

Supplemental “Transmit Simultaneously” Test Report

Report No.: RFBEOE-WTW-P23120072-5

FCC ID: MQT-AT150ED

Test Model: xCL_AT-150-ED

Received Date: 2023/12/5

Test Date: 2024/1/2 ~ 2024/1/11

Issued Date: 2024/1/22

Applicant: XAC AUTOMATION CORP.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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FCC Registration / Designation Number: 723255 / TW2022



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Table of Contents

Release Control Record	3
1 Certificate of Conformity.....	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Modification Record	5
3 General Information.....	6
3.1 General Description of EUT	6
3.1.1 Test Mode Applicability and Tested Channel Detail.....	8
3.2 Description of Support Units	10
3.2.1 Configuration of System under Test	11
4 Test Types and Results	12
4.1 Radiated Emission and Bandedge Measurement.....	12
4.1.1 Limits of Radiated Emission and Bandedge Measurement	12
4.1.2 Test Instruments	13
4.1.3 Test Procedures.....	15
4.1.4 Deviation from Test Standard	16
4.1.5 Test Setup.....	16
4.1.6 EUT Operating Conditions.....	17
4.1.7 Test Results (Mode 1).....	18
4.1.8 Test Results (Mode 2).....	21
4.2 Conducted Out of Band Emission Measurement.....	24
4.2.1 Limits of Conducted Out of Band Emission Measurement	24
4.2.2 Test Setup.....	24
4.2.3 Test Instruments	24
4.2.4 Test Procedures.....	24
4.2.5 Deviation from Test Standard	24
4.2.6 EUT Operating Conditions.....	24
4.2.7 Test Results	24
5 Pictures of Test Arrangements.....	26
Appendix – Information of the Testing Laboratories	27

Release Control Record

Issue No.	Description	Date Issued
RFBEOE-WTW-P23120072-5	Original release.	2024/1/22

1 Certificate of Conformity

Product: Terminal

Brand: XAC

Test Model: xCL_AT-150-ED

Sample Status: Engineering sample

Applicant: XAC AUTOMATION CORP.

Test Date: 2024/1/2 ~ 2024/1/11

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.225)

47 CFR FCC Part 15, Subpart C (Section 15.247)

47 CFR FCC Part 15, Subpart E (Section 15.407)

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:** 2024/1/22
Phoenix Huang / Specialist

Approved by : May Chen, **Date:** 2024/1/22
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C, E (SECTION 15.225, 15.247, 15.407)			
FCC Clause	Test Item	Result	Remarks
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/8) 15.225 (d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -2.3 dB at 41.97 MHz.

Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Conducted emissions	-	2.6 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.5 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 dB
	18 GHz ~ 40 GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Terminal
Brand	XAC
Test Model	xCL_AT-150-ED
Status of EUT	Engineering sample
Power Supply Rating	12 Vdc from power adapter
Modulation Type	WLAN: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode BT-EDR: GFSK, π/4-DQPSK, 8DPSK BT-LE: GFSK NFC: ASK
Modulation Technology	WLAN: DSSS, OFDM BT-EDR: FHSS BT-LE: DTS
Transfer Rate	WLAN: 802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 150 Mbps 802.11ac: up to 433.3 Mbps BT-EDR: up to 3 Mbps BT-LE: 1 Mbps NFC: 106 kbit/s
Operating Frequency	WLAN: 2.4GHz: 2.412 GHz ~ 2.462 GHz 5GHz: 5.18 GHz ~ 5.24 GHz, 5.26 GHz ~ 5.32 GHz, 5.5 GHz ~ 5.7 GHz, 5.745 GHz ~ 5.825 GHz BT-EDR: 2.402 GHz ~ 2.480 GHz BT-LE: 2.402 GHz ~ 2.480 GHz NFC: 13.56 MHz
Number of Channel	WLAN: 2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 24 802.11n (HT40), 802.11ac (VHT40): 11 802.11ac (VHT80): 5 BT-EDR: 79 BT-LE: 40 NFC: 1
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory	N/A

Note:

1. There are Bluetooth、WLAN (2.4 GHz & 5 GHz) and NFC technology used for the EUT.
2. Simultaneously transmission condition.

