

FCC Test Report (BT-LE)

Report No.: RF170912E01A-3

FCC ID: 2AHBN-AP61

Test Model: AP61

Series Model: AP61E

Received Date: Sep. 14, 2017

Test Date: Oct. 03 to 11, 2017

Issued Date: Nov. 16, 2017

Applicant: Mist Systems, Inc.

Address: 1601 South De Anza Blvd. Suite 248 Cupertino California United States
95014

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

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

**FCC Registration /
Designation Number:** 723255 / TW2022



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT (BT-LE)	7
3.2 Description of Test Modes	11
3.2.1 Test Mode Applicability and Tested Channel Detail	12
3.3 Description of Support Units	14
3.3.1 Configuration of System under Test	15
3.4 Duty Cycle of Test Signal	17
3.5 General Description of Applied Standards	18
4 Test Types and Results	19
4.1 Radiated Emission and Bandedge Measurement	19
4.1.1 Limits of Radiated Emission and Bandedge Measurement	19
4.1.2 Test Instruments	20
4.1.3 Test Procedures	22
4.1.4 Deviation from Test Standard	22
4.1.5 Test Setup	23
4.1.6 EUT Operating Conditions	24
4.1.7 Test Results (Mode 1)	25
4.1.8 Test Results (Mode 2)	29
4.2 Conducted Emission Measurement	33
4.2.1 Limits of Conducted Emission Measurement	33
4.2.2 Test Instruments	33
4.2.3 Test Procedures	34
4.2.4 Deviation from Test Standard	34
4.2.5 Test Setup	34
4.2.6 EUT Operating Conditions	34
4.2.7 Test Results (Mode 1)	35
4.3 6dB Bandwidth Measurement	37
4.3.1 Limits of 6dB Bandwidth Measurement	37
4.3.2 Test Setup	37
4.3.3 Test Instruments	37
4.3.4 Test Procedure	37
4.3.5 Deviation from Test Standard	37
4.3.6 EUT Operating Conditions	37
4.3.7 Test Result	38
4.4 Conducted Output Power Measurement	39
4.4.1 Limits OF Conducted Output Power Measurement	39
4.4.2 Test Setup	39
4.4.3 Test Instruments	39
4.4.4 Test Procedures	39
4.4.5 Deviation from Test Standard	39
4.4.6 EUT Operating Conditions	39
4.4.7 Test Results	40
4.5 Power Spectral Density Measurement	41
4.5.1 Limits of Power Spectral Density Measurement	41
4.5.2 Test Setup	41
4.5.3 Test Instruments	41
4.5.4 Test Procedure	41
4.5.5 Deviation from Test Standard	41

4.5.6 EUT Operating Condition	41
4.5.7 Test Results	42
4.6 Conducted Out of Band Emission Measurement	43
4.6.1 Limits of Conducted Out of Band Emission Measurement.....	43
4.6.2 Test Setup.....	43
4.6.3 Test Instruments	43
4.6.4 Test Procedure	43
4.6.5 Deviation from Test Standard	43
4.6.6 EUT Operating Condition	43
4.6.7 Test Results	44
5 Pictures of Test Arrangements.....	45
Appendix – Information on the Testing Laboratories	46

Release Control Record

Issue No.	Description	Date Issued
RF170912E01A-3	Original release.	Nov. 16, 2017

1 Certificate of Conformity

Product: Premium Outdoor Wi-Fi & BLE Array AP

Brand: Mist

Test Model: AP61

Series Model: AP61E

Sample Status: ENGINEERING SAMPLE

Applicant: Mist Systems, Inc.

Test Date: Oct. 03 to 11, 2017

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

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 : Wendy Wu , **Date:** Nov. 16, 2017
Wendy Wu / Specialist

Approved by : May Chen , **Date:** Nov. 16, 2017
May Chen / 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 -13.22dB at 0.16953MHz.
15.205 & 209 & 15.247(d)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -5.5dB at 342.21MHz.
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(MHF) not a standard connector.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.32 dB
	1GHz ~ 6GHz	5.14 dB
Radiated Emissions above 1 GHz	6GHz ~ 18GHz	5.04 dB
	18GHz ~ 40GHz	5.25 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (BT-LE)

Product	Premium Outdoor Wi-Fi & BLE Array AP
Brand	Mist
Test Model	AP61
Series Model	AP61E
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	802.3at (50-57Vdc)
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Up to 1Mbps
Operating Frequency	2402MHz ~ 2480MHz
Number of Channel	40
Output Power	6.622mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF170912E01-3 as the following:

◆ Added new model as following table:

Original			
Product	Brand	Model	Difference
Premium Outdoor Wi-Fi & BLE Array AP	Mist	AP61	1. Internal Antenna 2. For marketing purpose
Newly			
Product	Brand	Model	Difference
Premium Outdoor Wi-Fi & BLE Array AP	Mist	AP61E	1. External Antenna 2. For marketing purpose

Note: The difference between AP61 and AP61E is only add WiFi external Antenna, Bluetooth parameters and antenna do not change, so models: AP61 was selected as representative model for final test.

2. According to above condition, there is no addition test has to be performed. All test data were copied from the original test report (Report No.: RF170912E01-3). And all data were verified to meet the requirements.
3. There are WLAN and Bluetooth technology used for the EUT. The EUT has three radios as following table:

Radio 1	Radio 2	Radio 3
WLAN - 2.4GHz + 5GHz	(Scanning Radio) WLAN RX only - 2.4GHz + 5GHz	Bluetooth

4. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz (Radio 1)	Bluetooth(Radio 3)
2	WLAN 5GHz (Radio 1)	Bluetooth(Radio 3)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

5. The EUT must be supplied with a POE (only for test not for sale) as following table:

Brand	Model No.	Spec.
Microsemi	PD-9001GR/AT/AC	Input: 100-240Vac, 50/60Hz, 0.67A Output: 55Vdc, 0.6A

6. The antennas provided to the EUT, please refer to the following table:

For Model No.: AP61

Radio 1- WLAN - 2.4GHz + 5GHz (Internal antenna)

Antenna Set	Transmitter Circuit	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	Chain (0)	3.87	2.4~2.4835	PIFA	i-pex(MHF)
		4.94	5.15~5.25		
		4.66	5.25~5.35		
		4.25	5.47~5.725		
		4.42	5.725~5.85		
	Chain (1)	3.91	2.4~2.4835	PIFA	i-pex(MHF)
		4.23	5.15~5.25		
		4.54	5.25~5.35		
		4.66	5.47~5.725		
		4.70	5.725~5.85		
	Chain (2)	3.93	2.4~2.4835	PIFA	i-pex(MHF)
		4.53	5.15~5.25		
		4.86	5.25~5.35		
		4.95	5.47~5.725		
		4.94	5.725~5.85		
	Chain (3)	3.81	2.4~2.4835	PIFA	i-pex(MHF)
		4.50	5.15~5.25		
		4.92	5.25~5.35		
		4.71	5.47~5.725		
		4.90	5.725~5.85		

