FCC TEST REPORT
(WLAN 15.407)

REPORT NO.:	RF140430E05B-1
MODEL NO.:	1653
FCC ID:	C3K1653
RECEIVED:	Apr. 30, 2014
TESTED:	June 19 to July 31, 2014
ISSUED:	Sep. 02, 2014

APPLICANT:	Microsoft Corporation
ADDRESS:	One Microsoft Way Redmond WA 98052

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
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Testing Laboratory
2022

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140430E05B-1	Original release	Sep. 02, 2014

1. CERTIFICATION

PRODUCT:	802.11a/b/g/n 2T2R dual-band wireless LAN radio
BRAND NAME:	Microsoft
MODEL NO.:	1653
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	Microsoft Corporation
TESTED:	June 19 to July 31, 2014
STANDARDS:	**FCC Part 15, Subpart E (Section 15.407)**
	ANSI C63.10-2009

The above equipment (Model: 1653) 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:** *Sep. 02, 2014*
(Lori Chung, Specialist)

APPROVED BY : _____ , **DATE:** *Sep. 02, 2014*
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -19.63dB at 0.19687MHz
15.407 (b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 5350.00MHz.
15.407(a/1/2/3)	Transmit Power	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	For Accessory Radio: Antenna connector is i-PEX not a standard connector. For Network Radio: No antenna connector is used.

NOTE: 1. This report is prepared for FCC Class II change. (Add DFS band: 5250~5350MHz & 5470~5725MHz).

2. The DFS report was recorded in another test report.

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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions	2.86 dB
Radiated emissions (30MHz-1GHz)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.72 dB
Radiated emissions (6GHz -18GHz)	4.00 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	802.11a/b/g/n 2T2R dual-band wireless LAN radio
MODEL NO.	1653
POWER SUPPLY	3.3Vdc (from host equipment)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11a: up to 54Mbps 802.11n: up to 300Mbps
OPERATING FREQUENCY	5.26 ~ 5.32GHz, 5.50 ~ 5.70GHz
NUMBER OF CHANNEL	**Accessory Radio** 15 for 802.11a, 802.11n (HT20) **Network Radio** 15 for 802.11a, 802.11n (HT20) 7 for 802.11n (HT40)
MAXIMUM OUTPUT POWER	**Accessory Radio** 802.11a: 35.727mW 802.11n (HT20): 36.644mW **Network Radio** 802.11a: 240.731mW 802.11n (HT20): 240.473mW 802.11n (HT40): 240.203mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

Note:

1. This report is prepared for FCC Class II. The difference compared with the Report No.: RF140430E05-1 design is as the following:

   ◆ Add DFS band <5250~5350MHz & 5470~5725MHz>

2. Features (WiFi) Accessory Radio (1x1) and Features (WiFi) Network Radio (2x2) coexistence mode:

Condition	Technology	
	Networking Radio(2x2)	Accessory radio(1x1)
1	2.4GHz Band	5GHz U-NII-1 or 2A Band
2	2.4GHz Band	5GHz U-NII-3 or 2C Band
3	5GHz U-NII-1 or 2A Band	2.4GHz Band
4	5GHz U-NII-1 or 2A Band	5GHz U-NII-3 or 2C Band
5	5GHz U-NII-3 or 2C Band	2.4GHz Band
6	5GHz U-NII-3 or 2C Band	5GHz U-NII-1 or 2A Band
The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

3. The EUT has two different component configuration as following table:

Configuration	Different
Config-1	different vendor
Config-2	
From the above RF layers designs, Config-2 was selected as the representative mode for the test and its data is recorded in this report.	

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

Accessory Radio							
Ant. No.	Brand	Model	Ant. Gain(dBi) <including cable loss>	Frequency range (GHz ~ GHz)	Ant. Type	Connecter Type	Cable Length (mm)
1	Microsoft	NA	2.2	2.4~2.5	PCB	i-PEX	295
	Microsoft	NA	3.14	5.15~5.85	PCB	i-PEX	295

Network Radio							
Ant. No.	Transmitter Circuit	Brand	Model	Ant. Gain(dBi) <including cable loss>	Frequency range (GHz ~ GHz)	Ant. Type	Connecter Type
1	Chain (0)	Microsoft	NA	4.79	2.4~2.5	PCB	NA
				3.49	5.15~5.85		
2	Chain (1)	Microsoft	NA	1.87	2.4~2.5	PCB	NA
				2.63	5.15~5.85		

5. The EUT incorporates a MIMO function without beamforming.

Accessory Radio			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	1TX	1RX
802.11b	1 ~ 11Mbps	1TX	1RX
802.11g	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX
Network Radio			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	2TX CDD	2RX
802.11b	1 ~ 11Mbps	2TX CDD	2RX
802.11g	6 ~ 54Mbps	2TX CDD	2RX
802.11n (HT20)	MCS 0~7	2TX CDD	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX CDD	2RX
	MCS 8~15	2TX	2RX

6. The above EUT information was 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

Operated in 5250 ~ 5350MHz band:

4 channels are provided for 802.11a, 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

Operated in 5470MHz ~ 5725MHz bands:

11 channels are provided for 802.11a, 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz		

5 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	
1	√	√	√	√	Accessory Radio
2	√	√	√	√	Network Radio

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

RE ≥ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

NOTE: 1. The EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane** (for below 1GHz) and **Z-plane** (for above 1GHz).

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

Accessory Radio					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)
802.11n (HT20)	52 to 140	100	OFDM	BPSK	6.5
Network Radio					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)
802.11a	52 to 140	100	OFDM	BPSK	6

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ 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.

Accessory Radio					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)
802.11n (HT20)	52 to 140	100	OFDM	BPSK	6.5
Network Radio					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)
802.11a	52 to 140	100	OFDM	BPSK	6

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ 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.

Accessory Radio					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION ON TYPE	DATA RATE (Mbps)
802.11a	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6
802.11n (HT20)	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6.5
Network Radio					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION ON TYPE	DATA RATE (Mbps)
802.11a	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6
802.11n (HT20)	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6.5
802.11n (HT40)	54 to 134	54, 62, 102, 118, 134	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ 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.

Accessory Radio					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6
802.11n (HT20)	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6.5
Network Radio					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6
802.11n (HT20)	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6.5
802.11n (HT40)	54 to 134	54, 62, 102, 118, 134	OFDM	BPSK	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	25deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
RE<1G	24deg. C, 68%RH	120Vac, 60Hz	Tim Ho
RE≥1G	22deg. C, 67%RH	120Vac, 60Hz	Gary Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee

3.3 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 E (15.407)

789033 D02 General UNII Test Procedures New Rules v01

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2009

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

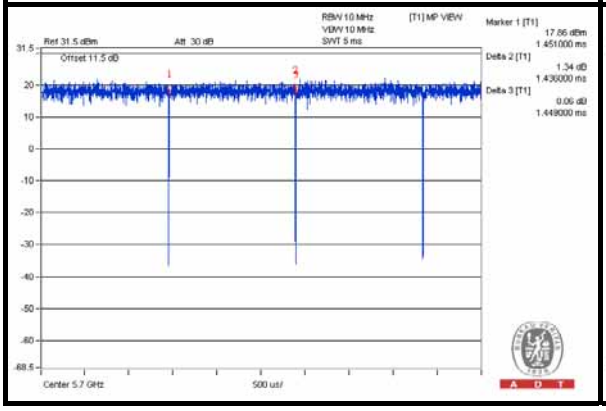
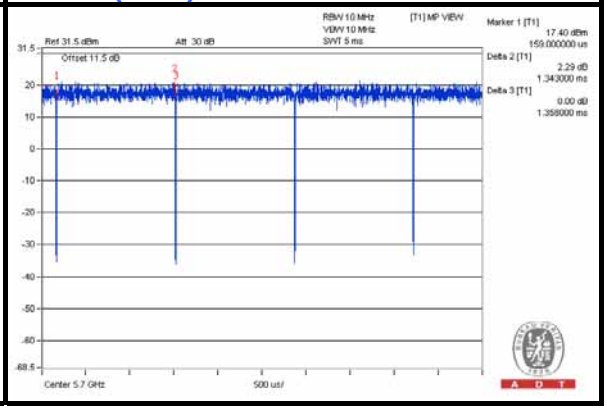
3.4 DUTY CYCLE OF TEST SIGNAL

For Accessory Radio

If duty cycle of test signal is ≥ 98 %, duty factor is not required.

802.11a: Duty cycle = 1.436 ms/1.449 ms = 0.991

802.11n (HT20): Duty cycle = 1.343 ms/1.358 ms = 0.989

802.11a	802.11n (HT20)
	

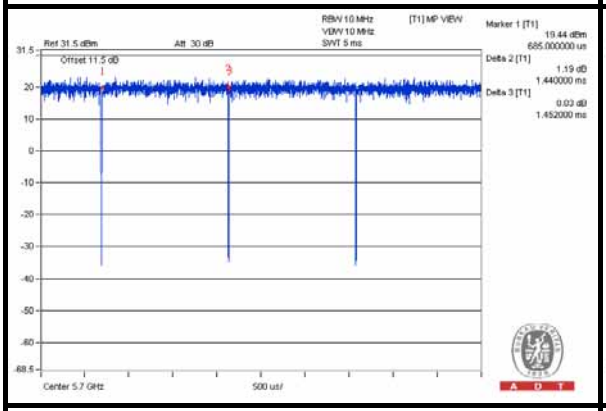
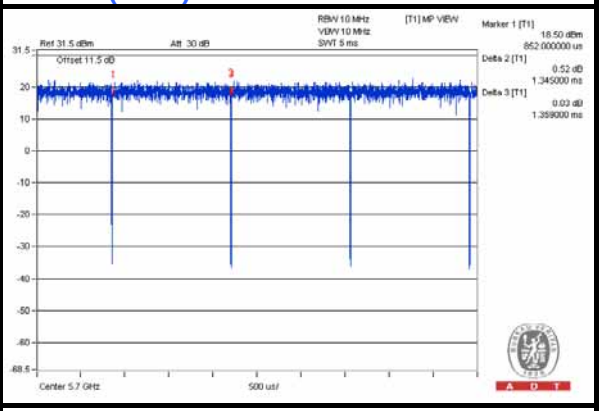
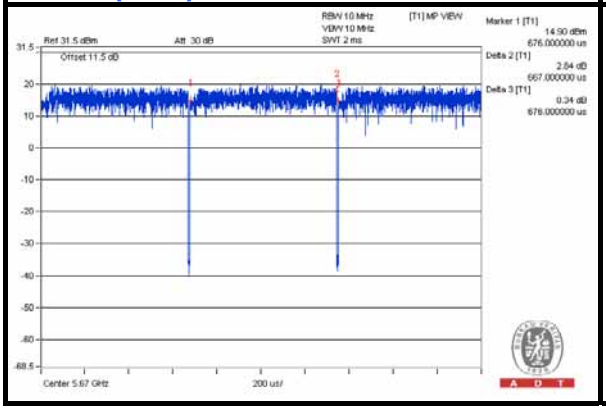
For Network Radio

If duty cycle of test signal is ≥ 98 %, duty factor is not required.

802.11a: Duty cycle = 1.44 ms/1.452 ms = 0.992

802.11n (HT20): Duty cycle = 1.345 ms/1.359 ms = 0.99

802.11n (HT40): Duty cycle = 0.667 ms/0.676 ms = 0.987

802.11a	802.11n (HT20)
	
802.11n (HT40)	
	

3.5 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.

