

## FCC Test Report (BT-LE)

**Report No.:** RF170807E03-1

**FCC ID:** TLZ-CU302

**Test Model:** AW-CU302

**Received Date:** Aug. 07, 2017

**Test Date:** Aug. 18 to Sep. 18, 2017

**Issued Date:** Sep. 27, 2017

**Applicant:** AzureWave Technologies, Inc.

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

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



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### Release Control Record

Issue No.	Description	Date Issued
RF170807E03-1	Original release.	Sep. 27, 2017



## 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 -12.74dB at 16.46456MHz.
15.205 & 209 & 15.247(d)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -2.6dB at 4804.00MHz and 4880.00MHz.
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	No antenna connector is used.

### 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	5.30 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.16 dB
	6GHz ~ 18GHz	4.91 dB
	18GHz ~ 40GHz	5.30 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	IEEE 802.11 b/g/n + Bluetooth 4.2 LE WLAN/BT Microcontroller Module
Brand	AzureWave
Test Model	AW-CU302
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 3.3V from host equipment
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Up to 1Mbps
Operating Frequency	2402MHz ~ 2480MHz
Number of Channel	40
Output Power	0.9183mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. There are WLAN and Bluetooth technology used for the EUT.
2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	Bluetooth

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

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

Antenna No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length
1(Internal)	AzureWave	AW-CU302 ANT	2.5	2.4~2.4835GHz	Chip	NA	NA
2(External)	TAOGLAS	FXP73.07.0100A	3	2.4~2.4835GHz	Monopole	I-PEX	100mm
3(External)	TAOGLAS	PC11.07.0100A	3	2.4~2.4835GHz	Dipole	I-PEX	100mm
4(External)	TAOGLAS	FXP74.07.0100A	4	2.4~2.4835GHz	PIFA	I-PEX	100mm
5(External)	TAOGLAS	PC17.07.0070A	0.9	2.4~2.4835GHz	PIFA	I-PEX	70mm
6(External)	TAOGLAS	GW.17.07.0250E	2.7	2.4~2.4835GHz	Dipole	I-PEX	250mm
7(External)	TAOGLAS	FXP840.07.0055B	2	2.4~2.4836GHz	PIFA	I-PEX	55mm
8(External)	TAOGLAS	FXP75.07.0045B	2.5	2.4~2.4836GHz	PIFA	I-PEX	45mm
9(External)	LAIRD	NanoBlue-IP4_MAF94045	2	2.4~2.4835GHz	Dipole	I-PEX	100mm
10(External)	LAIRD	EBL2400A1-23UFL	2.45	2.4~2.4835GHz	Dipole	I-PEX	230mm
11(External)	LAIRD	NanoBlade-IP04_CAF94505	2	2.4~2.4835GHz	Dipole	I-PEX	100mm
12(External)	MOLEX	1461530100	3	2.4~2.4835GHz	Dipole	I-PEX	100mm
13(External)	MOLEX	1461530150	2.8	2.4~2.4835GHz	Dipole	I-PEX	150mm
14(External)	MOLEX	1461530200	2.6	2.4~2.4835GHz	Dipole	I-PEX	200mm
15(External)	MOLEX	1461530250	2.4	2.4~2.4835GHz	Dipole	I-PEX	250mm
16(External)	MOLEX	1461530300	2.2	2.4~2.4835GHz	Dipole	I-PEX	300mm
17(External)	MOLEX	2042810050	2.2	2.4~2.4835GHz	Dipole	I-PEX	50mm
18(External)	MOLEX	2042810100	2	2.4~2.4835GHz	Dipole	I-PEX	100mm
19(External)	MOLEX	2042810150	1.8	2.4~2.4835GHz	Dipole	I-PEX	150mm
20(External)	MOLEX	2042810200	1.6	2.4~2.4835GHz	Dipole	I-PEX	200mm
21(External)	MOLEX	2042810250	1.4	2.4~2.4835GHz	Dipole	I-PEX	250mm
22(External)	MOLEX	2042810300	1.2	2.4~2.4835GHz	Dipole	I-PEX	300mm
23(External)	YAGEO	ANTX100F113B24003	2.9	2.4~2.4835GHz	PIFA	I-PEX	100mm
24(External)	YAGEO	ANTX100P113B24003	2.8	2.4~2.4835GHz	PIFA	I-PEX	100mm
25(External)	LYNWAVE	ALA110-052020	2	2.4~2.4835GHz	Dipole	I-PEX	50mm
26(External)	LYNWAVE	ALA120-052024	2	2.4~2.4835GHz	Dipole	I-PEX	160mm
27(External)	LYNWAVE	ALA150-052020	2	2.4~2.4835GHz	Dipole	I-PEX	85mm
28(External)	LYNWAVE	ALA140-05102J	2	2.4~2.4835GHz	Dipole	I-PEX	40mm
29(External)	LYNWAVE	ALA120-051020	2	2.4~2.4835GHz	Dipole	I-PEX	50mm
30(External)	LYNWAVE	ALA120-051022	2	2.4~2.4835GHz	Dipole	I-PEX	30mm
31(External)	LYNWAVE	ALA140-051020	1.88	2.4~2.4835GHz	Dipole	I-PEX	70mm
32(External)	LYNWAVE	ALA150-05102B	2	2.4~2.4835GHz	Dipole	I-PEX	10mm
33(External)	LYNWAVE	ALA150-05102C	2	2.4~2.4835GHz	Dipole	I-PEX	75mm
34(External)	LYNWAVE	ALA1500-05102F	2	2.4~2.4835GHz	Dipole	I-PEX	140mm
35(External)	LYNWAVE	ALA150-05102J	2	2.4~2.4835GHz	Dipole	I-PEX	100mm
36(External)	LYNWAVE	ALA140-05102D	2	2.4~2.4835GHz	Dipole	I-PEX	95mm
37(External)	LYNWAVE	ALA150-051026	2	2.4~2.4835GHz	Dipole	I-PEX	150mm

From the above antennas, antenna 1, 2, 3, 4 were selected for the test and its data was recorded in this report.

4. 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	-	√	-	-	EUT with Chip antenna
2	-	√	-	-	EUT with Monopole antenna
3	-	√	-	-	EUT with Dipole antenna
4	√	√	√	√	EUT with PIFA antenna

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:** The EUT's antenna 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.

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.

