

FCC TEST REPORT (WLAN/DTS-15.247)

REPORT NO.: RF130207E09 R1

MODEL NO.: QCSNFA282

FCC ID: PPD-QCSNFA282

IC: 4104A-QCSNFA282

RECEIVED: Feb. 07, 2013

TESTED: Mar. 05 to Aug. 08, 2013

ISSUED: Aug. 28, 2013

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Table of Contents

RELEASE CONTROL RECORD.....	7
1. CERTIFICATION.....	8
2. SUMMARY OF TEST RESULTS	9
2.1 MEASUREMENT UNCERTAINTY	12
3. GENERAL INFORMATION	13
3.1 GENERAL DESCRIPTION OF EUT(WLAN / DTS)	13
3.2 DESCRIPTION OF ANTENNA	16
3.3 DESCRIPTION OF TEST MODES	17
3.3.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	19
3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS.....	22
3.5 DESCRIPTION OF SUPPORT UNITS	23
3.6 CONFIGURATION OF SYSTEM UNDER TEST.....	23
4. TEST TYPES AND RESULTS (FOR 2.4GHz, 2400 ~ 2483.5MHz BAND)	24
4.1 CONDUCTED OUTPUT POWER MEASUREMENT	24
4.1.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT	24
4.1.2 INSTRUMENTS.....	24
4.1.3 TEST PROCEDURES	24
4.1.4 DEVIATION FROM TEST STANDARD.....	24
4.1.5 TEST SETUP	25
4.1.6 EUT OPERATING CONDITIONS	25
4.1.7 TEST RESULTS	26
4.2 AVERAGE OUTPUT POWER.....	28
4.2.1 FOR REFERENCE.....	28
4.2.2 TEST INSTRUMENTS.....	28
4.2.3 TEST PROCEDURES	28
4.2.4 TEST SETUP	28
4.2.5 EUT OPERATING CONDITIONS	28
4.2.6 TEST RESULTS	29
4.3 POWER SPECTRAL DENSITY MEASUREMENT	31
4.3.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT.....	31
4.3.2 TEST INSTRUMENTS.....	31
4.3.3 TEST PROCEDURE.....	31
4.3.4 DEVIATION FROM TEST STANDARD.....	31
4.3.5 TEST SETUP	31
4.3.6 EUT OPERATING CONDITION.....	31
4.3.7 TEST RESULTS	32
4.4 6dB BANDWIDTH MEASUREMENT	41



A D T

4.4.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT	41
4.4.2 TEST INSTRUMENTS.....	41
4.4.3 TEST PROCEDURE.....	41
4.4.4 DEVIATION FROM TEST STANDARD.....	41
4.4.5 TEST SETUP	41
4.4.6 EUT OPERATING CONDITIONS	41
4.4.7 TEST RESULTS	42
4.5 OCCUPIED BANDWIDTH MEASUREMENT	51
4.5.1 TEST INSTRUMENTS.....	51
4.5.2 TEST PROCEDURE.....	51
4.5.3 TEST SETUP	51
4.5.4 EUT OPERATING CONDITIONS	51
4.5.5 TEST RESULTS	52
4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT	61
4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT	61
4.6.2 TEST INSTRUMENTS.....	61
4.6.3 TEST PROCEDURE.....	61
4.6.4 DEVIATION FROM TEST STANDARD.....	62
4.6.5 EUT OPERATING CONDITION.....	62
4.6.6 TEST RESULTS	62
4.7 UNWANTED EMISSION MEASUREMENT(RADIATED VERSUS CONDUCTED)	72
4.7.1 LIMITS OF UNWANTED EMISSION MEASUREMENT	72
4.7.2 TEST INSTRUMENTS.....	73
4.7.3 TEST PROCEDURES	76
4.7.4 DEVIATION FROM TEST STANDARD.....	78
4.7.5 TEST SETUP	79
4.7.6 EUT OPERATING CONDITIONS	80
4.7.7 TEST RESULTS (WLAN MODE, RADIATED MEASUREMENT)	81
4.7.8 TEST RESULTS (BT <LE> MODE, RADIATED MEASUREMENT).....	95
4.7.9 TEST RESULTS (WLAN MODE, CONDUCTED MEASUREMENT)	100
4.8 AC POWER LINE CONDUCTED EMISSION MEASUREMENT	113
4.8.1 LIMITS OF AC POWER LINE CONDUCTED EMISSION MEASUREMENT.....	113
4.8.2 TEST INSTRUMENTS.....	113
4.8.3 TEST PROCEDURES	114
4.8.4 DEVIATION FROM TEST STANDARD.....	114
4.8.5 TEST SETUP	115
4.8.6 EUT OPERATING CONDITIONS	115
4.8.7 TEST RESULTS (WLAN MODE).....	116



A D T

4.8.8 TEST RESULTS (BT<LE> MODE)	118
5. TEST TYPES AND RESULTS (FOR 5GHz, 5725~5850MHz BAND)	120
5.1 CONDUCTED OUTPUT POWER MEASUREMENT	120
5.1.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT	120
5.1.2 INSTRUMENTS	120
5.1.3 TEST PROCEDURES	120
5.1.4 DEVIATION FROM TEST STANDARD	120
5.1.5 TEST SETUP	121
5.1.6 EUT OPERATING CONDITIONS	121
5.1.7 TEST RESULTS	122
5.2 AVERAGE OUTPUT POWER	123
5.2.1 FOR REFERENCE	123
5.2.2 TEST INSTRUMENTS	123
5.2.3 TEST PROCEDURES	123
5.2.4 TEST SETUP	123
5.2.5 EUT OPERATING CONDITIONS	123
5.2.6 TEST RESULTS	124
5.3 POWER SPECTRAL DENSITY MEASUREMENT	125
5.3.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	125
5.3.2 TEST INSTRUMENTS	125
5.3.3 TEST PROCEDURE	125
5.3.4 DEVIATION FROM TEST STANDARD	125
5.3.5 TEST SETUP	125
5.3.6 EUT OPERATING CONDITION	125
5.3.7 TEST RESULTS	126
5.4 6dB BANDWIDTH MEASUREMENT	131
5.4.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT	131
5.4.2 TEST INSTRUMENTS	131
5.4.3 TEST PROCEDURE	131
5.4.4 DEVIATION FROM TEST STANDARD	131
5.4.5 TEST SETUP	131
5.4.6 EUT OPERATING CONDITIONS	131
5.4.7 TEST RESULTS	132
5.5 OCCUPIED BANDWIDTH MEASUREMENT	137
5.5.1 TEST INSTRUMENTS	137
5.5.2 TEST PROCEDURE	137
5.5.3 TEST SETUP	137
5.5.4 EUT OPERATING CONDITIONS	137



A D T

5.5.5 TEST RESULTS	138
5.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT	143
5.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT	143
5.6.2 TEST INSTRUMENTS.....	143
5.6.3 TEST PROCEDURE.....	143
5.6.4 DEVIATION FROM TEST STANDARD.....	144
5.6.5 EUT OPERATING CONDITION.....	144
5.6.6 TEST RESULTS	144
5.7 UNWANTED EMISSION MEASUREMENT (RADIATED VERSUS CONDUCTED)	151
5.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT	151
5.7.2 TEST INSTRUMENTS.....	152
5.7.3 TEST PROCEDURES	154
5.7.4 DEVIATION FROM TEST STANDARD.....	156
5.7.5 TEST SETUP	157
5.7.6 EUT OPERATING CONDITIONS	158
5.7.7 TEST RESULTS (RADIATED MEASUREMENT)	159
5.7.8 TEST RESULTS (CONDUCTED MEASUREMENT)	169
5.8 AC POWER LINE AC POWER LINE CONDUCTED EMISSION MEASUREMENT	175
5.8.1 LIMITS OF AC POWER LINE CONDUCTED EMISSION MEASUREMENT.....	175
5.8.2 TEST INSTRUMENTS.....	175
5.8.3 TEST PROCEDURES	176
5.8.4 DEVIATION FROM TEST STANDARD.....	176
5.8.5 TEST SETUP	177
5.8.6 EUT OPERATING CONDITIONS	177
5.8.7 TEST RESULTS	178
6. PHOTOGRAPHS OF THE TEST CONFIGURATION	180
7. INFORMATION ON THE TESTING LABORATORIES.....	181
8. APPENDIX A - RADIATED EMISSION MEASUREMENT(FOR 2.4GHz, 2400 ~ 2483.5MHz BAND)	182
8.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT	182
8.1.2 TEST INSTRUMENTS.....	183
8.1.3 TEST PROCEDURES	184
8.1.4 DEVIATION FROM TEST STANDARD.....	184
8.1.5 TEST SETUP	185
8.1.6 EUT OPERATING CONDITIONS	185
8.1.7 TEST RESULTS	186



A D T

9. APPENDIX B - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	196
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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130207E09	Original release	Aug. 14, 2013
RF130207E09 R1	Revise the "Product Name".	Aug. 28, 2013



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1. CERTIFICATION

PRODUCT: Low Power 2x2 802.11 a/b/g/n + BT Card
BRAND NAME: Qualcomm Atheros
MODEL NO.: QCSNFA282
TEST SAMPLE: R&D SAMPLE
APPLICANT: Qualcomm Atheros, Inc.
TESTED: Mar. 05 to Aug. 08, 2013
STANDARDS: FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10-2009
Canada RSS-210 Issue 8 (2010-12)
Canada RSS-Gen Issue 3 (2010-12)

The above equipment (Model: QCSNFA282) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and was in 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 : Midoli Peng, **DATE:** Aug. 28, 2013
(Midoli Peng, Specialist)

APPROVED BY : May Chen, **DATE:** Aug. 28, 2013
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 2.4GHz(WLAN), 2412~2462MHz Band

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) ; RSS-210; RSS-Gen				
STANDARD SECTION		TEST TYPE	RESULT	REMARK
FCC Part 15	RSS-Gen			
15.207	RSS-Gen 7.2.4	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -22.27dB at 2.56250MHz
15.247(d) 15.209	RSS-210 A8.5	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.4dB at 99.60MHz
15.247(d)	RSS-210 A8.5	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	RSS-210 A8.2 (a)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	RSS-210 A8.2 (4)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	RSS-210 A8.2 (b)	Power Spectral Density	PASS	Meet the requirement of limit.
-	RSS-Gen 4.6	Occupied Bandwidth Measurement	-	Meet the requirement
15.203	-	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

For 2.4GHz(BT-LE(GFSK)), 2402~2480MHz Band

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) ; RSS-210; RSS-Gen				
STANDARD SECTION		TEST TYPE	RESULT	REMARK
FCC Part 15	RSS-Gen			
15.207	RSS-Gen 7.2.4	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -22.43dB at 2.250MHz
15.247(d) 15.209	RSS-210 A8.5	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.5dB at 2361.06MHz
15.247(d)	RSS-210 A8.5	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	RSS-210 A8.2 (a)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	RSS-210 A8.2 (4)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	RSS-210 A8.2 (b)	Power Spectral Density	PASS	Meet the requirement of limit.
-	RSS-Gen 4.6	Occupied Bandwidth Measurement	-	Meet the requirement
15.203	-	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

For 5GHz, 5725~5850MHz Band

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) ; RSS-210; RSS-Gen				
STANDARD SECTION		TEST TYPE	RESULT	REMARK
FCC Part 15	RSS-210; RSS-Gen			
15.207	RSS-Gen 7.2.4	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -24.09dB at 2.18359MHz
15.247(d) 15.209	RSS-210 A8.5	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.6dB at 99.46MHz
15.247(d)	RSS-210 A8.5	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	RSS-210 A8.2 (a)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	RSS-210 A8.2 (4)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	RSS-210 A8.2 (b)	Power Spectral Density	PASS	Meet the requirement of limit.
-	RSS-Gen 4.6	Occupied Bandwidth Measurement	-	Meet the requirement.
15.203	-	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

NOTE: The EUT was operating in 2400 ~ 2483.5MHz, 5.15~5.35GHz, 5.47~5.6GHz & 5.65~5.725GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 2400 ~ 2483.5MHz and 5.725~5.850GHz. For the 5.15~5.35GHz, 5.47~5.6GHz & 5.65~5.725GHz RF parameters 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	2.98 dB
Radiated emissions (30MHz-1GHz)	5.63 dB
Radiated emissions (1GHz -6GHz) – chamber G	3.73 dB
Radiated emissions (6GHz -18GHz) – chamber G	3.90 dB
Radiated emissions (18GHz -40GHz) – chamber G	4.11 dB
Radiated emissions (1GHz -6GHz) – chamber H	3.54 dB
Radiated emissions (6GHz -18GHz) – chamber H	4.08 dB
Radiated emissions (18GHz -40GHz) – chamber H	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT(WLAN / DTS)

PRODUCT	Low Power 2x2 802.11 a/b/g/n + BT Card
MODEL NO.	QCSNFA282
POWER SUPPLY	DC 3.3V from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM BT-LE (GFSK) for DTS
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n : up to 300Mbps BT-LE(GFSK): 1Mbps
OPERATING FREQUENCY	For 15.407 802.11a: 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.5~5.72GHz
	For 15.247 2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.745 ~ 5.825GHz BT-LE(GFSK): 2.402 ~ 2.480GHz
NUMBER OF CHANNEL	For 15.407 19 for 802.11a, 802.11n (HT20) 9 for 802.11n (HT40)
	For 15.247(2.4GHz) 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) 40 for BT-LE(GFSK) For 15.247(5GHz) 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40)

MAXIMUM OUTPUT POWER	For 15.407 802.11a: 63.077mW 802.11n (HT20): 67.027mW 802.11n (HT40): 42.841mW For 15.247(2.4GHz) 802.11b: 199.980mW 802.11g: 230.757mW 802.11n (HT20): 228.065mW 802.11n (HT40): 119.692mW BT-LE(GFSK): 7.228mW For 15.247(5GHz) 802.11a: 124.432mW 802.11n (HT20): 118.866mW 802.11n (HT40): 115.085mW
ANTENNA TYPE	See item 3.2
ANTENNA CONNECTOR	See item 3.2
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

- There are Bluetooth technology and WLAN technology used for the EUT.
- The EUT has two variant designs with different filter. Detail as described in table below.

Version	Description
Version 631	Use TDK D2033 (R081) filter
Version 731	Use TDK D6107 (R083) w/3G filter

From the above Versions, the worst case was found in **Version 731**. Therefore only the test data of the version was recorded in this report.

- The device has below configurations

Working mode	chain 0	chain 1	Note
1X1+BT	11a/b/g/n (MCS0~7)	BT	WLAN/BT concurrent
2X2+BT	11a/n (MCS0~15)	11a/n (MCS0~15)+ BT	WLAN/BT concurrent only when WLAN is 802.11an.
2x2 WLAN only	11a/b/g/n (MCS0~15)	11a/b/g/n (MCS0~15)	-

4. The EUT is 2 * 2 MIMO with beam forming function.

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX/1RX(Diversity) or 2TX/2RX
802.11g	1TX/1RX(Diversity) or 2TX/2RX
802.11a	1TX/1RX(Diversity) or 2TX/2RX
802.11n (HT20)	1TX/1RX(Diversity) or 2TX/2RX
802.11n (HT40)	1TX/1RX(Diversity) or 2TX/2RX

5. The EUT was pre-tested under the following modes:

Test Mode	Data rate
Mode A	400ns GI
Mode B	800ns GI

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

6. Spurious Emission (radiated emission) of the simultaneous operation (WiFi & Bluetooth) have been evaluated and no non-compliance found. The detail combinations of transmitters / frequencies / modes as below table

Mode	Available Channel	Tested Channel	Modulation Technology
2.4 GHz (802.11g) + Bluetooth	1 to 11	6	OFDM
	0 to 78	39	FHSS
5 GHz (802.11a) + Bluetooth	149 to 165	149	OFDM
	0 to 78	39	FHSS

7. 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 ANTENNA

The antenna provided to the EUT, please refer to the following table:

Brand	Model	Antenna Type	2.4G Gain with cable loss (dBi)	5G Gain with cable loss (dBi)	2.4G Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)
WNC	81.EBJ15.005	PIFA	3.62	Band 1&2: 3.08 Band 3: 4.76 Band 4: 4.76	1.15	Band1&2: 1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300

- Note: 1. Above antenna gains of antenna are Total (H+V).
 2. All of antenna can be application for WLAN and Bluetooth.

3.3 DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz band:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT 40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

40 channels are provided for Bluetooth LE mode:

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480



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Operated in 5725 ~ 5850MHz band:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz

3.3.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	PLC	UE < 1G	UE ≥ 1G	APCM	OB	
-	√	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission **UE < 1G**: Unwanted Emission below 1GHz
UE ≥ 1G: Unwanted Emission above 1GHz **APCM**: Antenna Port Conducted Measurement
OB: Conducted Out-Band Emission Measurement

NOTE: The EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

AC 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
For 2.4 GHz 802.11g	1 to 11	6	OFDM	6
BT-LE	0 to 39	19	DTS	1
For 5 GHz 802.11a	149 to 165	149	OFDM	6

UNWANTED 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
For 2.4 GHz 802.11g	1 to 11	6	OFDM	6
BT-LE	0 to 39	19	DTS	1
For 5 GHz 802.11a	149 to 165	149	OFDM	6

UNWANTED EMISSION TEST (ABOVE 1 GHz):

- ☒ Radiated versus Conducted Measurements
- ☒ 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1
802.11g	1 to 11	1, 6, 11	OFDM	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	13.5
BT-LE	0 to 39	0, 19, 39	DTS	1
802.11a	149 to 165	149, 157, 165	OFDM	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1
802.11g	1 to 11	1, 6, 11	OFDM	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	13.5
BT-LE	0 to 39	0, 19, 39	DTS	1
802.11a	149 to 165	149, 157, 165	OFDM	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	13.5

CONDUCTED OUT-BAND EMISSION 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1
802.11g	1 to 11	1, 6, 11	OFDM	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	13.5
BT-LE	0 to 39	0, 39	DTS	1
802.11a	149 to 165	149, 157, 165	OFDM	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	26deg. C, 66%RH	120Vac, 60Hz	Jyunchun Lin
RE<1G	25deg. C, 66%RH	120Vac, 60Hz	Chilin Lee
RE ³ 1G	22deg. C, 63%RH	120Vac, 60Hz	Robert Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	James Chan
OB	25deg. C, 60%RH	120Vac, 60Hz	James Chan



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3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (Section 15.247)

558074 D01 DTS Meas Guidance v03r01

662911 D01 Multiple Transmitter Output v01 r02

ANSI C63.10-2009

Canada RSS-210 Issue 8 (2010-12)

Canada RSS-Gen Issue 3 (2010-12)

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



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3.5 DESCRIPTION OF SUPPORT UNITS

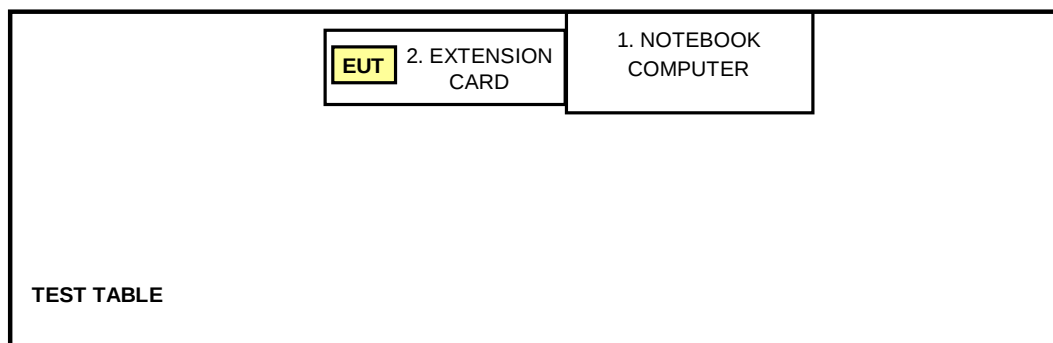
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	E6420	H62T3R1	FCC DoC
2	EXTENSION CARD	Qualcomm Atheros	TB686	250-02384-020	NA

No.	Signal cable description
1	NA
2	NA

Note: The power cords of the above support units were unshielded (1.8m).

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS (FOR 2.4GHz, 2400 ~ 2483.5MHz Band)

4.1 CONDUCTED OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

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

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

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

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 $NANT \geq 5$.

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

4.1.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 20, 2013	May 19, 2014
Power Sensor	MA2411B	0738172	May 20, 2013	May 19, 2014

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, 2013

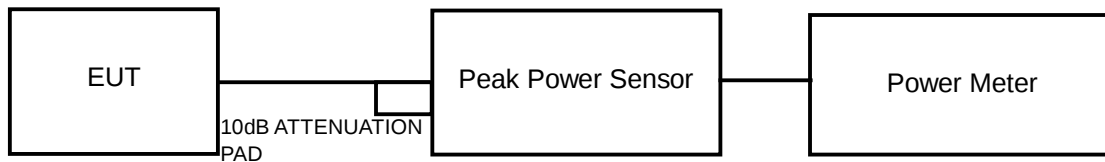
4.1.3 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the peak power level.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



4.1.6 EUT OPERATING CONDITIONS

The software (artgui.exe Version:2.3<WLAN> / BtUART.exe Version:2.1.2<BT-LE>) provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.1.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2412	20.09	17.97	164.755	22.17	29.37	PASS
6	2437	21.15	18.43	199.980	23.01	29.37	PASS
11	2462	21.04	18.05	190.883	22.81	29.37	PASS

NOTE: Directional gain = $3.62\text{dBi} + 10\log(2) = 6.63\text{dBi} > 6\text{dBi}$, therefore the limit needs to reduce, so the power limit shall be reduced to $30 - (6.63 - 6) = 29.37\text{dBm}$.

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2412	16.04	14.47	68.169	18.34	29.37	PASS
6	2437	21.03	20.17	230.757	23.63	29.37	PASS
11	2462	15.85	13.65	61.633	17.90	29.37	PASS

NOTE: Directional gain = $3.62\text{dBi} + 10\log(2) = 6.63\text{dBi} > 6\text{dBi}$, therefore the limit needs to reduce, so the power limit shall be reduced to $30 - (6.63 - 6) = 29.37\text{dBm}$.

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2412	16.92	14.11	74.967	18.75	29.37	PASS
6	2437	20.97	20.13	228.065	23.58	29.37	PASS
11	2462	15.42	13.42	56.813	17.54	29.37	PASS

NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(6.63-6) = 29.37dBm.

802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
3	2422	15.60	14.73	66.025	18.20	29.37	PASS
6	2437	18.06	17.46	119.692	20.78	29.37	PASS
9	2452	17.01	15.32	84.275	19.26	29.37	PASS

NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(6.63-6) = 29.37dBm.

BT_LE-GFSK

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
0	2402	6.053	7.82	30	PASS
19	2440	7.228	8.59	30	PASS
39	2480	6.383	8.05	30	PASS

4.2 AVERAGE OUTPUT POWER

4.2.1 FOR REFERENCE.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 20, 2013	May 19, 2014
Power Sensor	MA2411B	0738172	May 20, 2013	May 19, 2014

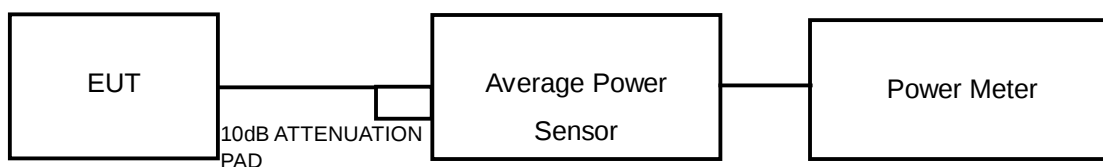
Note:

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, 2013

4.2.3 TEST PROCEDURES

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the average power level.

4.2.4 TEST SETUP



4.2.5 EUT OPERATING CONDITIONS

Same as Item 4.1.6

4.2.6 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		AVERAGE POWER OUTPUT (dBm)
		Chain(0)	Chain(1)	
1	2412	17.66	16.23	20.01
6	2437	17.59	16.74	20.20
11	2462	17.82	16.39	20.17

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		AVERAGE POWER OUTPUT (dBm)
		Chain(0)	Chain(1)	
1	2412	11.01	9.47	13.32
6	2437	17.01	16.24	19.65
11	2462	10.62	8.25	12.61

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		AVERAGE POWER OUTPUT (dBm)
		Chain(0)	Chain(1)	
1	2412	11.13	9.31	13.32
6	2437	16.93	16.17	19.58
11	2462	9.96	7.98	12.09

802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		AVERAGE POWER OUTPUT (dBm)
		Chain(0)	Chain(1)	
3	2422	8.72	7.46	11.15
6	2437	11.73	11.19	14.48
9	2452	8.92	7.31	11.20

BT_LE-GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)
0	2402	7.73
19	2440	8.52
39	2480	7.99

4.3 POWER SPECTRAL DENSITY MEASUREMENT

4.3.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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, 2013

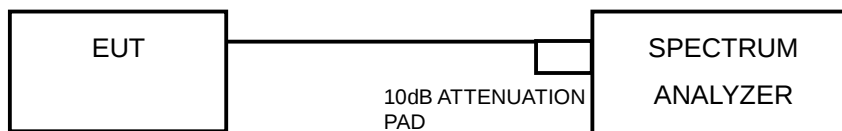
4.3.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITION

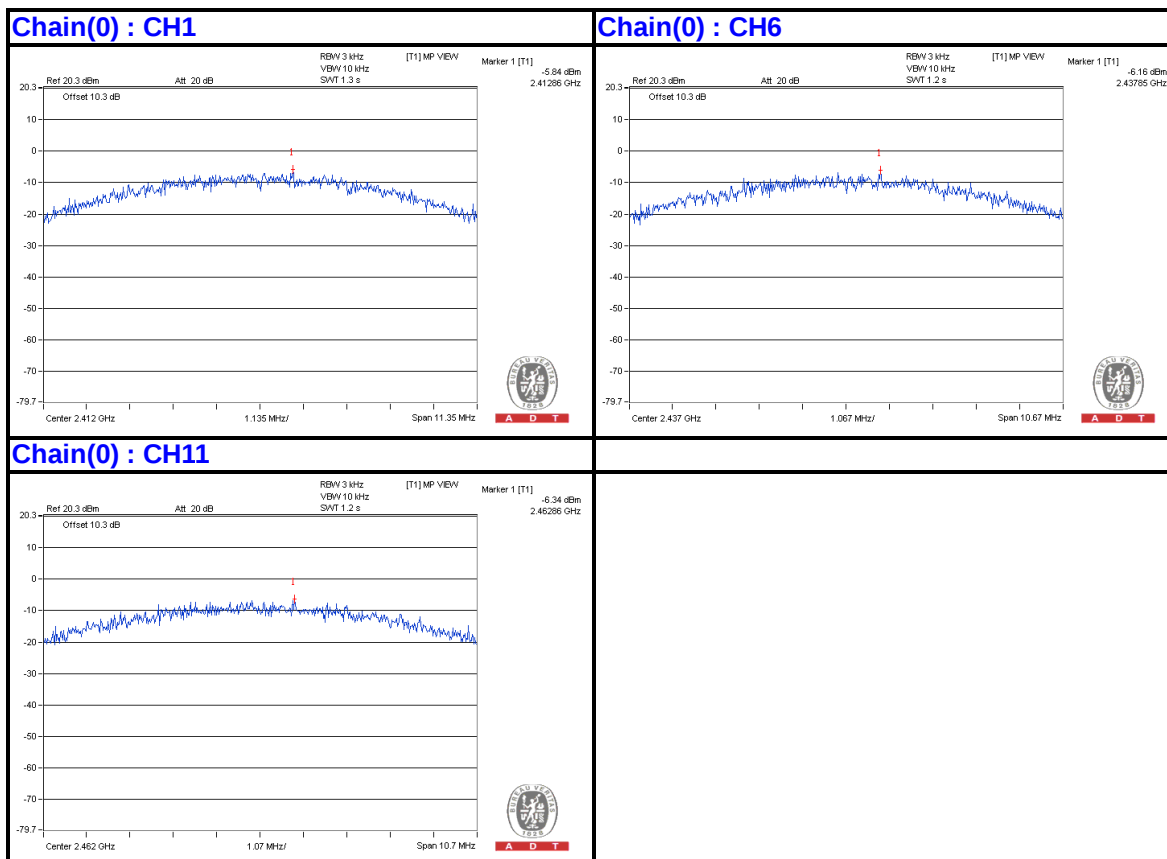
Same as Item 4.1.6

4.3.7 TEST RESULTS

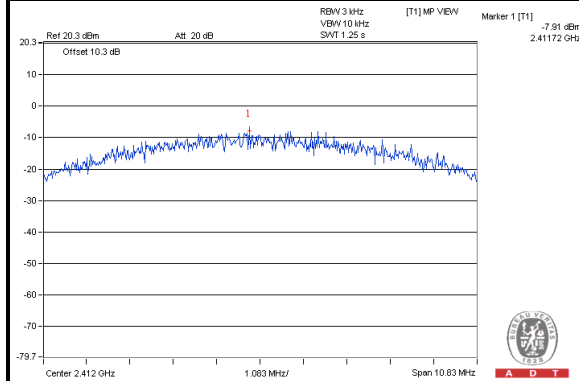
802.11b

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-5.84	3.01	-2.83	7.37	PASS
	6	2437	-6.16	3.01	-3.15	7.37	PASS
	11	2462	-6.34	3.01	-3.33	7.37	PASS
1	1	2412	-7.91	3.01	-4.90	7.37	PASS
	6	2437	-7.01	3.01	-4.00	7.37	PASS
	11	2462	-7.75	3.01	-4.74	7.37	PASS

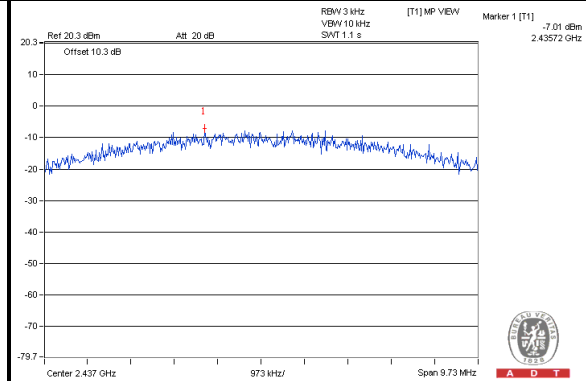
NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , so the power density limit shall be reduced to 8-(6.63-6) = 7.37dBm.



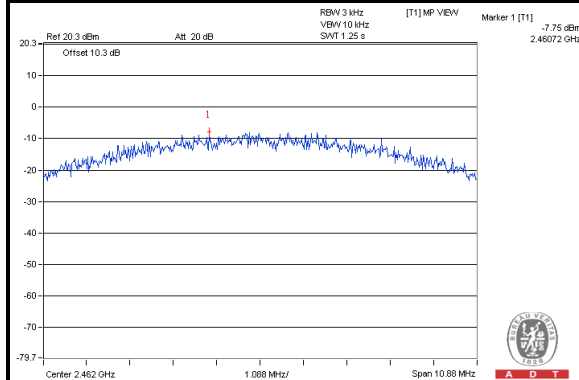
Chain(1) : CH1



Chain(1) : CH6



Chain(1) : CH11

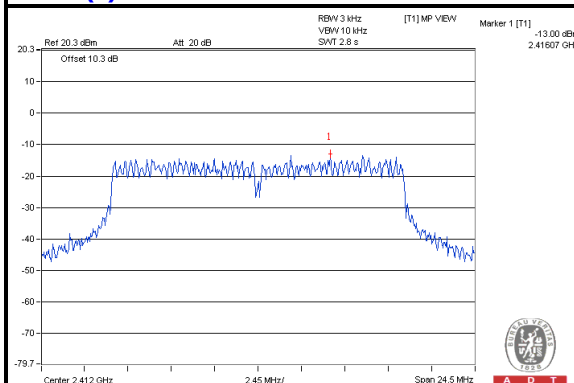


802.11g

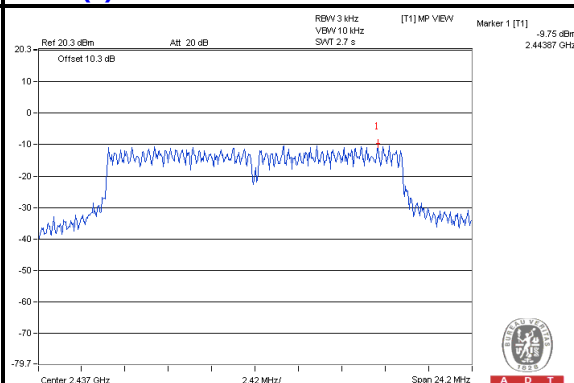
TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-13.00	3.01	-9.99	7.37	PASS
	6	2437	-9.75	3.01	-6.74	7.37	PASS
	11	2462	-9.89	3.01	-6.88	7.37	PASS
1	1	2412	-14.97	3.01	-11.96	7.37	PASS
	6	2437	-8.94	3.01	-5.93	7.37	PASS
	11	2462	-8.95	3.01	-5.94	7.37	PASS

NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , so the power density limit shall be reduced to 8-(6.63-6) = 7.37dBm.