Condition	Technology		
1	WLAN (2.4 GHz)	WLAN (5 GHz)	NFC
2	WLAN (5 GHz)	Bluetooth	NFC

3. The antenna information is listed as below.

WLAN / Bluetooth							
Antenna No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	AWAN	AYF6P-100002	2.25	2.4~2.5	PIFA	I-PEX MHF1	129.34
			3.56	5.15~5.85			
NFC							
Antenna No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	
2	XAC	PTOS	5	13.56MHz	Loop	none	

4. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.
5. The EUT incorporates a SISO function:

2.4 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
5 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11a	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX
802.11ac (VHT20)	1TX	1RX
802.11ac (VHT40)	1TX	1RX
802.11ac (VHT80)	1TX	1RX

6. The EUT has one type according to NFC technology as following table:

Mode	Type	Modulation	Data rate
Active	A	100%, ASK	106 kbit/s

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.

3.1.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To			Description
	RE≥1G	RE<1G	OB	
-	√	√	√	-

Where **RE≥1G**: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz
OB: Conducted Out-Band Emission Measurement

Radiated Emission Test (Above 1GHz):

- The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type
1	2.4 GHz: 802.11g + 5 GHz: 802.11ac (VHT40) + NFC	1 to 11	6	OFDM	BPSK
		38 to 159	110	OFDM	BPSK
		1	1	DTS	ASK
2	5 GHz: 802.11ac (VHT40) + BT-EDR + NFC	38 to 159	110	OFDM	BPSK
		0 to 78	39	FHSS	GFSK
		1	1	-	ASK

Radiated Emission Test (Below 1GHz):

- The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type
1	2.4 GHz: 802.11g + 5 GHz: 802.11ac (VHT40) + NFC	1 to 11	6	OFDM	BPSK
		38 to 159	110	OFDM	BPSK
		1	1	DTS	ASK
2	5 GHz: 802.11ac (VHT40) + BT-EDR + NFC	38 to 159	110	OFDM	BPSK
		0 to 78	39	FHSS	GFSK
		1	1	-	ASK

Conducted Out-Band Emission Measurement:

- The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type
1	2.4 GHz: 802.11g + 5 GHz: 802.11ac (VHT40)	1 to 11	6	OFDM	BPSK
		38 to 159	110	OFDM	BPSK
2	5 GHz: 802.11ac (VHT40) + BT-EDR	38 to 159	110	OFDM	BPSK
		0 to 78	39	FHSS	GFSK

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	20deg. C, 67%RH	120Vac, 60Hz (System)	Sampson Chen
RE<1G	25deg. C, 71%RH	120Vac, 60Hz (System)	Sampson Chen
OB	25deg. C, 60%RH	12 Vdc	Kevin Ko