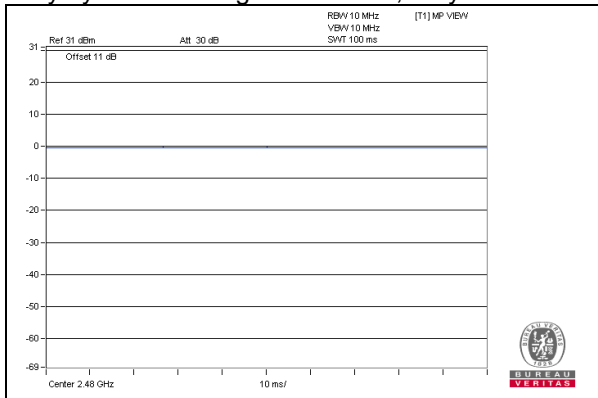
AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	0, 19, 39	GFSK	1

**Test Condition:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (System)	TESTED BY
RE $\geq$ 1G	24deg. C, 65%RH	120Vac, 60Hz	JyunChun Lin
RE $<$ 1G	25deg. C, 72%RH	120Vac, 60Hz	Eason Tseng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

### 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.

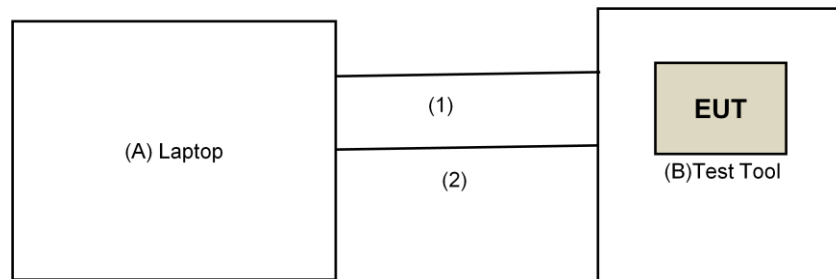
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6440	F9LYQ32	FCC DoC	Provided by Lab
B.	Test Tool	AzureWave	NA	NA	NA	Supplied by clien

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.	USB Cable	1	1.6	Yes	0	Provided by Lab
2.	USB Cable	1	1.6	Yes	0	Provided by Lab

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

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

## 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
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Pre-Amplifier <sup>(*)</sup> EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna <sup>(*)</sup> 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-01	Nov. 10, 2016	Nov. 09, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Dec. 13, 2016	Dec. 12, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 27, 2016	Dec. 26, 2017
Pre-Amplifier EMCI	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Pre-Amplifier EMCI	EMC184045SE	980387	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	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer Agilent	E4446A	MY48250253	Dec. 21, 2016	Dec. 20, 2017
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. 4.
4. The FCC Designation Number is TW2022.
5. The CANADA Site Registration No. is 20331-2
6. Tested Date: Aug. 18 to Sep. 18, 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:**

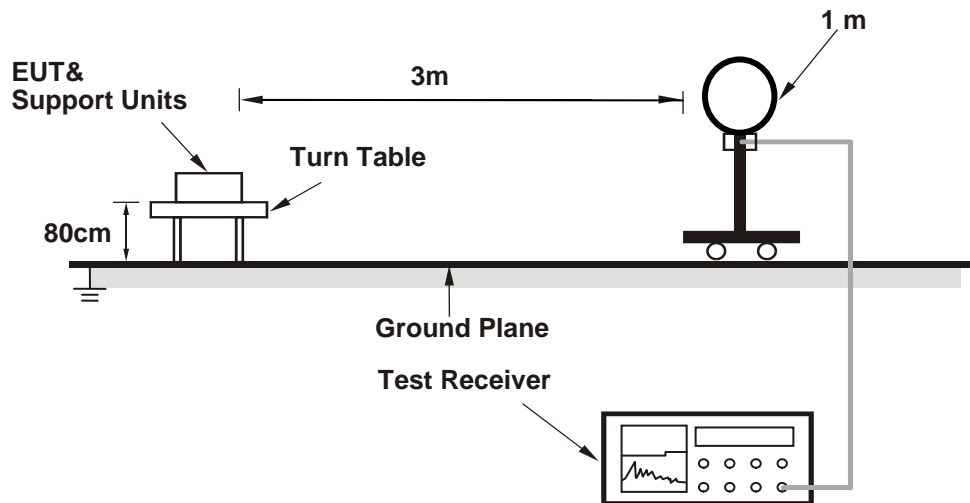
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

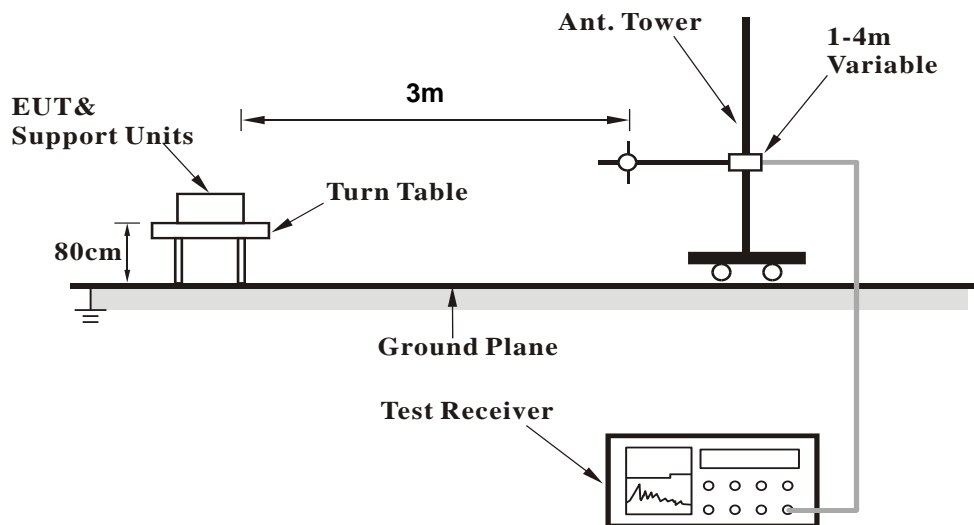
No deviation.

#### 4.1.5 Test Setup

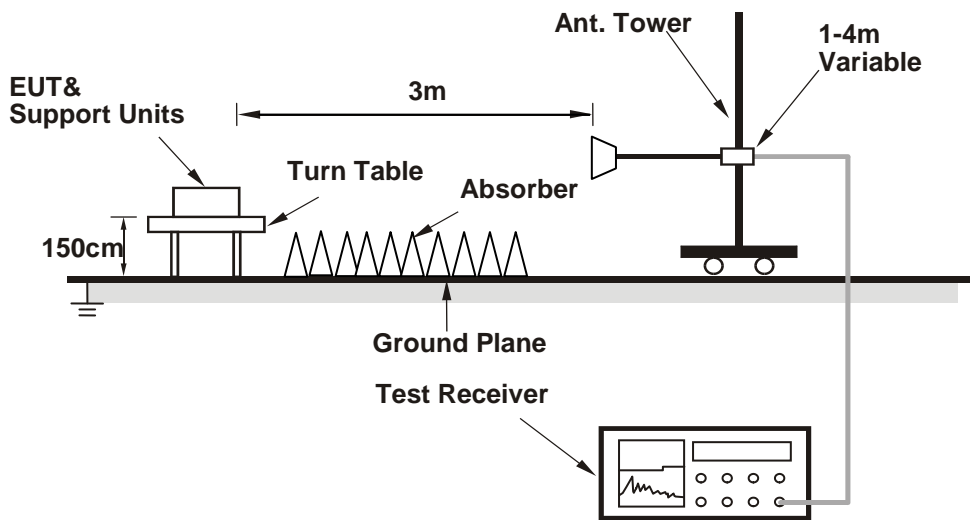
##### For Radiated emission below 30MHz



##### 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**

- a. Connected the EUT with the Laptop.
- b. Contorlling software (SmartSnippets Ver 3.9) has been activated to set the EUT on specific status.