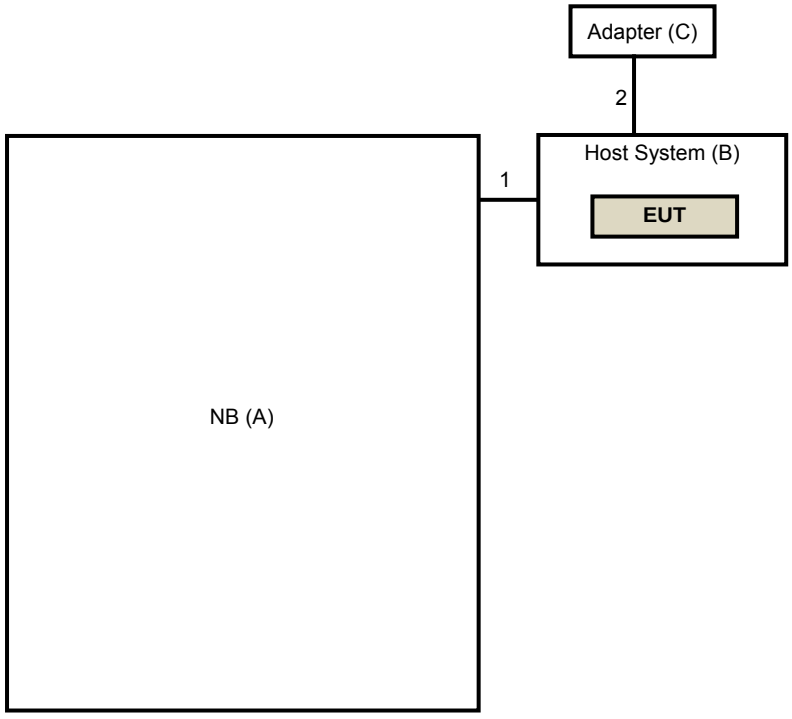
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B	Host System	Microsoft	1540	NA	NA	Supplied by client
C	Adapter	Volgen	KTPS10-03300W9	NA	NA	Supplied by Client

NOTE:

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	USB Cable	2	1.8	Yes	0	Provided by Lab
2	DC	1	1.3	No	1	Supplied by Client

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 56 60	56 to 46 46 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 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 12, 2013	Sep. 11, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100071	Nov. 13, 2013	Nov. 12, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 24, 2013	Sep. 23, 2014
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2013	Sep. 30, 2014
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: June 19, 2014

4.1.3 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.

b. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

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

d. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

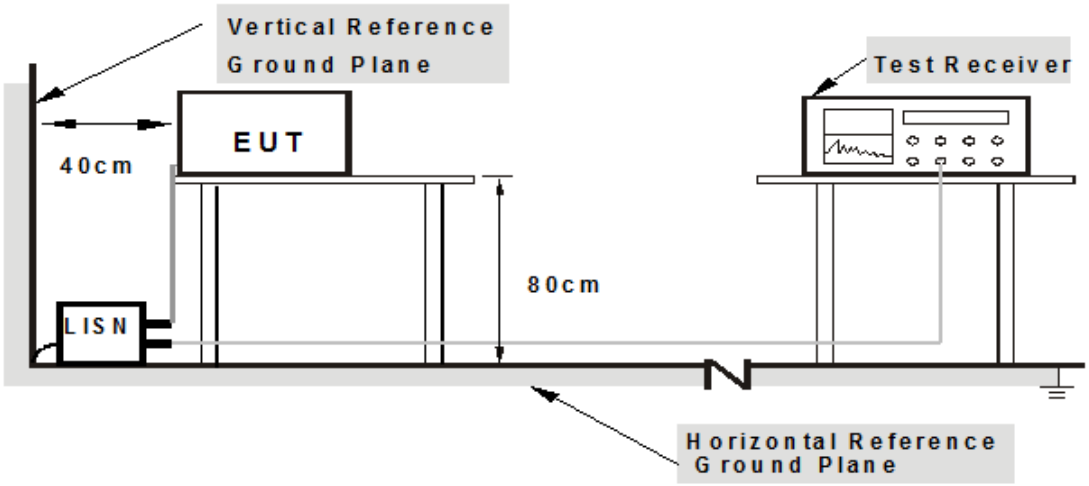
NOTE:

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit B (Host System) which is placed on a testing table.
2. The support unit A (Notebook Computer) runs test program “MT7662UQA.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

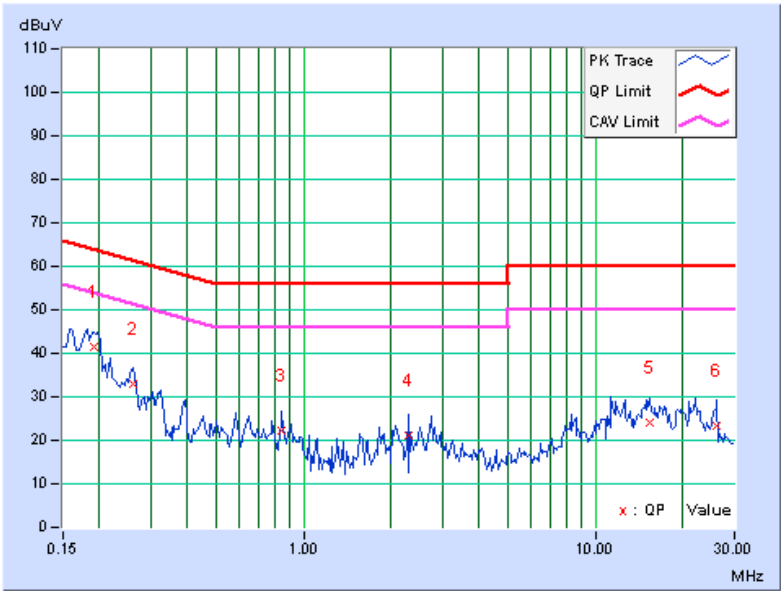
4.1.7 TEST RESULTS (ACCESSORY RADIO)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19275	0.07	41.59	33.29	41.66	33.36	63.92	53.92	-22.26	-20.56
2	0.25938	0.08	32.84	22.58	32.92	22.66	61.45	51.45	-28.54	-28.80
3	0.84531	0.12	22.01	14.14	22.13	14.26	56.00	46.00	-33.87	-31.74
4	2.28906	0.18	20.87	10.84	21.05	11.02	56.00	46.00	-34.95	-34.98
5	15.36719	0.60	23.53	16.86	24.13	17.46	60.00	50.00	-35.87	-32.54
6	25.97266	0.88	22.38	12.95	23.26	13.83	60.00	50.00	-36.74	-36.17

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

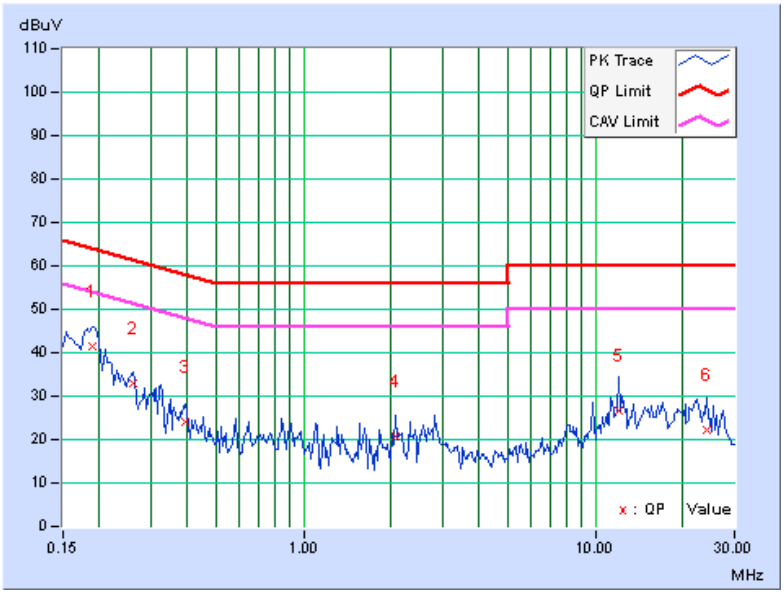


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.07	41.39	31.89	41.46	31.96	64.08	54.08	-22.62	-22.12
2	0.25938	0.08	32.74	21.41	32.82	21.49	61.45	51.45	-28.64	-29.97
3	0.39219	0.09	24.12	17.92	24.21	18.01	58.02	48.02	-33.81	-30.01
4	2.07031	0.18	20.43	11.12	20.61	11.30	56.00	46.00	-35.39	-34.70
5	12.07422	0.51	26.24	16.87	26.75	17.38	60.00	50.00	-33.25	-32.62
6	24.15625	0.82	21.30	14.16	22.12	14.98	60.00	50.00	-37.88	-35.02

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



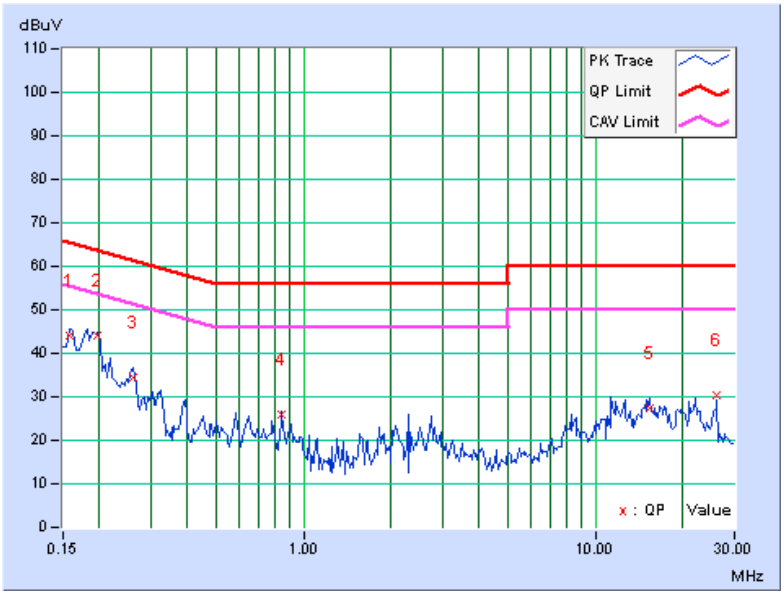
4.1.8 TEST RESULTS (NETWORK RADIO)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.07	43.82	26.63	43.89	26.70	65.58	55.58	-21.69	-28.88
2	**0.19687**	**0.07**	**44.04**	**20.67**	**44.11**	**20.74**	**63.74**	**53.74**	**-19.63**	**-33.00**
3	0.25937	0.08	34.29	26.78	34.37	26.86	61.45	51.45	-27.09	-24.60
4	0.84531	0.12	25.69	24.78	25.81	24.90	56.00	46.00	-30.19	-21.10
5	15.42156	0.60	26.78	25.11	27.38	25.71	60.00	50.00	-32.62	-24.29
6	25.97266	0.88	29.38	23.62	30.26	24.50	60.00	50.00	-29.74	-25.50

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

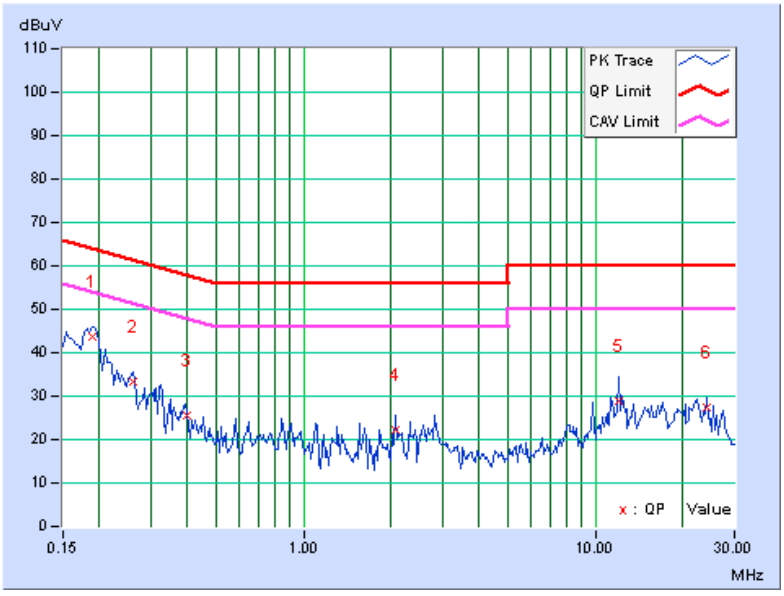


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.07	43.51	32.78	43.58	32.85	64.08	54.08	-20.50	-21.23
2	0.26012	0.08	33.15	23.45	33.23	23.53	61.43	51.43	-28.20	-27.90
3	0.39786	0.09	25.63	23.74	25.72	23.83	57.90	47.90	-32.18	-24.07
4	2.07031	0.18	21.87	20.15	22.05	20.33	56.00	46.00	-33.95	-25.67
5	12.07422	0.51	28.26	21.69	28.77	22.20	60.00	50.00	-31.23	-27.80
6	24.15625	0.82	26.45	25.71	27.27	26.53	60.00	50.00	-32.73	-23.47

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



4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 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.

4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)
APPLICABLE TO	**EIRP LIMIT**	**EQUIVALENT FIELD STRENGTH AT 3m**
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) *1 PK:-17 (dBm/MHz) *2	PK: 68.2(dBμV/m) *1 PK:78.2 (dBμV/m) *2

NOTE: *1 beyond 10MHz of the band edge *2 within 10 MHz of band edge

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).

