FCC Test Report (BT-LE)

Report No.:	RF171130C28-4
FCC ID:	HD5-CN80L0N
Test Model:	CN80L0N
Received Date:	Dec. 04, 2017
Test Date:	Jan. 25 to 26, 2018
Issued Date:	Feb. 23, 2018
Applicant:	Honeywell International Inc.
Address:	9680 Old Bailes Road, Fort Mill, SC 29707 USA
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

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Release Control Record

Issue No.	Description	Date Issued
RF171130C28-4	Original release.	Feb. 23, 2018

1 Certificate of Conformity

Product:	Dolphin CN80
Brand:	Honeywell
Test Model:	CN80L0N
Sample Status:	ENGINEERING SAMPLE
Applicant:	Honeywell International Inc.
Test Date:	Jan. 25 to 26, 2018
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 : Phoenix Huang , **Date:** Feb. 23, 2018

Phoenix Huang / Specialist

Approved by : , **Date:** Feb. 23, 2018

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	NA	Without AC power port of the EUT.
15.205 & 209 & 15.247(d)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -10.8dB at 2390MHz and 2483.5MHz.
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 PIFA 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) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.53 dB
	1GHz ~ 6GHz	5.08 dB
Radiated Emissions above 1 GHz	6GHz ~ 18GHz	4.98 dB
	18GHz ~ 40GHz	5.19 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Dolphin CN80
Brand	Honeywell
Test Model	CN80L0N
Status of EUT	ENGINEERING SAMPLE
HW Version	Rev 1.1
HW P/N	DVT1
SW Version	351D
SW P/N	351D
Power Supply Rating	3.85Vdc from battery
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Up to 2Mbps
Operating Frequency	2402MHz ~ 2480MHz
Number of Channel	40
Output Power	**For Radio 1** **LE 1M:** 1.247mW **LE 2M (BT 5.0):** 1.239mW **For Radio 2** **LE 1M:** 1.901mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Battery x 1 Touch pen x 1
Data Cable Supplied	NA

Note:

1. All Scanners are listed as below.

Item	Model	Difference
Scanner	EX20	20.53 mm (L) x 7.8 mm (W) x 3.97 mm (H) (8.08 in x 3.07 in x 1.56 in) Weight: 500 grams (17.6 oz) with battery pack
	N6603ER	20.4 mm (L) x 7.8 mm (W) x 3.32 mm (H (8.03 in x 3.07 in x 1.31 in) Weight: 550 grams (19.4 oz) with battery pack
* All scanners are appearance and size different.		

2. There are WLAN, Bluetooth, Zigbee and NFC technology used for the EUT. The EUT has three radios as following table:

Radio 1	Radio 2	Radio 3
WLAN+BT 1	Zigbee+BT 2	NFC
Note: For Bluetooth technology the Radio 1 support BT 5.0 dual mode, the Radio 2 support BT-LE (4.2) single mode only.		

3. There're 4 configurations for the EUT listed as below.

Sample A: Short K/B-number + Scanner (EX20)
Sample B: Short K/B-Qwety + Scanner (EX20)
Sample C: Short K/B-number + Scanner (N6603ER)
Sample D: Short K/B-Qwenty + Scanner (N6603ER)
From the above samples, the worst cases were found in **Sample C**. Therefore only the test data of the mode was recorded in this report.

4. Simultaneously transmission condition.

Condition	Technology		
1	WLAN 2.4GHz	NFC	Zigbee
2	WLAN 5GHz	NFC	Zigbee
3	Bluetooth	NFC	Zigbee
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.			

5. The EUT needs to be supplied from battery, the information is as below table:

Brand	Model No.	Spec.
Inventus Power, Inc. / Honeywell	CW-BAT	3.85Vdc, 5800mAh, 22.3Wh

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

Radio 1					
WLAN Antenna Spec. / Bluetooth Antenna No. 1 Spec.					
Chain No.	Antenna Gain include trace loss and cable loss (dBi)	Frequency range (GHz)	Antenna type	Connector type	Trace loss and cable loss (dB)
Chain 0	-0.38	2.4~2.4835	PIFA	POGO pin	1.6
	-0.39	5.15~5.25			3
	-0.39	5.25~5.35			
	-0.39	5.47~5.725			
	-0.39	5.725~5.85			
Chain 1	3.36	2.4~2.4835	PIFA	POGO pin	0.6
	3.46	5.15~5.25			1.2
	3.46	5.25~5.35			
	3.46	5.47~5.725			
	3.46	5.725~5.85			

Radio 2				
Bluetooth Antenna No. 2 Spec. / Zigbee Antenna Spec.				
Antenna Gain include trace loss (dBi)	Frequency range (GHz)	Antenna type	Connector type	Trace loss (dB)
-0.03	2.4~2.4835	PIFA	POGO pin	0.8

Radio 3		
NFC Antenna Spec.		
Frequency range (MHz)	Antenna type	Connector type
13~14	Loop	NA

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 for BT-LE mode:

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≥1G	RE<1G	PLC	APCM	
1	√	√	-	√	Radio 1: Technology LE 1M (BT 4.2)
2	√	√	-	√	Radio 1: Technology LE 2M (BT 5.0)
3	√	√	-	√	Radio 2: Technology LE 1M (BT 4.2)

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

Note:
1. No need to concern of Conducted Emission due to the EUT is powered by battery.
2. Fot Mode 1~2: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane (below 1GHz) & X-plane (above 1GHz)**.
3. Fot Mode 3: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-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.

Radio 1			
AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	0, 19, 39	GFSK	1
0 to 39	0, 19, 39	GFSK	2
Radio 2			
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.

Radio 1			
AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	0	GFSK	1
0 to 39	0	GFSK	2
Radio 2			
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.

Radio 1			
AVAILABLE CHANNEL	**TESTED CHANNEL**	**MODULATION TYPE**	**DATA RATE (Mbps)**
0 to 39	0, 19, 39	GFSK	1
0 to 39	0, 19, 39	GFSK	2
Radio 2			
AVAILABLE CHANNEL	**TESTED CHANNEL**	**MODULATION TYPE**	**DATA RATE (Mbps)**
0 to 39	0, 19, 39	GFSK	1

Test Condition:

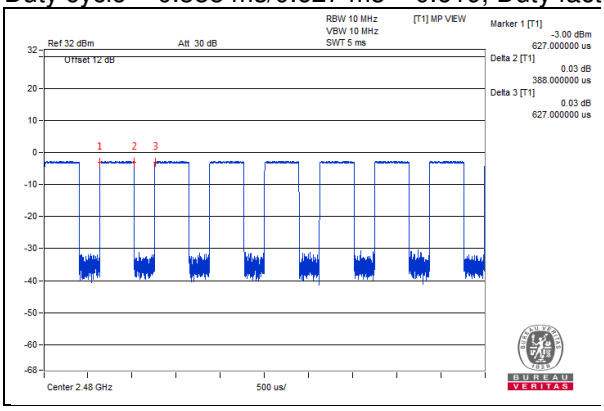
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	26deg. C, 70%RH	DC 3.85V	Weiwei Lo
RE<1G	24deg. C, 68%RH	DC 3.85V	Weiwei Lo
APCM	25deg. C, 60%RH	DC 3.85V	Jyunchun Lin

3.3 Duty Cycle of Test Signal

Radio 1: Technology LE 1M (BT 4.2)

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

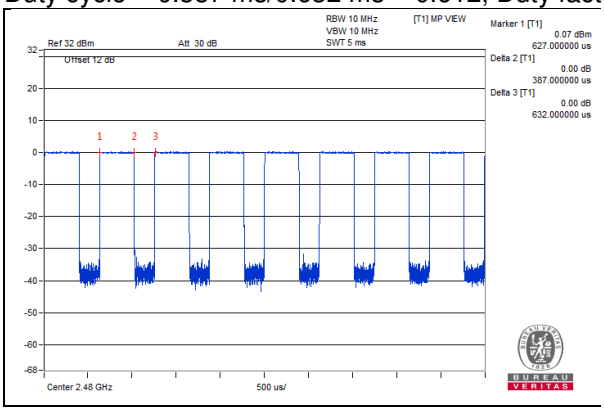
Duty cycle = 0.388 ms/0.627 ms = 0.619, Duty factor = 10 * log(1/0.619) = 2.08



Radio 1: Technology LE 2M (BT 5.0)

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

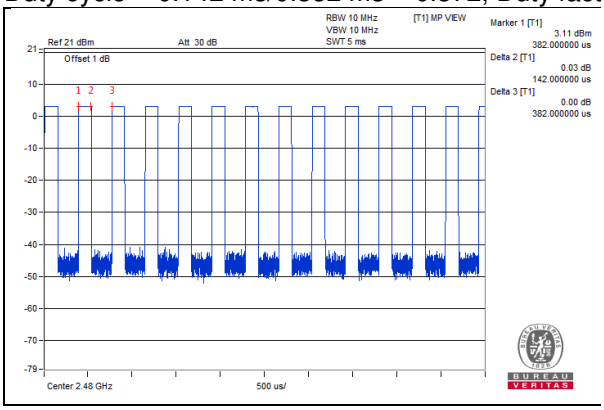
Duty cycle = 0.387 ms/0.632 ms = 0.612, Duty factor = 10 * log(1/0.612) = 2.13



Radio 2: Technology LE 1M (BT 4.2)

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

Duty cycle = 0.142 ms/0.382 ms = 0.372, Duty factor = 10 * log(1/0.372) = 4.3

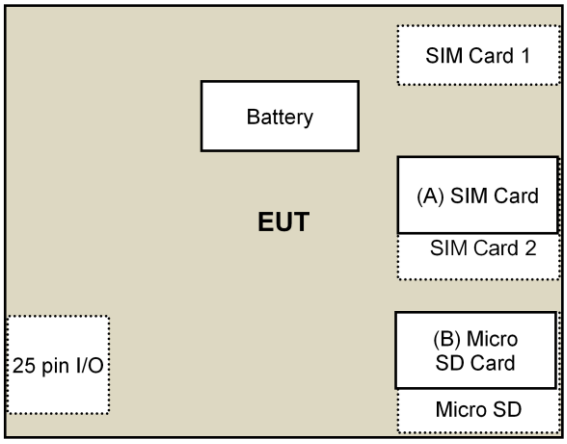


3.4 Description of Support Units

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.	SIM Card	NA	NA	NA	NA	Supplied by client
B.	SD Card	NA	NA	NA	NA	Supplied by client

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.

