Test Report No.:
FCCSZ2024-0069-RF1

RF Test Report

FCC ID	:	**2BEA6VOSM350**
EUT	:	**Module**
MODEL	:	**VOSM350**
BRAND NAME	:	**N/A**
APPLICANT	:	**Vantron Technology, Inc.**
Classification of Test	:	**N/A**

CVC Testing Technology (Shenzhen) Co., Ltd.

Applicant	**Name: Vantron Technology, Inc.** **Address:48434 Milmont Drive Fremont, CA 94538-7324, USA**
Manufacturer	**Name: Vantron Technology, Inc.** **Address:48434 Milmont Drive Fremont, CA 94538-7324, USA**
Equipment Under Test	**Product Name:Module** **Model/Type: VOSM350** **Brand Name: N/A** **Serial NO.: N/A** **Sample NO.:3-1**

Date of Receipt.	**2024.09.04**	Date of Testing	**2024.09.04～2024.10.11**

Test Specification	**Test Result**
FCC Part 15, Subpart C (15.247)	PASS

Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. Seal of CVC **Issue Date: 2024.11.10**

Compiled by:	Reviewed by:	Approved by:
Cai Jianyu	Mo Xianbiao	Dong Sanbi
Name Signature	Name Signature	Name Signature

Other Aspects: NONE.

Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCCSZ2024-0069-RF1	Original release	2024.11.10

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
FCC 15.207	AC Power Conducted Emission	PASS	See section 3.1
FCC 15.247(d) FCC 15.209	Radiated Emissions	PASS	See section 3.2
FCC 15.247(d) RSS-247 5.5	Out of band Emission Measurement	PASS	Appendix E&F of FCCSZ2024-0069-RF1-A1
FCC 15.247(a)(2) RSS-247 5.2(a)	6dB bandwidth	PASS	Appendix A of FCCSZ2024-0069-RF1-A1
---	Occupied Bandwidth Measurement	ONLY FOR REPORTED	Appendix B of FCCSZ2024-0069-RF1-A1
FCC 15.247(b)	Conducted Output power	PASS	Appendix C of FCCSZ2024-0069-RF1-A1
FCC 15.247(e)	Power Spectral Density	PASS	Appendix D of FCCSZ2024-0069-RF1-A1
FCC 15.203 FCC 15.247(b)	Antenna Requirement	PASS	See section 3.8

1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial Number	Cal. interval	Cal. Due
Antenna Port Conducted Test					
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 30	104408	1 year	2025.5.22
#4Shielding room	MORI	443	N/A	3 year	2026.5.16
Wideband radio communication tester	Rohde&Schwarz	CMW 500	168588	1 year	2025.5.24
Analog signal Generator(100kHz～12.75GHz)	Rohde&Schwarz	SMB 100A	181882	1 year	2025.4.27
Vector signal Generator(8kHz～6GHz)	Rohde&Schwarz	SMBV 100B	101846	1 year	2025.4.28
DC power supply	Rohde&Schwarz	HMC8041-G	101203	1 year	2025.4.29
RF control unit(2/3/4/5G)	Tonscend	JS0806-1	CS0300027	1 year	2025.4.28
Automatic filter bank(2/3/4G)	Tonscend	JS0806-F	CS0300028	1 year	2025.4.28
Automatic filter bank(5G)	Tonscend	JS0806-F-5G NR	N/A	1 year	2025.4.28
Temperature and humidity meter	UNI-T	A10T	C193561464	1 year	2025.4.27
Radio Communication Analyzer	Anritsu	MT8821C	6272374548	1 year	2025.1.09
Constant temperature humidity chamber	TEELONG	TL-HW-225B	20220518-01	1 year	2025.5.24
Radio Communication Test Station	Anritsu	MT8000A	6272354169	1 year	2025.1.09
Radiation Spurious(Above 1GHz)					/
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 40	101898	1 year	2025.4.28
EMI Test Receiver	Rohde&Schwarz	ESR3	102693	1 year	2025.5.24
Antenna(30MHz~1001MHz)	SCHWARZBECK	VULB 9168	1133	1 year	2025.2.21
Horn antenna(1GHz-18GHz)	ETS	3117	227611	1 year	2025.3.24
Horn antenna(18GHz-40GHz)	QMS	QMS-00880	22051	1 year	2025.3.24
3m anechoic chamber	MORI	966	CS0300011	3 year	2026.5.18
Filter group(RSE-BT/WiFi)	Rohde&Schwarz	WiFi /BT Variant 1	100820	1 year	2025.4.28
Filter group(RSE-Cellular)	Rohde&Schwarz	Cellular Variant 1	100768	1 year	2025.4.28
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100799	1 year	2025.4.28
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100801	1 year	2025.4.28
Preamplifier(18Gz-40GHz)	Rohde&Schwarz	SCU-40A	101209	1 year	2025.4.28
#2 control room	MORI	433	CS0200059	3 year	2026.5.16
Temperature and humidity meter	/	C193561517	C193561517	1 year	2025.4.27
CE Test - 3M Chamber					
EMI Test Receiver	Rohde&Schwarz	ESR3	102693	1 year	2025.5.24
limiter （10 dB）	Rohde&Schwarz	ESH3-Z2	102824	1 year	2025.5.15
Voltage probe	Rohde&Schwarz	CVP9222C	28	1 year	2025.4.27
Current probe	Rohde&Schwarz	EZ-17	101442	1 year	2025.4.28
ISN network	Rohde&Schwarz	ENV 81	100401	1 year	2025.4.28
ISN network	Rohde&Schwarz	ENV 81 Cat6	101896	1 year	2025.4.28
#1Shielding room	MORI	854	N/A	3 year	2026.5.16
LISN	SCHWARZBECK	NSLK 8129	5021	1 year	2025.4.27
Temperature and humidity meter	/	C193561430	C193561430	1 year	2025.4.27