Radio 2- WLAN RX only - 2.4GHz + 5GHz (Scanning radio antenna)

Antenna No.	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	3.85	2.4~2.4835	PIFA	i-pex(MHF)
	4.61	5.15~5.25		
	4.71	5.25~5.35		
	4.72	5.47~5.725		
	4.73	5.725~5.85		

Radio 3 - Bluetooth

Antenna No.	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	3.56	2.4~2.4835	Omni	i-pex(MHF)
2	5.01	2.4~2.4835	Patch	i-pex(MHF)

For Model No.: AP61E
Radio 1 - WLAN - 2.4GHz + 5GHz (External antenna)

Antenna Set	Transmitter Circuit	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	Chain (0)	PCTEL	FPMI2458-DP4NM	6	2.4~2.4835	Sector	N-Type
				5	5.15~5.25		
				5	5.25~5.35		
				5	5.47~5.725		
				5	5.725~5.85		
	Chain (1)	PCTEL	FPMI2458-DP4NM	6	2.4~2.4835	Sector	N-Type
				5	5.15~5.25		
				5	5.25~5.35		
				5	5.47~5.725		
				5	5.725~5.85		
	Chain (2)	PCTEL	FPMI2458-DP4NM	6	2.4~2.4835	Sector	N-Type
				5	5.15~5.25		
				5	5.25~5.35		
				5	5.47~5.725		
				5	5.725~5.85		
	Chain (3)	PCTEL	FPMI2458-DP4NM	6	2.4~2.4835	Sector	N-Type
				5	5.15~5.25		
				5	5.25~5.35		
				5	5.47~5.725		
				5	5.725~5.85		
Antenna Set	Transmitter Circuit	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
2	Chain (0)	PCTEL	MPMI2458-4-NM	4	2.4~2.4835	Omnidirectional	N-Type
				4	5.15~5.25		
				4	5.25~5.35		
				4	5.47~5.725		
				4	5.725~5.85		
	Chain (1)	PCTEL	MPMI2458-4-NM	4	2.4~2.4835	Omnidirectional	N-Type
				4	5.15~5.25		
				4	5.25~5.35		
				4	5.47~5.725		
				4	5.725~5.85		
	Chain (2)	PCTEL	MPMI2458-4-NM	4	2.4~2.4835	Omnidirectional	N-Type
				4	5.15~5.25		
				4	5.25~5.35		
				4	5.47~5.725		
				4	5.725~5.85		
	Chain (3)	PCTEL	MPMI2458-4-NM	4	2.4~2.4835	Omnidirectional	N-Type
				4	5.15~5.25		
				4	5.25~5.35		
				4	5.47~5.725		
				4	5.725~5.85		

Radio 2 - WLAN RX only - 2.4GHz + 5GHz (Scanning radio antenna)

Antenna No.	Transmitter Circuit	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	Chain (0)	3.85	2.4~2.4835	PIFA	i-pex(MHF)
		4.61	5.15~5.25		
		4.71	5.25~5.35		
		4.72	5.47~5.725		
		4.73	5.725~5.85		

Radio 3 - Bluetooth

Antenna No.	Transmitter Circuit	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	Chain (0)	3.56	2.4~2.4835	Omni	i-pex(MHF)
2	Chain (1)	5.01	2.4~2.4835	Patch	i-pex(MHF)

Note:

1. For antennas of radio 2 & 3, Model No.: AP61 is as same as AP61E.

7. 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

40 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE<1G	PLC	APCM	
1	√	√	√	√	Antenna type: Patch
2	√	√	-	-	Antenna type: Omni

Where **RE \geq 1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE: “-” means no effect.

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	0, 19, 39	GFSK	1

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	0	GFSK	1

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	0	GFSK	1

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	0, 19, 39	GFSK	1

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE \geq 1G	23deg. C, 70%RH	120Vac, 60Hz	Rey chen
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Eason Tseng
PLC	26deg. C, 74%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 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.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
C.	PoE	Microsemi	PD-9001GR/AT/AC	NA	NA	Supplied by client

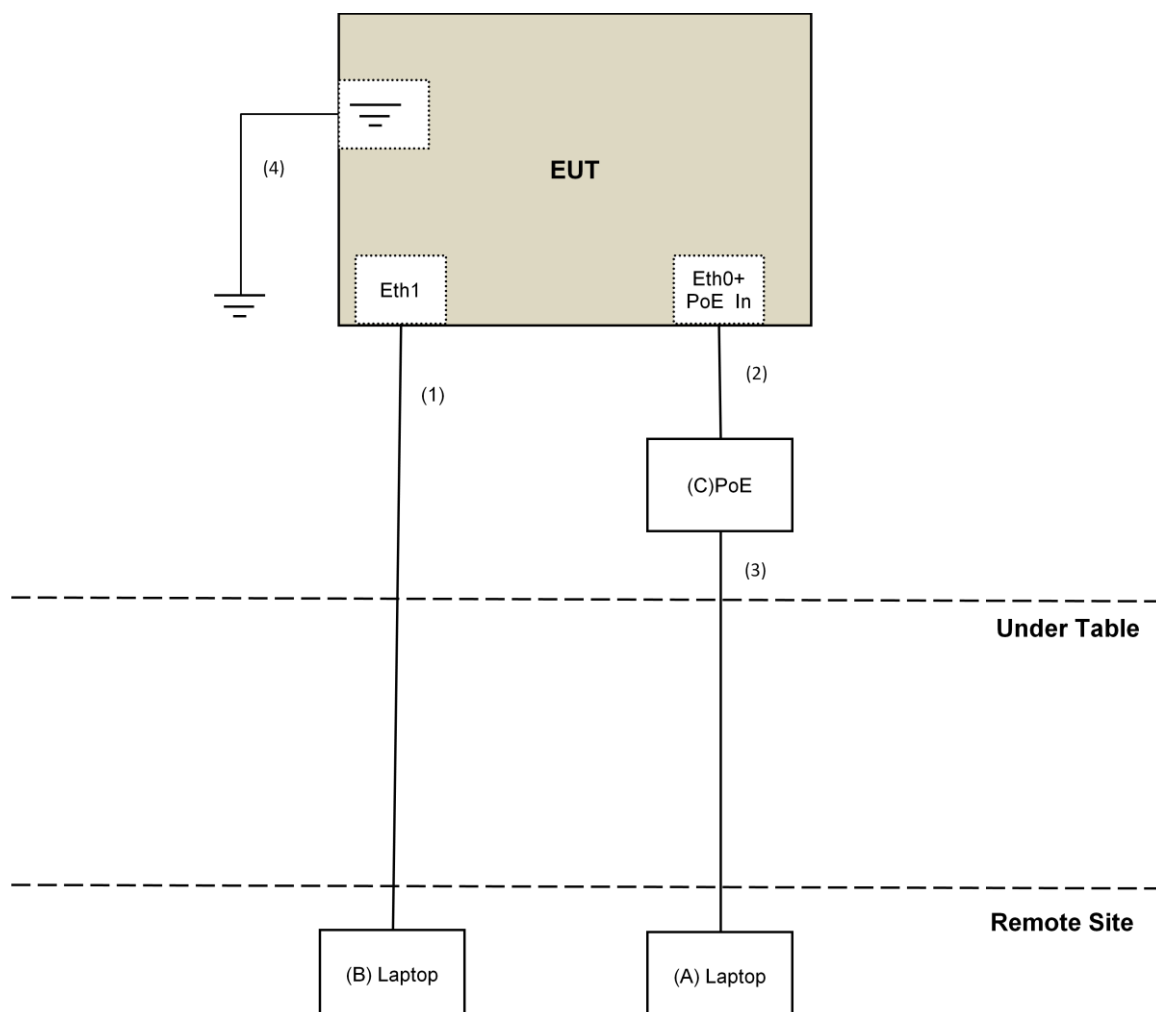
Note:

