

Supplemental “Transmit Simultaneously” Test Report

Report No.: RF150410E09-2

FCC ID: PY315100300

Test Model: R6400

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Release Control Record

Issue No.	Description	Date Issued
RF150410E09-2	Original release.	Apr. 28, 2015

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -10.21dB at 0.17566MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.4dB at 4874.00MHz.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC1750 Smart WiFi Router
Brand	NETGEAR
Test Model	R6400
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps
Operating Frequency	For 15.407 5GHz: 5.18 ~ 5.24GHz
	For 15.247 2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.745 ~ 5.825GHz
Number of Channel	For 15.407 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
	For 15.247 (2.4GHz) 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) For 15.247 (5GHz) 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)

Output Power	<p>For 15.407 CDD Mode: 802.11a: 274.765mW Beamforming Mode: 802.11ac (VHT20): 331.812mW 802.11ac (VHT40): 278.695mW 802.11ac (VHT80): 103.865mW</p>
	<p>For 15.247 (2.4GHz) CDD Mode: 802.11b: 537.365mW 802.11g: 536.684mW 802.11n (HT20): 435.03mW 802.11n (HT40): 112.913mW For 15.247 (5GHz) CDD Mode: 802.11a: 915.893mW 802.11ac (VHT20): 896.802mW 802.11ac (VHT40): 894.191mW 802.11ac (VHT80): 419.248mW Beamforming Mode: 802.11ac (VHT20): 555.34mW 802.11ac (VHT40): 557.193mW 802.11ac (VHT80): 419.248mW</p>
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. 2.4GHz and 5GHz technology can transmit at same time.
2. The antennas provided to the EUT, please refer to the following table:

Antenna No.	Transmitter Circuit	Ant. Gain(dBi) <Including cable loss>	Frequency range (GHz to GHz)	Ant. Type	Connector Type
98612PIPF003	Chain (0)	3.4	2.4~2.4835	Dipole	R-SMA
		3.94	5.15~5.25		
		3.73	5.725~5.85		
98612PIPF004	Chain (1)	3.23	2.4~2.4835	Dipole	R-SMA
		3.66	5.15~5.25		
		3.77	5.725~5.85		
98612PIPF005	Chain (2)	3.36	2.4~2.4835	Dipole	R-SMA
		3.32	5.15~5.25		
		3.74	5.725~5.85		

3. The EUT must be supplied with a power adapter and following four different models could be chosen as following table:

No	P/N	Brand Name	Model No.	Spec.
1	332-10758-01	NETGEAR	2ABL030F 1 NA	Input: 100-120V, 1.0A, 50/60Hz Output: 12.0V, 2.5A DC output cable: 1.8m, unshielded
2	332-10756-01	NETGEAR	2ABL030F NA	Input: 100-240V, 1.0A, 50/60Hz Output: 12.0V, 2.5A DC output cable: 1.8m, unshielded
3	332-10759-01	NETGEAR	ADS-40FPA-12 12030GPCU-L	Input: 100-120V, 1.0A, 60Hz Output: 12.0V, 2.5A DC output cable: 1.7m, unshielded
4	332-10757-01	NETGEAR	ADS-40FPA-12 12030GPCU	Input: 100-240V, 1.0A, 50/60Hz Output: 12.0V, 2.5A DC output cable: 1.7m, unshielded

From the above adapters, the worst radiated test item was found in Adapter 1. Therefore only the test data of the mode was recorded in this report.

4. The EUT incorporates a MIMO function with beamforming for 5GHz (802.11n & 802.11ac mode).

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	3TX	3RX
802.11g	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11ac (VHT20)	MCS0~8 Nss=1	3TX	3RX
	MCS0~8 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
802.11ac (VHT40)	MCS0~9 Nss=1	3TX	3RX
	MCS0~9 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
802.11ac (VHT80)	MCS0~9 Nss=1	3TX	3RX
	MCS0~9 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report.