Equipment	Manufacturer	Model No.	Serial Number	Cal. interval	Cal. Due
RE Test - 3M Chamber(Below 1GHz)					
EMI Test Receiver	Rohde&Schwarz	ESR 26	101718	1 year	2025.5.24
Loop antenna（8.3k~30MHz）	Rohde&Schwarz	HFH2-Z2E	100951	1 year	2025.6.3
Antenna(30MHz~1000MHz)	SCHWARZBECK	VULB 9168	1132	1 year	2025.2.27
Horn antenna(1GHz-18GHz)	ETS	3117	227634	1 year	2025.3.24
Horn antenna(18GHz-40GHz)	SCHWARZBECK	BBHA 9170	1003	1 year	2025.3.24
3m anechoic chamber	MORI	966	N/A	1 year	2026.5.18
Preamplifier(10kHz-1GHz)	Rohde&Schwarz	SCU-01F	100298	1 year	2025.4.28
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100799	1 year	2025.4.28
Attenuator	/	SJ-5dB	607684	1 year	2025.2.4
#1 control room	MORI	433	/	1 year	2026.5.16
Temperature and humidity meter	/	C193561473	C193561473	1 year	2025.4.27

1.2 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:

No.	Item	Measurement Uncertainty
1	Conducted emission test	+/-2.7 dB
2	Radiated emission 9kHz-30MHz	+/-5.6 dB
3	Radiated emission 30MHz-1GHz	+/-4.6 dB
4	Radiated emission 1GHz-18GHz	+/-4.4 dB
5	Radiated emission 18GHz-40GHz	+/-5.1 dB
6	RF power	+/-0.9 dB
7	Power Spectral Density	+/-0.8 dB
8	Conducted spurious emissions	+/-2.7 dB
9	Transmission Time	+/-0.27%
10	Occupied Bandwidth	+/-1.86%
Remark: 95% Confidence Levels, k=2.		

1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab of CVC Testing Technology (Shenzhen) Co., Ltd.

Lab Address: No. 1301-14&16, Guanguang Road, Xinlan Community, Guanlan Subdistrict, Longhua District, Shenzhen, Guangdong,China

Post Code：518110 Tel：0755-23763060-8805
Fax：0755-23763060 E-mail：sz-kf@cvc.org.cn
FCC(Test firm designation number：CN1363)
IC(Test firm CAB identifier number：CN0137)
CNAS(Test firm designation number：L16091)

2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	Module
BRAND	N/A
TEST MODEL	VOSM350
ADDITIONAL MODEL	N/A
POWER SUPPLY	DC 5V
MODULATIONTECHNOLOGY	DSSS,DTS
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
OPERATING FREQUENCY	2412MHz ~ 2462MHz for 11b/g/n(HT20) 2422MHz ~ 2452MHz for 11n(HT40)
NUMBER OF CHANNEL	802.11b/g/n(HT20): 11 802.11n(HT40): 7
PEAK OUTPUT POWER	17.36dBm for WiFi(Maximum)
ANTENNA TYPE(Note 4)	External Antenna 1: 1.82dBi External Antenna 2: 1.82dBi
FIX FREQUENCY SOFTWARE	adb
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

Note:

1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. EUT photo refer to report (Report NO.: FCCSZ2024-0069-EUT).
4. Since the above data and/or information is provided by the client, CVC is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
5. EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitter and 2 receiver.

MODULATION MODE	TX FUNCTION
802.11b	SISO
802. 11g	SISO
802.11n	MIMO

2.2 OTHER INFORMATION

Operating frequency of each channel

2.4G WIFI					
802.11b/g/n(HT20)					
CHANNEL	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**
1	**2412**	5	2432	9	2452
2	2417	**6**	**2437**	10	2457
3	2422	7	2442	**11**	**2462**
4	2427	8	2447	N/A	N/A
2.4G WIFI					
802.11n(HT40)					
CHANNEL	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**
3	**2422**	**6**	**2437**	**9**	**2452**
4	2427	7	2442	N/A	N/A
5	2432	8	2447	N/A	N/A

1. The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.

2. By means of test software which provided by manufacture, the power levels during the tests were set

2.4G							
802.11b		**802.11g**		**802.11n(HT20)**		**802.11n(HT40)**	
FREQUENCY (MHZ)	**POWER SETTING**	**FREQUENCY (MHZ)**	**POWER SETTING**	**FREQUENCY (MHZ)**	**POWER SETTING**	**FREQUENCY (MHZ)**	**POWER SETTING**
2412	15	**2412**	15	**2412**	15	**2422**	15
2437	15	**2437**	15	**2437**	15	**2437**	15
2462	15	**2462**	15	**2462**	15	**2452**	15

2.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

EUT CONFIGURE MODE	APPLICABLE TEST ITEMS				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	√	√	2.4G WIFI Function

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

The worst case Antenna mode for each of the following tests for Wi-Fi:

RADIATED EMISSION TEST (BELOW 1 GHz):

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

☒ The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1	DSSS	DBPSK	1.0

For the test results, only the worst case was shown in test report.