1. All power cords of the above support units are non-shielded (1.8m).

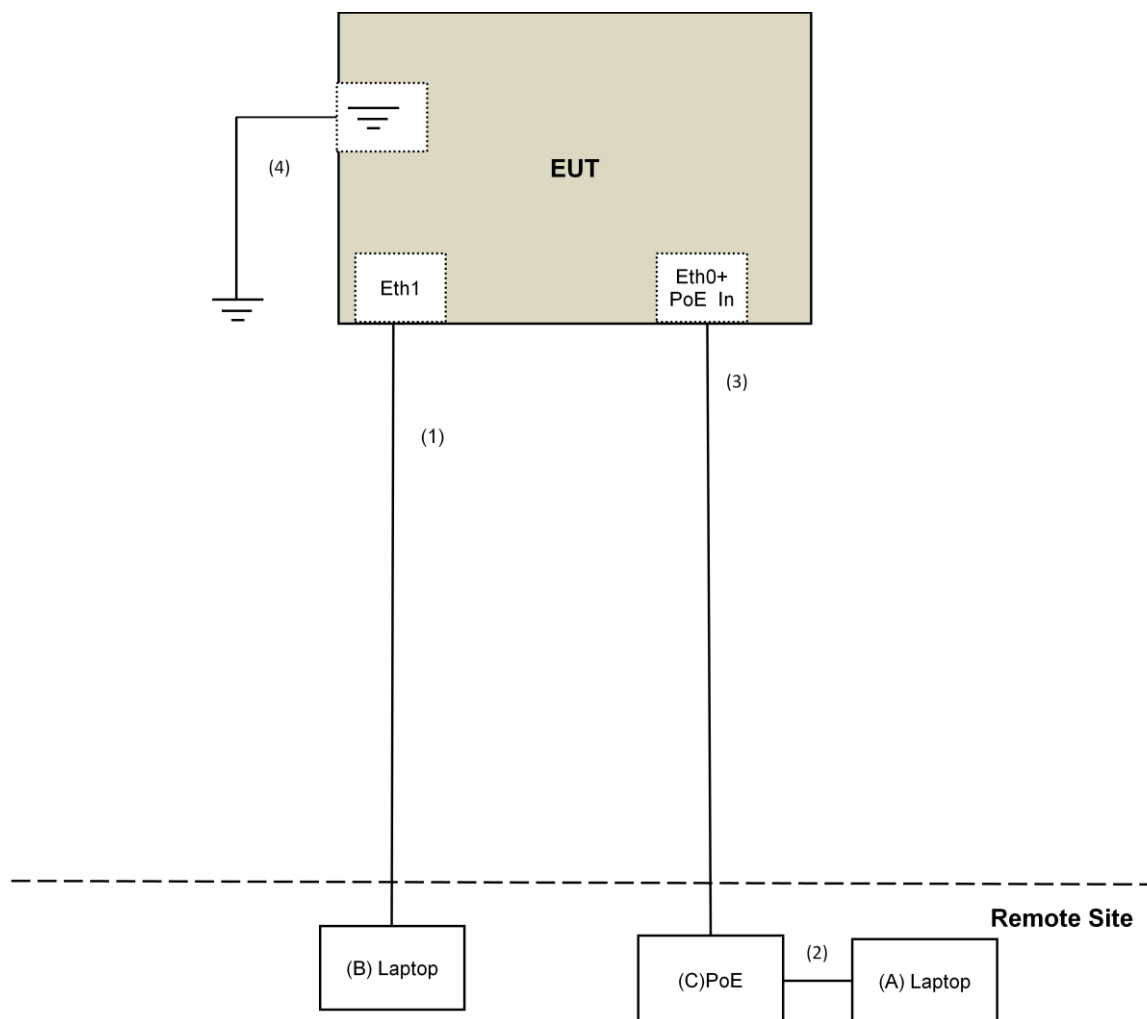
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	3	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	Earth Cable	1	3	No	0	Provided by Lab

3.3.1 Configuration of System under Test

For Conducted Emission:



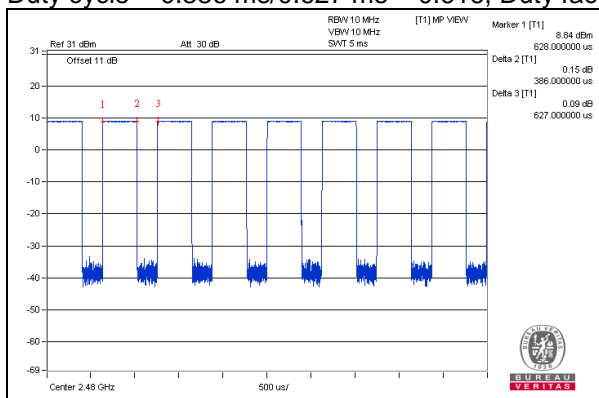
For other test:



3.4 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor shall be considered.

Duty cycle = $0.386 \text{ ms} / 0.627 \text{ ms} = 0.616$, Duty factor = $10 * \log(1/0.616) = 2.11$



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)
KDB 558074 D01 DTS Meas Guidance v04
ANSI C63.10-2013

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

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2017	July 11, 2018
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 06, 2017	May 05, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Dec. 29, 2016	Dec. 28, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 05, 2016	Oct. 04, 2017
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA

Note:

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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. Loop antenna was used for all emissions below 30 MHz.
5. The CANADA Site Registration No. is 20331-1.
6. Tested Date: Oct. 03, 2017.