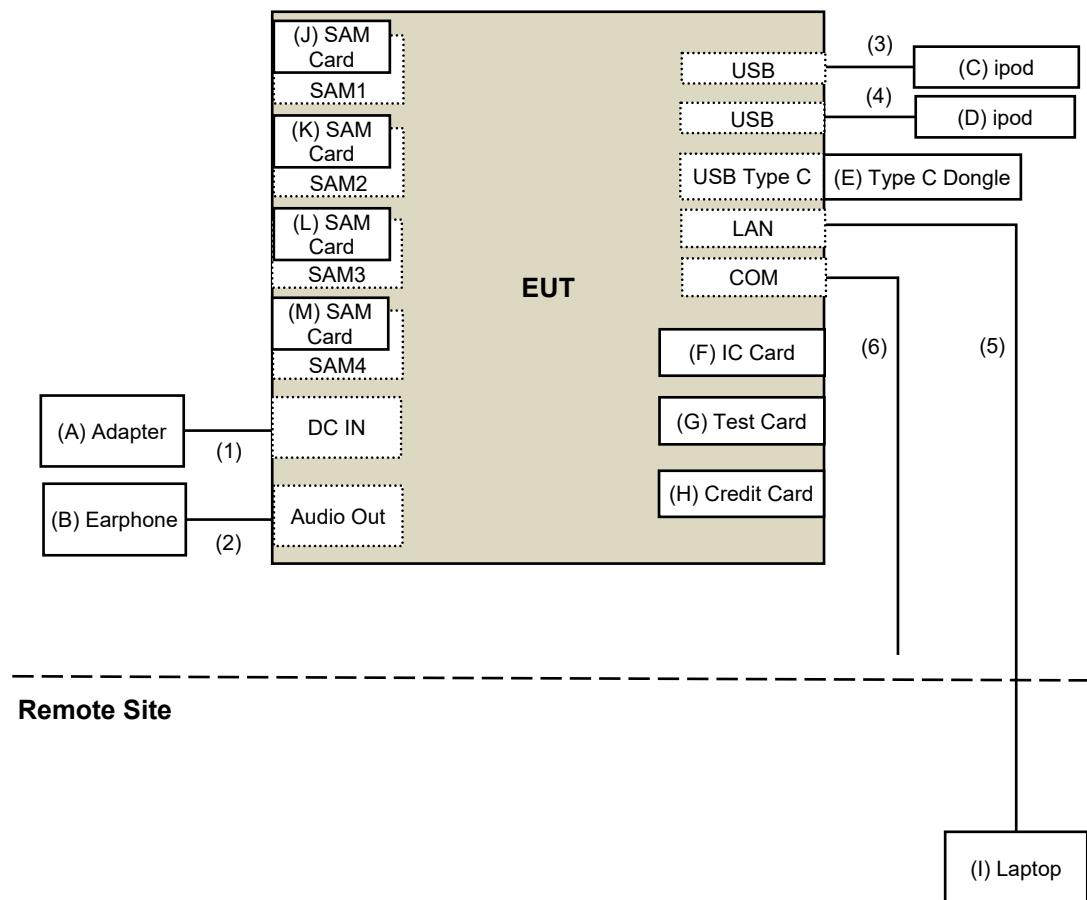
3.2 Description of Support Units

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	Adapter	DEE VAN ENTERPRISE	DSA-36PFN-12FCA 120300	N/A	N/A	Supplied by applicant
B	Earphone	SONY	MDR-XB50AP	N/A	N/A	Provided by Lab
C	ipod	Apple	MD778TA/A	CC4JL03FF41	N/A	Provided by Lab
D	ipod	Apple	MC749TA/A	CC4DN25WDFDM	N/A	Provided by Lab
E	Type C Dongle	SanDisk	SDDDC4	N/A	N/A	Provided by Lab
F	IC Card	XAC	N/A	N/A	N/A	Supplied by applicant
G	Test Card	XAC	N/A	N/A	N/A	Supplied by applicant
H	Credit Card	XAC	N/A	N/A	N/A	Supplied by applicant
I	Laptop	HP	TPN-Q186	5CD8212YYK	DoC	Provided by Lab
J	SAM Card	XAC	N/A	N/A	N/A	Supplied by applicant
K	SAM Card	XAC	N/A	N/A	N/A	Supplied by applicant
L	SAM Card	XAC	N/A	N/A	N/A	Supplied by applicant
M	SAM Card	XAC	N/A	N/A	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC cable	1	1.5	No	0	Supplied by applicant
2	Audio Cable	1	1.2	No	0	Provided by Lab
3	USB cable	1	0.1	Yes	0	Provided by Lab
4	USB cable	1	0.1	Yes	0	Provided by Lab
5	RJ-45 Cable	1	10	No	0	Provided by Lab
6	RJ-12 Cable	1	1.5	No	0	Provided by Lab

3.2.1 Configuration of System under Test



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.

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 (dB μ V/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.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dB μ V/m)	AV:54 (dB μ V/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		
5250~5350 MHz	15.407(b)(2)	PK: -27 (dBm/MHz)	PK: 68.2 (dB μ V/m)
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2 (dB μ V/m) ^{*1} PK: 105.2 (dB μ V/m) ^{*2} PK: 110.8 (dB μ V/m) ^{*3} PK: 122.2 (dB μ V/m) ^{*4}

^{*1} beyond 75 MHz or more above of the band edge.