4.1.7 Test Results (Mode 1)

Above 1GHz Data:

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	55.1 PK	74.0	-18.9	2.04 H	37	56.4	-1.3
2	2390.00	42.1 AV	54.0	-11.9	2.04 H	37	43.4	-1.3
3	*2402.00	95.1 PK			2.04 H	37	96.2	-1.1
4	*2402.00	94.0 AV			2.04 H	37	95.1	-1.1
5	4804.00	39.2 PK	74.0	-34.8	1.08 H	129	36.0	3.2
6	4804.00	30.5 AV	54.0	-23.5	1.08 H	129	27.3	3.2

**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	2390.00	54.4 PK	74.0	-19.6	1.02 V	27	55.7	-1.3
2	2390.00	41.7 AV	54.0	-12.3	1.02 V	27	43.0	-1.3
3	*2402.00	87.3 PK			1.02 V	27	88.4	-1.1
4	*2402.00	86.5 AV			1.02 V	27	87.6	-1.1
5	4804.00	41.5 PK	74.0	-32.5	2.44 V	17	38.3	3.2
6	4804.00	34.2 AV	54.0	-19.8	2.44 V	17	31.0	3.2

**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.

<b>CHANNEL</b>	TX Channel 19	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	95.2 PK			1.50 H	33	96.4	-1.2
2	*2440.00	94.1 AV			1.50 H	33	95.3	-1.2
3	4880.00	39.7 PK	74.0	-34.3	1.20 H	110	36.3	3.4
4	4880.00	30.1 AV	54.0	-23.9	1.20 H	110	26.7	3.4
5	7320.00	41.4 PK	74.0	-32.6	2.24 H	360	31.6	9.8
6	7320.00	32.1 AV	54.0	-21.9	2.24 H	360	22.3	9.8

**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	*2440.00	87.2 PK			1.15 V	36	88.4	-1.2
2	*2440.00	86.4 AV			1.15 V	36	87.6	-1.2
3	4880.00	42.4 PK	74.0	-31.6	1.24 V	197	39.0	3.4
4	4880.00	34.4 AV	54.0	-19.6	1.24 V	197	31.0	3.4
5	7320.00	46.6 PK	74.0	-27.4	3.66 V	195	36.8	9.8
6	7320.00	35.7 AV	54.0	-18.3	3.66 V	195	25.9	9.8

**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
5. " \* ": Fundamental frequency.

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	95.3 PK			1.50 H	30	96.3	-1.0
2	*2480.00	94.2 AV			1.50 H	30	95.2	-1.0
3	2483.50	56.5 PK	74.0	-17.5	1.50 H	30	57.5	-1.0
4	2483.50	42.6 AV	54.0	-11.4	1.50 H	30	43.6	-1.0
5	4960.00	39.4 PK	74.0	-34.6	1.18 H	109	35.8	3.6
6	4960.00	29.7 AV	54.0	-24.3	1.18 H	109	26.1	3.6
7	7440.00	45.3 PK	74.0	-28.7	1.87 H	254	35.2	10.1
8	7440.00	33.4 AV	54.0	-20.6	1.87 H	254	23.3	10.1

**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	88.4 PK			1.00 V	33	89.4	-1.0
2	*2480.00	87.0 AV			1.00 V	33	88.0	-1.0
3	2483.50	55.2 PK	74.0	-18.8	1.00 V	33	56.2	-1.0
4	2483.50	42.1 AV	54.0	-11.9	1.00 V	33	43.1	-1.0
5	4960.00	42.8 PK	74.0	-31.2	1.22 V	206	39.2	3.6
6	4960.00	34.7 AV	54.0	-19.3	1.22 V	206	31.1	3.6
7	7440.00	48.3 PK	74.0	-25.7	3.91 V	203	38.2	10.1
8	7440.00	36.1 AV	54.0	-17.9	3.91 V	203	26.0	10.1

**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:**

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	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	44.20	30.1 QP	40.0	-9.9	1.50 H	243	37.8	-7.7
2	128.05	30.3 QP	43.5	-13.2	2.00 H	119	39.6	-9.3
3	224.52	27.1 QP	46.0	-18.9	1.31 H	282	38.8	-11.7
4	312.00	33.6 QP	46.0	-12.4	1.50 H	178	40.8	-7.2
5	384.00	33.4 QP	46.0	-12.6	1.43 H	221	39.0	-5.6
6	821.65	32.7 QP	46.0	-13.3	1.12 H	46	29.8	2.9

**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	154.23	30.6 QP	43.5	-12.9	1.00 V	221	38.5	-7.9
2	232.40	28.4 QP	46.0	-17.6	1.50 V	305	38.9	-10.5
3	360.02	29.6 QP	46.0	-16.4	1.00 V	79	35.7	-6.1
4	497.90	29.5 QP	46.0	-16.5	1.50 V	279	32.3	-2.8
5	797.78	34.2 QP	46.0	-11.8	1.50 V	243	31.7	2.5
6	861.00	34.2 QP	46.0	-11.8	1.00 V	264	30.8	3.4

**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:

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	56.1 PK	74.0	-17.9	1.04 H	65	57.4	-1.3
2	2390.00	43.2 AV	54.0	-10.8	1.04 H	65	44.5	-1.3
3	*2402.00	97.2 PK			1.14 H	66	98.3	-1.1
4	*2402.00	96.9 AV			1.14 H	66	98.0	-1.1
5	4804.00	56.6 PK	74.0	-17.4	1.07 H	76	53.4	3.2
<b>6</b>	<b>4804.00</b>	<b>51.4 AV</b>	<b>54.0</b>	<b>-2.6</b>	<b>1.07 H</b>	<b>76</b>	<b>48.2</b>	<b>3.2</b>

**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	55.3 PK	74.0	-18.7	2.57 V	162	56.6	-1.3
2	2390.00	41.9 AV	54.0	-12.1	2.57 V	162	43.2	-1.3
3	*2402.00	94.5 PK			2.57 V	162	95.6	-1.1
4	*2402.00	94.3 AV			2.57 V	162	95.4	-1.1
5	4804.00	54.8 PK	74.0	-19.2	2.59 V	227	51.6	3.2
6	4804.00	49.6 AV	54.0	-4.4	2.59 V	227	46.4	3.2

**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.



<b>CHANNEL</b>	TX Channel 19	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	95.5 PK			1.00 H	63	96.7	-1.2
2	*2440.00	94.1 AV			1.00 H	63	95.3	-1.2
3	4880.00	55.8 PK	74.0	-18.2	1.14 H	73	52.4	3.4
4	<b>4880.00</b>	<b>51.4 AV</b>	<b>54.0</b>	<b>-2.6</b>	<b>1.14 H</b>	<b>73</b>	<b>48.0</b>	<b>3.4</b>
5	7320.00	52.4 PK	74.0	-21.6	1.04 H	88	42.6	9.8
6	7320.00	42.1 AV	54.0	-11.9	1.04 H	88	32.3	9.8

**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	*2440.00	92.8 PK			2.54 V	174	94.0	-1.2
2	*2440.00	91.5 AV			2.54 V	174	92.7	-1.2
3	4880.00	54.3 PK	74.0	-19.7	2.54 V	236	50.9	3.4
4	4880.00	49.6 AV	54.0	-4.4	2.54 V	236	46.2	3.4
5	7320.00	50.6 PK	74.0	-23.4	1.77 V	242	40.8	9.8
6	7320.00	40.3 AV	54.0	-13.7	1.77 V	242	30.5	9.8