4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 15, 2014	Jan. 14, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Dec. 06, 2013	Dec. 05, 2014
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2013	Oct. 28, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: July 14 to 29, 2014

4.2.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters 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:

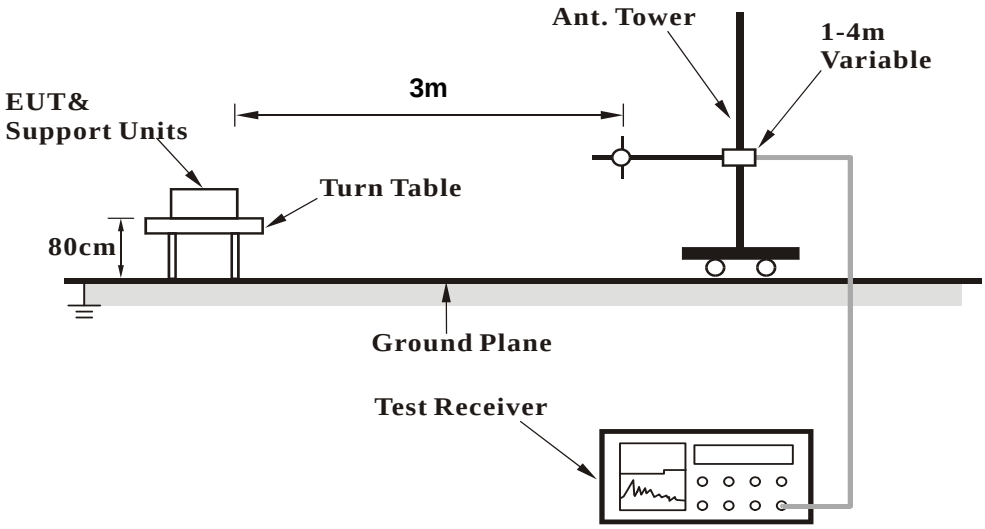
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.2.5 DEVIATION FROM TEST STANDARD

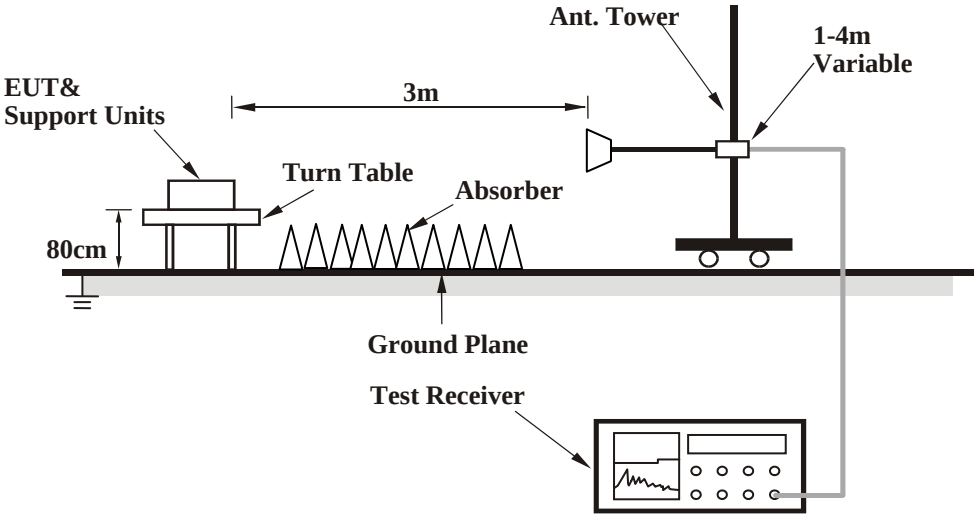
No deviation

4.2.6 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

4.2.8 TEST RESULTS (ACCESSORY RADIO)

BELOW 1GHz WORST-CASE DATA

802.11n (HT20)

CHANNEL	TX Channel 100	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	84.90	32.9 QP	40.0	-7.2	1.00 H	22	51.21	-18.36
2	113.86	26.7 QP	43.5	-16.8	2.00 H	0	41.98	-15.24
3	211.20	35.8 QP	43.5	-7.7	1.00 H	99	51.65	-15.81
4	345.01	32.5 QP	46.0	-13.5	2.00 H	109	43.06	-10.57
5	447.63	28.1 QP	46.0	-17.9	2.00 H	68	35.94	-7.80
6	732.33	24.9 QP	46.0	-21.1	1.00 H	176	27.30	-2.42
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	33.30	35.6 QP	40.0	-4.4	1.00 V	72	49.72	-14.15
2	80.59	30.3 QP	40.0	-9.7	1.00 V	279	47.96	-17.63
3	201.16	26.1 QP	43.5	-17.4	1.00 V	67	41.93	-15.79
4	345.01	29.7 QP	46.0	-16.3	1.50 V	60	40.30	-10.57
5	444.43	27.9 QP	46.0	-18.1	1.00 V	121	35.71	-7.83
6	940.54	29.6 QP	46.0	-16.4	1.00 V	79	28.24	1.37

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

ABOVE 1GHz DATA

802.11a

CHANNEL	TX Channel 52	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5260.00	104.6 PK			1.63 H	306	100.65	3.95
2	*5260.00	95.4 AV			1.63 H	306	91.45	3.95
3	#10520.00	55.1 PK	74.0	-18.9	1.05 H	353	45.32	9.78
4	#10520.00	41.3 AV	54.0	-12.7	1.05 H	353	31.52	9.78
5	15780.00	61.8 PK	74.0	-12.2	1.15 H	195	47.87	13.93
6	15780.00	48.8 AV	54.0	-5.2	1.15 H	195	34.87	13.93
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	*5260.00	102.1 PK			1.02 V	333	98.15	3.95
2	*5260.00	93.2 AV			1.02 V	333	89.25	3.95
3	#10520.00	55.3 PK	74.0	-18.7	1.10 V	16	45.52	9.78
4	#10520.00	42.2 AV	54.0	-11.8	1.10 V	16	32.42	9.78
5	15780.00	60.7 PK	74.0	-13.3	1.00 V	319	46.77	13.93
6	15780.00	48.6 AV	54.0	-5.4	1.00 V	319	34.67	13.93

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	**DETECTOR FUNCTION**	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5300.00	106.3 PK			1.64 H	307	102.36	3.94
2	*5300.00	96.9 AV			1.64 H	307	92.96	3.94
3	10600.00	55.3 PK	74.0	-18.7	1.01 H	349	45.23	10.07
4	10600.00	41.7 AV	54.0	-12.3	1.01 H	349	31.63	10.07
5	15900.00	62.4 PK	74.0	-11.6	1.14 H	196	48.18	14.22
6	15900.00	49.3 AV	54.0	-4.7	1.14 H	196	35.08	14.22
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	*5300.00	102.5 PK			1.00 V	345	98.56	3.94
2	*5300.00	93.4 AV			1.00 V	345	89.46	3.94
3	10600.00	54.8 PK	74.0	-19.2	1.06 V	4	44.73	10.07
4	10600.00	41.8 AV	54.0	-12.2	1.06 V	4	31.73	10.07
5	15900.00	61.5 PK	74.0	-12.5	1.03 V	340	47.28	14.22
6	15900.00	49.2 AV	54.0	-4.8	1.03 V	340	34.98	14.22

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 64	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5320.00	106.2 PK			1.66 H	310	102.21	3.99
2	*5320.00	96.5 AV			1.66 H	310	92.51	3.99
3	5350.00	51.8 PK	74.0	-22.2	1.66 H	310	47.73	4.07
4	5350.00	41.0 AV	54.0	-13.0	1.66 H	310	36.93	4.07
5	10640.00	55.3 PK	74.0	-18.7	1.10 H	342	45.29	10.01
6	10640.00	41.6 AV	54.0	-12.4	1.10 H	342	31.59	10.01
7	15960.00	62.4 PK	74.0	-11.6	1.17 H	205	48.25	14.15
8	15960.00	49.5 AV	54.0	-4.5	1.17 H	205	35.35	14.15
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	*5320.00	102.4 PK			1.00 V	348	98.41	3.99
2	*5320.00	93.0 AV			1.00 V	348	89.01	3.99
3	5350.00	53.6 PK	74.0	-20.4	1.00 V	348	49.53	4.07
4	5350.00	40.2 AV	54.0	-13.8	1.00 V	348	36.13	4.07
5	10640.00	54.4 PK	74.0	-19.6	1.04 V	8	44.39	10.01
6	10640.00	41.4 AV	54.0	-12.6	1.04 V	8	31.39	10.01
7	15960.00	61.3 PK	74.0	-12.7	1.08 V	340	47.15	14.15
8	15960.00	48.9 AV	54.0	-5.1	1.08 V	340	34.75	14.15

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 100	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5460.00	53.1 PK	74.0	-20.9	1.63 H	307	48.93	4.17
2	5460.00	40.8 AV	54.0	-13.2	1.63 H	307	36.63	4.17
3	#5470.00	57.2 PK	74.0	-16.8	1.63 H	307	53.03	4.17
4	#5470.00	42.7 AV	54.0	-11.3	1.63 H	307	38.53	4.17
5	*5500.00	107.0 PK			1.63 H	307	102.84	4.16
6	*5500.00	97.7 AV			1.63 H	307	93.54	4.16
7	11000.00	55.1 PK	74.0	-18.9	1.09 H	349	44.87	10.23
8	11000.00	41.1 AV	54.0	-12.9	1.09 H	349	30.87	10.23
9	#16500.00	61.0 PK	74.0	-13.0	1.01 H	187	44.80	16.20
10	#16500.00	48.3 AV	54.0	-5.7	1.01 H	187	32.10	16.20
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	5460.00	52.7 PK	74.0	-21.3	1.05 V	345	48.53	4.17
2	5460.00	38.2 AV	54.0	-15.8	1.05 V	345	34.03	4.17
3	#5470.00	53.4 PK	74.0	-20.6	1.05 V	345	49.23	4.17
4	#5470.00	40.2 AV	54.0	-13.8	1.05 V	345	36.03	4.17
5	*5500.00	102.4 PK			1.05 V	345	98.24	4.16
6	*5500.00	93.7 AV			1.05 V	345	89.54	4.16
7	11000.00	55.5 PK	74.0	-18.5	1.08 V	17	45.27	10.23
8	11000.00	42.3 AV	54.0	-11.7	1.08 V	17	32.07	10.23
9	#16500.00	60.5 PK	74.0	-13.5	1.02 V	318	44.30	16.20
10	#16500.00	48.7 AV	54.0	-5.3	1.02 V	318	32.50	16.20

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 120	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5470.00	52.1 PK	74.0	-21.9	1.58 H	305	47.93	4.17
2	#5470.00	39.7 AV	54.0	-14.3	1.58 H	305	35.53	4.17
3	*5600.00	108.4 PK			1.58 H	305	103.89	4.51
4	*5600.00	98.7 AV			1.58 H	305	94.19	4.51
5	11200.00	54.9 PK	74.0	-19.1	1.14 H	354	44.77	10.13
6	11200.00	40.7 AV	54.0	-13.3	1.14 H	354	30.57	10.13
7	#16800.00	61.4 PK	74.0	-12.6	1.00 H	200	43.98	17.42
8	#16800.00	48.7 AV	54.0	-5.3	1.00 H	200	31.28	17.42
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	#5470.00	52.6 PK	74.0	-21.4	1.00 V	344	48.43	4.17
2	#5470.00	38.5 AV	54.0	-15.5	1.00 V	344	34.33	4.17
3	*5600.00	102.0 PK			1.00 V	344	97.49	4.51
4	*5600.00	93.6 AV			1.00 V	344	89.09	4.51
5	11200.00	55.7 PK	74.0	-18.3	1.07 V	17	45.57	10.13
6	11200.00	42.7 AV	54.0	-11.3	1.07 V	17	32.57	10.13
7	#16800.00	59.9 PK	74.0	-14.1	1.04 V	316	42.48	17.42
8	#16800.00	48.7 AV	54.0	-5.3	1.04 V	316	31.28	17.42

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5700.00	108.3 PK			1.52 H	305	103.81	4.49
2	*5700.00	98.7 AV			1.52 H	305	94.21	4.49
3	#5725.00	63.2 PK	74.0	-10.8	1.52 H	305	58.70	4.50
4	#5725.00	45.8 AV	54.0	-8.2	1.52 H	305	41.30	4.50
5	11400.00	55.4 PK	74.0	-18.6	1.06 H	336	45.43	9.97
6	11400.00	41.5 AV	54.0	-12.5	1.06 H	336	31.53	9.97
7	#17100.00	60.0 PK	74.0	-14.0	1.01 H	193	42.28	17.72
8	#17100.00	48.8 AV	54.0	-5.2	1.01 H	193	31.08	17.72
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	*5700.00	101.9 PK			1.08 V	346	97.41	4.49
2	*5700.00	93.3 AV			1.08 V	346	88.81	4.49
3	#5725.00	60.3 PK	74.0	-13.7	1.08 V	346	55.80	4.50
4	#5725.00	43.2 AV	54.0	-10.8	1.08 V	346	38.70	4.50
5	11400.00	54.8 PK	74.0	-19.2	1.04 V	31	44.83	9.97
6	11400.00	41.8 AV	54.0	-12.2	1.04 V	31	31.83	9.97
7	#17100.00	60.3 PK	74.0	-13.7	1.00 V	289	42.58	17.72
8	#17100.00	48.7 AV	54.0	-5.3	1.00 V	289	30.98	17.72

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.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (HT20)

CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5260.00	103.7 PK			1.52 H	291	99.75	3.95
2	*5260.00	94.6 AV			1.52 H	291	90.65	3.95
3	#10520.00	54.5 PK	74.0	-19.5	1.09 H	360	44.72	9.78
4	#10520.00	40.9 AV	54.0	-13.1	1.09 H	360	31.12	9.78
5	15780.00	61.7 PK	74.0	-12.3	1.11 H	183	47.77	13.93
6	15780.00	48.6 AV	54.0	-5.4	1.11 H	183	34.67	13.93
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	*5260.00	101.7 PK			1.02 V	318	97.75	3.95
2	*5260.00	93.3 AV			1.02 V	318	89.35	3.95
3	#10520.00	55.5 PK	74.0	-18.5	1.04 V	20	45.72	9.78
4	#10520.00	42.7 AV	54.0	-11.3	1.04 V	20	32.92	9.78
5	15780.00	60.5 PK	74.0	-13.5	1.00 V	319	46.57	13.93
6	15780.00	48.4 AV	54.0	-5.6	1.00 V	319	34.47	13.93