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2017	July 11, 2018
Loop Antenna(*) TESEQ	HLA 6121	45745	May 19, 2017	May 18, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-05	May 06, 2017	May 05, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
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. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160922 150317 150322	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Spectrum Analyzer Keysight	N9030A	MY54490679	July 25, 2017	July 24, 2018
Pre-Amplifier EMCI	EMC184045S E	980386	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 11, 2018	Jan. 10, 2019
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
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 21, 2017	Nov. 20, 2018
Power meter Anritsu	ML2495A	1014008	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. The CANADA Site Registration No. is 20331-1
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Jan. 25 to 26, 2018

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:

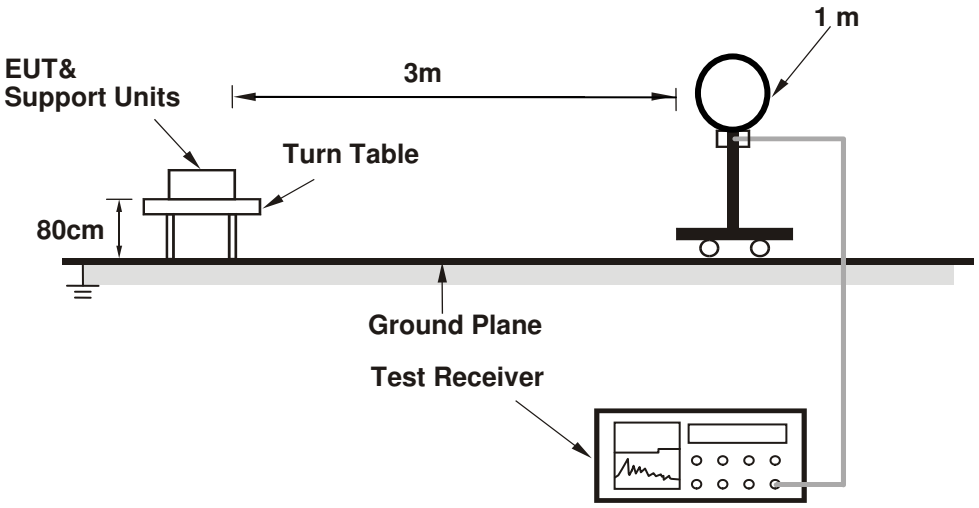
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 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

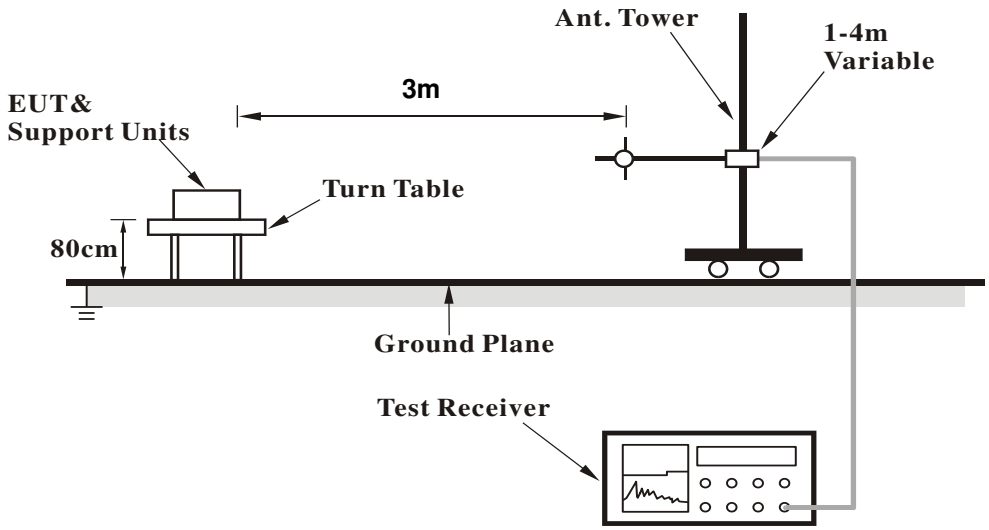
No deviation.

4.1.5 Test Setup

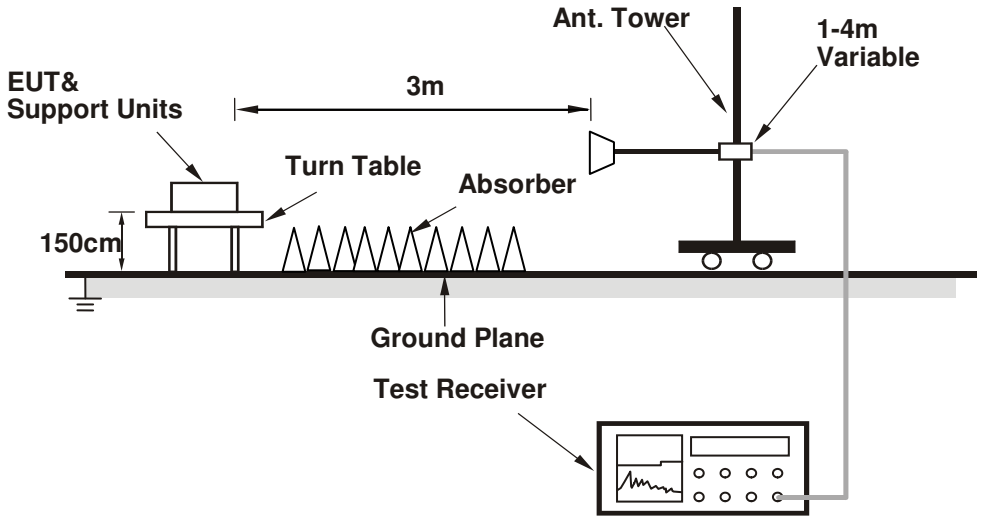
For Radiated emission below 30MHz



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. Controlling software (QRCT.exe V3.0.268.0) 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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	44.0 PK	74.0	-30.0	2.94 H	230	45.2	-1.2
2	2390.00	33.7 AV	54.0	-20.3	2.94 H	230	34.9	-1.2
3	*2402.00	89.3 PK			2.94 H	230	90.6	-1.3
4	*2402.00	88.6 AV			2.94 H	230	89.9	-1.3
5	4804.00	39.0 PK	74.0	-35.0	2.94 H	227	35.9	3.1
6	4804.00	31.3 AV	54.0	-22.7	2.94 H	227	28.2	3.1
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	2390.00	48.3 PK	74.0	-25.7	1.56 V	189	49.5	-1.2
2	2390.00	33.5 AV	54.0	-20.5	1.56 V	189	34.7	-1.2
3	*2402.00	91.1 PK			1.56 V	189	92.4	-1.3
4	*2402.00	90.7 AV			1.56 V	189	92.0	-1.3
5	4804.00	41.2 PK	74.0	-32.8	1.60 V	250	38.1	3.1
6	4804.00	32.6 AV	54.0	-21.4	1.60 V	250	29.5	3.1

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.

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	89.5 PK			2.87 H	220	91.1	-1.6
2	*2440.00	89.0 AV			2.87 H	220	90.6	-1.6
3	4880.00	39.4 PK	74.0	-34.6	2.96 H	225	36.1	3.3
4	4880.00	32.0 AV	54.0	-22.0	2.96 H	225	28.7	3.3
5	7320.00	41.5 PK	74.0	-32.5	1.69 H	226	32.6	8.9
6	7320.00	33.5 AV	54.0	-20.5	1.69 H	226	24.6	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	91.6 PK			1.64 V	176	93.2	-1.6
2	*2440.00	91.1 AV			1.64 V	176	92.7	-1.6
3	4880.00	40.8 PK	74.0	-33.2	1.61 V	262	37.5	3.3
4	4880.00	32.4 AV	54.0	-21.6	1.61 V	262	29.1	3.3
5	7320.00	41.9 PK	74.0	-32.1	1.34 V	175	33.0	8.9
6	7320.00	33.3 AV	54.0	-20.7	1.34 V	175	24.4	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	89.7 PK			2.89 H	234	91.2	-1.5
2	*2480.00	88.9 AV			2.89 H	234	90.4	-1.5
3	2483.50	43.7 PK	74.0	-30.3	2.89 H	235	45.2	-1.5
4	2483.50	33.6 AV	54.0	-20.4	2.89 H	235	35.1	-1.5
5	4960.00	39.6 PK	74.0	-34.4	3.01 H	220	36.3	3.3
6	4960.00	31.8 AV	54.0	-22.2	3.01 H	220	28.5	3.3
7	7440.00	42.4 PK	74.0	-31.6	1.69 H	211	33.3	9.1
8	7440.00	34.0 AV	54.0	-20.0	1.69 H	211	24.9	9.1
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	91.1 PK			1.58 V	165	92.6	-1.5
2	*2480.00	90.4 AV			1.58 V	165	91.9	-1.5
3	2483.50	48.8 PK	74.0	-25.2	1.59 V	174	50.3	-1.5
4	2483.50	34.2 AV	54.0	-19.8	1.59 V	174	35.7	-1.5
5	4960.00	40.6 PK	74.0	-33.4	1.63 V	264	37.3	3.3
6	4960.00	32.5 AV	54.0	-21.5	1.63 V	264	29.2	3.3
7	7440.00	42.2 PK	74.0	-31.8	1.29 V	184	33.1	9.1
8	7440.00	33.6 AV	54.0	-20.4	1.29 V	184	24.5	9.1

