

FCC TEST REPORT

(Part 15, Subpart C)

Applicant:	MUNIC
Address:	100 Avenue de Stalingrad 94800 Villejuif – France

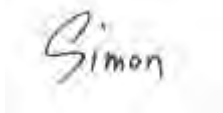
Manufacturer or Supplier:	MUNIC
Address:	100 Avenue de Stalingrad 94800 Villejuif – France
Product:	telematics embedded system
Brand Name:	MUNIC
Model Name:	C4D-4G4USAB_V8+
FCC ID:	A6GC4D-4G4USV8-2
Date of tests:	May. 05, 2022 ~ May. 16, 2022

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.247**

☒ **ANSI C63.10-2013**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
 Date: May. 16, 2022	 Date: May. 16, 2022

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P22040029RF02	Original release	May. 16, 2022



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)		
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT
15.207	AC Power Conducted Emission	Compliance
15.205 15.209	Radiated Emissions	Compliance
15.247(d)	Out of band Emission Measurement	Compliance
15.247(a)(2)	6dB bandwidth	Compliance
15.247(b)	Conducted Output power	Compliance
15.247(e)	Power Spectral Density	Compliance
15.203	Antenna Requirement	Compliance

Note : Except RSE , other data please refer to Appendix 1 (for WIFI-2.4G) and Appendix 2 (for BLE)



1.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (30MHz~1GMHz)	±4.98dB
Radiated emissions (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Power Spectral Density	±0.85 dB

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



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	telematics embedded system	
BRAND NAME	MUNIC	
MODEL NAME	C4D-4G4USAB_V8+	
NOMINAL VOLTAGE	DC 13.7V	
MODULATION	DSSS, OFDM, GFSK	
TRANSMISSION RATE	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 300Mbps BT_LE: 1 Mbps	
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20/40) 2402-2480MHz for BT-LE(GFSK)	
MAX. OUTPUT POWER	WLAN: 176.20mW (Maximum) BT-LE: 1.07mW (Maximum)	
ANTENNA TYPE	2.4G WIFI	Fixed Internal Antenna with 2.7 dBi gain
	BT_LE	Fixed Internal Antenna with 2.7 dBi gain
HW VERSION	HW.01	
SW VERSION	SW.01	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	N/A	

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The EUT incorporates a SISO function. Physically, the EUT provides one transmitter and one receiver.

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX /1RX
802.11g	1TX /1RX
802.11n (20MHz)	1TX /1RX
802.11n (40MHz)	1TX /1RX
BT_LE(1MHz)	1TX /1RX

- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



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List of Accessory:

ACCESSORIES	BRAND	MODEL	SPECIFICATION
Battery 1	Howell	Li-polymer 552535H	Capacity : Li-ion, 270mAh
Battery 2	Akkutronics	382530-PTL	Capacity : Li-ion, 270mAh

NOTE:

BLE&WIFI test in the engineer mode,power setting at “ MAXIMUM CONDUCTED OUTPUT POWER”, the steps for entering engineering mode are as follows:

1. In the finger plate, dial the code for entering Engineer mode: *****#3646633#*****
2. EngineerMode->CONNECTIVITY->Wifi->Tx or->BT->LE TX



2.2 DESCRIPTION OF TEST MODES

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

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

7 channels are provided for 802.11n (HT40):

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

40 channels are provided for BT-LE (GFSK):

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



2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

2.2.2 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.

The worst case was found when positioned on Y axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
-	√	√	√	√	-

Where **RE<1G**: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ 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	DATA RATE (Mbps)
802.11n HT40	3 to 9	3	OFDM	MCS0
BT-LE	0 to 39	19	GFSK	1.0



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RADIATED EMISSION TEST (ABOVE 1GHz):

☒ 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	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
802.11n HT40	3 to 9	3,6,9	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	1.0

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	DATA RATE (Mbps)
802.11n HT40	3 to 9	3	OFDM	MCS0

**BANDEDGE 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	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
802.11n HT40	3 to 9	3,6,9	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	1.0

**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, 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	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
802.11n HT40	3 to 9	3,6,9	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	1.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	23deg. C, 70%RH	DC13.7V	Carl Xie
RE≥1G	23deg. C, 70%RH	DC13.7V	Carl Xie
PLC	25deg. C, 52%RH	DC13.7V	Lily Zhao
APCM	25deg. C, 60%RH	DC13.7V	Lily Zhao



2.3 Duty Cycle of Test Signal

Please Refer to Appendix1/2 Of this test report.

WORST-CASE DATA:

Measured Duty Cycle		
Mode		Duty Cycle [%]
WIFI 2.4GHz	11B	99.20
	11G	94.93
	11N20	92.75
	11N40	87.04
BT LE	BT4.0	66.13

Note:

Duty cycle of test signal is < 98%, duty factor shall be considered.

2.4 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

KDB 558074 D01 DTS Meas Guidance v05r02

ANSI C63.10-2013

Note :

1. All test items have been performed and recorded as per the above standards.
2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Desktop	Lenovo	M73 SFF	PC04GRQV	N/A
2	Desktop	Lenovo	M73 SFF	PC06CS27	N/A
3	Laptop	Lenovo	Thnikpad T450	PC-049PT1	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.5m
2	AC Line: Unshielded, Detachable 1.5m
3	AC Line: Unshielded, Detachable 1.5m



3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF 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 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Feb. 15,22	Feb. 14,23
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Mar. 04,22	Mar. 03,23

NOTE:

1. The test was performed in CE shielded room.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



3.1.3 TEST PROCEDURES

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

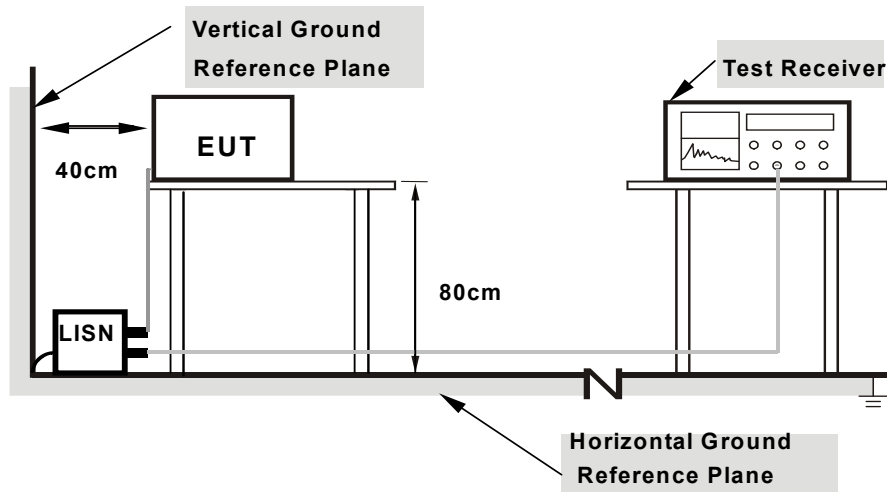
NOTE: All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.



3.1.5 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
from other units and other metal planes**

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

3.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.



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3.1.7 TEST RESULTS

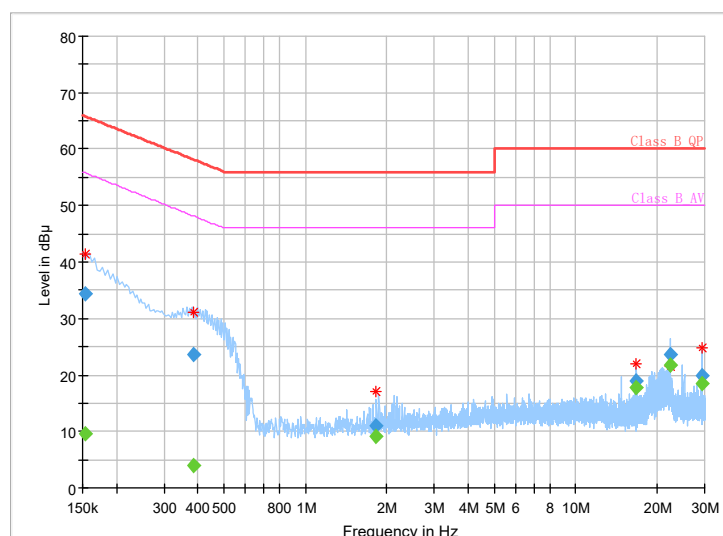
CONDUCTED WORST-CASE DATA:

Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25deg. C, 55%RH
Tested By	Carl Xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154000	---	9.64	55.78	46.14	L1	ON	9.7
0.154000	34.33	---	65.78	31.45	L1	ON	9.7
0.384000	---	3.95	48.19	44.24	L1	ON	9.7
0.384000	23.54	---	58.19	34.65	L1	ON	9.7
1.828000	---	9.19	46.00	36.81	L1	ON	9.7
1.828000	11.01	---	56.00	44.99	L1	ON	9.7
16.800000	---	17.79	50.00	32.21	L1	ON	9.8
16.800000	18.87	---	60.00	41.13	L1	ON	9.8
22.400000	---	21.81	50.00	28.19	L1	ON	9.8
22.400000	23.67	---	60.00	36.33	L1	ON	9.8
29.488000	---	18.45	50.00	31.55	L1	ON	9.8
29.488000	19.92	---	60.00	40.08	L1	ON	9.8