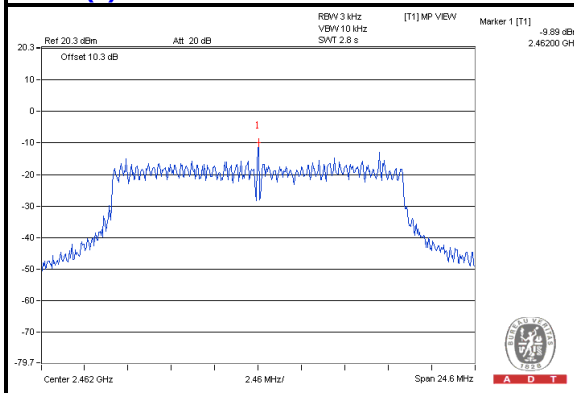
Chain(0) : CH1



Chain(0) : CH6



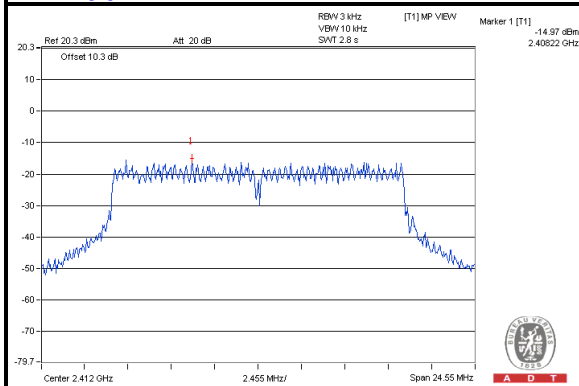
Chain(0) : CH11



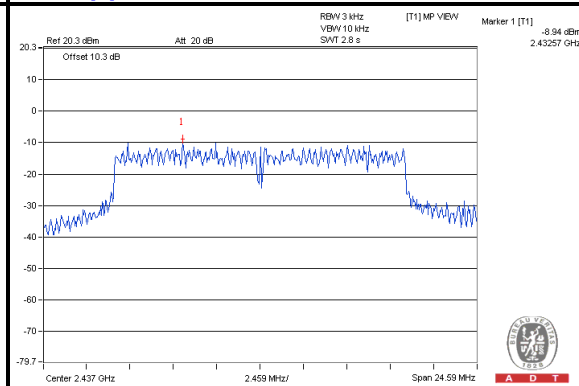


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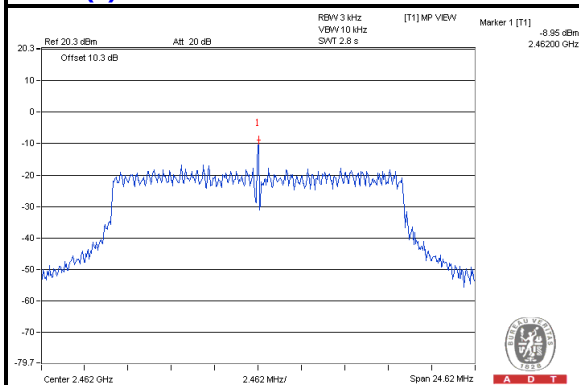
Chain(1) : CH1



Chain(1) : CH6



Chain(1) : CH11

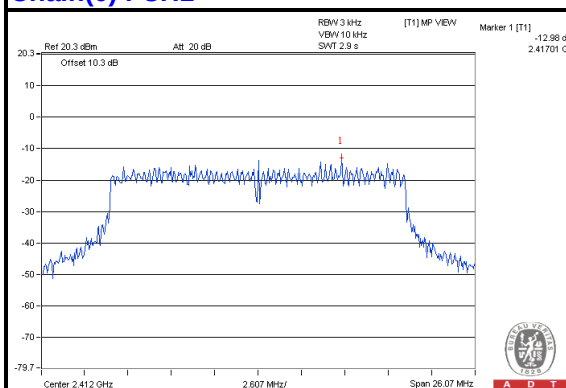


802.11n (HT20)

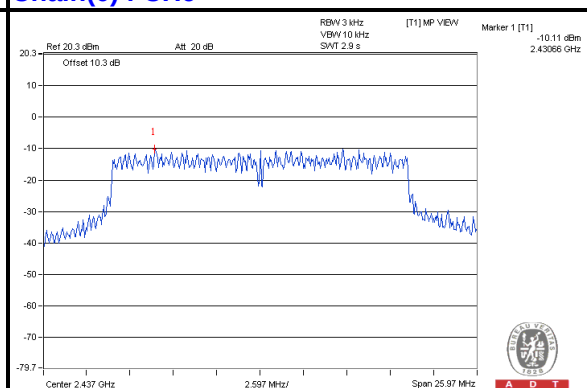
TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-12.98	3.01	-9.97	7.37	PASS
	6	2437	-10.11	3.01	-7.10	7.37	PASS
	11	2462	-9.78	3.01	-6.77	7.37	PASS
1	1	2412	-16.59	3.01	-13.58	7.37	PASS
	6	2437	-11.33	3.01	-8.32	7.37	PASS
	11	2462	-16.72	3.01	-13.71	7.37	PASS

NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , so the power density limit shall be reduced to 8-(6.63-6) = 7.37dBm.

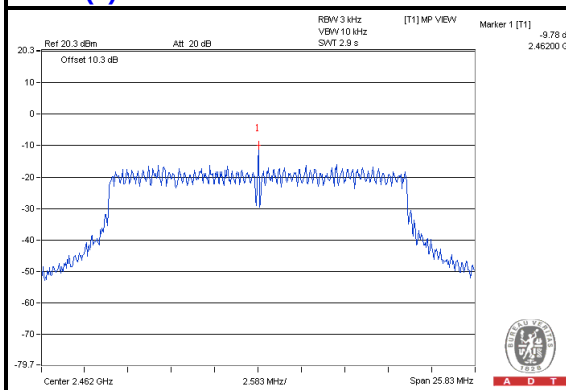
Chain(0) : CH1



Chain(0) : CH6



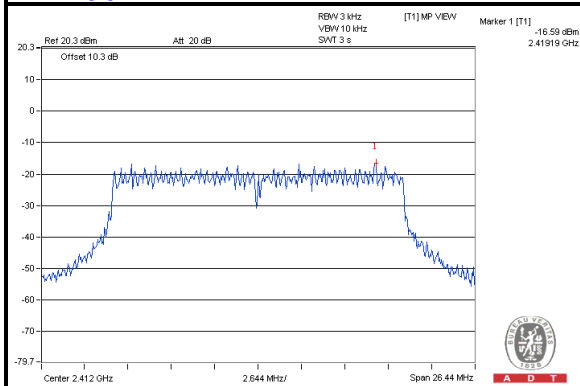
Chain(0) : CH11



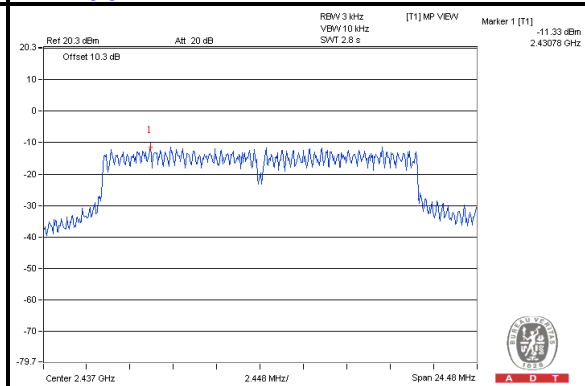


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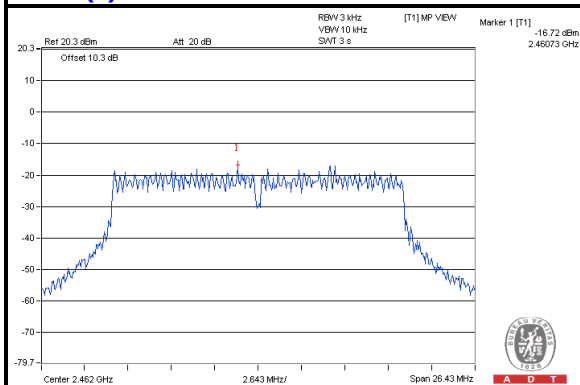
Chain(1) : CH1



Chain(1) : CH6



Chain(1) : CH11

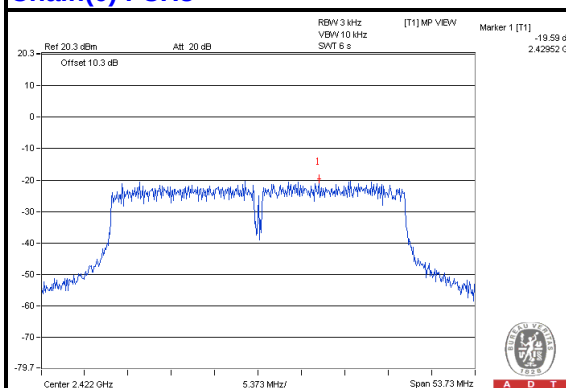


802.11n (HT40)

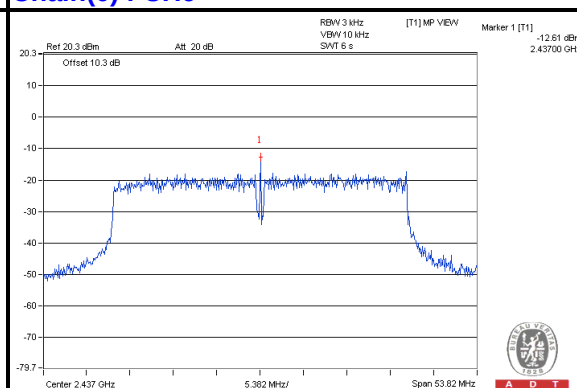
TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-19.59	3.01	-16.58	7.37	PASS
	6	2437	-12.61	3.01	-9.60	7.37	PASS
	9	2452	-20.21	3.01	-17.20	7.37	PASS
1	3	2422	-21.69	3.01	-18.68	7.37	PASS
	6	2437	-17.81	3.01	-14.80	7.37	PASS
	9	2452	-22.09	3.01	-19.08	7.37	PASS

NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , so the power density limit shall be reduced to 8-(6.63-6) = 7.37dBm.

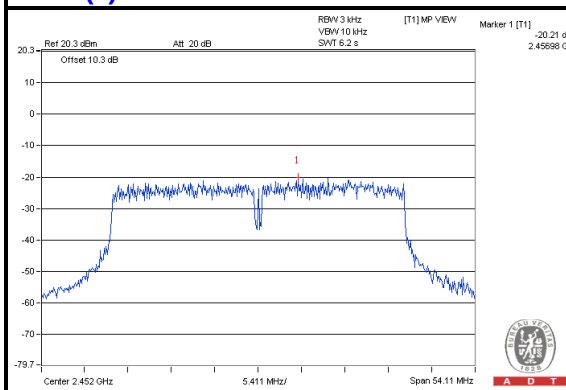
Chain(0) : CH3



Chain(0) : CH6



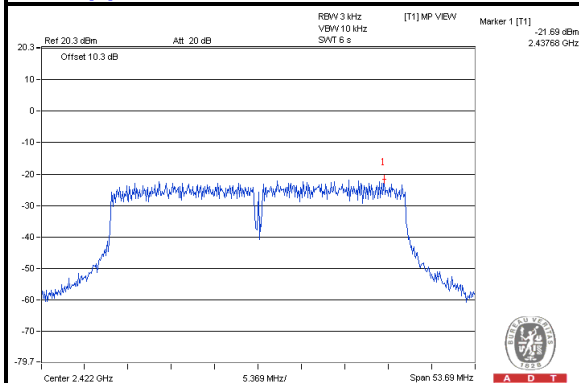
Chain(0) : CH9



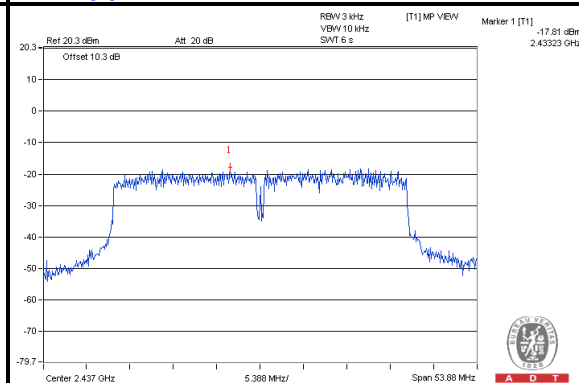


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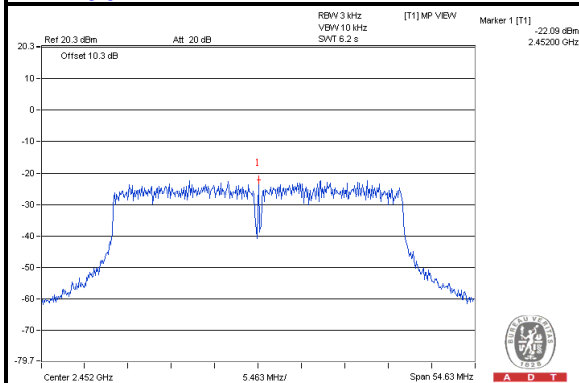
Chain(1) : CH3



Chain(1) : CH6



Chain(1) : CH9

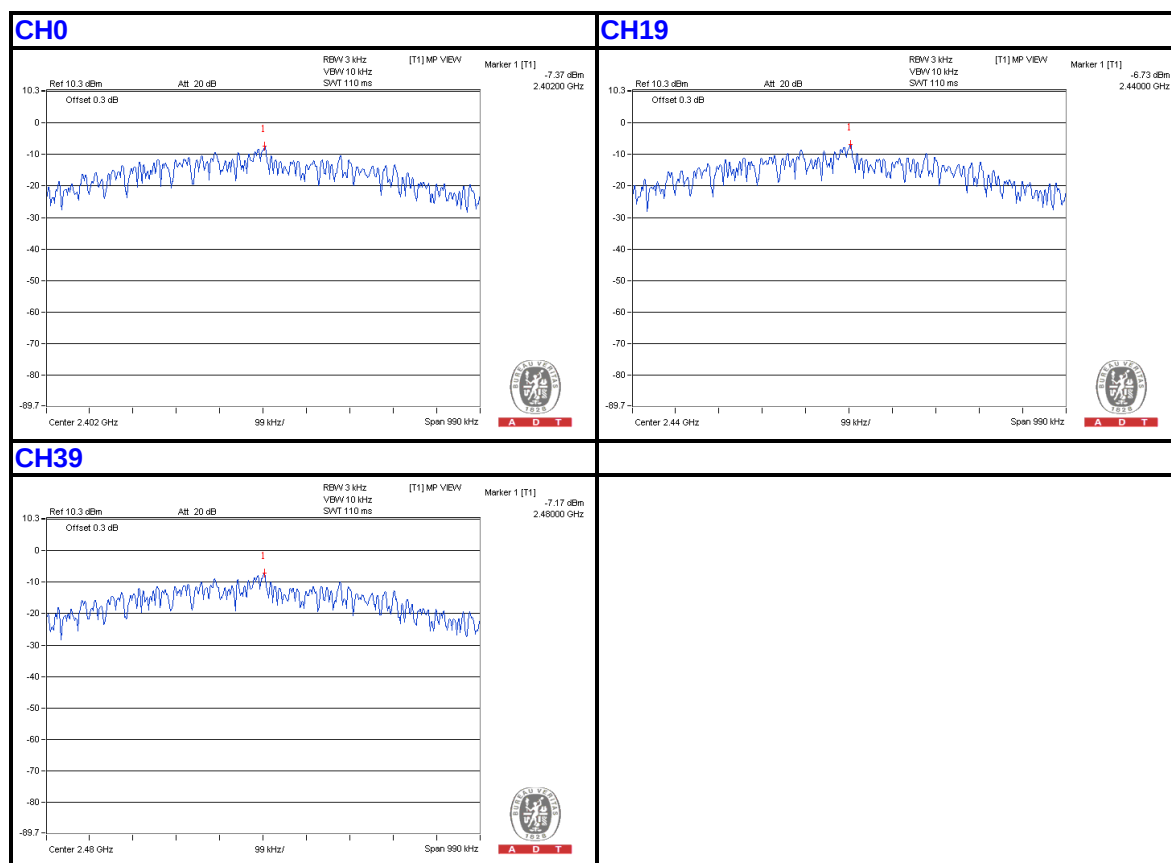




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BT_LE-GFSK

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2402	-7.37	8	PASS
19	2440	-6.73	8	PASS
39	2480	-7.17	8	PASS



4.4 6dB BANDWIDTH MEASUREMENT

4.4.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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, 2013

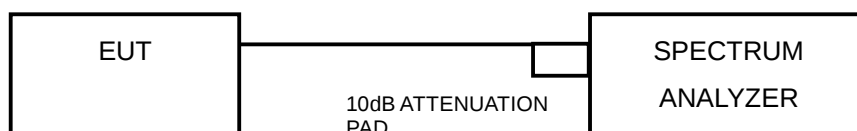
4.4.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

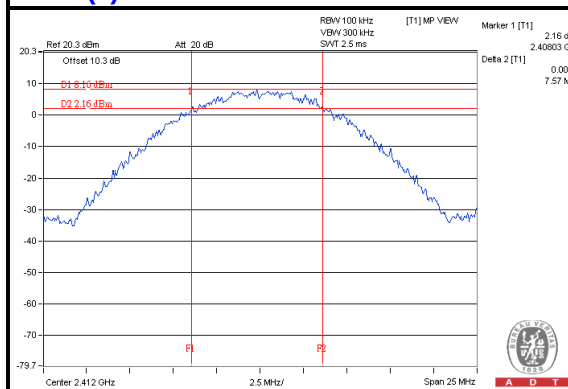
Same as Item 4.1.6

4.4.7 TEST RESULTS

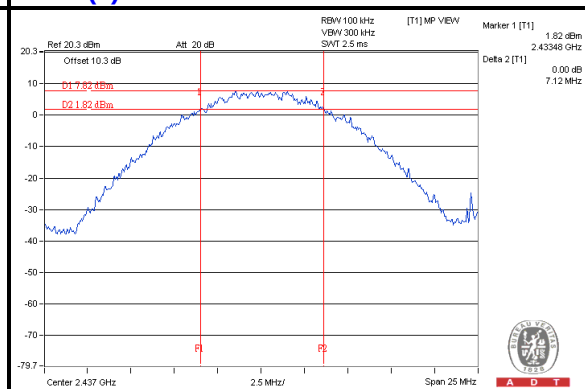
802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
1	2412	7.57	7.22	0.5	PASS
6	2437	7.12	6.49	0.5	PASS
11	2462	7.14	7.25	0.5	PASS

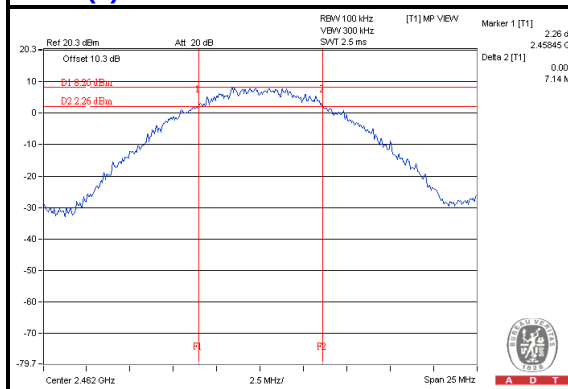
Chain(0) : CH1



Chain(0) : CH6



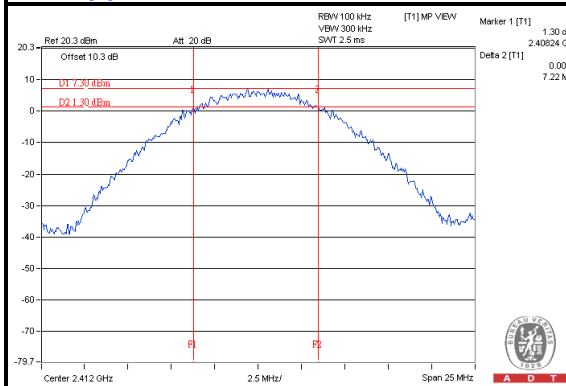
Chain(0) : CH11



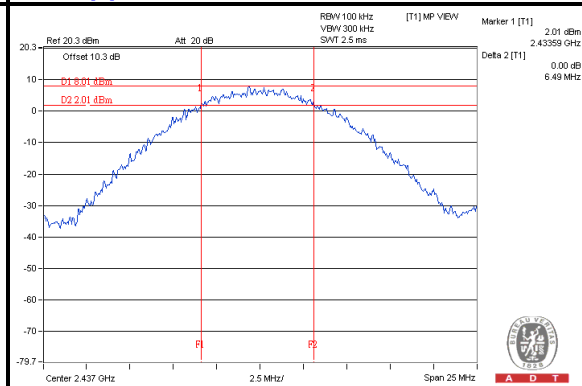


A D T

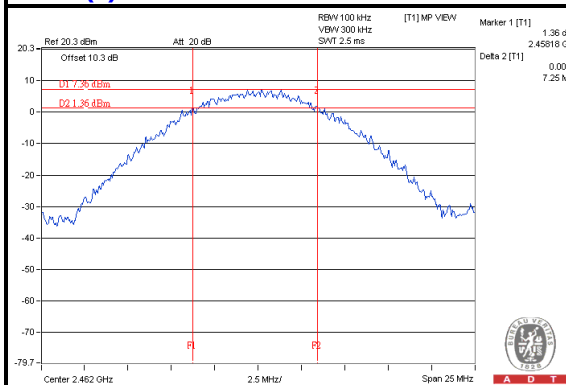
Chain(1) : CH1



Chain(1) : CH6



Chain(1) : CH11



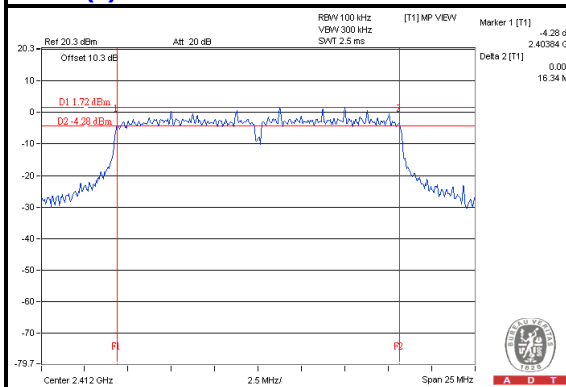


A D T

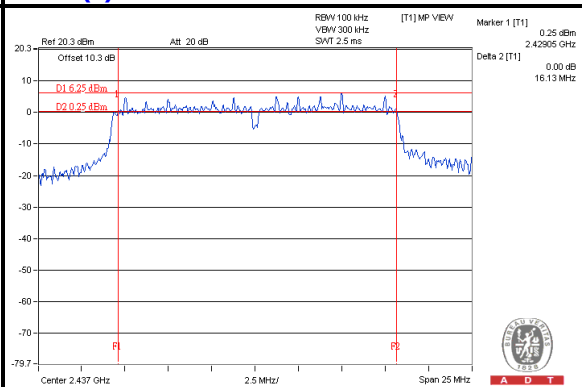
802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
1	2412	16.34	16.37	0.5	PASS
6	2437	16.13	16.40	0.5	PASS
11	2462	16.40	16.42	0.5	PASS

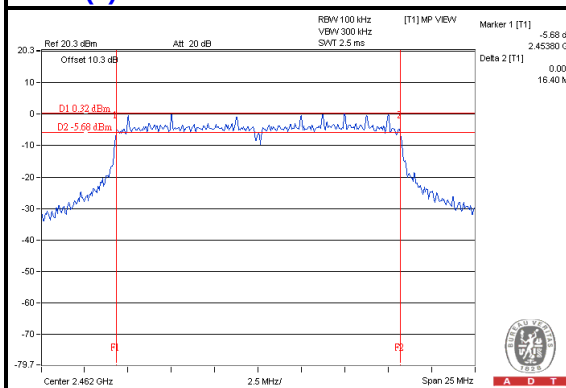
Chain(0) : CH1



Chain(0) : CH6



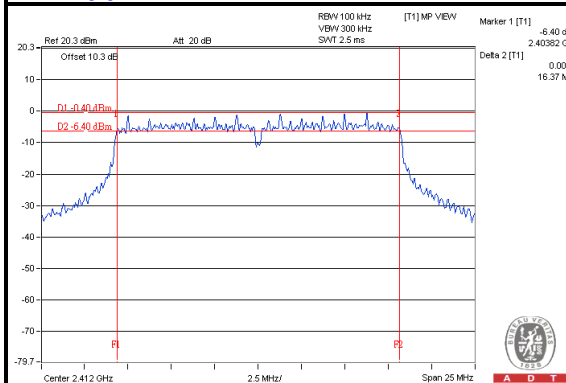
Chain(0) : CH11



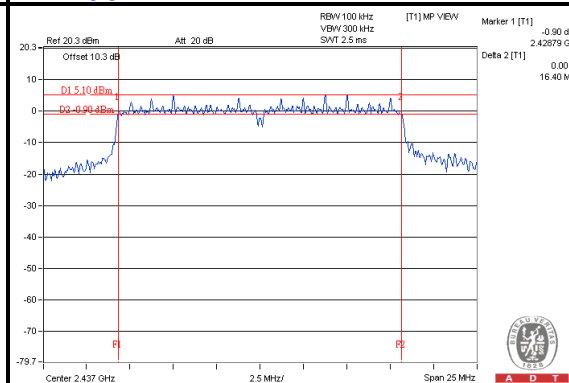


A D T

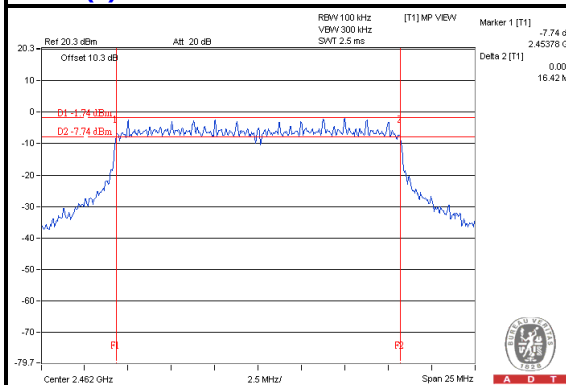
Chain(1) : CH1



Chain(1) : CH6



Chain(1) : CH11



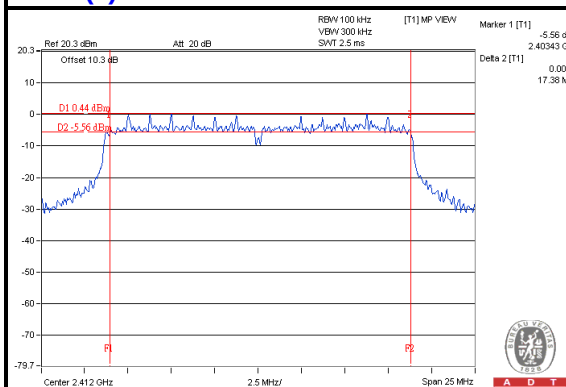


A D T

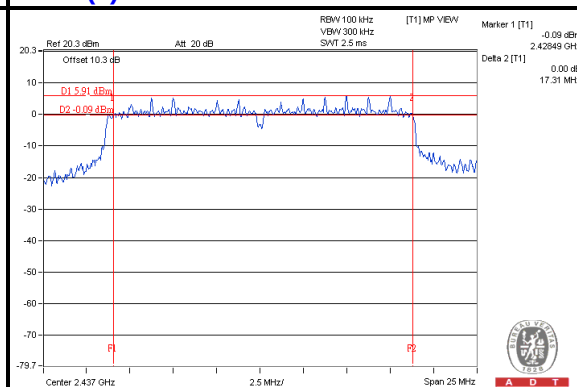
802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
1	2412	17.38	17.63	0.5	PASS
6	2437	17.31	16.32	0.5	PASS
11	2462	17.22	17.62	0.5	PASS

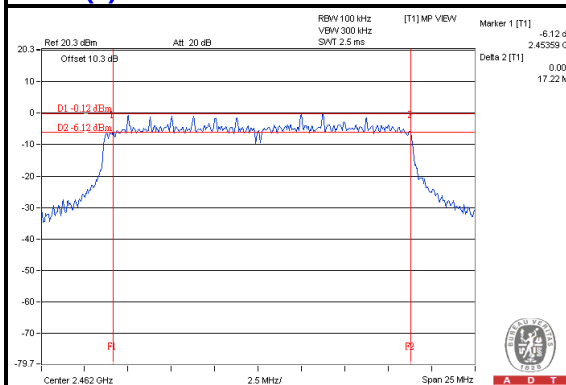
Chain(0) : CH1



Chain(0) : CH6



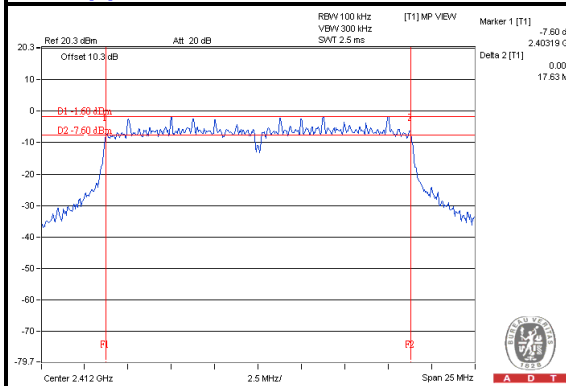
Chain(0) : CH11



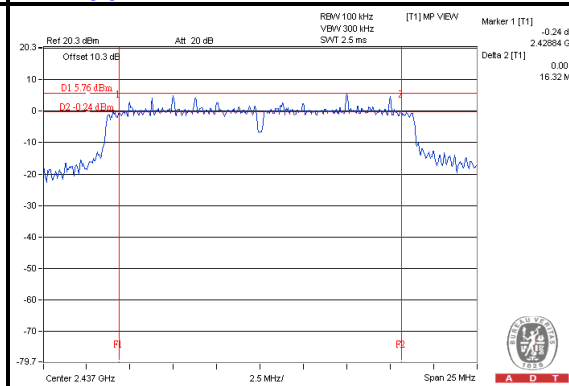


A D T

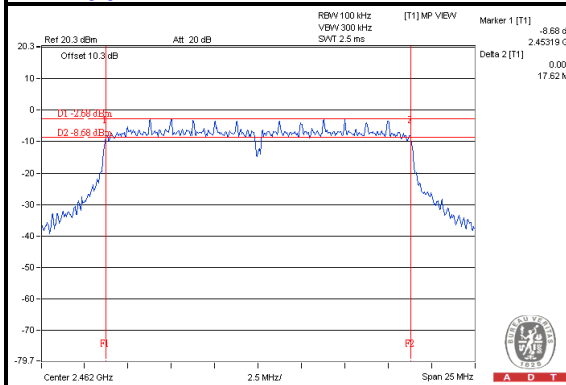
Chain(1) : CH1



Chain(1) : CH6



Chain(1) : CH11



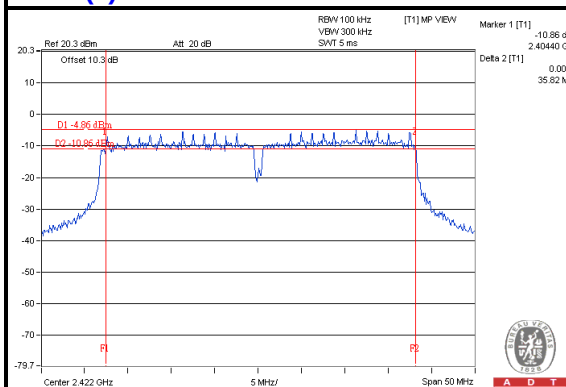


A D T

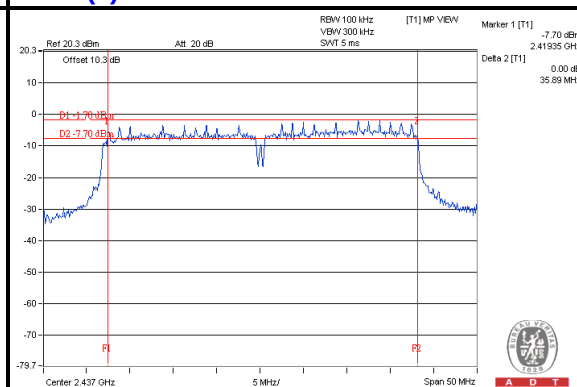
802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
3	2422	35.82	35.80	0.5	PASS
6	2437	35.89	35.92	0.5	PASS
9	2452	36.08	36.42	0.5	PASS

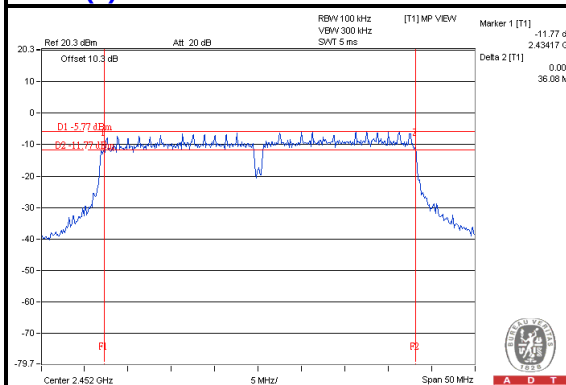
Chain(0) : CH3



Chain(0) : CH6



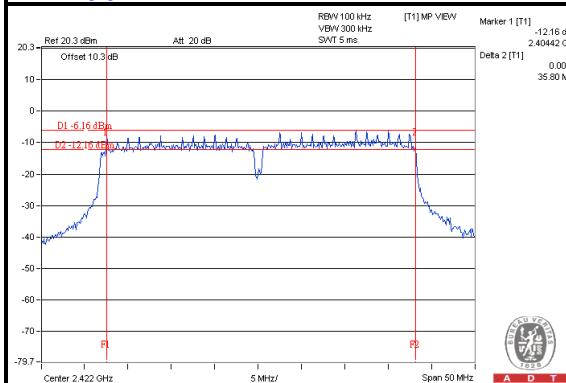
Chain(0) : CH9



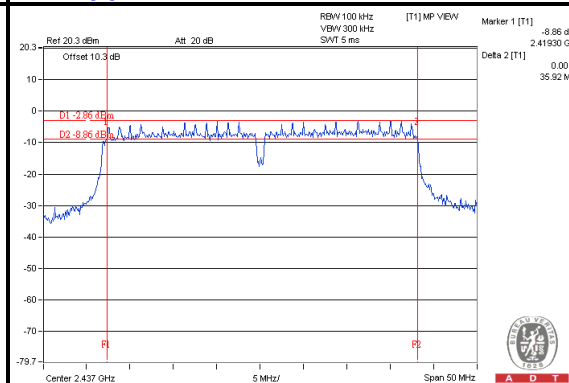


A D T

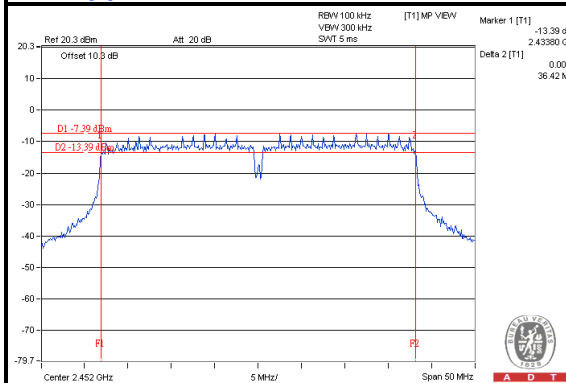
Chain(1) : CH3



Chain(1) : CH6



Chain(1) : CH9



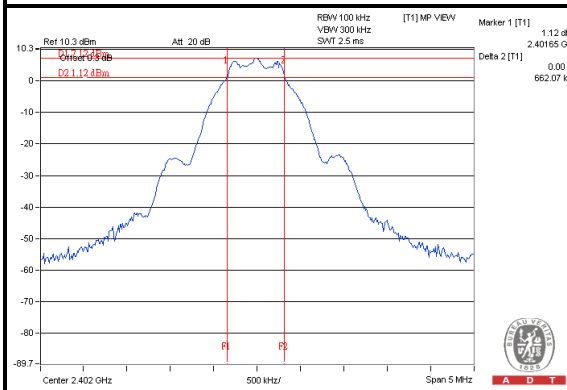


A D T

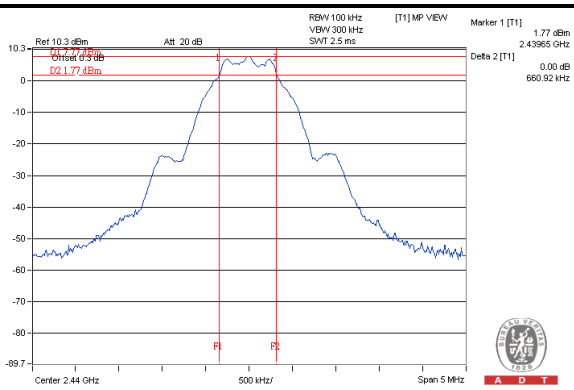
BT_LE-GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)
0	2402	0.66
19	2440	0.66
39	2480	0.67

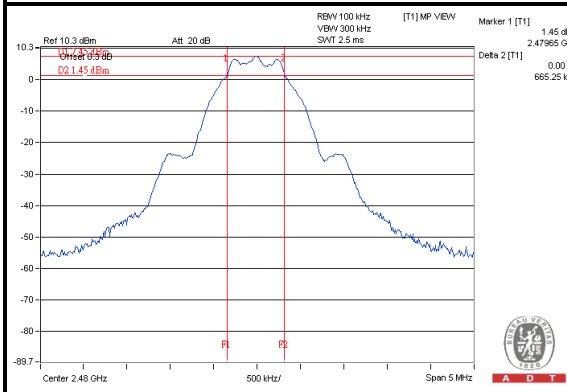
CH0



CH19



CH39



4.5 OCCUPIED BANDWIDTH MEASUREMENT

4.5.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

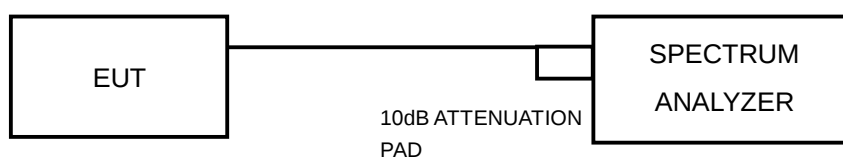
Note:

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, 2013

4.5.2 TEST PROCEDURE

1. Set RBW $\geq 1\%$ of the emission bandwidth.
2. Set the VBW $> 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Record the 99% emission bandwidth.

