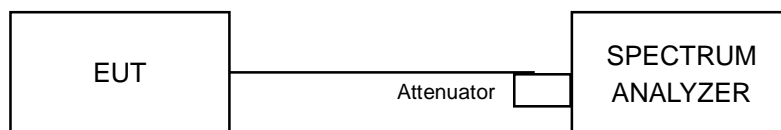


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

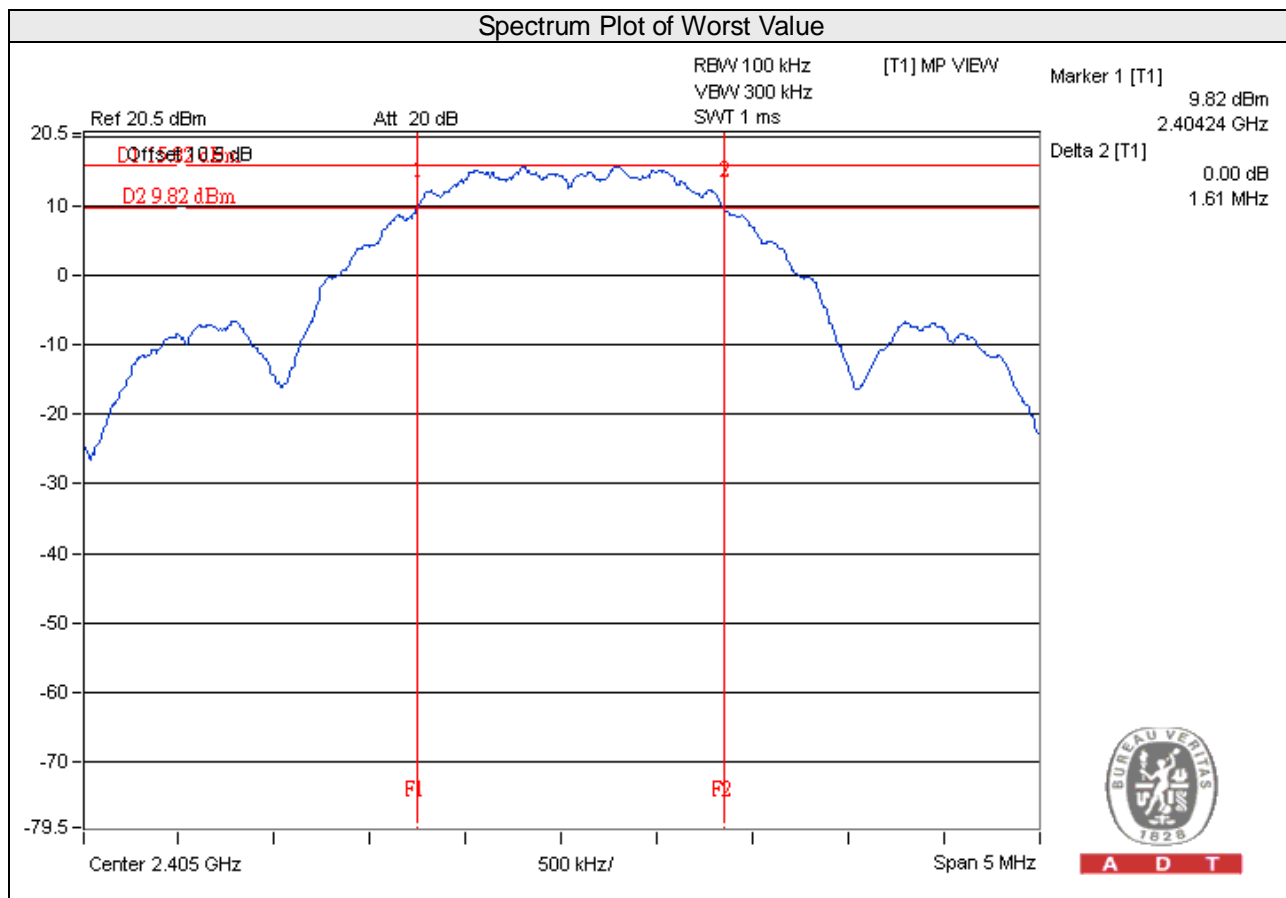
No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