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2017	July 11, 2018
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 28, 2016	Dec. 27, 2017
Pre-Amplifier EMC	EMC12630SE	980384	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200	160922	Feb. 02, 2017	Feb. 01, 2018
	EMC104-SM-SM-2000	150317	Mar. 29, 2017	Mar. 28, 2018
	EMC104-SM-SM-5000	150322	Mar. 29, 2017	Mar. 28, 2018
Spectrum Analyzer Keysight	N9030A	MY54490679	July 25, 2017	July 24, 2018
Pre-Amplifier EMC	EMC184045SE	980386	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSV40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018

Note:

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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. Loop antenna was used for all emissions below 30 MHz.
5. The CANADA Site Registration No. is 20331-1.
6. Tested Date: Oct. 05 to 11, 2017.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) 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:

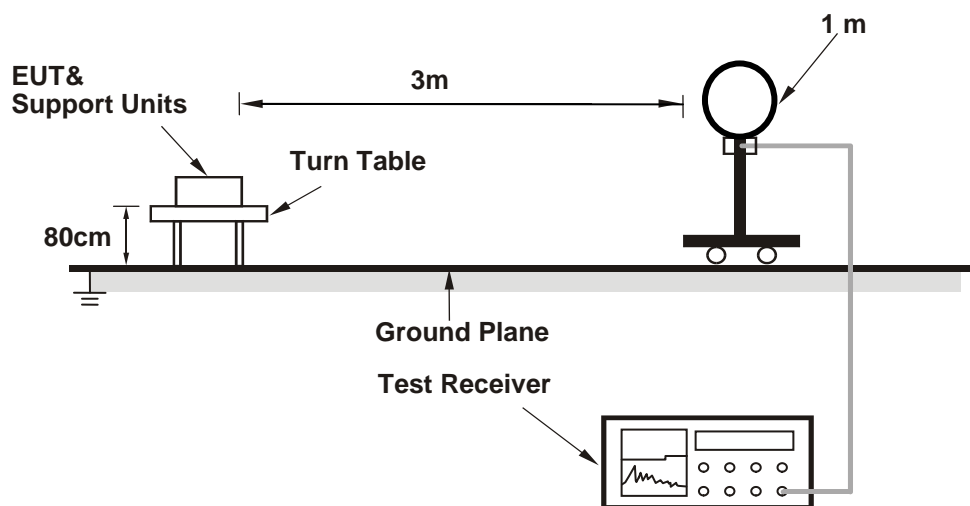
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

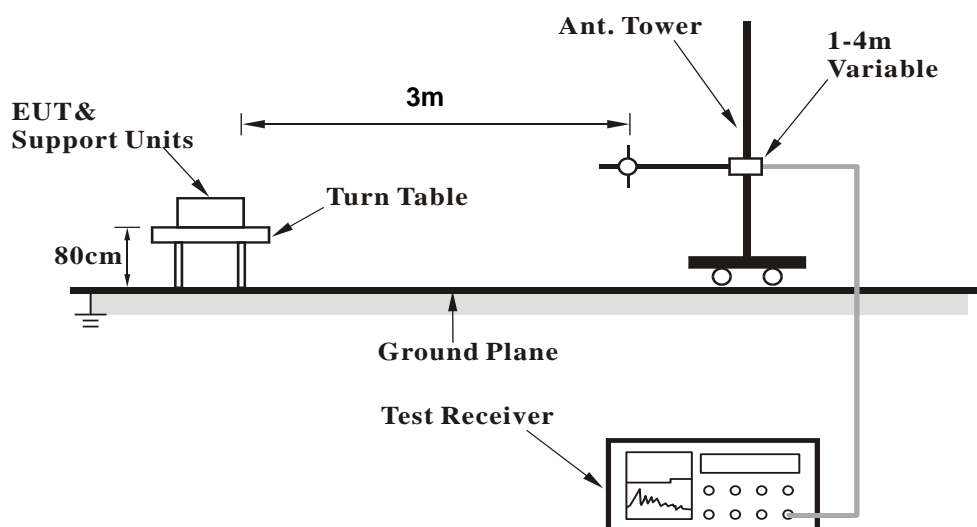
No deviation.

4.1.5 Test Setup

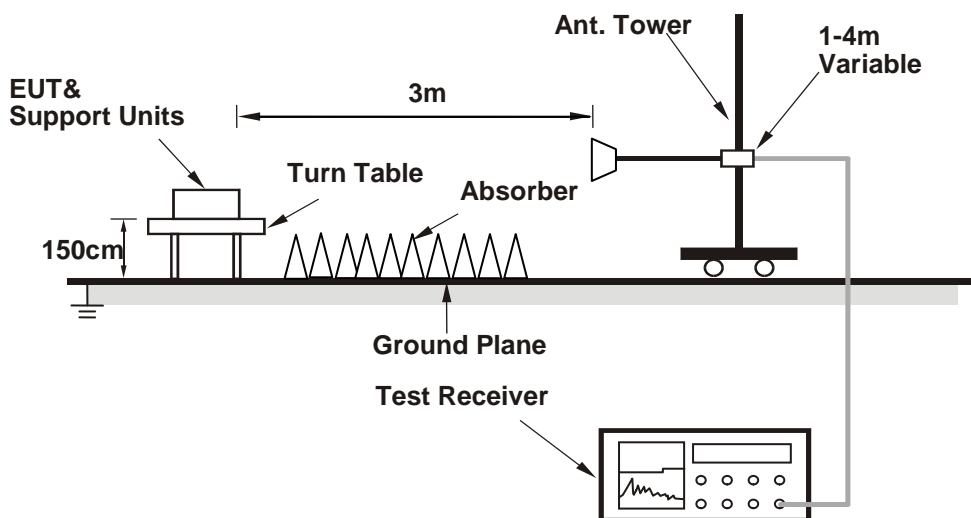
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- Connected the EUT with the Laptop which is placed on remote site.
- Controlling software (HyperTerminal paste AP61_BT+BLE SOP_170929.txt command) has been activated to set the EUT on specific status.

4.1.7 Test Results (Mode 1)

Above 1GHz Data :

CHANNEL	TX Channel 0	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	55.3 PK	74.0	-18.7	1.92 H	320	56.9	-1.6
2	2390.00	43.6 AV	54.0	-10.4	1.92 H	320	45.2	-1.6
3	*2402.00	99.8 PK			1.92 H	320	101.3	-1.5
4	*2402.00	98.4 AV			1.92 H	320	99.9	-1.5
5	4804.00	41.7 PK	74.0	-32.3	1.57 H	298	38.7	3.0
6	4804.00	32.3 AV	54.0	-21.7	1.57 H	298	29.3	3.0
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	55.1 PK	74.0	-18.9	1.60 V	136	56.7	-1.6
2	2390.00	43.3 AV	54.0	-10.7	1.60 V	136	44.9	-1.6
3	*2402.00	94.8 PK			1.60 V	136	96.3	-1.5
4	*2402.00	93.7 AV			1.60 V	136	95.2	-1.5
5	4804.00	42.0 PK	74.0	-32.0	1.76 V	20	39.0	3.0
6	4804.00	34.6 AV	54.0	-19.4	1.76 V	20	31.6	3.0

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.