4.5.3 TEST SETUP



4.5.4 EUT OPERATING CONDITIONS

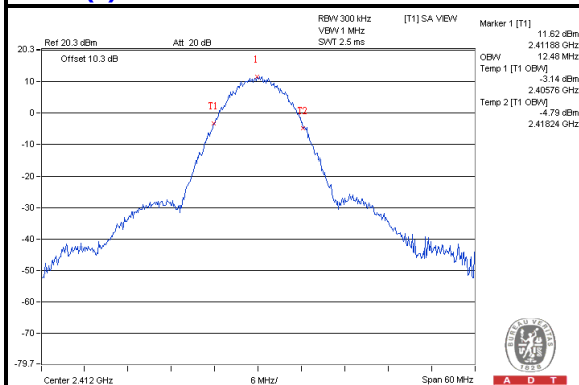
Same as Item 4.1.6

4.5.5 TEST RESULTS

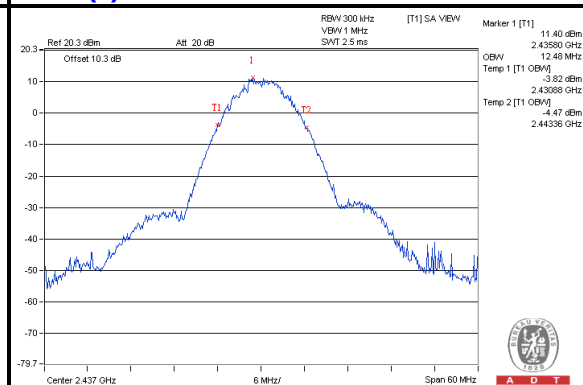
802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
1	2412	12.48	12.24
6	2437	12.48	12.36
11	2462	12.96	12.60

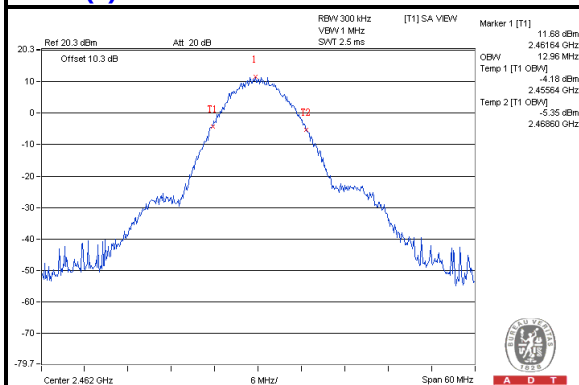
Chain(0) : CH1



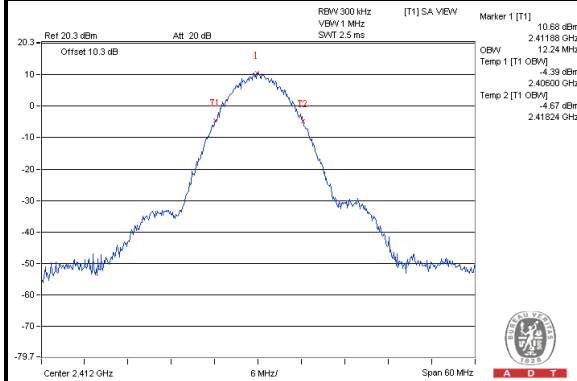
Chain(0) : CH6



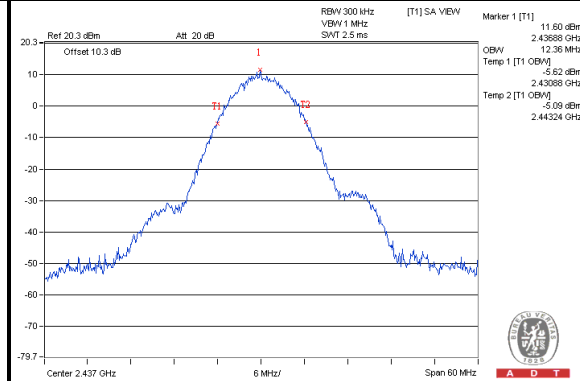
Chain(0) : CH11



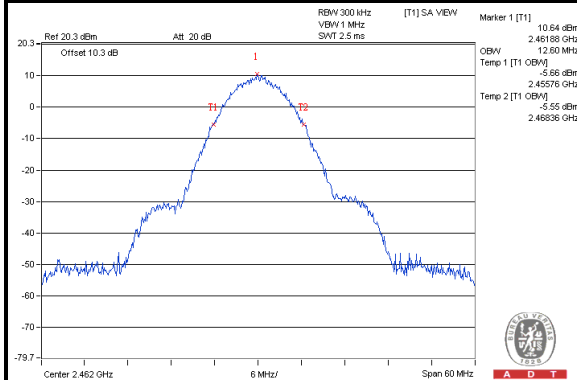
Chain(1) : CH1



Chain(1) : CH6



Chain(1) : CH11



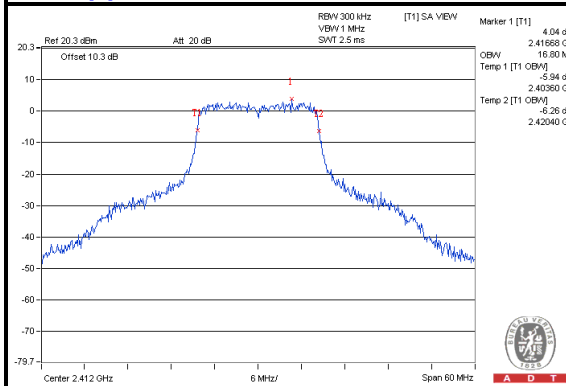


A D T

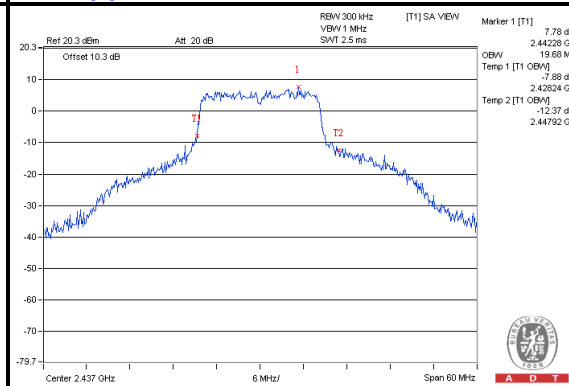
802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
1	2412	16.80	16.68
6	2437	19.68	21.48
11	2462	16.68	16.56

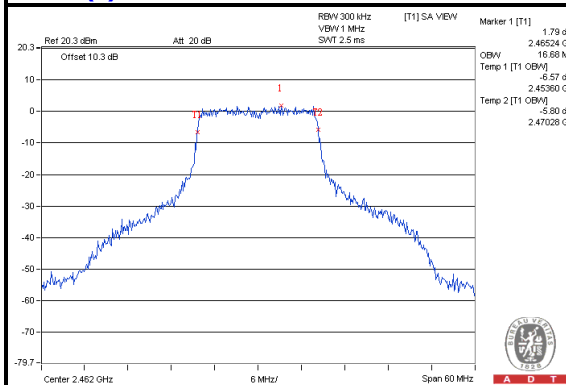
Chain(0) : CH1



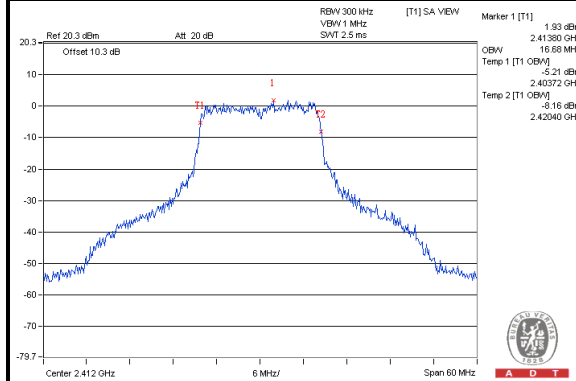
Chain(0) : CH6



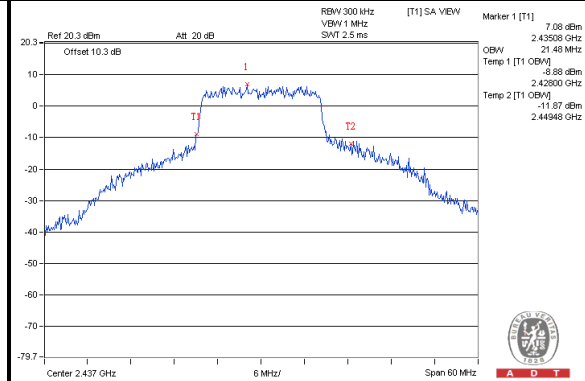
Chain(0) : CH11



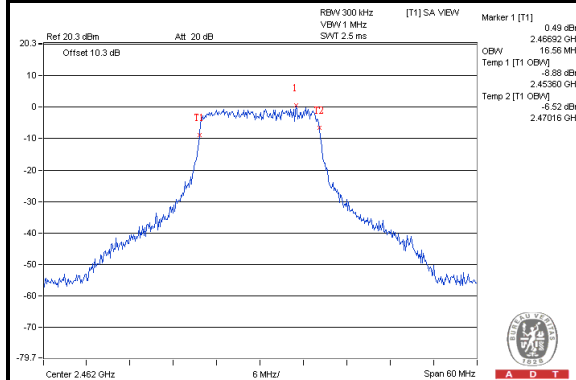
Chain(1) : CH1



Chain(1) : CH6



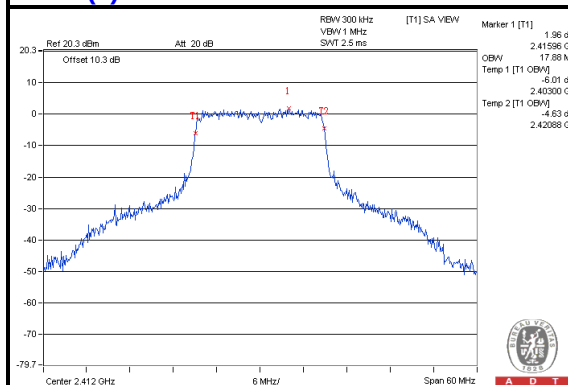
Chain(1) : CH11



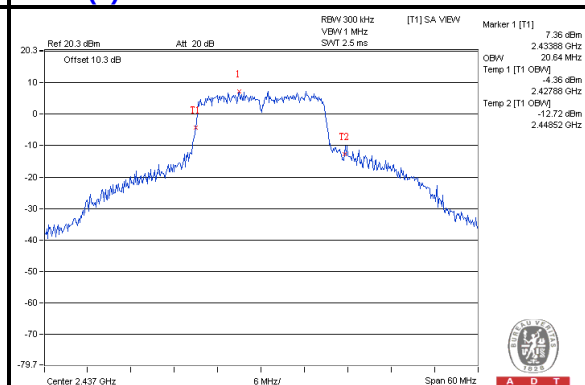
802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
1	2412	17.88	17.88
6	2437	20.64	21.60
11	2462	17.88	17.88

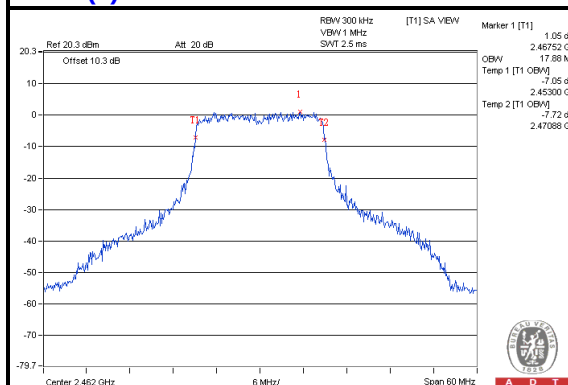
Chain(0) : CH1



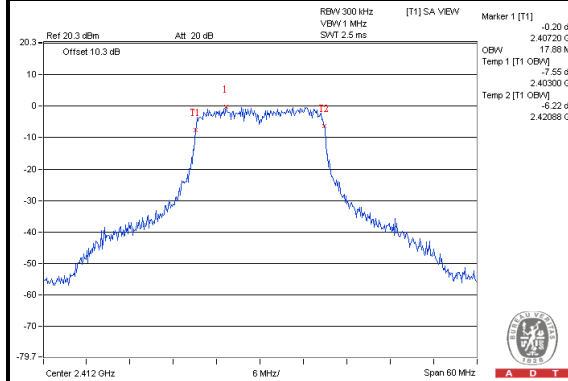
Chain(0) : CH6



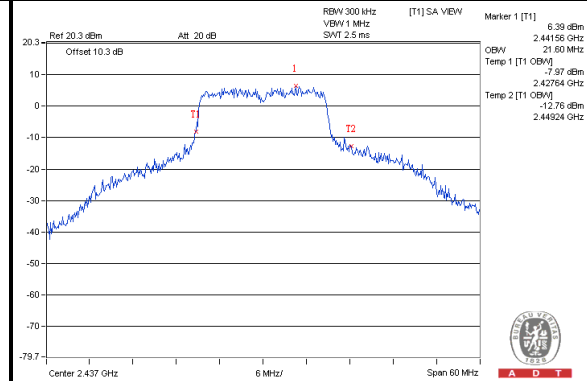
Chain(0) : CH11



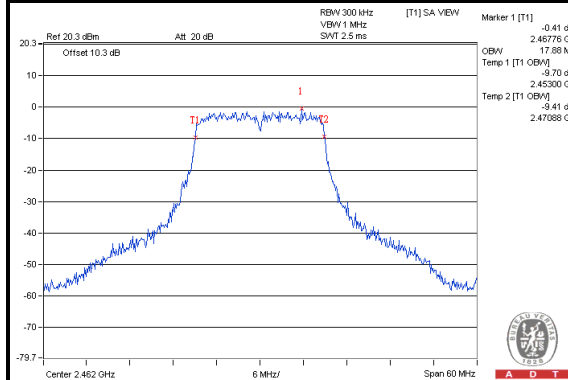
Chain(1) : CH1



Chain(1) : CH6



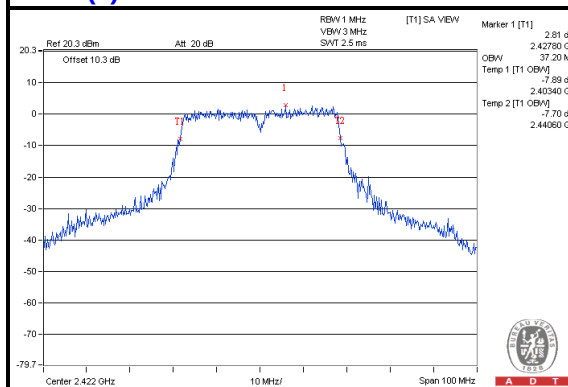
Chain(1) : CH11



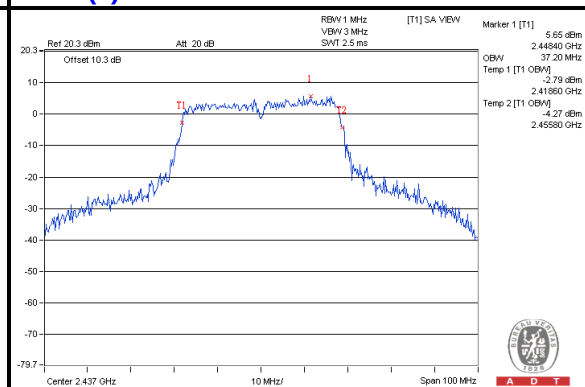
802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
3	2422	37.20	37.00
6	2437	37.20	37.60
9	2452	37.20	37.00

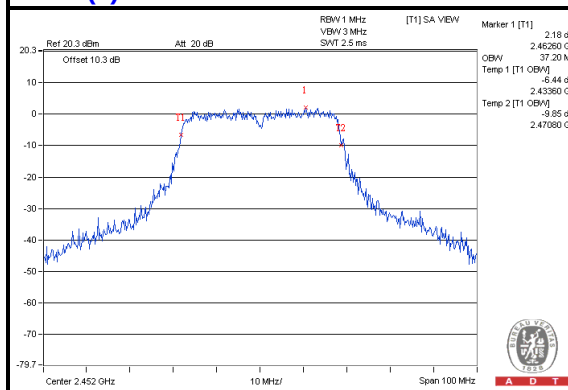
Chain(0) : CH3



Chain(0) : CH6



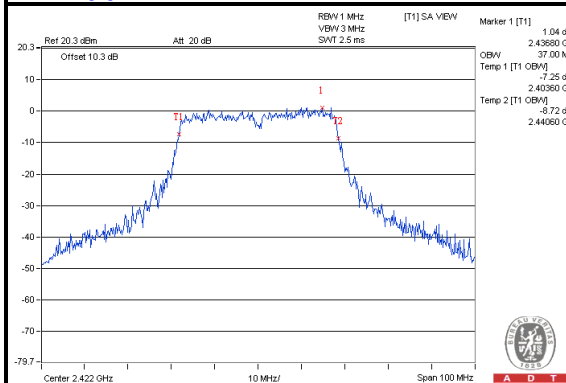
Chain(0) : CH9



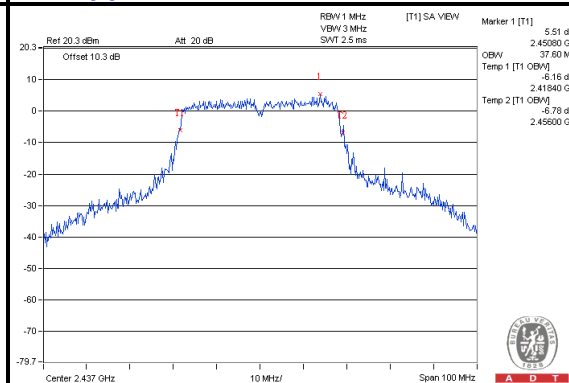


A D T

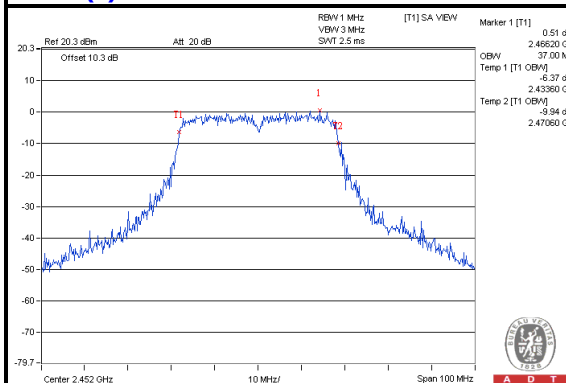
Chain(1) : CH3



Chain(1) : CH6



Chain(1) : CH9

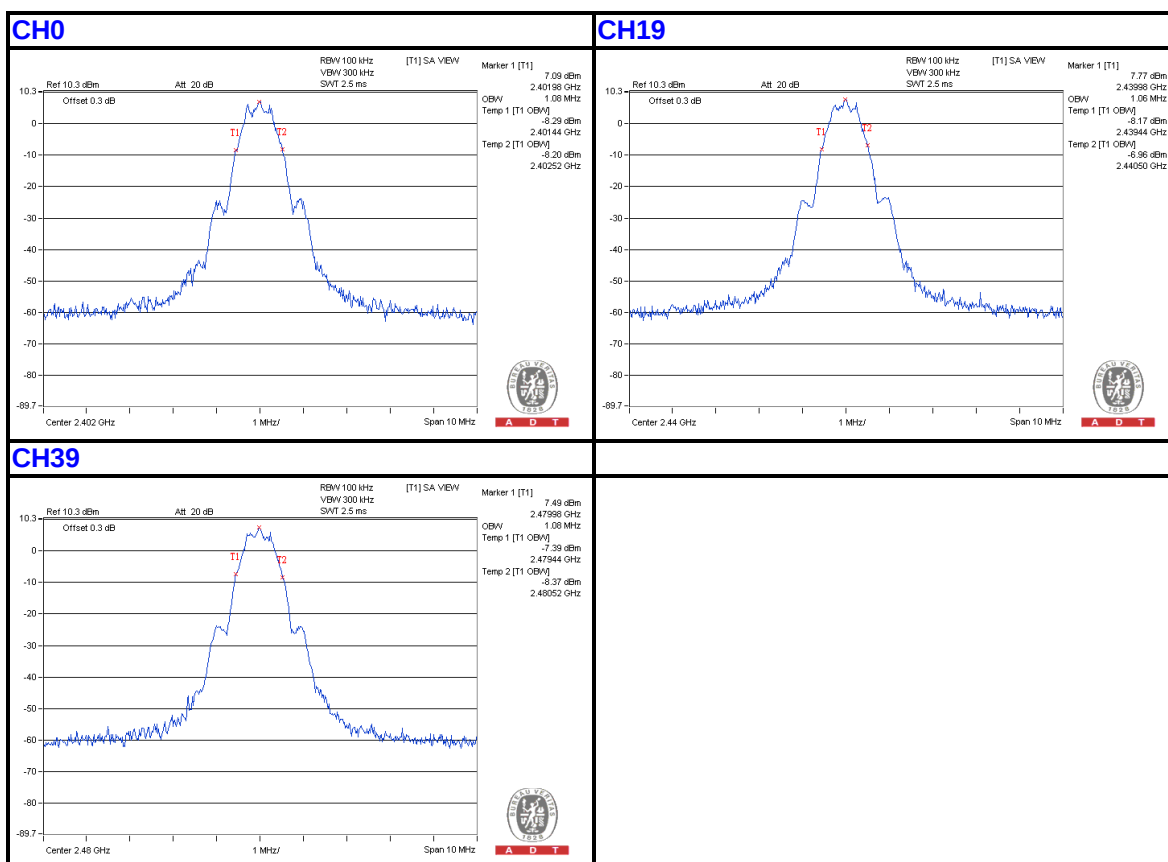




A D T

BT_LE-GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)
0	2402	1.08
19	2440	1.06
39	2480	1.08



4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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, 2013

4.6.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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 –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.



A D T

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

Same as Item 4.1.6

4.6.6 TEST RESULTS

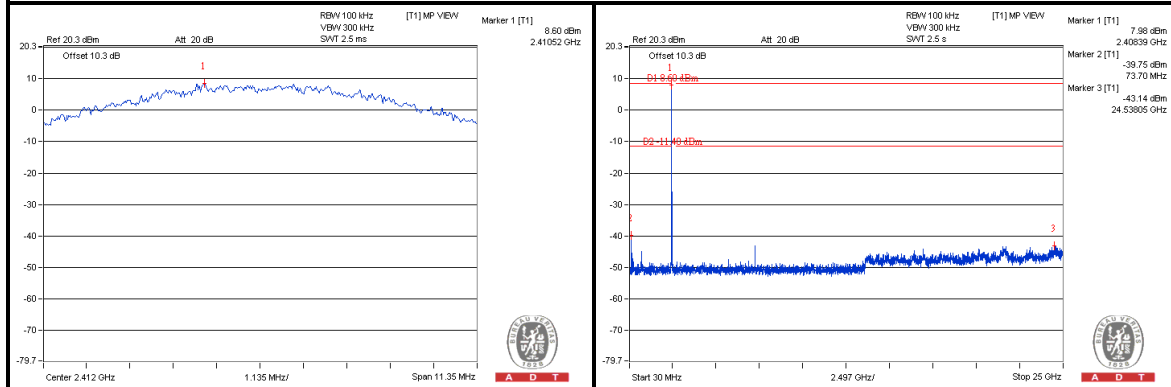
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