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value -Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum





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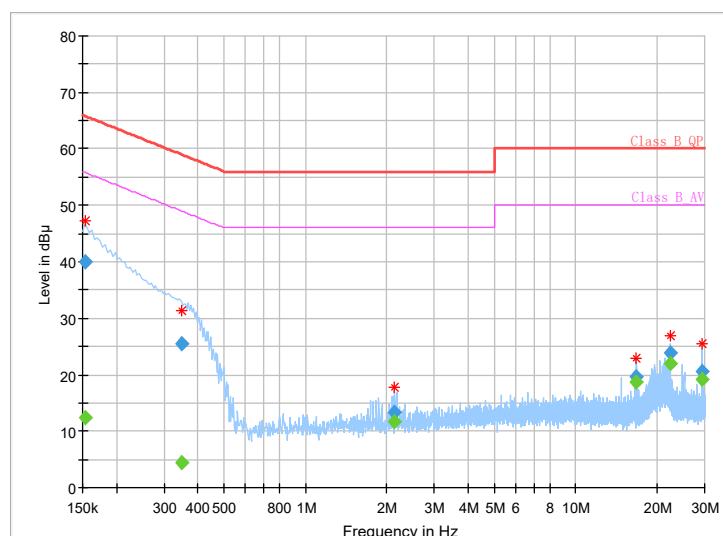
Test Report No.: W7L-P22040029RF02

Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25deg. C, 55%RH
Tested By	Carl Xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154000	---	12.40	55.78	43.38	N	ON	9.7
0.154000	39.92	---	65.78	25.86	N	ON	9.7
0.348000	---	4.55	49.01	44.46	N	ON	9.7
0.348000	25.54	---	59.01	33.47	N	ON	9.7
2.140000	---	11.72	46.00	34.28	N	ON	9.8
2.140000	13.26	---	56.00	42.74	N	ON	9.8
16.804000	---	18.70	50.00	31.30	N	ON	9.9
16.804000	19.62	---	60.00	40.38	N	ON	9.9
22.408000	---	21.95	50.00	28.05	N	ON	9.9
22.408000	23.83	---	60.00	36.17	N	ON	9.9
29.492000	---	19.17	50.00	30.83	N	ON	9.9
29.492000	20.65	---	60.00	39.35	N	ON	9.9

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value -Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
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 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Bilog Antenna	ETS-LINDGREN	3143B	00161964	Feb. 25,21	Feb. 24,22
Bilog Antenna	ETS-LINDGREN	3143B	00161964	Feb. 24,22	Feb. 23,23
Horn Antenna	ETS-LINDGREN	3117	00168692	Mar. 06,22	Mar. 05,23
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 25, 21	Aug. 24, 22
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 27,22	Apr. 26,23
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 30,22	Apr. 29,23
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 25,21	Aug. 24,22
Power Meter	Anritsu	ML2495A	1506002	Feb. 22,22	Feb. 21,23
Power Sensor	Anritsu	MA2411B	1339352	May. 07,21	May. 06,22
Power Sensor	Anritsu	MA2411B	1339352	May. 06,22	May. 07,23
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.05,21	Sep.04,22

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in 3m Chamber.
 3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.



3.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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 (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

3.2.4 DEVIATION FROM TEST STANDARD

No deviation

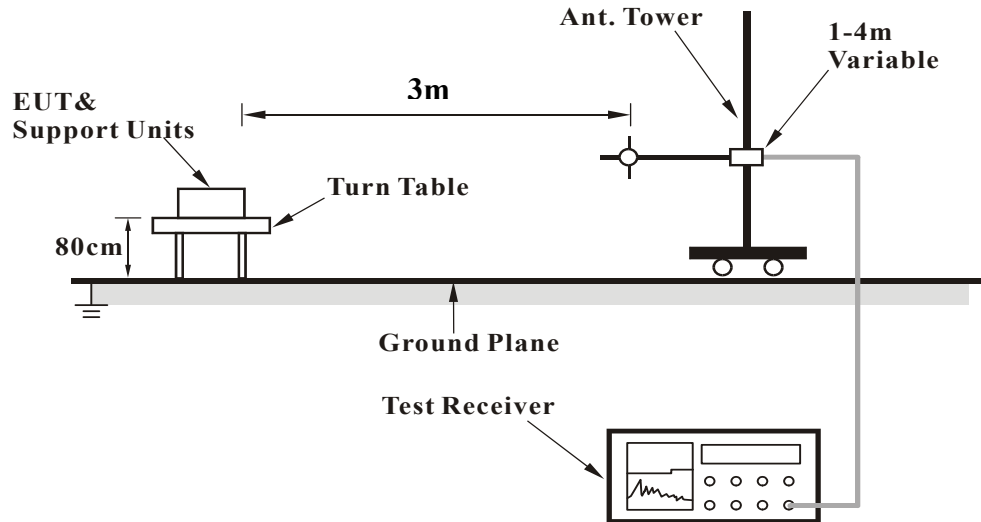


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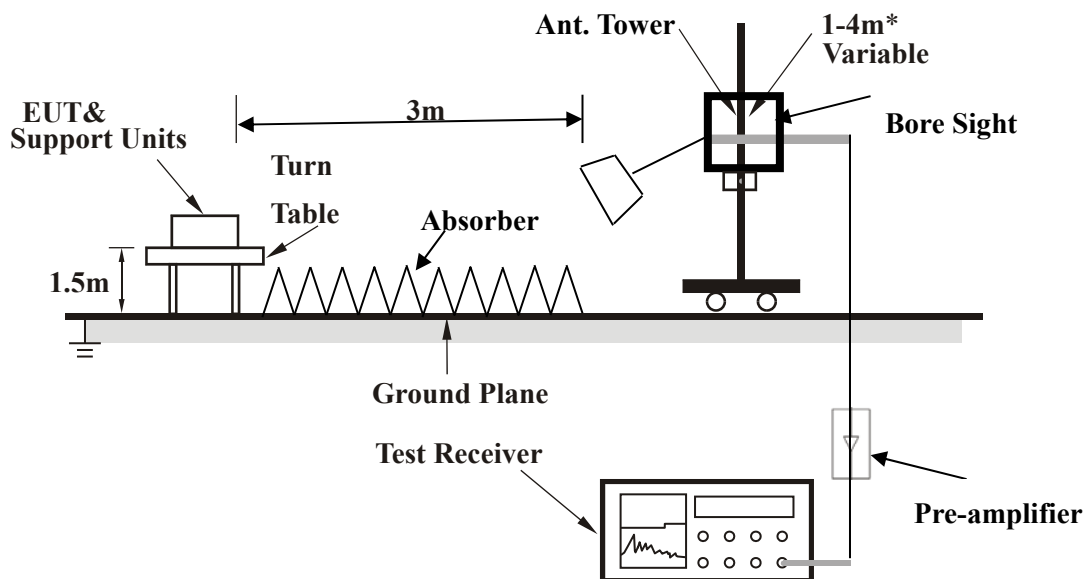
Test Report No.: W7L-P22040029RF02

3.2.5 TEST SETUP

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

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



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3.2.6 EUT OPERATING CONDITIONS

- a. Set the EUT under full load condition and placed them on a testing table.
- b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the EUT in full functions.



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3.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

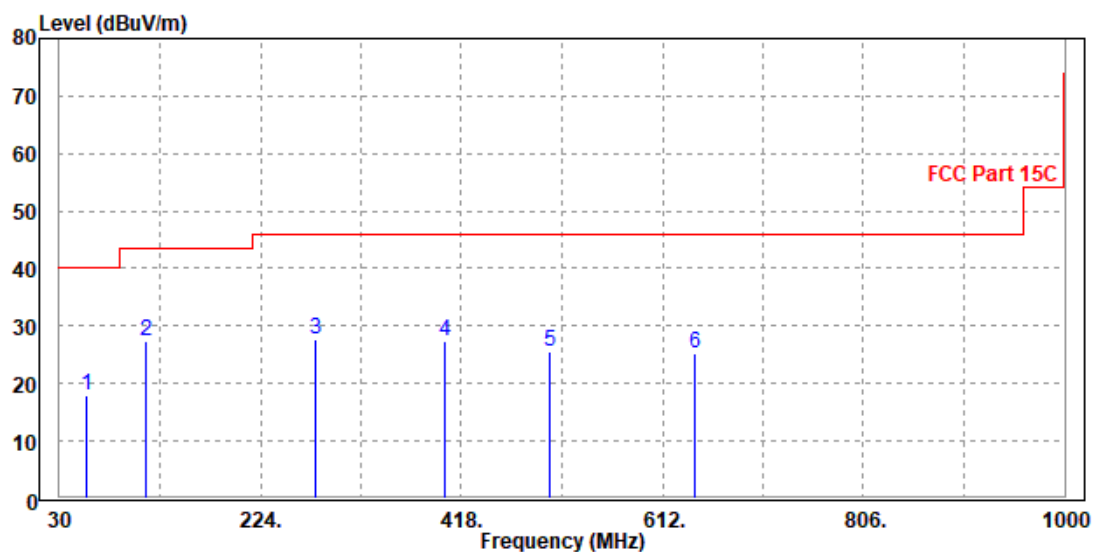
802.11n (40MHz)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
56.19	18	45.75	40	-22	9.58	0	37.33	108	14	QP
113.42	27.23	54.58	43.5	-16.27	9.76	0	37.11	158	357	QP
276.38	27.83	50.77	46	-18.17	13.76	0	36.7	157	318	QP
402.48	27.44	48.02	46	-18.56	16.25	0	36.83	161	325	QP
503.36	25.46	44.32	46	-20.54	18.15	0	37.01	140	253	QP
643.04	25.28	42.2	46	-20.72	20.52	0	37.44	185	249	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.





