Supplemental “Transmit Simultaneously” Test Report

Report No.:	RF191023E01-3
FCC ID:	UDX-60094010
Test Model:	MR86-HW
Received Date:	Oct. 22, 2019
Test Date:	Nov. 30, 2019 to Jan. 08, 2020
Issued Date:	Mar. 02, 2020
Applicant:	Cisco Systems, Inc.
Address:	170 West Tasman Drive, San Jose, CA 95134 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, Taiwa.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan.
FCC Registration / Designation Number:	723255 / TW2022

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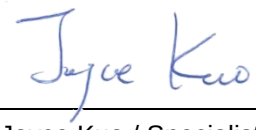
Release Control Record

Issue No.	Description	Date Issued
RF191023E01-3	Original release.	Mar. 02, 2020

1 Certificate of Conformity

Product:	4x4 WiFi6 Outdoor Access Point
Brand:	Cisco
Test Model:	MR86-HW
Sample Status:	ENGINEERING SAMPLE
Applicant:	Cisco Systems, Inc.
Test Date:	Nov. 30, 2019 to Jan. 08, 2020
Standards:	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 :  , **Date:** Mar. 02, 2020

Joyce Kuo / Specialist

Approved by :  , **Date:** Mar. 02, 2020

Clark Lin / Technical Manager

2 Summary of Test Results

FCC Part 15, Subpart C, E (SECTION 15.247, 15.407)			
FCC Clause	Test Item	Result	Remarks
15.207 15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -5.47 dB at 23.43750 MHz.
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -3.1 dB at 4874.00MHz, 53.69MHz, 79.62MHz.

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	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	4x4 WiFi6 Outdoor Access Point
Brand	Cisco
Test Model	MR86-HW
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	55Vdc or 56Vdc from PoE adapter
Modulation Type	**WLAN**: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode 1024QAM for OFDMA in 11ax HE mode **BT-LE:** GFSK
Modulation Technology	**WLAN**: DSSS, OFDM, OFDMA **BT-LE:** DTS
Operating Frequency	**WLAN**: **2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz **BT-LE:** 2.402 ~ 2.480 GHz
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. There are WLAN, Bluetooth technology used for the EUT.
2. The EUT power needs to be supplied from a PoE adapter, the information is as below table:

Only for test, not for sale			
No.	Brand	Model No.	Spec.
1	PHIHONG	POEA30U-1ATE	Input: 100-240Vac, 50/60Hz, 0.8A Output: 56V, 0.536A DC Output Cable: shielded, 1.5 m
2	CISCO	MA-INJ-5	Input: 100-240Vac, 50/60Hz, 1.5A Output: 55V, 0.63A DC Output Cable: shielded, 1.5 m
3	CISCO	MA-INJ-4	Input: 100-240Vac, 50/60Hz, 0.67A Output: 55V, 0.6A DC Output Cable: shielded, 1.5 m
From the above adapters, the Emissions worse case was found in **Adapter 1**. Therefore only the test data of the mode was recorded in this report.			

3. Simultabeously transmission condition

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

4. There are WLAN, Bluetooth technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
WLAN2.4G	WLAN 5G	2.4G/5G 1x1 scanning radio	Bluetooth

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

WLAN 2.4GHz + WLAN 5GHz							
Antenna set	Chain No.	Brand	Model	Antenna Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	Chain 0/1 Chain 2/3	Cisco	AIR-ANT2513P4M-N	13	2.4~2.4835	Dual-Band Polarization Diverse Patch Array	R-N type(F)
				13	5.15~5.85		
2	Chain 0/1 Chain 2/3	Cisco	MA-ANT-20	4	2.4~2.4835	omni-directional	
				7	5.15~5.85		
3	Chain 0/1 Chain 2/3	Cisco	MA-ANT-25	8	2.4~2.4835	Patch Array	
				6.5	5.15~5.85		
4	Chain 0/1 Chain 2/3	Cisco	MA-ANT-27	9	2.4~2.4835	Sector	
				12	5.15~5.85		
Scanning Radio							
-	-	-	-	4	2.4~2.4835	PIFA	I-PEX
				6.63	5.15~5.85		
Bluetooth							
-	-	-	-	4.13	2.4~2.4835	PIFA	I-PEX

6. The EUT could be supplied with components and following different brand names could be chosen:

PART DES	Main source		2nd source	
Item list	Vendor	Vendor PN	Vendor	Vendor PN
DDR	MICRON	MT40A512M16LY-062E IT:E	SAMSUNG	K4A8G165WC-BITD
NAND	WINBOND	W29N02GZBJBF	CYPRESS	S34MS02G200BHV000
M-SMART CONN	GTT	1020G00000340	UDE	R65-MK-0002
From the above sources, the Emissions worse case was found in **Main source**. Therefore only the test data of the mode was recorded in this report.				

7. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	4TX	4RX
802.11g	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11ax (HE80)	4TX	4RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and non-beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.

Radio 3 - Scanning (only RX)	
2.4GHZ	
MODULATION MODE	**RX CONFIGURATION**
802.11b	1RX
802.11g	1RX
802.11n (HT20)	1RX
802.11n (HT40)	1RX
802.11ax (HE20)	1RX
802.11ax (HE40)	1RX
5GHz	
MODULATION MODE	**RX CONFIGURATION**
802.11a	1RX
802.11n (HT20)	1RX
802.11n (HT40)	1RX
802.11ac (VHT20)	1RX
802.11ac (VHT40)	1RX
802.11ac (VHT80)	1RX
802.11ax (HE20)	1RX
802.11ax (HE40)	1RX
802.11ax (HE80)	1RX

8. The above EUT information is declared by manufacturer and for more detailed features description, please refers 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	PLC	OB	
1	√	√	-	√	Antenna: AIR-ANT2513P4M-N
2	√	√	√	√	Antenna: MA-ANT-20
3	√	√	-	√	Antenna: MA-ANT-25
4	√	√	-	√	Antenna: MA-ANT-27

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **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.

Mode 1				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11ax (HE20) + 802.11a + BT-LE	1 to 11	6	OFDMA	BPSK
	36 to 48 149 to 165	149	OFDM	BPSK
	0 to 39	0	GFSK	1
Mode 2				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11g + 802.11ax (HE40) + BT-LE	1 to 11	6	OFDM	BPSK
	36 to 48 149 to 165	159	OFDM	BPSK
	0 to 39	0	GFSK	1
Mode 3				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11g + 802.11ax (HE80) + BT-LE	1 to 11	6	OFDMA	BPSK
	155	155	OFDMA	BPSK
	0 to 39	0	GFSK	1
Mode 4				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11ax (HE20) + 802.11a + BT-LE	1 to 11	6	OFDM	BPSK
	149 to 165	149	OFDM	BPSK
	0 to 39	0	GFSK	1

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.

Mode 1				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11ax (HE20) + 802.11a + BT-LE	1 to 11	6	OFDMA	BPSK
	36 to 48 149 to 165	149	OFDM	BPSK
	0 to 39	0	GFSK	1
Mode 2				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11g + 802.11ax (HE40) + BT-LE	1 to 11	6	OFDM	BPSK
	36 to 48 149 to 165	159	OFDM	BPSK
	0 to 39	0	GFSK	1
Mode 3				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11g + 802.11ax (HE80) + BT-LE	1 to 11	6	OFDMA	BPSK
	155	155	OFDMA	BPSK
	0 to 39	0	GFSK	1
Mode 4				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11ax (HE20) + 802.11a + BT-LE	1 to 11	6	OFDM	BPSK
	149 to 165	149	OFDM	BPSK
	0 to 39	0	GFSK	1

Power Line Conducted Emission Test:

☒ 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.

MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11ax (HE20) + 802.11a + BT-LE	1 to 11	6	OFDMA	BPSK
	36 to 48 149 to 165	149	OFDM	BPSK
	0 to 39	0	GFSK	1

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.