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	**DETECTOR FUNCTION**	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5300.00	106.0 PK			1.59 H	309	102.06	3.94
2	*5300.00	96.4 AV			1.59 H	309	92.46	3.94
3	10600.00	55.2 PK	74.0	-18.8	1.10 H	336	45.13	10.07
4	10600.00	41.2 AV	54.0	-12.8	1.10 H	336	31.13	10.07
5	15900.00	62.2 PK	74.0	-11.8	1.11 H	227	47.98	14.22
6	15900.00	49.3 AV	54.0	-4.7	1.11 H	227	35.08	14.22
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	*5300.00	102.2 PK			1.00 V	358	98.26	3.94
2	*5300.00	93.0 AV			1.00 V	358	89.06	3.94
3	10600.00	55.0 PK	74.0	-19.0	1.05 V	2	44.93	10.07
4	10600.00	41.5 AV	54.0	-12.5	1.05 V	2	31.43	10.07
5	15900.00	61.6 PK	74.0	-12.4	1.19 V	329	47.38	14.22
6	15900.00	49.0 AV	54.0	-5.0	1.19 V	329	34.78	14.22

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 64	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5320.00	105.5 PK			1.65 H	299	101.51	3.99
2	*5320.00	96.0 AV			1.65 H	299	92.01	3.99
3	5350.00	51.0 PK	74.0	-23.0	1.71 H	309	46.93	4.07
4	5350.00	40.5 AV	54.0	-13.5	1.71 H	309	36.43	4.07
5	10640.00	55.7 PK	74.0	-18.3	1.15 H	342	45.69	10.01
6	10640.00	41.6 AV	54.0	-12.4	1.15 H	342	31.59	10.01
7	15960.00	62.5 PK	74.0	-11.5	1.11 H	220	48.35	14.15
8	15960.00	49.6 AV	54.0	-4.4	1.11 H	220	35.45	14.15
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	*5320.00	101.7 PK			1.00 V	358	97.71	3.99
2	*5320.00	92.6 AV			1.00 V	358	88.61	3.99
3	5350.00	44.8 PK	74.0	-29.2	1.00 V	358	40.73	4.07
4	5350.00	36.3 AV	54.0	-17.7	1.00 V	358	32.23	4.07
5	10640.00	55.6 PK	74.0	-18.4	1.08 V	2	45.59	10.01
6	10640.00	41.8 AV	54.0	-12.2	1.08 V	2	31.79	10.01
7	15960.00	62.1 PK	74.0	-11.9	1.17 V	337	47.95	14.15
8	15960.00	49.2 AV	54.0	-4.8	1.17 V	337	35.05	14.15

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 100	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5460.00	52.9 PK	74.0	-21.1	1.59 H	319	48.73	4.17
2	5460.00	41.0 AV	54.0	-13.0	1.59 H	319	36.83	4.17
3	#5470.00	57.4 PK	74.0	-16.6	1.67 H	316	53.23	4.17
4	#5470.00	42.9 AV	54.0	-11.1	1.67 H	316	38.73	4.17
5	*5500.00	106.5 PK			1.57 H	316	102.34	4.16
6	*5500.00	97.4 AV			1.57 H	316	93.24	4.16
7	11000.00	54.8 PK	74.0	-19.2	1.05 H	339	44.57	10.23
8	11000.00	41.1 AV	54.0	-12.9	1.05 H	339	30.87	10.23
9	#16500.00	61.1 PK	74.0	-12.9	1.02 H	160	44.90	16.20
10	#16500.00	48.5 AV	54.0	-5.5	1.02 H	160	32.30	16.20
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	5460.00	52.7 PK	74.0	-21.3	1.09 V	350	48.53	4.17
2	5460.00	38.4 AV	54.0	-15.6	1.09 V	350	34.23	4.17
3	#5470.00	53.0 PK	74.0	-21.0	1.09 V	350	48.83	4.17
4	#5470.00	39.6 AV	54.0	-14.4	1.09 V	350	35.43	4.17
5	*5500.00	102.3 PK			1.09 V	350	98.14	4.16
6	*5500.00	93.7 AV			1.09 V	350	89.54	4.16
7	11000.00	55.2 PK	74.0	-18.8	1.11 V	27	44.97	10.23
8	11000.00	42.2 AV	54.0	-11.8	1.11 V	27	31.97	10.23
9	#16500.00	60.8 PK	74.0	-13.2	1.00 V	314	44.60	16.20
10	#16500.00	48.9 AV	54.0	-5.1	1.00 V	314	32.70	16.20

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 120	**DETECTOR FUNCTION**	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5600.00	108.5 PK			1.60 H	321	103.99	4.51
2	*5600.00	98.9 AV			1.60 H	321	94.39	4.51
3	11200.00	54.5 PK	74.0	-19.5	1.11 H	347	44.37	10.13
4	11200.00	40.7 AV	54.0	-13.3	1.11 H	347	30.57	10.13
5	#16800.00	61.7 PK	74.0	-12.3	1.00 H	192	44.28	17.42
6	#16800.00	49.1 AV	54.0	-4.9	1.00 H	192	31.68	17.42
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	*5600.00	101.5 PK			1.04 V	345	96.99	4.51
2	*5600.00	93.2 AV			1.04 V	345	88.69	4.51
3	11200.00	55.5 PK	74.0	-18.5	1.03 V	0	45.37	10.13
4	11200.00	42.8 AV	54.0	-11.2	1.03 V	0	32.67	10.13
5	#16800.00	59.8 PK	74.0	-14.2	1.08 V	303	42.38	17.42
6	#16800.00	48.7 AV	54.0	-5.3	1.08 V	303	31.28	17.42

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5700.00	107.5 PK			1.54 H	317	103.01	4.49
2	*5700.00	98.1 AV			1.54 H	317	93.61	4.49
3	#5725.00	63.3 PK	74.0	-10.7	1.47 H	292	58.80	4.50
4	#5725.00	46.3 AV	54.0	-7.7	1.47 H	292	41.80	4.50
5	11400.00	55.5 PK	74.0	-18.5	1.03 H	317	45.53	9.97
6	11400.00	41.6 AV	54.0	-12.4	1.03 H	317	31.63	9.97
7	#17100.00	59.5 PK	74.0	-14.5	1.00 H	207	41.78	17.72
8	#17100.00	48.2 AV	54.0	-5.8	1.00 H	207	30.48	17.72
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	*5700.00	102.5 PK			1.07 V	354	98.01	4.49
2	*5700.00	93.8 AV			1.07 V	354	89.31	4.49
3	#5725.00	60.1 PK	74.0	-13.9	1.07 V	354	55.60	4.50
4	#5725.00	42.1 AV	54.0	-11.9	1.07 V	354	37.60	4.50
5	11400.00	54.3 PK	74.0	-19.7	1.00 V	38	44.33	9.97
6	11400.00	41.7 AV	54.0	-12.3	1.00 V	38	31.73	9.97
7	#17100.00	59.8 PK	74.0	-14.2	1.00 V	302	42.08	17.72
8	#17100.00	47.3 AV	54.0	-6.7	1.00 V	302	29.58	17.72

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.
6. " # ": The radiated frequency is out of the restricted band.

4.2.9 TEST RESULTS (NETWORK RADIO)

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 100	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	89.70	31.3 QP	43.5	-12.2	2.00 H	83	49.81	-18.49
2	107.75	28.9 QP	43.5	-14.6	1.50 H	240	44.77	-15.84
3	204.31	34.7 QP	43.5	-8.8	1.00 H	99	50.59	-15.85
4	238.60	32.6 QP	46.0	-13.4	1.00 H	108	46.42	-13.85
5	345.01	32.7 QP	46.0	-13.3	2.00 H	118	43.30	-10.57
6	444.00	30.2 QP	46.0	-15.8	1.50 H	118	38.02	-7.83
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	34.07	33.7 QP	40.0	-6.4	1.00 V	96	47.70	-14.05
2	59.49	28.0 QP	40.0	-12.0	1.00 V	322	41.39	-13.41
3	88.49	27.6 QP	43.5	-15.9	2.00 V	126	46.05	-18.45
4	144.32	22.0 QP	43.5	-21.5	2.00 V	360	34.64	-12.67
5	215.37	18.5 QP	43.5	-25.1	1.00 V	119	34.19	-15.74
6	940.68	26.8 QP	46.0	-19.2	1.00 V	360	25.47	1.37

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

ABOVE 1GHz DATA

802.11a

CHANNEL	TX Channel 52	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5260.00	117.4 PK			1.29 H	31	113.45	3.95
2	*5260.00	107.6 AV			1.29 H	31	103.65	3.95
3	#10520.00	55.8 PK	74.0	-18.2	1.15 H	193	46.02	9.78
4	#10520.00	42.0 AV	54.0	-12.0	1.15 H	193	32.22	9.78
5	15780.00	65.7 PK	74.0	-8.3	1.13 H	87	51.77	13.93
6	15780.00	53.5 AV	54.0	-0.5	1.13 H	87	39.57	13.93
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	*5260.00	114.8 PK			1.00 V	183	110.85	3.95
2	*5260.00	105.1 AV			1.00 V	183	101.15	3.95
3	#10520.00	55.4 PK	74.0	-18.6	1.01 V	84	45.62	9.78
4	#10520.00	42.6 AV	54.0	-11.4	1.01 V	84	32.82	9.78
5	15780.00	60.6 PK	74.0	-13.4	1.38 V	113	46.67	13.93
6	15780.00	48.5 AV	54.0	-5.5	1.38 V	113	34.57	13.93

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5300.00	117.1 PK			1.00 H	160	113.16	3.94
2	*5300.00	107.4 AV			1.00 H	160	103.46	3.94
3	5350.00	64.9 PK	74.0	-9.1	1.00 H	160	60.83	4.07
4	5350.00	47.2 AV	54.0	-6.8	1.00 H	160	43.13	4.07
5	10600.00	55.6 PK	74.0	-18.4	1.20 H	198	45.53	10.07
6	10600.00	42.1 AV	54.0	-11.9	1.20 H	198	32.03	10.07
7	15900.00	65.9 PK	74.0	-8.1	1.15 H	82	51.68	14.22
8	15900.00	53.4 AV	54.0	-0.6	1.15 H	82	39.18	14.22
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	*5300.00	114.9 PK			1.00 V	187	110.96	3.94
2	*5300.00	105.1 AV			1.00 V	187	101.16	3.94
3	5350.00	62.9 PK	74.0	-11.1	1.00 V	187	58.83	4.07
4	5350.00	47.2 AV	54.0	-6.8	1.00 V	187	43.13	4.07
5	10600.00	54.7 PK	74.0	-19.3	1.00 V	78	44.63	10.07
6	10600.00	42.2 AV	54.0	-11.8	1.00 V	78	32.13	10.07
7	15900.00	60.8 PK	74.0	-13.2	1.32 V	120	46.58	14.22
8	15900.00	48.5 AV	54.0	-5.5	1.32 V	120	34.28	14.22

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 64	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5320.00	114.3 PK			1.03 H	72	110.31	3.99
2	*5320.00	104.8 AV			1.03 H	72	100.81	3.99
3	**5350.00**	**73.8 PK**	**74.0**	**-0.2**	**1.03 H**	**72**	**69.73**	**4.07**
4	5350.00	51.3 AV	54.0	-2.7	1.03 H	72	47.23	4.07
5	10640.00	55.2 PK	74.0	-18.8	1.17 H	209	45.19	10.01
6	10640.00	41.7 AV	54.0	-12.3	1.17 H	209	31.69	10.01
7	15960.00	64.7 PK	74.0	-9.3	1.21 H	185	50.55	14.15
8	15960.00	52.7 AV	54.0	-1.3	1.21 H	185	38.55	14.15
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	*5320.00	111.9 PK			1.00 V	183	107.91	3.99
2	*5320.00	102.3 AV			1.00 V	183	98.31	3.99
3	5350.00	62.6 PK	74.0	-11.4	1.00 V	183	58.53	4.07
4	5350.00	46.7 AV	54.0	-7.3	1.00 V	183	42.63	4.07
5	10640.00	54.7 PK	74.0	-19.3	1.00 V	87	44.69	10.01
6	10640.00	42.0 AV	54.0	-12.0	1.00 V	87	31.99	10.01
7	15960.00	61.0 PK	74.0	-13.0	1.30 V	132	46.85	14.15
8	15960.00	48.5 AV	54.0	-5.5	1.30 V	132	34.35	14.15