^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000 \sqrt{30P}}{3} \text{ } \mu\text{V/m, where P is the eirp (Watts).}$$

4.1.2 Test Instruments

Radiated Emission (below 1 GHz):

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-406	2023/10/13	2024/10/12
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	2023/12/12	2024/12/11
Loop Antenna Electro-Metrics	EM-6879	264	2023/2/21	2024/2/20
MXA Signal Analyzer Keysight	N9020B	MY60112408	2023/3/6	2024/3/5
MXE EMI Receiver Keysight	N9038A	MY59050100	2023/6/13	2024/6/12
Preamplifier EMCI	EMC330N	980701	2023/2/18	2024/2/17
	EMC001340	980142	2023/5/8	2024/5/7
RF Coaxial Cable JYEBAO	5D-FB	LOOPCAB-001	2023/12/12	2024/12/11
		LOOPCAB-002	2023/12/12	2024/12/11
RF Coaxial Cable PEWC	8D	966-4-1	2023/2/18	2024/2/17
		966-4-2	2023/2/18	2024/2/17
		966-4-3	2023/2/18	2024/2/17
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Tested Date: 2024/1/2

Radiated Emission (above 1 GHz):

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-783	2023/11/12	2024/11/11
	BBHA 9170	9170-739	2023/11/12	2024/11/11
MXA Signal Analyzer Keysight	N9020B	MY60112408	2023/3/6	2024/3/5
Preamplifier EMCI	EMC12630SE	980688	2023/10/3	2024/10/2
	EMC184045SE	980387	2023/8/9	2024/8/8
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2023/2/20	2024/2/19
	EMC102-KM-KM-1200	160924	2023/8/9	2024/8/8
	EMC104-SM-SM-1200	160922	2023/8/9	2024/8/8
	EMC104-SM-SM-2000	180502	2023/3/27	2024/3/26
	EMC104-SM-SM-6000	210704	2023/11/2	2024/11/1
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Tested Date: 2024/1/11

For other test:

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
MXA Signal Analyzer Keysight	N9020B	MY60112409	2023/2/18	2024/2/17
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Oven room 2.
3. Tested Date: 2024/1/9

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. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

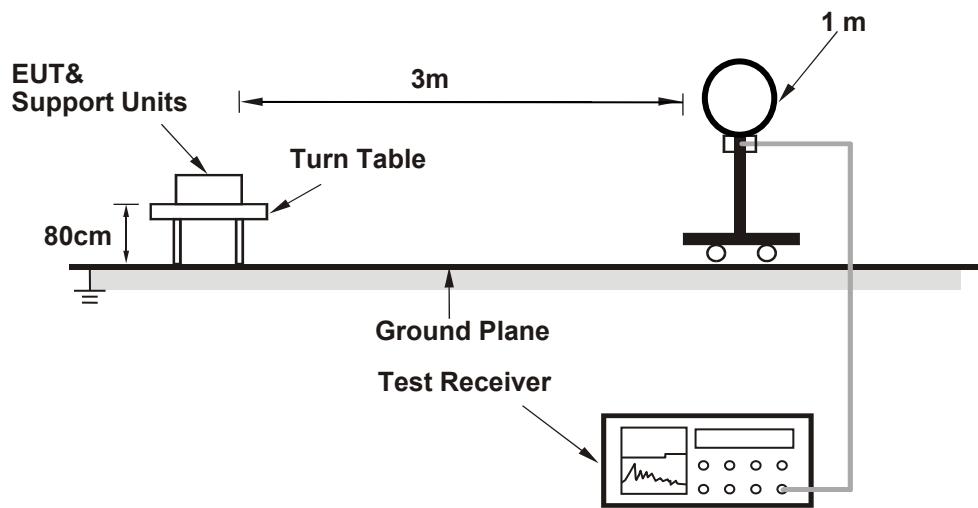
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