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

☒ The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
A	802.11b ANT1	1 to 11	1, 6, 11	DSSS	DBPSK	1.0 Mbps
A	802.11b ANT2	1 to 11	1, 6, 11	DSSS	DBPSK	1.0 Mbps
A	802.11g ANT1	1 to 11	1, 6, 11	OFDM	BPSK	6.0 Mbps
A	802.11g ANT2	1 to 11	1, 6, 11	OFDM	BPSK	6.0 Mbps
A	802.11n(HT20) ANT1	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A	802.11n(HT20) ANT2	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A	802.11n(HT20) MIMO	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A	802.11n(HT40) ANT1	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
A	802.11n(HT40) ANT2	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
A	802.11n(HT40) MIMO	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

Note:
1.All test mode has been tested and only the worst case(802.11n(HT20) MIMO) was presented in the report.

POWER LINE CONDUCTED EMISSION TEST:

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

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

EUT CONFIGURE MODE	TESTED CONDITION
-	WIFI (2.4G)

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0 Mbps
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0 Mbps
A	802.11n(HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A	802.11n(HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	24deg. C, 55%RH	DC 5V	Liu Yuan
RE≥1G	24deg. C, 55%RH	DC 5V	Liu Yuan
PLC	24deg. C, 55%RH	DC 5V	Wang Zhiming
APCM	25deg. C, 58%RH	DC 5V	Cai Jianyu

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, Subpart C. Section 15.247
KDB 558074 D01 15.247 Meas Guidance v05r02
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

2.5 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.

Support Equipment					
NO	**Description**	**Brand**	**Model No.**	**Serial Number**	**Supplied by**
1	Laptop	Lenovo	K4e-ARE120	MP20kshe	Lab
2	Adapter	FUJIA	FJ-SW124S0503000N	0503000	CLIENT
3	Debugging Board	N/A	VOSM	5302-24050017-00004	CLIENT

Support Cable							
NO	**Description**	**Quantity (Number)**	**Length (cm)**	**Detachable (Yes/ No)**	**Shielded (Yes/ No)**	**Cores (Number)**	**Supplied by**
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 Limit

Frequency (MHz)	Conducted Limits(dBμV)	
	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. NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

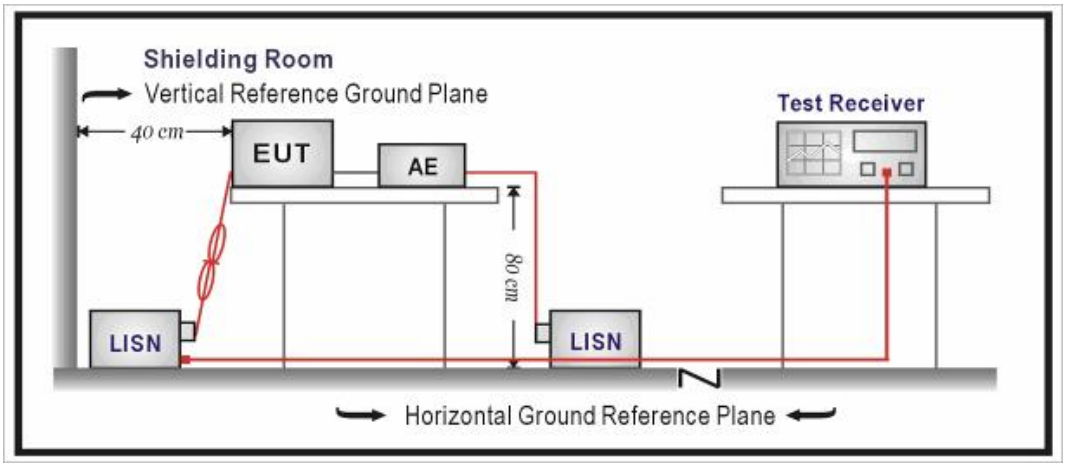
3.1.2 Measurement procedure

a. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the Test photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.The equipment under test shall be placed on a support of non-metallic material, the height of which shall be1.5m above the ground,

b. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

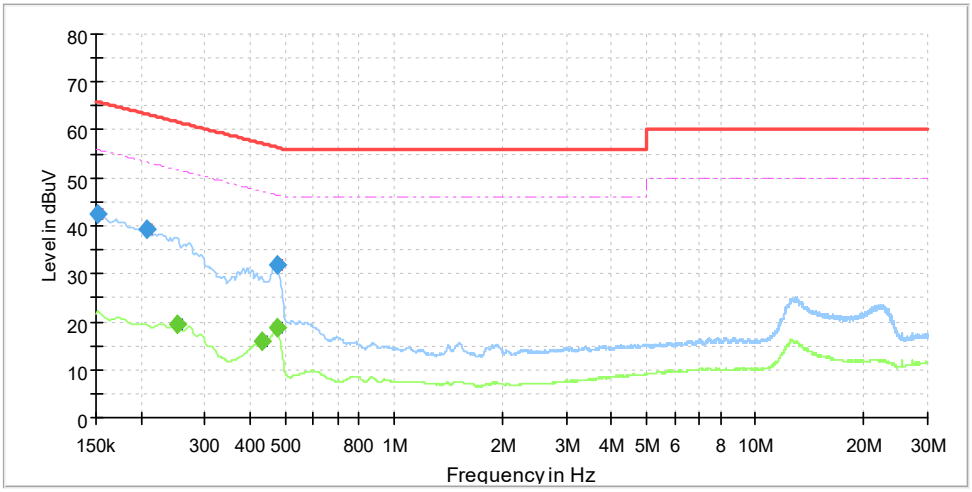
c. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.1.3 Test setup