**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
5. " \* ": Fundamental frequency.

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	95.2 PK			1.04 H	65	96.2	-1.0
2	*2480.00	94.0 AV			1.04 H	65	95.0	-1.0
3	2483.50	57.5 PK	74.0	-16.5	1.04 H	65	58.5	-1.0
4	2483.50	43.4 AV	54.0	-10.6	1.04 H	65	44.4	-1.0
5	4960.00	56.0 PK	74.0	-18.0	1.09 H	81	52.4	3.6
6	4960.00	51.2 AV	54.0	-2.8	1.09 H	81	47.6	3.6
7	7440.00	52.0 PK	74.0	-22.0	1.01 H	83	41.9	10.1
8	7440.00	42.0 AV	54.0	-12.0	1.01 H	83	31.9	10.1

**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	92.5 PK			2.55 V	180	93.5	-1.0
2	*2480.00	91.4 AV			2.55 V	180	92.4	-1.0
3	2483.50	56.7 PK	74.0	-17.3	2.55 V	180	57.7	-1.0
4	2483.50	42.1 AV	54.0	-11.9	2.55 V	180	43.1	-1.0
5	4960.00	54.6 PK	74.0	-19.4	2.52 V	227	51.0	3.6
6	4960.00	49.7 AV	54.0	-4.3	2.52 V	227	46.1	3.6
7	7440.00	50.9 PK	74.0	-23.1	1.78 V	243	40.8	10.1
8	7440.00	40.5 AV	54.0	-13.5	1.78 V	243	30.4	10.1

**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:**

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	43.26	24.5 QP	40.0	-15.5	1.73 H	224	32.3	-7.8
2	166.55	33.6 QP	43.5	-9.9	1.56 H	283	41.9	-8.3
3	199.92	34.2 QP	43.5	-9.3	1.05 H	134	45.6	-11.4
4	452.05	29.4 QP	46.0	-16.6	2.02 H	224	32.9	-3.5
5	597.95	30.2 QP	46.0	-15.8	1.12 H	64	30.7	-0.5
6	720.03	32.8 QP	46.0	-13.2	1.16 H	103	31.7	1.1

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	138.06	32.2 QP	43.5	-11.3	1.57 V	243	40.4	-8.2
2	166.55	34.5 QP	43.5	-9.0	1.13 V	287	42.8	-8.3
3	199.80	31.2 QP	43.5	-12.3	1.51 V	206	42.6	-11.4
4	276.11	37.2 QP	46.0	-8.8	1.14 V	93	45.4	-8.2
5	599.22	30.2 QP	46.0	-15.8	1.06 V	179	30.6	-0.4
6	816.02	31.5 QP	46.0	-14.5	1.51 V	221	28.8	2.7

**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

## 4.1.9 Test Results (Mode 3)

## Above 1GHz Data:

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	56.1 PK	74.0	-17.9	1.48 H	42	57.4	-1.3
2	2390.00	44.4 AV	54.0	-9.6	1.48 H	42	45.7	-1.3
3	*2402.00	95.3 PK			1.38 H	59	96.4	-1.1
4	*2402.00	94.3 AV			1.38 H	59	95.4	-1.1
5	4804.00	45.2 PK	74.0	-28.8	1.00 H	316	42.0	3.2
6	4804.00	38.4 AV	54.0	-15.6	1.00 H	316	35.2	3.2

**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	2390.00	55.6 PK	74.0	-18.4	3.39 V	6	56.9	-1.3
2	2390.00	44.2 AV	54.0	-9.8	3.39 V	6	45.5	-1.3
3	*2402.00	94.4 PK			3.39 V	6	95.5	-1.1
4	*2402.00	93.2 AV			3.39 V	6	94.3	-1.1
5	4804.00	47.9 PK	74.0	-26.1	2.58 V	309	44.7	3.2
6	4804.00	41.3 AV	54.0	-12.7	2.58 V	309	38.1	3.2

**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.

<b>CHANNEL</b>	TX Channel 19	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	95.4 PK			1.43 H	51	96.6	-1.2
2	*2440.00	94.2 AV			1.43 H	51	95.4	-1.2
3	4880.00	44.8 PK	74.0	-29.2	1.00 H	328	41.4	3.4
4	4880.00	38.1 AV	54.0	-15.9	1.00 H	328	34.7	3.4
5	7320.00	45.8 PK	74.0	-28.2	1.82 H	151	36.0	9.8
6	7320.00	32.9 AV	54.0	-21.1	1.82 H	151	23.1	9.8

**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	*2440.00	94.5 PK			3.37 V	8	95.7	-1.2
2	*2440.00	93.3 AV			3.37 V	8	94.5	-1.2
3	4880.00	47.7 PK	74.0	-26.3	2.59 V	280	44.3	3.4
4	4880.00	41.2 AV	54.0	-12.8	2.59 V	280	37.8	3.4
5	7320.00	43.9 PK	74.0	-30.1	1.72 V	76	34.1	9.8
6	7320.00	32.6 AV	54.0	-21.4	1.72 V	76	22.8	9.8

**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
5. " \* ": Fundamental frequency.

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	96.2 PK			1.53 H	58	97.2	-1.0
2	*2480.00	95.0 AV			1.53 H	58	96.0	-1.0
3	2483.50	55.3 PK	74.0	-18.7	1.53 H	58	56.3	-1.0
4	2483.50	43.1 AV	54.0	-10.9	1.53 H	58	44.1	-1.0
5	4960.00	45.4 PK	74.0	-28.6	1.02 H	323	41.8	3.6
6	4960.00	38.5 AV	54.0	-15.5	1.02 H	323	34.9	3.6
7	7440.00	45.8 PK	74.0	-28.2	1.84 H	163	35.7	10.1
8	7440.00	32.8 AV	54.0	-21.2	1.84 H	163	22.7	10.1

**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	94.1 PK			3.38 V	12	95.1	-1.0
2	*2480.00	93.0 AV			3.38 V	12	94.0	-1.0
3	2483.50	56.4 PK	74.0	-17.6	3.38 V	12	57.4	-1.0
4	2483.50	44.4 AV	54.0	-9.6	3.38 V	12	45.4	-1.0
5	4960.00	47.6 PK	74.0	-26.4	2.57 V	293	44.0	3.6
6	4960.00	41.3 AV	54.0	-12.7	2.57 V	293	37.7	3.6
7	7440.00	43.8 PK	74.0	-30.2	1.77 V	91	33.7	10.1
8	7440.00	32.5 AV	54.0	-21.5	1.77 V	91	22.4	10.1

**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:**

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	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	44.32	26.2 QP	40.0	-13.8	1.56 H	224	34.0	-7.8
2	138.03	30.4 QP	43.5	-13.1	2.00 H	179	38.6	-8.2
3	166.58	33.2 QP	43.5	-10.3	2.00 H	246	41.5	-8.3
4	199.87	32.9 QP	43.5	-10.6	1.43 H	278	44.3	-11.4
5	607.15	29.4 QP	46.0	-16.6	1.52 H	220	29.7	-0.3
6	720.01	31.8 QP	46.0	-14.2	1.53 H	309	30.7	1.1