CHANNEL	TX Channel 19	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	99.9 PK			1.84 H	338	101.4	-1.5
2	*2440.00	98.2 AV			1.84 H	338	99.7	-1.5
3	4880.00	41.1 PK	74.0	-32.9	1.63 H	298	37.9	3.2
4	4880.00	31.7 AV	54.0	-22.3	1.63 H	298	28.5	3.2
5	7320.00	44.5 PK	74.0	-29.5	1.45 H	360	35.6	8.9
6	7320.00	32.1 AV	54.0	-21.9	1.45 H	360	23.2	8.9

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	95.0 PK			1.60 V	141	96.5	-1.5
2	*2440.00	93.4 AV			1.60 V	141	94.9	-1.5
3	4880.00	42.5 PK	74.0	-31.5	1.82 V	18	39.3	3.2
4	4880.00	35.1 AV	54.0	-18.9	1.82 V	18	31.9	3.2
5	7320.00	44.3 PK	74.0	-29.7	3.06 V	197	35.4	8.9
6	7320.00	31.9 AV	54.0	-22.1	3.06 V	197	23.0	8.9

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.

CHANNEL	TX Channel 39	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	*2480.00	99.7 PK			1.86 H	325	101.1	-1.4
2	*2480.00	98.4 AV			1.86 H	325	99.8	-1.4
3	2483.50	55.3 PK	74.0	-18.7	1.86 H	325	56.7	-1.4
4	2483.50	42.5 AV	54.0	-11.5	1.86 H	325	43.9	-1.4
5	4960.00	41.4 PK	74.0	-32.6	1.58 H	304	38.2	3.2
6	4960.00	32.2 AV	54.0	-21.8	1.58 H	304	29.0	3.2
7	7440.00	44.0 PK	74.0	-30.0	1.42 H	345	34.8	9.2
8	7440.00	31.9 AV	54.0	-22.1	1.42 H	345	22.7	9.2

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	*2480.00	94.6 PK			1.64 V	138	96.0	-1.4
2	*2480.00	93.9 AV			1.64 V	138	95.3	-1.4
3	2483.50	55.0 PK	74.0	-19.0	1.64 V	138	56.4	-1.4
4	2483.50	42.4 AV	54.0	-11.6	1.64 V	138	43.8	-1.4
5	4960.00	42.6 PK	74.0	-31.4	1.81 V	30	39.4	3.2
6	4960.00	35.0 AV	54.0	-19.0	1.81 V	30	31.8	3.2
7	7440.00	44.6 PK	74.0	-29.4	3.01 V	182	35.4	9.2
8	7440.00	32.4 AV	54.0	-21.6	3.01 V	182	23.2	9.2

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.

Below 1GHz Data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	55.32	27.8 QP	40.0	-12.2	2.00 H	214	36.1	-8.3
2	165.23	34.9 QP	43.5	-8.6	1.00 H	354	43.4	-8.5
3	317.49	35.2 QP	46.0	-10.8	2.00 H	177	42.0	-6.8
4	342.21	40.5 QP	46.0	-5.5	1.50 H	158	47.0	-6.5
5	443.61	35.0 QP	46.0	-11.0	1.00 H	154	38.8	-3.8
6	564.38	37.1 QP	46.0	-8.9	2.00 H	121	38.9	-1.8
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	45.21	25.8 QP	40.0	-14.2	1.41 V	360	34.1	-8.3
2	185.47	35.0 QP	43.5	-8.5	1.62 V	179	45.4	-10.4
3	251.54	35.4 QP	46.0	-10.6	1.92 V	296	45.0	-9.6
4	353.43	40.1 QP	46.0	-5.9	1.40 V	40	46.5	-6.4
5	438.42	32.3 QP	46.0	-13.7	1.17 V	355	36.2	-3.9
6	609.33	38.0 QP	46.0	-8.0	1.90 V	264	38.8	-0.8

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

4.1.8 Test Results (Mode 2)

Above 1GHz Data :

CHANNEL	TX Channel 0	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	55.5 PK	74.0	-18.5	1.57 H	60	57.1	-1.6
2	2390.00	43.9 AV	54.0	-10.1	1.57 H	60	45.5	-1.6
3	*2402.00	103.1 PK			1.57 H	60	104.6	-1.5
4	*2402.00	102.1 AV			1.57 H	60	103.6	-1.5
5	4804.00	40.1 PK	74.0	-33.9	1.49 H	312	37.1	3.0
6	4804.00	31.1 AV	54.0	-22.9	1.49 H	312	28.1	3.0
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	54.0 PK	74.0	-20.0	1.00 V	347	55.6	-1.6
2	2390.00	42.9 AV	54.0	-11.1	1.00 V	347	44.5	-1.6
3	*2402.00	100.9 PK			1.00 V	347	102.4	-1.5
4	*2402.00	100.0 AV			1.00 V	347	101.5	-1.5
5	4804.00	41.5 PK	74.0	-32.5	2.50 V	342	38.5	3.0
6	4804.00	33.7 AV	54.0	-20.3	2.50 V	342	30.7	3.0

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.

CHANNEL	TX Channel 19	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	104.2 PK			1.57 H	50	105.7	-1.5
2	*2440.00	102.9 AV			1.57 H	50	104.4	-1.5
3	4880.00	40.5 PK	74.0	-33.5	1.57 H	310	37.3	3.2
4	4880.00	31.0 AV	54.0	-23.0	1.57 H	310	27.8	3.2
5	7320.00	43.3 PK	74.0	-30.7	1.42 H	325	34.4	8.9
6	7320.00	31.4 AV	54.0	-22.6	1.42 H	325	22.5	8.9

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	100.2 PK			1.40 V	335	101.7	-1.5
2	*2440.00	99.9 AV			1.40 V	335	101.4	-1.5
3	4880.00	42.0 PK	74.0	-32.0	2.50 V	333	38.8	3.2
4	4880.00	34.4 AV	54.0	-19.6	2.50 V	333	31.2	3.2
5	7320.00	43.0 PK	74.0	-31.0	2.33 V	330	34.1	8.9
6	7320.00	30.9 AV	54.0	-23.1	2.33 V	330	22.0	8.9

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.

CHANNEL	TX Channel 39	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	*2480.00	103.7 PK			1.60 H	47	105.1	-1.4
2	*2480.00	102.5 AV			1.60 H	47	103.9	-1.4
3	2483.50	55.6 PK	74.0	-18.4	1.60 H	47	57.0	-1.4
4	2483.50	44.0 AV	54.0	-10.0	1.60 H	47	45.4	-1.4
5	4960.00	40.7 PK	74.0	-33.3	1.55 H	303	37.5	3.2
6	4960.00	31.4 AV	54.0	-22.6	1.55 H	303	28.2	3.2
7	7440.00	43.1 PK	74.0	-30.9	1.40 H	332	33.9	9.2
8	7440.00	31.3 AV	54.0	-22.7	1.40 H	332	22.1	9.2

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	*2480.00	103.6 PK			1.00 V	360	105.0	-1.4
2	*2480.00	102.9 AV			1.00 V	360	104.3	-1.4
3	2483.50	55.5 PK	74.0	-18.5	1.00 V	360	56.9	-1.4
4	2483.50	44.4 AV	54.0	-9.6	1.00 V	360	45.8	-1.4
5	4960.00	41.7 PK	74.0	-32.3	2.44 V	338	38.5	3.2
6	4960.00	34.0 AV	54.0	-20.0	2.44 V	338	30.8	3.2
7	7440.00	43.2 PK	74.0	-30.8	2.34 V	320	34.0	9.2
8	7440.00	31.0 AV	54.0	-23.0	2.34 V	320	21.8	9.2

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.