Channel	Frequency (MHz)	6db Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
11	2405	1.61	0.5	PASS
18	2440	1.61	0.5	PASS
25	2475	1.61	0.5	PASS

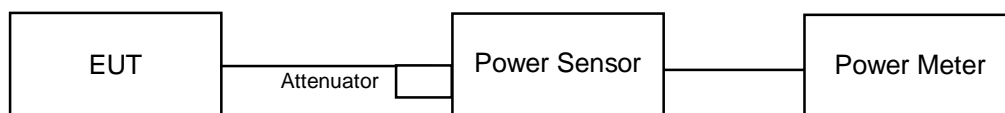


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

A peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the power level.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
11	2405	39.628	15.98	30	Pass
18	2440	38.637	15.87	30	Pass
25	2475	24.831	13.95	30	Pass

FOR AVERAGE POWER

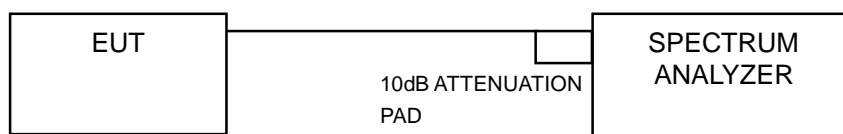
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
11	2405	38.815	15.89
18	2440	37.670	15.76
25	2475	24.491	13.89

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.

4.5.5 Deviation from Test Standard

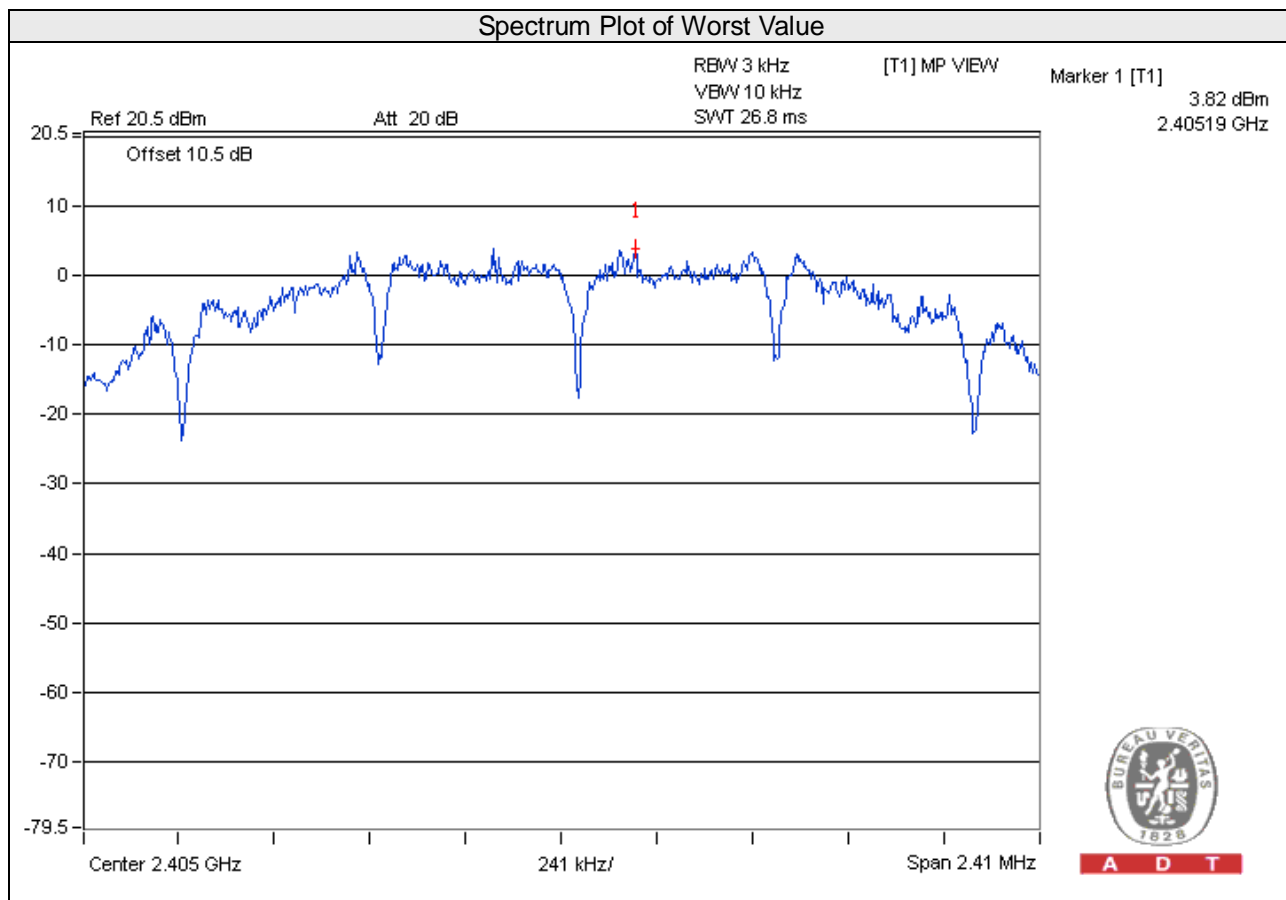
No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
11	2405	3.82	8	Pass
18	2440	1.87	8	Pass
25	2475	-1.38	8	Pass