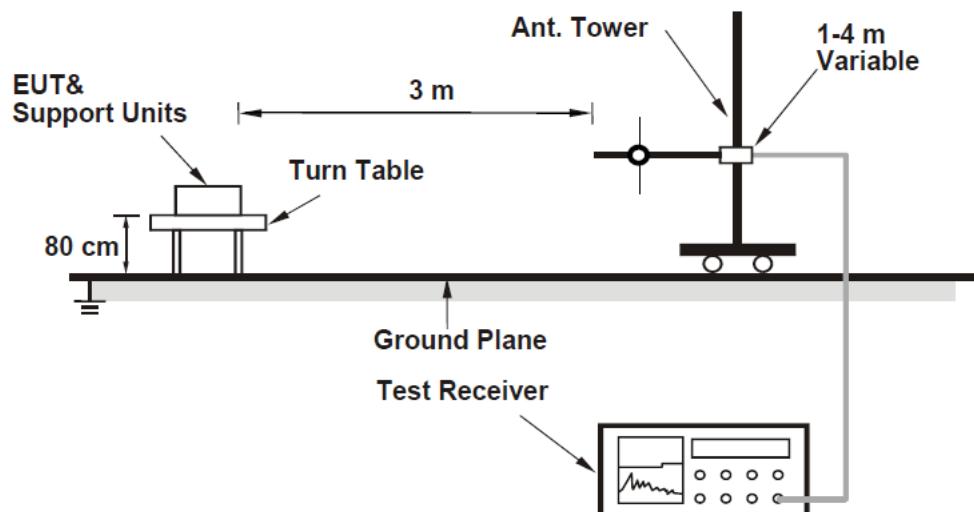
No deviation.

4.1.5 Test Setup

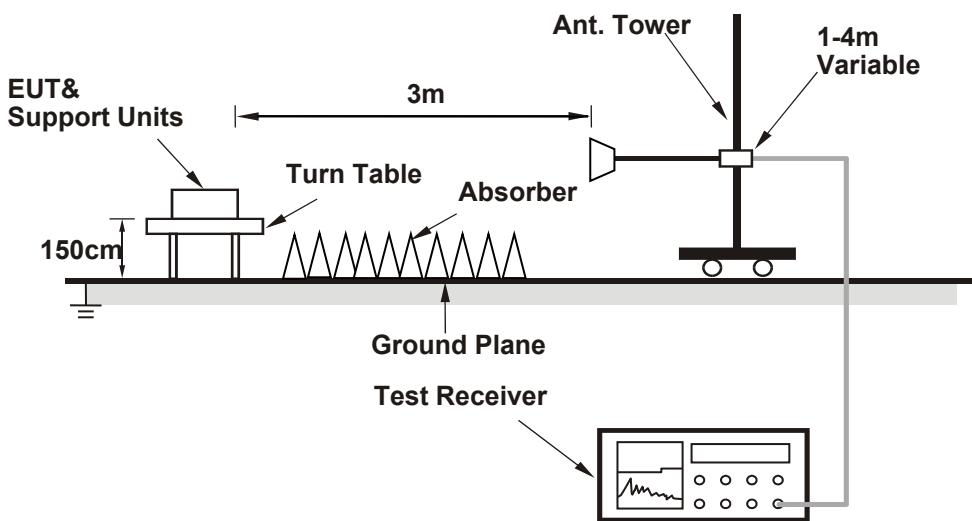
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- Connected the EUT with the Laptop which is placed on remote site.
- Controlling software (WLAN/Bluetooth: QDART_WIN_4_8_Installer_00057_1 / NFC: NFC:E.P.T.exe) has been activated to set the EUT on specific status.