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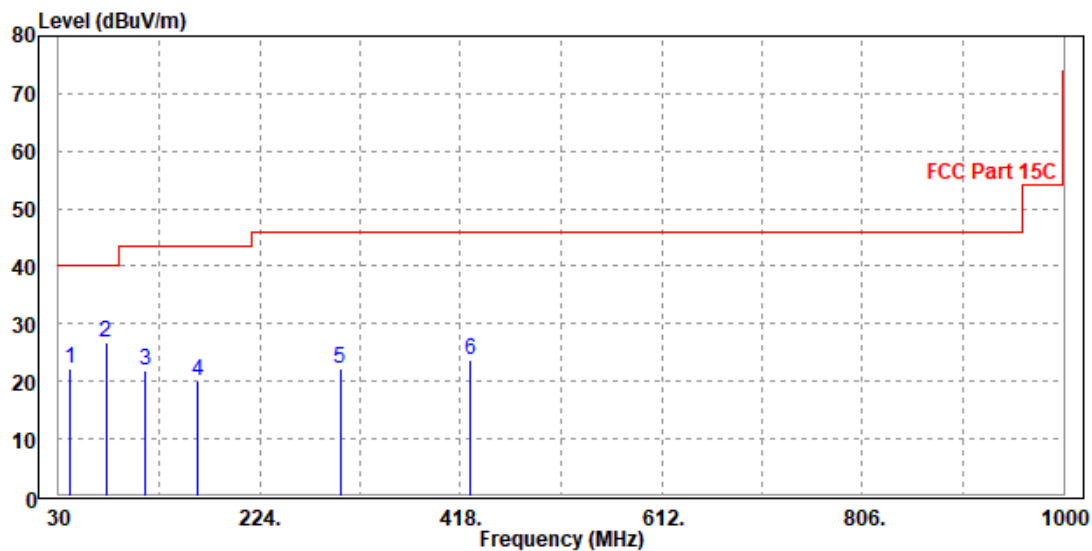
Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
41.64	22.34	47.85	40	-17.66	11.97	0	37.48	129	107	QP
75.59	26.87	56.39	40	-13.13	7.82	0	37.34	149	231	QP
113.42	21.78	50.19	43.5	-21.72	8.7	0	37.11	170	36	QP
163.86	19.98	45.73	43.5	-23.52	10.96	0	36.71	138	336	QP
301.6	22.35	45.06	46	-23.65	14.04	0	36.75	192	243	QP
427.7	23.82	44.04	46	-22.18	16.66	0	36.88	151	200	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.





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Test Report No.: W7L-P22040029RF02

ABOVE 1GHz WORST-CASE DATA:

Note: 1. For radiated emissions testing , the full testing range of different modes have been scanned , only the worst case harmonic data is reported in the sheet.

2. All other emissions were greater than 20dB below the limit was not recorded

802.11b:

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.57	62.33	74	-20.43	31.75	5.86	46.37	151	201	Peak
2390	48.78	57.54	54	-5.22	31.75	5.86	46.37	151	201	Average
2412	102.2	110.86	/	/	31.82	5.89	46.37	122	125	Peak
2412	99.67	108.33	/	/	31.82	5.89	46.37	122	125	Average
2483.5	51.08	59.41	74	-22.92	32.05	5.99	46.37	143	8	Peak
2483.5	44.53	52.86	54	-9.47	32.05	5.99	46.37	143	8	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	54.21	62.58	74	-19.79	32.14	5.86	46.37	159	330	Peak
2390	46.41	54.78	54	-7.59	32.14	5.86	46.37	159	330	Average
2412	101.77	110.06	/	/	32.19	5.89	46.37	128	288	Peak
2412	100.51	108.8	/	/	32.19	5.89	46.37	128	288	Average
2483.5	54.54	62.56	74	-19.46	32.36	5.99	46.37	198	302	Peak
2483.5	44.32	52.34	54	-9.68	32.36	5.99	46.37	198	302	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.78	61.54	74	-21.22	31.75	5.86	46.37	184	238	Peak
2390	44.05	52.81	54	-9.95	31.75	5.86	46.37	184	238	Average
2437	101.56	110.1	/	/	31.9	5.93	46.37	179	189	Peak
2437	99.34	107.88	/	/	31.9	5.93	46.37	179	189	Average
2483.5	56.08	64.41	74	-17.92	32.05	5.99	46.37	187	299	Peak
2483.5	44.45	52.78	54	-9.55	32.05	5.99	46.37	187	299	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.78	62.15	74	-20.22	32.14	5.86	46.37	138	250	Peak
2390	45.19	53.56	54	-8.81	32.14	5.86	46.37	138	250	Average
2437	101.67	109.86	/	/	32.25	5.93	46.37	187	43	Peak
2437	100.65	108.84	/	/	32.25	5.93	46.37	187	43	Average
2483.5	51.83	59.85	74	-22.17	32.36	5.99	46.37	137	330	Peak
2483.5	44.19	52.21	54	-9.81	32.36	5.99	46.37	137	330	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.54	61.3	74	-21.46	31.75	5.86	46.37	184	228	Peak
2390	44.27	53.03	54	-9.73	31.75	5.86	46.37	184	228	Average
2462	104.72	113.15	/	/	31.98	5.96	46.37	159	162	Peak
2462	101.36	109.79	/	/	31.98	5.96	46.37	159	162	Average
2483.5	64.13	72.46	74	-9.87	32.05	5.99	46.37	112	246	Peak
2483.5	51.79	60.12	54	-2.21	32.05	5.99	46.37	112	246	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.25	59.62	74	-22.75	32.14	5.86	46.37	194	268	Peak
2390	43.6	51.97	54	-10.4	32.14	5.86	46.37	194	268	Average
2462	102.02	110.12	/	/	32.31	5.96	46.37	155	220	Peak
2462	99.03	107.13	/	/	32.31	5.96	46.37	155	220	Average
2483.5	54.02	62.04	74	-19.98	32.36	5.99	46.37	103	139	Peak
2483.5	44.35	52.37	54	-9.65	32.36	5.99	46.37	103	139	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	60.05	68.81	74	-13.95	31.75	5.86	46.37	158	109	Peak
2390	50.9	59.66	54	-3.1	31.75	5.86	46.37	158	109	Average
2412	104.87	113.53	/	/	31.82	5.89	46.37	149	218	Peak
2412	98	106.66	/	/	31.82	5.89	46.37	149	218	Average
2483.5	55.51	63.84	74	-18.49	32.05	5.99	46.37	177	241	Peak
2483.5	45.14	53.47	54	-8.86	32.05	5.99	46.37	177	241	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	55.86	64.23	74	-18.14	32.14	5.86	46.37	169	231	Peak
2390	49.95	58.32	54	-4.05	32.14	5.86	46.37	169	231	Average
2412	104.5	112.79	/	/	32.19	5.89	46.37	198	233	Peak
2412	96.91	105.2	/	/	32.19	5.89	46.37	198	233	Average
2483.5	53.34	61.36	74	-20.66	32.36	5.99	46.37	185	50	Peak
2483.5	43.84	51.86	54	-10.16	32.36	5.99	46.37	185	50	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 2412MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	54.97	63.73	74	-19.03	31.75	5.86	46.37	132	239	Peak
2390	45.57	54.33	54	-8.43	31.75	5.86	46.37	132	239	Average
2437	107.26	115.8	/	/	31.9	5.93	46.37	159	176	Peak
2437	99.87	108.41	/	/	31.9	5.93	46.37	159	176	Average
2483.5	56.5	64.83	74	-17.5	32.05	5.99	46.37	110	128	Peak
2483.5	47.33	55.66	54	-6.67	32.05	5.99	46.37	110	128	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	54.19	62.56	74	-19.81	32.14	5.86	46.37	169	82	Peak
2390	45.65	54.02	54	-8.35	32.14	5.86	46.37	169	82	Average
2437	104.6	112.79	/	/	32.25	5.93	46.37	150	207	Peak
2437	97.32	105.51	/	/	32.25	5.93	46.37	150	207	Average
2483.5	52.85	60.87	74	-21.15	32.36	5.99	46.37	167	157	Peak
2483.5	45.13	53.15	54	-8.87	32.36	5.99	46.37	167	157	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53	61.76	74	-21	31.75	5.86	46.37	122	271	Peak
2390	44.24	53	54	-9.76	31.75	5.86	46.37	122	271	Average
2462	103.91	112.34	/	/	31.98	5.96	46.37	164	279	Peak
2462	95.52	103.95	/	/	31.98	5.96	46.37	164	279	Average
2483.5	66.76	75.09	74	-7.24	32.05	5.99	46.37	147	96	Peak
2483.5	53.52	61.85	54	-0.48	32.05	5.99	46.37	147	96	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.3	60.67	74	-21.7	32.14	5.86	46.37	113	172	Peak
2390	44	52.37	54	-10	32.14	5.86	46.37	113	172	Average
2462	100.26	108.36	/	/	32.31	5.96	46.37	106	53	Peak
2462	92.5	100.6	/	/	32.31	5.96	46.37	106	53	Average
2483.5	60.76	68.78	74	-13.24	32.36	5.99	46.37	152	202	Peak
2483.5	49.08	57.1	54	-4.92	32.36	5.99	46.37	152	202	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 2462MHz: Fundamental frequency.