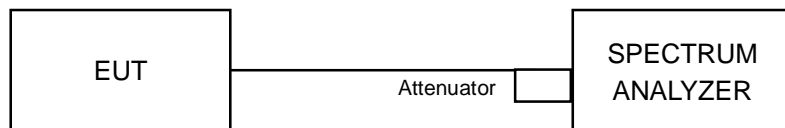


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW \geq 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW \geq 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

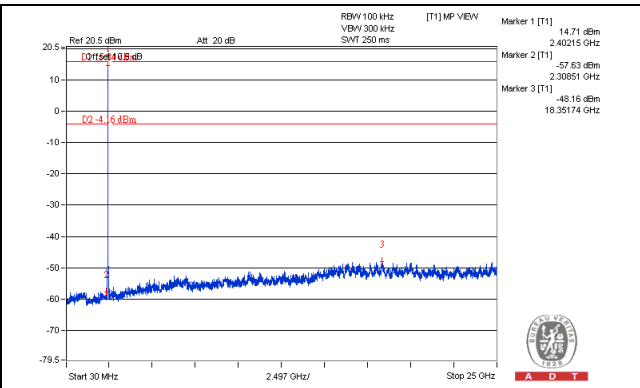
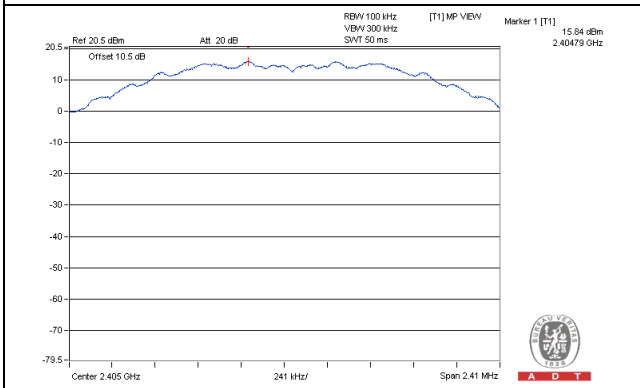
4.6.6 EUT Operating Condition

Same as Item 4.3.6

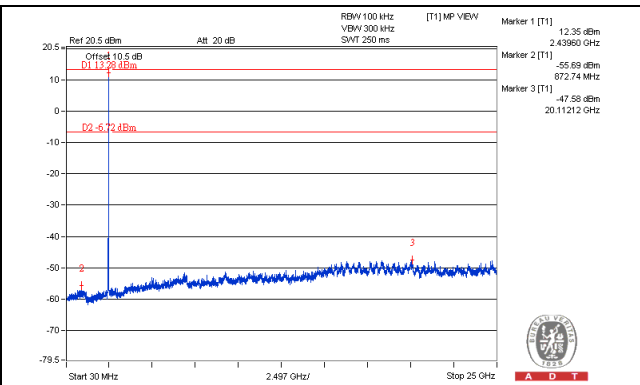
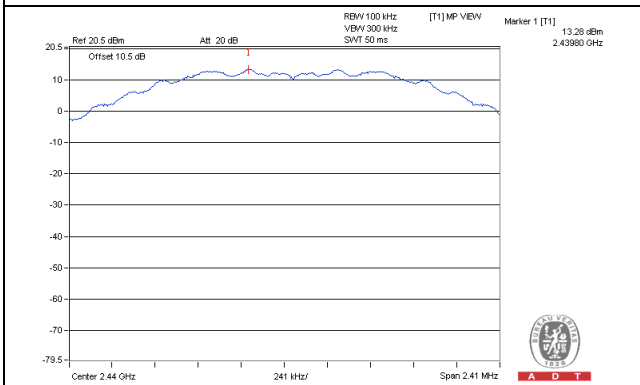
4.6.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