**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	137.96	32.3 QP	43.5	-11.2	1.71 V	318	40.5	-8.2
2	166.58	34.5 QP	43.5	-9.0	1.57 V	78	42.8	-8.3
3	199.22	29.8 QP	43.5	-13.7	1.55 V	216	41.2	-11.4
4	276.22	30.7 QP	46.0	-15.3	1.53 V	297	38.9	-8.2
5	455.83	29.5 QP	46.0	-16.5	1.03 V	96	33.0	-3.5
6	828.86	32.2 QP	46.0	-13.8	1.46 V	205	29.2	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

## 4.1.10 Test Results (Mode 4)

## Above 1GHz Data:

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	54.3 PK	74.0	-19.7	1.02 H	115	55.6	-1.3
2	2390.00	41.4 AV	54.0	-12.6	1.02 H	115	42.7	-1.3
3	*2402.00	96.7 PK			1.02 H	115	97.8	-1.1
4	*2402.00	95.8 AV			1.02 H	115	96.9	-1.1
5	4804.00	42.9 PK	74.0	-31.1	1.16 H	104	39.7	3.2
6	4804.00	35.0 AV	54.0	-19.0	1.16 H	104	31.8	3.2

**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	2390.00	53.9 PK	74.0	-20.1	3.88 V	338	55.2	-1.3
2	2390.00	41.1 AV	54.0	-12.9	3.88 V	338	42.4	-1.3
3	*2402.00	92.5 PK			3.88 V	338	93.6	-1.1
4	*2402.00	91.3 AV			3.88 V	338	92.4	-1.1
5	4804.00	43.7 PK	74.0	-30.3	2.82 V	128	40.5	3.2
6	4804.00	36.5 AV	54.0	-17.5	2.82 V	128	33.3	3.2

**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.



<b>CHANNEL</b>	TX Channel 19	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	97.2 PK			1.07 H	119	98.4	-1.2
2	*2440.00	96.1 AV			1.07 H	119	97.3	-1.2
3	4880.00	43.2 PK	74.0	-30.8	1.19 H	93	39.8	3.4
4	4880.00	35.4 AV	54.0	-18.6	1.19 H	93	32.0	3.4
5	7320.00	45.0 PK	74.0	-29.0	1.74 H	139	35.2	9.8
6	7320.00	31.7 AV	54.0	-22.3	1.74 H	139	21.9	9.8

**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	*2440.00	92.3 PK			3.89 V	353	93.5	-1.2
2	*2440.00	91.0 AV			3.89 V	353	92.2	-1.2
3	4880.00	43.8 PK	74.0	-30.2	2.80 V	121	40.4	3.4
4	4880.00	36.8 AV	54.0	-17.2	2.80 V	121	33.4	3.4
5	7320.00	43.7 PK	74.0	-30.3	1.67 V	260	33.9	9.8
6	7320.00	31.2 AV	54.0	-22.8	1.67 V	260	21.4	9.8

**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
5. " \* ": Fundamental frequency.

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	96.2 PK			1.03 H	117	97.2	-1.0
2	*2480.00	95.3 AV			1.03 H	117	96.3	-1.0
3	2483.50	55.7 PK	74.0	-18.3	1.03 H	117	56.7	-1.0
4	2483.50	42.9 AV	54.0	-11.1	1.03 H	117	43.9	-1.0
5	4960.00	43.1 PK	74.0	-30.9	1.15 H	107	39.5	3.6
6	4960.00	35.3 AV	54.0	-18.7	1.15 H	107	31.7	3.6
7	7440.00	44.3 PK	74.0	-29.7	1.70 H	145	34.2	10.1
8	7440.00	31.2 AV	54.0	-22.8	1.70 H	145	21.1	10.1

**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	92.5 PK			3.91 V	348	93.5	-1.0
2	*2480.00	91.2 AV			3.91 V	348	92.2	-1.0
3	2483.50	55.4 PK	74.0	-18.6	3.91 V	348	56.4	-1.0
4	2483.50	42.7 AV	54.0	-11.3	3.91 V	348	43.7	-1.0
5	4960.00	43.9 PK	74.0	-30.1	2.77 V	119	40.3	3.6
6	4960.00	36.8 AV	54.0	-17.2	2.77 V	119	33.2	3.6
7	7440.00	43.8 PK	74.0	-30.2	1.68 V	254	33.7	10.1
8	7440.00	31.0 AV	54.0	-23.0	1.68 V	254	20.9	10.1

**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:**

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	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	44.65	25.2 QP	40.0	-14.8	1.50 H	114	33.1	-7.9
2	166.56	34.5 QP	43.5	-9.0	1.48 H	210	42.8	-8.3
3	199.90	33.5 QP	43.5	-10.0	1.65 H	224	44.9	-11.4
4	441.56	29.5 QP	46.0	-16.5	1.59 H	66	33.3	-3.8
5	600.63	31.0 QP	46.0	-15.0	2.00 H	311	31.4	-0.4
6	720.01	32.4 QP	46.0	-13.6	1.15 H	218	31.3	1.1

**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	137.99	31.3 QP	43.5	-12.2	1.51 V	139	39.5	-8.2
2	165.99	32.4 QP	43.5	-11.1	1.50 V	308	40.7	-8.3
3	199.92	31.1 QP	43.5	-12.4	1.56 V	278	42.5	-11.4
4	296.19	28.6 QP	46.0	-17.4	1.50 V	203	36.3	-7.7
5	597.26	30.2 QP	46.0	-15.8	1.15 V	203	30.7	-0.5
6	796.57	35.4 QP	46.0	-10.6	1.50 V	143	33.0	2.4

**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. 29, 2016	Sep. 28, 2017
RF Cable	5D-FB	COCCAB-001	Sep. 30, 2016	Sep. 29, 2017
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: Aug. 22, 2017

#### 4.2.3 Test Procedures

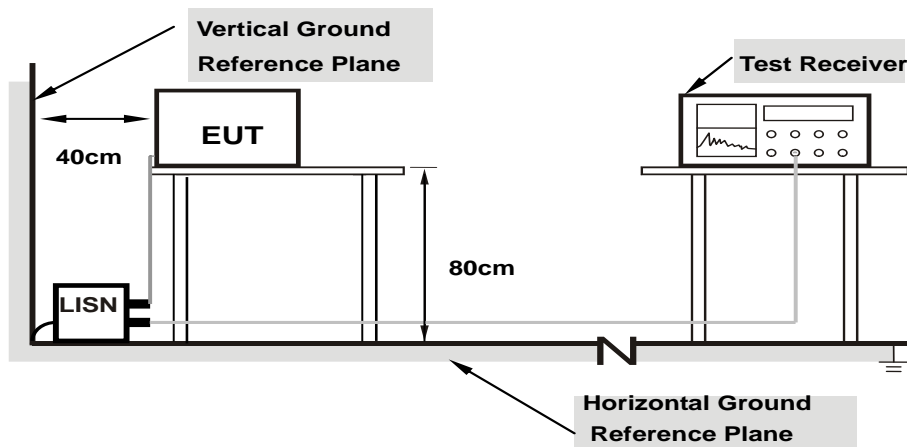
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