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.1.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE $<$ 1G	PLC	OB	
1	√	√	√	√	With adapter 1
2	-	-	√	-	With adapter 2
3	-	-	√	-	With adapter 3
4	-	-	√	-	With adapter 4

Where **RE \geq 1G**: Radiated Emission above 1GHz & Bandedge Measurement
RE $<$ 1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission
OB: Conducted Out-Band Emission Measurement

NOTE:

1. The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane**

Radiated Emission Test (Above 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b + 5GHz	1 to 11	6	DSSS	DBPSK	1
802.11a	149 to 165	157	OFDM	BPSK	6

Radiated Emission Test (Below 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b + 5GHz	1 to 11	6	DSSS	DBPSK	1
802.11a	149 to 165	157	OFDM	BPSK	6

Power Line Conducted Emission Test:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b + 5GHz	1 to 11	6	DSSS	DBPSK	1
802.11a	149 to 165	157	OFDM	BPSK	6

Conducted Out-Band Emission Measurement:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b + 5GHz	1 to 11	6	DSSS	DBPSK	1
802.11a	149 to 165	157	OFDM	BPSK	6

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE<1G	24deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
RE≥1G	24deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
PLC	26deg. C, 55%RH	120Vac, 60Hz	Jyunchun Lin
OB	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.2 Description of Support Units

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

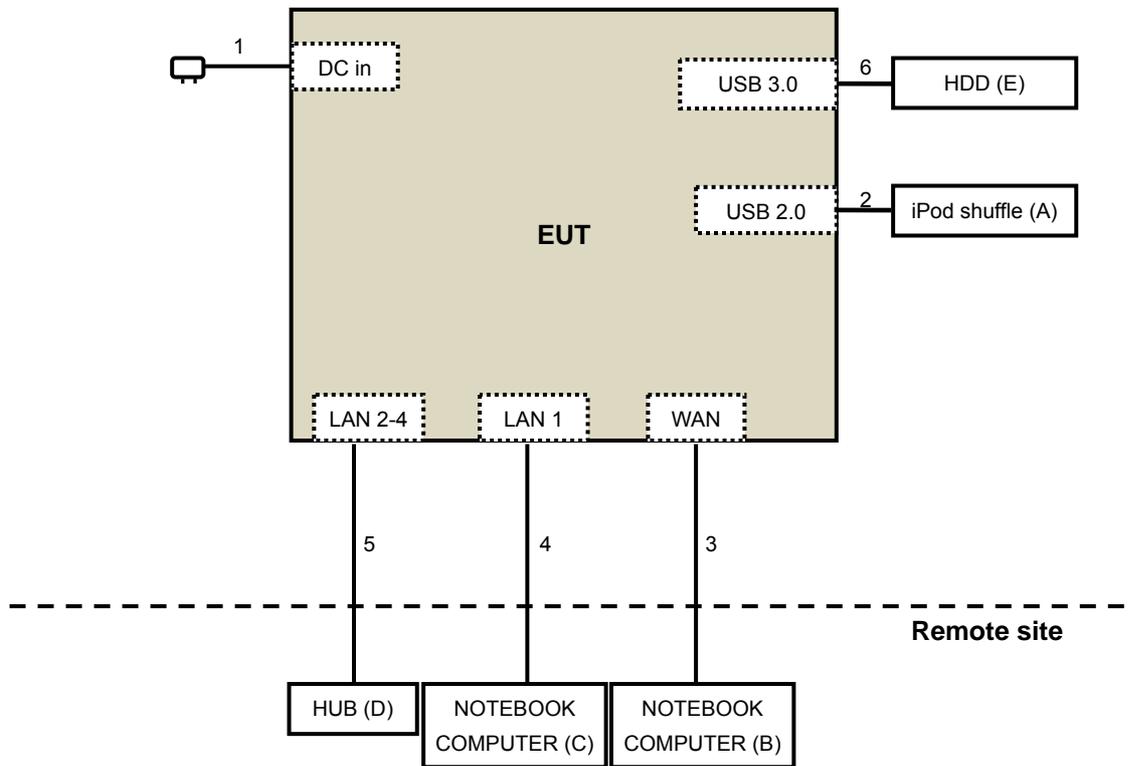
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	iPod shuffle	Apple	MC749TA/A	CC4DN29UDFDM	NA	Provided by Lab
B.	NOTEBOOK COMPUTER	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
C.	NOTEBOOK COMPUTER	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
D.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
E.	HDD	WD	WDBACW0010HB K-SESN	WCAZAL625787	FCC DoC	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC	1	1.8	No	0	Supplied by Client
2.	USB	1	0.1	Yes	0	Provided by Lab
3.	RJ-45	1	10	No	0	Provided by Lab
4.	RJ-45	1	10	No	0	Provided by Lab
5.	RJ-45	3	10	No	0	Provided by Lab
6.	USB	1	0.45	Yes	0	Provided by Lab