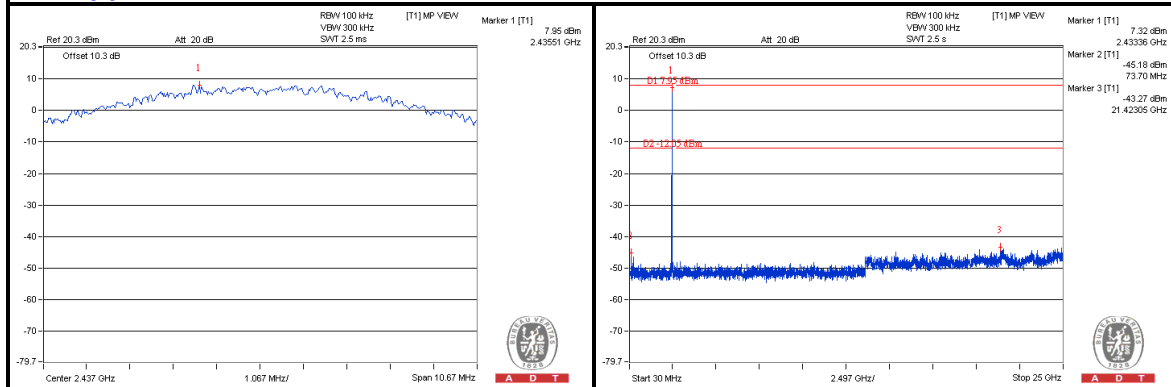
A D T

802.11b

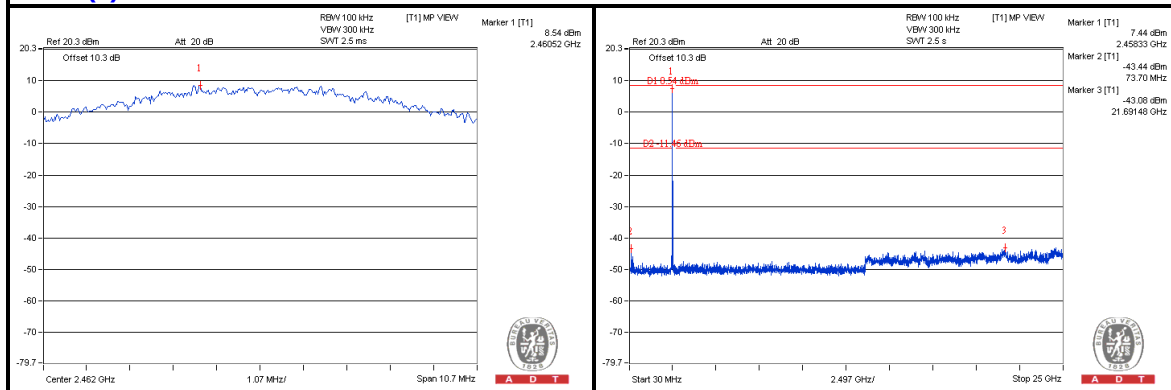
Chain(0) : CH 1



Chain(0) : CH 6



Chain(0) : CH 11

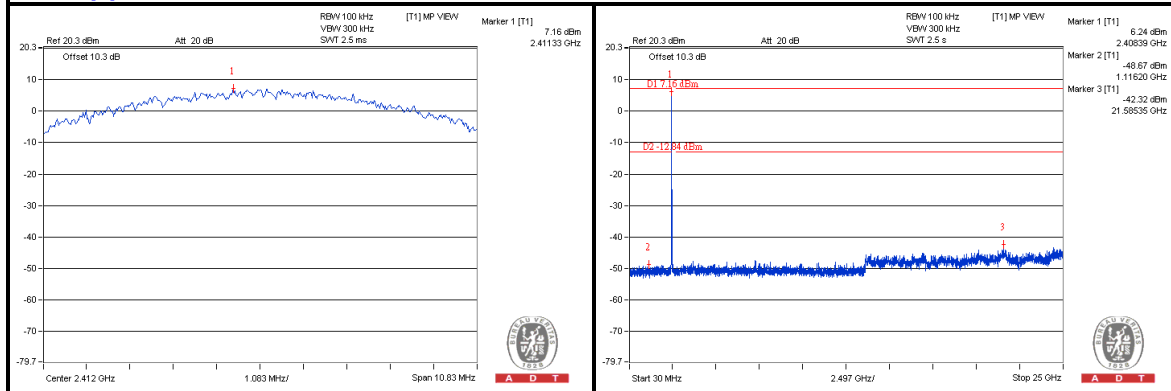




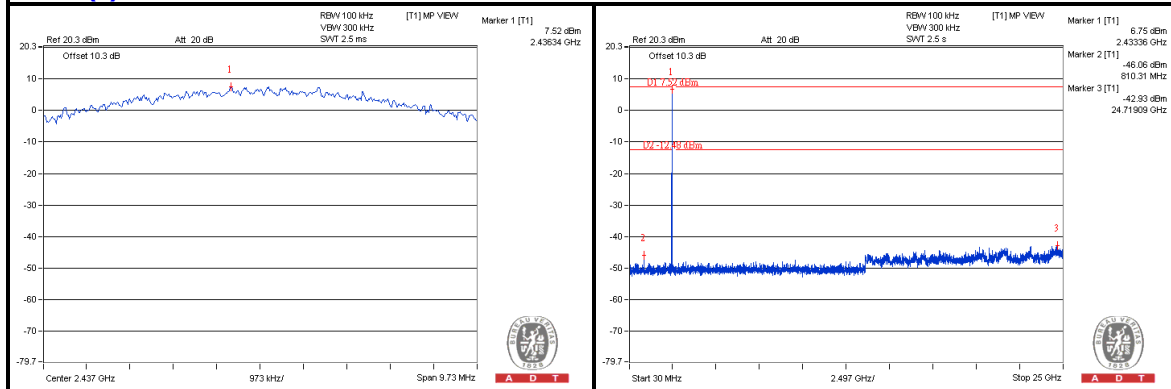
A D T

802.11b

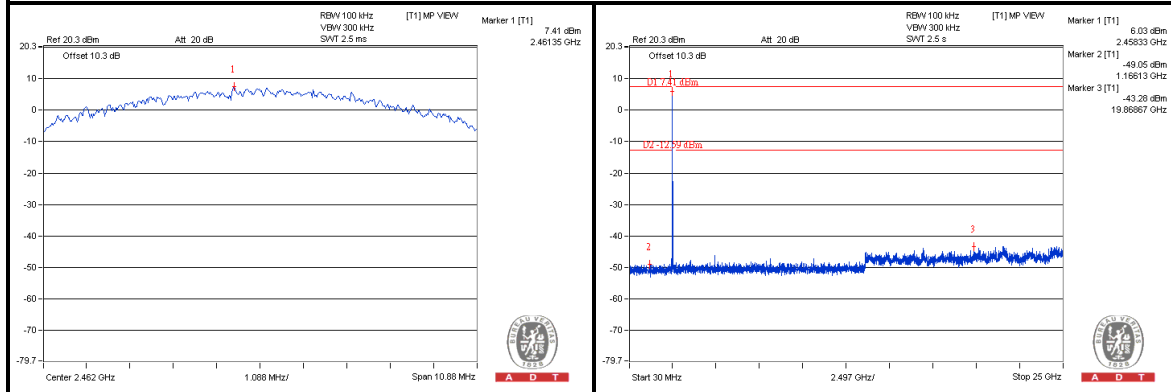
Chain(1) : CH 1



Chain(1) : CH 6



Chain(1) : CH 11

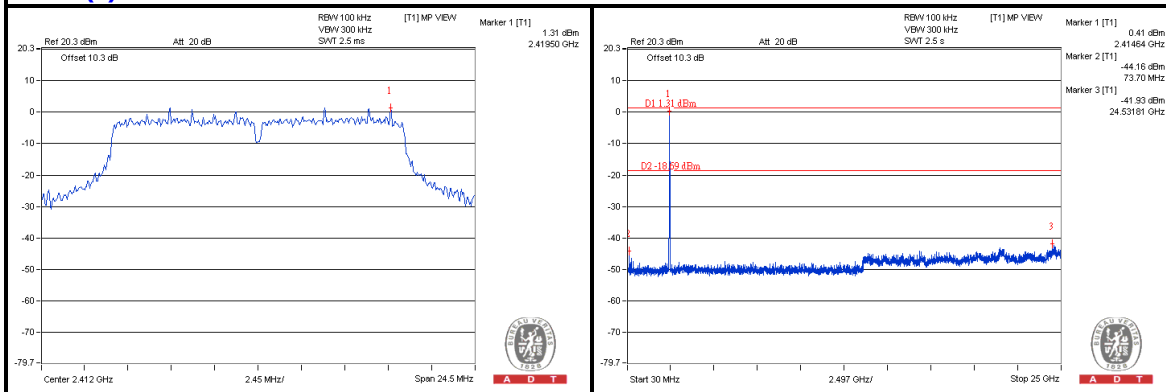




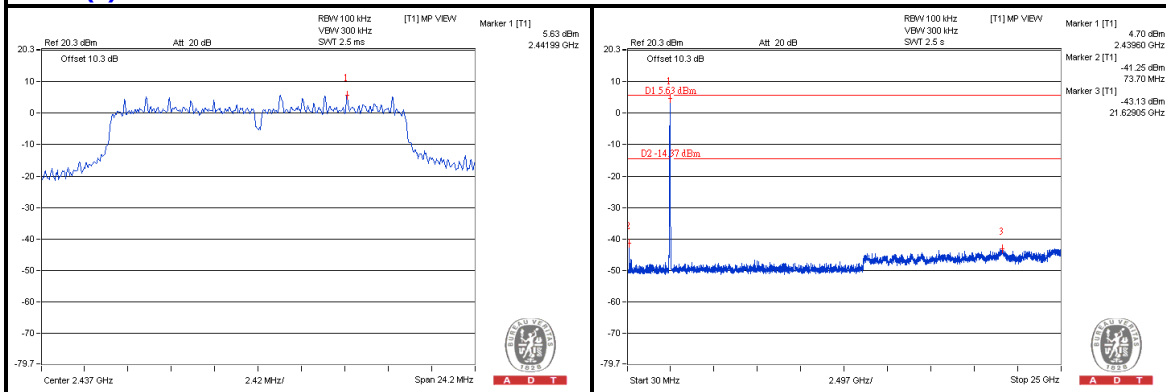
A D T

802.11g

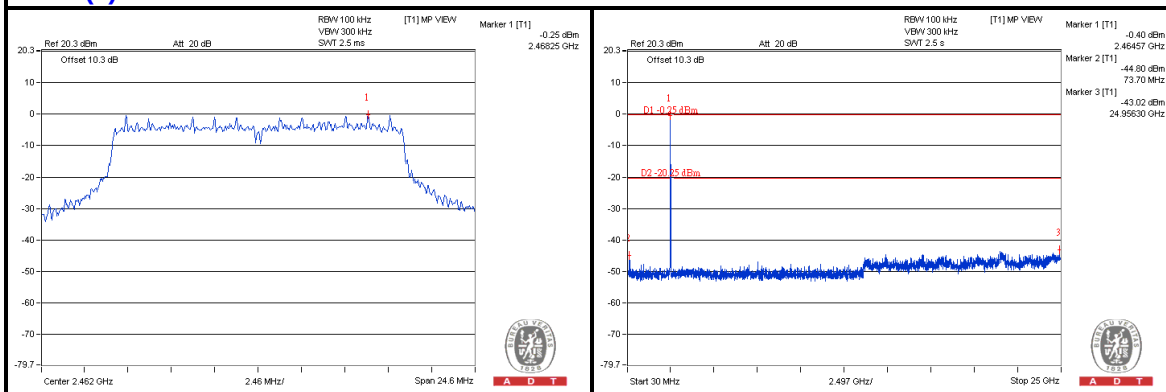
Chain(0) : CH 1



Chain(0) : CH 6



Chain(0) : CH 11

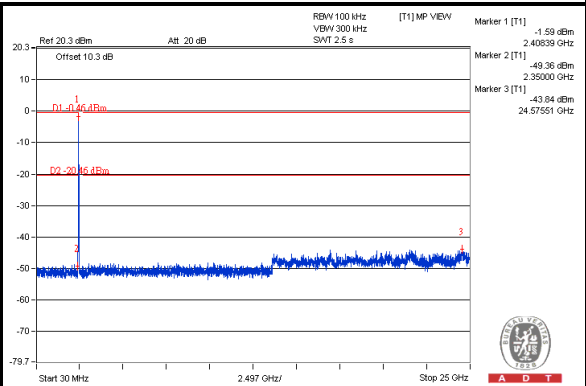
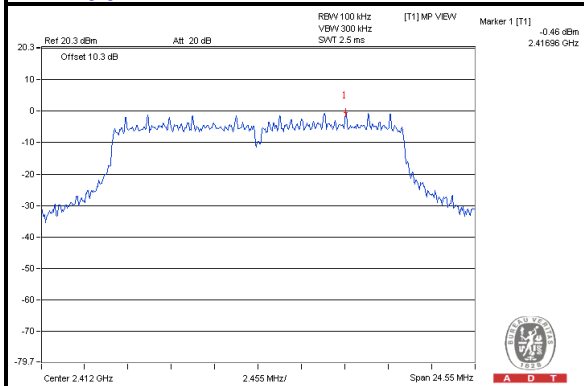




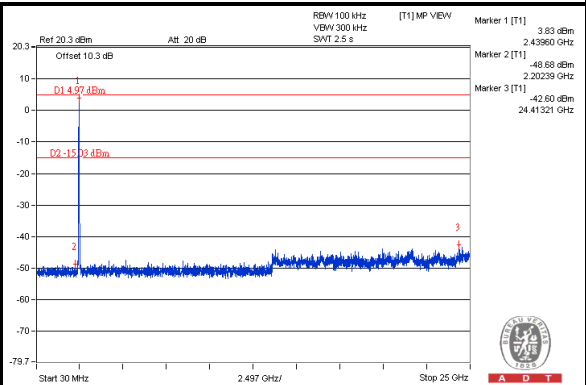
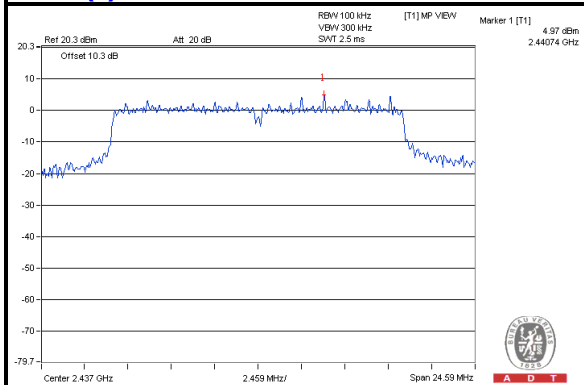
A D T

802.11g

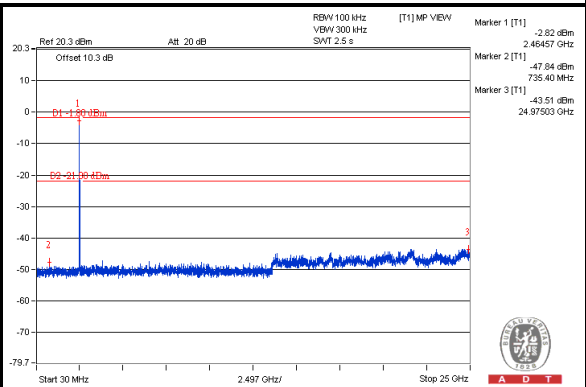
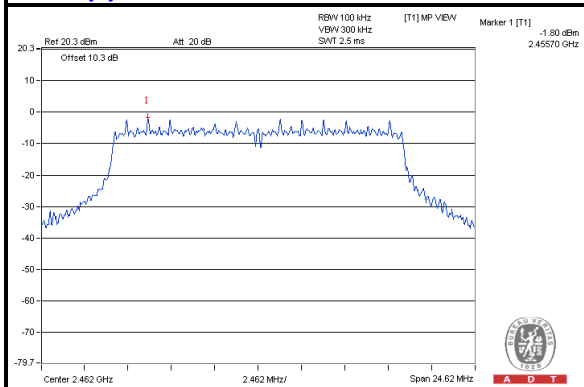
Chain(1) : CH 1



Chain(1) : CH 6



Chain(1) : CH 11

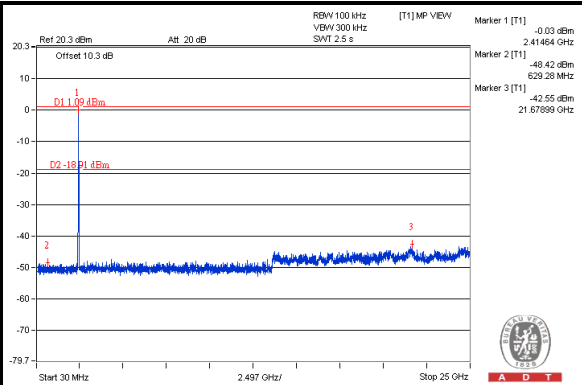
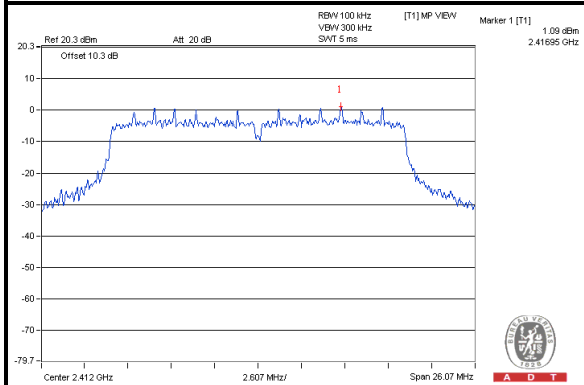




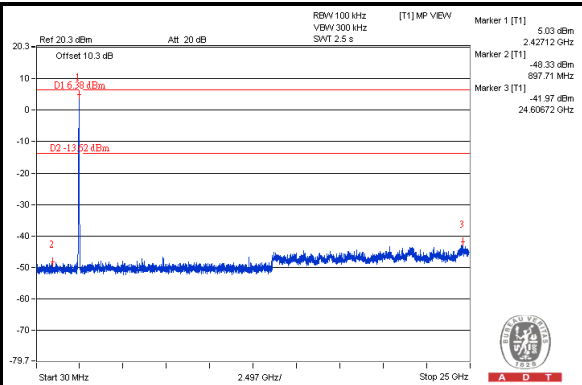
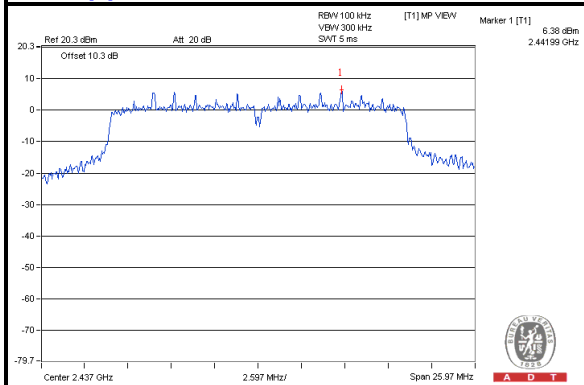
A D T

802.11n (HT20)

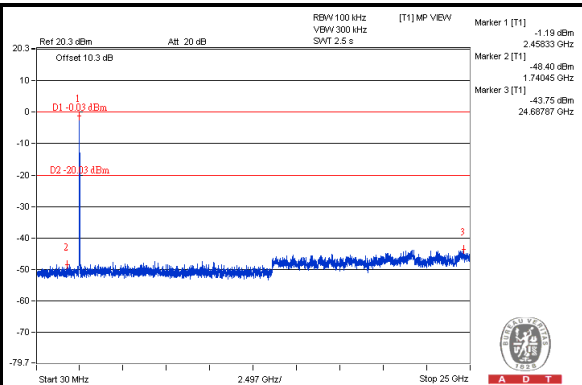
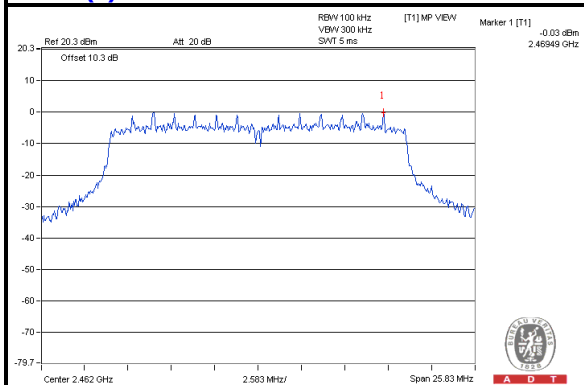
Chain(0) : CH 1



Chain(0) : CH 6



Chain(0) : CH 11

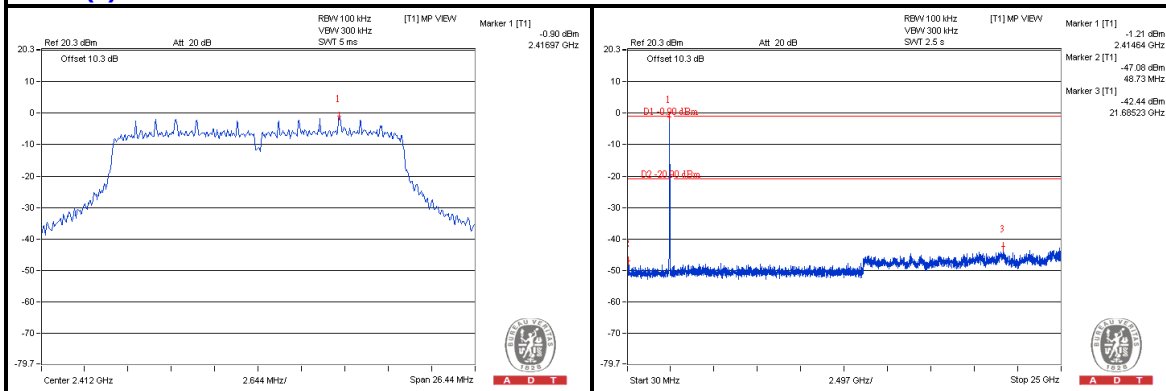




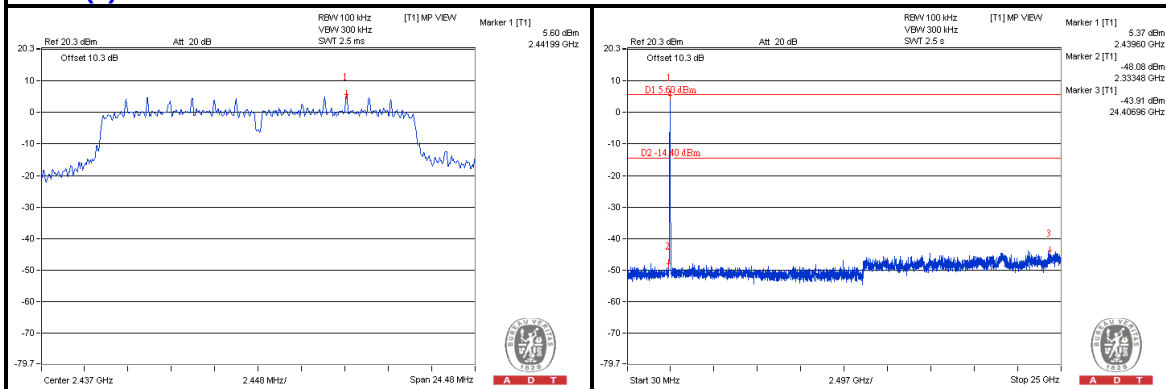
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802.11n (HT20)

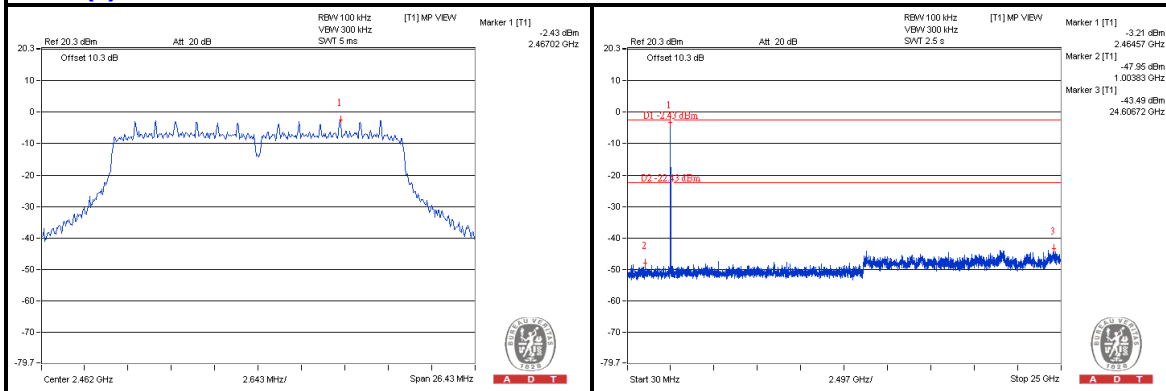
Chain(1) : CH 1



Chain(1) : CH 6



Chain(1) : CH 11

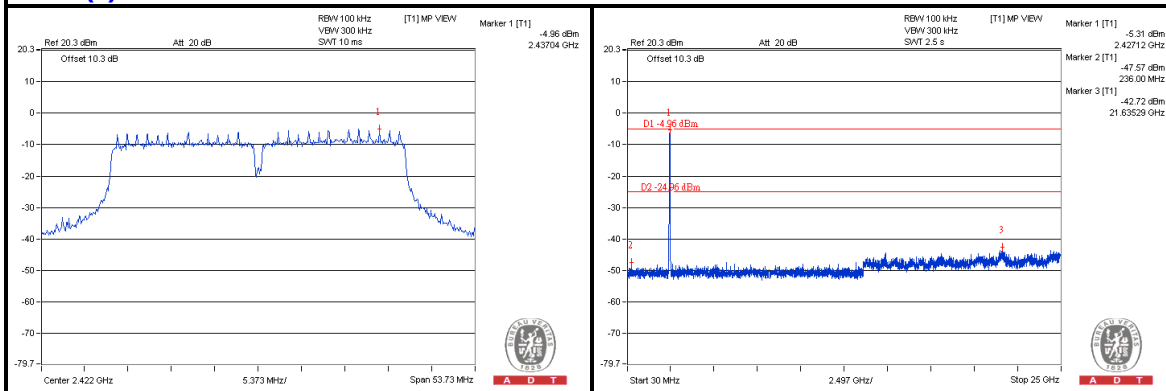




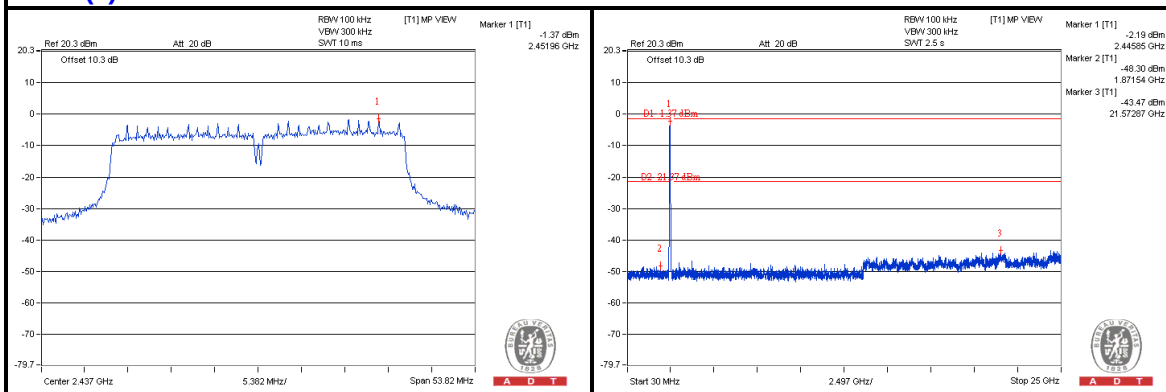
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802.11n (HT40)

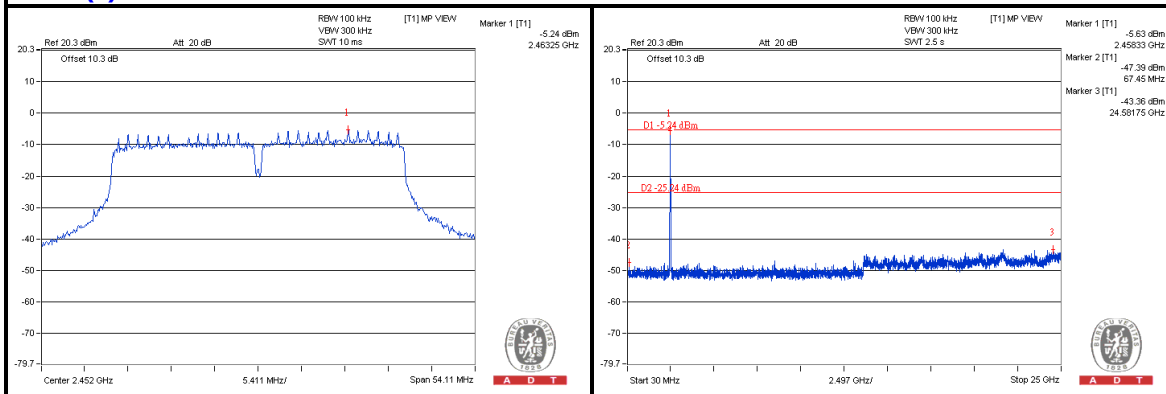
Chain(0) : CH 3



Chain(0) : CH 6



Chain(0) : CH 9

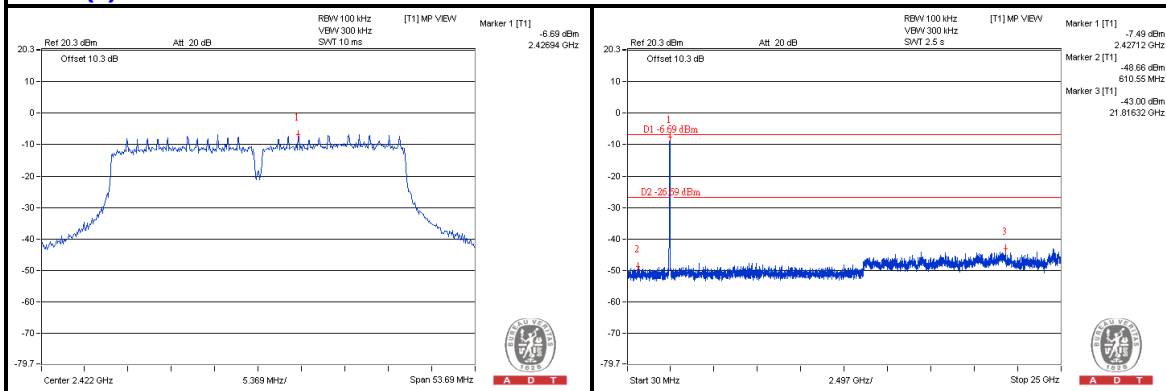




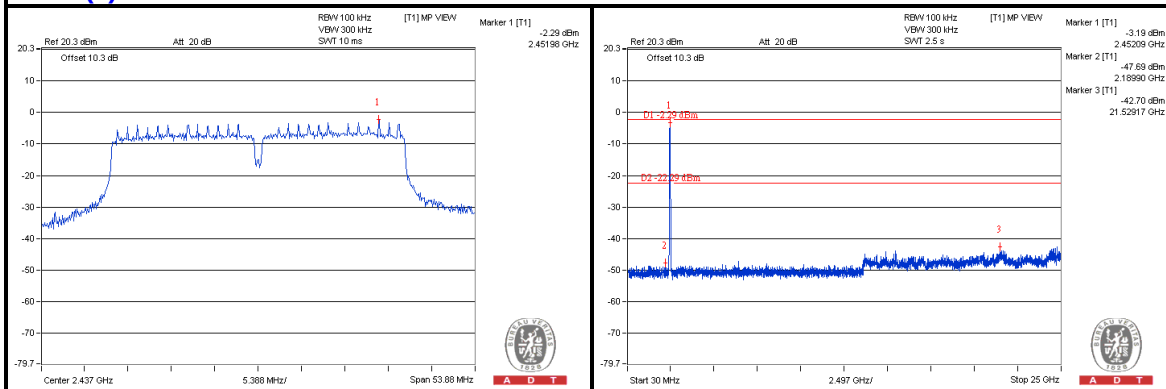
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802.11n (HT40)

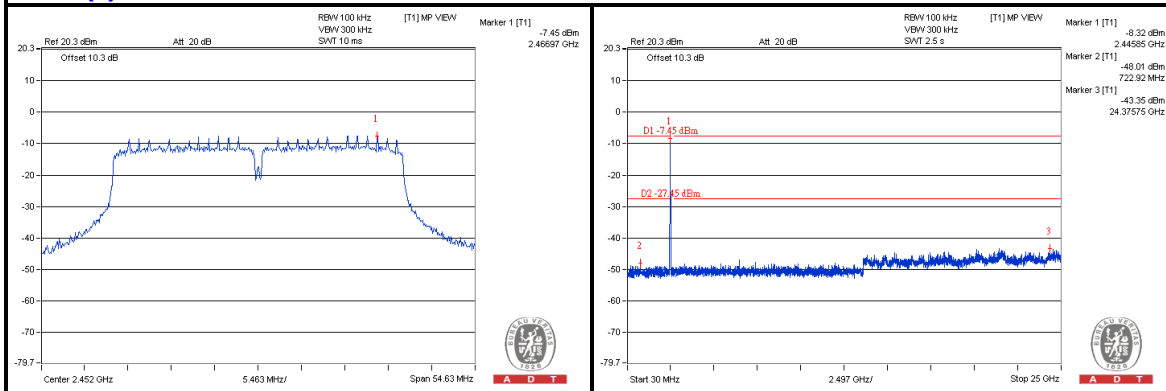
Chain(1) : CH 3



Chain(1) : CH 6



Chain(1) : CH 9

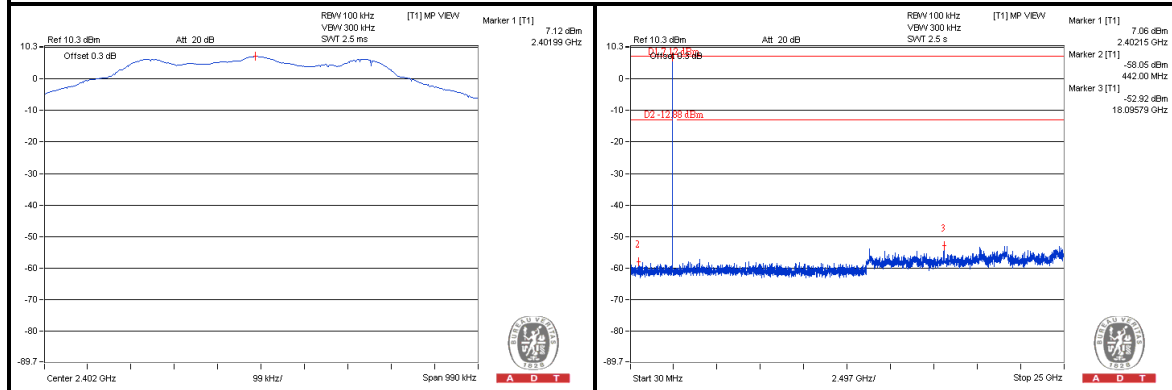




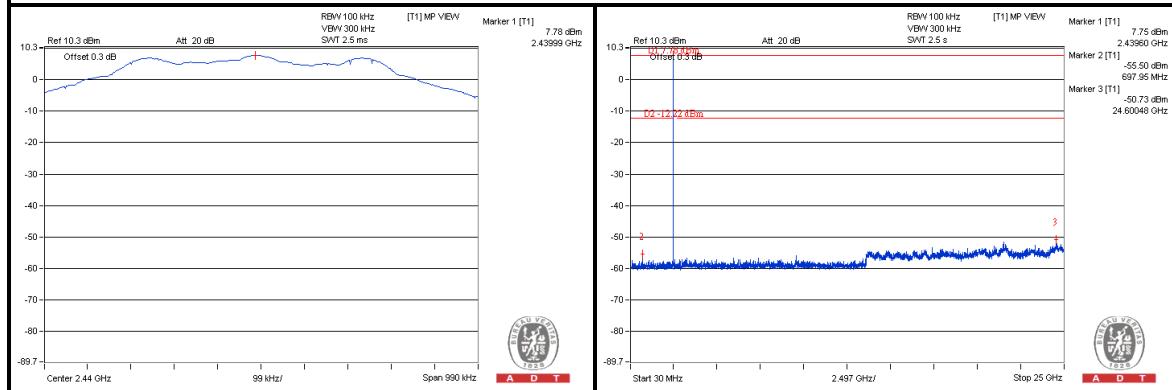
A D T

BT_LE-GFSK

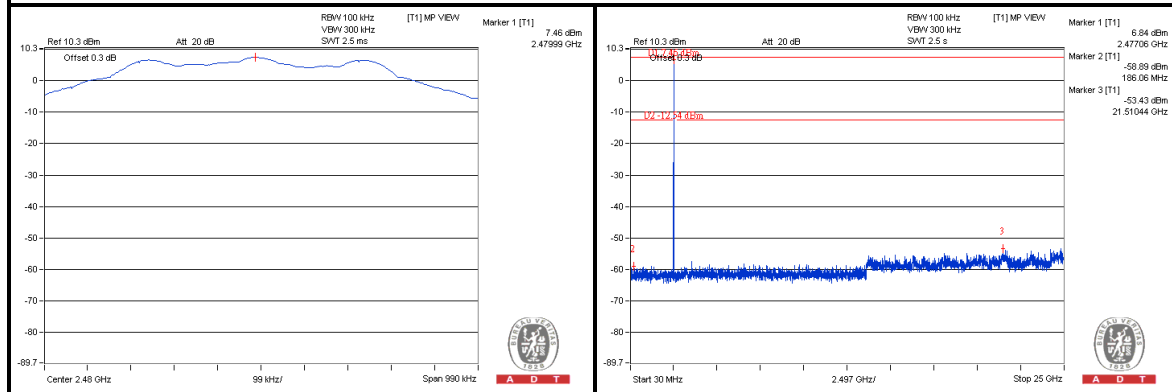
CH 0



CH 19



CH 39



4.7 UNWANTED EMISSION MEASUREMENT(RADIATED VERSUS CONDUCTED)

4.7.1 LIMITS OF UNWANTED EMISSION 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.

4.7.2 TEST INSTRUMENTS

For WLAN / BT_LE-GFSK: below 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29, 2013	Jan. 28, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
Pre-Amplifier SPACEK LABS	SLKKA-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
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. 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: Aug. 06, 2013



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For BT_LE-GFSK: above 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29, 2013	Jan. 28, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 26, 2012	June 25, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Apr. 09, 2012	Apr. 08, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
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. 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: Mar. 06, 2013



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For WLAN: above 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 30, 2012	Oct. 29, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	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: Mar. 05, 2013

4.7.3 TEST PROCEDURES

For Below 1GHz test:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. 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 antenna is a broadband antenna, and its height 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.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency below 1GHz.