802.11n (20MHz)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	61.79	70.55	74	-12.21	31.75	5.86	46.37	177	288	Peak
2390	50.18	58.94	54	-3.82	31.75	5.86	46.37	177	288	Average
2412	102.48	111.14	/	/	31.82	5.89	46.37	163	269	Peak
2412	95.26	103.92	/	/	31.82	5.89	46.37	163	269	Average
2483.5	52.72	61.05	74	-21.28	32.05	5.99	46.37	150	257	Peak
2483.5	44.13	52.46	54	-9.87	32.05	5.99	46.37	150	257	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	64.75	73.12	74	-9.25	32.14	5.86	46.37	119	354	Peak
2390	50.51	58.88	54	-3.49	32.14	5.86	46.37	119	354	Average
2412	102.78	111.07	/	/	32.19	5.89	46.37	101	52	Peak
2412	94.98	103.27	/	/	32.19	5.89	46.37	101	52	Average
2483.5	52.3	60.32	74	-21.7	32.36	5.99	46.37	155	6	Peak
2483.5	44.92	52.94	54	-9.08	32.36	5.99	46.37	155	6	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 2412MHz: Fundamental frequency.



CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	54.4	63.16	74	-19.6	31.75	5.86	46.37	150	125	Peak
2390	45.41	54.17	54	-8.59	31.75	5.86	46.37	150	125	Average
2437	103.94	112.48	/	/	31.9	5.93	46.37	171	192	Peak
2437	96.39	104.93	/	/	31.9	5.93	46.37	171	192	Average
2483.5	55.32	63.65	74	-18.68	32.05	5.99	46.37	123	356	Peak
2483.5	45.74	54.07	54	-8.26	32.05	5.99	46.37	123	356	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	54.29	62.66	74	-19.71	32.14	5.86	46.37	171	97	Peak
2390	45.45	53.82	54	-8.55	32.14	5.86	46.37	171	97	Average
2437	103.39	111.58	/	/	32.25	5.93	46.37	150	75	Peak
2437	95.77	103.96	/	/	32.25	5.93	46.37	150	75	Average
2483.5	54.95	62.97	74	-19.05	32.36	5.99	46.37	197	217	Peak
2483.5	44.93	52.95	54	-9.07	32.36	5.99	46.37	197	217	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



**BUREAU
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Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.59	61.35	74	-21.41	31.75	5.86	46.37	101	170	Peak
2390	44.62	53.38	54	-9.38	31.75	5.86	46.37	101	170	Average
2462	104.02	112.45	/	/	31.98	5.96	46.37	129	327	Peak
2462	96.39	104.82	/	/	31.98	5.96	46.37	129	327	Average
2483.5	63.96	72.29	74	-10.04	32.05	5.99	46.37	111	312	Peak
2483.5	52.38	60.71	54	-1.62	32.05	5.99	46.37	111	312	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52	60.37	74	-22	32.14	5.86	46.37	106	129	Peak
2390	44.12	52.49	54	-9.88	32.14	5.86	46.37	106	129	Average
2462	101.1	109.2	/	/	32.31	5.96	46.37	137	182	Peak
2462	92.79	100.89	/	/	32.31	5.96	46.37	137	182	Average
2483.5	60.76	68.78	74	-13.24	32.36	5.99	46.37	175	252	Peak
2483.5	51.18	59.2	54	-2.82	32.36	5.99	46.37	175	252	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 2462MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

802.11n (40MHz)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	63.43	72.19	74	-10.57	31.75	5.86	46.37	134	127	Peak
2390	53.67	62.43	54	-0.33	31.75	5.86	46.37	134	127	Average
2422	102.21	110.82	/	/	31.85	5.91	46.37	195	16	Peak
2422	93.77	102.38	/	/	31.85	5.91	46.37	195	16	Average
2483.5	59.53	67.86	74	-14.47	32.05	5.99	46.37	103	270	Peak
2483.5	45.29	53.62	54	-8.71	32.05	5.99	46.37	103	270	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	60.38	68.75	74	-13.62	32.14	5.86	46.37	194	248	Peak
2390	52.54	60.91	54	-1.46	32.14	5.86	46.37	194	248	Average
2422	102.59	110.84	/	/	32.21	5.91	46.37	165	156	Peak
2422	91.66	99.91	/	/	32.21	5.91	46.37	165	156	Average
2483.5	52.88	60.9	74	-21.12	32.36	5.99	46.37	142	169	Peak
2483.5	43.72	51.74	54	-10.28	32.36	5.99	46.37	142	169	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2422MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	58.34	67.1	74	-15.66	31.75	5.86	46.37	157	263	Peak
2390	47.99	56.75	54	-6.01	31.75	5.86	46.37	157	263	Average
2437	102.63	111.17	/	/	31.9	5.93	46.37	155	32	Peak
2437	91.7	100.24	/	/	31.9	5.93	46.37	155	32	Average
2483.5	58.53	66.86	74	-15.47	32.05	5.99	46.37	191	188	Peak
2483.5	47.13	55.46	54	-6.87	32.05	5.99	46.37	191	188	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	58.44	66.81	74	-15.56	32.14	5.86	46.37	147	135	Peak
2390	48.75	57.12	54	-5.25	32.14	5.86	46.37	147	135	Average
2437	103.18	111.37	/	/	32.25	5.93	46.37	146	119	Peak
2437	91.83	100.02	/	/	32.25	5.93	46.37	146	119	Average
2483.5	56.64	64.66	74	-17.36	32.36	5.99	46.37	173	336	Peak
2483.5	47.43	55.45	54	-6.57	32.36	5.99	46.37	173	336	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.05	61.81	74	-20.95	31.75	5.86	46.37	150	320	Peak
2390	44.71	53.47	54	-9.29	31.75	5.86	46.37	150	320	Average
2452	99.71	108.18	/	/	31.95	5.95	46.37	111	78	Peak
2452	91.95	100.42	/	/	31.95	5.95	46.37	111	78	Average
2483.5	61.88	70.21	74	-12.12	32.05	5.99	46.37	116	219	Peak
2483.5	53.34	61.67	54	-0.66	32.05	5.99	46.37	116	219	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.93	61.3	74	-21.07	32.14	5.86	46.37	113	158	Peak
2390	43.99	52.36	54	-10.01	32.14	5.86	46.37	113	158	Average
2452	95.15	103.29	/	/	32.28	5.95	46.37	115	315	Peak
2452	87.54	95.68	/	/	32.28	5.95	46.37	115	315	Average
2483.5	59.1	67.12	74	-14.9	32.36	5.99	46.37	189	37	Peak
2483.5	49.68	57.7	54	-4.32	32.36	5.99	46.37	189	37	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2452MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