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 100	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5460.00	64.9 PK	74.0	-9.1	1.36 H	22	60.73	4.17
2	5460.00	45.9 AV	54.0	-8.1	1.36 H	22	41.73	4.17
3	#5470.00	71.2 PK	74.0	-2.8	1.36 H	22	67.03	4.17
4	#5470.00	53.6 AV	54.0	-0.4	1.36 H	22	49.43	4.17
5	*5500.00	115.1 PK			1.36 H	22	110.94	4.16
6	*5500.00	105.1 AV			1.36 H	22	100.94	4.16
7	11000.00	55.3 PK	74.0	-18.7	1.22 H	200	45.07	10.23
8	11000.00	42.0 AV	54.0	-12.0	1.22 H	200	31.77	10.23
9	#16500.00	64.5 PK	74.0	-9.5	1.25 H	190	48.30	16.20
10	#16500.00	51.9 AV	54.0	-2.1	1.25 H	190	35.70	16.20
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	5460.00	62.8 PK	74.0	-11.2	1.02 V	186	58.63	4.17
2	5460.00	44.2 AV	54.0	-9.8	1.02 V	186	40.03	4.17
3	#5470.00	62.8 PK	74.0	-11.2	1.02 V	186	58.63	4.17
4	#5470.00	46.9 AV	54.0	-7.1	1.02 V	186	42.73	4.17
5	*5500.00	112.7 PK			1.02 V	186	108.54	4.16
6	*5500.00	102.8 AV			1.02 V	186	98.64	4.16
7	11000.00	54.4 PK	74.0	-19.6	1.05 V	72	44.17	10.23
8	11000.00	42.2 AV	54.0	-11.8	1.05 V	72	31.97	10.23
9	#16500.00	60.8 PK	74.0	-13.2	1.37 V	124	44.60	16.20
10	#16500.00	48.2 AV	54.0	-5.8	1.37 V	124	32.00	16.20

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 120	**DETECTOR FUNCTION**	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5600.00	115.1 PK			1.50 H	64	110.59	4.51
2	*5600.00	105.5 AV			1.50 H	64	100.99	4.51
3	11200.00	54.9 PK	74.0	-19.1	1.26 H	205	44.77	10.13
4	11200.00	41.6 AV	54.0	-12.4	1.26 H	205	31.47	10.13
5	#16800.00	65.7 PK	74.0	-8.3	1.19 H	55	48.28	17.42
6	#16800.00	53.2 AV	54.0	-0.8	1.19 H	55	35.78	17.42
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	*5600.00	112.8 PK			1.03 V	169	108.29	4.51
2	*5600.00	103.3 AV			1.03 V	169	98.79	4.51
3	11200.00	54.9 PK	74.0	-19.1	1.03 V	90	44.77	10.13
4	11200.00	42.4 AV	54.0	-11.6	1.03 V	90	32.27	10.13
5	#16800.00	61.5 PK	74.0	-12.5	1.30 V	113	44.08	17.42
6	#16800.00	49.0 AV	54.0	-5.0	1.30 V	113	31.58	17.42

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5700.00	111.2 PK			1.71 H	80	106.71	4.49
2	*5700.00	101.2 AV			1.71 H	80	96.71	4.49
3	#5725.00	73.2 PK	74.0	-0.8	1.71 H	80	68.70	4.50
4	#5725.00	53.1 AV	54.0	-0.9	1.71 H	80	48.60	4.50
5	11400.00	55.3 PK	74.0	-18.7	1.31 H	177	45.33	9.97
6	11400.00	41.8 AV	54.0	-12.2	1.31 H	177	31.83	9.97
7	#17100.00	64.7 PK	74.0	-9.3	1.25 H	74	46.98	17.72
8	#17100.00	52.6 AV	54.0	-1.4	1.25 H	74	34.88	17.72
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	*5700.00	108.9 PK			1.01 V	193	104.41	4.49
2	*5700.00	98.7 AV			1.01 V	193	94.21	4.49
3	#5725.00	63.0 PK	74.0	-11.0	1.01 V	193	58.50	4.50
4	#5725.00	47.1 AV	54.0	-6.9	1.01 V	193	42.60	4.50
5	11400.00	54.8 PK	74.0	-19.2	1.06 V	86	44.83	9.97
6	11400.00	42.5 AV	54.0	-11.5	1.06 V	86	32.53	9.97
7	#17100.00	60.2 PK	74.0	-13.8	1.30 V	105	42.48	17.72
8	#17100.00	48.0 AV	54.0	-6.0	1.30 V	105	30.28	17.72

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.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (HT20)

CHANNEL	TX Channel 52	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5260.00	115.2 PK			1.05 H	61	111.25	3.95
2	*5260.00	106.3 AV			1.05 H	61	102.35	3.95
3	#10520.00	55.5 PK	74.0	-18.5	1.27 H	176	45.72	9.78
4	#10520.00	42.1 AV	54.0	-11.9	1.27 H	176	32.32	9.78
5	15780.00	66.2 PK	74.0	-7.8	1.15 H	89	52.27	13.93
6	15780.00	53.7 AV	54.0	-0.3	1.15 H	89	39.77	13.93
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	*5260.00	113.1 PK			1.00 V	182	109.15	3.95
2	*5260.00	104.1 AV			1.00 V	182	100.15	3.95
3	#10520.00	54.7 PK	74.0	-19.3	1.00 V	65	44.92	9.78
4	#10520.00	41.9 AV	54.0	-12.1	1.00 V	65	32.12	9.78
5	15780.00	61.0 PK	74.0	-13.0	1.35 V	126	47.07	13.93
6	15780.00	48.7 AV	54.0	-5.3	1.35 V	126	34.77	13.93

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5300.00	116.2 PK			1.06 H	71	112.26	3.94
2	*5300.00	106.3 AV			1.06 H	71	102.36	3.94
3	5350.00	66.6 PK	74.0	-7.4	1.06 H	71	62.53	4.07
4	5350.00	47.1 AV	54.0	-6.9	1.06 H	71	43.03	4.07
5	10600.00	54.8 PK	74.0	-19.2	1.28 H	179	44.73	10.07
6	10600.00	41.5 AV	54.0	-12.5	1.28 H	179	31.43	10.07
7	15900.00	65.9 PK	74.0	-8.1	1.13 H	80	51.68	14.22
8	15900.00	53.7 AV	54.0	-0.3	1.13 H	80	39.48	14.22
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	*5300.00	113.8 PK			1.00 V	199	109.86	3.94
2	*5300.00	103.9 AV			1.00 V	199	99.96	3.94
3	5350.00	61.5 PK	74.0	-12.5	1.00 V	199	57.43	4.07
4	5350.00	42.4 AV	54.0	-11.6	1.00 V	199	38.33	4.07
5	10600.00	55.0 PK	74.0	-19.0	1.02 V	81	44.93	10.07
6	10600.00	42.5 AV	54.0	-11.5	1.02 V	81	32.43	10.07
7	15900.00	60.5 PK	74.0	-13.5	1.27 V	112	46.28	14.22
8	15900.00	48.2 AV	54.0	-5.8	1.27 V	112	33.98	14.22

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 64	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5320.00	112.3 PK			1.00 H	165	108.31	3.99
2	*5320.00	102.2 AV			1.00 H	165	98.21	3.99
3	5350.00	73.5 PK	74.0	-0.5	1.00 H	165	69.43	4.07
4	5350.00	51.2 AV	54.0	-2.8	1.00 H	165	47.13	4.07
5	10640.00	55.0 PK	74.0	-19.0	1.33 H	165	44.99	10.01
6	10640.00	41.5 AV	54.0	-12.5	1.33 H	165	31.49	10.01
7	15960.00	64.7 PK	74.0	-9.3	1.13 H	95	50.55	14.15
8	15960.00	51.7 AV	54.0	-2.3	1.13 H	95	37.55	14.15
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	*5320.00	110.2 PK			1.00 V	195	106.21	3.99
2	*5320.00	100.1 AV			1.00 V	195	96.11	3.99
3	5350.00	62.8 PK	74.0	-11.2	1.00 V	195	58.73	4.07
4	5350.00	47.1 AV	54.0	-6.9	1.00 V	195	43.03	4.07
5	10640.00	54.5 PK	74.0	-19.5	1.04 V	89	44.49	10.01
6	10640.00	42.1 AV	54.0	-11.9	1.04 V	89	32.09	10.01
7	15960.00	60.4 PK	74.0	-13.6	1.31 V	114	46.25	14.15
8	15960.00	48.2 AV	54.0	-5.8	1.31 V	114	34.05	14.15

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 100	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5460.00	60.9 PK	74.0	-13.1	1.00 H	74	56.73	4.17
2	5460.00	45.2 AV	54.0	-8.8	1.00 H	74	41.03	4.17
3	#5470.00	73.0 PK	74.0	-1.0	1.00 H	74	68.83	4.17
4	#5470.00	50.4 AV	54.0	-3.6	1.00 H	74	46.23	4.17
5	*5500.00	115.9 PK			1.00 H	74	111.74	4.16
6	*5500.00	105.8 AV			1.00 H	74	101.64	4.16
7	11000.00	54.7 PK	74.0	-19.3	1.32 H	162	44.47	10.23
8	11000.00	41.3 AV	54.0	-12.7	1.32 H	162	31.07	10.23
9	#16500.00	64.9 PK	74.0	-9.1	1.24 H	62	48.70	16.20
10	#16500.00	52.9 AV	54.0	-1.1	1.24 H	62	36.70	16.20
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	5460.00	58.9 PK	74.0	-15.1	1.00 V	190	54.73	4.17
2	5460.00	44.3 AV	54.0	-9.7	1.00 V	190	40.13	4.17
3	#5470.00	62.3 PK	74.0	-11.7	1.00 V	190	58.13	4.17
4	#5470.00	46.4 AV	54.0	-7.6	1.00 V	190	42.23	4.17
5	*5500.00	113.8 PK			1.00 V	190	109.64	4.16
6	*5500.00	103.4 AV			1.00 V	190	99.24	4.16
7	11000.00	54.2 PK	74.0	-19.8	1.00 V	86	43.97	10.23
8	11000.00	42.0 AV	54.0	-12.0	1.00 V	86	31.77	10.23
9	#16500.00	61.1 PK	74.0	-12.9	1.34 V	130	44.90	16.20
10	#16500.00	48.7 AV	54.0	-5.3	1.34 V	130	32.50	16.20

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 120	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5470.00	54.4 PK	74.0	-19.6	1.00 H	73	50.23	4.17
2	#5470.00	41.6 AV	54.0	-12.4	1.00 H	73	37.43	4.17
3	*5600.00	115.3 PK			1.00 H	73	110.79	4.51
4	*5600.00	105.3 AV			1.00 H	73	100.79	4.51
5	11200.00	54.9 PK	74.0	-19.1	1.31 H	165	44.77	10.13
6	11200.00	41.4 AV	54.0	-12.6	1.31 H	165	31.27	10.13
7	#16800.00	61.5 PK	74.0	-12.5	1.22 H	42	44.08	17.42
8	#16800.00	53.0 AV	54.0	-1.0	1.22 H	42	35.58	17.42
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	*5600.00	112.7 PK			1.04 V	171	108.19	4.51
2	*5600.00	102.9 AV			1.04 V	171	98.39	4.51
3	11200.00	54.7 PK	74.0	-19.3	1.00 V	72	44.57	10.13
4	11200.00	41.9 AV	54.0	-12.1	1.00 V	72	31.77	10.13
5	#16800.00	61.3 PK	74.0	-12.7	1.30 V	127	43.88	17.42
6	#16800.00	48.9 AV	54.0	-5.1	1.30 V	127	31.48	17.42

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5700.00	107.9 PK			1.00 H	18	103.41	4.49
2	*5700.00	98.8 AV			1.00 H	18	94.31	4.49
3	#5725.00	67.1 PK	74.0	-6.9	1.00 H	18	62.60	4.50
4	#5725.00	53.4 AV	54.0	-0.6	1.00 H	18	48.90	4.50
5	11400.00	54.5 PK	74.0	-19.5	1.26 H	153	44.53	9.97
6	11400.00	41.3 AV	54.0	-12.7	1.26 H	153	31.33	9.97
7	#17100.00	58.2 PK	74.0	-15.8	1.21 H	58	40.48	17.72
8	#17100.00	50.4 AV	54.0	-3.6	1.21 H	58	32.68	17.72
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	*5700.00	105.6 PK			1.04 V	183	101.11	4.49
2	*5700.00	96.1 AV			1.04 V	183	91.61	4.49
3	#5725.00	62.6 PK	74.0	-11.4	1.04 V	183	58.10	4.50
4	#5725.00	47.0 AV	54.0	-7.0	1.04 V	183	42.50	4.50
5	11400.00	54.8 PK	74.0	-19.2	1.00 V	65	44.83	9.97
6	11400.00	42.4 AV	54.0	-11.6	1.00 V	65	32.43	9.97
7	#17100.00	61.0 PK	74.0	-13.0	1.33 V	122	43.28	17.72
8	#17100.00	48.7 AV	54.0	-5.3	1.33 V	122	30.98	17.72

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.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (HT40)

CHANNEL	TX Channel 54	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5270.00	116.7 PK			1.07 H	66	112.76	3.94
2	*5270.00	106.8 AV			1.07 H	66	102.86	3.94
3	5350.00	73.1 PK	74.0	-0.9	1.07 H	66	69.03	4.07
4	5350.00	53.2 AV	54.0	-0.8	1.07 H	66	49.13	4.07
5	#10540.00	54.9 PK	74.0	-19.1	1.22 H	155	45.04	9.86
6	#10540.00	41.7 AV	54.0	-12.3	1.22 H	155	31.84	9.86
7	15810.00	62.4 PK	74.0	-11.6	1.11 H	46	48.42	13.98
8	15810.00	50.3 AV	54.0	-3.7	1.11 H	46	36.32	13.98
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	*5270.00	114.4 PK			1.00 V	184	110.46	3.94
2	*5270.00	104.5 AV			1.00 V	184	100.56	3.94
3	5350.00	62.3 PK	74.0	-11.7	1.00 V	184	58.23	4.07
4	5350.00	46.4 AV	54.0	-7.6	1.00 V	184	42.33	4.07
5	#10540.00	54.4 PK	74.0	-19.6	1.04 V	81	44.54	9.86
6	#10540.00	42.1 AV	54.0	-11.9	1.04 V	81	32.24	9.86
7	15810.00	60.7 PK	74.0	-13.3	1.36 V	132	46.72	13.98
8	15810.00	48.2 AV	54.0	-5.8	1.36 V	132	34.22	13.98