4.1.7 Test Results (Mode 1)

Above 1GHz Data:

Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
-----------------	----------------	-------------------------------	--

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	4874.00	43.7 PK	74.0	-30.3	3.62 H	238	39.2	4.5
2	4874.00	32.5 AV	54.0	-21.5	3.62 H	238	28.0	4.5
3	7311.00	44.1 PK	74.0	-29.9	1.56 H	212	32.6	11.5
4	7311.00	32.0 AV	54.0	-22.0	1.56 H	212	20.5	11.5
5	11100.00	49.2 PK	74.0	-24.8	1.37 H	209	32.0	17.2
6	11100.00	37.4 AV	54.0	-16.6	1.37 H	209	20.2	17.2
7	#16650.00	56.4 PK	68.2	-11.8	2.63 H	291	35.2	21.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	4874.00	47.5 PK	74.0	-26.5	2.31 V	346	43.0	4.5
2	4874.00	36.3 AV	54.0	-17.7	2.31 V	346	31.8	4.5
3	7311.00	46.4 PK	74.0	-27.6	1.46 V	228	34.9	11.5
4	7311.00	33.4 AV	54.0	-20.6	1.46 V	228	21.9	11.5
5	11100.00	48.9 PK	74.0	-25.1	2.18 V	140	31.7	17.2
6	11100.00	37.1 AV	54.0	-16.9	2.18 V	140	19.9	17.2
7	#16650.00	56.4 PK	68.2	-11.8	3.50 V	242	35.2	21.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

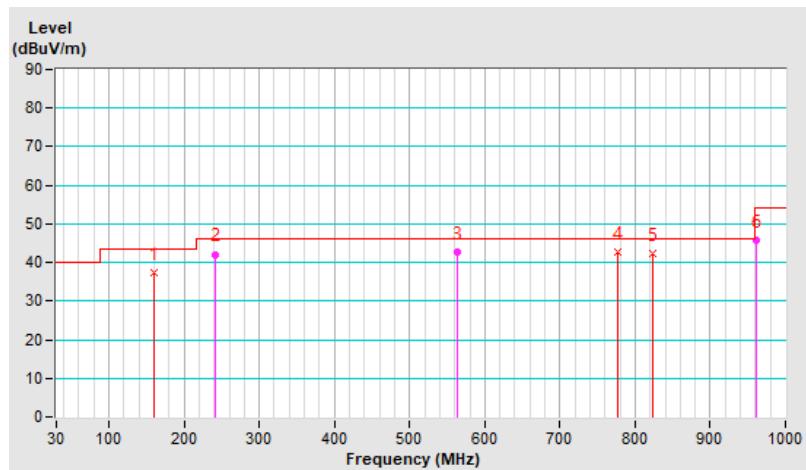
Below 1GHz Data:

Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
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Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	160.23	37.3 QP	43.5	-6.2	1.00 H	133	50.3	-13.0
2	242.31	42.1 QP	46.0	-3.9	1.50 H	197	56.7	-14.6
3	563.87	42.6 QP	46.0	-3.4	1.50 H	333	49.2	-6.6
4	776.64	42.8 QP	46.0	-3.2	1.50 H	114	45.1	-2.3
5	824.01	42.3 QP	46.0	-3.7	1.50 H	69	44.5	-2.2
6	960.63	45.9 QP	54.0	-8.1	2.00 H	199	45.2	0.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

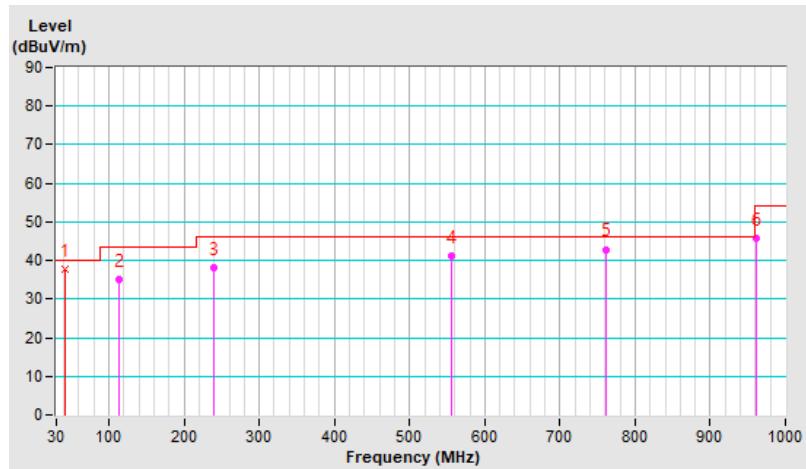


Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
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Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	41.97	37.7 QP	40.0	-2.3	2.00 V	113	50.9	-13.2
2	114.08	35.2 QP	43.5	-8.3	1.50 V	41	50.8	-15.6
3	239.70	38.2 QP	46.0	-7.8	1.50 V	255	52.9	-14.7
4	556.42	41.2 QP	46.0	-4.8	2.00 V	299	47.8	-6.6
5	761.77	42.9 QP	46.0	-3.1	1.50 V	337	45.3	-2.4
6	961.28	45.6 QP	54.0	-8.4	2.00 V	107	44.9	0.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