Mode 1				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11ax (HE20) + 802.11a	1 to 11	6	OFDMA	BPSK
	36 to 48 149 to 165	149	OFDM	BPSK
Mode 2				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11g + 802.11ax (HE40)	1 to 11	6	OFDM	BPSK
	36 to 48 149 to 165	159	OFDM	BPSK
Mode 3				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11g + 802.11ax (HE80)	1 to 11	6	OFDMA	BPSK
	155	155	OFDMA	BPSK
Mode 4				
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**
802.11g + 802.11a	1 to 11	6	OFDMA	BPSK
	36 to 48 149 to 165	149	OFDM	BPSK

Test Condition:

Applicable To	Environmental Conditions	INPUT POWER (SYSTEM)	Tested By
RE≥1G	22deg. C, 70%RH	120Vac, 60Hz	Andy Ho
RE<1G	22deg. C, 67%RH	120Vac, 60Hz	Ryan Du
PLC	25deg. C, 62%RH	120Vac, 60Hz	Andy Ho
OB	25deg. C, 60%RH	120Vac, 60Hz	Andy Ho

3.2 Description of Support Units

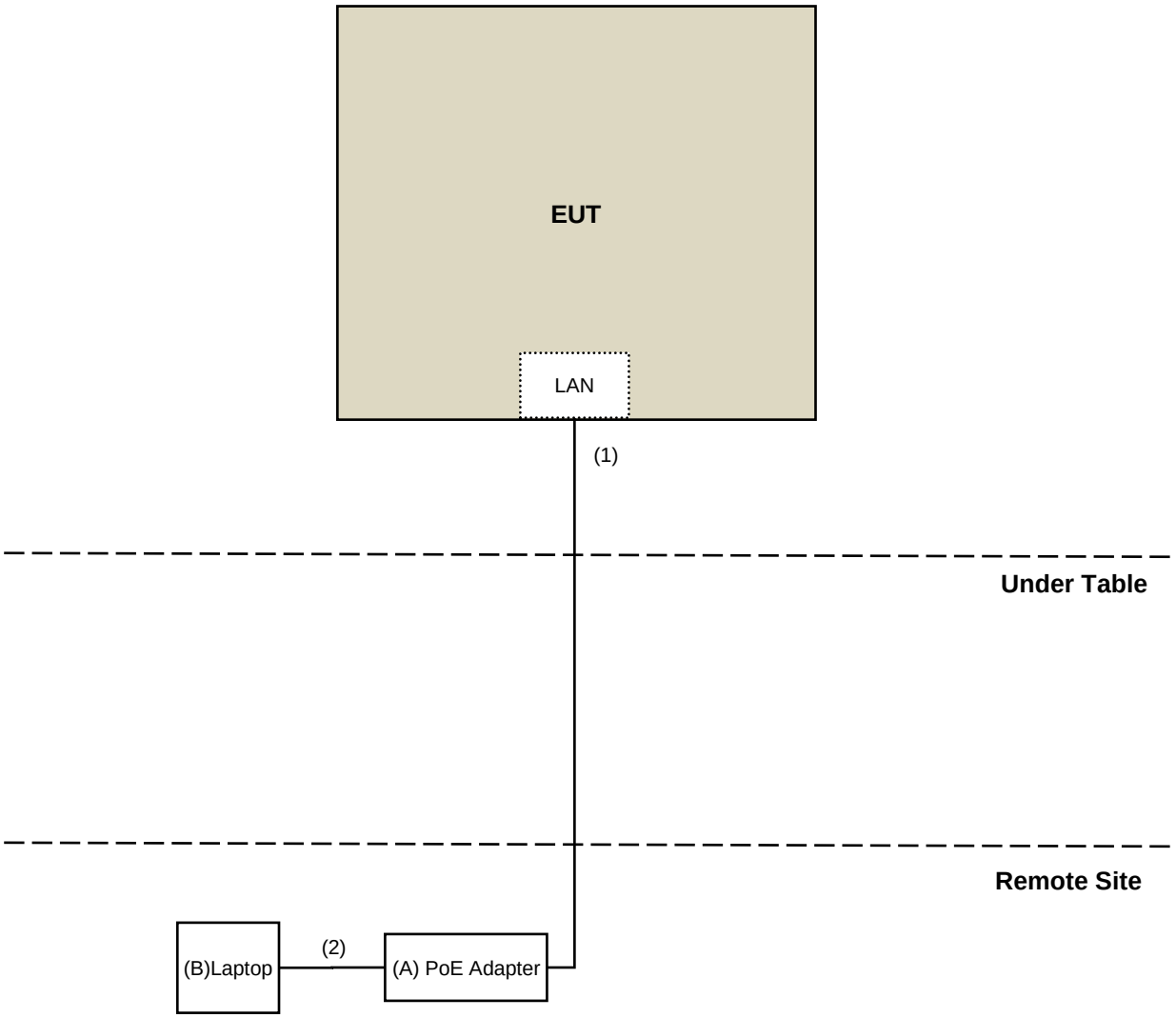
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	PoE Adapter	PHIHONG	POEA30U-1ATE	NA	NA	Supplied by client
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

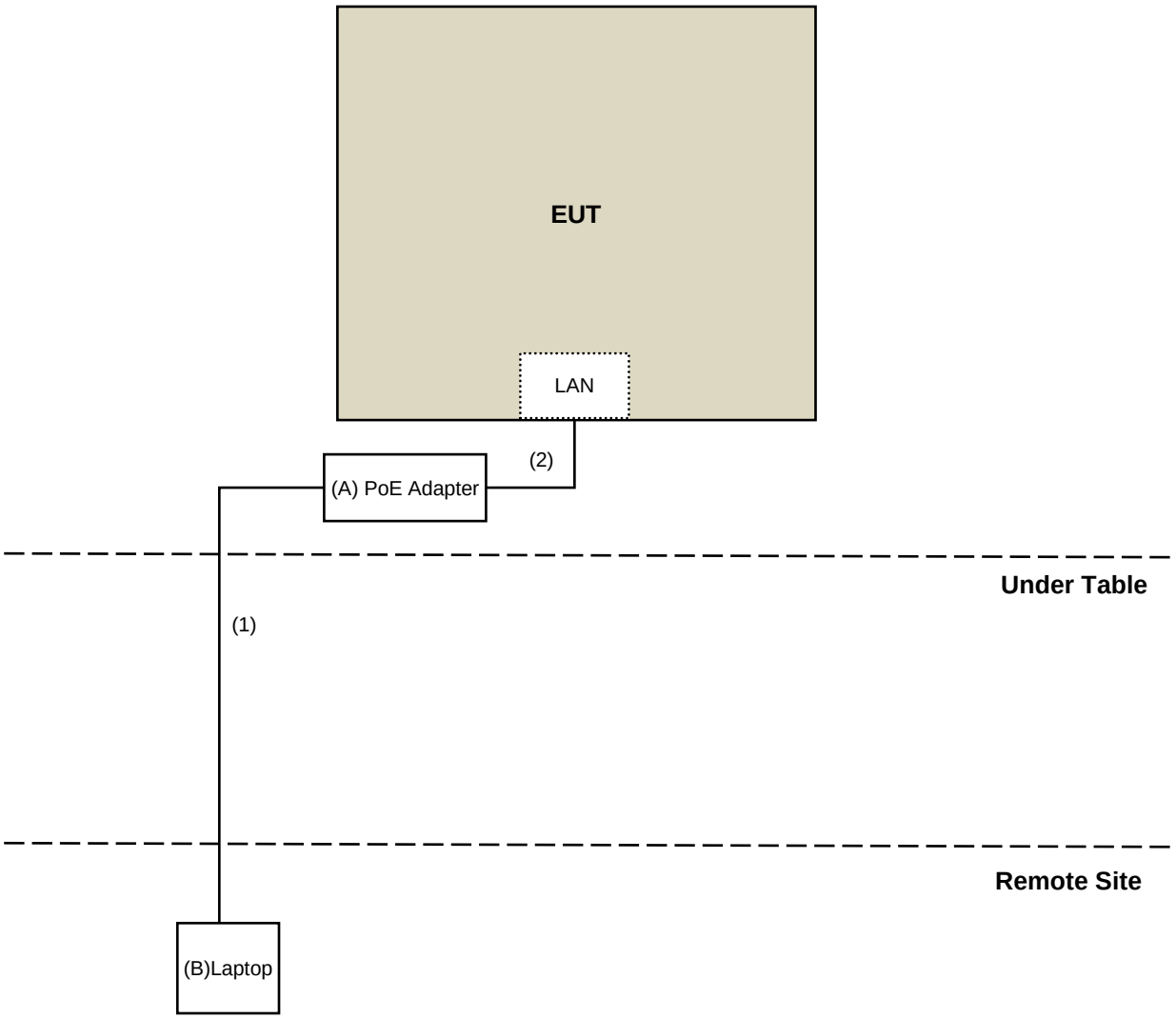
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	3	No	0	Provided by Lab

3.2.1 Configuration of System under Test

POE Mode for Radiation



POE Mode for Conduction



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 (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.