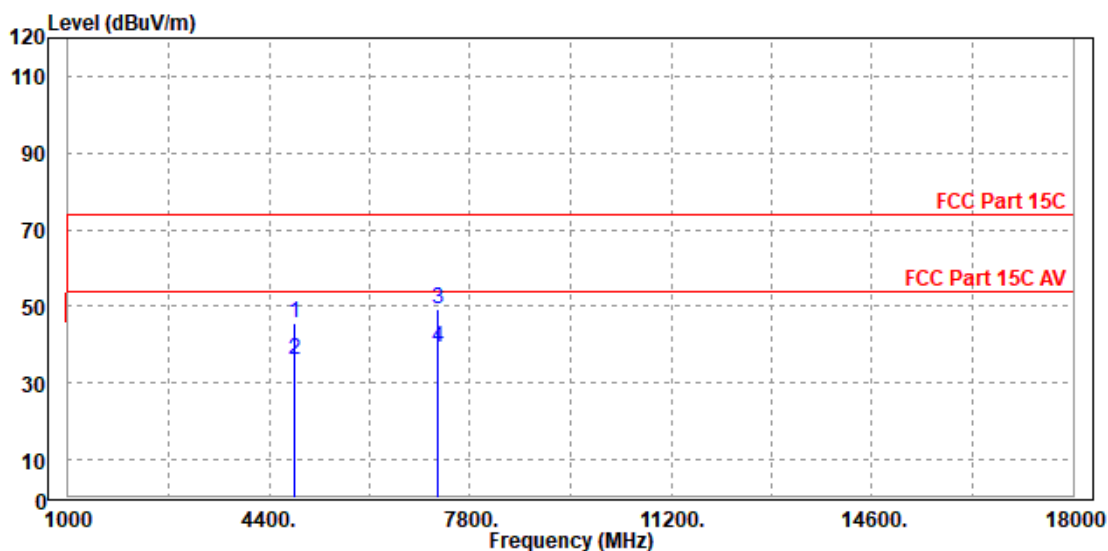
WORST CASE HARMONIC:

802.11n40

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	4842.000	45.41	48.67	74.00	-28.59	-3.26	Peak	Horizontal
2	4842.000	35.95	39.21	54.00	-18.05	-3.26	Average	Horizontal
3 PK	7266.000	49.29	47.25	74.00	-24.71	2.04	Peak	Horizontal
4 PP	7266.000	39.26	37.22	54.00	-14.74	2.04	Average	Horizontal



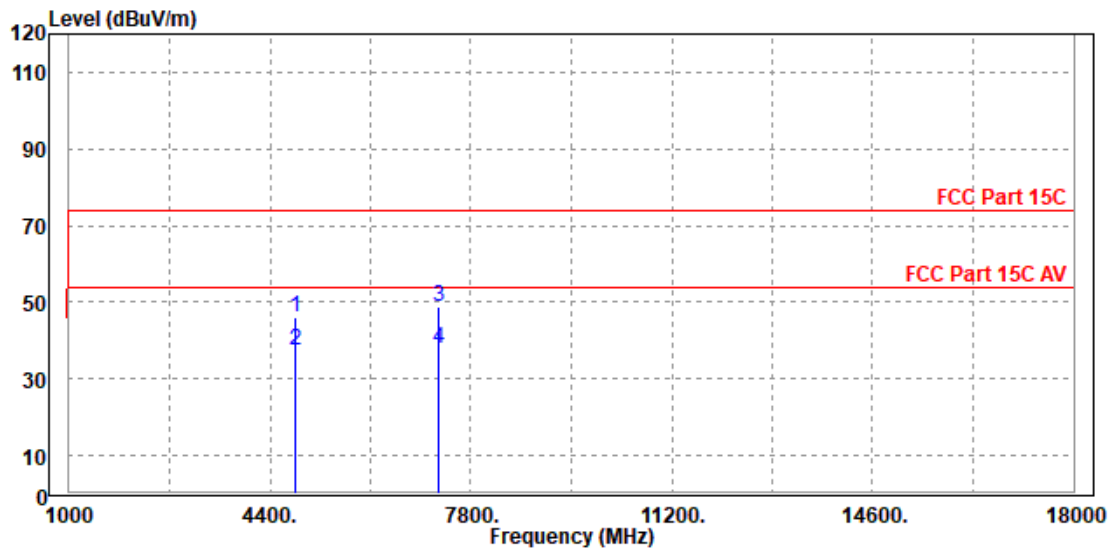


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Test Report No.: W7L-P22040029RF02

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	4842.000	45.96	49.02	74.00	-28.04	-3.06	Peak	Vertical
2	4842.000	37.22	40.28	54.00	-16.78	-3.06	Average	Vertical
3 PK	7266.000	49.00	46.87	74.00	-25.00	2.13	Peak	Vertical
4 PP	7266.000	37.98	35.85	54.00	-16.02	2.13	Average	Vertical



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2422MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

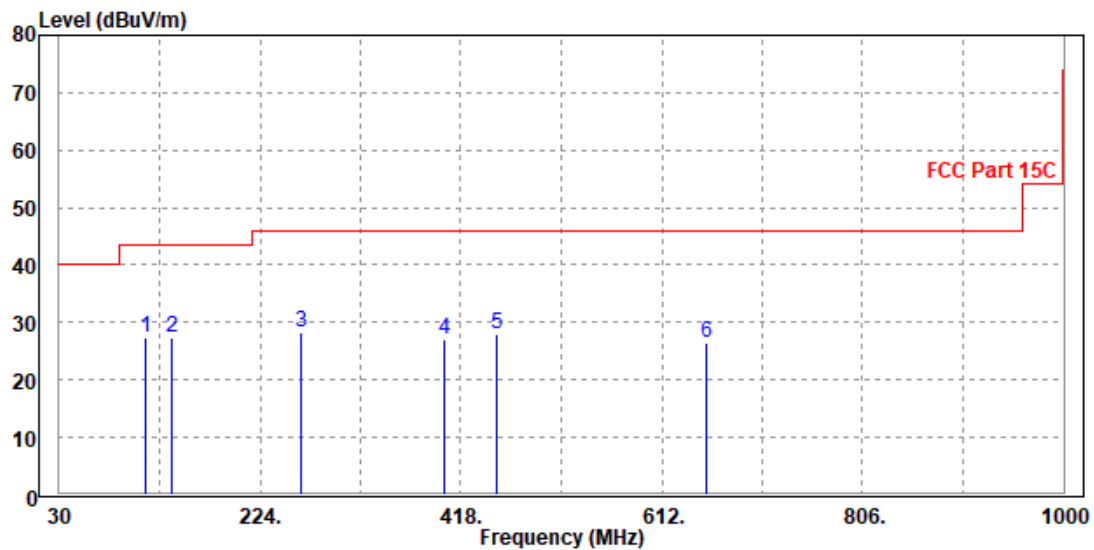
BT-LE _1M

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
113.42	27.32	54.1	43.5	-16.18	9.76	0.57	37.11	104	37	Peak
138.64	27.49	54.75	43.5	-16.01	9.03	0.63	36.92	129	155	Peak
263.77	28.22	50.41	46	-17.78	13.64	0.85	36.68	143	101	Peak
402.48	27.19	46.69	46	-18.81	16.25	1.08	36.83	181	291	Peak
452.92	28.04	46.6	46	-17.96	17.21	1.15	36.92	123	345	Peak
654.68	26.58	41.88	46	-19.42	20.74	1.42	37.46	136	311	Peak

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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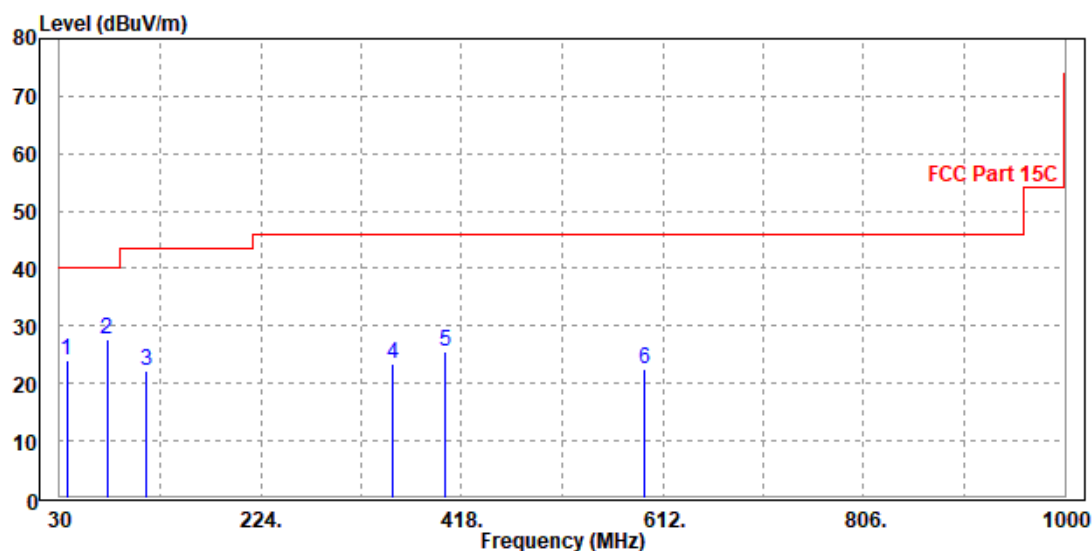
Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
36.79	23.96	45.39	40	-16.04	15.8	0.34	37.57	113	6	Peak
75.59	27.54	56.58	40	-12.46	7.82	0.48	37.34	197	56	Peak
113.42	22.17	50.01	43.5	-21.33	8.7	0.57	37.11	129	324	Peak
352.04	23.5	44.1	46	-22.5	15.2	0.99	36.79	189	237	Peak
402.48	25.57	44.99	46	-20.43	16.33	1.08	36.83	194	161	Peak
594.54	22.62	39.13	46	-23.38	19.49	1.35	37.35	116	230	Peak

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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Test Report No.: W7L-P22040029RF02

ABOVE 1GHz TEST DATA

Note: 1. For radiated emissions testing , the full testing range of different modes have been scanned , only the worst case harmonic data is reported in the sheet.