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 62	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5310.00	107.8 PK			1.08 H	71	103.84	3.96
2	*5310.00	98.5 AV			1.08 H	71	94.54	3.96
3	5350.00	73.1 PK	74.0	-0.9	1.08 H	71	69.03	4.07
4	5350.00	53.5 AV	54.0	-0.5	1.08 H	71	49.43	4.07
5	10620.00	54.5 PK	74.0	-19.5	1.21 H	163	44.47	10.03
6	10620.00	41.6 AV	54.0	-12.4	1.21 H	163	31.57	10.03
7	15930.00	61.4 PK	74.0	-12.6	1.05 H	54	47.22	14.18
8	15930.00	49.5 AV	54.0	-4.5	1.05 H	54	35.32	14.18
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	*5310.00	105.2 PK			1.02 V	182	101.24	3.96
2	*5310.00	96.1 AV			1.02 V	182	92.14	3.96
3	5350.00	62.2 PK	74.0	-11.8	1.02 V	182	58.13	4.07
4	5350.00	46.5 AV	54.0	-7.5	1.02 V	182	42.43	4.07
5	10620.00	55.1 PK	74.0	-18.9	1.00 V	76	45.07	10.03
6	10620.00	42.7 AV	54.0	-11.3	1.00 V	76	32.67	10.03
7	15930.00	60.5 PK	74.0	-13.5	1.38 V	127	46.32	14.18
8	15930.00	48.3 AV	54.0	-5.7	1.38 V	127	34.12	14.18

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 102	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5460.00	59.4 PK	74.0	-14.6	1.02 H	67	55.23	4.17
2	5460.00	46.0 AV	54.0	-8.0	1.02 H	67	41.83	4.17
3	#5470.00	73.5 PK	74.0	-0.5	1.02 H	67	69.33	4.17
4	#5470.00	53.4 AV	54.0	-0.6	1.02 H	67	49.23	4.17
5	*5510.00	108.5 PK			1.02 H	67	104.30	4.20
6	*5510.00	98.2 AV			1.02 H	67	94.00	4.20
7	11020.00	54.9 PK	74.0	-19.1	1.22 H	141	44.70	10.20
8	11020.00	41.6 AV	54.0	-12.4	1.22 H	141	31.40	10.20
9	#16530.00	61.7 PK	74.0	-12.3	1.08 H	68	45.43	16.27
10	#16530.00	49.8 AV	54.0	-4.2	1.08 H	68	33.53	16.27
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	5460.00	57.2 PK	74.0	-16.8	1.03 V	171	53.03	4.17
2	5460.00	44.8 AV	54.0	-9.2	1.03 V	171	40.63	4.17
3	#5470.00	62.5 PK	74.0	-11.5	1.03 V	171	58.33	4.17
4	#5470.00	46.5 AV	54.0	-7.5	1.03 V	171	42.33	4.17
5	*5510.00	106.3 PK			1.03 V	171	102.10	4.20
6	*5510.00	96.1 AV			1.03 V	171	91.90	4.20
7	11020.00	54.1 PK	74.0	-19.9	1.00 V	92	43.90	10.20
8	11020.00	41.8 AV	54.0	-12.2	1.00 V	92	31.60	10.20
9	#16530.00	60.4 PK	74.0	-13.6	1.36 V	123	44.13	16.27
10	#16530.00	48.4 AV	54.0	-5.6	1.36 V	123	32.13	16.27

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 118	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5470.00	73.0 PK	74.0	-1.0	1.00 H	71	68.83	4.17
2	#5470.00	48.1 AV	54.0	-5.9	1.00 H	71	43.93	4.17
3	*5590.00	116.1 PK			1.00 H	71	111.63	4.47
4	*5590.00	105.8 AV			1.00 H	71	101.33	4.47
5	11180.00	54.7 PK	74.0	-19.3	1.21 H	150	44.59	10.11
6	11180.00	41.7 AV	54.0	-12.3	1.21 H	150	31.59	10.11
7	#16770.00	62.4 PK	74.0	-11.6	1.06 H	58	45.15	17.25
8	#16770.00	50.2 AV	54.0	-3.8	1.06 H	58	32.95	17.25
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	#5470.00	62.7 PK	74.0	-11.3	1.01 V	192	58.53	4.17
2	#5470.00	46.9 AV	54.0	-7.1	1.01 V	192	42.73	4.17
3	*5590.00	113.7 PK			1.01 V	192	109.23	4.47
4	*5590.00	103.4 AV			1.01 V	192	98.93	4.47
5	11180.00	54.8 PK	74.0	-19.2	1.00 V	77	44.69	10.11
6	11180.00	42.5 AV	54.0	-11.5	1.00 V	77	32.39	10.11
7	#16770.00	61.3 PK	74.0	-12.7	1.33 V	111	44.05	17.25
8	#16770.00	48.9 AV	54.0	-5.1	1.33 V	111	31.65	17.25

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 134	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5670.00	110.6 PK			1.00 H	68	106.10	4.50
2	*5670.00	100.6 AV			1.00 H	68	96.10	4.50
3	#5725.00	68.5 PK	74.0	-5.5	1.00 H	68	64.00	4.50
4	#5725.00	53.4 AV	54.0	-0.6	1.00 H	68	48.90	4.50
5	11340.00	54.4 PK	74.0	-19.6	1.23 H	142	44.30	10.10
6	11340.00	41.3 AV	54.0	-12.7	1.23 H	142	31.20	10.10
7	#17010.00	62.1 PK	74.0	-11.9	1.13 H	36	44.50	17.60
8	#17010.00	50.3 AV	54.0	-3.7	1.13 H	36	32.70	17.60
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	*5670.00	108.2 PK			1.00 V	187	103.70	4.50
2	*5670.00	98.1 AV			1.00 V	187	93.60	4.50
3	#5725.00	63.2 PK	74.0	-10.8	1.00 V	187	58.70	4.50
4	#5725.00	47.2 AV	54.0	-6.8	1.00 V	187	42.70	4.50
5	11340.00	54.3 PK	74.0	-19.7	1.00 V	87	44.20	10.10
6	11340.00	41.9 AV	54.0	-12.1	1.00 V	87	31.80	10.10
7	#17010.00	60.9 PK	74.0	-13.1	1.30 V	119	43.30	17.60
8	#17010.00	48.8 AV	54.0	-5.2	1.30 V	119	31.20	17.60

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.
6. " # ": The radiated frequency is out of the restricted band.

4.3 TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Mobile and Portable client device	250mW (24 dBm)
U-NII-2A	---		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	---		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	---		1 Watt (30 dBm)

Note: Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

4.3.2 TEST INSTRUMENTS

FOR POWER OUTPUT MEASUREMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

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. Tested date : July 31, 2014

FOR 26dB OCCUPIED BANDWIDTH

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

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. Tested date : July 31, 2014

4.3.3 TEST PROCEDURE

FOR POWER OUTPUT MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB OCCUPIED BANDWIDTH

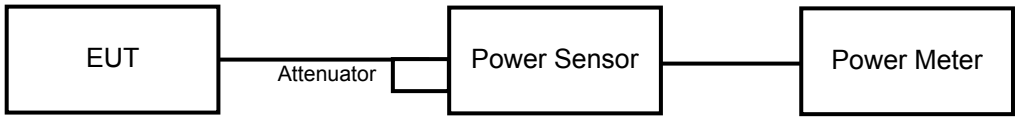
1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.3.4 DEVIATION FROM TEST STANDARD

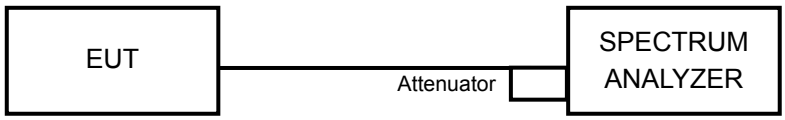
No deviation

4.3.5 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB OCCUPIED BANDWIDTH



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 (ACCESSORY RADIO)

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
52	5260	33.343	15.23	24	PASS
60	5300	31.623	15.00	24	PASS
64	5320	31.915	15.04	24	PASS
100	5500	34.995	15.44	24	PASS
120	5600	35.727	15.53	24	PASS
140	5700	34.914	15.43	24	PASS

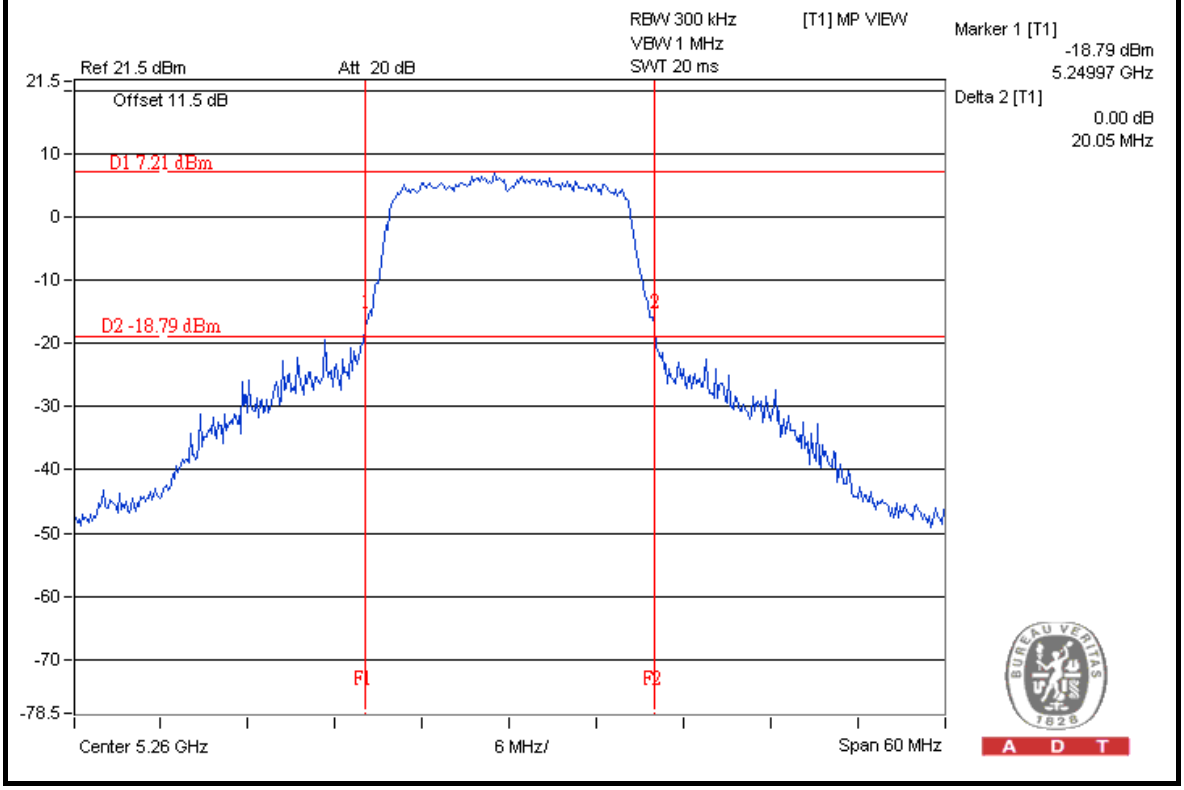
26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)
52	5260	20.05
60	5300	20.50
64	5320	20.48
100	5500	24.75
120	5600	21.04
140	5700	24.54

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.05	24.02 > 24
60	5300	20.50	24.11 > 24
64	5320	20.48	24.11 > 24
100	5500	24.75	24.93 > 24
120	5600	21.04	24.23 > 24
140	5700	24.54	24.89 > 24

SPECTRUM PLOT OF WORST VALUE

802.11a : CH52



802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
52	5260	33.651	15.27	24	PASS
60	5300	34.041	15.32	24	PASS
64	5320	34.119	15.33	24	PASS
100	5500	35.892	15.55	24	PASS
120	5600	36.644	15.64	24	PASS
140	5700	35.975	15.56	24	PASS