For Above 1GHz test:

Following FCC KDB 558074 D01 DTS Meas. Guidance :

Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

- a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.
- b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT
- c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater
- d. EIRP adjustments for multiple outputs. (Follow the procedures specified in FCC KDB Publication 662911)
- e. For all of Radiation emission test
 - e-1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
 - e-2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
 - e-3. 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.
 - e-4. 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-5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
 - e-6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

1. 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.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

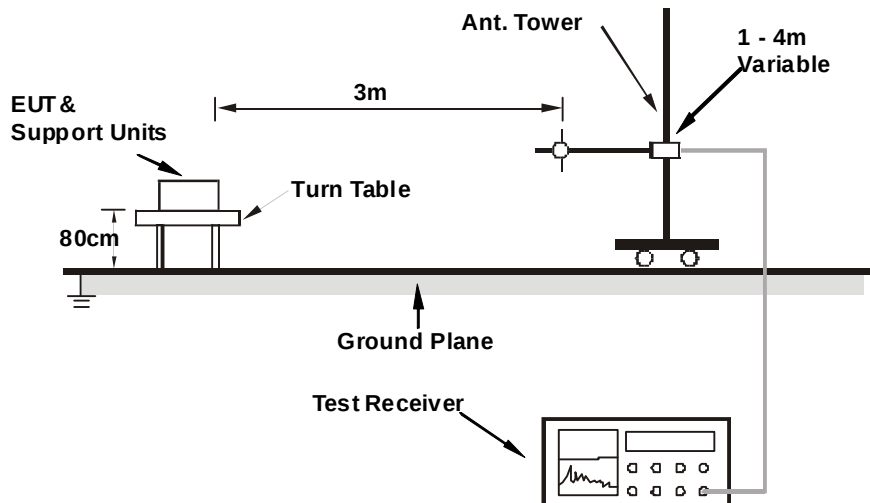
4.7.4 DEVIATION FROM TEST STANDARD

No deviation

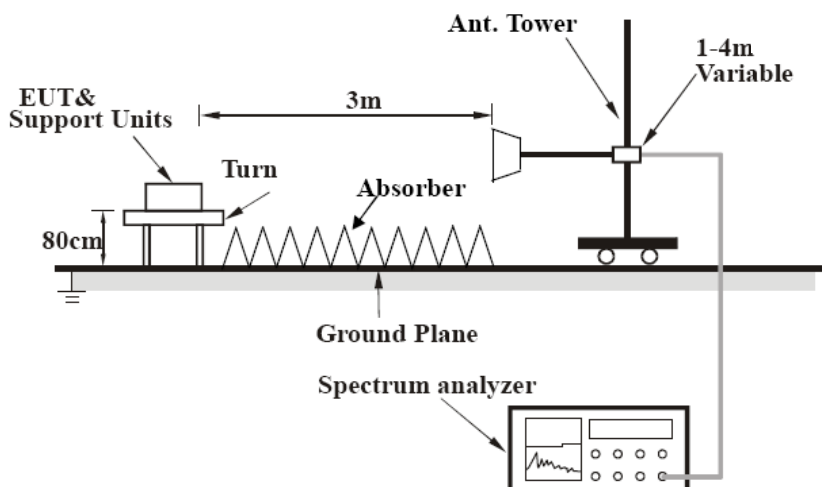
4.7.5 TEST SETUP

For radiated configuration:

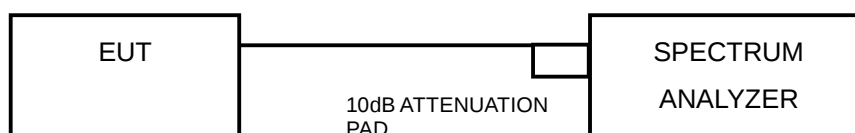
<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For conducted configuration:



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



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4.7.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “artgui.exe Version:2.3<WLAN> / BtUART.exe Version:2.1.2<BT-LE>” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.7.7 TEST RESULTS (WLAN MODE, RADIATED MEASUREMENT)

Radiated versus Conducted Measurement	
☐ Conducted measurement	☒ Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation) <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).	

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 6	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	99.60	40.1 QP	43.5	-3.4	2.00 H	19	58.19	-18.09
2	232.39	35.3 QP	46.0	-10.7	1.00 H	0	51.05	-15.73
3	647.31	40.7 QP	46.0	-5.3	1.00 H	241	45.22	-4.54
4	697.12	41.0 QP	46.0	-5.0	1.00 H	286	44.98	-3.99
5	799.79	40.9 QP	46.0	-5.1	1.50 H	231	42.83	-1.91
6	896.26	40.5 QP	46.0	-5.5	1.50 H	219	40.99	-0.49
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	99.65	33.3 QP	43.5	-10.2	2.00 V	322	51.40	-18.06
2	324.88	38.7 QP	46.0	-7.3	1.50 V	146	50.64	-11.93
3	647.31	36.3 QP	46.0	-9.7	1.50 V	204	40.82	-4.54
4	722.00	39.6 QP	46.0	-6.4	2.00 V	333	43.37	-3.73
5	846.45	40.0 QP	46.0	-6.0	1.50 V	0	41.35	-1.34
6	896.21	38.2 QP	46.0	-7.8	1.50 V	185	38.70	-0.50

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

Radiated test was done with 50ohm terminator on antenna port

ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	4824.00	50.5 PK	74.0	-23.5	1.00 H	0	8.23	42.27
2	4824.00	44.9 AV	54.0	-9.1	1.00 H	0	2.63	42.27
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	4824.00	54.4 PK	74.0	-19.6	1.21 V	29	12.13	42.27
2	4824.00	50.0 AV	54.0	-4.0	1.21 V	29	7.73	42.27

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	50.4 PK	74.0	-23.6	1.00 H	130	8.08	42.32
2	4874.00	45.0 AV	54.0	-9.0	1.00 H	130	2.68	42.32
3	7311.00	56.2 PK	74.0	-17.8	1.00 H	237	9.25	46.95
4	7311.00	45.1 AV	54.0	-8.9	1.00 H	237	-1.85	46.95
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	53.3 PK	74.0	-20.7	1.00 V	43	10.98	42.32
2	4874.00	47.5 AV	54.0	-6.5	1.00 V	43	5.18	42.32
3	7311.00	56.4 PK	74.0	-17.6	1.20 V	252	9.45	46.95
4	7311.00	46.3 AV	54.0	-7.7	1.20 V	252	-0.65	46.95

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	4924.00	50.6 PK	74.0	-23.4	1.00 H	118	8.28	42.32
2	4924.00	45.4 AV	54.0	-8.6	1.00 H	118	3.08	42.32
3	7386.00	56.3 PK	74.0	-17.7	1.00 H	239	9.11	47.19
4	7386.00	45.1 AV	54.0	-8.9	1.00 H	239	-2.09	47.19
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	4924.00	53.3 PK	74.0	-20.7	1.31 V	31	10.98	42.32
2	4924.00	47.4 AV	54.0	-6.6	1.31 V	31	5.08	42.32
3	7386.00	56.9 PK	74.0	-17.1	1.16 V	252	9.71	47.19
4	7386.00	46.7 AV	54.0	-7.3	1.16 V	252	-0.49	47.19

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



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802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	4824.00	48.1 PK	74.0	-25.9	1.00 H	118	5.83	42.27
2	4824.00	36.8 AV	54.0	-17.2	1.00 H	118	-5.47	42.27
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	4824.00	49.9 PK	74.0	-24.1	1.20 V	29	7.63	42.27
2	4824.00	39.0 AV	54.0	-15.0	1.20 V	29	-3.27	42.27

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	47.9 PK	74.0	-26.2	1.02 H	144	5.53	42.32
2	4874.00	36.6 AV	54.0	-17.4	1.02 H	144	-5.72	42.32
3	7311.00	55.0 PK	74.0	-19.0	1.05 H	226	8.05	46.95
4	7311.00	44.9 AV	54.0	-9.1	1.05 H	226	-2.05	46.95
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	49.9 PK	74.0	-24.1	1.19 V	22	7.58	42.32
2	4874.00	39.0 AV	54.0	-15.0	1.19 V	22	-3.32	42.32
3	7311.00	56.1 PK	74.0	-17.9	1.03 V	64	9.15	46.95
4	7311.00	45.0 AV	54.0	-9.0	1.03 V	64	-1.95	46.95

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	4924.00	48.2 PK	74.0	-25.8	1.02 H	106	5.88	42.32
2	4924.00	37.0 AV	54.0	-17.0	1.02 H	106	-5.32	42.32
3	7386.00	56.6 PK	74.0	-17.4	1.03 H	238	9.41	47.19
4	7386.00	45.1 AV	54.0	-8.9	1.03 H	238	-2.09	47.19
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	4924.00	49.0 PK	74.0	-25.0	1.19 V	220	6.68	42.32
2	4924.00	38.1 AV	54.0	-15.9	1.19 V	220	-4.22	42.32
3	7386.00	55.4 PK	74.0	-18.6	1.00 V	65	8.21	47.19
4	7386.00	44.5 AV	54.0	-9.5	1.00 V	65	-2.69	47.19

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

802.11n (HT20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	4824.00	48.1 PK	74.0	-25.9	1.00 H	120	5.83	42.27
2	4824.00	37.1 AV	54.0	-16.9	1.00 H	120	-5.17	42.27
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	4824.00	50.1 PK	74.0	-23.9	1.26 V	43	7.83	42.27
2	4824.00	38.9 AV	54.0	-15.1	1.26 V	43	-3.37	42.27

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	47.9 PK	74.0	-26.1	1.00 H	104	5.58	42.32
2	4874.00	37.2 AV	54.0	-16.8	1.00 H	104	-5.12	42.32
3	7311.00	56.5 PK	74.0	-17.5	1.05 H	223	9.55	46.95
4	7311.00	44.7 AV	54.0	-9.3	1.05 H	223	-2.25	46.95
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	49.7 PK	74.0	-24.3	1.23 V	12	7.38	42.32
2	4874.00	38.5 AV	54.0	-15.5	1.23 V	12	-3.82	42.32
3	7311.00	56.4 PK	74.0	-17.6	1.00 V	79	9.45	46.95
4	7311.00	45.2 AV	54.0	-8.8	1.00 V	79	-1.75	46.95

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	4924.00	48.1 PK	74.0	-25.9	1.00 H	104	5.78	42.32
2	4924.00	37.5 AV	54.0	-16.5	1.00 H	104	-4.82	42.32
3	7386.00	57.2 PK	74.0	-16.8	1.05 H	220	10.01	47.19
4	7386.00	45.2 AV	54.0	-8.8	1.05 H	220	-1.99	47.19
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	4924.00	49.3 PK	74.0	-24.7	1.13 V	224	6.98	42.32
2	4924.00	38.2 AV	54.0	-15.8	1.13 V	224	-4.12	42.32
3	7386.00	55.1 PK	74.0	-18.9	1.00 V	60	7.91	47.19
4	7386.00	44.1 AV	54.0	-9.9	1.00 V	60	-3.09	47.19

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

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	4844.00	48.7 PK	74.0	-25.3	1.00 H	68	7.09	41.61
2	4844.00	38.1 AV	54.0	-15.9	1.00 H	68	-3.51	41.61
3	7266.00	56.1 PK	74.0	-17.9	1.03 H	246	10.08	46.02
4	7266.00	44.9 AV	54.0	-9.1	1.03 H	246	-1.12	46.02
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	4844.00	49.5 PK	74.0	-24.5	1.08 V	239	7.56	41.94
2	4844.00	38.6 AV	54.0	-15.4	1.08 V	239	-3.34	41.94
3	7266.00	55.4 PK	74.0	-18.6	1.02 V	55	8.97	46.43
4	7266.00	44.5 AV	54.0	-9.5	1.02 V	55	-1.93	46.43

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	49.0 PK	74.0	-25.0	1.01 H	40	7.34	41.66
2	4874.00	38.4 AV	54.0	-15.6	1.01 H	40	-3.26	41.66
3	7311.00	56.0 PK	74.0	-18.0	1.02 H	259	9.86	46.14
4	7311.00	44.7 AV	54.0	-9.3	1.02 H	259	-1.44	46.14
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	49.9 PK	74.0	-24.1	1.12 V	235	7.91	41.99
2	4874.00	38.8 AV	54.0	-15.2	1.12 V	235	-3.19	41.99
3	7311.00	55.8 PK	74.0	-18.2	1.06 V	53	9.24	46.56
4	7311.00	44.8 AV	54.0	-9.2	1.06 V	53	-1.76	46.56

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

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	4904.00	48.5 PK	74.0	-25.5	1.01 H	51	6.79	41.71
2	4904.00	37.9 AV	54.0	-16.1	1.01 H	51	-3.81	41.71
3	7356.00	56.4 PK	74.0	-17.6	1.03 H	237	10.15	46.25
4	7356.00	45.1 AV	54.0	-8.9	1.03 H	237	-1.15	46.25
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	4904.00	49.0 PK	74.0	-25.0	1.07 V	240	6.97	42.03
2	4904.00	38.3 AV	54.0	-15.7	1.07 V	240	-3.73	42.03
3	7356.00	54.4 PK	74.0	-19.6	1.10 V	70	7.71	46.69
4	7356.00	44.1 AV	54.0	-9.9	1.10 V	70	-2.59	46.69

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

4.7.8 TEST RESULTS (BT <LE> MODE, RADIATED MEASUREMENT)

Radiated versus Conducted Measurement	
☐ Conducted measurement	☒ Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation) <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).	

BELOW 1GHz WORST-CASE DATA

BT_LE-GFSK

CHANNEL	TX Channel 19	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	100.01	40.4 QP	43.5	-3.1	2.00 H	79	58.28	-17.84
2	222.99	36.4 QP	46.0	-9.6	1.00 H	90	52.72	-16.36
3	646.29	41.2 QP	46.0	-4.8	1.00 H	221	45.76	-4.55
4	695.93	40.9 QP	46.0	-5.1	1.00 H	126	44.85	-3.99
5	799.87	41.7 QP	46.0	-4.3	1.50 H	191	43.65	-1.91
6	896.35	40.3 QP	46.0	-5.7	1.50 H	219	40.81	-0.49
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	99.87	32.9 QP	43.5	-10.6	2.00 V	352	50.81	-17.92
2	324.74	39.2 QP	46.0	-6.8	1.50 V	146	51.17	-11.94
3	646.88	36.6 QP	46.0	-9.4	1.50 V	184	41.10	-4.54
4	721.71	40.2 QP	46.0	-5.9	2.00 V	273	43.88	-3.73
5	846.86	39.9 QP	46.0	-6.2	1.50 V	90	41.20	-1.35
6	896.54	38.8 QP	46.0	-7.2	1.50 V	165	39.30	-0.47

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

Radiated test was done with 50ohm terminator on antenna port

ABOVE 1GHz DATA

BT_LE-GFSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2322.00	60.4 PK	74.0	-13.6	1.41 H	75	28.68	31.72
2	2322.00	51.1 AV	54.0	-2.9	1.41 H	75	19.38	31.72
3	*2402.00	103.0 PK			1.41 H	89	70.97	32.03
4	*2402.00	98.7 AV			1.41 H	89	66.67	32.03
5	4804.00	47.2 PK	74.0	-26.8	1.22 H	330	7.67	39.53
6	4804.00	35.9 AV	54.0	-18.1	1.22 H	330	-3.63	39.53
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	2322.00	58.6 PK	74.0	-15.4	1.28 V	119	26.88	31.72
2	2322.00	48.4 AV	54.0	-5.6	1.28 V	119	16.68	31.72
3	*2402.00	101.1 PK			1.24 V	122	69.07	32.03
4	*2402.00	96.6 AV			1.24 V	122	64.57	32.03
5	4804.00	46.4 PK	74.0	-27.6	1.26 V	176	6.87	39.53
6	4804.00	35.7 AV	54.0	-18.3	1.26 V	176	-3.83	39.53

REMARKS:

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

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2361.06	60.0 PK	74.0	-14.0	1.44 H	119	28.13	31.87
2	2361.06	51.5 AV	54.0	-2.5	1.44 H	119	19.63	31.87
3	*2440.00	103.9 PK			1.41 H	122	71.78	32.12
4	*2440.00	99.7 AV			1.41 H	122	67.58	32.12
5	4880.00	46.8 PK	74.0	-27.2	1.22 H	173	7.09	39.71
6	4880.00	36.3 AV	54.0	-17.7	1.22 H	173	-3.41	39.71
7	7320.00	53.5 PK	74.0	-20.5	1.18 H	192	5.92	47.58
8	7320.00	43.6 AV	54.0	-10.4	1.18 H	192	-3.98	47.58
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	2361.06	58.4 PK	74.0	-15.6	1.00 V	117	26.53	31.87
2	2361.06	49.0 AV	54.0	-5.0	1.00 V	117	17.13	31.87
3	*2440.00	101.5 PK			1.00 V	117	69.38	32.12
4	*2440.00	97.3 AV			1.00 V	117	65.18	32.12
5	4880.00	46.5 PK	74.0	-27.5	1.22 V	186	6.79	39.71
6	4880.00	36.0 AV	54.0	-18.0	1.22 V	186	-3.71	39.71
7	7320.00	54.2 PK	74.0	-19.8	1.22 V	186	6.62	47.58
8	7320.00	44.1 AV	54.0	-9.9	1.22 V	186	-3.48	47.58

REMARKS:

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

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2480.00	104.5 PK			1.37 H	87	72.27	32.23
2	*2480.00	100.2 AV			1.37 H	87	67.97	32.23
3	2483.50	57.5 PK	74.0	-16.5	1.37 H	87	25.26	32.24
4	2483.50	45.9 AV	54.0	-8.1	1.37 H	87	13.66	32.24
5	4960.00	46.5 PK	74.0	-27.5	1.21 H	189	6.55	39.95
6	4960.00	36.0 AV	54.0	-18.0	1.21 H	189	-3.95	39.95
7	7440.00	53.1 PK	74.0	-20.9	1.21 H	179	5.70	47.40
8	7440.00	43.5 AV	54.0	-10.5	1.21 H	179	-3.90	47.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	102.0 PK			1.20 V	129	69.77	32.23
2	*2480.00	97.9 AV			1.20 V	129	65.67	32.23
3	2483.50	56.0 PK	74.0	-18.0	1.19 V	186	23.76	32.24
4	2483.50	43.3 AV	54.0	-10.7	1.19 V	186	11.06	32.24
5	4960.00	47.0 PK	74.0	-27.0	1.27 V	182	7.05	39.95
6	4960.00	36.3 AV	54.0	-17.7	1.27 V	182	-3.65	39.95
7	7440.00	53.7 PK	74.0	-20.3	1.20 V	170	6.30	47.40
8	7440.00	43.6 AV	54.0	-10.4	1.20 V	170	-3.80	47.40

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.

4.7.9 TEST RESULTS (WLAN MODE, CONDUCTED MEASUREMENT)

Radiated versus Conducted Measurement	
☒ Conducted measurement	☐ Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation) <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).	

Conducted Measurement Factor
a. The composite gain will be used when signal support the correlated signal. (Composite gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.63\text{dBi}$) b. For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands. c. For the band edge the gain for the specific band may have been used. d. In restricted bands below 1000 MHz, add upper bound on ground plane reflection: For $f = 30 - 1000$ MHz, add 4.7 dB. Note: The conducted emission test was considered some factor to compute test result.

ABOVE 1GHz DATA

802.11b - Channel 1

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	1609.375 PK	50.89	74	-23.11	-54.37	-53.68	6.63	-44.37
2	1615.625 AV	40.15	54	-13.85	-64.75	-64.75	6.63	-55.11
3	4825 PK	58.75	74	-15.25	-46.18	-46.13	6.63	-36.51
4	4821.875 AV	54.7	54	* 0.7	-49.98	-50.43	6.63	-40.56

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2387.14 PK	65.51	74	-8.49	-36.72	-47.56	6.63	-29.75
2	2387.14 AV	57.4	54	* 3.4	-44.71	-57.55	6.63	-37.86
3	2490.5 PK	56.39	74	-17.61	-47.58	-49.7	6.63	-38.87
4	2491.26 AV	43.82	54	-10.18	-61.6	-60.61	6.63	-51.44

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

802.11b - Channel 6

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	4875 PK	59.2	74	-14.8	-45.84	-45.57	6.63	-36.06
2	4871.875 AV	56.19	54	* 2.19	-49.26	-48.22	6.63	-39.07
3	7309.375 PK	58.7	74	-15.3	-44.77	-48.34	6.63	-36.56
4	7309.375 AV	51.73	54	-2.27	-51.09	-57.32	6.63	-43.53

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2386 PK	61.91	74	-12.09	-42.72	-43.28	6.63	-33.35
2	2384.1 AV	54.88	54	* 0.88	-50.02	-50.03	6.63	-40.38
3	2489.74 PK	59.27	74	-14.73	-44.34	-47.48	6.63	-35.99
4	2488.22 AV	48.86	54	-5.14	-55.89	-56.2	6.63	-46.4

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

802.11b - Channel 11

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	4925 PK	58.38	74	-15.62	-46.74	-46.32	6.63	-36.88
2	4921.875 AV	53.7	54	-0.3	-50.93	-51.49	6.63	-41.56
3	7387.5 PK	57.02	74	-16.98	-47.1	-48.84	6.63	-38.24
4	7384.375 AV	49.5	54	-4.5	-53.79	-57.98	6.63	-45.76

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2383.72 PK	56.39	74	-17.61	-48.5	-48.53	6.63	-38.87
2	2384.86 AV	46.43	54	-7.57	-57.88	-59.16	6.63	-48.83
3	2486.7 PK	69.36	74	-4.64	-32.89	-43.51	6.63	-25.9
4	2483.66 AV	59.8	54	* 5.8	-42.78	-50.44	6.63	-35.46

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

802.11g - Channel 1

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	1600 PK	49.93	74	-24.07	-55.44	-54.55	6.63	-45.33
2	1609.375 AV	40.18	54	-13.82	-64.71	-64.74	6.63	-55.08
3	4821.875 PK	54.32	74	-19.68	-50.24	-50.94	6.63	-40.94
4	4825 AV	43.73	54	-10.27	-61.22	-61.12	6.63	-51.53

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2389.8 PK	77.34	74	* 3.34	-25.16	-33.41	6.63	-17.92
2	2389.8 AV	58.61	54	* 4.61	-43.99	-51.5	6.63	-36.65
3	2490.12 PK	55.85	74	-18.15	-49.43	-48.7	6.63	-39.41
4	2492.78 AV	43.39	54	-10.61	-61.41	-61.61	6.63	-51.87

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

802.11g - Channel 6

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	1625 PK	50.05	74	-23.95	-54.85	-54.86	6.63	-45.21
2	1621.875 AV	40.2	54	-13.8	-64.81	-64.6	6.63	-55.06
3	4875 PK	56.79	74	-17.21	-49.48	-47.07	6.63	-38.47
4	4875 AV	45.87	54	-8.13	-58.86	-59.2	6.63	-49.39
5	7306.25 PK	57.24	74	-16.76	-46.66	-48.95	6.63	-38.02
6	7306.25 AV	46.52	54	-7.48	-57.38	-59.68	6.63	-48.74

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2389.04 PK	65.5	74	-8.5	-37.55	-42.68	6.63	-29.76
2	2389.8 AV	51.09	54	-2.91	-53.35	-54.33	6.63	-44.17
3	2484.8 PK	65.13	74	-8.87	-40.25	-39.34	6.63	-30.13
4	2483.66 AV	49.5	54	-4.5	-55.27	-55.54	6.63	-45.76

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

802.11g - Channel 11

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	4921.875 PK	53.53	74	-20.47	-50.41	-52.61	6.63	-41.73
2	4925 AV	43.11	54	-10.89	-61.66	-61.93	6.63	-52.15
3	7378.125 PK	54.64	74	-19.36	-50.24	-50.28	6.63	-40.62
4	7390.625 AV	44.46	54	-9.54	-60.41	-60.48	6.63	-50.8

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2383.34 PK	55.44	74	-18.56	-48.04	-51.59	6.63	-39.82
2	2381.06 AV	42.56	54	-11.44	-62.16	-62.53	6.63	-52.7
3	2484.04 PK	72	74	-2	-30.77	-37.25	6.63	-23.26
4	2483.66 AV	54.25	54	* 0.25	-48.99	-53.39	6.63	-41.01

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

802.11n(HT20) - Channel 1

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	1609.375 PK	50.39	74	-23.61	-54.32	-54.7	6.63	-44.87
2	1600 AV	40.21	54	-13.79	-64.63	-64.76	6.63	-55.05
3	4825 PK	53.8	74	-20.2	-50.98	-51.23	6.63	-41.46
4	4821.875 AV	43.45	54	-10.55	-61.51	-61.39	6.63	-51.81

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2389.8 PK	73.86	74	-0.14	-28.79	-35.96	6.63	-21.4
2	2389.8 AV	58.59	54	* 4.59	-44.05	-51.27	6.63	-36.67
3	2495.82 PK	55.79	74	-18.21	-48.64	-49.64	6.63	-39.47
4	2492.4 AV	43.39	54	-10.61	-61.35	-61.68	6.63	-51.87

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

802.11n(HT20) - Channel 6

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	1621.875 AV	40.19	54	-13.81	-64.73	-64.69	6.63	-55.07
2	4868.75 PK	56.3	74	-17.7	-48.46	-48.74	6.63	-38.96
3	4871.875 AV	45.38	54	-8.62	-59.75	-59.3	6.63	-49.88
4	7309.375 PK	57.7	74	-16.3	-45.74	-49.41	6.63	-37.56
5	7306.25 AV	47.04	54	-6.96	-56.52	-59.82	6.63	-48.22

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2388.66 PK	65.51	74	-8.49	-37.49	-42.84	6.63	-29.75
2	2389.8 AV	51.16	54	-2.84	-53.08	-54.53	6.63	-44.1
3	2484.04 PK	64.49	74	-9.51	-39.12	-42.24	6.63	-30.77
4	2483.66 AV	49.78	54	-4.22	-54.83	-55.44	6.63	-45.48

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

802.11n(HT20) - Channel 11

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	4928.125 PK	53.93	74	-20.07	-51.03	-50.92	6.63	-41.33
2	4928.125 AV	43.15	54	-10.85	-61.69	-61.82	6.63	-52.11
3	7378.125 PK	55.54	74	-18.46	-48.39	-50.6	6.63	-39.72
4	7390.625 AV	44.41	54	-9.59	-60.59	-60.39	6.63	-50.85

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2381.82 PK	54.3	74	-19.7	-50.11	-51.16	6.63	-40.96
2	2379.92 AV	42.04	54	-11.96	-62.29	-63.52	6.63	-53.22
3	2483.66 PK	70.83	74	-3.17	-31.47	-41.46	6.63	-24.43
4	2483.66 AV	55.5	54	* 1.5	-47.06	-54.85	6.63	-39.76

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

802.11n(HT40) - Channel 3

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	1621.875 PK	50.18	74	-23.82	-55.4	-54.13	6.63	-45.08
2	1615.625 AV	40.2	54	-13.8	-64.81	-64.59	6.63	-55.06
3	4843.75 PK	53.45	74	-20.55	-50.82	-52.19	6.63	-41.81
4	4834.375 AV	43.15	54	-10.85	-61.68	-61.83	6.63	-52.11
5	7271.875 PK	54.92	74	-19.08	-50.61	-49.43	6.63	-40.34
6	7256.25 AV	44.32	54	-9.68	-60.5	-60.67	6.63	-50.94

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2387.14 PK	74.85	74	* 0.85	-27.51	-36.92	6.63	-20.41
2	2389.42 AV	57.88	54	* 3.88	-44.91	-51.28	6.63	-37.38
3	2483.66 PK	58.25	74	-15.75	-45.47	-48.28	6.63	-37.01
4	2483.66 AV	44.71	54	-9.29	-59.75	-60.69	6.63	-50.55

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

802.11n(HT40) - Channel 6

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	1618.75 PK	50.26	74	-23.74	-54.7	-54.59	6.63	-45
2	1621.875 AV	40.23	54	-13.77	-64.68	-64.66	6.63	-55.03
3	4875 PK	54.09	74	-19.91	-51.21	-50.44	6.63	-41.17
4	4881.25 AV	43.24	54	-10.76	-61.61	-61.71	6.63	-52.02
5	7306.25 PK	55.46	74	-18.54	-49.61	-49.28	6.63	-39.8
6	7303.125 AV	44.66	54	-9.34	-60.02	-60.47	6.63	-50.6

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2389.04 PK	72.12	74	-1.88	-31.88	-33.93	6.63	-23.14
2	2389.8 AV	54.63	54	* 0.63	-48.83	-52.43	6.63	-40.63
3	2484.42 PK	76.05	74	* 2.05	-32.61	-26.87	6.63	-19.21
4	2483.66 AV	56.19	54	* 2.19	-48.63	-48.79	6.63	-39.07

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

802.11n(HT40) - Channel 9

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	4906.25 PK	53.79	74	-20.21	-50.4	-51.95	6.63	-41.47
2	4896.875 AV	42.79	54	-11.21	-62.09	-62.13	6.63	-52.47
3	7365.625 PK	54.94	74	-19.06	-49.41	-50.58	6.63	-40.32
4	7365.625 AV	44.14	54	-9.86	-60.84	-60.69	6.63	-51.12

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	2389.8 PK	56.3	74	-17.7	-47.88	-49.46	6.63	-38.96
2	2388.66 AV	44.03	54	-9.97	-60.61	-61.15	6.63	-51.23
3	2483.66 PK	73.66	74	-0.34	-30.12	-32.75	6.63	-21.6
4	2483.66 AV	56.37	54	* 2.37	-46.92	-51.13	6.63	-38.89

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

4.8 AC POWER LINE CONDUCTED EMISSION MEASUREMENT

4.8.1 LIMITS OF AC POWER LINE CONDUCTED EMISSION MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 07, 2013	June 06, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
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: July 24, 2013

4.8.3 TEST PROCEDURES

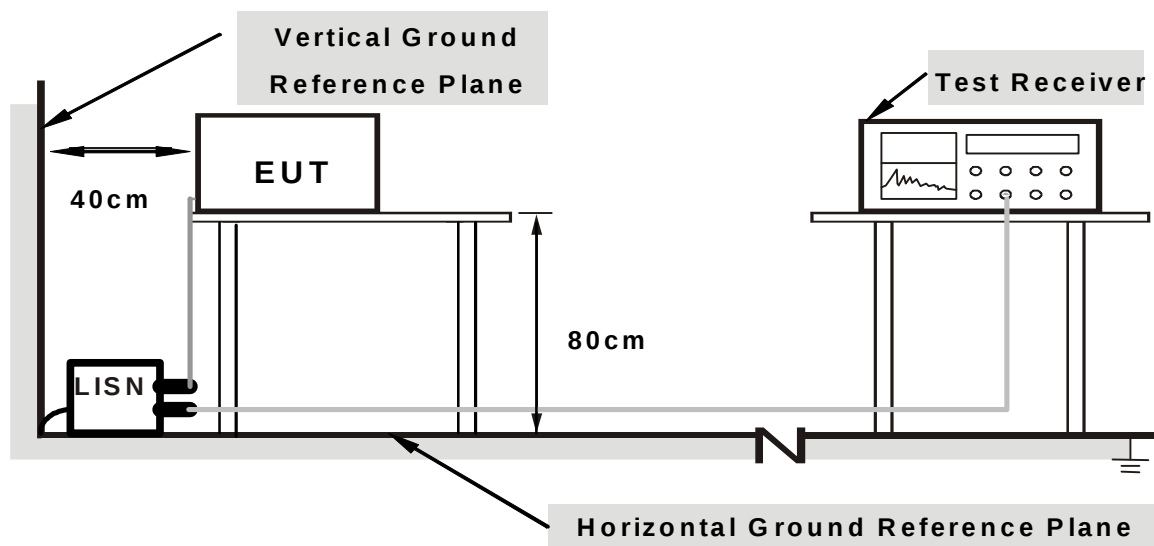
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 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.