3.1.4 Test results

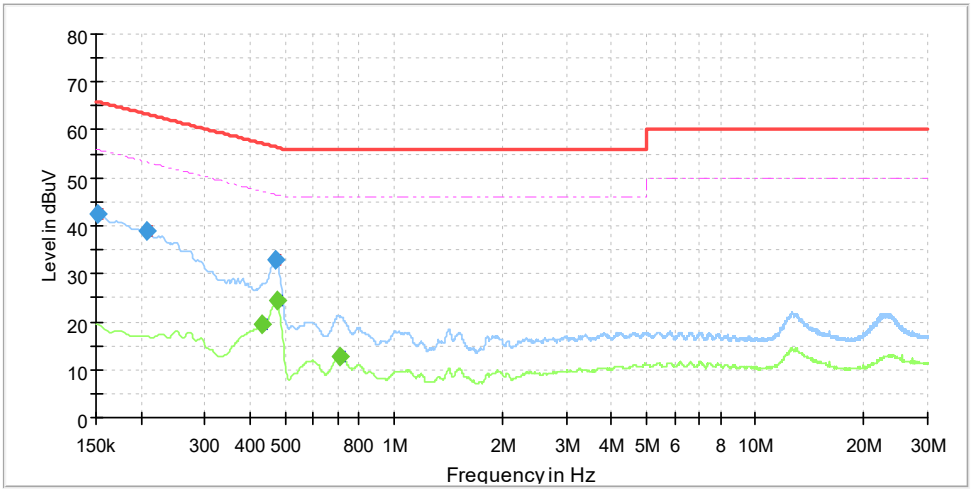
Test Mode	WIFI (2.4G)	Frequency Range	150KHz ~ 30MHz
PHASE	Line (L)		



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.152	42.6	---	65.9	23.3	L1	16.0
2	0.206	39.1	---	63.4	24.2	L1	16.0
3	0.251	---	19.6	51.7	32.1	L1	16.1
4	0.431	---	16.0	47.2	31.3	L1	16.1
5	0.474	---	18.6	46.4	27.8	L1	16.1
6	0.476	31.7	---	56.4	24.7	L1	16.1

Remark: The emission levels of other frequencies were very low against the limit.

Test Mode	WIFI (2.4G)	Frequency Range	150KHz ~ 30MHz
PHASE	Line (N)		



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.152	42.6	---	65.9	23.3	N	16.0
2	0.206	39.0	---	63.4	24.4	N	16.0
3	0.431	---	19.6	47.2	27.7	N	16.1
4	0.472	32.8	---	56.5	23.7	N	16.1
5	0.474	---	24.3	46.4	22.1	N	16.1
6	0.708	---	12.8	46.0	33.2	N	16.1

Remark: The emission levels of other frequencies were very low against the limit.

3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

3.2.1 Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

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.
NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
NOTE: 3. As shown in 15.35(b), 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.

3.2.2 Measurement procedure

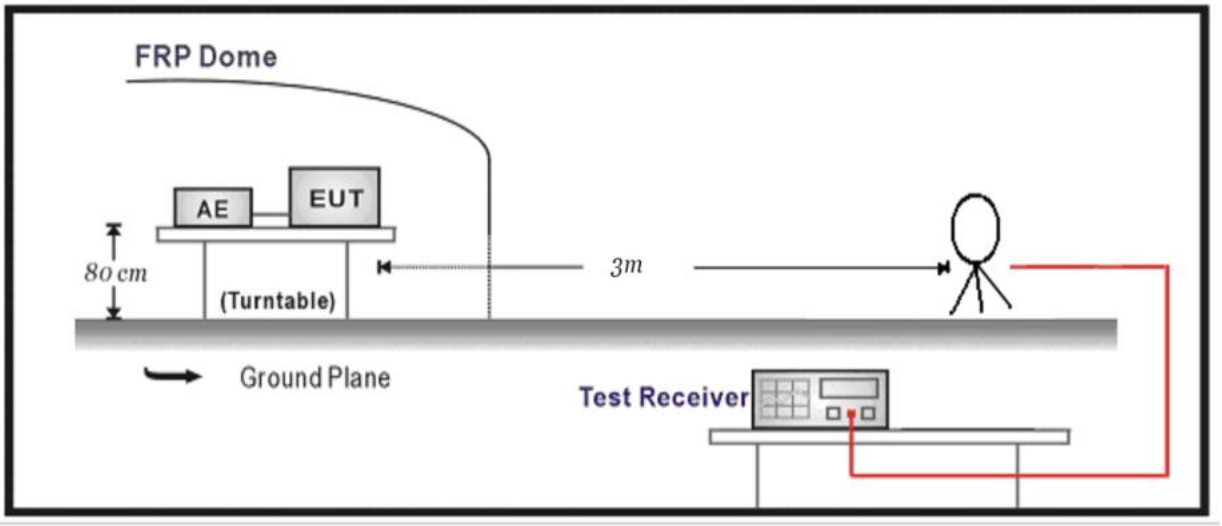
a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. For below 1GHz was used bilog antenna, and above 1GHz was used horn 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
g. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