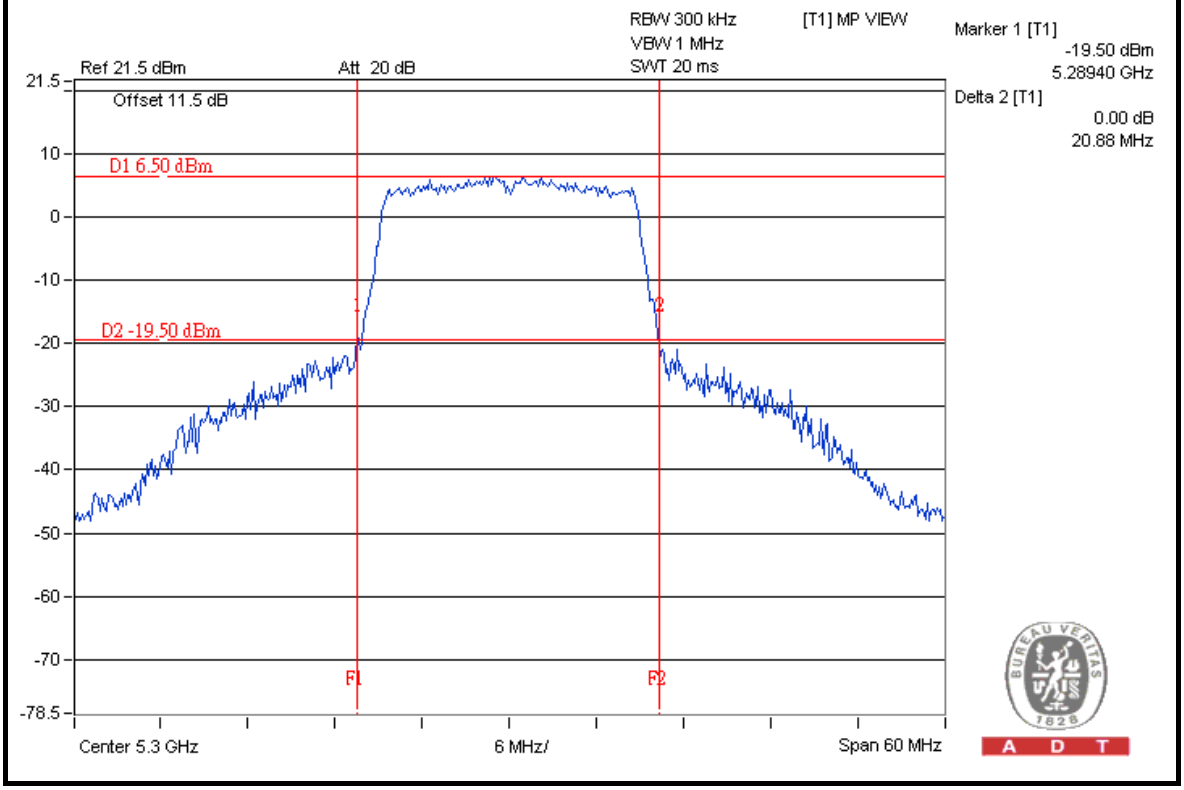
26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)
52	5260	22.50
60	5300	20.88
64	5320	21.35
100	5500	25.71
120	5600	23.36
140	5700	22.66

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	22.50	24.52 > 24
60	5300	20.88	24.19 > 24
64	5320	21.35	24.29 > 24
100	5500	25.71	25.1 > 24
120	5600	23.36	24.68 > 24
140	5700	22.66	24.55 > 24

SPECTRUM PLOT OF WORST VALUE

802.11n (HT20): CH60



4.3.8 TEST RESULTS (NETWORK RADIO)

802.11a

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
52	5260	20.86	20.71	239.66	23.80	24	PASS
60	5300	20.87	20.73	240.484	23.81	24	PASS
64	5320	19.68	19.74	187.086	22.72	24	PASS
100	5500	20.82	20.79	240.731	23.82	24	PASS
120	5600	20.76	20.74	237.701	23.76	24	PASS
140	5700	18.48	18.54	141.919	21.52	24	PASS

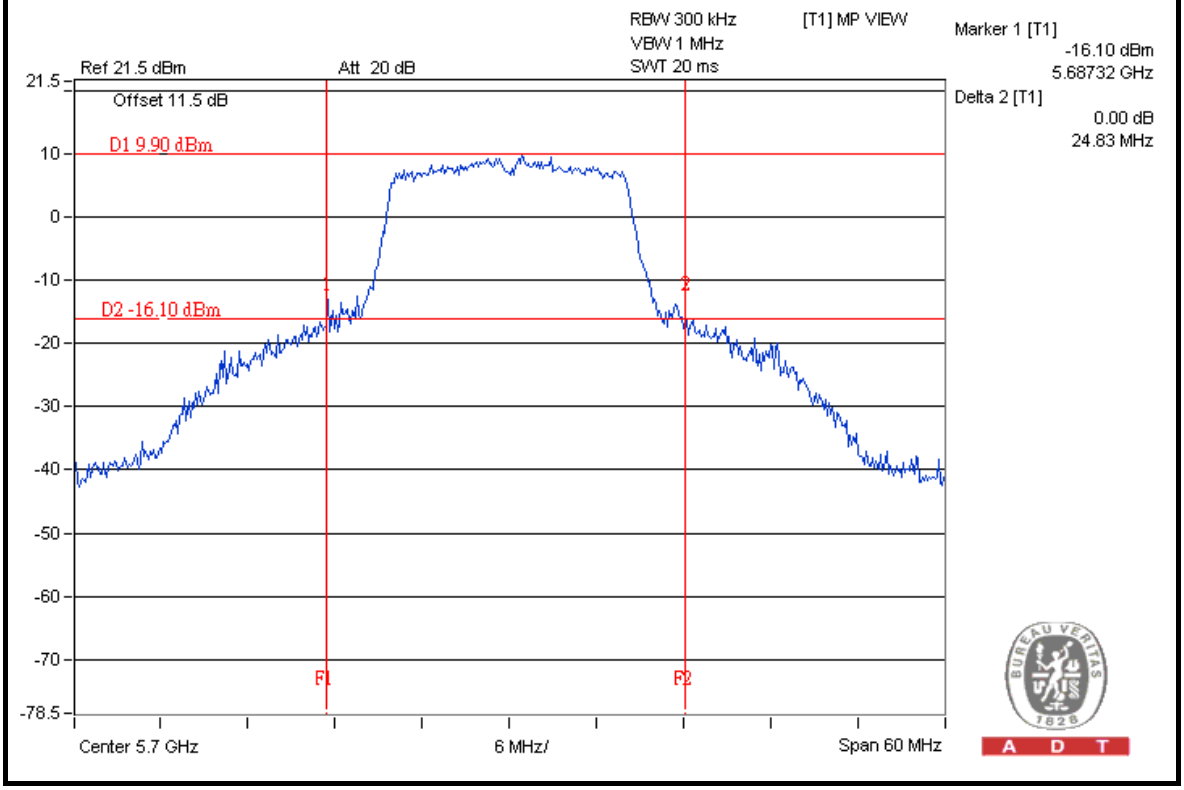
26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
52	5260	39.31	38.28
60	5300	36.17	37.53
64	5320	33.34	29.34
100	5500	36.02	32.99
120	5600	44.09	38.88
140	5700	24.83	27.52

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	38.28	26.82 > 24
60	5300	36.17	26.58 > 24
64	5320	29.34	25.67 > 24
100	5500	32.99	26.18 > 24
120	5600	38.88	26.89 > 24
140	5700	24.83	24.94 > 24

SPECTRUM PLOT OF WORST VALUE

802.11a / Chain(0): CH140



802.11n (HT20)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
52	5260	20.86	20.68	238.849	23.78	24	PASS
60	5300	21.09	20.49	240.473	23.81	24	PASS
64	5320	19.05	18.71	154.655	21.89	24	PASS
100	5500	17.62	17.62	115.62	20.63	24	PASS
120	5600	20.55	20.98	238.815	23.78	24	PASS
140	5700	16.04	17.30	93.882	19.73	24	PASS

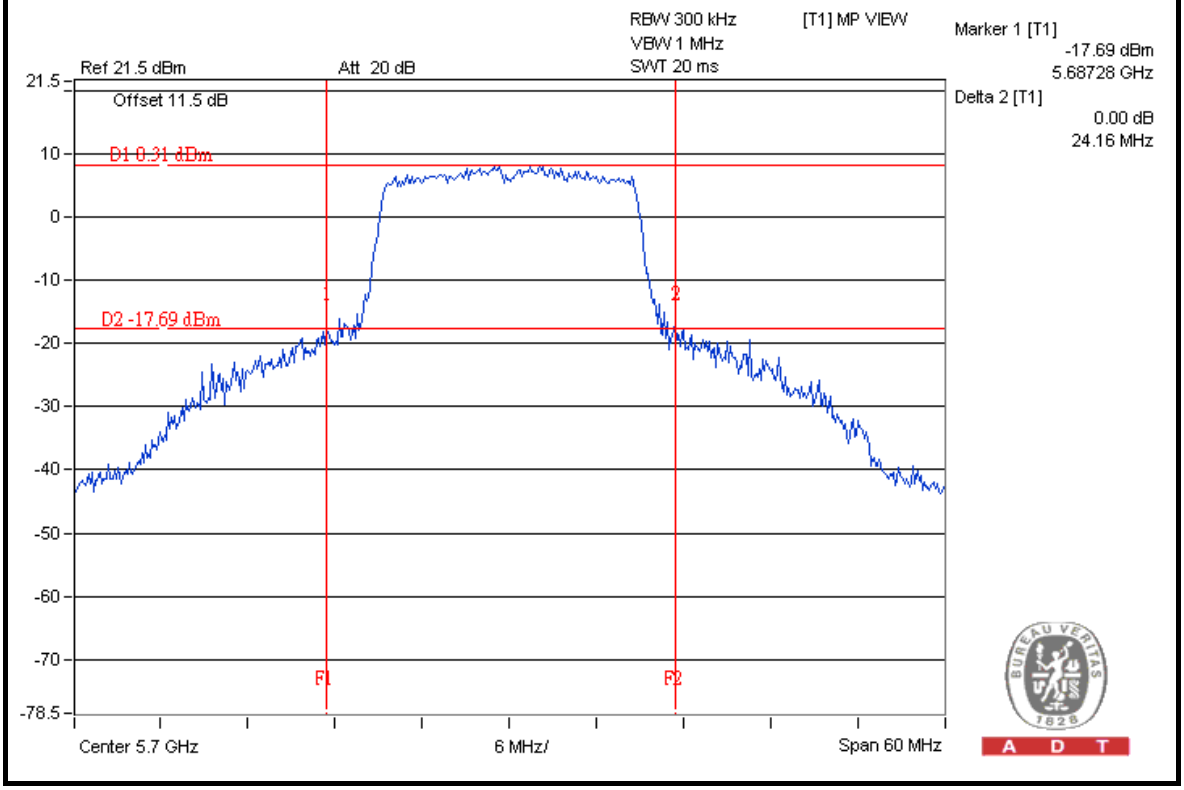
26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
52	5260	38.84	40.74
60	5300	41.61	38.77
64	5320	28.37	26.71
100	5500	29.21	28.39
120	5600	45.84	39.66
140	5700	24.16	28.13

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	38.84	26.89 > 24
60	5300	38.77	26.88 > 24
64	5320	26.71	25.26 > 24
100	5500	28.39	25.53 > 24
120	5600	39.66	26.98 > 24
140	5700	24.16	24.83 > 24

SPECTRUM PLOT OF WORST VALUE

802.11n (HT20) / Chain(0): CH140



802.11n (HT40)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
54	5270	21.20	20.30	238.978	23.78	24	PASS
62	5310	14.64	13.70	52.549	17.21	24	PASS
102	5510	14.10	13.66	48.931	16.90	24	PASS
118	5590	20.73	20.86	240.203	23.81	24	PASS
134	5670	17.20	17.89	113.999	20.57	24	PASS

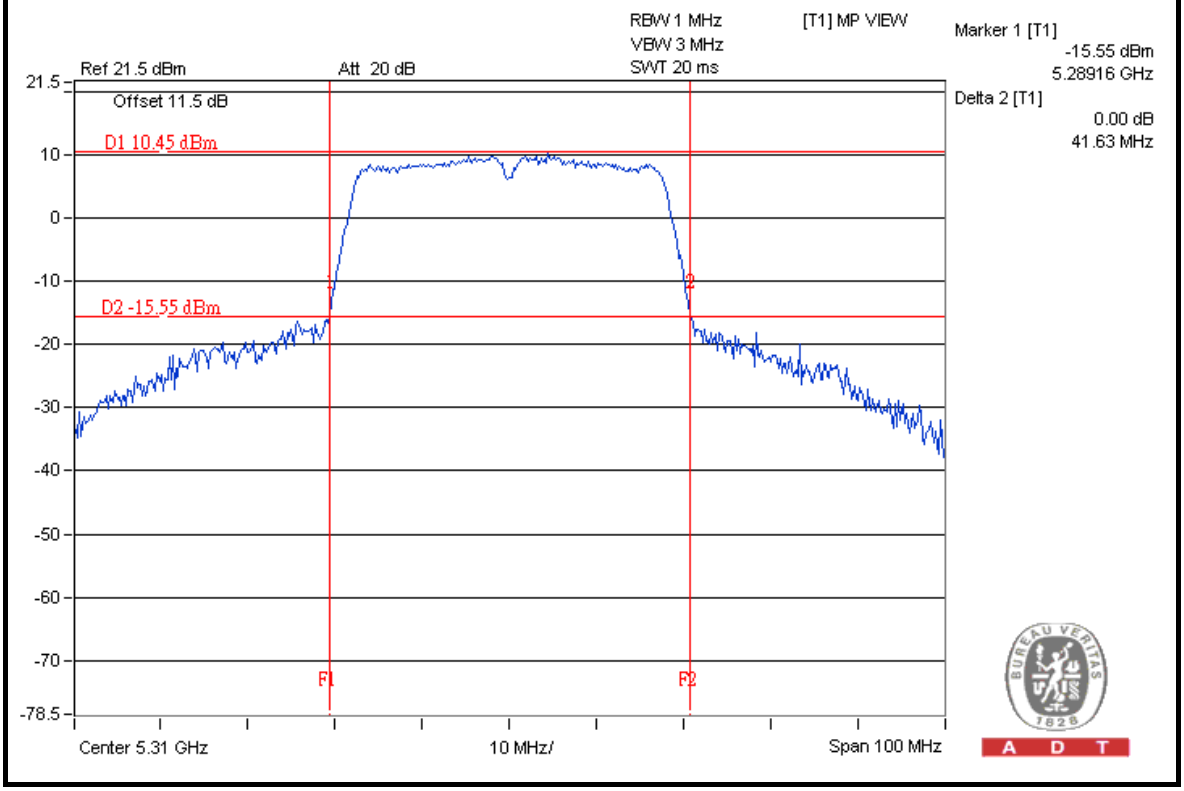
26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
54	5270	98.24	96.93
62	5310	42.12	41.63
102	5510	42.10	41.89
118	5590	98.22	100.56
134	5670	79.11	81.26