4.8.6 EUT OPERATING CONDITIONS

Same as Item 4.7.6

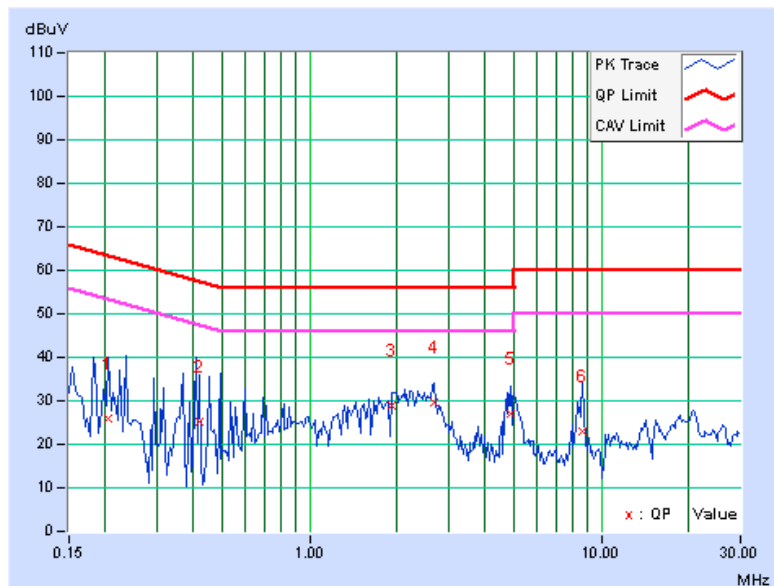
4.8.7 TEST RESULTS (WLAN MODE)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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	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	0.20469	0.14	25.75	20.69	25.89	20.83	63.42	53.42	-37.53	-32.59
2	0.41881	0.18	25.04	10.30	25.22	10.48	57.47	47.47	-32.25	-36.99
3	1.91406	0.27	28.74	16.49	29.01	16.76	56.00	46.00	-26.99	-29.24
4	2.66016	0.31	29.28	20.36	29.59	20.67	56.00	46.00	-26.41	-25.33
5	4.86719	0.40	26.82	11.33	27.22	11.73	56.00	46.00	-28.78	-34.27
6	8.66406	0.59	22.32	6.38	22.91	6.97	60.00	50.00	-37.09	-43.03

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

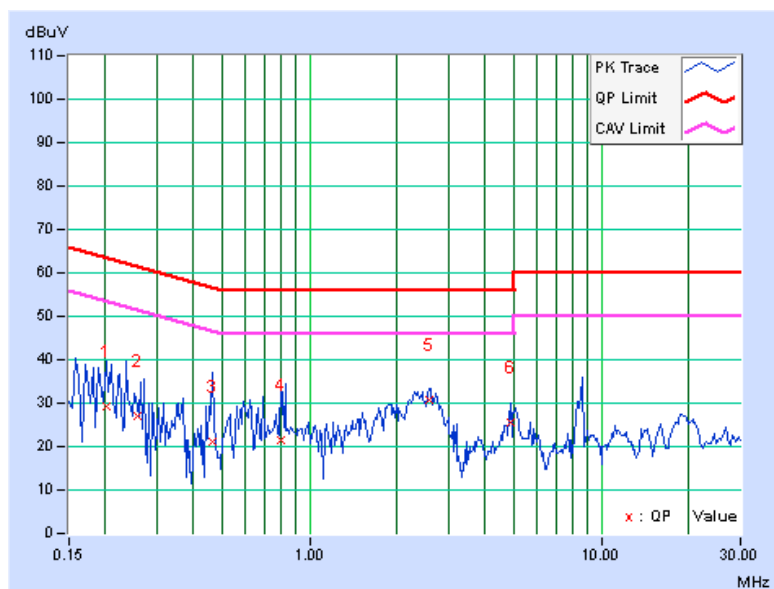


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20078	0.12	28.99	20.55	29.11	20.67	63.58	53.58	-34.47	-32.91
2	0.25897	0.13	26.94	18.91	27.07	19.04	61.46	51.46	-34.39	-32.42
3	0.46250	0.17	21.09	14.85	21.26	15.02	56.65	46.65	-35.38	-31.62
4	0.80234	0.19	21.24	11.21	21.43	11.40	56.00	46.00	-34.57	-34.60
5	2.56250	0.28	30.31	23.45	30.59	23.73	56.00	46.00	-25.41	-22.27
6	4.87500	0.36	25.09	11.73	25.45	12.09	56.00	46.00	-30.55	-33.91

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



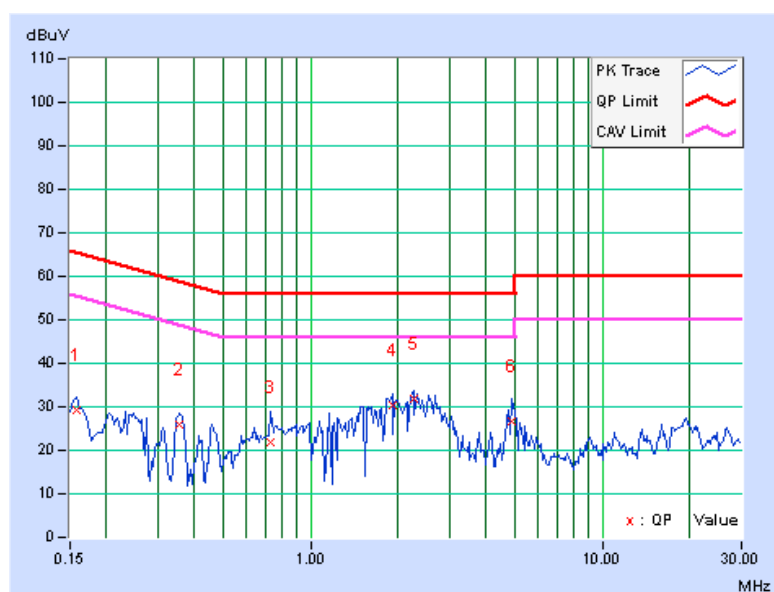
4.8.8 TEST RESULTS (BT<LE> MODE)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.12	29.31	20.92	29.43	21.04	65.58	55.58	-36.15	-34.54
2	0.35703	0.17	25.80	19.59	25.97	19.76	58.80	48.80	-32.83	-29.04
3	0.73203	0.20	21.81	13.75	22.01	13.95	56.00	46.00	-33.99	-32.05
4	1.90234	0.27	30.27	18.57	30.54	18.84	56.00	46.00	-25.46	-27.16
5	2.25000	0.29	31.40	23.28	31.69	23.57	56.00	46.00	-24.31	-22.43
6	4.92188	0.41	26.39	11.62	26.80	12.03	56.00	46.00	-29.20	-33.97

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

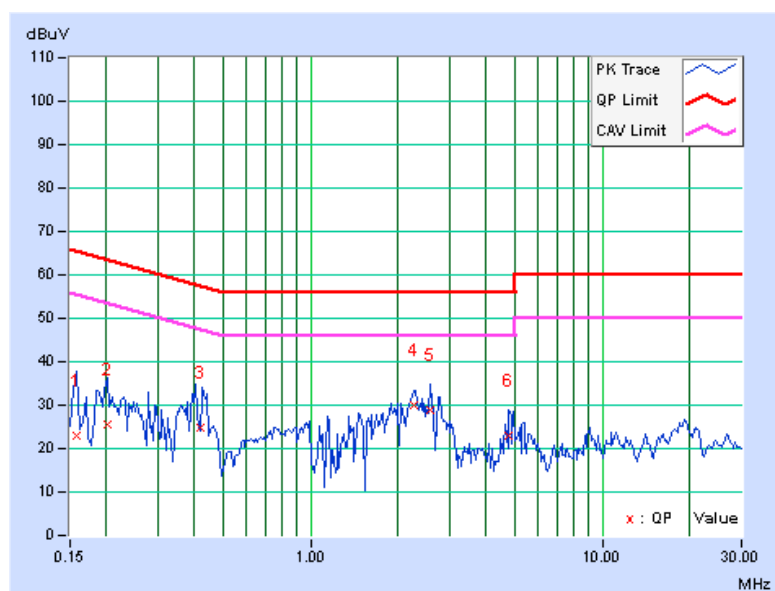


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.10	22.72	12.47	22.82	12.57	65.58	55.58	-42.76	-43.01
2	0.20078	0.12	25.60	20.34	25.72	20.46	63.58	53.58	-37.86	-33.12
3	0.41916	0.17	24.70	16.50	24.87	16.67	57.46	47.46	-32.59	-30.79
4	2.25391	0.27	29.81	21.81	30.08	22.08	56.00	46.00	-25.92	-23.92
5	2.57422	0.28	28.53	19.50	28.81	19.78	56.00	46.00	-27.19	-26.22
6	4.77734	0.35	22.48	12.43	22.83	12.78	56.00	46.00	-33.17	-33.22

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



5. TEST TYPES AND RESULTS (FOR 5GHz, 5725~5850MHz Band)

5.1 CONDUCTED OUTPUT POWER MEASUREMENT

5.1.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725 –5850 MHz band: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

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

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 $NANT \geq 5$.

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

5.1.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 20, 2013	May 19, 2014
Power Sensor	MA2411B	0738172	May 20, 2013	May 19, 2014

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, 2013

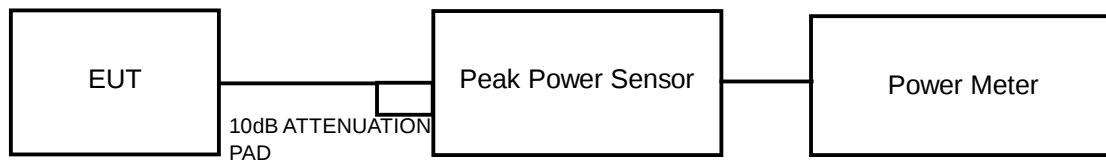
5.1.3 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the peak power level.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 TEST SETUP



5.1.6 EUT OPERATING CONDITIONS

Same as Item 4.1.6

5.1.7 TEST RESULTS

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
149	5745	17.65	18.21	124.432	20.95	28.23	PASS
157	5785	17.36	17.69	113.199	20.54	28.23	PASS
165	5825	16.98	17.71	108.908	20.37	28.23	PASS

NOTE: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.77-6) = 28.23dBm.

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
149	5745	17.30	18.14	118.866	20.75	28.23	PASS
157	5785	17.41	17.87	116.316	20.66	28.23	PASS
165	5825	17.14	16.85	100.178	20.01	28.23	PASS

NOTE: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.77-6) = 28.23dBm.

802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
151	5755	17.11	17.51	107.768	20.32	28.23	PASS
159	5795	17.06	18.08	115.085	20.61	28.23	PASS

NOTE: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.77-6) = 28.23dBm.

5.2 AVERAGE OUTPUT POWER

5.2.1 For reference.

5.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 20, 2013	May 19, 2014
Power Sensor	MA2411B	0738172	May 20, 2013	May 19, 2014

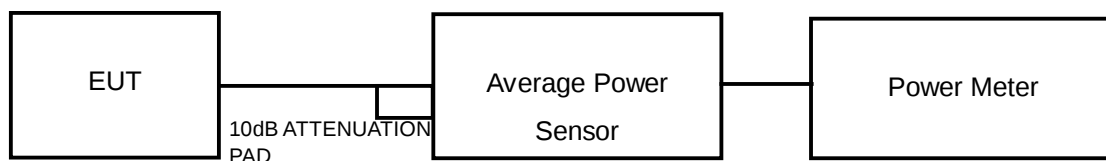
Note:

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, 2013

5.2.3 TEST PROCEDURES

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the average power level.

5.2.4 TEST SETUP



5.2.5 EUT OPERATING CONDITIONS

Same as Item 4.1.6

5.2.6 TEST RESULTS

802.11a :

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		AVERAGE POWER OUTPUT (dBm)
		Chain(0)	Chain(1)	
149	5745	13.61	14.94	17.34
157	5785	13.39	14.87	17.20
165	5825	13.29	14.37	16.87

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		AVERAGE POWER OUTPUT (dBm)
		Chain(0)	Chain(1)	
149	5745	13.04	14.84	17.04
157	5785	13.32	14.93	17.21
165	5825	13.23	13.86	16.57

802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		AVERAGE POWER OUTPUT (dBm)
		Chain(0)	Chain(1)	
151	5755	11.52	12.90	15.27
159	5795	11.46	13.13	15.39

5.3 POWER SPECTRAL DENSITY MEASUREMENT

5.3.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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, 2013

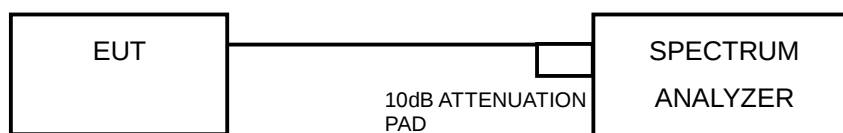
5.3.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

5.3.4 DEVIATION FROM TEST STANDARD

No deviation

5.3.5 TEST SETUP



5.3.6 EUT OPERATING CONDITION

Same as Item 4.1.6

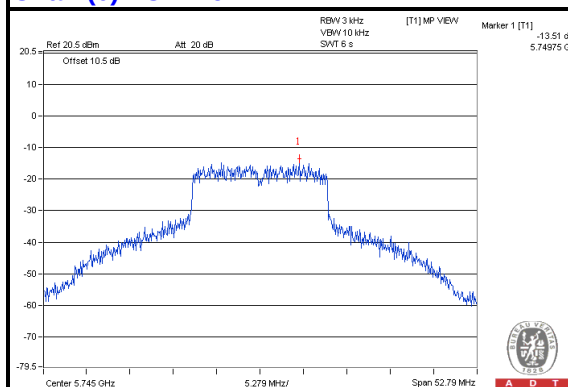
5.3.7 TEST RESULTS

802.11a

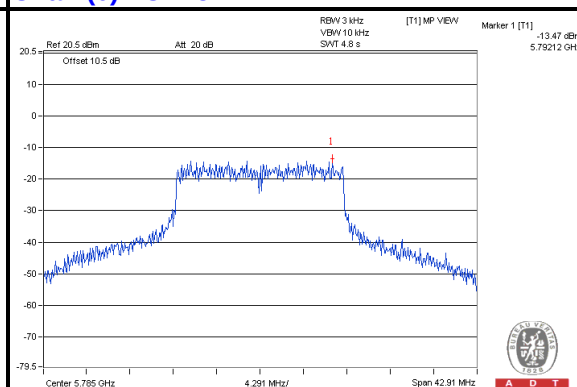
TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-13.51	3.01	-10.50	6.23	PASS
	157	5785	-13.47	3.01	-10.46	6.23	PASS
	165	5825	-14.34	3.01	-11.33	6.23	PASS
1	149	5745	-11.63	3.01	-8.62	6.23	PASS
	157	5785	-10.23	3.01	-7.22	6.23	PASS
	165	5825	-12.85	3.01	-9.84	6.23	PASS

NOTE: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dBi , so the power density limit shall be reduced to 8-(7.77-6) = 6.23dBm.

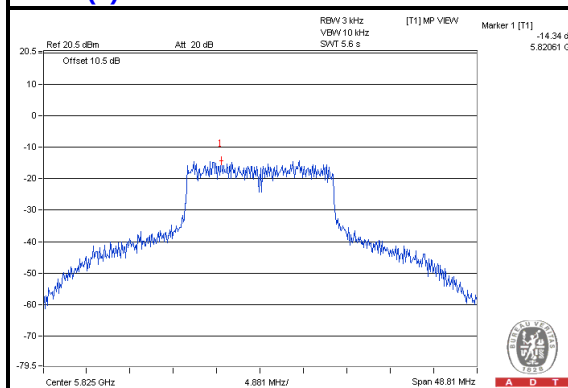
Chain(0) : CH149



Chain(0) : CH157



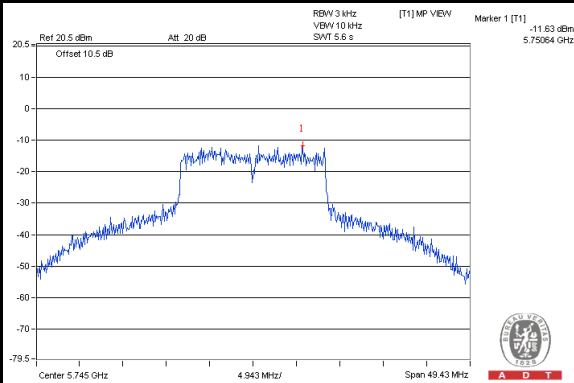
Chain(0) : CH165



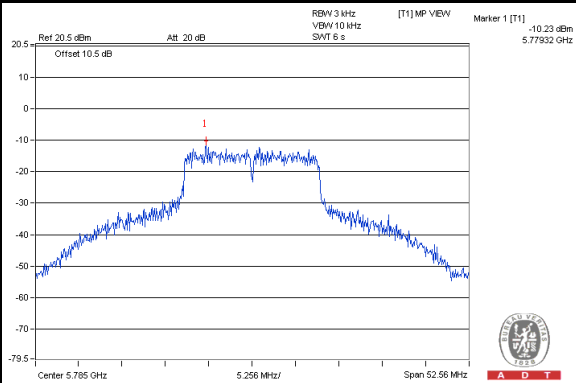


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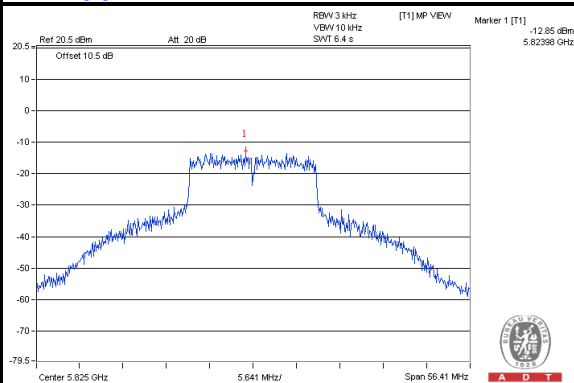
Chain(1) : CH149



Chain(1) : CH157



Chain(1) : CH165

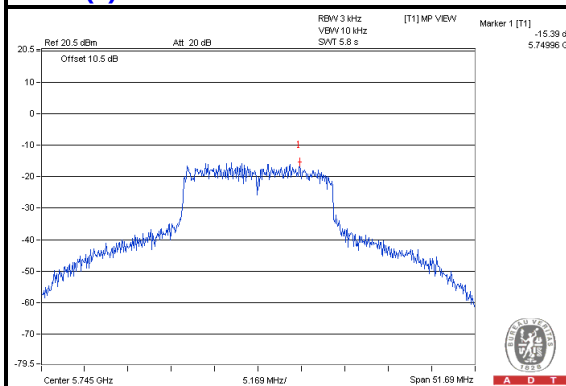


802.11n (HT20):

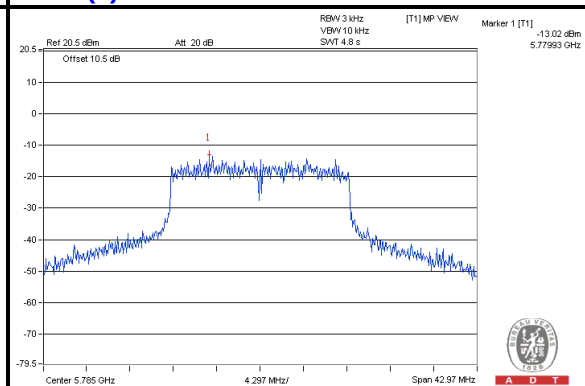
TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-15.39	3.01	-12.38	6.23	PASS
	157	5785	-13.02	3.01	-10.01	6.23	PASS
	165	5825	-14.84	3.01	-11.83	6.23	PASS
1	149	5745	-12.03	3.01	-9.02	6.23	PASS
	157	5785	-12.26	3.01	-9.25	6.23	PASS
	165	5825	-12.95	3.01	-9.94	6.23	PASS

NOTE: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dBi , so the power density limit shall be reduced to 8-(7.77-6) = 6.23dBm.

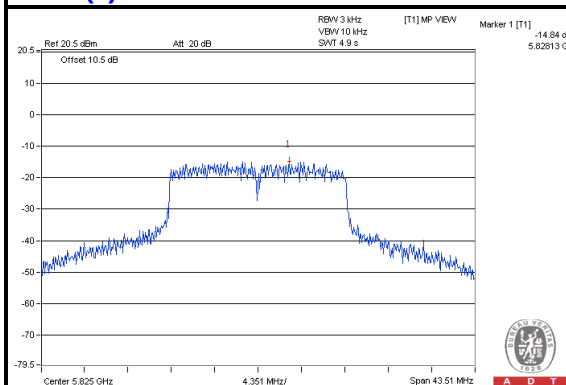
Chain(0) : CH149



Chain(0) : CH157



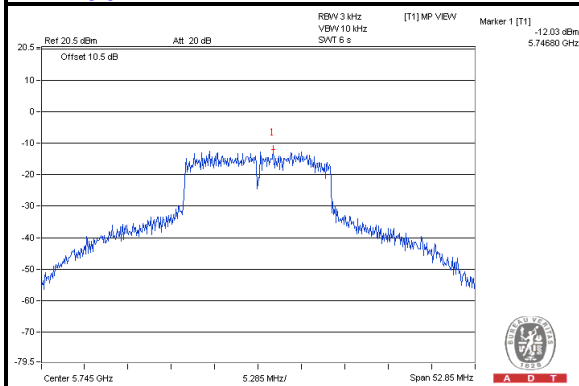
Chain(0) : CH165



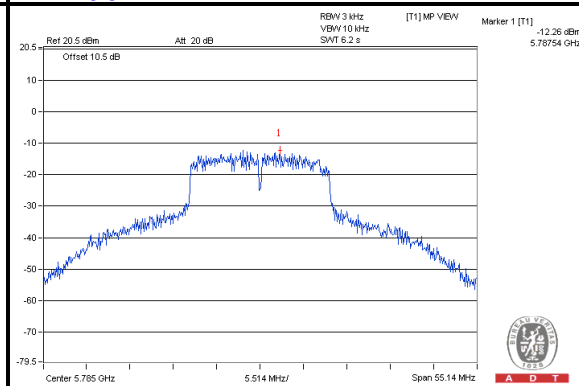


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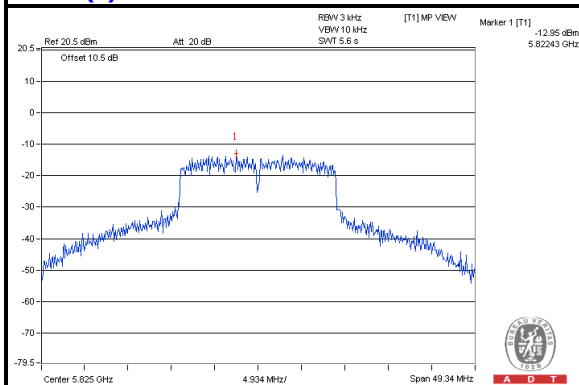
Chain(1) : CH149



Chain(1) : CH157



Chain(1) : CH165





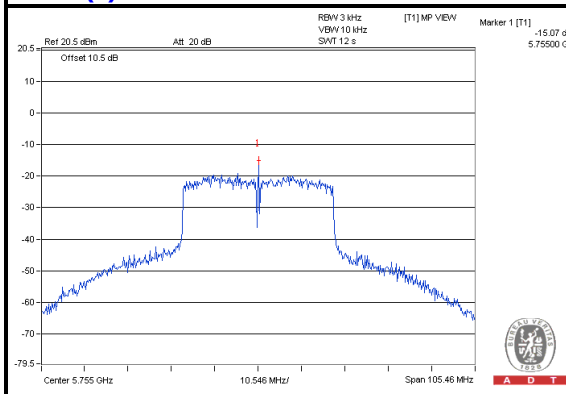
A D T

802.11n (HT40)

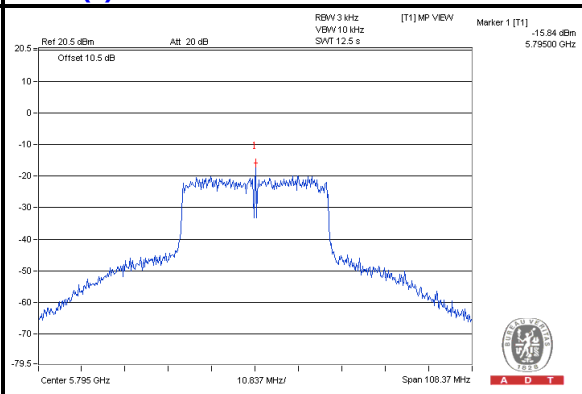
TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-15.07	3.01	-12.06	6.23	PASS
	157	5785	-15.84	3.01	-12.83	6.23	PASS
1	149	5745	-15.67	3.01	-12.66	6.23	PASS
	157	5785	-16.58	3.01	-13.57	6.23	PASS

NOTE: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dBi , so the power density limit shall be reduced to 8-(7.77-6) = 6.23dBm.

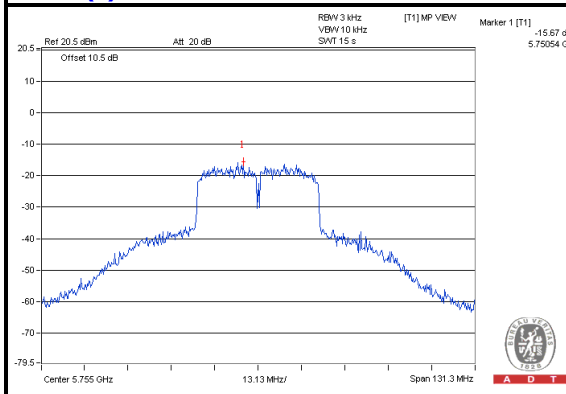
Chain(0) : CH151



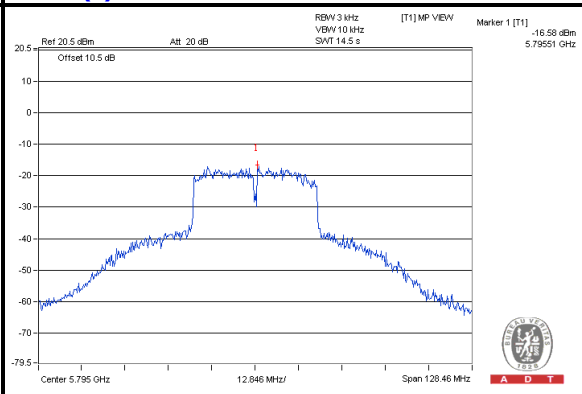
Chain(0) : CH159



Chain(1) : CH151



Chain(1) : CH159





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5.4 6dB BANDWIDTH MEASUREMENT

5.4.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

5.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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, 2013

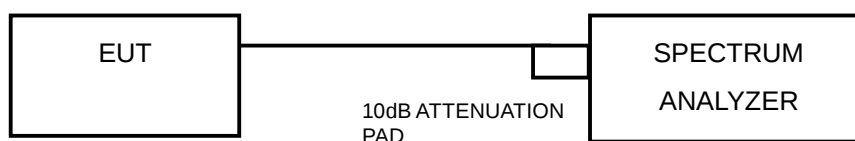
5.4.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITIONS

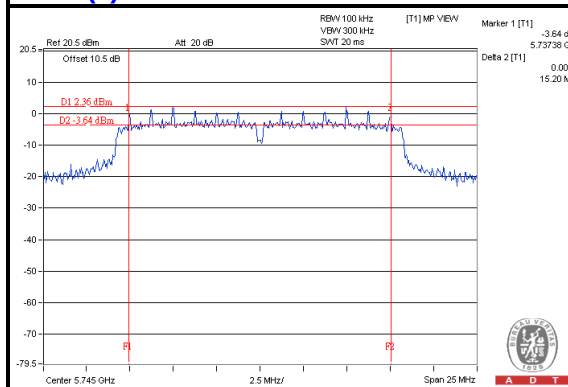
Same as the 4.1.6

5.4.7 TEST RESULTS

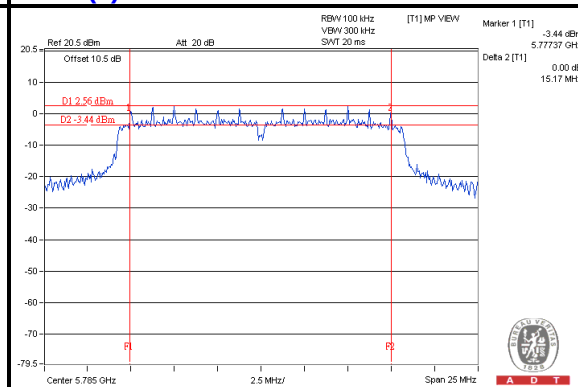
802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
149	5745	15.20	15.76	0.5	PASS
157	5785	15.17	15.20	0.5	PASS
165	5825	15.38	15.36	0.5	PASS

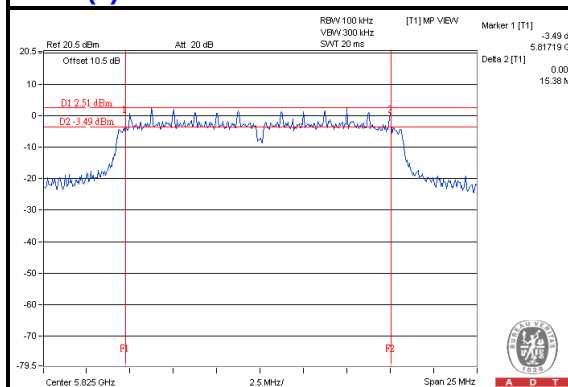
Chain(0) : CH149



Chain(0) : CH157



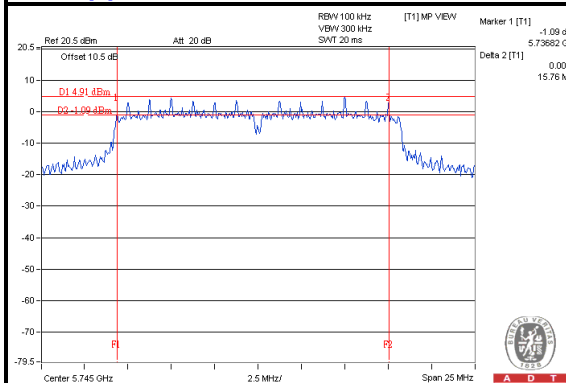
Chain(0) : CH165



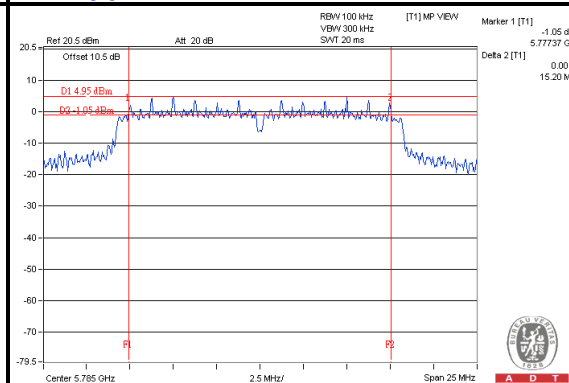


A D T

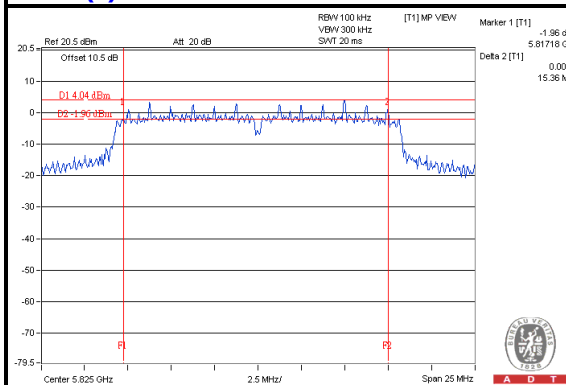
Chain(1) : CH149



Chain(1) : CH157



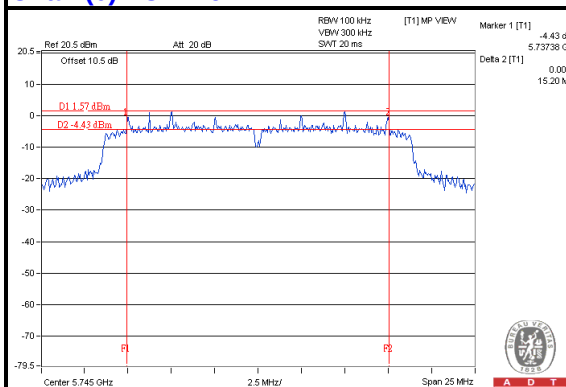
Chain(1) : CH165



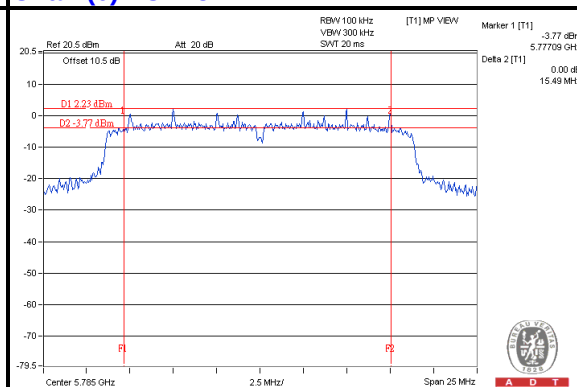
802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
149	5745	15.20	15.74	0.5	PASS
157	5785	15.49	15.75	0.5	PASS
165	5825	15.75	15.19	0.5	PASS

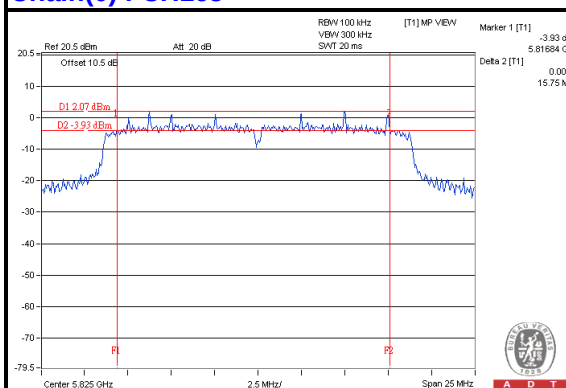
Chain(0) : CH149



Chain(0) : CH157



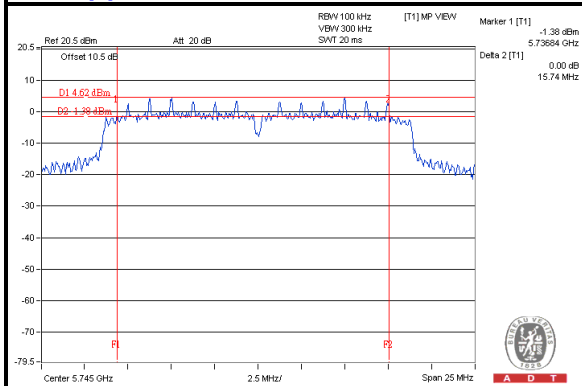
Chain(0) : CH165



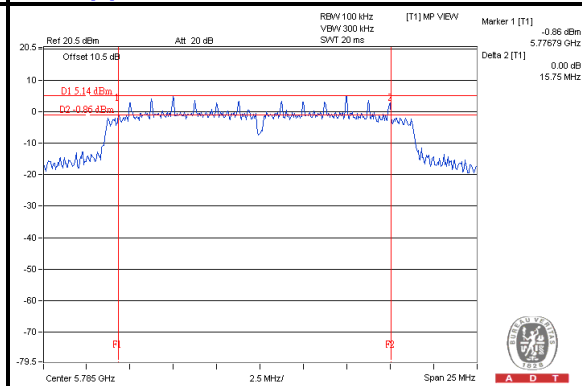


A D T

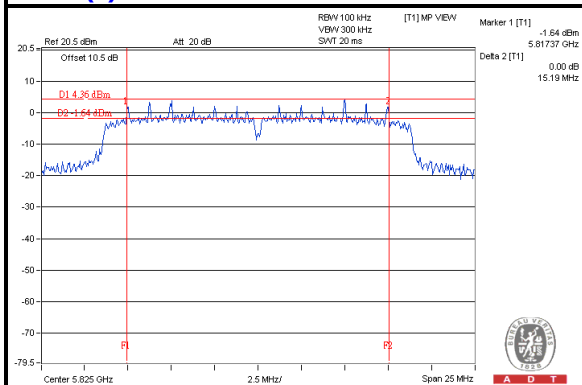
Chain(1) : CH149



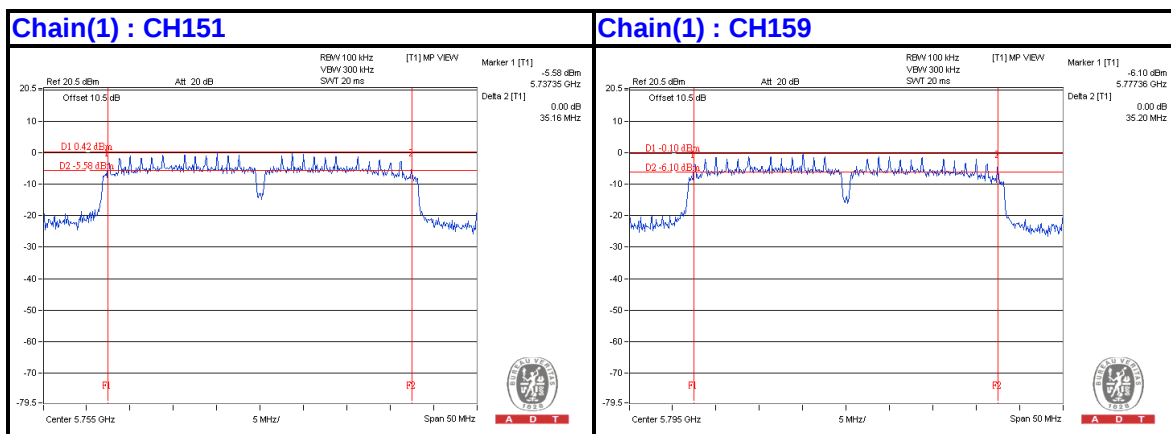
Chain(1) : CH157



Chain(1) : CH165



CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
151	5755	35.29	35.16	0.5	PASS
159	5795	35.22	35.20	0.5	PASS



5.5 OCCUPIED BANDWIDTH MEASUREMENT

5.5.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

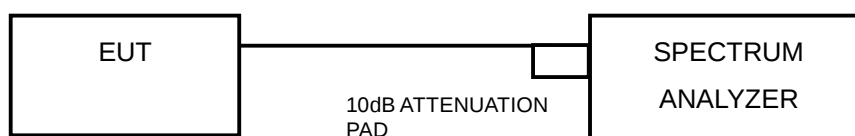
Note:

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, 2013

5.5.2 TEST PROCEDURE

1. Set RBW $\geq 1\%$ of the emission bandwidth.
2. Set the VBW $> 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Record the 99% emission bandwidth.