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:

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	107.55	20.4 QP	43.5	-23.1	1.00 H	54	31.6	-11.2
2	205.84	20.5 QP	43.5	-23.0	1.50 H	312	31.9	-11.4
3	350.37	23.4 QP	46.0	-22.6	2.00 H	360	29.6	-6.2
4	457.82	27.0 QP	46.0	-19.0	3.00 H	181	30.5	-3.5
5	545.53	27.7 QP	46.0	-18.3	1.00 H	360	29.8	-2.1
6	674.93	29.5 QP	46.0	-16.5	2.00 H	360	29.1	0.4
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	53.21	23.5 QP	40.0	-16.5	1.50 V	41	31.5	-8.0
2	153.00	22.5 QP	43.5	-21.0	1.50 V	30	30.4	-7.9
3	295.97	22.7 QP	46.0	-23.3	1.00 V	299	30.2	-7.5
4	396.20	24.9 QP	46.0	-21.1	1.50 V	7	30.0	-5.1
5	557.20	27.8 QP	46.0	-18.2	3.00 V	360	29.5	-1.7
6	758.52	33.3 QP	46.0	-12.7	1.50 V	128	31.2	2.1

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

4.1.8 Test Results (Mode 2)

Above 1GHz Data:

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	43.0 PK	74.0	-31.0	2.95 H	213	44.2	-1.2
2	2390.00	33.1 AV	54.0	-20.9	2.95 H	213	34.3	-1.2
3	*2402.00	90.6 PK			2.95 H	213	91.9	-1.3
4	*2402.00	89.7 AV			2.95 H	213	91.0	-1.3
5	4804.00	39.4 PK	74.0	-34.6	2.88 H	227	36.3	3.1
6	4804.00	31.8 AV	54.0	-22.2	2.88 H	227	28.7	3.1
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	2390.00	47.7 PK	74.0	-26.3	1.56 V	163	48.9	-1.2
2	2390.00	33.4 AV	54.0	-20.6	1.56 V	163	34.6	-1.2
3	*2402.00	91.9 PK			1.61 V	185	93.2	-1.3
4	*2402.00	91.1 AV			1.61 V	185	92.4	-1.3
5	4804.00	41.0 PK	74.0	-33.0	1.63 V	265	37.9	3.1
6	4804.00	32.6 AV	54.0	-21.4	1.63 V	265	29.5	3.1

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.

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	90.9 PK			2.90 H	238	92.5	-1.6
2	*2440.00	89.7 AV			2.90 H	238	91.3	-1.6
3	4880.00	39.4 PK	74.0	-34.6	2.91 H	215	36.1	3.3
4	4880.00	31.7 AV	54.0	-22.3	2.91 H	215	28.4	3.3
5	7320.00	42.1 PK	74.0	-31.9	1.65 H	223	33.2	8.9
6	7320.00	33.6 AV	54.0	-20.4	1.65 H	223	24.7	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	91.3 PK			1.65 V	171	92.9	-1.6
2	*2440.00	90.6 AV			1.65 V	171	92.2	-1.6
3	4880.00	40.4 PK	74.0	-33.6	1.63 V	269	37.1	3.3
4	4880.00	32.3 AV	54.0	-21.7	1.63 V	269	29.0	3.3
5	7320.00	42.5 PK	74.0	-31.5	1.31 V	185	33.6	8.9
6	7320.00	34.1 AV	54.0	-19.9	1.31 V	185	25.2	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	89.8 PK			2.91 H	210	91.3	-1.5
2	*2480.00	88.8 AV			2.91 H	210	90.3	-1.5
3	2483.50	43.7 PK	74.0	-30.3	2.92 H	210	45.2	-1.5
4	2483.50	33.8 AV	54.0	-20.2	2.92 H	210	35.3	-1.5
5	4960.00	38.9 PK	74.0	-35.1	2.87 H	220	35.6	3.3
6	4960.00	31.5 AV	54.0	-22.5	2.87 H	220	28.2	3.3
7	7440.00	41.9 PK	74.0	-32.1	1.62 H	228	32.8	9.1
8	7440.00	33.6 AV	54.0	-20.4	1.62 H	228	24.5	9.1
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	91.4 PK			1.59 V	178	92.9	-1.5
2	*2480.00	90.7 AV			1.59 V	178	92.2	-1.5
3	2483.50	49.1 PK	74.0	-24.9	1.56 V	187	50.6	-1.5
4	2483.50	34.4 AV	54.0	-19.6	1.56 V	187	35.9	-1.5
5	4960.00	40.7 PK	74.0	-33.3	1.66 V	270	37.4	3.3
6	4960.00	32.7 AV	54.0	-21.3	1.66 V	270	29.4	3.3
7	7440.00	42.3 PK	74.0	-31.7	1.34 V	181	33.2	9.1
8	7440.00	33.7 AV	54.0	-20.3	1.34 V	181	24.6	9.1

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:

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	324.93	23.8 QP	46.0	-22.2	3.00 H	249	30.1	-6.3
2	360.45	24.4 QP	46.0	-21.6	2.00 H	360	30.4	-6.0
3	617.75	29.4 QP	46.0	-16.6	2.00 H	360	29.6	-0.2
4	756.65	31.8 QP	46.0	-14.2	1.50 H	314	29.7	2.1
5	874.89	32.3 QP	46.0	-13.7	1.00 H	79	29.2	3.1
6	978.88	33.7 QP	54.0	-20.3	3.00 H	234	29.2	4.5
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	48.55	24.6 QP	40.0	-15.4	3.00 V	176	32.6	-8.0
2	183.09	21.5 QP	43.5	-22.0	1.50 V	80	31.5	-10.0
3	351.22	23.4 QP	46.0	-22.6	3.00 V	236	29.6	-6.2
4	474.31	25.8 QP	46.0	-20.2	2.00 V	0	29.1	-3.3
5	547.50	27.6 QP	46.0	-18.4	2.00 V	264	29.6	-2.0
6	655.53	29.8 QP	46.0	-16.2	2.00 V	209	29.6	0.2

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

4.1.9 Test Results (Mode 3)

Above 1GHz Data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	53.2 PK	74.0	-20.8	2.53 H	360	54.4	-1.2
2	2390.00	42.6 AV	54.0	-11.4	2.53 H	360	43.8	-1.2
3	*2402.00	90.0 PK			2.53 H	360	91.3	-1.3
4	*2402.00	89.3 AV			2.53 H	360	90.6	-1.3
5	4804.00	39.7 PK	74.0	-34.3	2.95 H	219	36.6	3.1
6	4804.00	32.4 AV	54.0	-21.6	2.95 H	219	29.3	3.1
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	2390.00	53.0 PK	74.0	-21.0	1.60 V	1	54.2	-1.2
2	**2390.00**	**43.2 AV**	**54.0**	**-10.8**	**1.60 V**	**1**	**44.4**	**-1.2**
3	*2402.00	92.6 PK			1.60 V	1	93.9	-1.3
4	*2402.00	90.6 AV			1.60 V	1	91.9	-1.3
5	4804.00	40.7 PK	74.0	-33.3	1.61 V	291	37.6	3.1
6	4804.00	32.5 AV	54.0	-21.5	1.61 V	291	29.4	3.1

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.

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	90.6 PK			2.56 H	360	92.2	-1.6
2	*2440.00	89.1 AV			2.56 H	360	90.7	-1.6
3	4880.00	39.2 PK	74.0	-34.8	2.99 H	238	35.9	3.3
4	4880.00	32.0 AV	54.0	-22.0	2.99 H	238	28.7	3.3
5	7320.00	41.7 PK	74.0	-32.3	1.66 H	237	32.8	8.9
6	7320.00	33.6 AV	54.0	-20.4	1.66 H	237	24.7	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	91.7 PK			1.56 V	9	93.3	-1.6
2	*2440.00	90.3 AV			1.56 V	9	91.9	-1.6
3	4880.00	40.8 PK	74.0	-33.2	1.64 V	276	37.5	3.3
4	4880.00	32.4 AV	54.0	-21.6	1.64 V	276	29.1	3.3
5	7320.00	41.8 PK	74.0	-32.2	1.30 V	185	32.9	8.9
6	7320.00	33.5 AV	54.0	-20.5	1.30 V	185	24.6	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	90.1 PK			2.54 H	350	91.6	-1.5
2	*2480.00	88.3 AV			2.54 H	350	89.8	-1.5
3	2483.50	53.1 PK	74.0	-20.9	2.54 H	350	54.6	-1.5
4	2483.50	42.8 AV	54.0	-11.2	2.54 H	350	44.3	-1.5
5	4960.00	39.5 PK	74.0	-34.5	2.94 H	217	36.2	3.3
6	4960.00	32.3 AV	54.0	-21.7	2.94 H	217	29.0	3.3
7	7440.00	41.7 PK	74.0	-32.3	1.69 H	233	32.6	9.1
8	7440.00	33.6 AV	54.0	-20.4	1.69 H	233	24.5	9.1
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	91.6 PK			1.61 V	1	93.1	-1.5
2	*2480.00	90.2 AV			1.61 V	1	91.7	-1.5
3	2483.50	53.2 PK	74.0	-20.8	1.61 V	1	54.7	-1.5
4	**2483.50**	**43.2 AV**	**54.0**	**-10.8**	**1.61 V**	**1**	**44.7**	**-1.5**
5	4960.00	40.8 PK	74.0	-33.2	1.62 V	284	37.5	3.3
6	4960.00	32.6 AV	54.0	-21.4	1.62 V	284	29.3	3.3
7	7440.00	42.0 PK	74.0	-32.0	1.30 V	193	32.9	9.1
8	7440.00	34.0 AV	54.0	-20.0	1.30 V	193	24.9	9.1