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBµV/m)</td><td>AV:54 (dBµV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBµV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBµV/m) *1
PK:105.2 (dBµV/m) *2
PK: 110.8(dBµV/m) *3
PK:122.2 (dBµV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*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.</td></tr>
</table>

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-3-1	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-2	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-3	Mar. 18, 2019	Mar. 17, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	EMC104-SM-SM-2000	180601	June 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
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	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020

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 test was performed in 966 Chamber No. 3.
3 Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Nov. 30, 2019 to Jan. 08, 2020

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 detects 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:

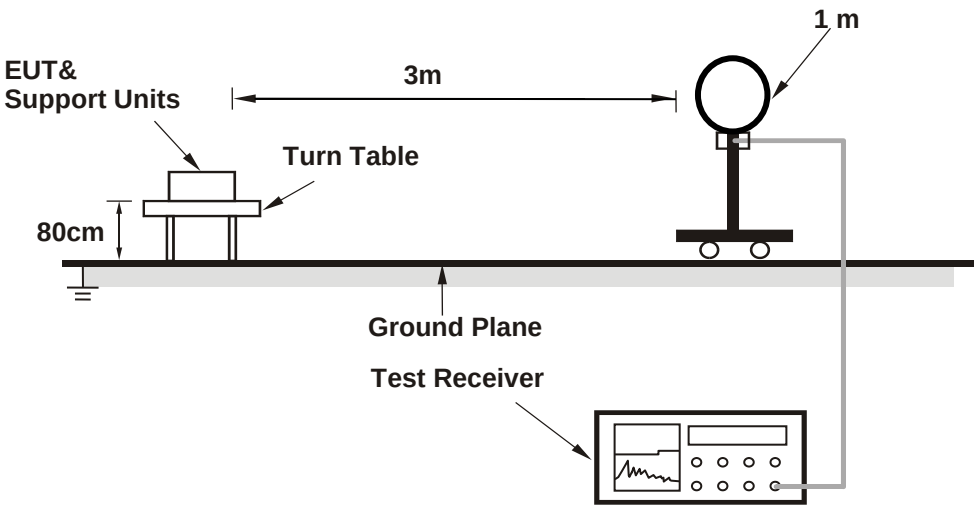
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

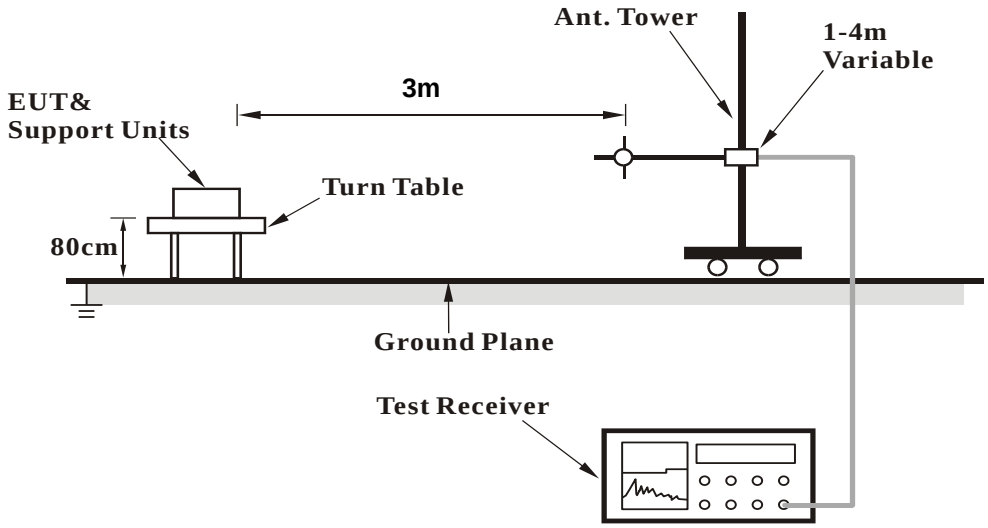
No deviation.

4.1.5 Test Setup

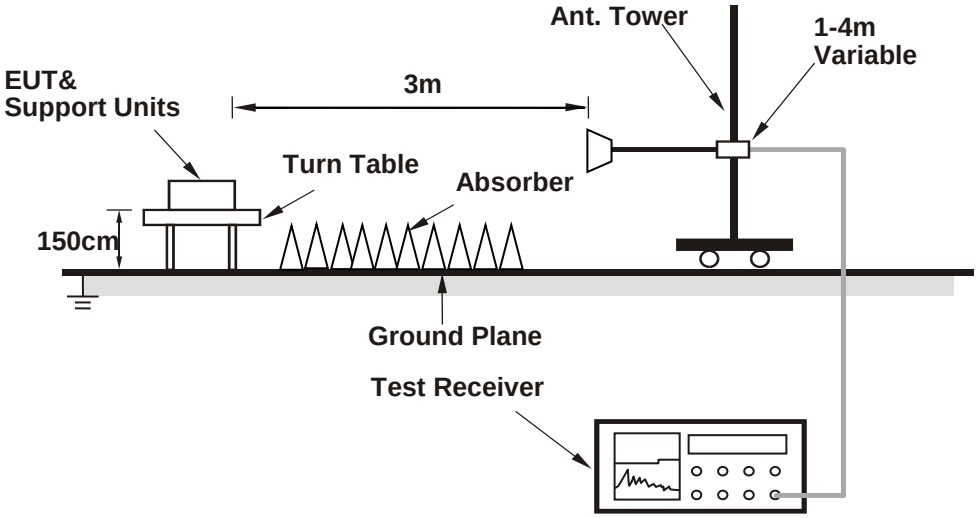
For Radiated emission below 30MHz



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. Placed the EUT on the testing table.
b. Controlling software (QSPR (5.0-00161)) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results (Mode 1)

Above 1GHz Data:

FREQUENCY RANGE	1GHz ~ 40GHz	DETECTOR FUNCTION	Peak (PK) 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	4804.00	40.3 PK	74.0	-33.7	1.46 H	210	38.2	2.1
2	4804.00	29.8 AV	54.0	-24.2	1.46 H	210	27.7	2.1
3	4874.00	46.6 PK	74.0	-27.4	1.65 H	202	44.5	2.1
4	4874.00	37.0 AV	54.0	-17.0	1.65 H	202	34.9	2.1
5	#7206.00	45.7 PK	68.2	-22.5	1.72 H	249	37.6	8.1
6	7311.00	47.0 PK	74.0	-27.0	1.37 H	254	38.9	8.1
7	7311.00	34.9 AV	54.0	-19.1	1.37 H	254	26.8	8.1
8	11490.00	46.5 PK	74.0	-27.5	1.61 H	181	33.9	12.6
9	11490.00	35.9 AV	54.0	-18.1	1.61 H	181	23.3	12.6
10	#17235.00	62.6 PK	68.2	-5.6	1.77 H	219	45.8	16.8
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	4804.00	41.6 PK	74.0	-32.4	1.47 V	209	39.5	2.1
2	4804.00	30.9 AV	54.0	-23.1	1.47 V	209	28.8	2.1
3	4874.00	61.6 PK	74.0	-12.4	1.58 V	134	59.5	2.1
4	**4874.00**	**50.9 AV**	**54.0**	**-3.1**	**1.58 V**	**134**	**48.8**	**2.1**
5	#7206.00	46.0 PK	68.2	-22.2	1.38 V	197	37.9	8.1
6	7311.00	54.4 PK	74.0	-19.6	1.10 V	209	46.3	8.1
7	7311.00	40.7 AV	54.0	-13.3	1.10 V	209	32.6	8.1
8	11490.00	46.1 PK	74.0	-27.9	1.37 V	219	33.5	12.6
9	11490.00	36.6 AV	54.0	-17.4	1.37 V	219	24.0	12.6
10	#17235.00	66.6 PK	68.2	-1.6	2.33 V	181	49.8	16.8

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. 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.