2. All other emissions were greater than 20dB below the limit was not recorded

BT-LE _1M

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.4	61.16	74	-21.6	31.75	5.86	46.37	196	72	Peak
2390	44.02	52.78	54	-9.98	31.75	5.86	46.37	196	72	Average
2402	99.76	108.46	/	/	31.79	5.88	46.37	103	100	Peak
2402	96.94	105.64	/	/	31.79	5.88	46.37	103	100	Average
2483.5	51.82	60.15	74	-22.18	32.05	5.99	46.37	184	218	Peak
2483.5	44.41	52.74	54	-9.59	32.05	5.99	46.37	184	218	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.1	60.47	74	-21.9	32.14	5.86	46.37	140	171	Peak
2390	44.33	52.7	54	-9.67	32.14	5.86	46.37	140	171	Average
2402	98.85	107.18	/	/	32.16	5.88	46.37	112	317	Peak
2402	95.71	104.04	/	/	32.16	5.88	46.37	112	317	Average
2483.5	52.55	60.57	74	-21.45	32.36	5.99	46.37	150	151	Peak
2483.5	44.56	52.58	54	-9.44	32.36	5.99	46.37	150	151	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 2402MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.85	60.61	74	-22.15	31.75	5.86	46.37	163	260	Peak
2390	43.9	52.66	54	-10.1	31.75	5.86	46.37	163	260	Average
2440	99.08	107.61	/	/	31.91	5.93	46.37	170	71	Peak
2440	95.69	104.22	/	/	31.91	5.93	46.37	170	71	Average
2483.5	52.56	60.89	74	-21.44	32.05	5.99	46.37	139	118	Peak
2483.5	43.8	52.13	54	-10.2	32.05	5.99	46.37	139	118	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.7	60.07	74	-22.3	32.14	5.86	46.37	156	9	Peak
2390	44.31	52.68	54	-9.69	32.14	5.86	46.37	156	9	Average
2440	98.3	106.48	/	/	32.26	5.93	46.37	108	193	Peak
2440	95.3	103.48	/	/	32.26	5.93	46.37	108	193	Average
2483.5	52.39	60.41	74	-21.61	32.36	5.99	46.37	100	115	Peak
2483.5	44.93	52.95	54	-9.07	32.36	5.99	46.37	100	115	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2440MHz: Fundamental frequency.



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Test Report No.: W7L-P22040029RF02

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.42	61.18	74	-21.58	31.75	5.86	46.37	160	304	Peak
2390	44.01	52.77	54	-9.99	31.75	5.86	46.37	160	304	Average
2480	97.45	105.8	/	/	32.04	5.98	46.37	181	177	Peak
2480	93.99	102.34	/	/	32.04	5.98	46.37	181	177	Average
2483.5	52.53	60.86	74	-21.47	32.05	5.99	46.37	122	335	Peak
2483.5	44.48	52.81	54	-9.52	32.05	5.99	46.37	122	335	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	50.99	59.36	74	-23.01	32.14	5.86	46.37	139	223	Peak
2390	44.67	53.04	54	-9.33	32.14	5.86	46.37	139	223	Average
2480	98.56	106.6	/	/	32.35	5.98	46.37	124	71	Peak
2480	96.77	104.81	/	/	32.35	5.98	46.37	124	71	Average
2483.5	51.93	59.95	74	-22.07	32.36	5.99	46.37	183	326	Peak
2483.5	44.68	52.7	54	-9.32	32.36	5.99	46.37	183	326	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2480MHz: Fundamental frequency.



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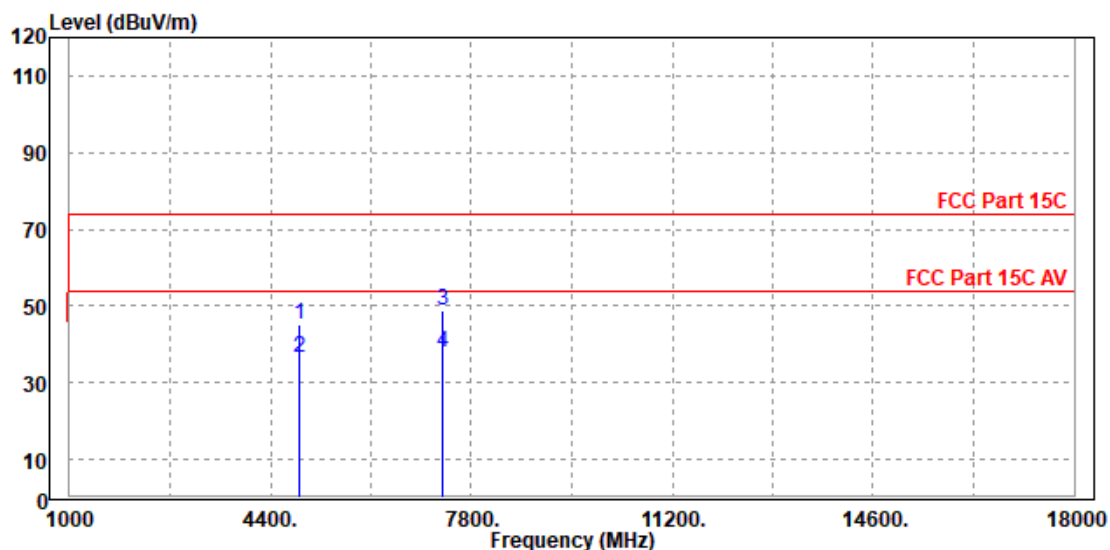
Test Report No.: W7L-P22040029RF02

WORST CASE HARMONIC:

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	4876.000	45.24	48.41	74.00	-28.76	-3.17	Peak	Horizontal
2	4876.000	36.32	39.49	54.00	-17.68	-3.17	Average	Horizontal
3 PK	7320.000	48.93	46.85	74.00	-25.07	2.08	Peak	Horizontal
4 PP	7320.000	37.70	35.62	54.00	-16.30	2.08	Average	Horizontal



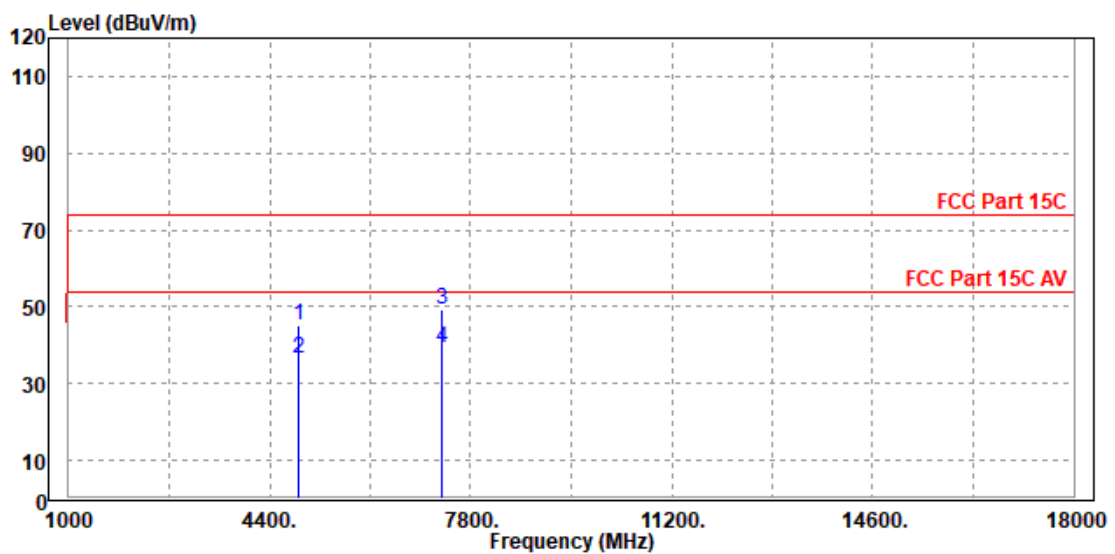


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Test Report No.: W7L-P22040029RF02

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	4876.000	45.26	48.23	74.00	-28.74	-2.97	Peak	Vertical
2	4876.000	36.35	39.32	54.00	-17.65	-2.97	Average	Vertical
3 PK	7320.000	49.31	47.16	74.00	-24.69	2.15	Peak	Vertical
4 PP	7320.000	39.44	37.29	54.00	-14.56	2.15	Average	Vertical



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2440MHz: Fundamental frequency.