4.1.8 Test Results (Mode 2)

Above 1GHz Data:

Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
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Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	4882.00	44.3 PK	74.0	-29.7	2.81 H	187	39.8	4.5
2	4882.00	32.3 AV	54.0	-21.7	2.81 H	187	27.8	4.5
3	7323.00	47.0 PK	74.0	-27.0	3.37 H	326	35.4	11.6
4	7323.00	35.3 AV	54.0	-18.7	3.37 H	326	23.7	11.6
5	11100.00	48.8 PK	74.0	-25.2	1.51 H	225	31.6	17.2
6	11100.00	37.1 AV	54.0	-16.9	1.51 H	225	19.9	17.2
7	#16650.00	56.8 PK	68.2	-11.4	2.71 H	296	35.6	21.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	4882.00	43.9 PK	74.0	-30.1	3.61 V	334	39.4	4.5
2	4882.00	31.1 AV	54.0	-22.9	3.61 V	334	26.6	4.5
3	7323.00	46.1 PK	74.0	-27.9	2.52 V	161	34.5	11.6
4	7323.00	34.0 AV	54.0	-20.0	2.52 V	161	22.4	11.6
5	11100.00	48.4 PK	74.0	-25.6	2.11 V	147	31.2	17.2
6	11100.00	36.5 AV	54.0	-17.5	2.11 V	147	19.3	17.2
7	#16650.00	56.3 PK	68.2	-11.9	3.54 V	223	35.1	21.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

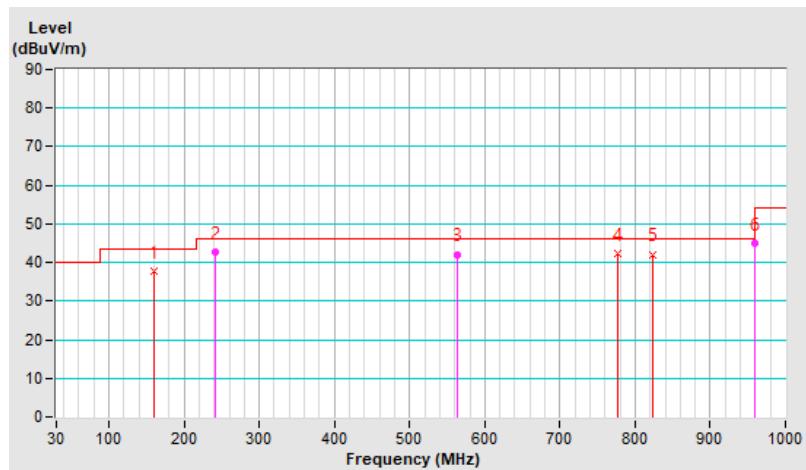
Below 1GHz Data:

Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
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Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	160.69	37.6 QP	43.5	-5.9	1.50 H	157	50.7	-13.1
2	241.84	42.8 QP	46.0	-3.2	3.00 H	207	57.4	-14.6
3	563.35	42.1 QP	46.0	-3.9	2.00 H	300	48.7	-6.6
4	776.27	42.2 QP	46.0	-3.8	2.00 H	197	44.5	-2.3
5	824.30	42.1 QP	46.0	-3.9	2.00 H	75	44.3	-2.2
6	960.22	45.1 QP	54.0	-8.9	1.50 H	133	44.4	0.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