3.2.1 Configuration of System under Test



4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

For above 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	July 25, 2014	July 24, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01961	Oct. 18, 2014	Oct. 17, 2015
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2014	Oct. 17, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 09, 2014	Aug. 08, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 2015
High Speed Peak Power Meter	ML2495A	0824011	July 26, 2014	July 25, 2015
Power Sensor	MA2411B	0738171	July 26, 2014	July 25, 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. The test was performed in HwaYa Chamber 4.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 460141.
5. The IC Site Registration No. is IC7450F-4.
6. Tested Date: Apr. 18, 2015

For below 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 09, 2015	Feb. 08, 2016
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
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. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Apr. 17, 2015

4.1.3 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:

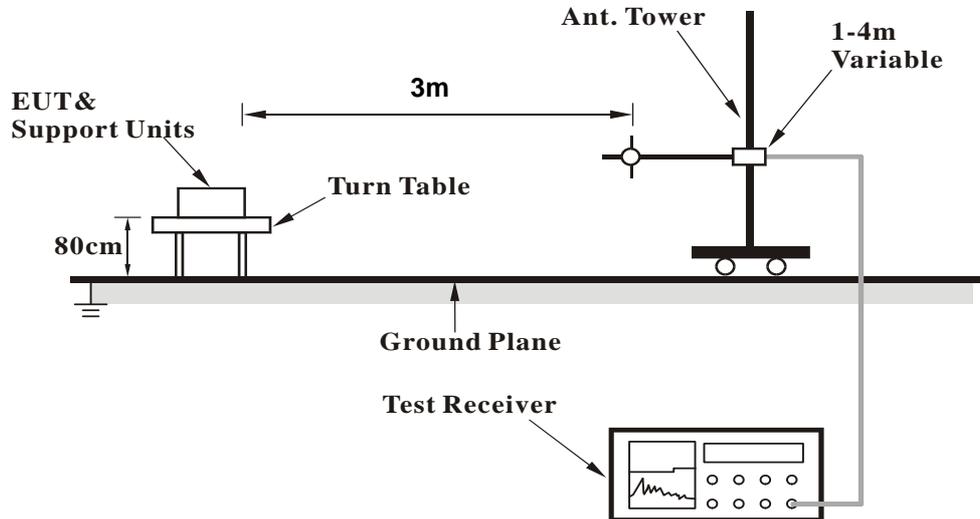
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. 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 ($10 \log(1/\text{duty cycle})$).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

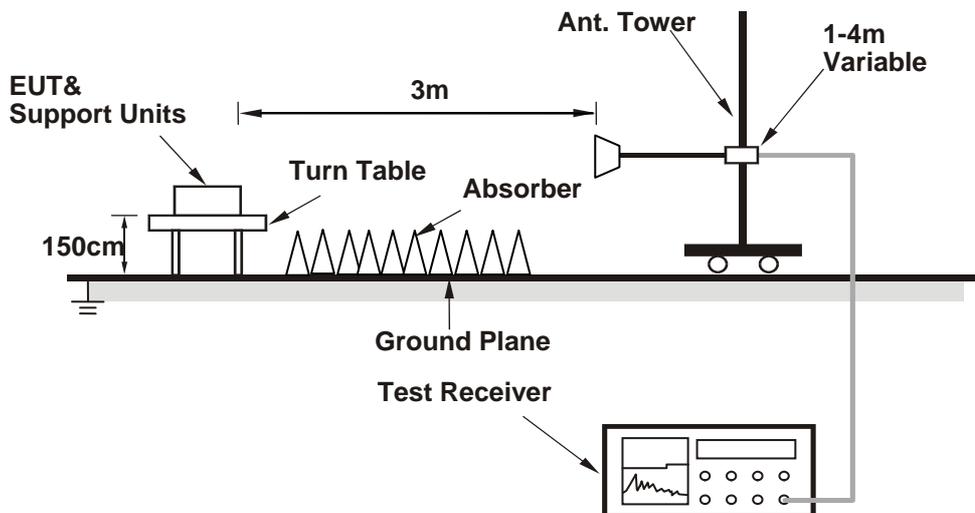
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