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:

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	45.18	24.2 QP	40.0	-15.8	2.00 H	214	32.3	-8.1
2	113.88	21.1 QP	43.5	-22.4	1.00 H	360	31.6	-10.5
3	277.18	22.1 QP	46.0	-23.9	3.00 H	36	30.3	-8.2
4	428.77	25.9 QP	46.0	-20.1	1.50 H	274	29.9	-4.0
5	480.32	26.9 QP	46.0	-19.1	1.00 H	70	30.1	-3.2
6	554.41	27.7 QP	46.0	-18.3	2.00 H	192	29.6	-1.9
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	51.95	24.1 QP	40.0	-15.9	2.00 V	110	32.0	-7.9
2	175.48	21.3 QP	43.5	-22.2	3.00 V	360	30.5	-9.2
3	233.02	21.3 QP	46.0	-24.7	2.00 V	151	31.5	-10.2
4	431.17	26.6 QP	46.0	-19.4	3.00 V	49	30.5	-3.9
5	643.55	29.5 QP	46.0	-16.5	2.00 V	149	29.3	0.2
6	762.30	31.7 QP	46.0	-14.3	1.50 V	30	29.5	2.2

REMARKS:

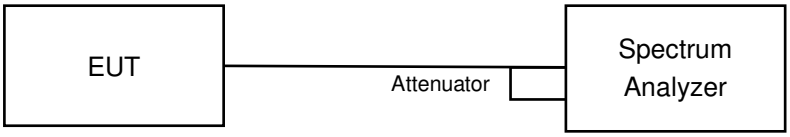
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 6dB Bandwidth Measurement

4.2.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x 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

4.2.5 Deviation from Test Standard

No deviation.

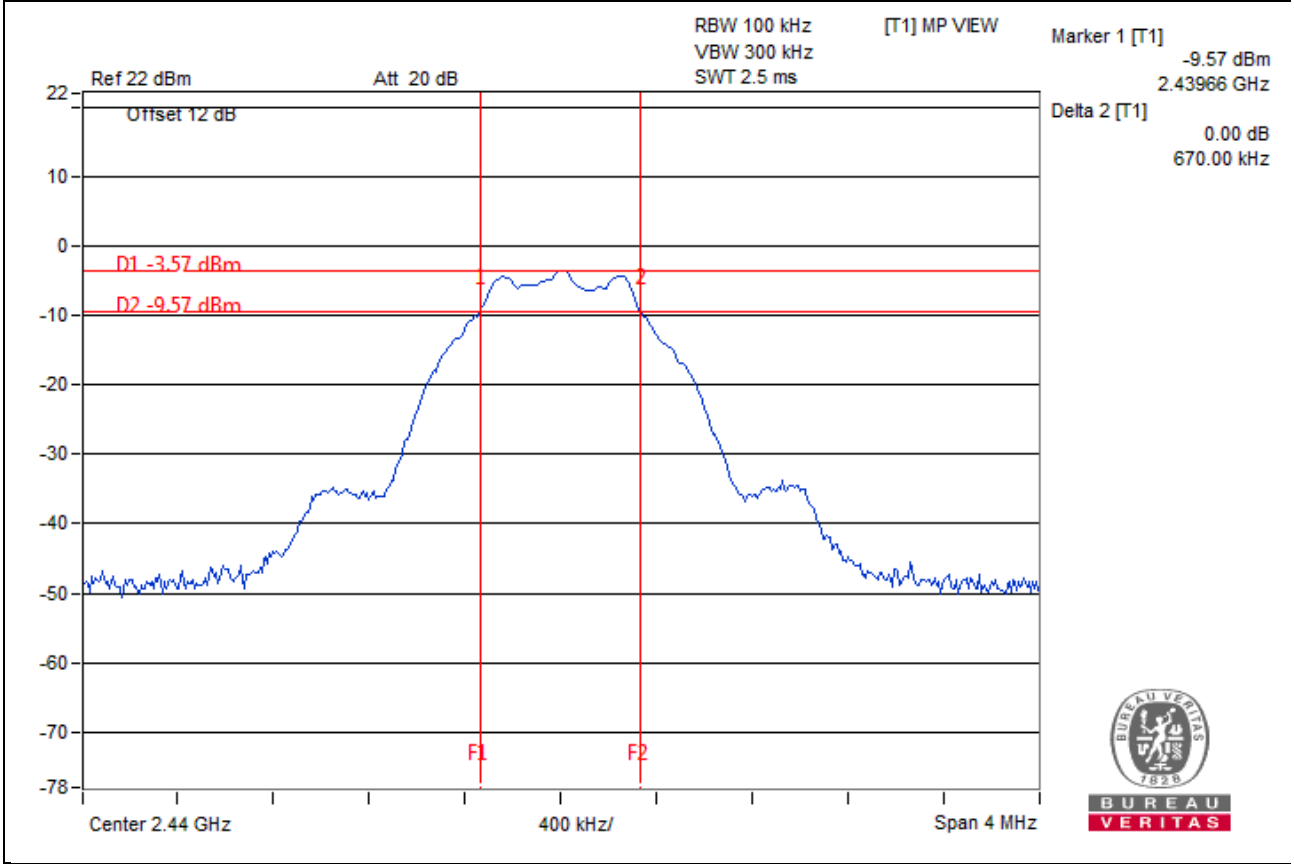
4.2.6 EUT Operating Conditions

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

4.2.7 Test Result (Mode 1)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	0.68	0.5	Pass
19	2440	0.67	0.5	Pass
39	2480	0.68	0.5	Pass

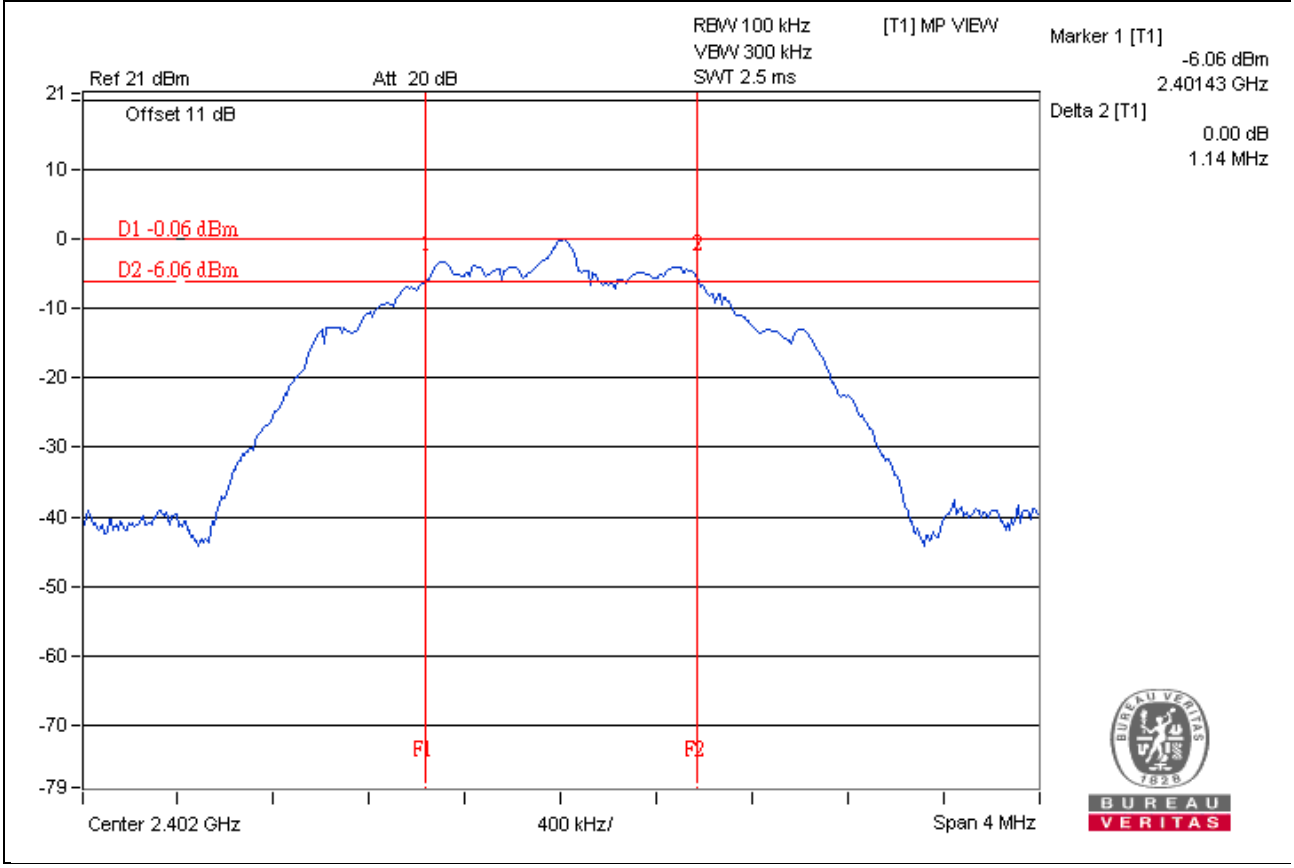
Spectrum Plot of Worst Value
CH 19



4.2.8 Test Result (Mode 2)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.14	0.5	Pass
19	2440	1.16	0.5	Pass
39	2480	1.16	0.5	Pass