Below 1GHz Data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	55.21	26.4 QP	40.0	-13.6	1.55 H	320	34.7	-8.3
2	165.87	35.3 QP	43.5	-8.2	1.37 H	229	43.9	-8.6
3	317.54	35.6 QP	46.0	-10.4	1.25 H	286	42.4	-6.8
4	342.13	40.1 QP	46.0	-5.9	3.10 H	140	46.6	-6.5
5	443.72	32.3 QP	46.0	-13.7	1.10 H	345	36.1	-3.8
6	564.33	38.0 QP	46.0	-8.0	2.00 H	94	39.8	-1.8
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	45.21	25.8 QP	40.0	-14.2	1.40 V	359	34.1	-8.3
2	185.87	35.3 QP	43.5	-8.2	1.50 V	219	45.7	-10.4
3	331.54	35.6 QP	46.0	-10.4	1.95 V	326	42.2	-6.6
4	353.13	40.1 QP	46.0	-5.9	3.40 V	70	46.5	-6.4
5	458.72	32.3 QP	46.0	-13.7	1.40 V	315	36.0	-3.7
6	614.33	38.0 QP	46.0	-8.0	2.20 V	294	38.7	-0.7

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

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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 18, 2017	June 17, 2018
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
- 3 Tested Date: Oct. 04, 2017

4.2.3 Test Procedures

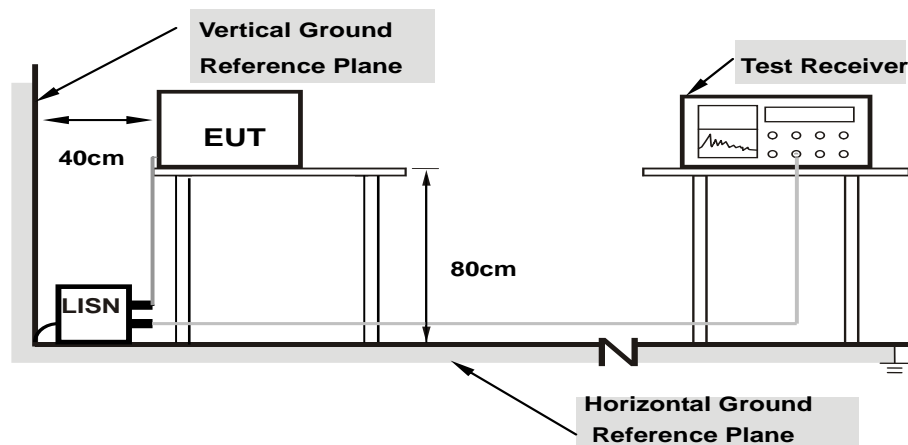
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 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.

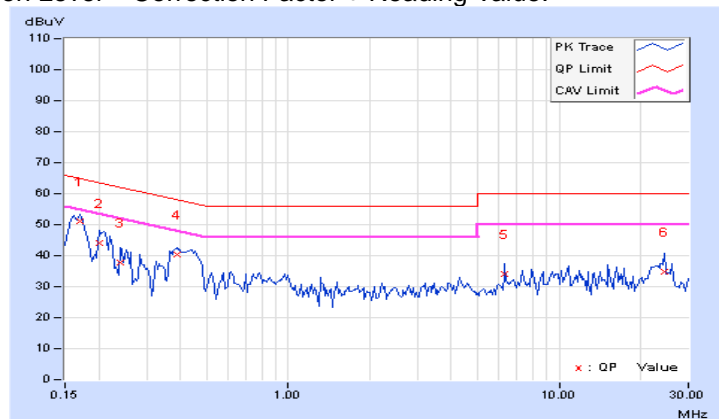
4.2.7 Test Results (Mode 1)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	10.07	40.88	31.69	50.95	41.76	64.98	54.98	-14.03	-13.22
2	0.20078	10.06	33.88	20.05	43.94	30.11	63.58	53.58	-19.64	-23.47
3	0.23984	10.07	27.77	13.83	37.84	23.90	62.10	52.10	-24.26	-28.20
4	0.38828	10.11	30.29	20.65	40.40	30.76	58.10	48.10	-17.70	-17.34
5	6.32031	10.42	23.69	21.90	34.11	32.32	60.00	50.00	-25.89	-17.68
6	24.55078	11.32	23.39	17.00	34.71	28.32	60.00	50.00	-25.29	-21.68

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.

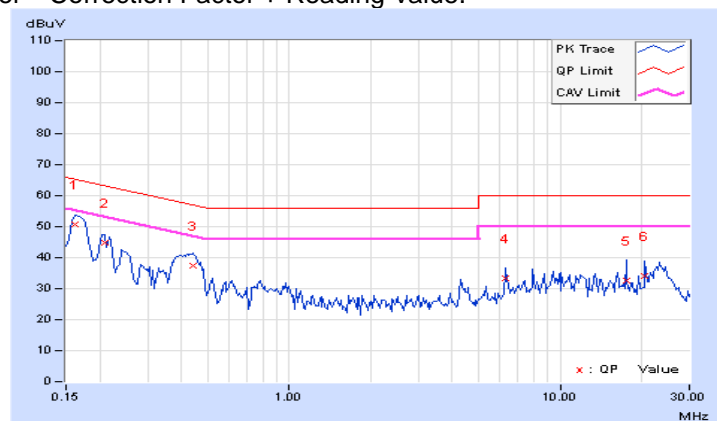


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	10.05	40.76	28.23	50.81	38.28	65.38	55.38	-14.57	-17.10
2	0.20859	10.03	34.68	24.84	44.71	34.87	63.26	53.26	-18.55	-18.39
3	0.43906	10.10	27.17	14.87	37.27	24.97	57.08	47.08	-19.81	-22.11
4	6.30859	10.35	22.98	20.14	33.33	30.49	60.00	50.00	-26.67	-19.51
5	17.64844	10.91	21.67	6.92	32.58	17.83	60.00	50.00	-27.42	-32.17
6	20.45703	11.01	23.05	9.44	34.06	20.45	60.00	50.00	-25.94	-29.55

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.