1. Connect the EUT with the support units B-C (NOTEBOOK COMPUTER) which is placed on remote site.
2. Controlling software (MTool.exe[2.0.1.8]) has been activated to set the EUT on specific status.

4.1.7 Test Results

ABOVE 1GHz DATA (Subcontract Item)

FREQUENCY RANGE	1GHz ~ 40GHz	DETECTOR FUNCTION	Peak (PK) Average (AV)
------------------------	--------------	--------------------------	---------------------------

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4874.00	51.1 PK	74.0	-22.9	1.00 H	159	48.60	2.50
2	4874.00	46.9 AV	54.0	-7.1	1.00 H	159	44.40	2.50
3	7311.00	56.5 PK	74.0	-17.5	1.52 H	218	46.82	9.68
4	7311.00	45.1 AV	54.0	-8.9	1.52 H	218	35.42	9.68
5	11570.00	57.1 PK	74.0	-16.9	1.00 H	289	46.54	10.56
6	11570.00	44.8 AV	54.0	-9.2	1.00 H	289	34.24	10.56

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	4874.00	60.9 PK	74.0	-13.1	1.00 V	143	58.40	2.50
2	4874.00	52.6 AV	54.0	-1.4	1.00 V	143	50.10	2.50
3	7311.00	58.6 PK	74.0	-15.4	1.44 V	211	48.92	9.68
4	7311.00	49.2 AV	54.0	-4.8	1.44 V	211	39.52	9.68
5	11570.00	63.2 PK	74.0	-10.8	1.52 V	207	52.64	10.56
6	11570.00	50.6 AV	54.0	-3.4	1.52 V	207	40.04	10.56

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

BELOW 1GHz WORST-CASE DATA

FREQUENCY RANGE	30MHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)
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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	87.89	36.0 QP	40.0	-4.0	1.45 H	75	54.76	-18.77
2	135.47	37.8 QP	43.5	-5.7	1.74 H	355	51.47	-13.65
3	192.24	32.4 QP	43.5	-11.1	1.54 H	85	48.22	-15.80
4	596.74	34.7 QP	46.0	-11.3	1.45 H	241	39.16	-4.42
5	630.35	35.7 QP	46.0	-10.3	1.64 H	214	39.38	-3.64
6	815.27	34.5 QP	46.0	-11.6	1.34 H	67	34.76	-0.31

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	65.11	35.8 QP	40.0	-4.2	1.24 V	100	50.04	-14.26
2	108.37	31.6 QP	43.5	-11.9	1.24 V	111	47.77	-16.13
3	189.42	30.1 QP	43.5	-13.4	1.44 V	344	45.68	-15.54
4	200.64	34.0 QP	43.5	-9.5	1.42 V	241	50.01	-16.05
5	668.61	33.5 QP	46.0	-12.5	1.64 V	241	36.82	-3.30
6	815.21	37.8 QP	46.0	-8.2	1.45 V	204	38.13	-0.32

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
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: Apr. 15, 2015