Spectrum Plot of Worst Value
CH 0

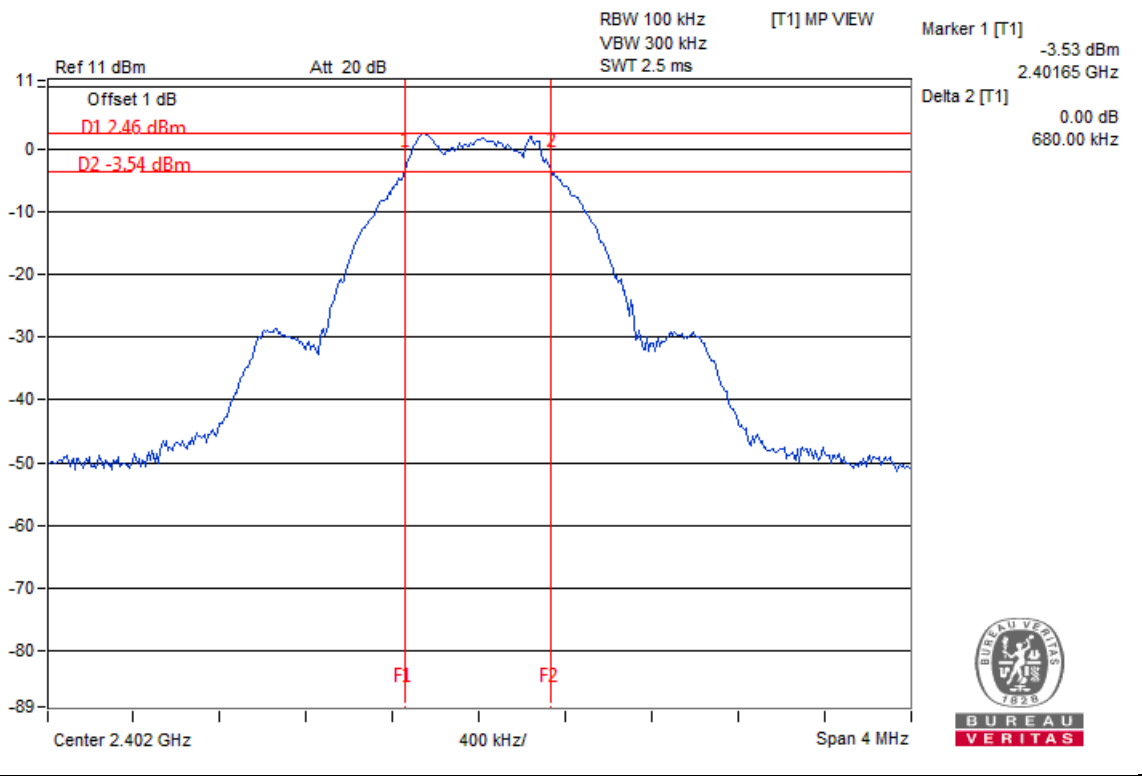


4.2.9 Test Result (Mode 3)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	0.68	0.5	Pass
19	2440	0.68	0.5	Pass
39	2480	0.68	0.5	Pass

Spectrum Plot of Worst Value

CH 0



4.3 Conducted Output Power Measurement

4.3.1 Limits of Conducted Output Power Measurement

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

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 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.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

Same as Item 4.2.6.

4.3.7 Test Results (Mode 1)

FOR PEAK POWER

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
0	2402	1.247	0.96	30	Pass
19	2440	1.062	0.26	30	Pass
39	2480	1.135	0.55	30	Pass

FOR AVERAGE POWER - reference only

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	1.23	0.90
19	2440	1.045	0.19
39	2480	1.109	0.45

4.3.8 Test Results (Mode 2)

FOR PEAK POWER

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
0	2402	1.239	0.93	30	Pass
19	2440	1.047	0.20	30	Pass
39	2480	1.127	0.52	30	Pass

FOR AVERAGE POWER - reference only

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	1.216	0.85
19	2440	1.028	0.12
39	2480	1.099	0.41

4.3.9 Test Results (Mode 3)

FOR PEAK POWER

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
0	2402	1.892	2.77	30	Pass
19	2440	1.884	2.75	30	Pass
39	2480	1.901	2.79	30	Pass

FOR AVERAGE POWER - reference only

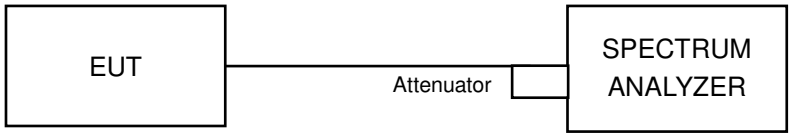
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	1.884	2.75
19	2440	1.879	2.74
39	2480	1.888	2.76

4.4 Power Spectral Density Measurement

4.4.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm in any 3kHz.

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 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 kHz ≤ RBW ≤ 100 kHz.
d. Set the VBW ≥ 3 × 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.

4.4.5 Deviation from Test Standard

No deviation.

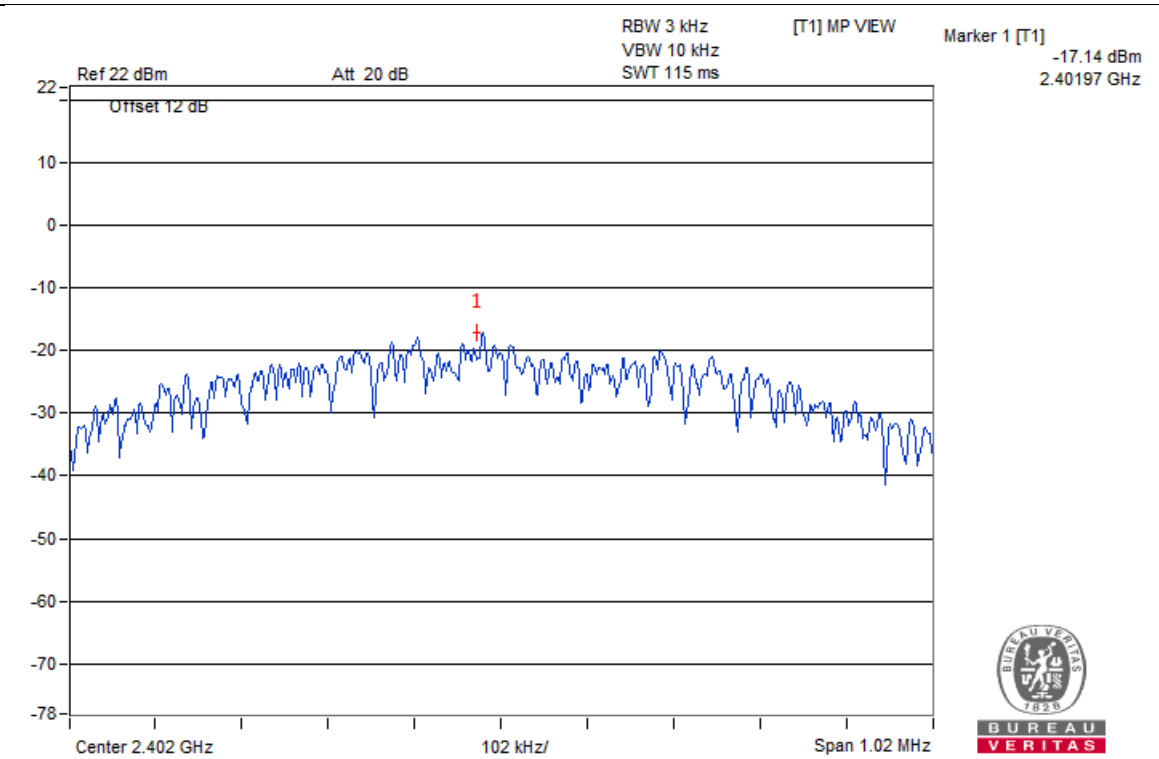
4.4.6 EUT Operating Condition

Same as Item 4.2.6.