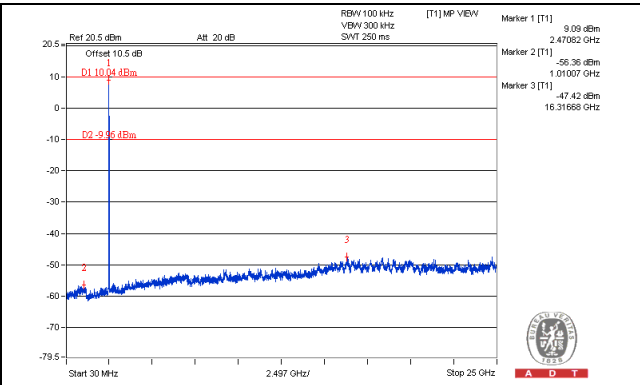
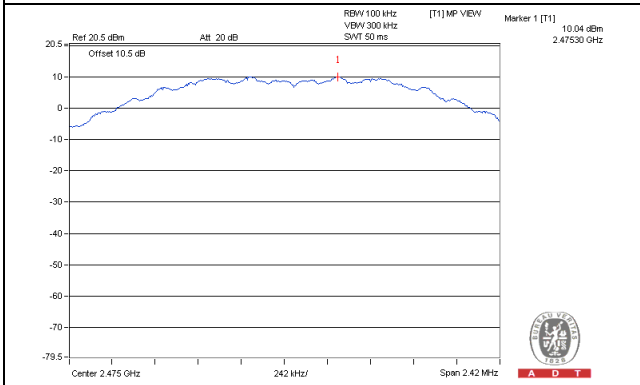
CH 11



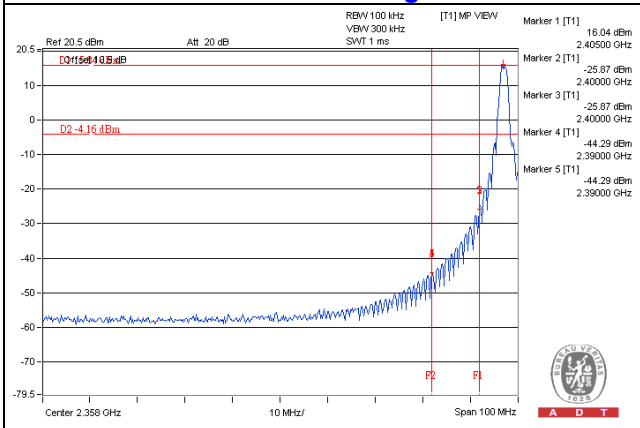
CH 18



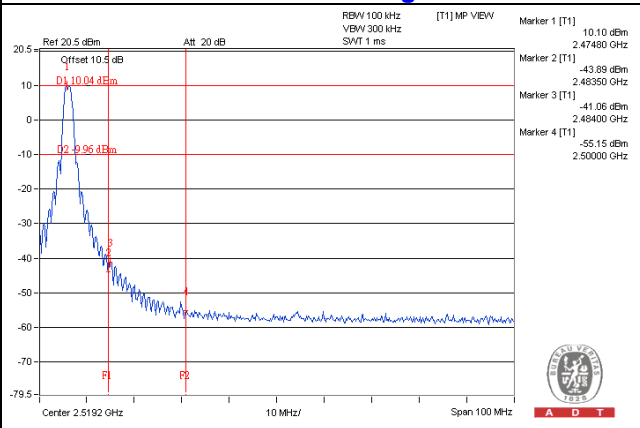
CH 25



CH 11 Band edge



CH 25 Band edge



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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