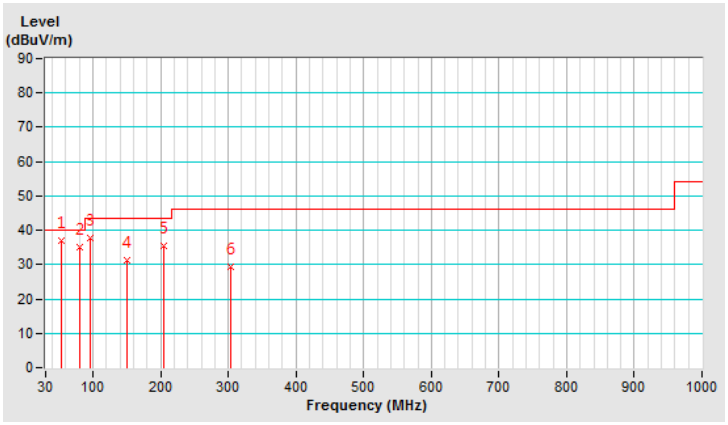
Below 1GHz Data:

FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	**53.69**	**36.9 QP**	**40.0**	**-3.1**	**2.00 H**	**80**	**44.8**	**-7.9**
2	80.12	35.0 QP	40.0	-5.0	2.50 H	353	47.6	-12.6
3	95.53	37.8 QP	43.5	-5.7	2.50 H	98	50.5	-12.7
4	149.80	31.2 QP	43.5	-12.3	1.50 H	70	38.3	-7.1
5	204.94	35.3 QP	43.5	-8.2	1.00 H	66	45.5	-10.2
6	304.03	29.4 QP	46.0	-16.6	1.00 H	323	35.6	-6.2

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 of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

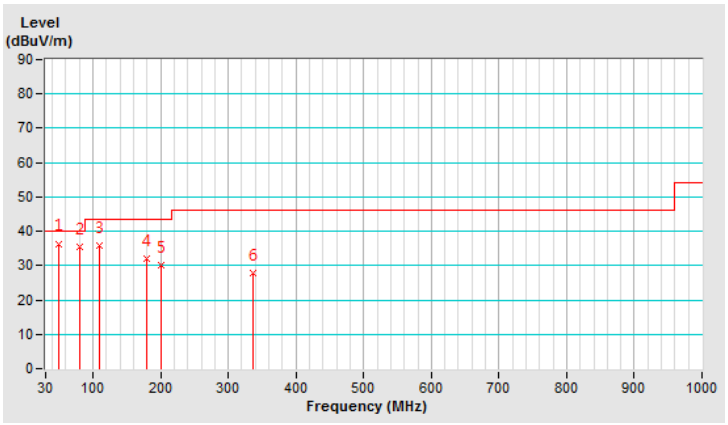


FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	49.73	36.4 QP	40.0	-3.6	1.00 V	134	44.1	-7.7
2	80.17	35.6 QP	40.0	-4.4	2.50 V	169	48.3	-12.7
3	108.89	35.7 QP	43.5	-7.8	1.50 V	211	46.1	-10.4
4	179.46	32.0 QP	43.5	-11.5	1.00 V	94	40.6	-8.6
5	200.47	30.0 QP	43.5	-13.5	1.00 V	43	40.4	-10.4
6	336.01	27.7 QP	46.0	-18.3	1.00 V	146	33.0	-5.3

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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.1.8 Test Results (Mode 2)

Above 1GHz Data:

FREQUENCY RANGE	1GHz ~ 40GHz	DETECTOR FUNCTION	Peak (PK) 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	4804.00	41.0 PK	74.0	-33.0	1.44 H	198	38.9	2.1
2	4804.00	30.2 AV	54.0	-23.8	1.44 H	198	28.1	2.1
3	4874.00	46.3 PK	74.0	-27.7	1.60 H	205	44.2	2.1
4	4874.00	36.5 AV	54.0	-17.5	1.60 H	205	34.4	2.1
5	#7206.00	46.0 PK	68.2	-22.2	1.76 H	262	37.9	8.1
6	7311.00	47.4 PK	74.0	-26.6	1.37 H	247	39.3	8.1
7	7311.00	35.1 AV	54.0	-18.9	1.37 H	247	27.0	8.1
8	11590.00	46.9 PK	74.0	-27.1	1.62 H	192	34.6	12.3
9	11590.00	36.2 AV	54.0	-17.8	1.62 H	192	23.9	12.3
10	#17385.00	62.5 PK	68.2	-5.7	1.76 H	232	46.0	16.5
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	4804.00	41.5 PK	74.0	-32.5	1.49 V	195	39.4	2.1
2	4804.00	30.7 AV	54.0	-23.3	1.49 V	195	28.6	2.1
3	4874.00	61.2 PK	74.0	-12.8	1.59 V	133	59.1	2.1
4	4874.00	50.7 AV	54.0	-3.3	1.59 V	133	48.6	2.1
5	#7206.00	46.7 PK	68.2	-21.5	1.41 V	205	38.6	8.1
6	7311.00	54.4 PK	74.0	-19.6	1.12 V	199	46.3	8.1
7	7311.00	40.8 AV	54.0	-13.2	1.12 V	199	32.7	8.1
8	11590.00	46.8 PK	74.0	-27.2	1.43 V	208	34.5	12.3
9	11590.00	37.1 AV	54.0	-16.9	1.43 V	208	24.8	12.3
10	#17385.00	66.7 PK	68.2	-1.5	2.31 V	168	50.2	16.5

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.

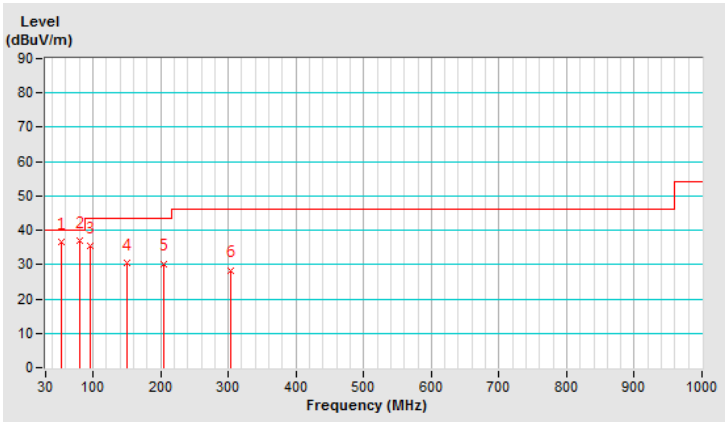
Below 1GHz Data:

FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	53.74	36.7 QP	40.0	-3.3	1.50 H	232	44.6	-7.9
2	**79.62**	**36.9 QP**	**40.0**	**-3.1**	**2.00 H**	**45**	**49.4**	**-12.5**
3	95.42	35.6 QP	43.5	-7.9	2.50 H	293	48.3	-12.7
4	150.26	30.5 QP	43.5	-13.0	1.50 H	45	37.6	-7.1
5	204.27	30.3 QP	43.5	-13.2	1.50 H	101	40.5	-10.2
6	303.57	28.4 QP	46.0	-17.6	1.00 H	227	34.6	-6.2