4.4.7 Test Results (Mode 1)

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	2402	-17.14	8	Pass
19	2440	-18.35	8	Pass
39	2480	-18.00	8	Pass

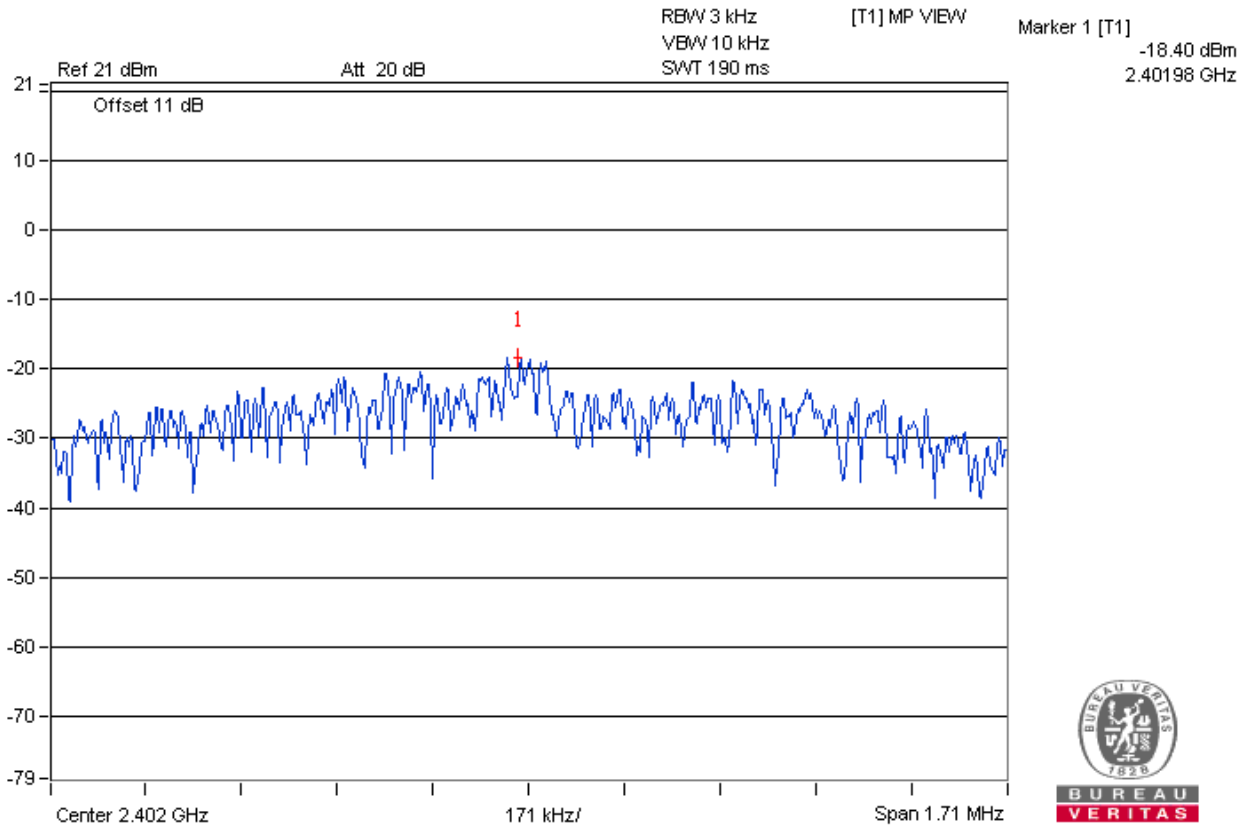
Spectrum Plot of Worst Value
CH0



4.4.8 Test Results (Mode 2)

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	2402	-18.40	8	Pass
19	2440	-19.40	8	Pass
39	2480	-19.57	8	Pass

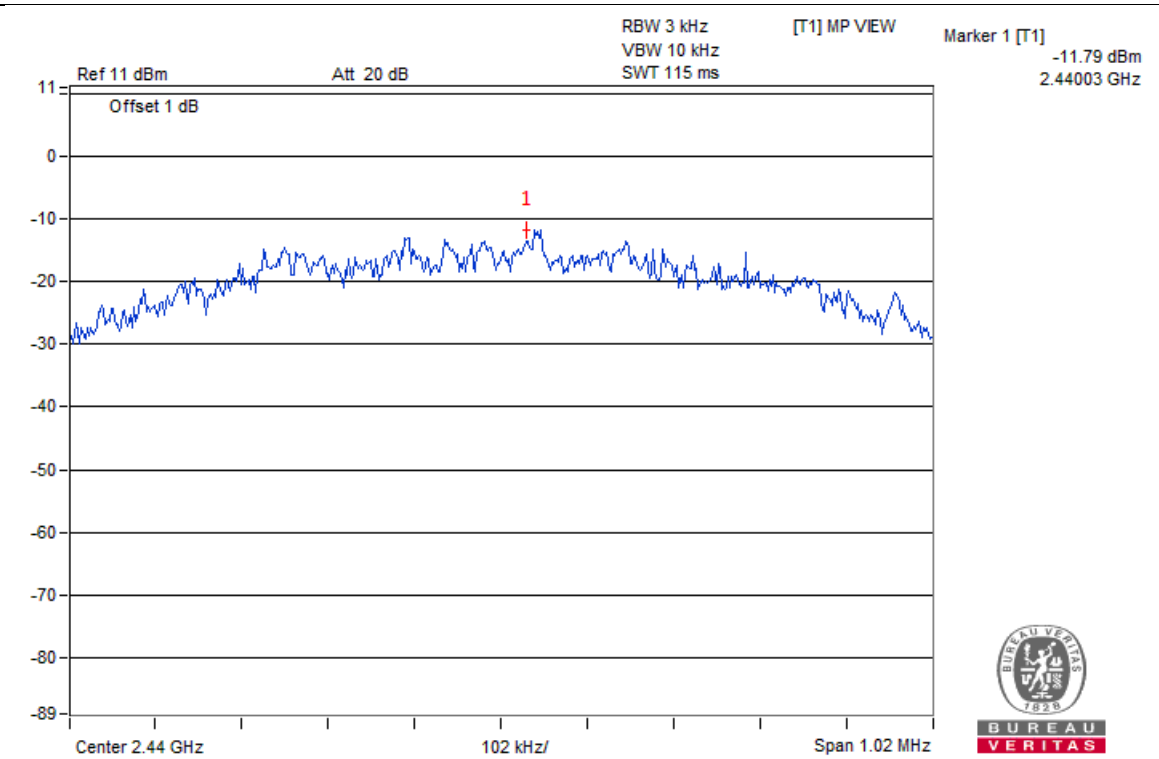
Spectrum Plot of Worst Value
CH0



4.4.9 Test Results (Mode 3)

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	2402	-12.17	8	Pass
19	2440	-11.79	8	Pass
39	2480	-12.00	8	Pass

Spectrum Plot of Worst Value
CH19

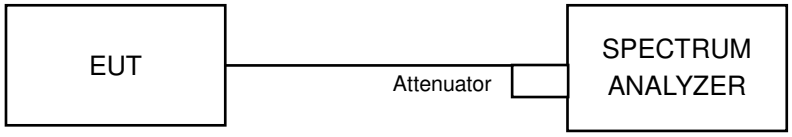


4.5 Conducted Out of Band Emission Measurement

4.5.1 Limits of Conducted Out of Band Emission Measurement

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

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

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 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 ≥ 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.

4.5.5 Deviation from Test Standard

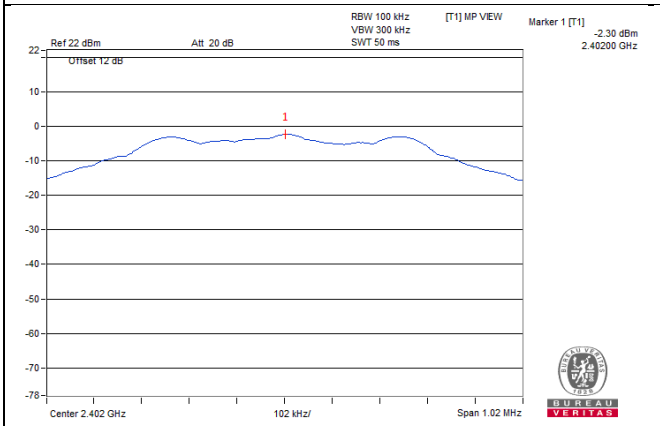
No deviation.

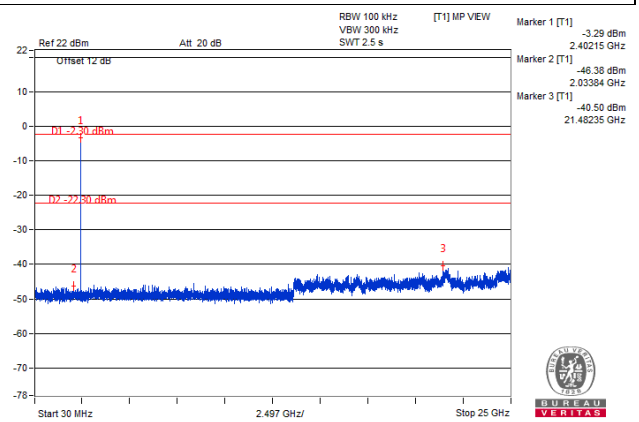
4.5.6 EUT Operating Condition

Same as Item 4.2.6.