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	96.93	30.86 > 24
62	5310	41.63	27.19 > 24
102	5510	41.89	27.22 > 24
118	5590	98.22	30.92 > 24
134	5670	79.11	29.98 > 24

SPECTRUM PLOT OF WORST VALUE

802.11n (HT40) / Chain(1): CH62



4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Mobile and Portable client device	11dBm/ MHz
U-NII-2A	---		11dBm/ MHz
U-NII-2C	---		11dBm/ MHz
U-NII-3	---		30dBm/ 500kHz

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

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. Tested date : July 31, 2014

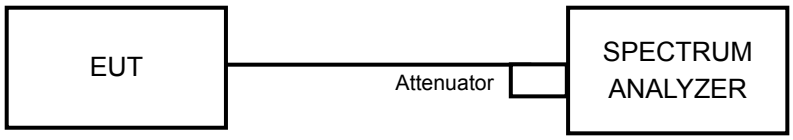
4.4.3 TEST PROCEDURES

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value and for duty cycle of test signal is < 98% add 10 log (1/duty cycle)

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6

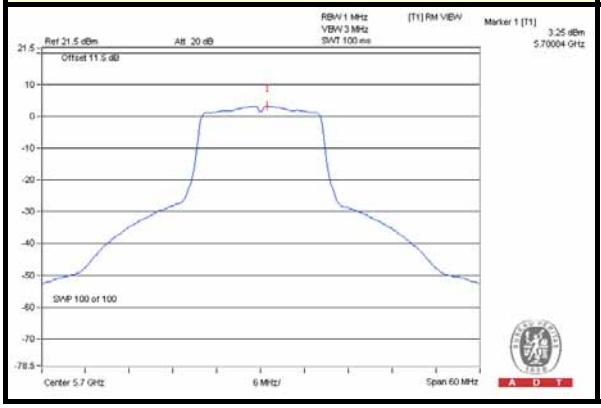
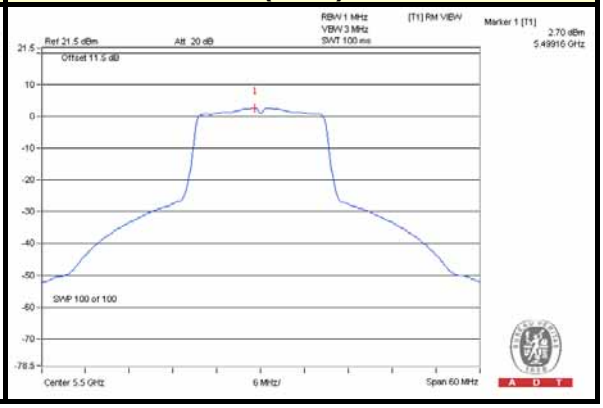
4.4.7 TEST RESULTS (ACCESSORY RADIO)

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	PSD (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
52	5260	2.12	11	PASS
60	5300	2.30	11	PASS
64	5320	2.30	11	PASS
100	5500	3.18	11	PASS
120	5600	2.55	11	PASS
140	5700	3.25	11	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	PSD (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
52	5260	1.90	11	PASS
60	5300	1.81	11	PASS
64	5320	1.87	11	PASS
100	5500	2.70	11	PASS
120	5600	2.32	11	PASS
140	5700	2.53	11	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11a : CH140	802.11n (HT20): CH100
	

4.4.8 TEST RESULTS (NETWORK RADIO)

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS/FAIL
		CHAIN 0	CHAIN 1			
52	5260	7.46	7.15	10.32	10.92	PASS
60	5300	7.30	6.99	10.16	10.92	PASS
64	5320	6.10	5.63	8.88	10.92	PASS
100	5500	7.52	6.93	10.25	10.92	PASS
120	5600	7.83	6.48	10.22	10.92	PASS
140	5700	4.75	4.50	7.64	10.92	PASS

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. **5150~5250MHz:** Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.08dBi > 6dBi , so the power density limit shall be reduced to 11-(6.08-6) = 10.92dBm.

3. **5470~5725MHz:** Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.08dBi > 6dBi , so the power density limit shall be reduced to 11-(6.08-6) = 10.92dBm.

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS/FAIL
		CHAIN 0	CHAIN 1			
52	5260	6.76	6.78	9.78	10.92	PASS
60	5300	7.39	6.63	10.04	10.92	PASS
64	5320	5.14	4.18	7.70	10.92	PASS
100	5500	5.60	4.33	8.02	10.92	PASS
120	5600	7.31	5.60	9.55	10.92	PASS
140	5700	3.60	3.39	6.51	10.92	PASS

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. **5150~5250MHz:** Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.08dBi > 6dBi , so the power density limit shall be reduced to 11-(6.08-6) = 10.92dBm.

3. **5470~5725MHz:** Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.08dBi > 6dBi , so the power density limit shall be reduced to 11-(6.08-6) = 10.92dBm.

802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS/FAIL
		CHAIN 0	CHAIN 1			
54	5270	4.85	4.80	7.84	10.92	PASS
62	5310	-1.24	-1.09	1.85	10.92	PASS
102	5510	-1.26	-1.60	1.58	10.92	PASS
118	5590	3.79	3.56	6.69	10.92	PASS
134	5670	1.33	1.36	4.36	10.92	PASS

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. **5150~5250MHz:** Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$)^2 / 2] = 6.08dBi > 6dBi , so the power density limit shall be reduced to 11-(6.08-6) = 10.92dBm.

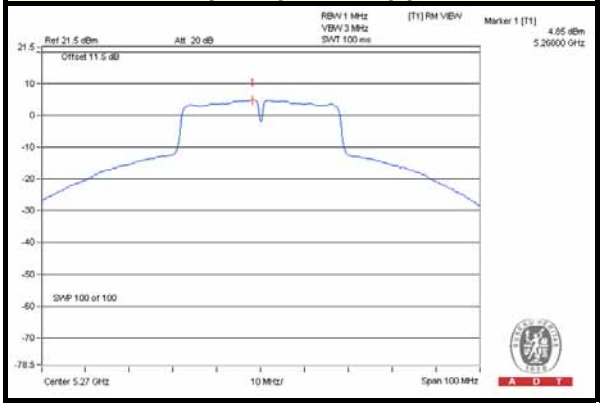
3. **5470~5725MHz:** Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$)^2 / 2] = 6.08dBi > 6dBi , so the power density limit shall be reduced to 11-(6.08-6) = 10.92dBm.

SPECTRUM PLOT OF WORST VALUE

802.11a / Chain(0): CH120

802.11n (HT20) / Chain(0): CH60

802.11n (HT40) / Chain(0): CH54



4.5 FREQUENCY STABILITY

4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-SP-AR	MAA0812-008	Jan. 13, 2014	Jan. 12, 2015

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. Tested date : July 31, 2014

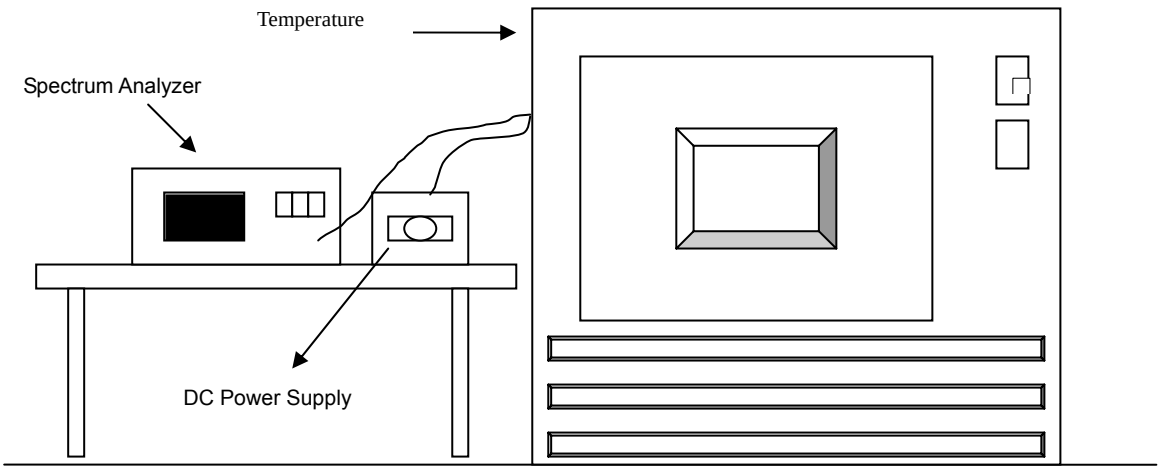
4.5.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

4.5.7 TEST RESULTS (ACCESSORY RADIO)

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	3.3	5319.9819	-0.00034	5319.9777	-0.00042	5319.9791	-0.00039	5319.98	-0.00038
40	3.3	5319.9833	-0.00031	5319.9807	-0.00036	5319.9837	-0.00031	5319.9834	-0.00031
30	3.3	5319.978	-0.00041	5319.9757	-0.00046	5319.9765	-0.00044	5319.9776	-0.00042
20	3.3	5320.0113	0.00021	5320.0116	0.00022	5320.0095	0.00018	5320.0112	0.00021
10	3.3	5319.9778	-0.00042	5319.9778	-0.00042	5319.9803	-0.00037	5319.9798	-0.00038
0	3.3	5319.9838	-0.00030	5319.9868	-0.00025	5319.9858	-0.00027	5319.9858	-0.00027
-10	3.3	5320.0092	0.00017	5320.0073	0.00014	5320.009	0.00017	5320.0061	0.00011
-20	3.3	5320.0199	0.00037	5320.0192	0.00036	5320.0183	0.00034	5320.0217	0.00041
-30	3.3	5319.9918	-0.00015	5319.9942	-0.00011	5319.9947	-0.00010	5319.9899	-0.00019

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	3.63	5320.0115	0.00022	5320.0119	0.00022	5320.0103	0.00019	5320.0105	0.00020
	3.3	5320.0113	0.00021	5320.0116	0.00022	5320.0095	0.00018	5320.0112	0.00021
	2.97	5320.0122	0.00023	5320.0124	0.00023	5320.01	0.00019	5320.012	0.00023

4.5.8 TEST RESULTS (NETWORK RADIO)

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	3.3	5320.0069	0.00013	5320.0081	0.00015	5320.0069	0.00013	5320.0083	0.00016
40	3.3	5320	0.00000	5320.0012	0.00002	5319.9993	-0.00001	5320.0004	0.00001
30	3.3	5319.9795	-0.00039	5319.9823	-0.00033	5319.9817	-0.00034	5319.983	-0.00032
20	3.3	5319.978	-0.00041	5319.9801	-0.00037	5319.9806	-0.00036	5319.9784	-0.00041
10	3.3	5320.0102	0.00019	5320.0075	0.00014	5320.0098	0.00018	5320.0094	0.00018
0	3.3	5319.9998	0.00000	5319.9969	-0.00006	5319.998	-0.00004	5319.9971	-0.00005
-10	3.3	5320.0097	0.00018	5320.01	0.00019	5320.0131	0.00025	5320.0102	0.00019
-20	3.3	5320.0214	0.00040	5320.0218	0.00041	5320.0235	0.00044	5320.024	0.00045
-30	3.3	5319.9913	-0.00016	5319.9915	-0.00016	5319.9901	-0.00019	5319.9909	-0.00017

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	3.63	5319.9774	-0.00042	5319.9793	-0.00039	5319.9803	-0.00037	5319.9773	-0.00043
	3.3	5319.978	-0.00041	5319.9801	-0.00037	5319.9806	-0.00036	5319.9784	-0.00041
	2.97	5319.9777	-0.00042	5319.9811	-0.00036	5319.9796	-0.00038	5319.9793	-0.00039

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. 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 accredited and approved 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.

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

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