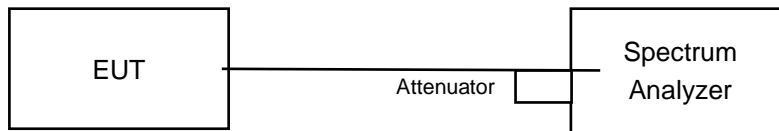


4.3 6dB Bandwidth Measurement

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

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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

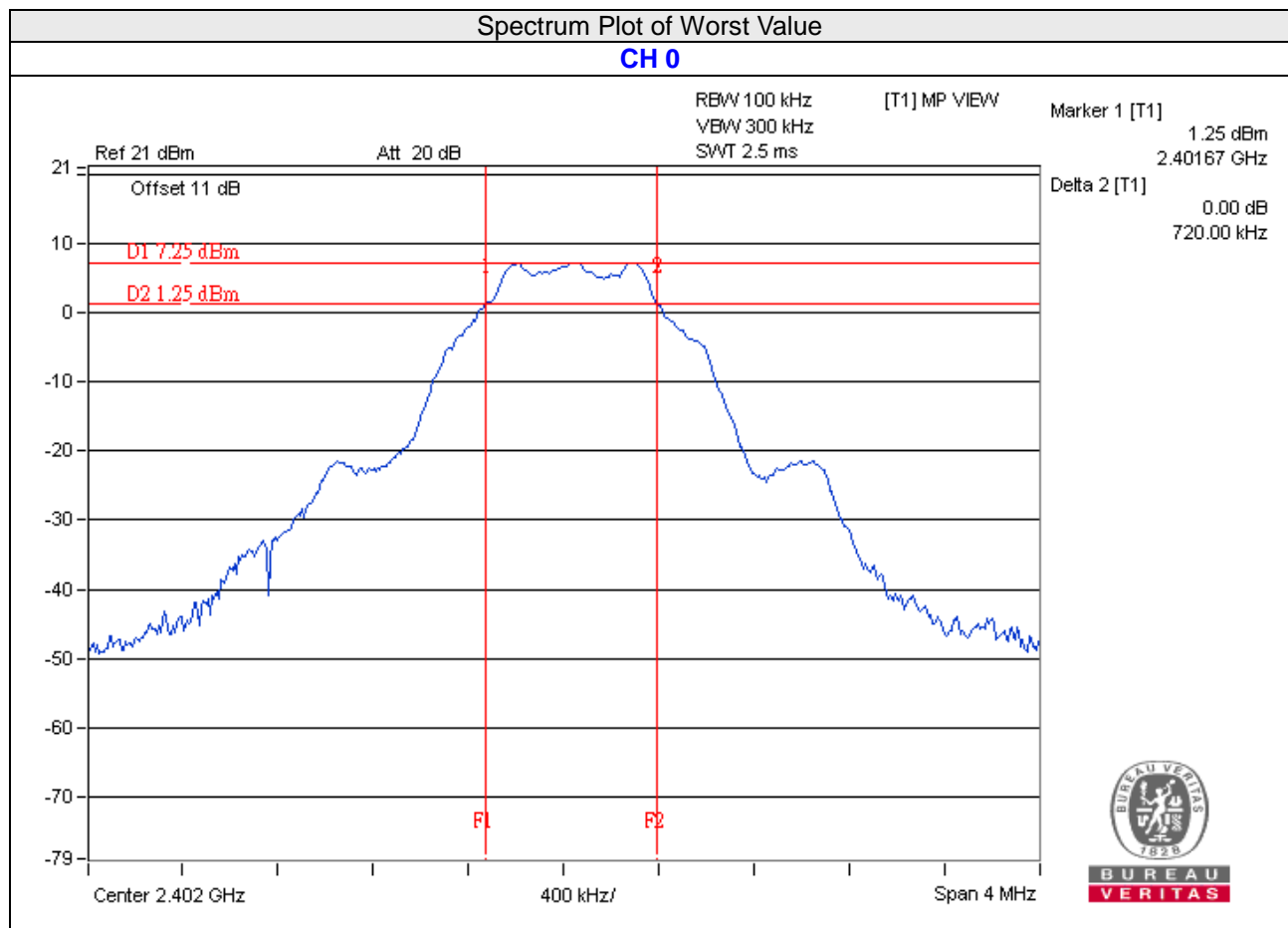
No deviation.

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
0	2402	0.72	0.5	Pass
19	2440	0.73	0.5	Pass
39	2480	0.73	0.5	Pass

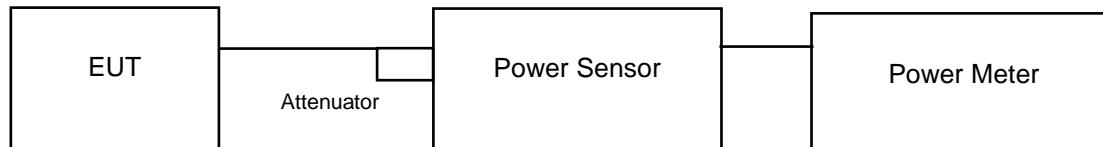


4.4 Conducted Output Power Measurement

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
0	2402	6.622	8.21	30	Pass
19	2440	6.561	8.17	30	Pass
39	2480	6.592	8.19	30	Pass

FOR AVERAGE POWER

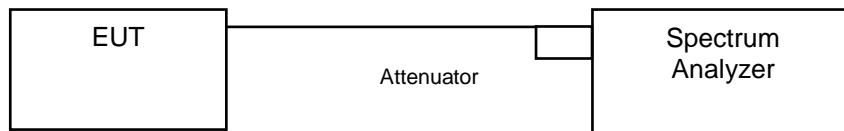
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	6.427	8.08
19	2440	6.383	8.05
39	2480	6.397	8.06