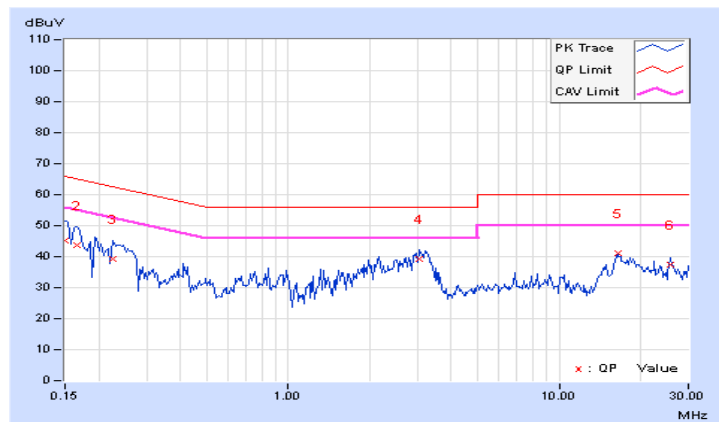
#### 4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.07	35.05	19.91	45.12	29.98	66.00	56.00	-20.88	-26.02
2	0.16562	10.07	33.46	29.58	43.53	39.65	65.18	55.18	-21.65	-15.53
3	0.22422	10.07	29.28	11.53	39.35	21.60	62.66	52.66	-23.31	-31.06
4	3.04688	10.22	29.14	21.98	39.36	32.20	56.00	46.00	-16.64	-13.80
<b>5</b>	<b>16.46456</b>	<b>11.06</b>	<b>30.12</b>	<b>26.20</b>	<b>41.18</b>	<b>37.26</b>	<b>60.00</b>	<b>50.00</b>	<b>-18.82</b>	<b>-12.74</b>
6	25.87500	11.33	26.22	23.39	37.55	34.72	60.00	50.00	-22.45	-15.28

#### 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.

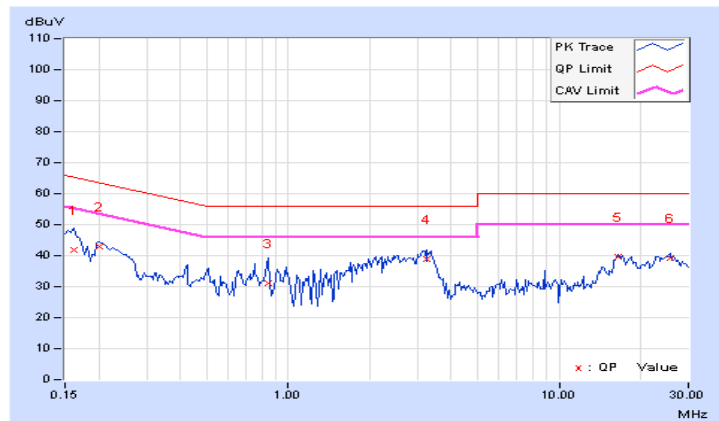


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	10.05	31.63	22.77	41.68	32.82	65.38	55.38	-23.70	-22.56
2	0.20078	10.03	33.04	19.34	43.07	29.37	63.58	53.58	-20.51	-24.21
3	0.84531	10.11	20.91	11.12	31.02	21.23	56.00	46.00	-24.98	-24.77
4	3.26563	10.21	28.78	22.08	38.99	32.29	56.00	46.00	-17.01	-13.71
5	16.46875	10.85	28.93	24.65	39.78	35.50	60.00	50.00	-20.22	-14.50
6	25.87109	10.97	28.13	23.57	39.10	34.54	60.00	50.00	-20.90	-15.46

**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.

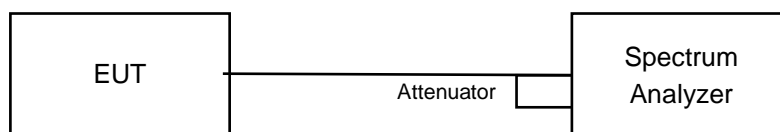


### 4.3 6dB Bandwidth Measurement

#### 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

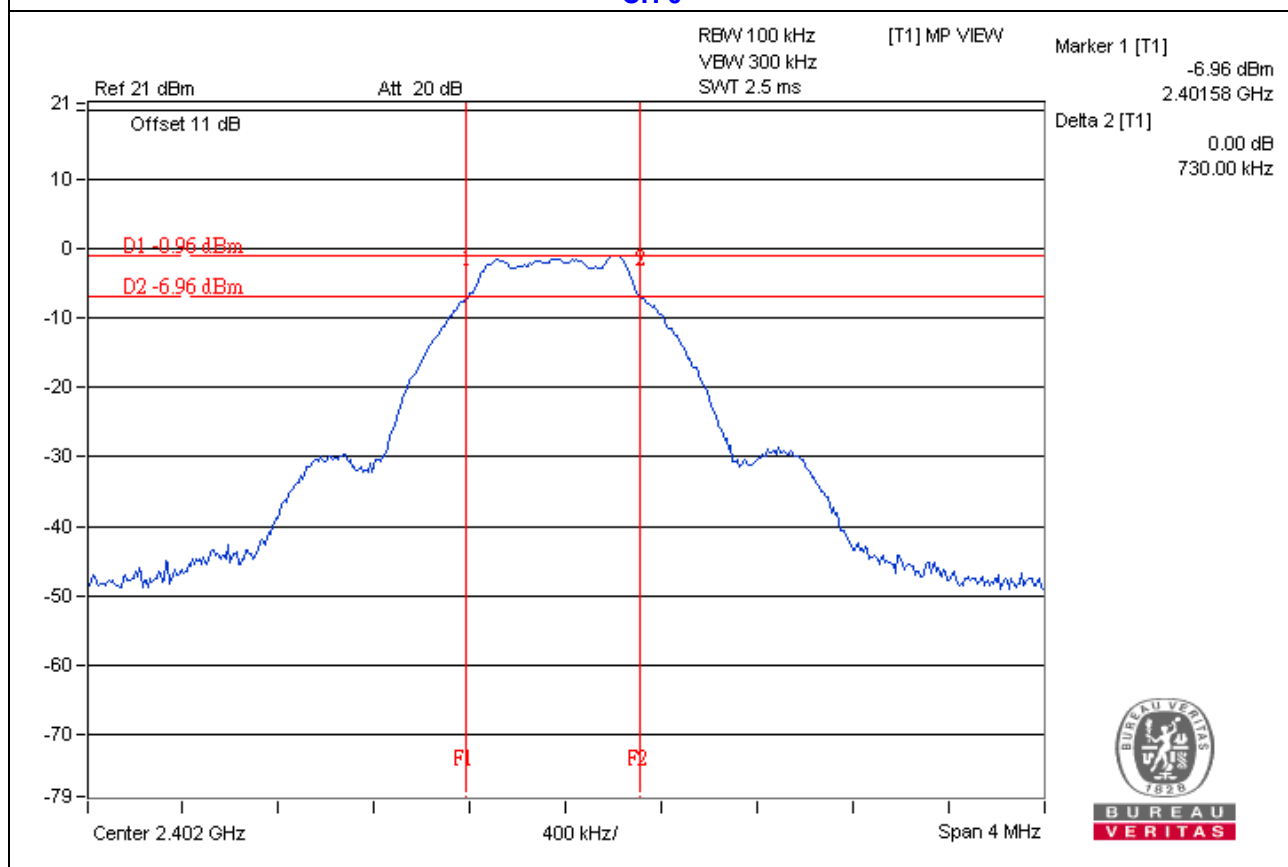
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