5.5.3 TEST SETUP



5.5.4 EUT OPERATING CONDITIONS

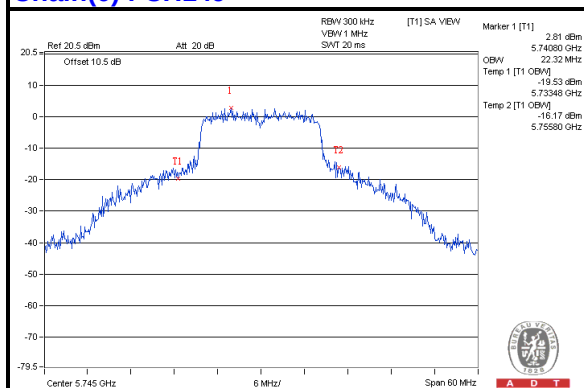
Same as the 4.1.6

5.5.5 TEST RESULTS

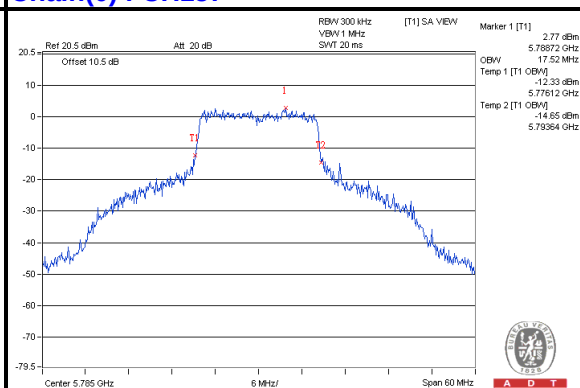
802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
149	5745	22.32	22.20
157	5785	17.52	25.44
165	5825	18.36	24.48

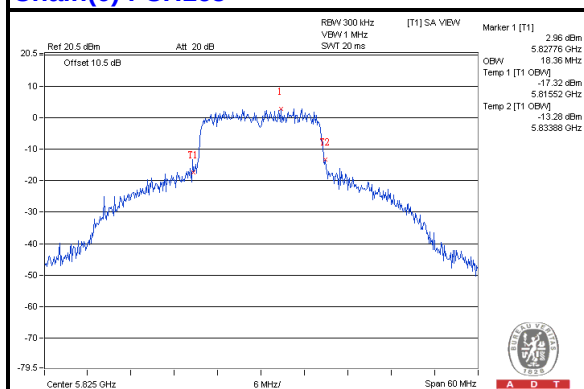
Chain(0) : CH149



Chain(0) : CH157



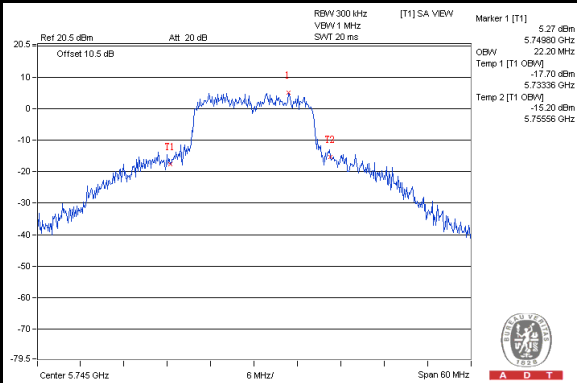
Chain(0) : CH165



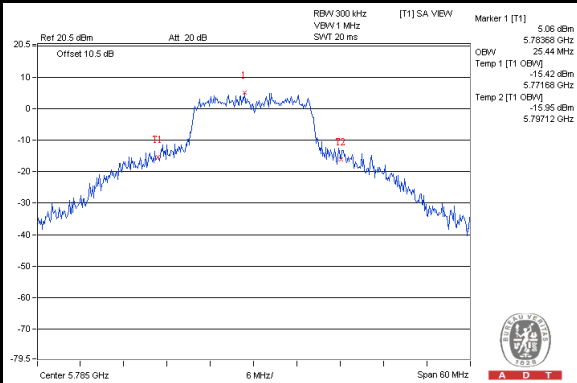


A D T

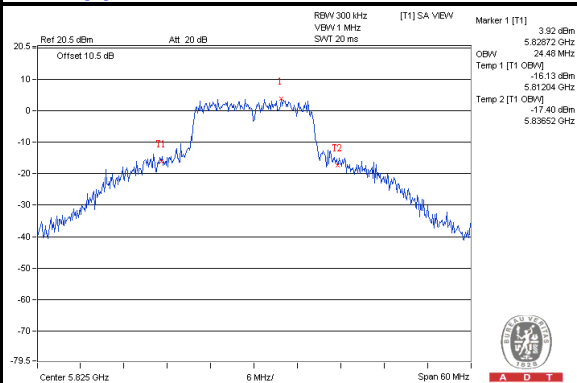
Chain(1) : CH149



Chain(1) : CH157



Chain(1) : CH165



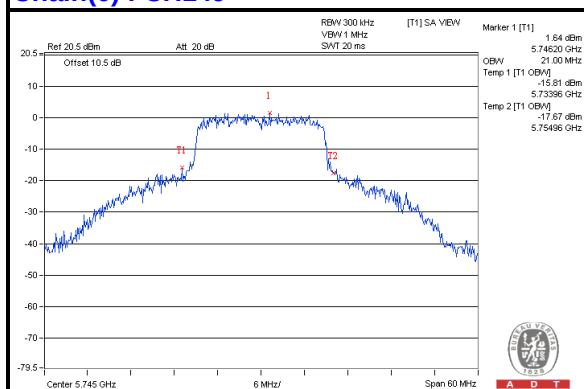


A D T

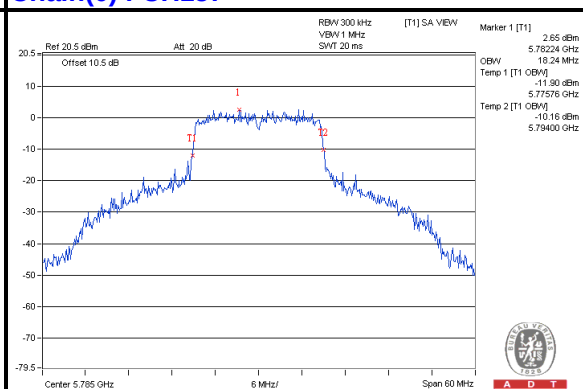
802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
149	5745	21.00	22.68
157	5785	18.24	25.92
165	5825	18.72	24.84

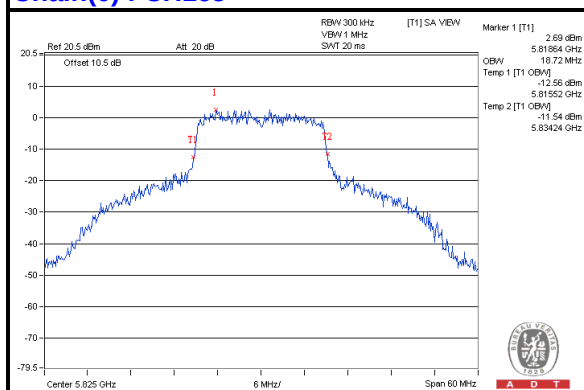
Chain(0) : CH149



Chain(0) : CH157



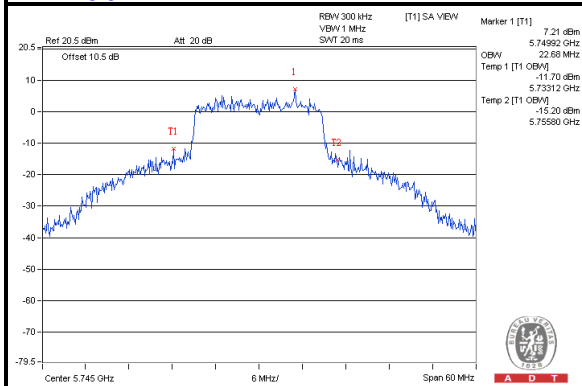
Chain(0) : CH165



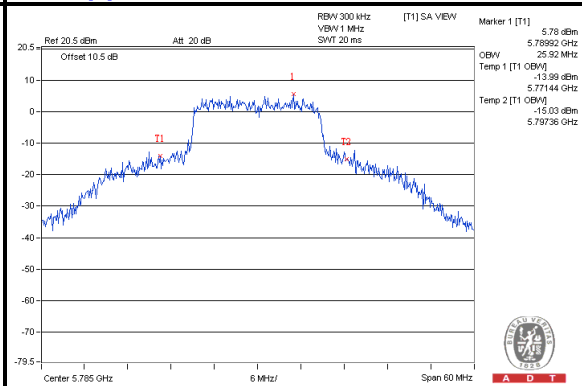


A D T

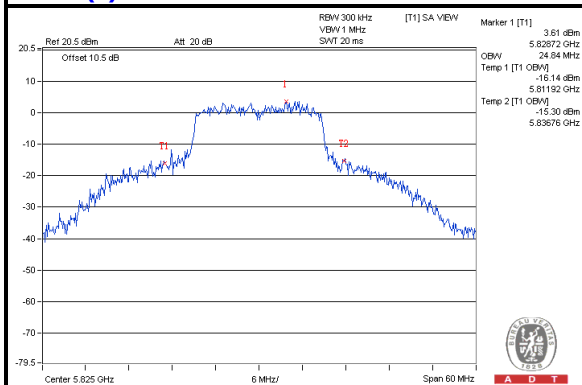
Chain(1) : CH149



Chain(1) : CH157



Chain(1) : CH165



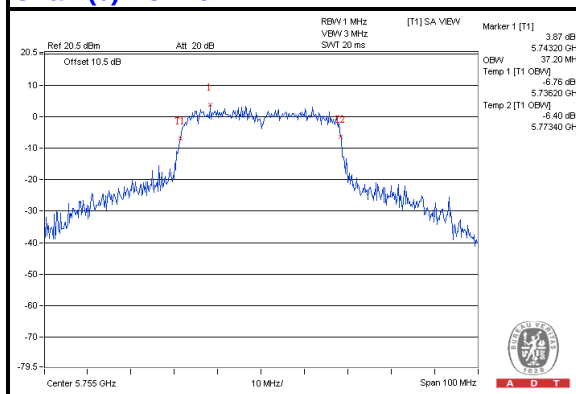


A D T

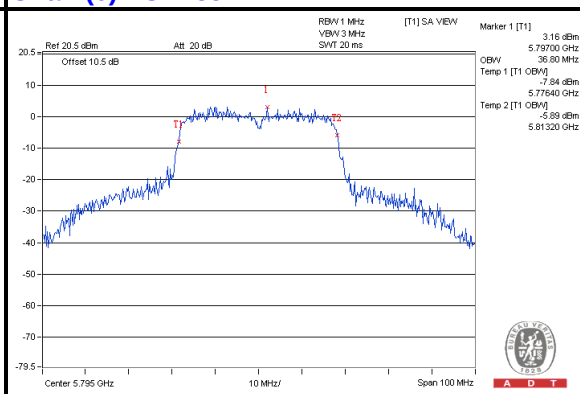
802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
151	5755	37.20	41.80
159	5795	36.80	42.80

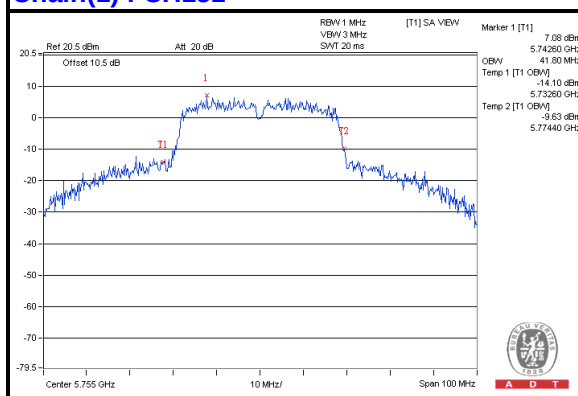
Chain(0) : CH151



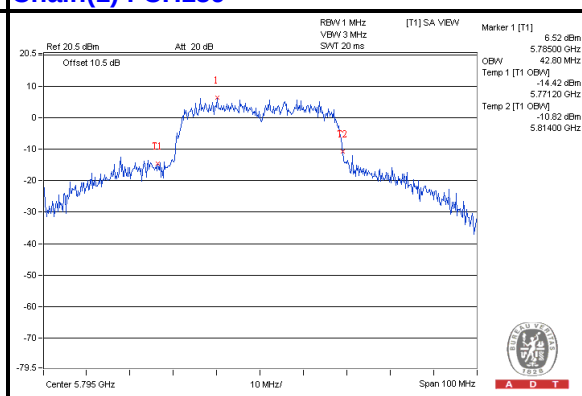
Chain(0) : CH159



Chain(1) : CH151



Chain(1) : CH159





A D T

5.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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, 2013

5.6.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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 –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

5.6.6 TEST RESULTS

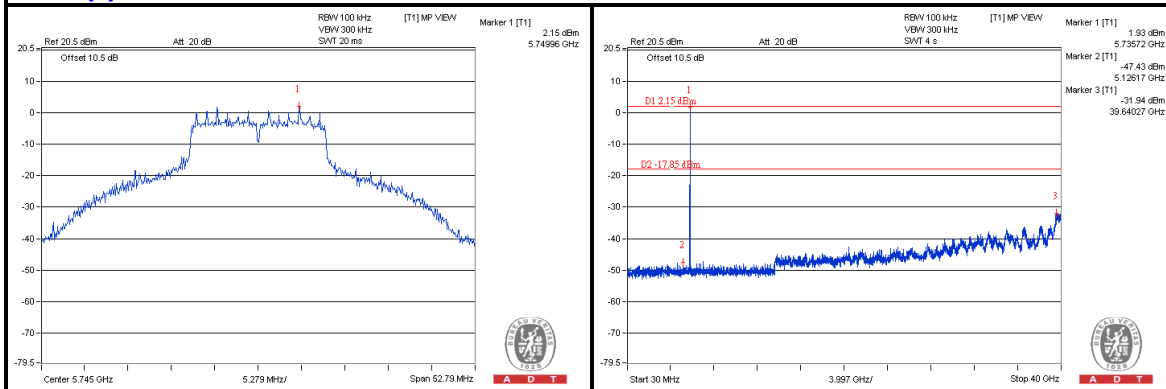
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



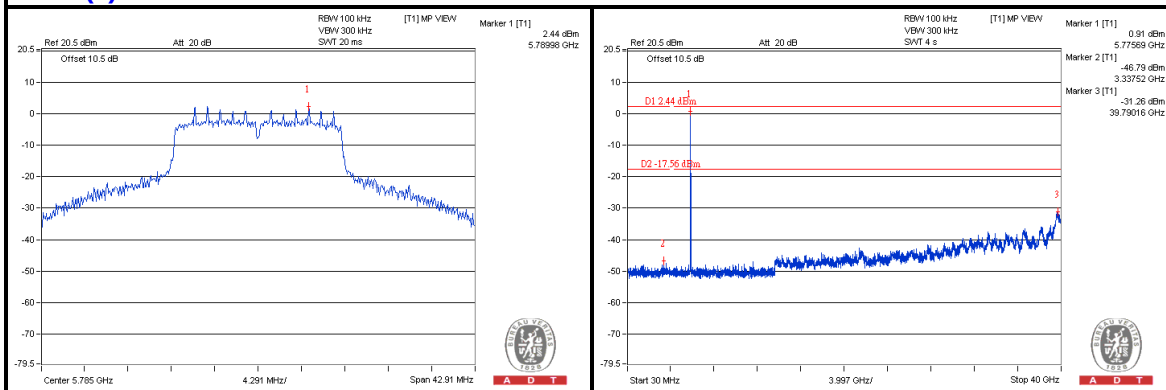
A D T

802.11a

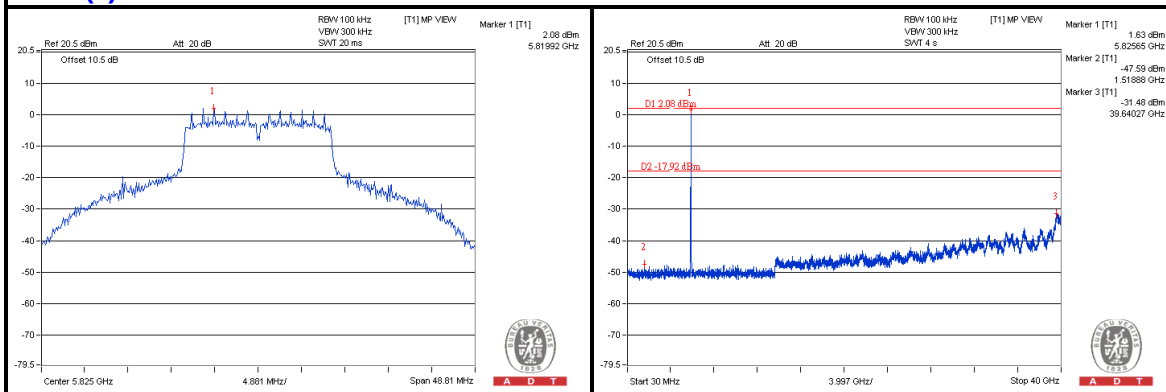
Chain(0) : CH149



Chain(0) : CH 157



Chain(0) : CH 165

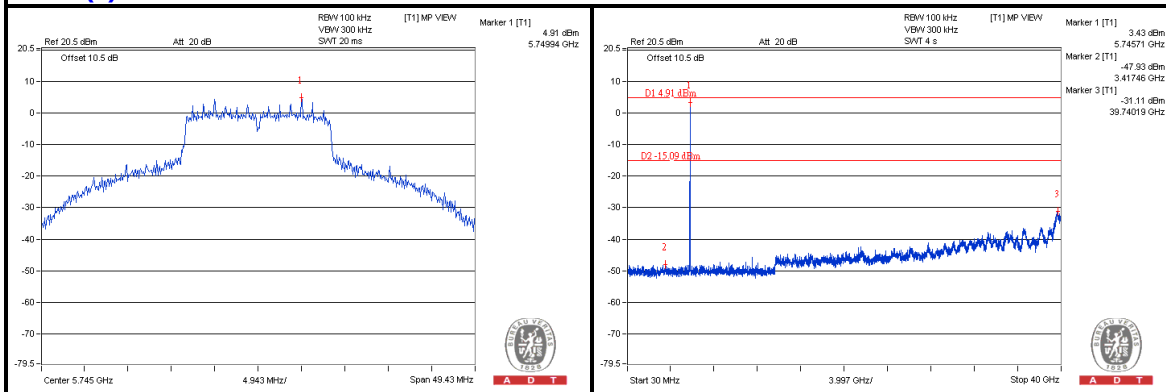




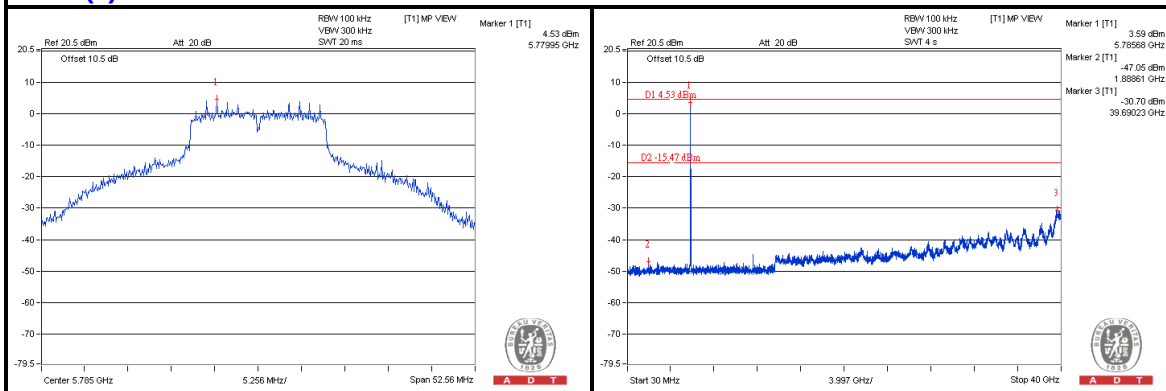
A D T

802.11a

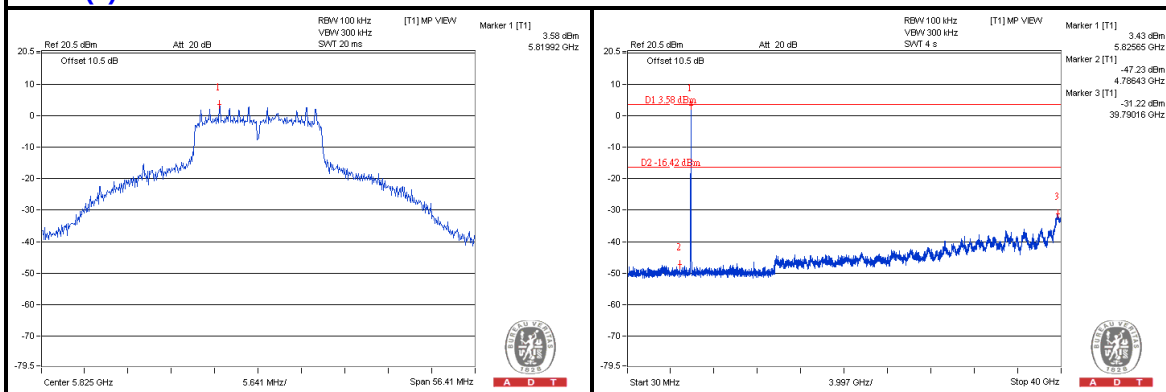
Chain(1) : CH149



Chain(1) : CH 157



Chain(1) : CH 165

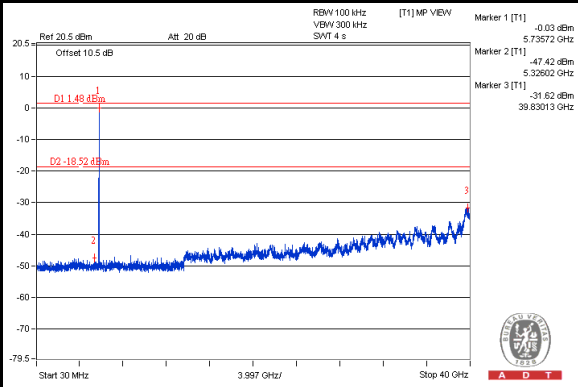
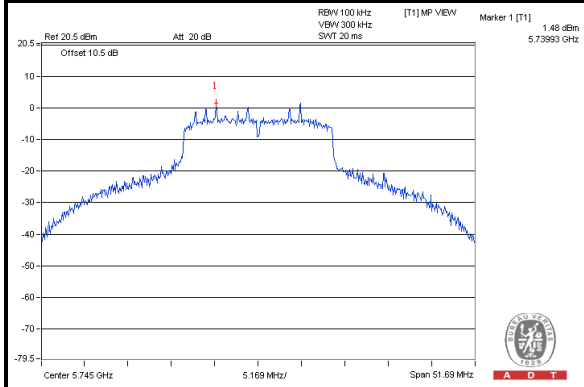




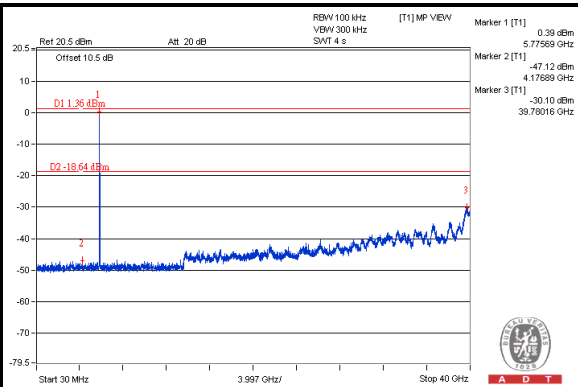
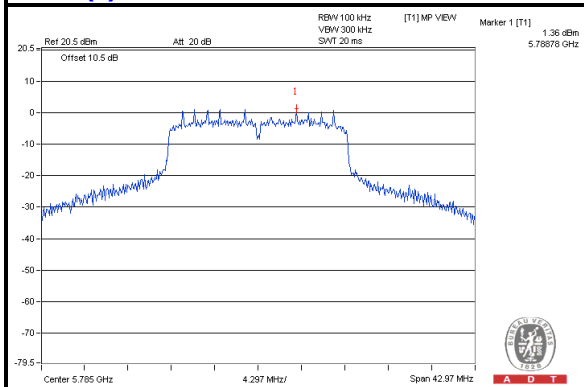
A D T

802.11n (HT20)

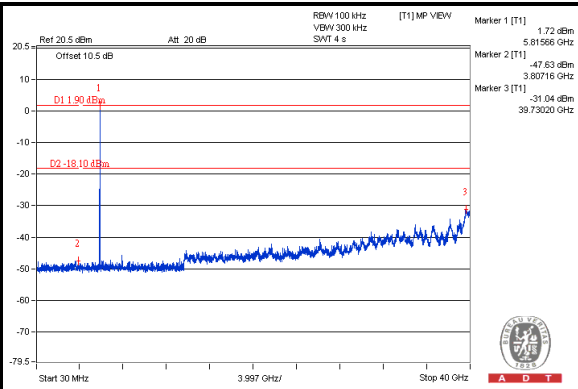
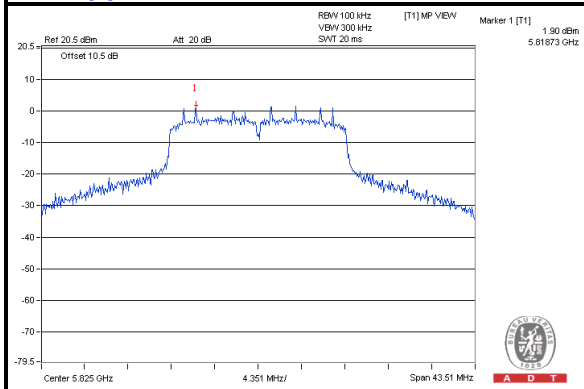
Chain(0) : CH149



Chain(0) : CH 157



Chain(0) : CH 165

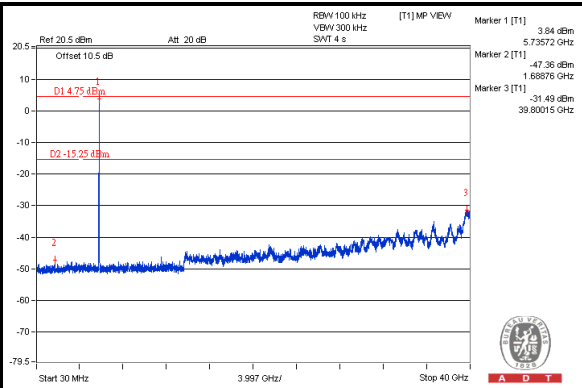
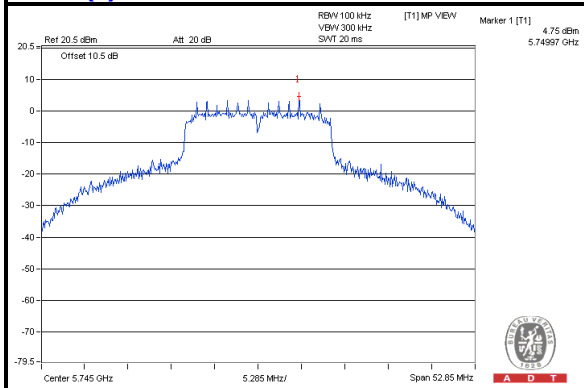




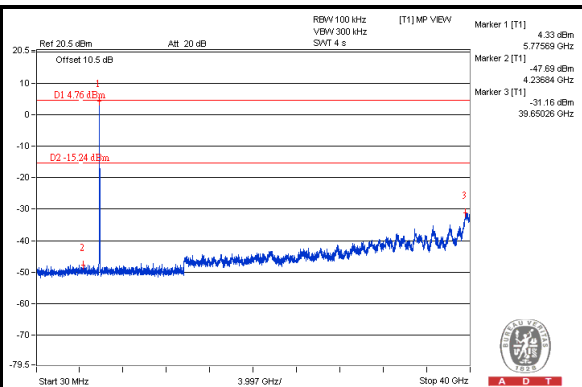
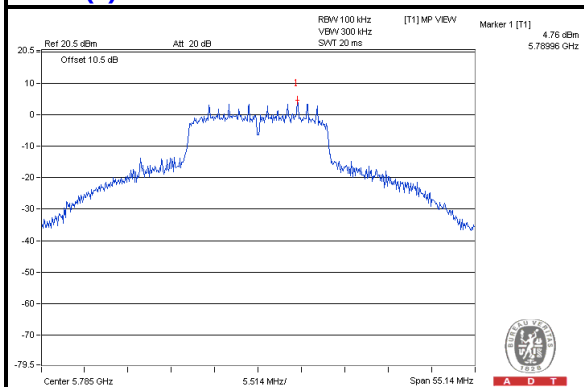
A D T

802.11n (HT20)

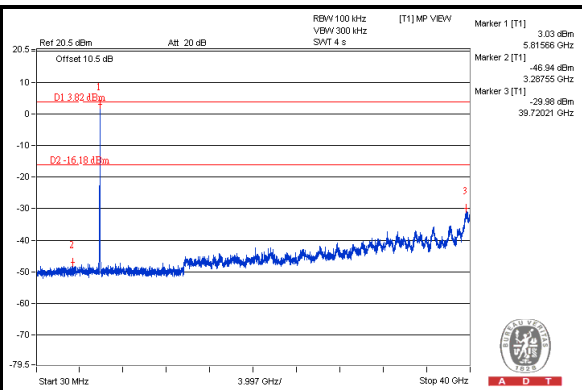
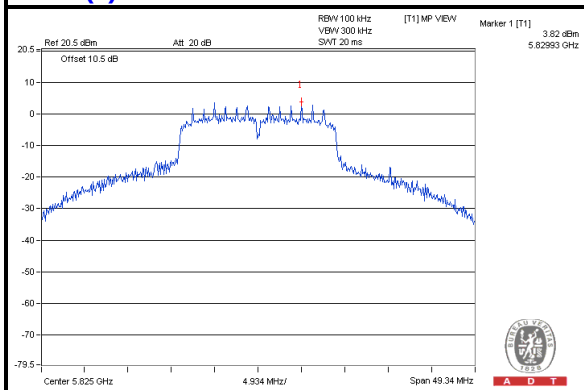
Chain(1) : CH149



Chain(1) : CH 157



Chain(1) : CH 165

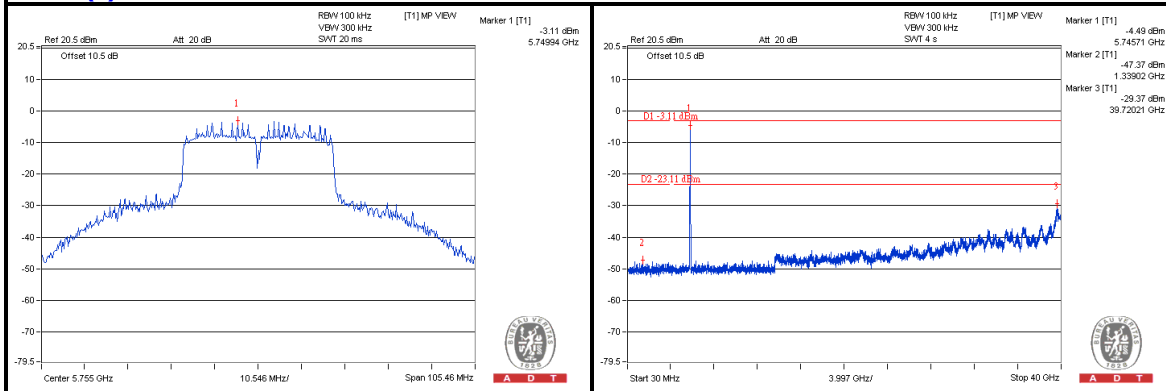




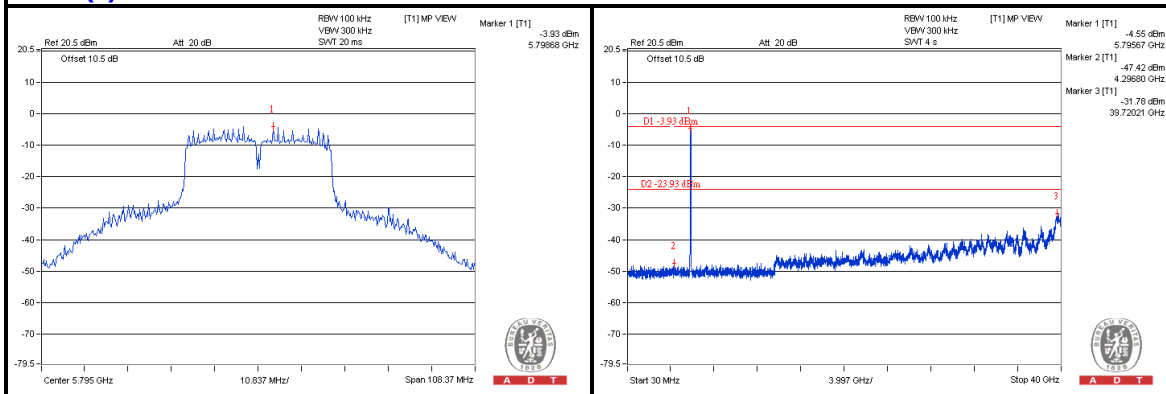
A D T

802.11n (HT40)

Chain(0) : CH 151



Chain(0) : CH 159

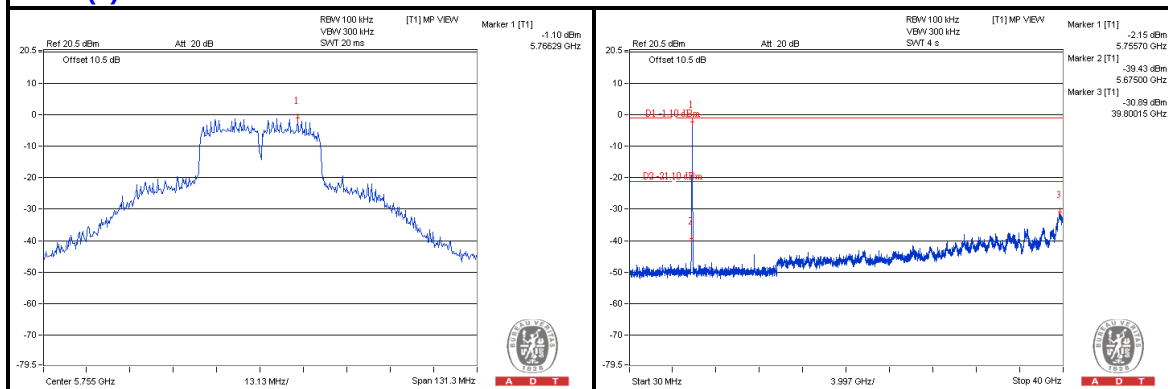




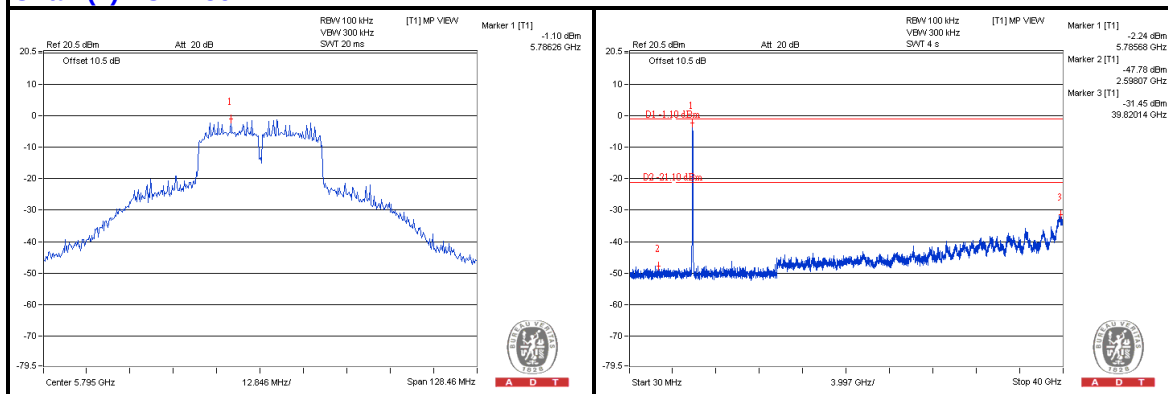
A D T

802.11n (HT40)

Chain(1) : CH 151



Chain(1) : CH 159



5.7 UNWANTED EMISSION MEASUREMENT (RADIATED VERSUS CONDUCTED)

5.7.1 LIMITS OF RADIATED EMISSION 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	$2400/F(\text{kHz})$	300
0.490-1.705	$24000/F(\text{kHz})$	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.