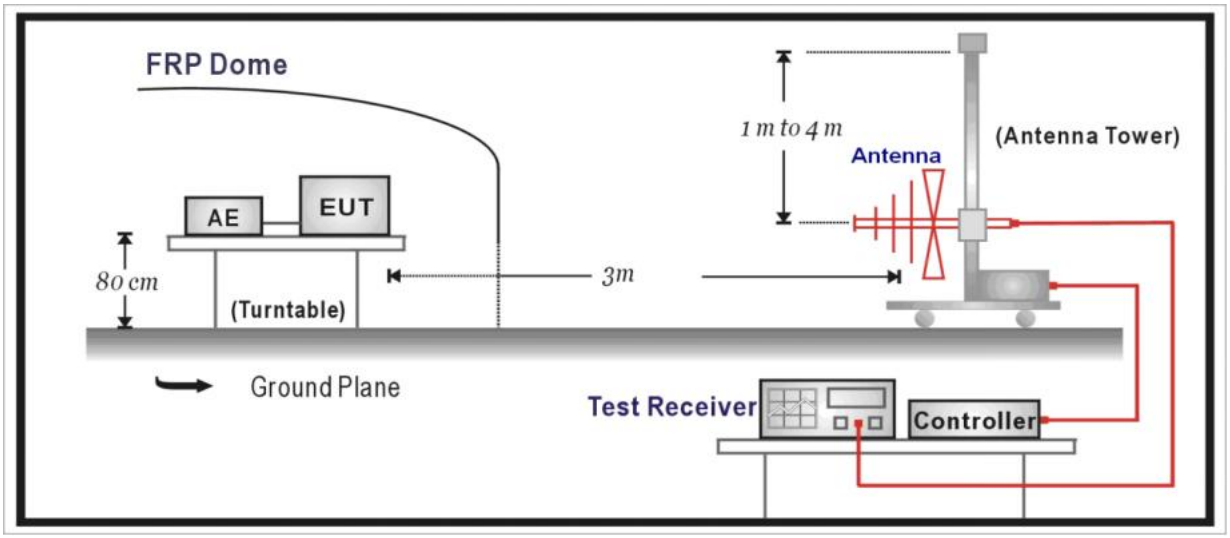
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ⩾ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.2.3 Test setup

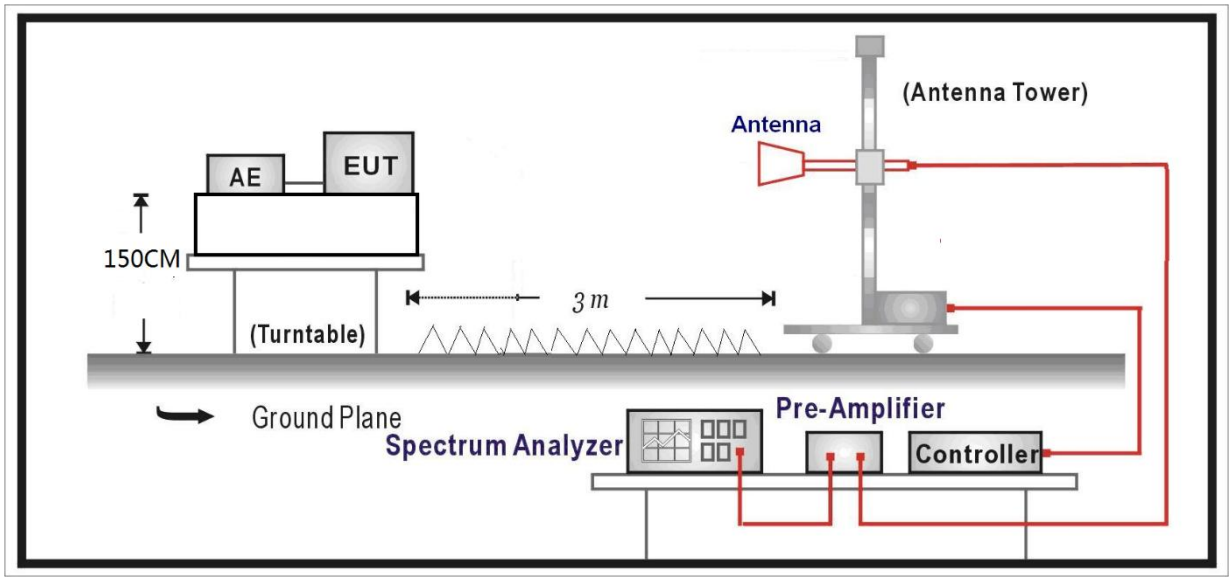
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:

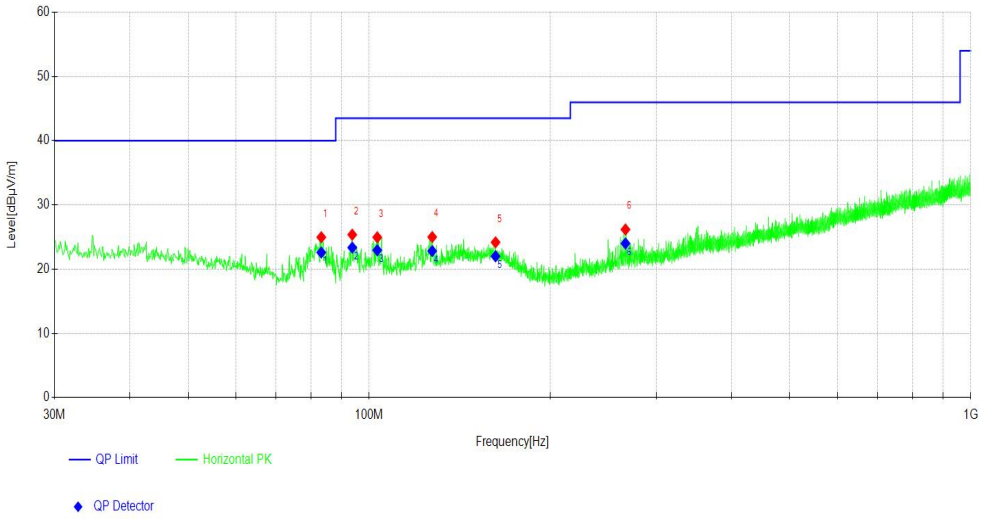


3.2.4 Test results

BELOW 1GHz WORST-CASE DATA:

Test Mode:	**802.11b CH 1**	Frequency Range	9kHz-1000MHz
Detector Function	Quasi-Peak(QP)		

Horizontal



NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	83.258	9.23	15.74	24.97	40.00	15.03	200	213
2	93.735	9.14	16.23	25.37	43.50	18.13	300	9
3	103.145	7.90	17.06	24.96	43.50	18.54	300	3
4	127.301	5.74	19.26	25.00	43.50	18.50	200	358
5	162.224	3.72	20.46	24.18	43.50	19.32	200	89
6	266.704	7.32	18.86	26.18	46.00	19.82	200	249

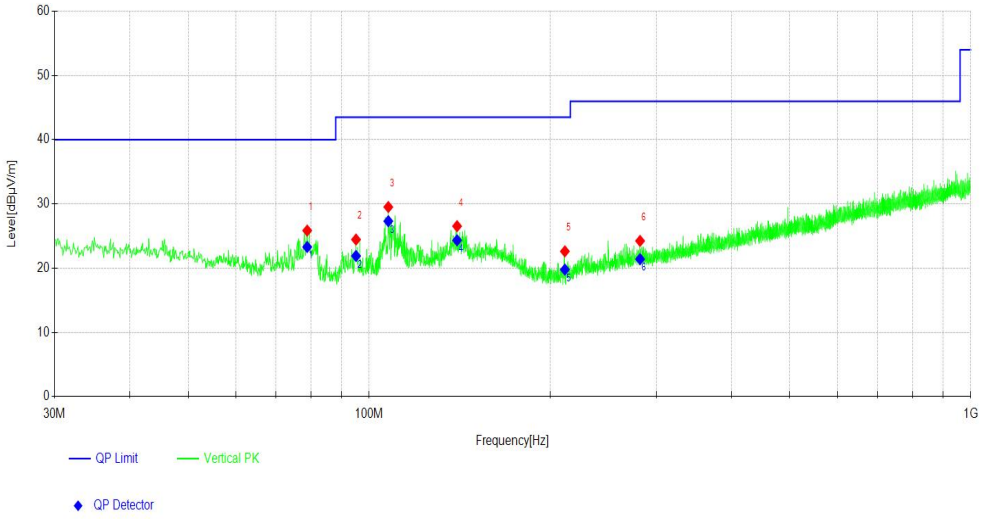
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	83.258	15.74	22.60	40.00	17.40	200	213	Horizontal
2	93.735	16.23	23.36	43.50	20.14	300	9	Horizontal
3	103.14	17.06	22.95	43.50	20.55	300	3	Horizontal
4	127.30	19.26	22.82	43.50	20.68	200	358	Horizontal
5	162.22	20.46	22.00	43.50	21.50	200	89	Horizontal
6	266.70	18.86	24.00	46.00	22.00	200	249	Horizontal

Remark: 1. The emission levels of 9k - 30MHz were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV) + Factor (dB/m).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

Test Mode:	**802.11b CH 1**	Frequency Range	9kHz-1000MHz
Detector Function	Quasi-Peak(QP)		

Vertical



NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	78.893	10.10	15.76	25.86	40.00	14.14	100	318
2	95.094	8.12	16.34	24.46	43.50	19.04	300	252
3	107.608	12.04	17.48	29.52	43.50	13.98	300	231
4	140.009	6.51	20.03	26.54	43.50	16.96	100	182
5	211.505	5.69	16.93	22.62	43.50	20.88	100	185
6	282.031	4.87	19.37	24.24	46.00	21.76	300	307

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	78.893	15.76	23.30	40.00	16.70	100	318	Vertical
2	95.094	16.34	21.90	43.50	21.60	300	252	Vertical
3	107.608	17.48	27.32	43.50	16.18	300	231	Vertical
4	140.009	20.03	24.34	43.50	19.16	100	182	Vertical
5	211.505	16.93	19.78	43.50	23.72	100	185	Vertical
6	282.031	19.37	21.40	46.00	24.60	300	307	Vertical

Remark: 1.The emission levels of 9k - 30MHz were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV) + Factor (dB/m).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

ABOVE 1GHz DATA
All test modes have been conducted, and the report only presents the worst case .

Channel	**802.11n(HT20) MIMO CH 1**	**Frequency**	2412MHz
Frequency Range	Above 1G	**Detector Function**	PK/AV

Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	2388.73	44.58	-1.39	43.19	54.00	10.81	AV	Horizontal
2	2389.08	55.95	-1.38	54.57	74.00	19.43	PK	Horizontal
3	2390.00	43.78	-1.37	42.41	54.00	11.59	AV	Horizontal
4	2390.00	52.83	-1.37	51.46	74.00	22.54	PK	Horizontal
5	2410.70	96.17	-1.19	94.98			AV	Horizontal
6	2411.35	102.27	-1.19	101.08			PK	Horizontal
7	4824.00	41.98	9.58	51.56	74.00	22.44	PK	Horizontal
8	4824.00	33.99	9.58	43.57	54.00	10.43	AV	Horizontal
9	7236.00	26.54	13.96	40.50	54.00	13.50	AV	Horizontal
10	7236.00	34.20	13.96	48.16	74.00	25.84	PK	Horizontal
11	9648.00	27.37	14.33	41.70	74.00	32.30	PK	Horizontal
12	9648.00	19.04	14.33	33.37	54.00	20.63	AV	Horizontal
13	2386.99	57.74	-1.42	56.32	74.00	17.68	PK	Vertical
14	2388.53	45.49	-1.39	44.10	54.00	9.90	AV	Vertical
15	2390.00	45.41	-1.37	44.04	54.00	9.96	AV	Vertical
16	2390.00	57.39	-1.37	56.02	74.00	17.98	PK	Vertical
17	2410.67	98.41	-1.19	97.22			AV	Vertical
18	2413.85	105.24	-1.19	104.05			PK	Vertical
19	4824.00	44.68	9.58	54.26	74.00	19.74	PK	Vertical
20	4824.00	35.58	9.58	45.16	54.00	8.84	AV	Vertical
21	7236.00	33.00	13.96	46.96	54.00	7.04	AV	Vertical
22	7236.00	41.49	13.96	55.45	74.00	18.55	PK	Vertical
23	9648.00	27.00	14.33	41.33	74.00	32.67	PK	Vertical
24	9648.00	19.59	14.33	33.92	54.00	20.08	AV	Vertical

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV) + Factor (dB/m).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

Channel	**802.11n(HT20) MIMO CH 6**	**Frequency**	2437MHz
Frequency Range	Above 1G	**Detector Function**	PK/AV

Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	4874.00	41.82	9.66	51.48	74.00	22.52	PK	Horizontal
2	4874.00	33.93	9.66	43.59	54.00	10.41	AV	Horizontal
3	7311.00	25.22	12.65	37.87	54.00	16.13	AV	Horizontal
4	7311.00	33.25	12.65	45.90	74.00	28.10	PK	Horizontal
5	9748.00	26.66	14.73	41.39	74.00	32.61	PK	Horizontal
6	9748.00	18.50	14.73	33.23	54.00	20.77	AV	Horizontal
7	4874.00	44.23	9.66	53.89	74.00	20.11	PK	Vertical
8	4874.00	34.40	9.66	44.06	54.00	9.94	AV	Vertical
9	7311.00	31.35	12.65	44.00	54.00	10.00	AV	Vertical
10	7311.00	39.92	12.65	52.57	74.00	21.43	PK	Vertical
11	9748.00	27.13	14.73	41.86	74.00	32.14	PK	Vertical
12	9748.00	19.49	14.73	34.22	54.00	19.78	AV	Vertical

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV) + Factor (dB/m).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

Channel	**802.11n(HT20) MIMO CH 11**	**Frequency**	2462MHz
Frequency Range	Above 1G	**Detector Function**	PK/AV

Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	2460.62	96.24	-1.16	95.08			AV	Horizontal
2	2461.14	102.89	-1.13	101.76			PK	Horizontal
3	2483.50	56.87	-1.15	55.72	74.00	18.28	PK	Horizontal
4	2483.50	44.53	-1.15	43.38	54.00	10.62	AV	Horizontal
5	2485.96	59.62	-1.03	58.59	74.00	15.41	PK	Horizontal
6	2486.29	46.99	-1.01	45.98	54.00	8.02	AV	Horizontal
7	4924.00	41.73	10.19	51.92	74.00	22.08	PK	Horizontal
8	4924.00	33.55	10.19	43.74	54.00	10.26	AV	Horizontal
9	7386.00	24.14	11.57	35.71	54.00	18.29	AV	Horizontal
10	7386.00	30.89	11.57	42.46	74.00	31.54	PK	Horizontal
11	9848.00	27.07	14.74	41.81	74.00	32.19	PK	Horizontal
12	9848.00	18.86	14.74	33.60	54.00	20.40	AV	Horizontal
13	2460.71	101.00	-1.16	99.84			AV	Vertical
14	2461.24	107.30	-1.13	106.17			PK	Vertical
15	2483.50	64.40	-1.15	63.25	74.00	10.75	PK	Vertical
16	2483.50	51.46	-1.15	50.31	54.00	3.69	AV	Vertical
17	2487.47	51.43	-0.96	50.47	54.00	3.53	AV	Vertical
18	2489.30	67.11	-0.87	66.24	74.00	7.76	PK	Vertical
19	4924.00	42.52	10.19	52.71	74.00	21.29	PK	Vertical
20	4924.00	34.40	10.19	44.59	54.00	9.41	AV	Vertical
21	7386.00	38.02	11.57	49.59	74.00	24.41	PK	Vertical
22	7386.00	29.48	11.57	41.05	54.00	12.95	AV	Vertical
23	9848.00	27.29	14.74	42.03	74.00	31.97	PK	Vertical
24	9848.00	18.73	14.74	33.47	54.00	20.53	AV	Vertical

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV) + Factor (dB/m).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

3.3 6DB BANDWIDTH MEASUREMENT

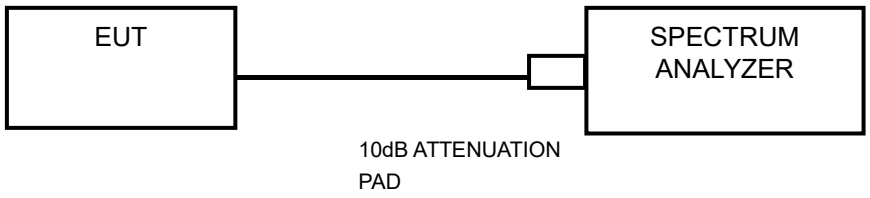
3.3.1 Limits

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 Measurement procedure

a. Set resolution bandwidth (RBW) = 100KHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associatedwith the two amplitude points (upper and lower) that are attenuated by 6 dB relative to themaximum level measured in the fundamental emission.