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

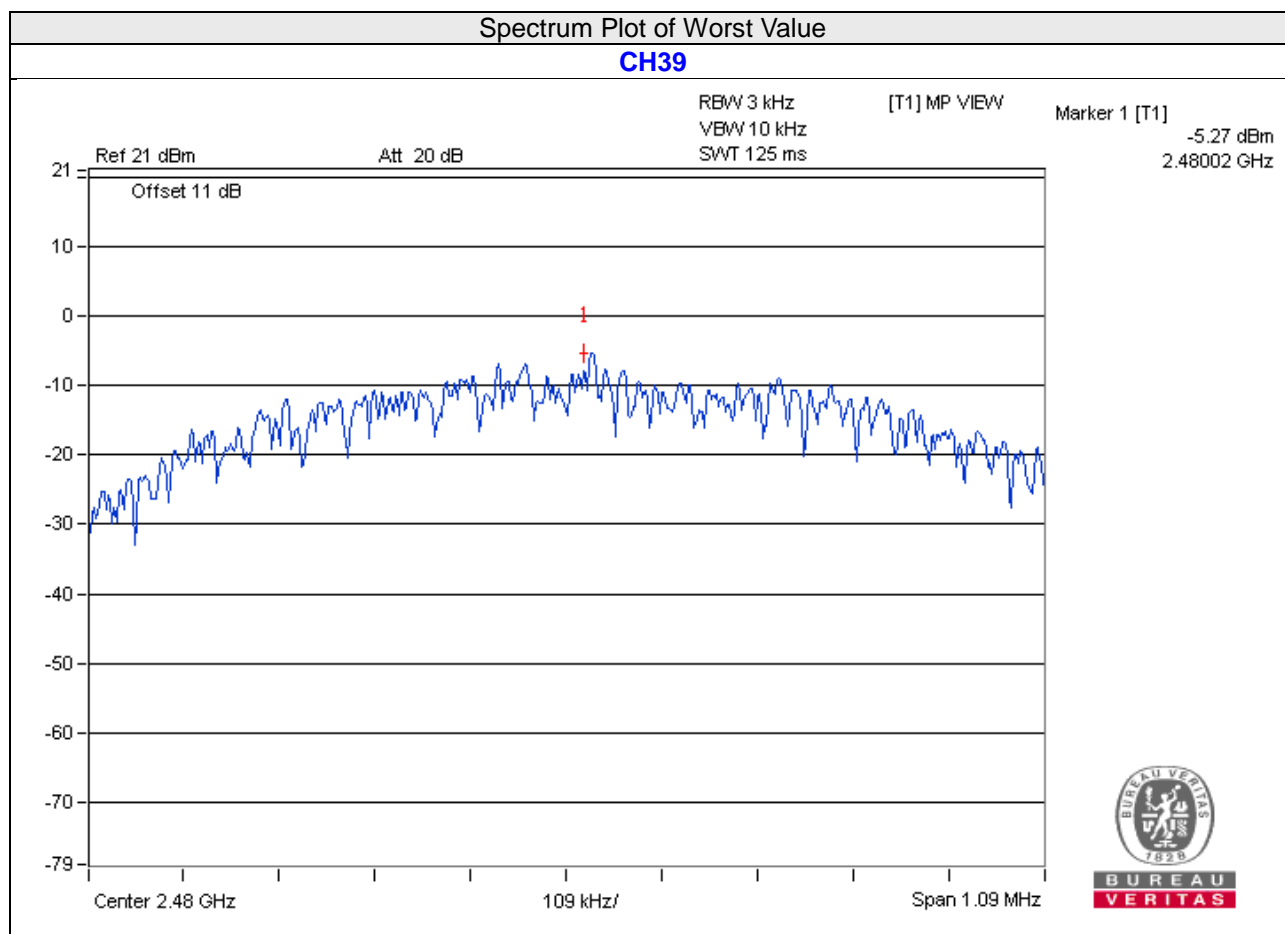
No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	2402	-6.27	8	Pass
19	2440	-5.54	8	Pass
39	2480	-5.27	8	Pass

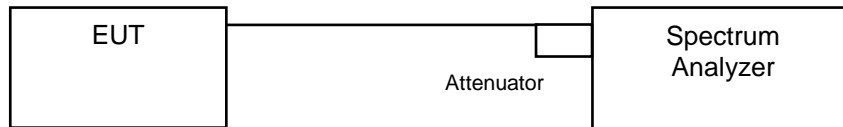


4.6 Conducted Out of Band Emission Measurement

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.

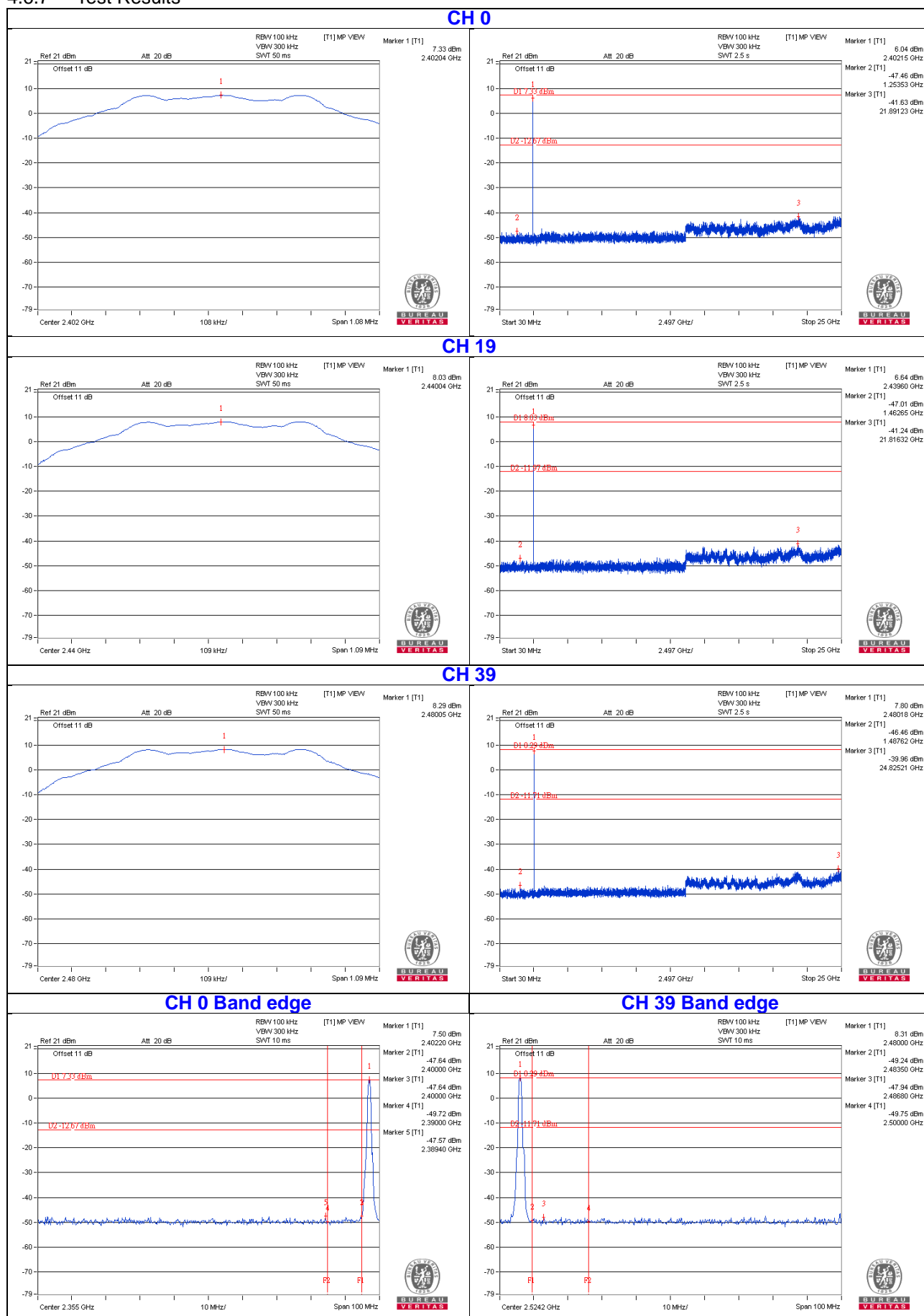
4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Same as Item 4.3.6

4.6.7 Test Results



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 FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---