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 of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

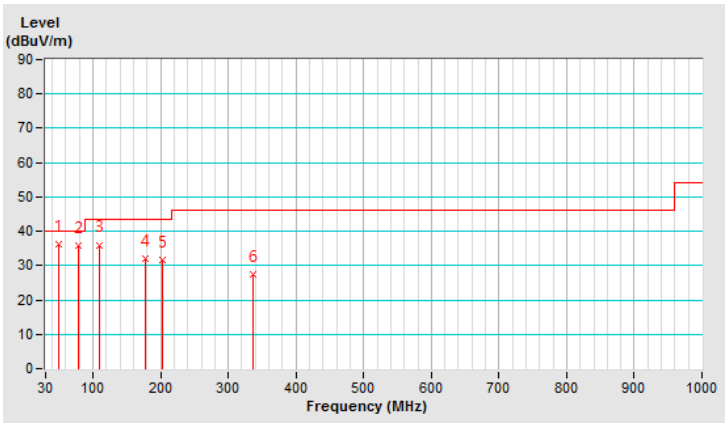


FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	48.48	36.2 QP	40.0	-3.8	1.50 V	242	43.9	-7.7
2	79.31	35.8 QP	40.0	-4.2	3.00 V	20	48.3	-12.5
3	109.21	36.0 QP	43.5	-7.5	1.50 V	300	46.4	-10.4
4	177.61	32.1 QP	43.5	-11.4	1.00 V	25	40.5	-8.4
5	201.88	31.6 QP	43.5	-11.9	1.50 V	79	41.9	-10.3
6	335.71	27.3 QP	46.0	-18.7	1.50 V	245	32.6	-5.3

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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.1.9 Test Results (Mode 3)

Above 1GHz Data:

FREQUENCY RANGE	1GHz ~ 40GHz	DETECTOR FUNCTION	Peak (PK) 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	4804.00	40.7 PK	74.0	-33.3	1.51 H	225	38.6	2.1
2	4804.00	30.1 AV	54.0	-23.9	1.51 H	225	28.0	2.1
3	4874.00	46.7 PK	74.0	-27.3	1.68 H	209	44.6	2.1
4	4874.00	37.3 AV	54.0	-16.7	1.68 H	209	35.2	2.1
5	#7206.00	45.1 PK	68.2	-23.1	1.72 H	241	37.0	8.1
6	7311.00	47.0 PK	74.0	-27.0	1.39 H	261	38.9	8.1
7	7311.00	34.8 AV	54.0	-19.2	1.39 H	261	26.7	8.1
8	11490.00	47.1 PK	74.0	-26.9	1.56 H	169	34.5	12.6
9	11490.00	36.4 AV	54.0	-17.6	1.56 H	169	23.8	12.6
10	#17235.00	61.9 PK	68.2	-6.3	1.77 H	226	45.1	16.8
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	4804.00	41.6 PK	74.0	-32.4	1.42 V	204	39.5	2.1
2	4804.00	30.9 AV	54.0	-23.1	1.42 V	204	28.8	2.1
3	4874.00	61.9 PK	74.0	-12.1	1.58 V	137	59.8	2.1
4	4874.00	51.1 AV	54.0	-2.9	1.58 V	137	49.0	2.1
5	#7206.00	45.8 PK	68.2	-22.4	1.39 V	205	37.7	8.1
6	7311.00	54.9 PK	74.0	-19.1	1.10 V	204	46.8	8.1
7	7311.00	41.0 AV	54.0	-13.0	1.10 V	204	32.9	8.1
8	11490.00	46.7 PK	74.0	-27.3	1.41 V	230	34.1	12.6
9	11490.00	37.0 AV	54.0	-17.0	1.41 V	230	24.4	12.6
10	#17235.00	66.7 PK	68.2	-1.5	2.34 V	196	49.9	16.8

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. 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.

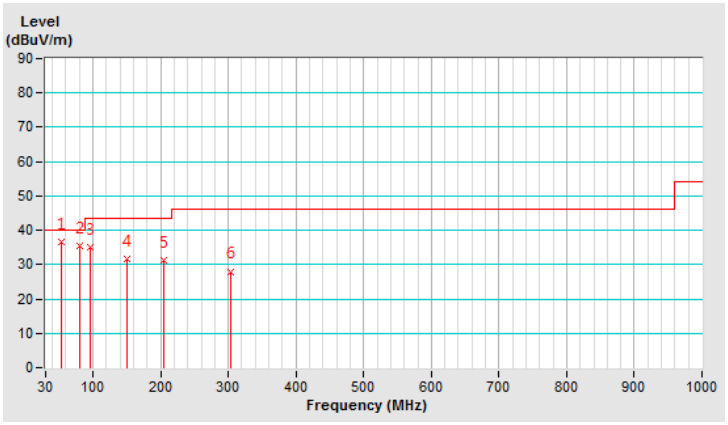
Below 1GHz Data:

FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	52.98	36.6 QP	40.0	-3.4	1.50 H	224	44.4	-7.8
2	80.94	35.6 QP	40.0	-4.4	2.00 H	19	48.5	-12.9
3	95.72	35.2 QP	43.5	-8.3	2.50 H	298	47.8	-12.6
4	149.44	31.5 QP	43.5	-12.0	1.50 H	46	38.6	-7.1
5	204.95	31.1 QP	43.5	-12.4	1.50 H	87	41.3	-10.2
6	303.59	28.0 QP	46.0	-18.0	1.00 H	230	34.2	-6.2

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 of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

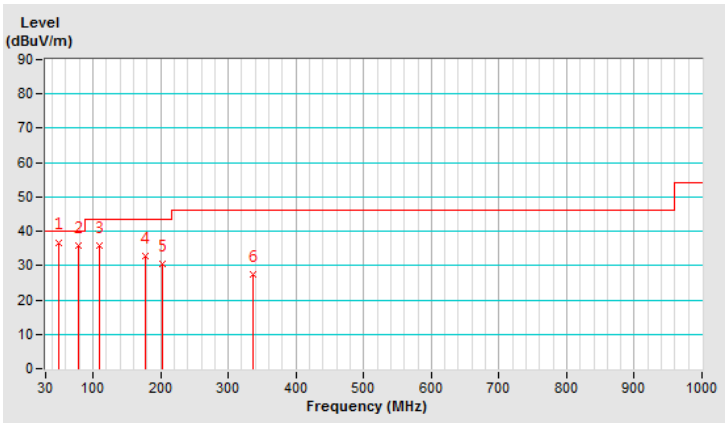


FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	49.21	36.8 QP	40.0	-3.2	1.50 V	242	44.5	-7.7
2	79.33	35.7 QP	40.0	-4.3	2.50 V	19	48.2	-12.5
3	109.66	35.8 QP	43.5	-7.7	1.00 V	310	46.2	-10.4
4	177.73	32.6 QP	43.5	-10.9	1.00 V	32	41.0	-8.4
5	202.32	30.6 QP	43.5	-12.9	1.00 V	96	40.9	-10.3
6	335.64	27.4 QP	46.0	-18.6	1.50 V	255	32.7	-5.3

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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.1.10 Test Results (Mode 4)

Above 1GHz Data:

FREQUENCY RANGE	1GHz ~ 40GHz	DETECTOR FUNCTION	Peak (PK) 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	4804.00	41.0 PK	74.0	-33.0	1.44 H	223	38.9	2.1
2	4804.00	30.3 AV	54.0	-23.7	1.44 H	223	28.2	2.1
3	4874.00	46.5 PK	74.0	-27.5	1.68 H	193	44.4	2.1
4	4874.00	36.9 AV	54.0	-17.1	1.68 H	193	34.8	2.1
5	#7206.00	45.7 PK	68.2	-22.5	1.73 H	264	37.6	8.1
6	7311.00	46.9 PK	74.0	-27.1	1.41 H	241	38.8	8.1
7	7311.00	34.7 AV	54.0	-19.3	1.41 H	241	26.6	8.1
8	11490.00	46.4 PK	74.0	-27.6	1.63 H	174	33.8	12.6
9	11490.00	35.5 AV	54.0	-18.5	1.63 H	174	22.9	12.6
10	#17235.00	62.4 PK	68.2	-5.8	1.82 H	234	45.6	16.8
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	4804.00	41.8 PK	74.0	-32.2	1.41 V	224	39.7	2.1
2	4804.00	31.3 AV	54.0	-22.7	1.41 V	224	29.2	2.1
3	4874.00	61.4 PK	74.0	-12.6	1.54 V	121	59.3	2.1
4	**4874.00**	**50.9 AV**	**54.0**	**-3.1**	**1.54 V**	**121**	**48.8**	**2.1**
5	#7206.00	46.7 PK	68.2	-21.5	1.43 V	186	38.6	8.1
6	7311.00	54.5 PK	74.0	-19.5	1.09 V	220	46.4	8.1
7	7311.00	40.6 AV	54.0	-13.4	1.09 V	220	32.5	8.1
8	11490.00	45.4 PK	74.0	-28.6	1.40 V	211	32.8	12.6
9	11490.00	36.1 AV	54.0	-17.9	1.40 V	211	23.5	12.6
10	#17235.00	66.6 PK	68.2	-1.6	2.35 V	167	49.8	16.8

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. 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.

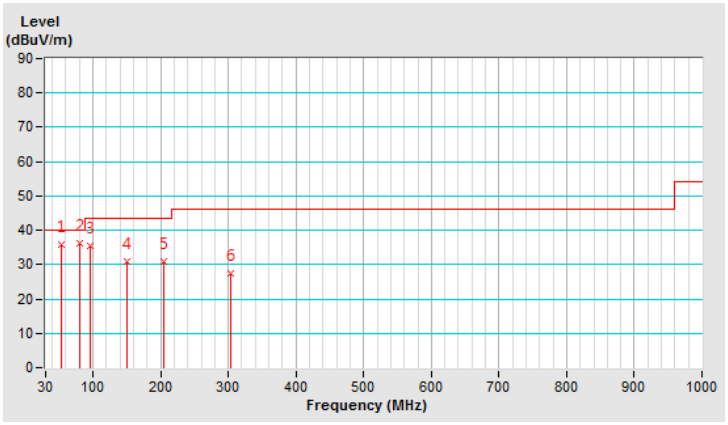
Below 1GHz Data:

FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	53.49	35.9 QP	40.0	-4.1	1.50 H	235	43.8	-7.9
2	80.32	36.2 QP	40.0	-3.8	2.50 H	27	48.9	-12.7
3	95.17	35.5 QP	43.5	-8.0	2.50 H	290	48.3	-12.8
4	149.94	30.8 QP	43.5	-12.7	1.50 H	51	37.9	-7.1
5	204.25	30.9 QP	43.5	-12.6	1.00 H	80	41.1	-10.2
6	304.44	27.6 QP	46.0	-18.4	1.00 H	218	33.8	-6.2

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 of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

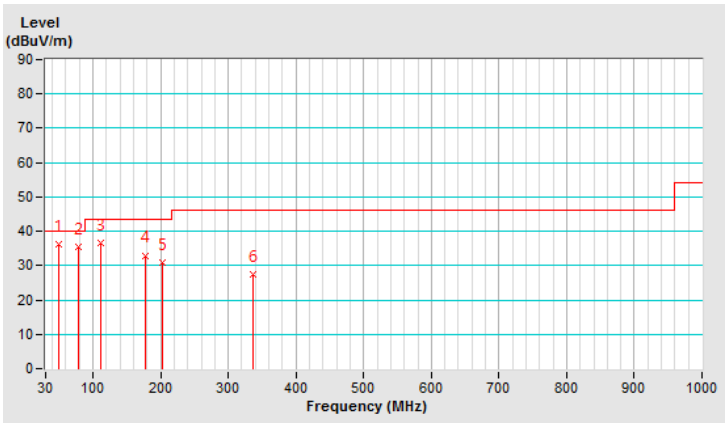


FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	48.97	36.3 QP	40.0	-3.7	1.50 V	243	44.0	-7.7
2	79.43	35.4 QP	40.0	-4.6	3.00 V	27	47.9	-12.5
3	110.56	36.7 QP	43.5	-6.8	1.50 V	310	47.0	-10.3
4	177.08	33.0 QP	43.5	-10.5	2.00 V	34	41.4	-8.4
5	203.05	30.8 QP	43.5	-12.7	1.00 V	101	41.0	-10.2
6	336.51	27.5 QP	46.0	-18.5	1.50 V	254	32.8	-5.3

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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
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 Conduction 1.
3 Tested Date: Dec. 03, 2019

4.2.3 Test Procedures

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

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

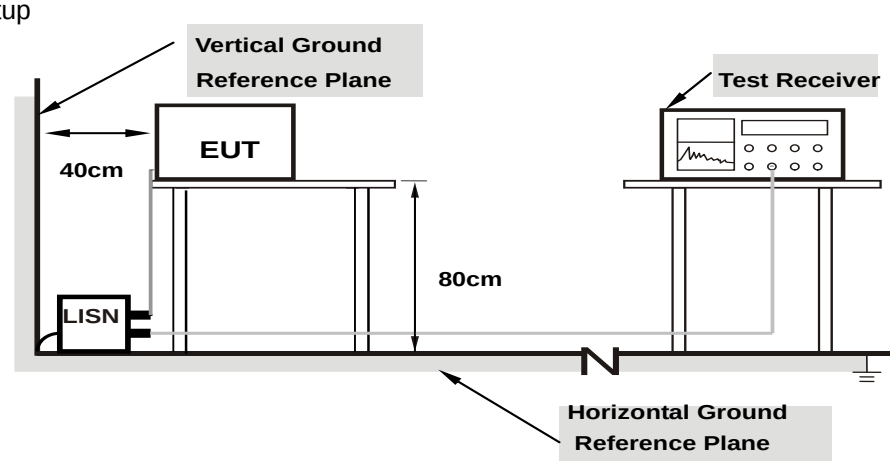
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

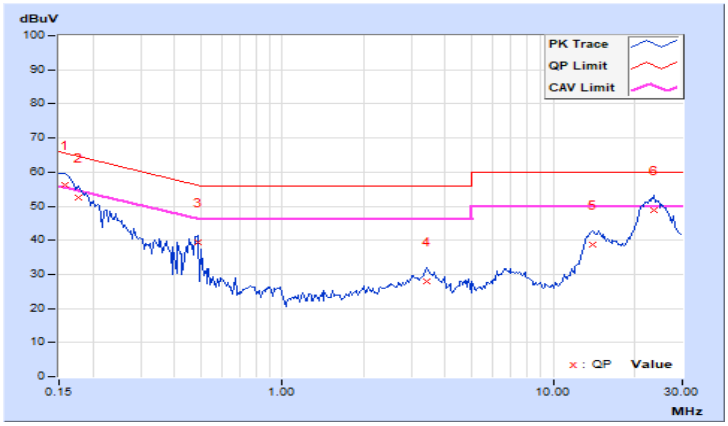
4.2.7 Test Results

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.97	46.21	31.34	56.18	41.31	65.58	55.58	-9.40	-14.27
2	0.17734	9.97	42.63	27.07	52.60	37.04	64.61	54.61	-12.01	-17.57
3	0.48984	9.99	29.44	23.79	39.43	33.78	56.17	46.17	-16.74	-12.39
4	3.42969	10.13	17.87	12.67	28.00	22.80	56.00	46.00	-28.00	-23.20
5	14.08203	10.72	27.98	23.23	38.70	33.95	60.00	50.00	-21.30	-16.05
6	**23.43750**	**11.15**	**37.51**	**33.38**	**48.66**	**44.53**	**60.00**	**50.00**	**-11.34**	**-5.47**