3.3 6 dB BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Meter	ANRITSU	ML2495A	1506002	Feb. 22,22	Feb. 21,23
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Apr. 26,22	Apr. 25,23
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Feb. 24,22	Feb. 23,23
Power Sensor	ANRITSU	MA2411B	1339352	May. 07,21	May. 06,22
Power Sensor	ANRITSU	MA2411B	1339352	May. 06,22	May. 07,23

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.

3.3.3 TEST PROCEDURE

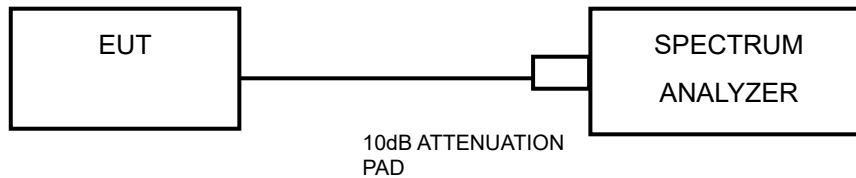
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points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



3.3.4 DEVIATION FROM TEST STANDARD

No deviation.

3.3.5 TEST SETUP



3.3.6 EUT OPERATING CONDITIONS

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



Test Report No.: W7L-P22040029RF02

3.3.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.

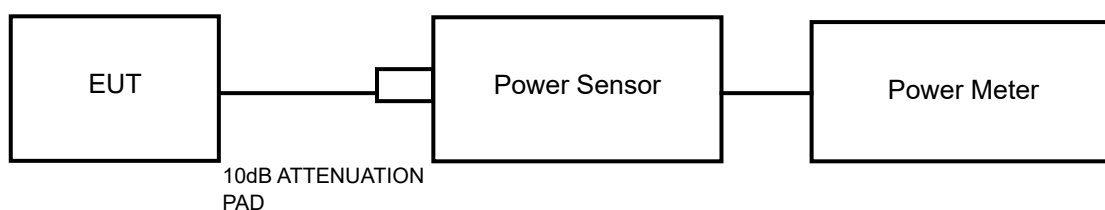


3.4 CONDUCTED OUTPUT POWER

3.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.4.4 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 power level.

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 EUT OPERATING CONDITIONS

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



Test Report No.: W7L-P22040029RF02

3.4.7 TEST RESULTS

3.4.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix1/2 Of this test report.



Test Report No.: W7L-P22040029RF02

3.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE)

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

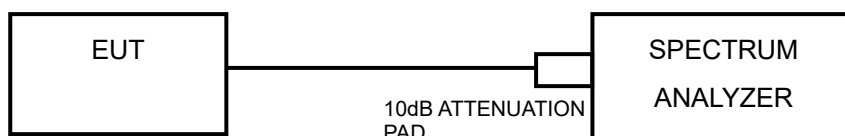
Please Refer to Appendix1/2 Of this test report.

3.5 POWER SPECTRAL DENSITY MEASUREMENT

3.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

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

3.5.2 TEST SETUP



3.5.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.5.4 TEST PROCEDURE

1. Set the span to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW $\geq 3 \times$ RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

3.5.6 EUT OPERATING CONDITION

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



Test Report No.: W7L-P22040029RF02

3.5.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.

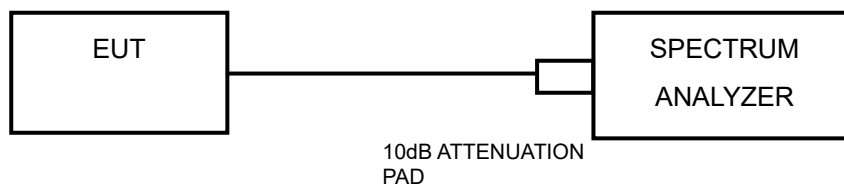


3.6 OUT OF BAND EMISSION MEASUREMENT

3.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

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

3.6.2 TEST SETUP



3.6.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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



MEASUREMENT PROCEDURE OOB

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

3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

3.6.6 EUT OPERATING CONDITION

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

3.6.7 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix1/2 Of this test report.



Test Report No.: W7L-P22040029RF02

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



Test Report No.: W7L-P22040029RF02

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.



6 Appendix 1 WLAN 2.4G

DTS BANDWIDTH

TEST RESULT

TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.040	2408.000	2416.040	0.5	PASS
		2437	9.040	2432.000	2441.040	0.5	PASS
		2462	7.080	2458.960	2466.040	0.5	PASS
11G	Ant1	2412	14.360	2404.560	2418.920	0.5	PASS
		2437	14.520	2429.120	2443.640	0.5	PASS
		2462	14.120	2455.760	2469.880	0.5	PASS
11N20SISO	Ant1	2412	13.840	2405.720	2419.560	0.5	PASS
		2437	14.240	2429.120	2443.360	0.5	PASS
		2462	15.080	2454.440	2469.520	0.5	PASS
11N40SISO	Ant1	2422	33.680	2404.560	2438.240	0.5	PASS
		2437	35.040	2419.480	2454.520	0.5	PASS
		2452	33.840	2435.680	2469.520	0.5	PASS



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Test Report No.: W7L-P22040029RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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Test Report No.: W7L-P22040029RF02



11G_Ant1_2412



11G_Ant1_2437



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11G_Ant1_2462



11N20SISO_Ant1_2412



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Test Report No.: W7L-P22040029RF02



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



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Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



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Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2452



**OCCUPIED CHANNEL BANDWIDTH****TEST RESULT**

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	12.828	2405.798	2418.626	---	---
		2437	13.361	2430.164	2443.525	---	---
		2462	13.163	2455.687	2468.850	---	---
11G	Ant1	2412	16.287	2403.916	2420.203	---	---
		2437	16.446	2428.729	2445.175	---	---
		2462	16.314	2453.933	2470.247	---	---
11N20SISO	Ant1	2412	17.329	2403.397	2420.726	---	---
		2437	17.536	2428.212	2445.748	---	---
		2462	17.451	2453.366	2470.817	---	---
11N40SISO	Ant1	2422	35.623	2404.115	2439.738	---	---
		2437	36.207	2418.738	2454.945	---	---
		2452	36.198	2434.063	2470.261	---	---

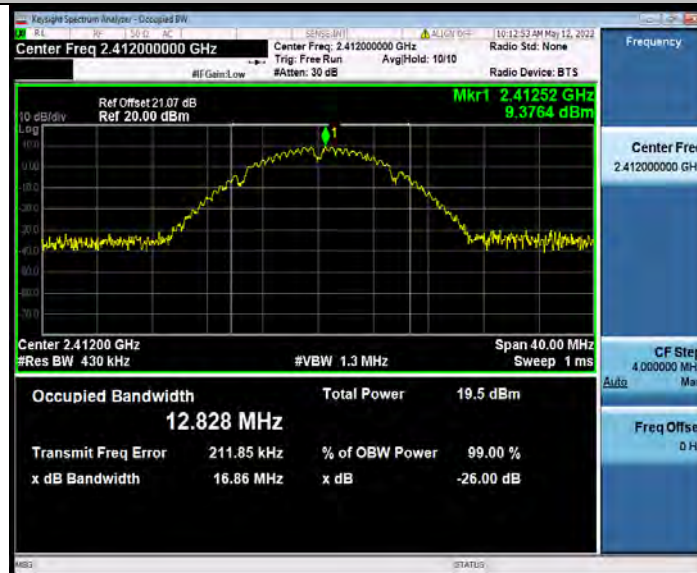


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Test Report No.: W7L-P22040029RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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Test Report No.: W7L-P22040029RF02



11G_Ant1_2412



11G_Ant1_2437

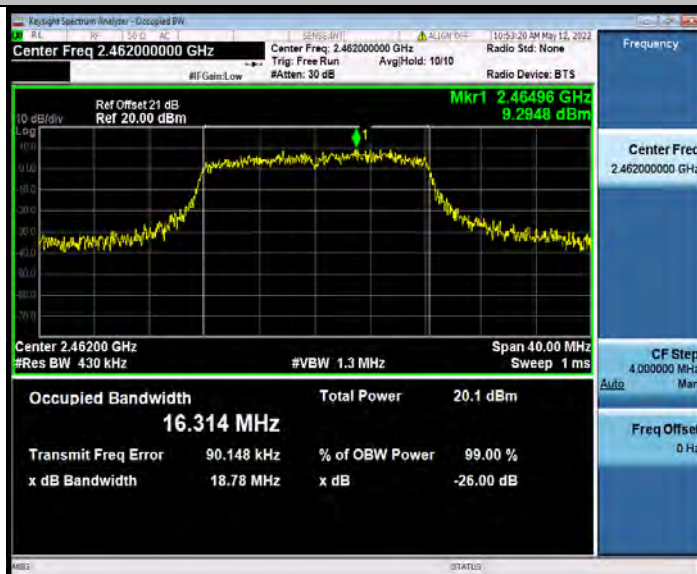


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Test Report No.: W7L-P22040029RF02