#### 4.3.7 Test Result

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	0.73	0.5	Pass
19	2440	0.74	0.5	Pass
39	2480	0.74	0.5	Pass

Spectrum Plot of Worst Value  
**CH 0**

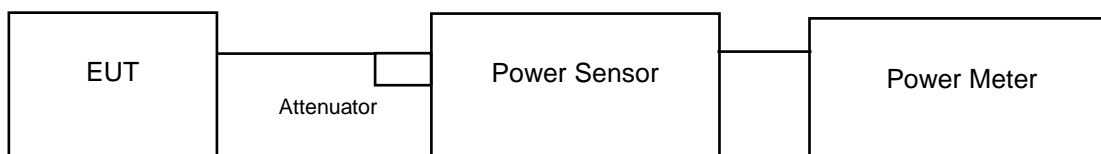


#### 4.4 Conducted Output Power Measurement

##### 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	0.9183	-0.37	30	Pass
19	2440	0.869	-0.61	30	Pass
39	2480	0.8318	-0.80	30	Pass

##### FOR AVERAGE POWER

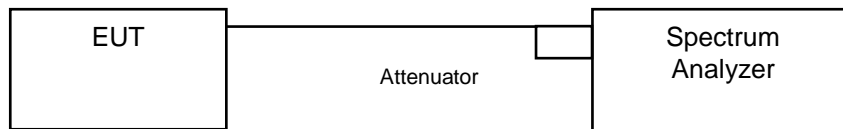
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	0.8872	-0.52
19	2440	0.8375	-0.77
39	2480	0.7943	-1.00

## 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

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d. Set the VBW  $\geq 3 \times \text{RBW}$ .
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. 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

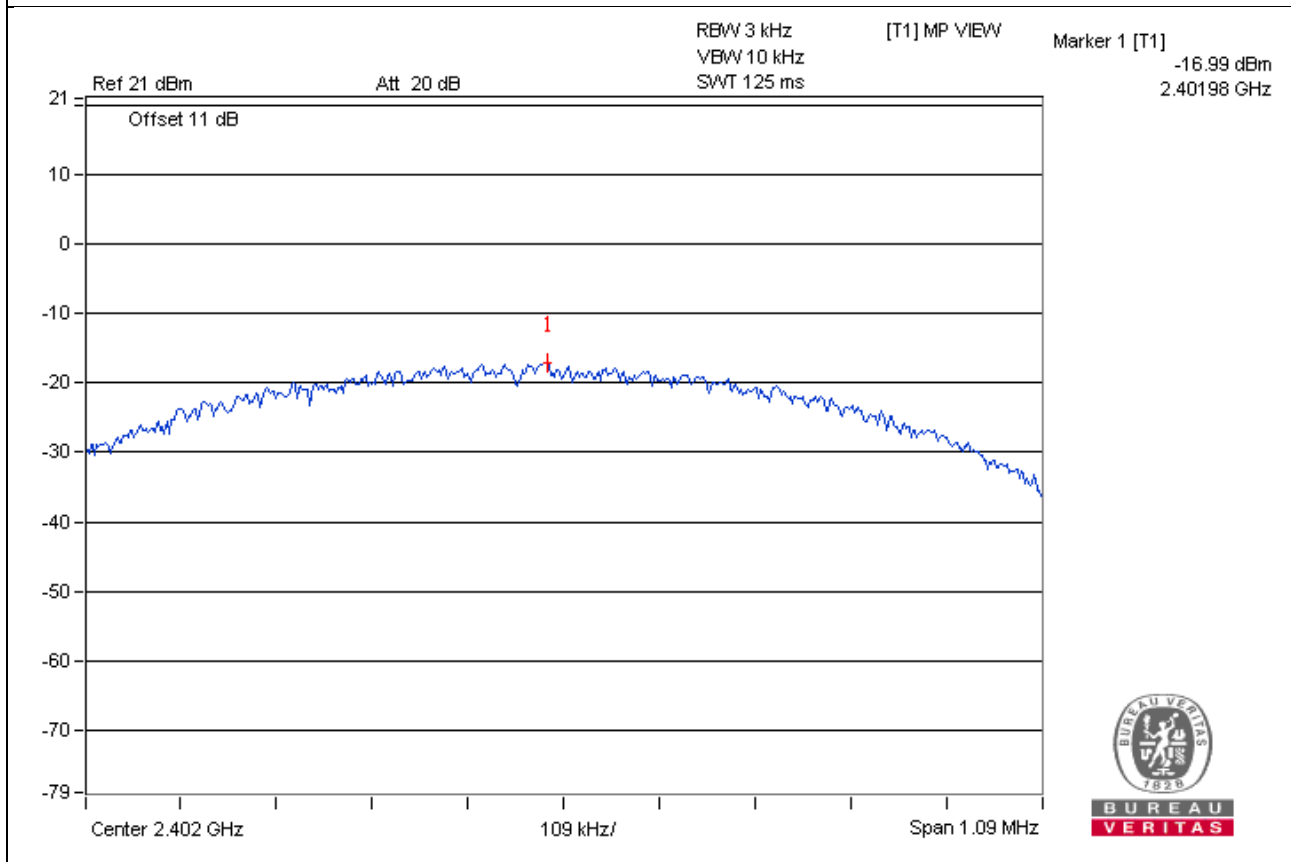
Same as Item 4.3.6

#### 4.5.7 Test Results

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	2402	-16.99	8	Pass
19	2440	-17.38	8	Pass
39	2480	-17.39	8	Pass