4.2.3 Test Procedures

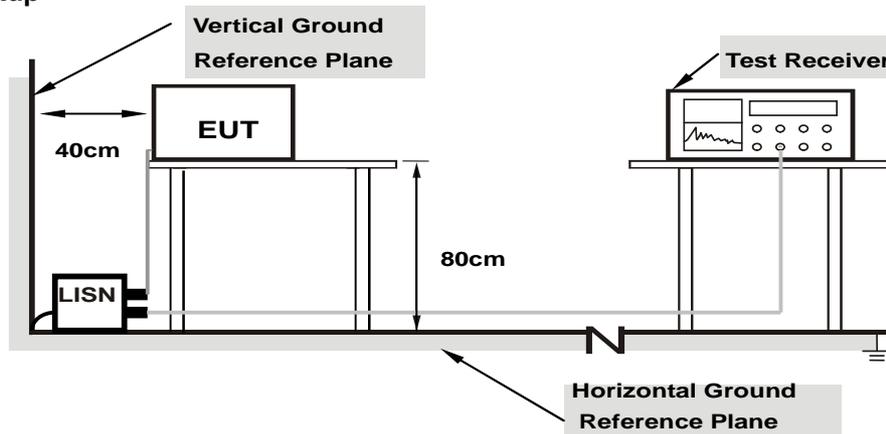
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results (MODE 1)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	51.35	43.22	51.43	43.30	66.00	56.00	-14.57	-12.70
2	0.18125	0.09	48.28	41.03	48.37	41.12	64.43	54.43	-16.06	-13.31
3	0.28672	0.09	44.57	39.66	44.66	39.75	60.62	50.62	-15.95	-10.86
4	0.32969	0.10	42.18	36.09	42.28	36.19	59.46	49.46	-17.18	-13.27
5	0.48203	0.10	26.27	18.78	26.37	18.88	56.30	46.30	-29.93	-27.42
6	10.35156	0.46	22.57	18.96	23.03	19.42	60.00	50.00	-36.97	-30.58

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.08	50.08	41.01	50.16	41.09	64.61	54.61	-14.45	-13.52
2	0.29063	0.09	46.20	39.94	46.29	40.03	60.51	50.51	-14.22	-10.48
3	0.32969	0.09	43.64	38.61	43.73	38.70	59.46	49.46	-15.73	-10.76
4	0.40000	0.10	31.33	23.97	31.43	24.07	57.85	47.85	-26.42	-23.78
5	0.72813	0.12	22.38	15.82	22.50	15.94	56.00	46.00	-33.50	-30.06
6	10.30469	0.47	24.32	20.97	24.79	21.44	60.00	50.00	-35.21	-28.56

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.



4.2.8 Test Results (MODE 2)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.15781	0.08	48.02	38.59	48.10	38.67	65.58	55.58	-17.48
2	0.20469	0.09	43.73	35.25	43.82	35.34	63.42	53.42	-19.60	-18.08
3	0.29844	0.09	42.51	34.57	42.60	34.66	60.29	50.29	-17.68	-15.62
4	0.34141	0.10	40.19	36.47	40.29	36.57	59.17	49.17	-18.88	-12.60
5	0.51719	0.11	23.49	17.25	23.60	17.36	56.00	46.00	-32.40	-28.64
6	11.14453	0.48	23.79	19.99	24.27	20.47	60.00	50.00	-35.73	-29.53

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.16953	0.08	46.93	37.85	47.01	37.93	64.98	54.98	-17.97	-17.05
2	0.20469	0.08	43.67	35.13	43.75	35.21	63.42	53.42	-19.67	-18.21
3	0.29416	0.09	43.33	39.34	43.42	39.43	60.41	50.41	-16.99	-10.98
4	0.31406	0.09	42.38	39.06	42.47	39.15	59.86	49.86	-17.39	-10.71
5	0.71641	0.12	20.06	13.68	20.18	13.80	56.00	46.00	-35.82	-32.20
6	11.09375	0.49	23.69	19.93	24.18	20.42	60.00	50.00	-35.82	-29.58

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.