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

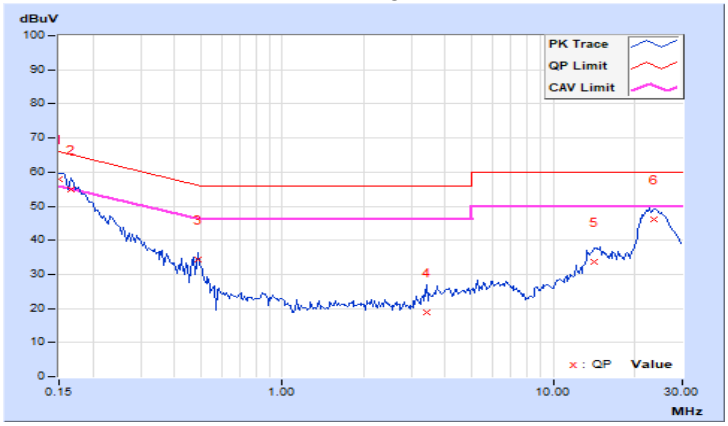


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.97	48.02	32.19	57.99	42.16	66.00	56.00	-8.01	-13.84
2	0.16562	9.97	44.93	28.92	54.90	38.89	65.18	55.18	-10.28	-16.29
3	0.48984	9.99	24.19	19.52	34.18	29.51	56.17	46.17	-21.99	-16.66
4	3.41406	10.12	8.77	0.73	18.89	10.85	56.00	46.00	-37.11	-35.15
5	14.20703	10.57	23.03	17.86	33.60	28.43	60.00	50.00	-26.40	-21.57
6	23.67969	10.86	35.41	31.20	46.27	42.06	60.00	50.00	-13.73	-7.94

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

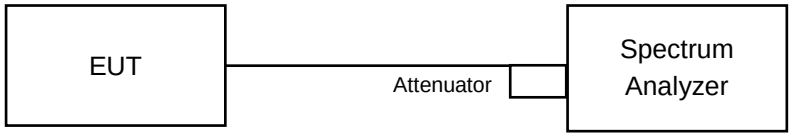


4.3 Conducted Out of Band Emission Measurement

4.3.1 Limits of Conducted Out of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

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

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.

4.3.5 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 specific channel frequencies individually.

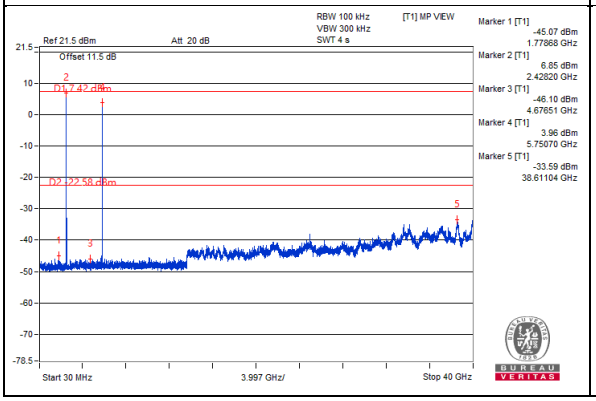
4.3.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