Spectrum Plot of Worst Value

CHO

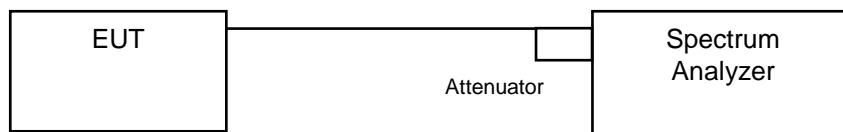


## 4.6 Conducted Out of Band Emission Measurement

### 4.6.1 Limits of Conducted Out of Band Emission Measurement

Below  $-20\text{dB}$  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 OOB

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

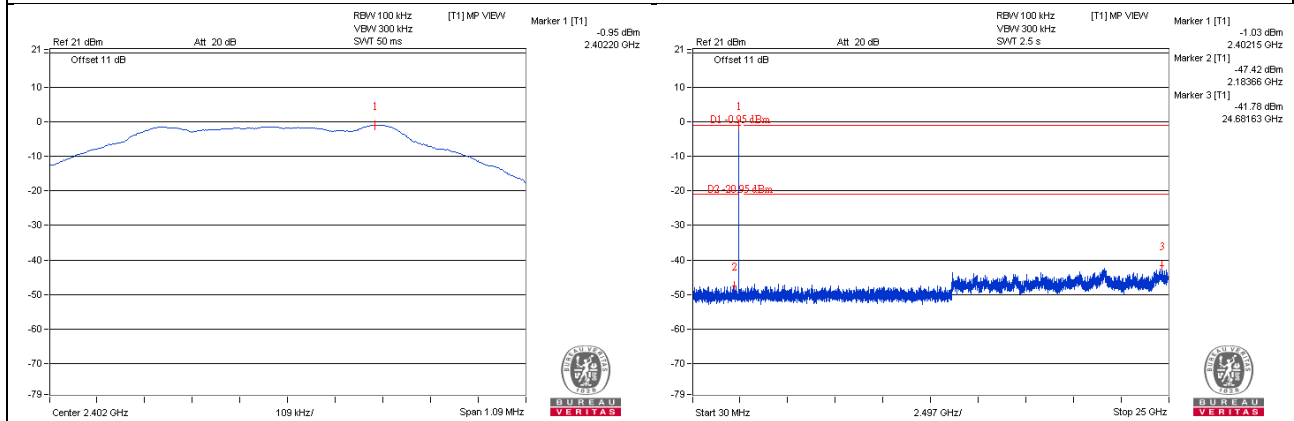
No deviation.

### 4.6.6 EUT Operating Condition

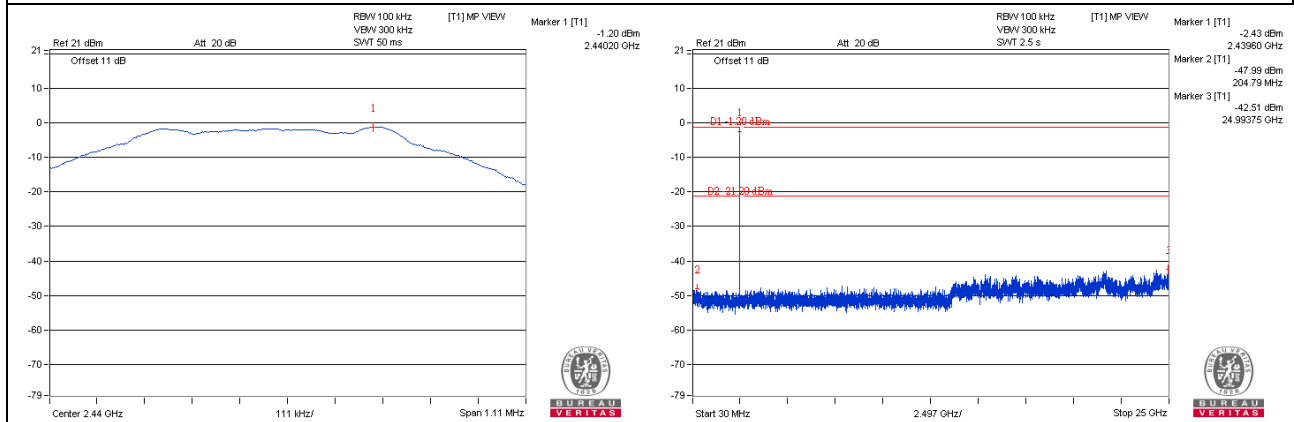
Same as Item 4.3.6

### 4.6.7 Test Results

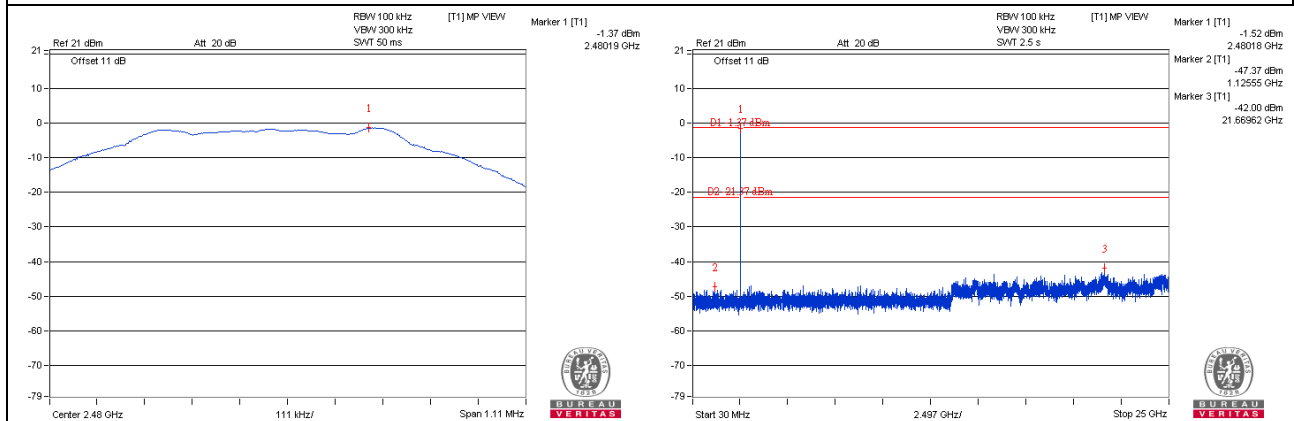
#### CH 0



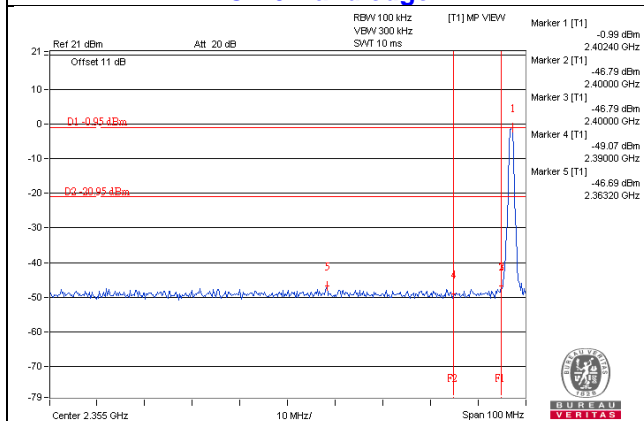
#### CH 19



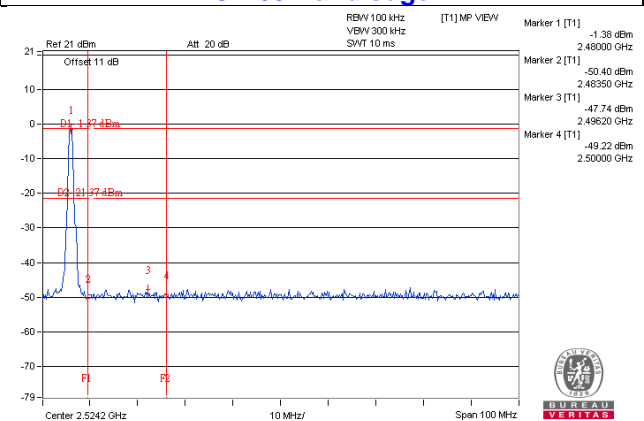
#### CH 39



#### CH 0 Band edge



#### CH 39 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 FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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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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