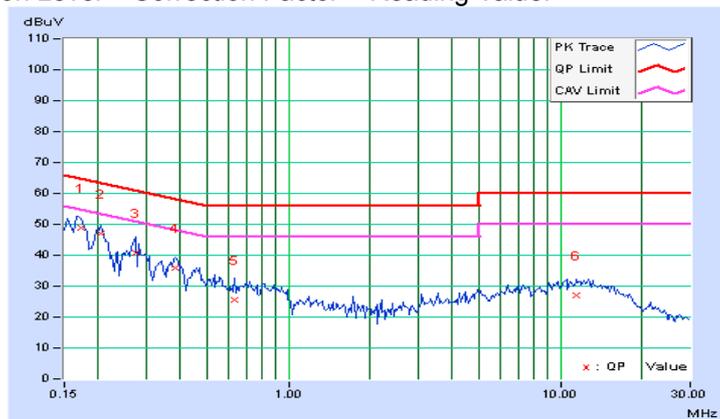
4.2.9 Test Results (MODE 3)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	0.08	48.76	39.33	48.84	39.41	64.79	54.79	-15.95	-15.38
2	0.20469	0.09	46.94	39.94	47.03	40.03	63.42	53.42	-16.39	-13.39
3	0.27500	0.09	40.63	32.34	40.72	32.43	60.97	50.97	-20.24	-18.53
4	0.38438	0.10	35.71	29.57	35.81	29.67	58.18	48.18	-22.38	-18.52
5	0.63438	0.11	25.53	18.27	25.64	18.38	56.00	46.00	-30.36	-27.62
6	11.50781	0.49	26.55	21.75	27.04	22.24	60.00	50.00	-32.96	-27.76

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

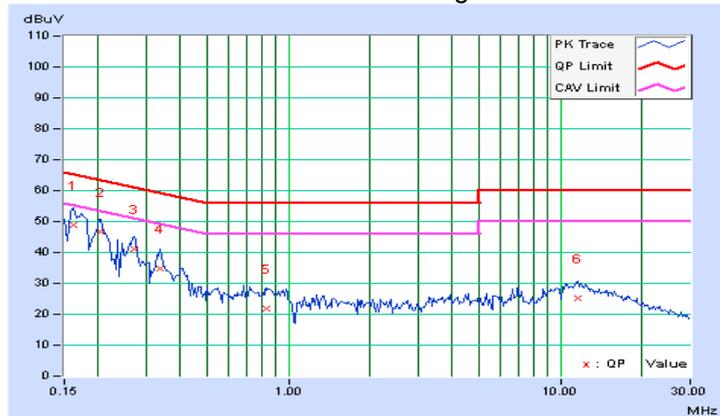


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.16172	0.08	48.75	35.81	48.83	35.89	65.38	55.38	-16.55	-19.49
2	0.20469	0.08	46.62	39.86	46.70	39.94	63.42	53.42	-16.72	-13.48
3	0.27109	0.09	41.01	33.05	41.10	33.14	61.08	51.08	-19.99	-17.95
4	0.33750	0.09	34.76	28.52	34.85	28.61	59.26	49.26	-24.41	-20.65
5	0.82969	0.12	21.74	13.31	21.86	13.43	56.00	46.00	-34.14	-32.57
6	11.53906	0.50	24.79	19.94	25.29	20.44	60.00	50.00	-34.71	-29.56

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.



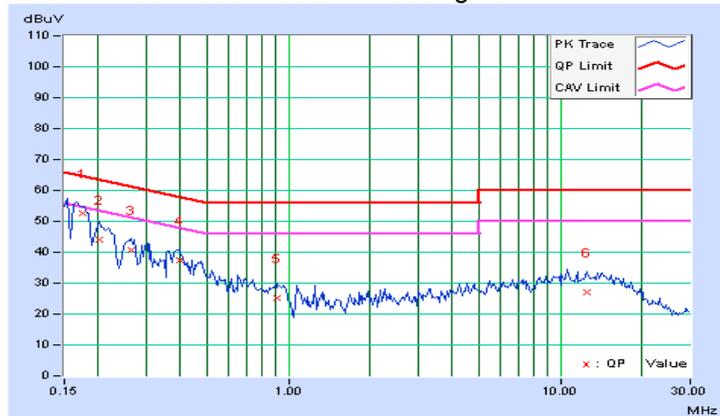
4.2.10 Test Results (MODE 4)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17566	0.09	52.44	44.39	52.53	44.48	64.69	54.69	-12.16	-10.21
2	0.20078	0.09	43.97	35.52	44.06	35.61	63.58	53.58	-19.52	-17.97
3	0.26328	0.09	40.81	33.19	40.90	33.28	61.33	51.33	-20.42	-18.04
4	0.39609	0.10	37.25	30.58	37.35	30.68	57.93	47.93	-20.59	-17.26
5	0.90391	0.13	25.20	19.03	25.33	19.16	56.00	46.00	-30.67	-26.84
6	12.50000	0.51	26.62	22.06	27.13	22.57	60.00	50.00	-32.87	-27.43