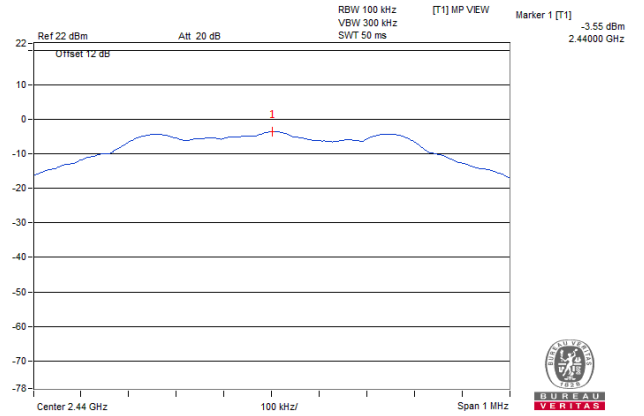
4.5.7 Test Results (Mode 1)

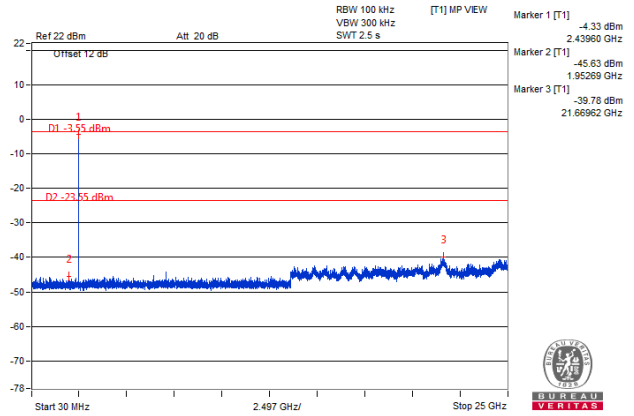
CH 0



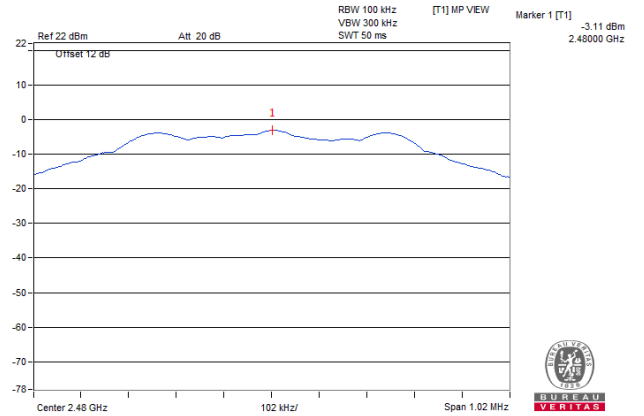


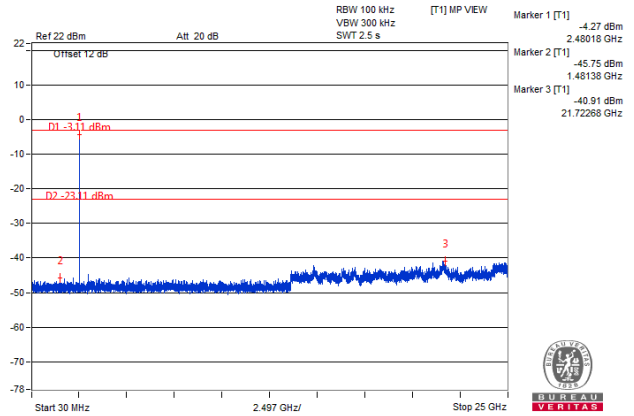
CH 19



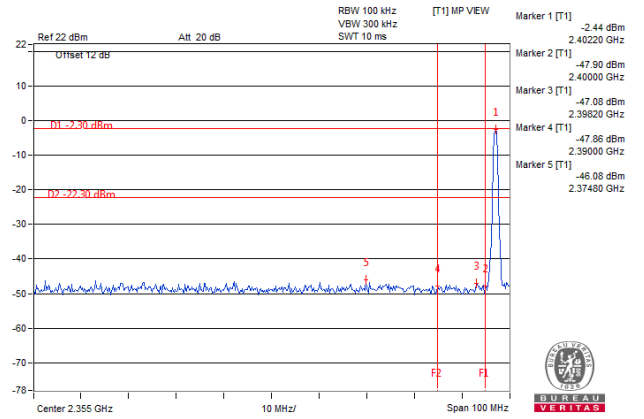


CH 39

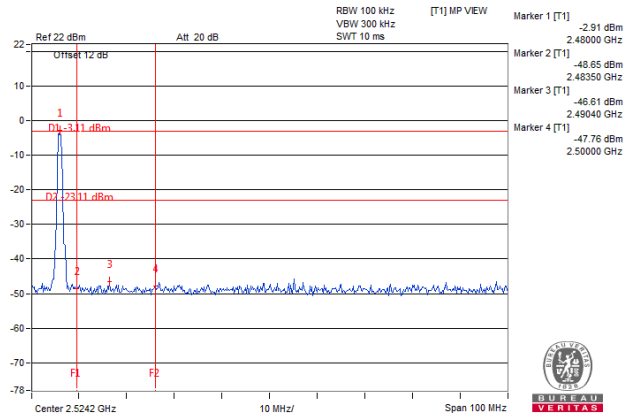




CH 0 Band edge

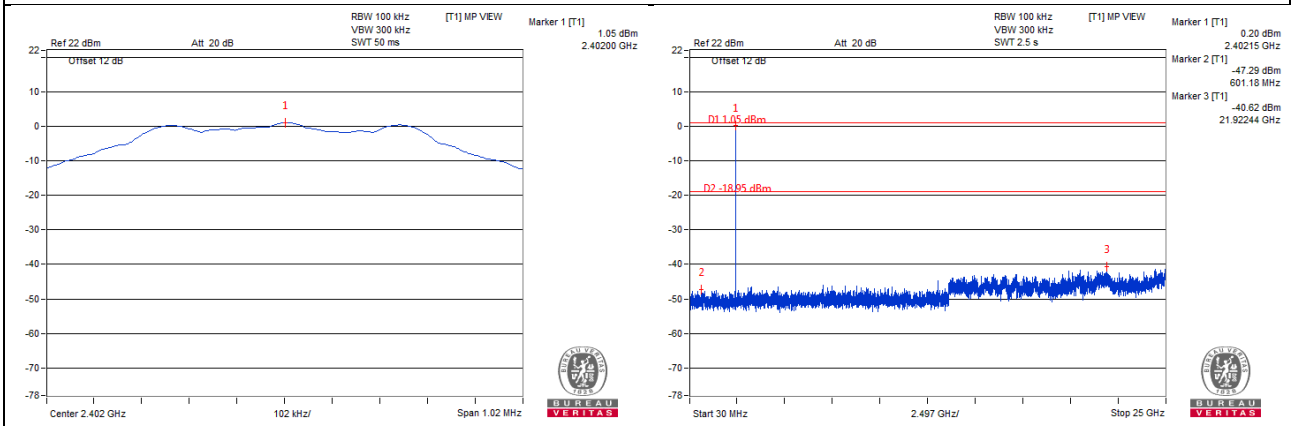


CH 39 Band edge

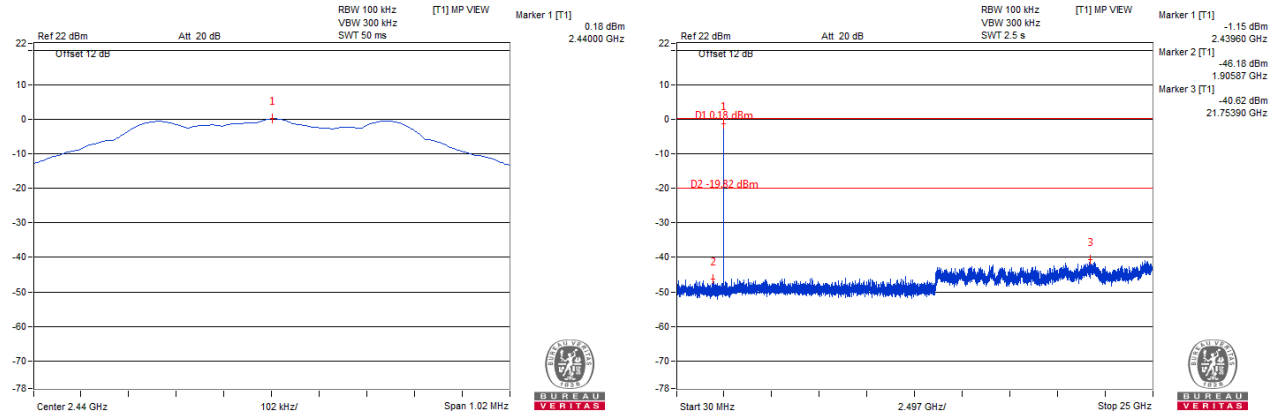


4.5.8 Test Results (Mode 2)

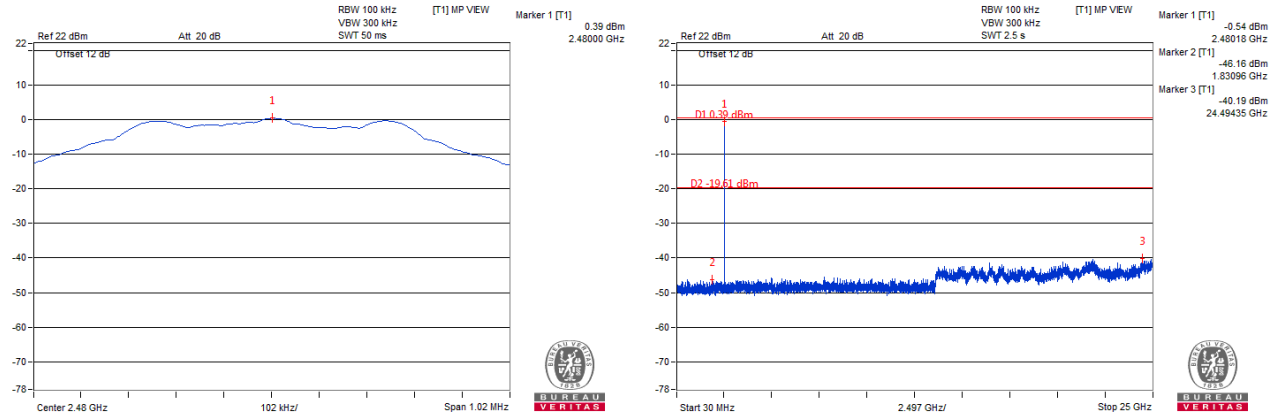
CH 0



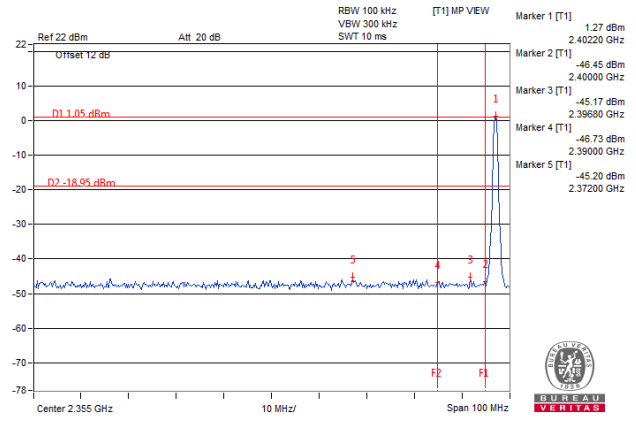
CH 19



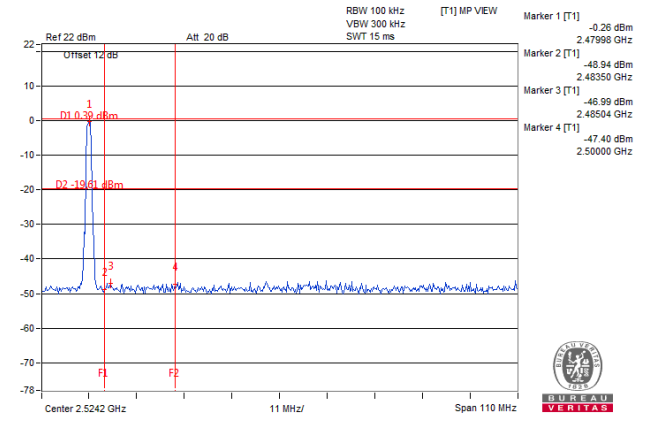
CH 39



CH 0 Band edge

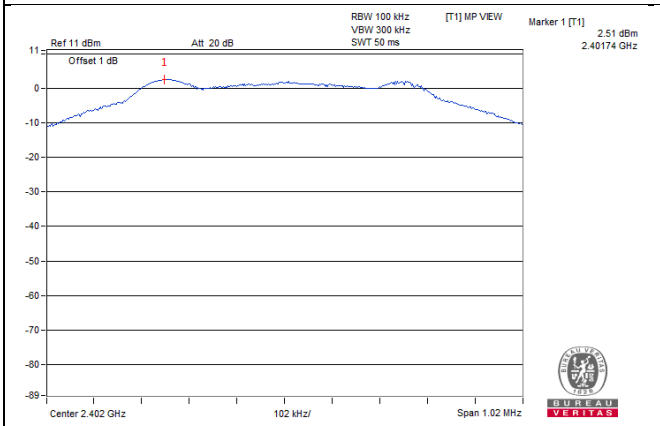


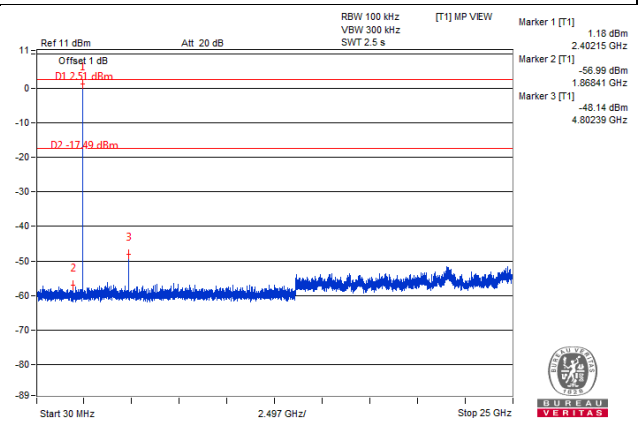