3.3.3 Test setup



3.4 CONDUCTED OUTPUT POWER

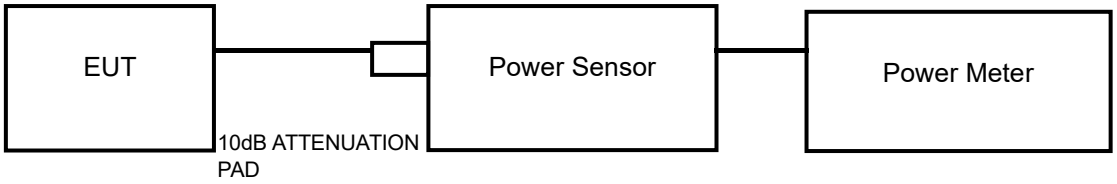
3.4.1 Limits

For DTS employing digital modulation techniques operating in the bands 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W,

3.4.2 Measurement procedure

a. 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 and set the detector to PEAK.Record the power level.
b. An 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 and set the detector to AVERAGE. Record the power level.

3.4.3 Test setup



3.5 POWER SPECTRAL DENSITY MEASUREMENT

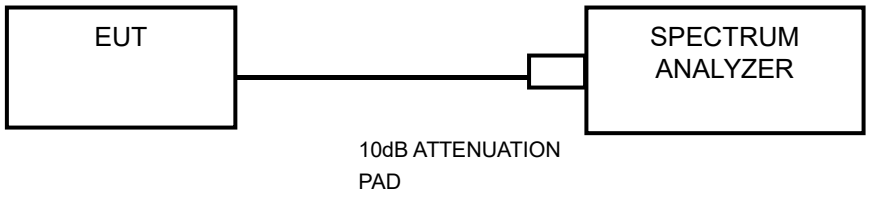
3.5.1 Limits

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.2 Measurement procedure

a. Set instrument center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set RBW to: 3KHz
d. Set VBW ≥3 x RBW.
e. Detector = peak
f. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g. Sweep time = auto couple.
h. Use the peak marker function to determine the maximum amplitude level.

3.5.3 Test setup



3.6 OUT OF BAND EMISSION MEASUREMENT

3.6.1 Limits

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

3.6.2 Measurement procedure

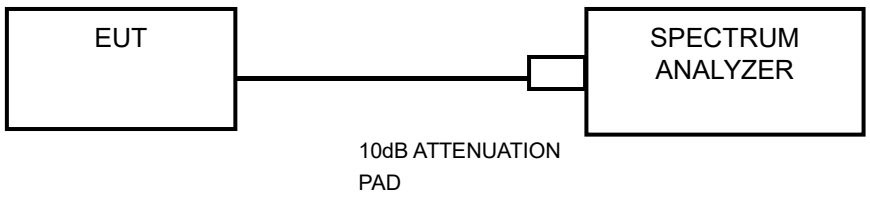
Measurement Procedure -Reference Level

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep time = auto couple.
e. Trace mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum power level in any 100 kHzband segment within the fundamental EBW.

Measurement Procedure –Unwanted Emission Level

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Set span to encompass the spectrum to be examined
d. Detector = peak.
e. Trace Mode = max hold.
f. Sweep = auto couple.

3.6.3 Test setup



3.7 OCCUPIED BANDWIDTH MEASUREMENT

3.7.1 Measurement procedure

The transmitter antenna output was connected to the spectrum analyzer through an attenuator. The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.
below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.7.2 TEST SETUP

3.8 ANTENNA REQUIREMENT

3.8.1 LIMITS OF ANTENNA REQUIREMENTS

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b) , if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.8.2 ANTENNA ANTI-REPLACEMENT CONSTRUCTION

The antenna used for this product is External antenna and that no antenna other than that furnished by the responsible party shall be used with the device

3.8.3 ANTENNA GAIN

The maximum peak gain of the transmit antenna 1 is 1.82 dBi.

The maximum peak gain of the transmit antenna 2 is 1.82 dBi.

Operation Band	Chain 1 Antenna Gain(dBi)	Chain 2 Antenna Gain(dBi)	DG For Power (dBi)	Power Limit Reduction
2412MHz ~ 2462MHz	1.82	1.82	4.83	0

Refer to KDB662911 D01 Multiple Transmitter Output v02r01.

a) Basic methodology with N_{ANT} transmit antennas, each with the same directional gain G_{ANT} dBi, being driven by N_{ANT} transmitter outputs of equal power. Directional gain is to be computed as follows:

(i) If *any* transmit signals are *correlated* with each other,
Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi

(ii) If *all* transmit signals are *completely uncorrelated* with each other,
Directional gain = G_{ANT}

4 PHOTOGRAPHS OF TEST SETUP

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

5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).

------ End of the Report ------

Important

(1) The test report is invalid without the official stamp of CVC;

(2) Any part photocopies of the test report are forbidden without the written permission from CVC;

(3) The test report is invalid without the signatures of Approval and Reviewer;

(4) The test report is invalid if altered;

(5) Objections to the test report must be submitted to CVC within 15 days.

(6) Generally, commission test is responsible for the tested samples only.

(7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

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