5.7.2 TEST INSTRUMENTS

below 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29, 2013	Jan. 28, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
Pre-Amplifier SPACEK LABS	SLKKA-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
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. 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: Aug. 06, 2013

above 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 30, 2012	Oct. 29, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	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: Mar. 05, 2013

5.7.3 TEST PROCEDURES

For Below 1GHz test:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. 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 antenna is a broadband antenna, and its height 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.

NOTE:

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency below 1GHz.



A D T

For Above 1GHz test:

Following FCC KDB 558074 D01 DTS Meas. Guidance :

Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

- a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.
- b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT
- c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater
- d. EIRP adjustments for multiple outputs. (Follow the procedures specified in FCC KDB Publication 662911)
- e. For all of Radiation emission test
 - e-1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
 - e-2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
 - e-3. 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.
 - e-4. 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-5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
 - e-6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



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NOTE:

1. 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.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

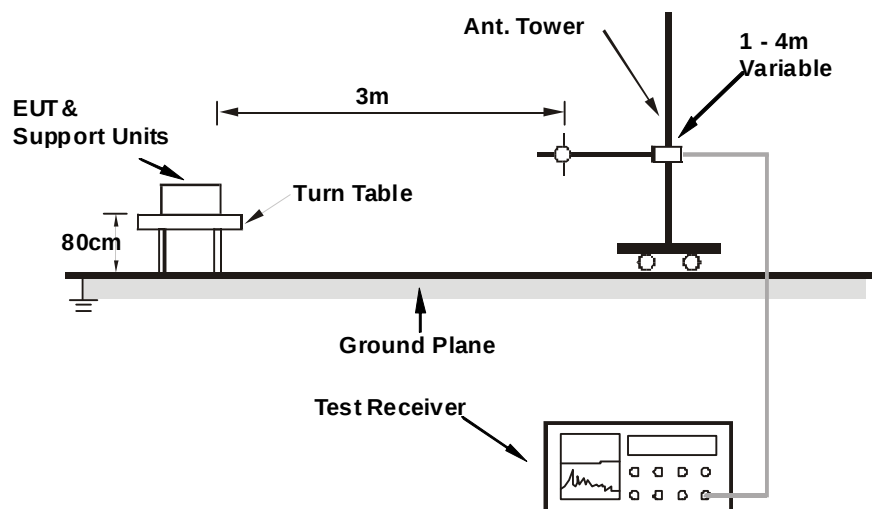
5.7.4 DEVIATION FROM TEST STANDARD

No deviation

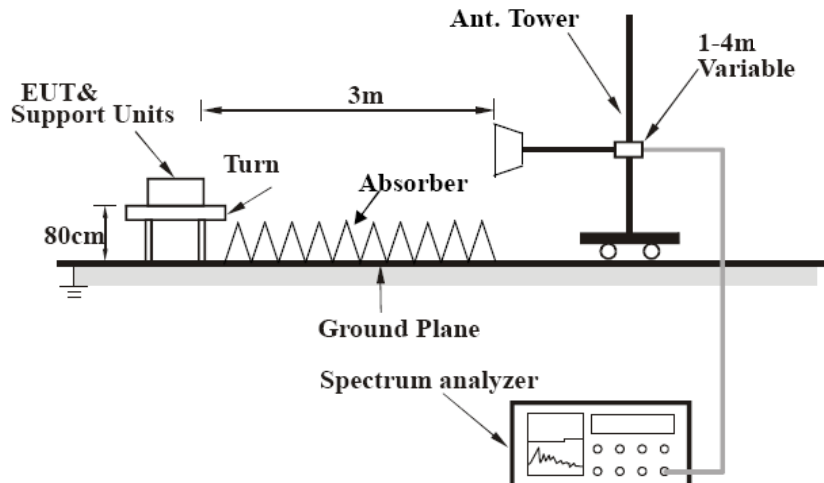
5.7.5 TEST SETUP

For radiated configuration:

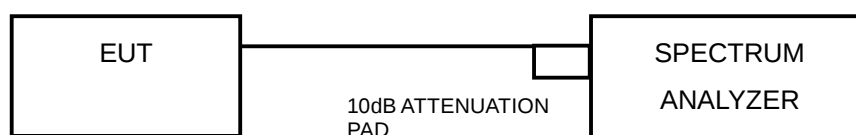
<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For conducted configuration:



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

5.7.6 EUT OPERATING CONDITIONS

Same as the 4.7.6

5.7.7 TEST RESULTS (RADIATED MEASUREMENT)

Radiated versus Conducted Measurement	
☐ Conducted measurement	☒ Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation) <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).	

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 149	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	99.46	39.9 QP	43.5	-3.6	2.00 H	39	58.06	-18.17
2	232.73	35.2 QP	46.0	-10.9	1.00 H	8	50.85	-15.70
3	647.75	40.5 QP	46.0	-5.5	1.00 H	261	45.01	-4.53
4	696.86	41.1 QP	46.0	-4.9	1.00 H	266	45.12	-3.98
5	799.17	41.2 QP	46.0	-4.8	1.50 H	211	43.12	-1.91
6	896.26	40.8 QP	46.0	-5.2	1.50 H	209	41.26	-0.49
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	99.82	33.2 QP	43.5	-10.3	2.00 V	292	51.11	-17.95
2	325.23	38.5 QP	46.0	-7.5	1.50 V	126	50.37	-11.90
3	647.70	36.5 QP	46.0	-9.5	1.50 V	184	41.06	-4.53
4	722.00	39.7 QP	46.0	-6.3	2.00 V	313	43.44	-3.73
5	846.76	39.9 QP	46.0	-6.1	1.50 V	90	41.22	-1.35
6	896.21	37.9 QP	46.0	-8.1	1.50 V	205	38.42	-0.50

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

Radiated test was done with 50ohm terminator on antenna port

ABOVE 1GHz DATA

802.11a

CHANNEL	TX Channel 149	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	7660.00	57.4 PK	74.0	-16.6	1.11 H	57	9.36	48.04
2	7660.00	44.8 AV	54.0	-9.2	1.11 H	57	-3.24	48.04
3	11490.00	58.7 PK	74.0	-15.3	1.51 H	243	8.52	50.18
4	11490.00	46.9 AV	54.0	-7.1	1.51 H	243	-3.28	50.18
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	7660.00	57.3 PK	74.0	-16.7	1.20 V	88	9.26	48.04
2	7660.00	44.6 AV	54.0	-9.4	1.20 V	88	-3.44	48.04
3	11490.00	58.8 PK	74.0	-15.2	1.21 V	179	8.62	50.18
4	11490.00	47.8 AV	54.0	-6.2	1.21 V	179	-2.38	50.18

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. The limit value is defined as per 15.247.

CHANNEL	TX Channel 157	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	11570.00	58.4 PK	74.0	-15.6	1.46 H	233	8.22	50.18
2	11570.00	46.8 AV	54.0	-7.2	1.46 H	233	-3.38	50.18
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	11570.00	58.6 PK	74.0	-15.4	1.18 V	163	8.42	50.18
2	11570.00	47.4 AV	54.0	-6.6	1.18 V	163	-2.78	50.18

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. The limit value is defined as per 15.247.

CHANNEL	TX Channel 165	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	11650.00	58.2 PK	74.0	-15.8	1.44 H	253	7.78	50.42
2	11650.00	46.8 AV	54.0	-7.2	1.44 H	253	-3.62	50.42
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	11650.00	58.7 PK	74.0	-15.3	1.19 V	176	8.28	50.42
2	11650.00	47.9 AV	54.0	-6.1	1.19 V	176	-2.52	50.42

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. The limit value is defined as per 15.247.

802.11n (HT20)

CHANNEL	TX Channel 149	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	11490.00	58.8 PK	74.0	-15.2	1.44 H	263	8.62	50.18
2	11490.00	47.2 AV	54.0	-6.8	1.44 H	263	-2.98	50.18
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	11490.00	59.1 PK	74.0	-14.9	1.14 V	187	8.92	50.18
2	11490.00	48.4 AV	54.0	-5.6	1.14 V	187	-1.78	50.18

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. The limit value is defined as per 15.247.

CHANNEL	TX Channel 157	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	11570.00	58.7 PK	74.0	-15.3	1.40 H	258	8.52	50.18
2	11570.00	47.2 AV	54.0	-6.8	1.40 H	258	-2.98	50.18
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	11570.00	58.8 PK	74.0	-15.2	1.24 V	176	8.62	50.18
2	11570.00	47.7 AV	54.0	-6.3	1.24 V	176	-2.48	50.18

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. The limit value is defined as per 15.247.

CHANNEL	TX Channel 165	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	11650.00	58.3 PK	74.0	-15.7	1.48 H	254	7.88	50.42
2	11650.00	46.9 AV	54.0	-7.1	1.48 H	254	-3.52	50.42
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	11650.00	58.3 PK	74.0	-15.7	1.21 V	168	7.88	50.42
2	11650.00	47.4 AV	54.0	-6.6	1.21 V	168	-3.02	50.42

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. The limit value is defined as per 15.247.

802.11n (HT40)

CHANNEL	TX Channel 151	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	11510.00	58.1 PK	74.0	-15.9	1.39 H	278	7.93	50.17
2	11510.00	46.4 AV	54.0	-7.6	1.39 H	278	-3.77	50.17
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	11510.00	59.0 PK	74.0	-15.0	1.28 V	189	8.83	50.17
2	11510.00	47.7 AV	54.0	-6.3	1.28 V	189	-2.47	50.17

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. The limit value is defined as per 15.247.

CHANNEL	TX Channel 159	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	11590.00	58.7 PK	74.0	-15.3	1.36 H	270	8.51	50.19
2	11590.00	46.9 AV	54.0	-7.1	1.36 H	270	-3.29	50.19
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	11590.00	58.4 PK	74.0	-15.6	1.21 V	175	8.21	50.19
2	11590.00	47.7 AV	54.0	-6.3	1.21 V	175	-2.49	50.19

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. The limit value is defined as per 15.247.

5.7.8 TEST RESULTS (CONDUCTED MEASUREMENT)

Radiated versus Conducted Measurement	
☒ Conducted measurement	☐ Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation) <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).	

Conducted Measurement Factor
a. The composite gain will be used when signal support the correlated signal. (Composite gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7.77\text{dBi}$) b. For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands. c. For the band edge the gain for the specific band may have been used. d. In restricted bands below 1000 MHz, add upper bound on ground plane reflection: For $f = 30 - 1000$ MHz, add 4.7 dB. Note: The conducted emission test was considered some factor to compute test result.

ABOVE 1GHz DATA

802.11a - Channel 149

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3828.125 PK	55.62	74	-18.38	-50.2	-50.65	7.77	-39.64
2	3821.875 AV	44.76	54	-9.24	-61.25	-61.32	7.77	-50.5
3	7659.375 PK	55.66	74	-18.34	-51.27	-49.65	7.77	-39.6
4	7659.375 AV	45.04	54	-8.96	-60.91	-61.09	7.77	-50.22
5	11487.5 PK	59.4	74	-14.6	-49.69	-44.86	7.77	-35.86
6	11493.75 AV	50.07	54	-3.93	-59.98	-53.92	7.77	-45.19

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

802.11a- Channel 157

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3853.125 PK	55.48	74	-18.52	-50.42	-50.7	7.77	-39.78
2	3856.25 AV	44.83	54	-9.17	-61.13	-61.29	7.77	-50.43
3	7712.5 PK	55.77	74	-18.23	-50.34	-50.2	7.77	-39.49
4	7715.625 AV	45.16	54	-8.84	-60.88	-60.89	7.77	-50.1
5	11578.125 PK	61.33	74	-12.67	-49.9	-42.41	7.77	-33.93
6	11568.75 AV	51.64	54	-2.36	-59.6	-52.1	7.77	-43.62

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



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802.11a- Channel 165

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3890.625 PK	56	74	-18	-50.91	-49.31	7.77	-39.26
2	3881.25 AV	44.88	54	-9.12	-61.14	-61.18	7.77	-50.38
3	11650 PK	63.01	74	-10.99	-49.87	-40.49	7.77	-32.25
4	11653.125 AV	51.17	54	-2.83	-58.37	-52.96	7.77	-44.09

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

802.11n(HT20) - Channel 149

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3834.375 PK	55.4	74	-18.6	-50.81	-50.47	7.77	-39.86
2	3825 AV	44.81	54	-9.19	-61.39	-61.08	7.77	-50.45
3	7656.25 PK	55.78	74	-18.22	-50.25	-50.28	7.77	-39.48
4	7653.125 AV	44.89	54	-9.11	-61.23	-61.07	7.77	-50.37
5	11500 PK	59.6	74	-14.4	-52	-44.08	7.77	-35.66
6	11496.875 AV	48.36	54	-5.64	-60.6	-55.95	7.77	-46.9

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

802.11n(HT20)- Channel 157

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3859.375 PK	55.69	74	-18.31	-49.86	-50.91	7.77	-39.57
2	3846.875 AV	44.82	54	-9.18	-61.3	-61.15	7.77	-50.44
3	7721.875 PK	55.6	74	-18.4	-49.64	-51.41	7.77	-39.66
4	7721.875 AV	45.19	54	-8.81	-60.79	-60.91	7.77	-50.07
5	11568.75 PK	59.91	74	-14.09	-48.85	-44.47	7.77	-35.35
6	11562.5 AV	49.8	54	-4.2	-61.77	-53.88	7.77	-45.46

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



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802.11n(HT20)- Channel 165**Conducted spurious emission table**

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3875 PK	55.47	74	-18.53	-50.38	-50.77	7.77	-39.79
2	3881.25 AV	44.95	54	-9.05	-60.78	-61.42	7.77	-50.31
3	11640.625 PK	60.24	74	-13.76	-50.94	-43.51	7.77	-35.02
4	11643.75 AV	49.75	54	-4.25	-62.04	-53.9	7.77	-45.51

Note :

$$\text{Emission Level (dBuV/m)} = \text{EIRP Level (dBm)} - 20\log(d) + 104.8$$

d = measurement distance in 3 meters.

802.11n(HT40) - Channel 151

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3837.5 PK	55.73	74	-18.27	-51.69	-49.26	7.77	-39.53
2	3837.5 AV	44.88	54	-9.12	-60.93	-61.41	7.77	-50.38
3	7668.75 PK	55.48	74	-18.52	-50	-51.21	7.77	-39.78
4	7678.125 AV	44.94	54	-9.06	-61.11	-61.1	7.77	-50.32
5	11512.5 PK	59.3	74	-14.7	-51.66	-44.49	7.77	-35.96
6	11518.75 AV	46.87	54	-7.13	-61.6	-57.62	7.77	-48.39

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

802.11n(HT40)- Channel 159

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3859.375 PK	55.42	74	-18.58	-51.29	-50.04	7.77	-39.84
2	3862.5 AV	44.8	54	-9.2	-61.15	-61.34	7.77	-50.46
3	7725 PK	56.72	74	-17.28	-49.13	-49.52	7.77	-38.54
4	7718.75 AV	45.16	54	-8.84	-60.99	-60.78	7.77	-50.1
5	11581.25 PK	57.37	74	-16.63	-51.14	-47.1	7.77	-37.89
6	11581.25 AV	46.81	54	-7.19	-61.99	-57.56	7.77	-48.45

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

5.8 AC POWER LINE AC POWER LINE CONDUCTED EMISSION MEASUREMENT

5.8.1 LIMITS OF AC POWER LINE CONDUCTED EMISSION MEASUREMENT

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

5.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 07, 2013	June 06, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
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: July 24, 2013

5.8.3 TEST PROCEDURES

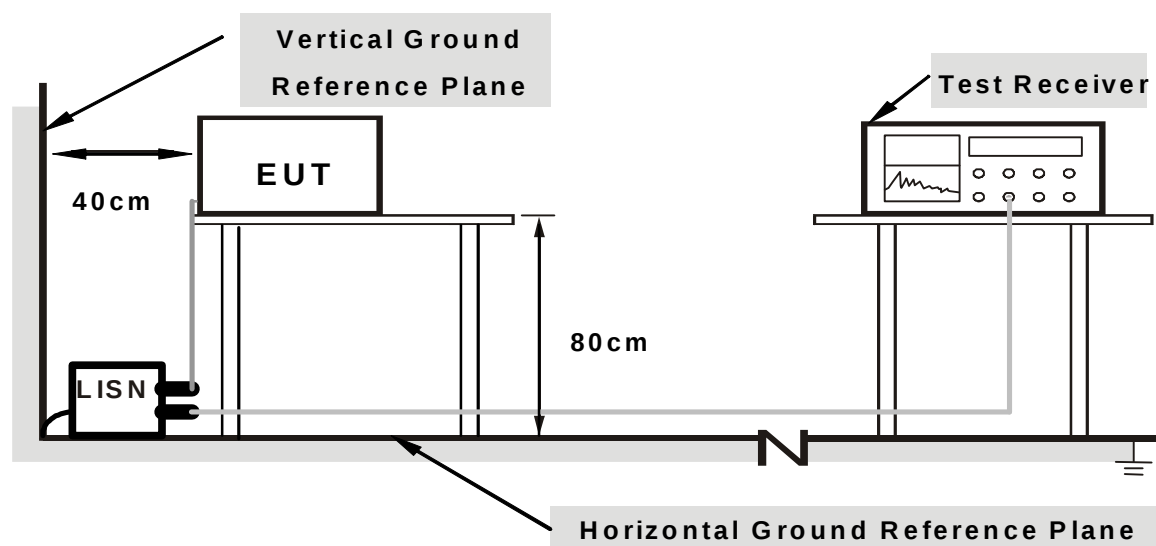
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

5.8.4 DEVIATION FROM TEST STANDARD

No deviation

5.8.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

5.8.6 EUT OPERATING CONDITIONS

Same as the 4.7.6

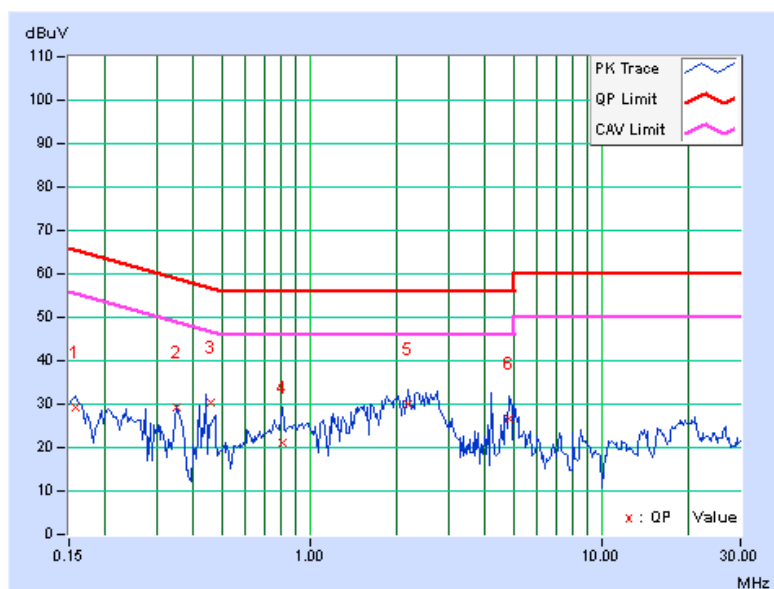
5.8.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.12	29.31	21.63	29.43	21.75	65.58	55.58	-36.15	-33.83
2	0.34922	0.17	29.01	14.10	29.18	14.27	58.98	48.98	-29.80	-34.71
3	0.45972	0.18	30.31	14.73	30.49	14.91	56.70	46.70	-26.20	-31.78
4	0.80625	0.21	20.74	8.50	20.95	8.71	56.00	46.00	-35.05	-37.29
5	2.18359	0.29	29.76	21.62	30.05	21.91	56.00	46.00	-25.95	-24.09
6	4.83984	0.40	26.35	12.07	26.75	12.47	56.00	46.00	-29.25	-33.53

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

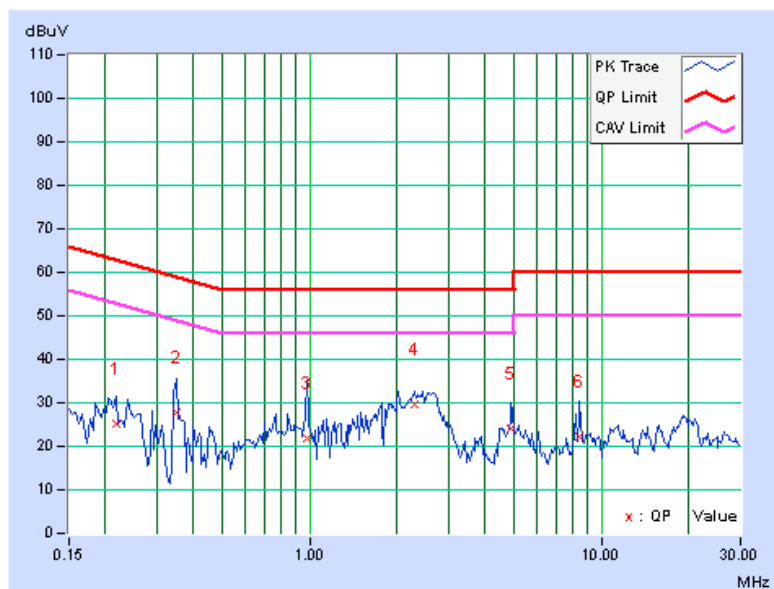


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor [dB]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB]	[dB]
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.21641	0.12	25.11	21.07	25.23	21.19	62.96	52.96	-37.72	-31.76
2	0.34922	0.16	27.50	13.53	27.66	13.69	58.98	48.98	-31.32	-35.29
3	0.98203	0.20	21.62	13.50	21.82	13.70	56.00	46.00	-34.18	-32.30
4	2.28516	0.27	29.20	16.01	29.47	16.28	56.00	46.00	-26.53	-29.72
5	4.90625	0.36	23.71	11.56	24.07	11.92	56.00	46.00	-31.93	-34.08
6	8.43522	0.47	21.69	11.27	22.16	11.74	60.00	50.00	-37.84	-38.26

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



6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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7. 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: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3270892

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.

8.APPENDIX A - RADIATED EMISSION MEASUREMENT(FOR 2.4GHz, 2400 ~ 2483.5MHZ BAND)

8.1.1 LIMITS OF RADIATED EMISSION 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.

8.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29, 2013	Jan. 28, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
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. 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: July 30 to Aug. 08, 2013

8.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.

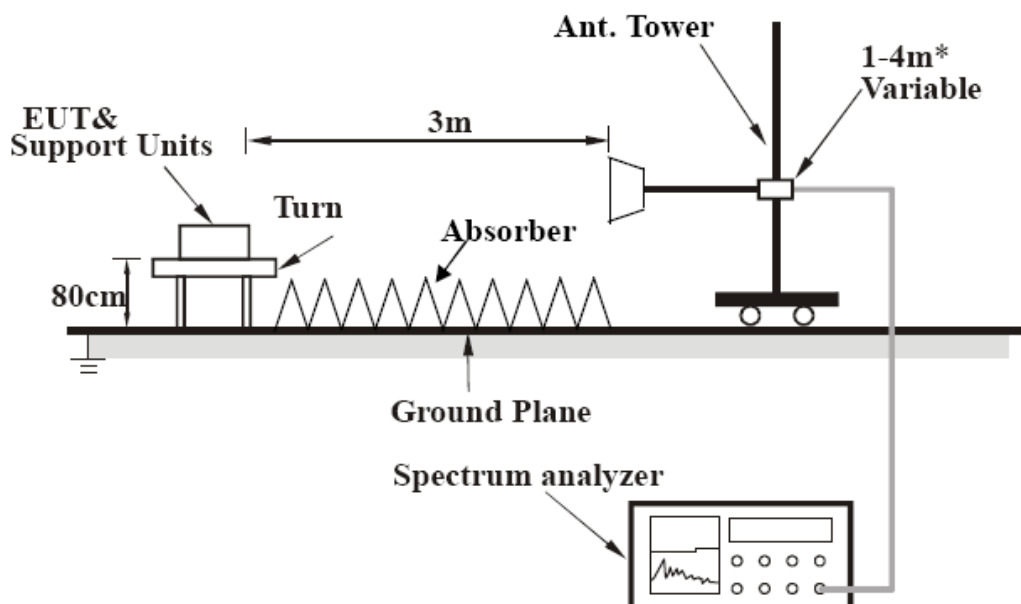
NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

8.1.4 DEVIATION FROM TEST STANDARD

No deviation

8.1.5 TEST SETUP



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

8.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “artgui.exe Version:2.3<WLAN> / BtUART.exe Version:2.1.2<BT-LE>” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

8.1.7 TEST RESULTS

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	58.3 PK	74.0	-15.7	1.40 H	280	61.75	-3.45
2	2390.00	51.1 AV	54.0	-2.9	1.40 H	280	54.55	-3.45
3	4824.00	53.6 PK	74.0	-20.4	1.11 H	125	47.11	6.49
4	4824.00	49.9 AV	54.0	-4.1	1.11 H	125	43.41	6.49
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.3 PK	74.0	-16.7	1.00 V	89	60.75	-3.45
2	2390.00	50.0 AV	54.0	-4.0	1.00 V	89	53.45	-3.45
3	4824.00	54.7 PK	74.0	-19.3	1.10 V	13	48.21	6.49
4	4824.00	51.5 AV	54.0	-2.5	1.10 V	13	45.01	6.49

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2386.00	57.4 PK	74.0	-16.6	1.40 H	276	60.88	-3.48
2	2386.00	53.2 AV	54.0	-0.8	1.40 H	276	56.68	-3.48
3	4874.00	53.5 PK	74.0	-20.5	1.12 H	128	46.97	6.53
4	4874.00	49.6 AV	54.0	-4.4	1.12 H	128	43.07	6.53
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	2386.00	58.3 PK	74.0	-15.7	1.03 V	77	61.78	-3.48
2	2386.00	50.9 AV	54.0	-3.1	1.03 V	77	54.38	-3.48
3	4874.00	54.6 PK	74.0	-19.4	1.00 V	4	48.07	6.53
4	4874.00	50.9 AV	54.0	-3.1	1.00 V	4	44.37	6.53

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2483.50	60.2 PK	74.0	-13.8	1.38 H	279	63.36	-3.16
2	2483.50	49.6 AV	54.0	-4.4	1.38 H	279	52.76	-3.16
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	2483.50	56.9 PK	74.0	-17.1	1.01 V	87	60.06	-3.16
2	2483.50	48.6 AV	54.0	-5.4	1.01 V	87	51.76	-3.16

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

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	72.8 PK	74.0	-1.2	1.37 H	271	74.75	-1.95
2	2390.00	52.9 AV	54.0	-1.1	1.37 H	271	54.85	-1.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.2 PK	74.0	-3.8	1.00 V	33	72.15	-1.95
2	2390.00	50.5 AV	54.0	-3.5	1.00 V	33	52.45	-1.95

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



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CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2483.50	72.1 PK	74.0	-1.9	1.37 H	271	73.66	-1.56
2	2483.50	53.0 AV	54.0	-1.0	1.37 H	271	54.56	-1.56
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	2483.50	69.9 PK	74.0	-4.1	1.00 V	31	71.46	-1.56
2	2483.50	50.3 AV	54.0	-3.7	1.00 V	31	51.86	-1.56

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

802.11n (HT20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	71.0 PK	74.0	-3.0	1.36 H	241	72.95	-1.95
2	2390.00	53.0 AV	54.0	-1.0	1.36 H	241	54.95	-1.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.1 PK	74.0	-3.9	1.00 V	31	72.05	-1.95
2	2390.00	50.9 AV	54.0	-3.1	1.00 V	31	52.85	-1.95

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2483.50	68.7 PK	74.0	-5.3	1.36 H	263	70.26	-1.56
2	2483.50	52.6 AV	54.0	-1.4	1.36 H	263	54.16	-1.56
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	2483.50	68.7 PK	74.0	-5.3	1.36 V	263	70.26	-1.56
2	2483.50	67.5 PK	74.0	-6.5	1.00 V	30	69.06	-1.56
3	2483.50	52.6 AV	54.0	-1.4	1.36 V	263	54.16	-1.56
4	2483.50	51.5 AV	54.0	-2.5	1.00 V	30	53.06	-1.56

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

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	71.0 PK	74.0	-3.0	1.38 H	273	72.95	-1.95
2	2390.00	52.7 AV	54.0	-1.3	1.38 H	273	54.65	-1.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.4 PK	74.0	-5.6	1.00 V	29	70.35	-1.95
2	2390.00	50.3 AV	54.0	-3.7	1.00 V	29	52.25	-1.95

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	72.3 PK	74.0	-1.7	1.38 H	273	74.25	-1.95
2	2390.00	51.3 AV	54.0	-2.7	1.38 H	273	53.25	-1.95
3	2483.50	72.6 PK	74.0	-1.4	1.38 H	273	74.16	-1.56
4	2483.50	52.0 AV	54.0	-2.0	1.38 H	273	53.56	-1.56
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	2390.00	69.9 PK	74.0	-4.1	1.00 V	30	71.85	-1.95
2	2390.00	48.6 AV	54.0	-5.4	1.00 V	30	50.55	-1.95
3	2483.50	72.2 PK	74.0	-1.8	1.00 V	30	73.76	-1.56
4	2483.50	51.7 AV	54.0	-2.3	1.00 V	30	53.26	-1.56

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



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CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2483.50	72.2 PK	74.0	-1.8	1.38 H	273	73.76	-1.56
2	2483.50	52.3 AV	54.0	-1.7	1.38 H	273	53.86	-1.56
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	2483.50	71.5 PK	74.0	-2.5	1.00 V	30	73.06	-1.56
2	2483.50	51.1 AV	54.0	-2.9	1.00 V	30	52.66	-1.56

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



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9.APPENDIX B - 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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