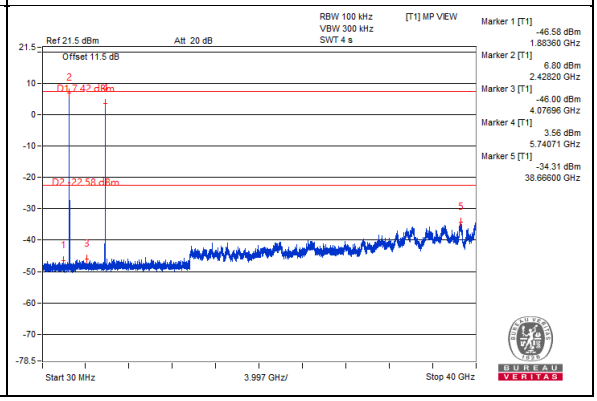
For Mode 1

2.4GHz_802.11ax (HE20) CH6 + 5GHz_802.11a CH149

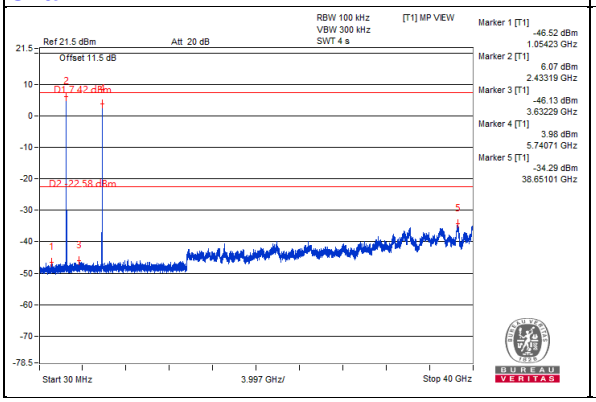
Chain 0



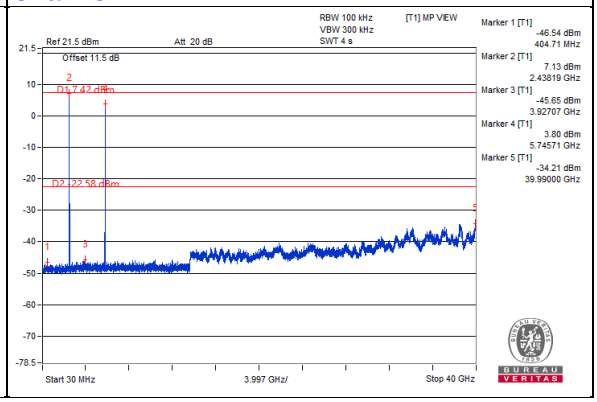
Chain 1



Chain 2



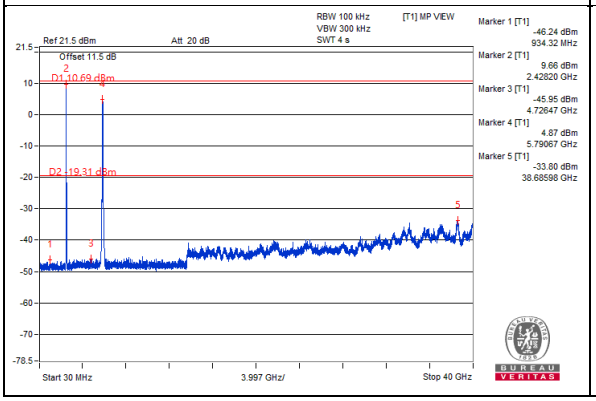
Chain 3



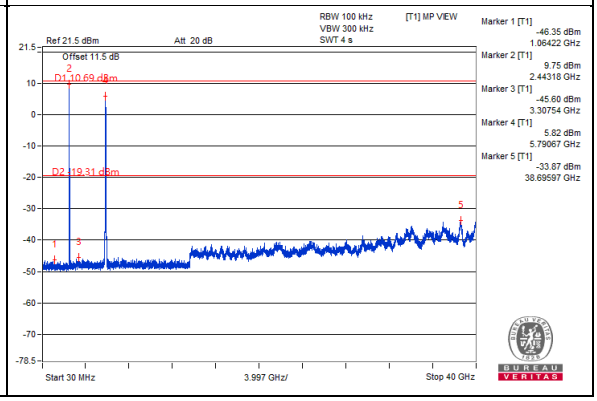
For Mode 2

2.4GHz_802.11g CH6 + 5GHz_802.11ax (HE40) CH159

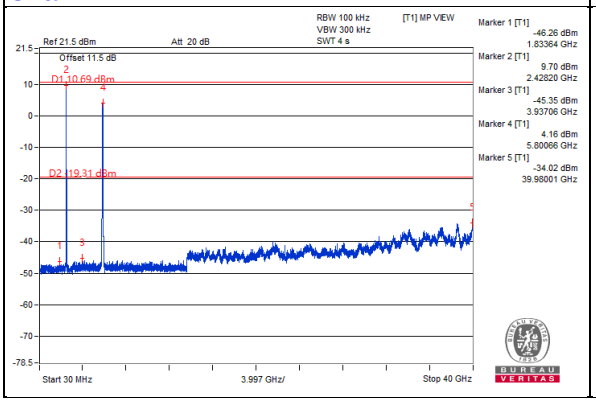
Chain 0



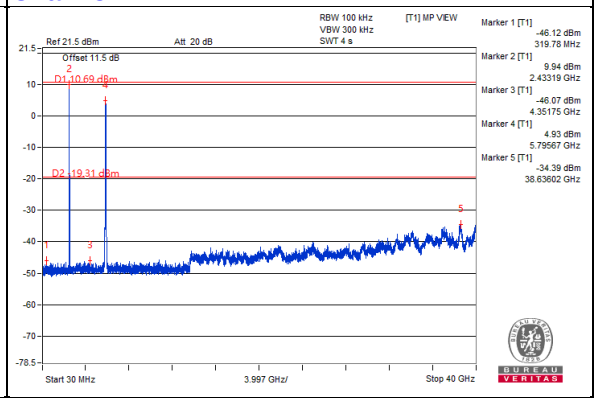
Chain 1



Chain 2



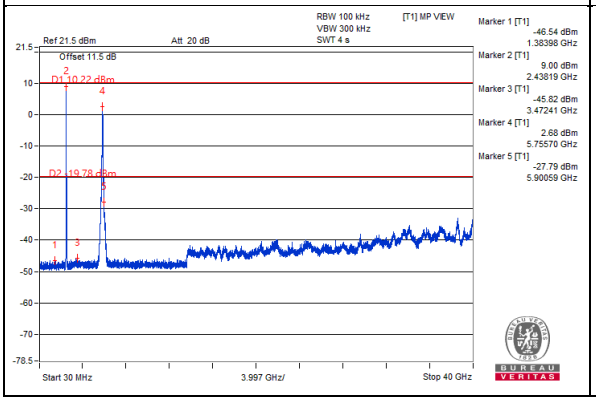
Chain 3



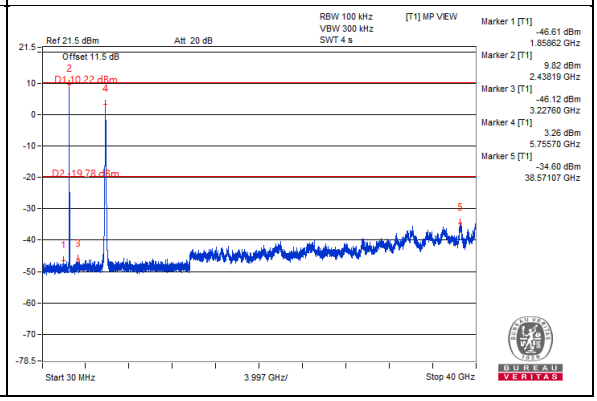
For Mode 3

2.4GHz_802.11g CH6 + 5GHz_802.11ax (HE80) CH155

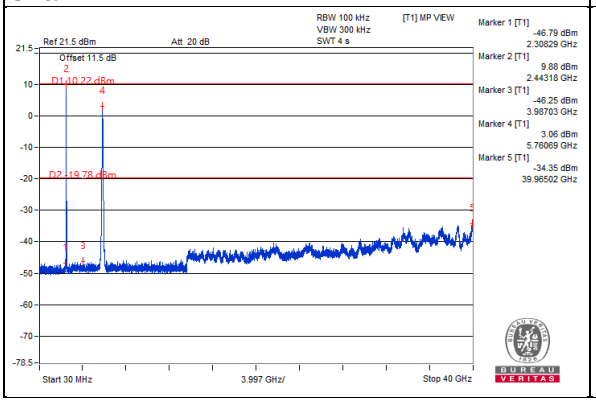
Chain 0



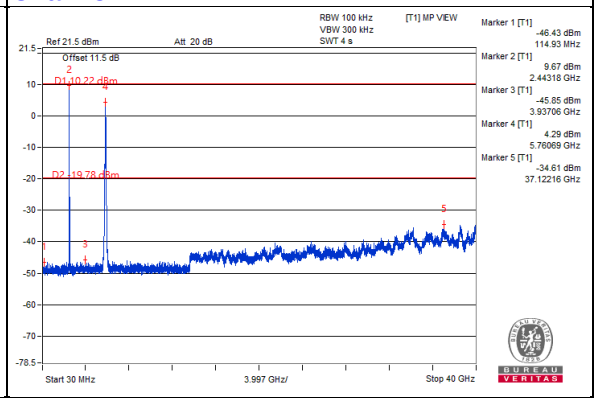
Chain 1



Chain 2



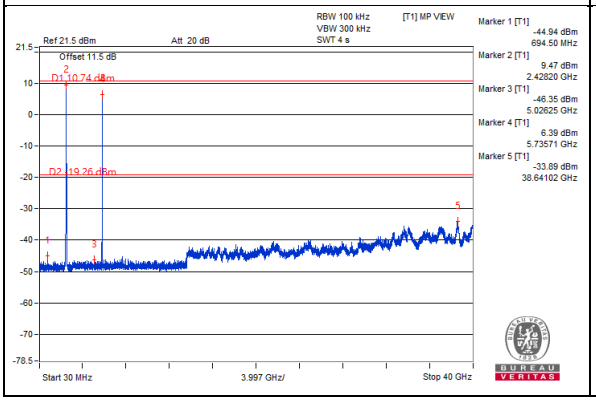
Chain 3



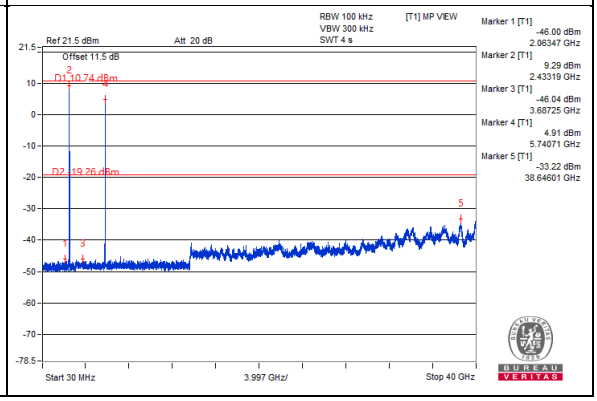
For Mode 4

2.4GHz_802.11 ax (HE20) CH6 + 5GHz_802.11a CH149

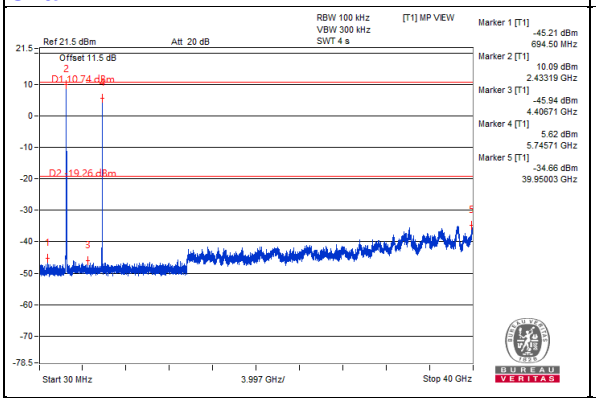
Chain 0



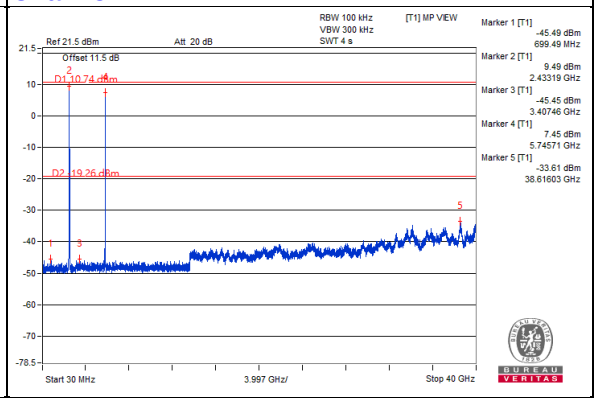
Chain 1



Chain 2



Chain 3



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

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