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

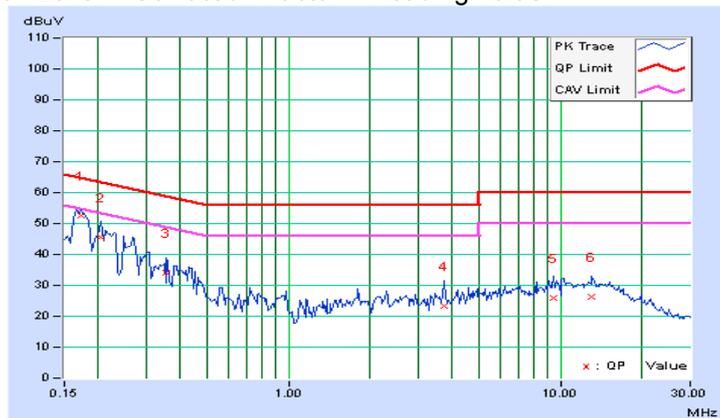


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.17344	0.08	52.36	44.12	52.44	44.20	64.79	54.79	-12.35	-10.59
2	0.20469	0.08	45.45	37.52	45.53	37.60	63.42	53.42	-17.89	-15.82
3	0.35703	0.10	34.15	23.66	34.25	23.76	58.80	48.80	-24.55	-25.04
4	3.72656	0.22	23.10	17.61	23.32	17.83	56.00	46.00	-32.68	-28.17
5	9.45703	0.44	25.52	20.78	25.96	21.22	60.00	50.00	-34.04	-28.78
6	13.05469	0.55	25.70	21.27	26.25	21.82	60.00	50.00	-33.75	-28.18

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

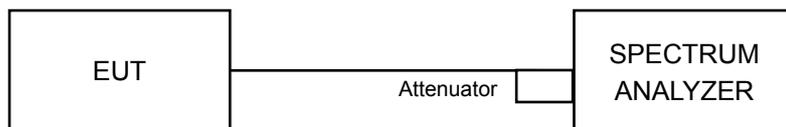


4.3 Conducted Out of Band Emission Measurement

4.3.1 Limits of Conducted Out of Band Emission Measurement

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

4.3.2 Test Setup



4.3.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

- NOTE:**
1. The test was performed in Oven room B.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Apr. 17, 2015

4.3.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW \geq 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW \geq 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.3.5 Deviation from Test Standard

No deviation.

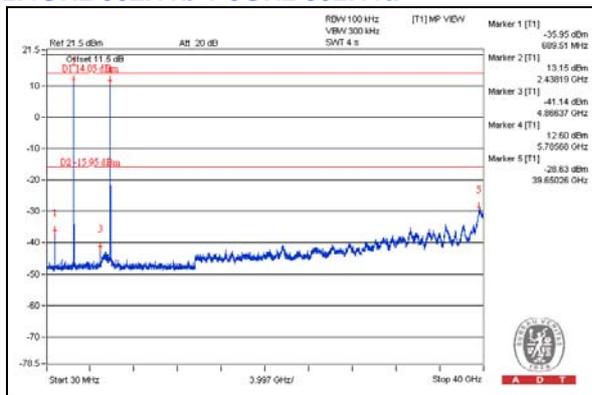
4.3.6 EUT Operating Condition

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

4.3.7 Test Results

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

2.4GHz 802.11b + 5GHz 802.11a



5 Pictures of Test Arrangements

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



Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-5935343

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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