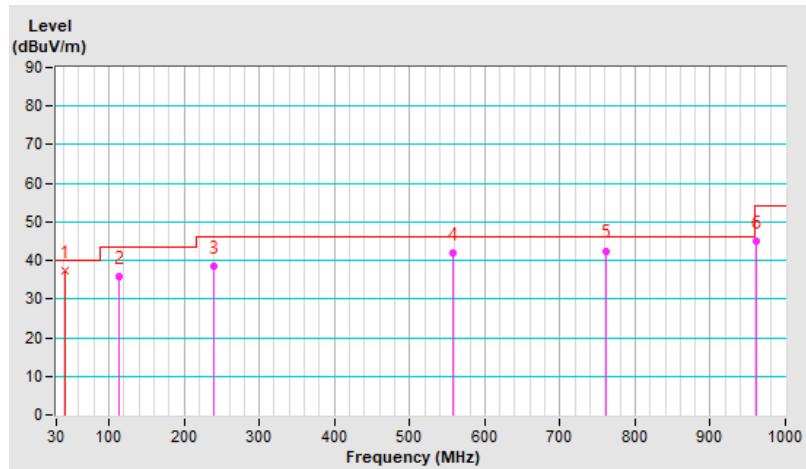


Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
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Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	41.32	37.5 QP	40.0	-2.5	1.50 V	139	50.8	-13.3
2	113.13	35.9 QP	43.5	-7.6	2.00 V	56	51.6	-15.7
3	238.67	38.5 QP	46.0	-7.5	1.00 V	269	53.3	-14.8
4	557.08	41.9 QP	46.0	-4.1	1.50 V	333	48.5	-6.6
5	762.32	42.5 QP	46.0	-3.5	2.00 V	350	44.9	-2.4
6	960.81	45.1 QP	54.0	-8.9	1.50 V	65	44.4	0.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

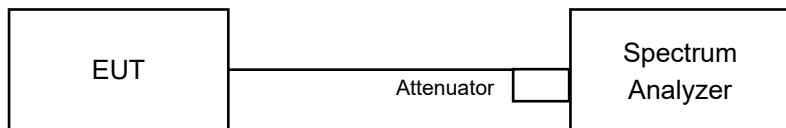


4.2 Conducted Out of Band Emission Measurement

4.2.1 Limits of Conducted Out of Band Emission Measurement

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

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 Procedures

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.

4.2.5 Deviation from Test Standard

No deviation.

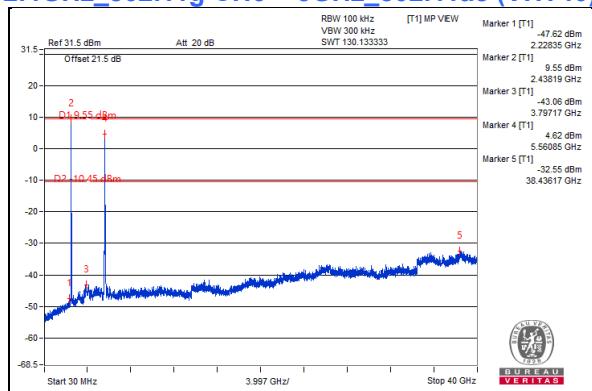
4.2.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

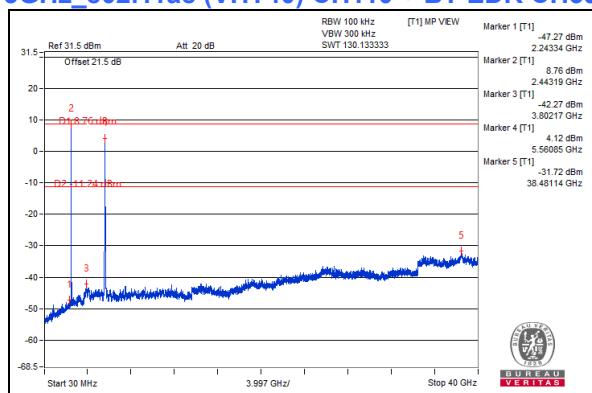
4.2.7 Test Results

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

2.4GHz_802.11g CH6 + 5GHz_802.11ac (VHT40) CH110



5GHz 802.11ac (VHT40) CH110 + BT-EDR CH39



5 Pictures of Test Arrangements

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

Appendix – Information of 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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Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

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

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