CH 39 Band edge



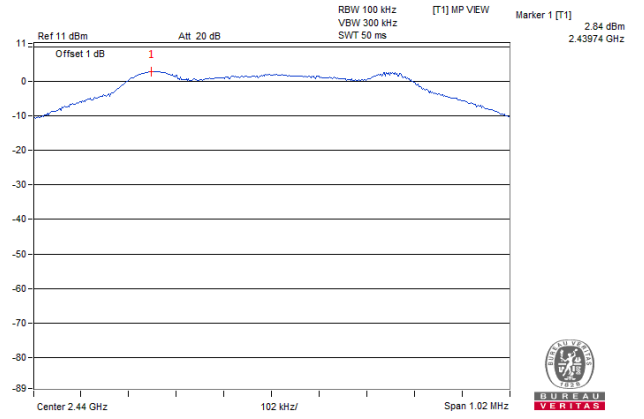
4.5.9 Test Results (Mode 3)

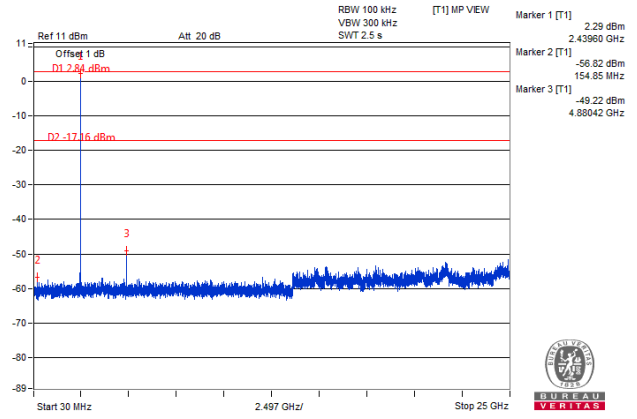
CH 0



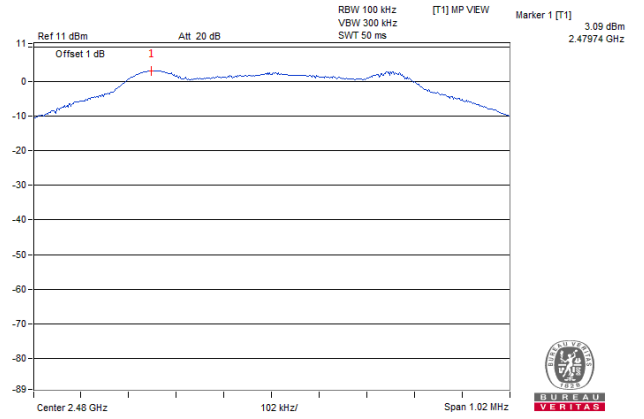


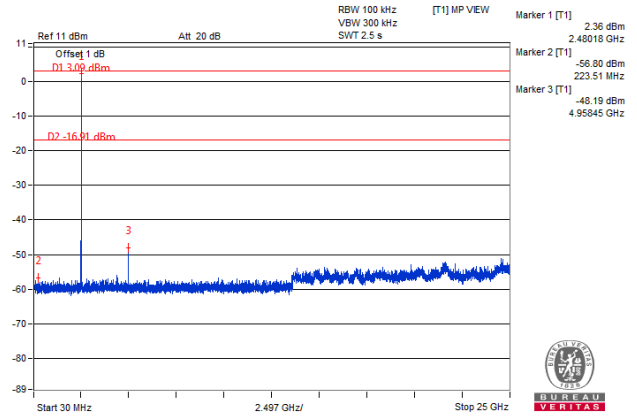
CH 19



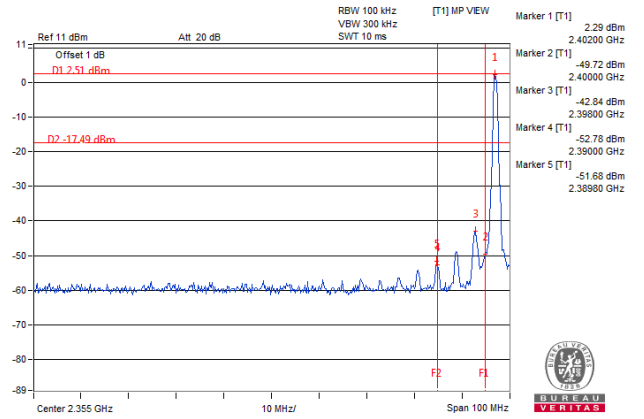


CH 39

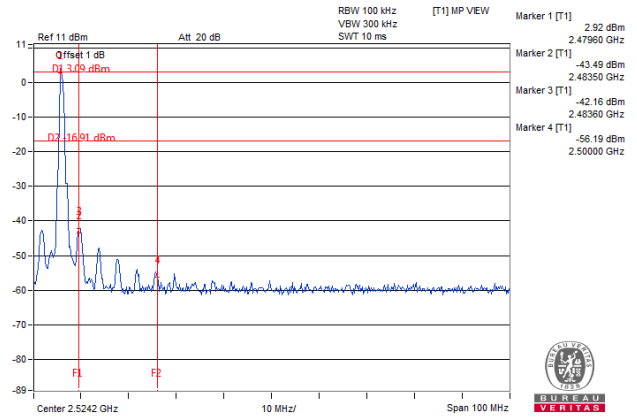




CH 0 Band edge



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.

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

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Hsin Chu EMC/RF/Telecom Lab
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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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