11G_Ant1_2462

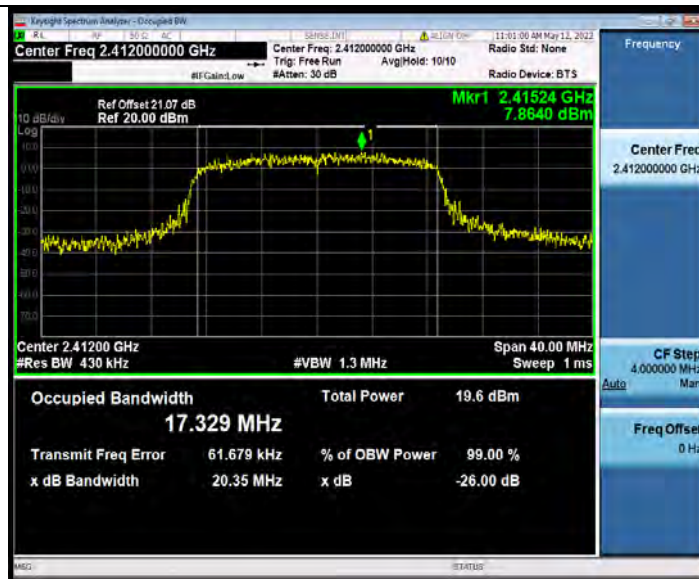


11N20SISO_Ant1_2412



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Test Report No.: W7L-P22040029RF02



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



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VERITAS

Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



**MAXIMUM CONDUCTED OUTPUT POWER****TEST RESULT PEAK**

TestMode	Antenna	Freq(MHz)	Peak Power [dBm]	Peak Power [mW]	Conducted Limit [dBm]	Verdict	Power setting
11B	Ant1	2412	18.82	76.21	≤30.00	PASS	15
		2437	18.98	79.07	≤30.00	PASS	16
		2462	18.81	76.03	≤30.00	PASS	16
11G	Ant1	2412	21.93	155.96	≤30.00	PASS	16
		2437	22.04	159.96	≤30.00	PASS	17
		2462	21.88	154.17	≤30.00	PASS	16.5
11N20SIS O	Ant1	2412	21.66	146.55	≤30.00	PASS	15
		2437	21.71	148.25	≤30.00	PASS	16
		2462	22.00	158.49	≤30.00	PASS	16
11N40SIS O	Ant1	2422	22.46	176.20	≤30.00	PASS	16
		2437	21.78	150.66	≤30.00	PASS	16
		2452	21.84	152.76	≤30.00	PASS	15.5

**TEST RESULT AVERAGE**

Test Mode	Antenna	Freq(MHz)	Average power [dBm]	Limit [dBm]	Verdict	Power setting
11B	Ant1	2412	16.07	/	PASS	15
		2437	16.49	/	PASS	16
		2462	16.30	/	PASS	16
11G	Ant1	2412	16.05	/	PASS	16
		2437	16.67	/	PASS	17
		2462	15.56	/	PASS	16.5
11N20SIS O	Ant1	2412	14.82	/	PASS	15
		2437	15.39	/	PASS	16
		2462	15.27	/	PASS	16
11N40SIS O	Ant1	2422	15.57	/	PASS	16
		2437	15.68	/	PASS	16
		2452	14.06	/	PASS	15.5



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Test Report No.: W7L-P22040029RF02

MAXIMUM POWER SPECTRAL DENSITY

TEST RESULT

TestMode	Antenna	Freq(MHz)	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
11B	Ant1	2412	-7.96	≤8.00	PASS
		2437	-7.96	≤8.00	PASS
		2462	-6.85	≤8.00	PASS
11G	Ant1	2412	-8.68	≤8.00	PASS
		2437	-9.01	≤8.00	PASS
		2462	-9.19	≤8.00	PASS
11N20SISO	Ant1	2412	-8.78	≤8.00	PASS
		2437	-9.44	≤8.00	PASS
		2462	-8.11	≤8.00	PASS
11N40SISO	Ant1	2422	-10.17	≤8.00	PASS
		2437	-10.77	≤8.00	PASS
		2452	-12.65	≤8.00	PASS



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Test Report No.: W7L-P22040029RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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Test Report No.: W7L-P22040029RF02



11G_Ant1_2412



11G_Ant1_2437



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VERITAS

Test Report No.: W7L-P22040029RF02



11G_Ant1_2462



11N20SISO_Ant1_2412



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Test Report No.: W7L-P22040029RF02



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

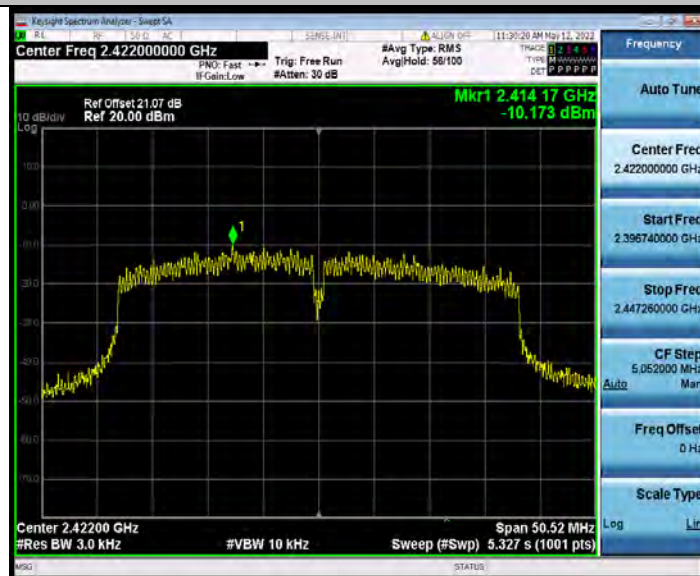


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11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



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Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2452



**REFERENCE LEVEL MEASUREMENT****TEST RESULT**

TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
11B	Ant1	2412	2412.51	7.85
		2437	2436.47	7.35
		2462	2462.51	8.07
11G	Ant1	2412	2410.71	6.13
		2437	2435.74	6.70
		2462	2464.48	6.41
11N20SISO	Ant1	2412	2414.49	6.20
		2437	2438.26	6.15
		2462	2464.51	6.48
11N40SISO	Ant1	2422	2417.00	4.50
		2437	2432.01	3.37
		2452	2464.47	2.57



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Test Report No.: W7L-P22040029RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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VERITAS

Test Report No.: W7L-P22040029RF02



11G_Ant1_2412



11G_Ant1_2437



BUREAU
VERITAS

Test Report No.: W7L-P22040029RF02



11G_Ant1_2462



11N20SISO_Ant1_2412



BUREAU
VERITAS

Test Report No.: W7L-P22040029RF02



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



BUREAU
VERITAS

Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



BUREAU
VERITAS

Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2452



**BAND EDGE MEASUREMENTS****TEST RESULT**

TestMode	Antenna	ChName	Freq (MHz)	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	Low	2412	7.85	-34.47	≤-12.15	PASS
		High	2462	8.07	-34.54	≤-11.93	PASS
11G	Ant1	Low	2412	6.13	-32.52	≤-13.87	PASS
		High	2462	6.41	-34.43	≤-13.59	PASS
11N20SISO	Ant1	Low	2412	6.20	-32.43	≤-13.8	PASS
		High	2462	6.48	-34.57	≤-13.52	PASS
11N40SISO	Ant1	Low	2422	4.50	-29.85	≤-15.5	PASS
		High	2452	2.57	-31.32	≤-17.43	PASS



BUREAU
VERITAS

Test Report No.: W7L-P22040029RF02

TEST GRAPHS

11B_Ant1_Low_2412



11B_Ant1_High_2462



11G_Ant1_Low_2412

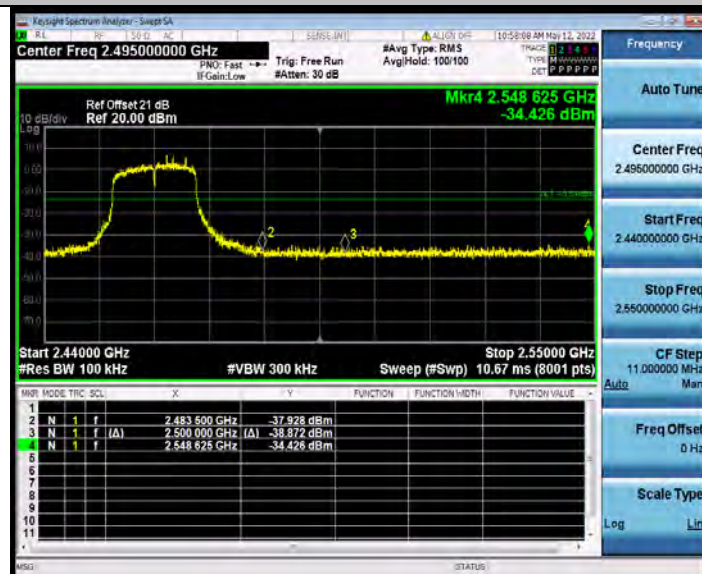


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Test Report No.: W7L-P22040029RF02



11G_Ant1_High_2462



11N20SISO_Ant1_Low_2412

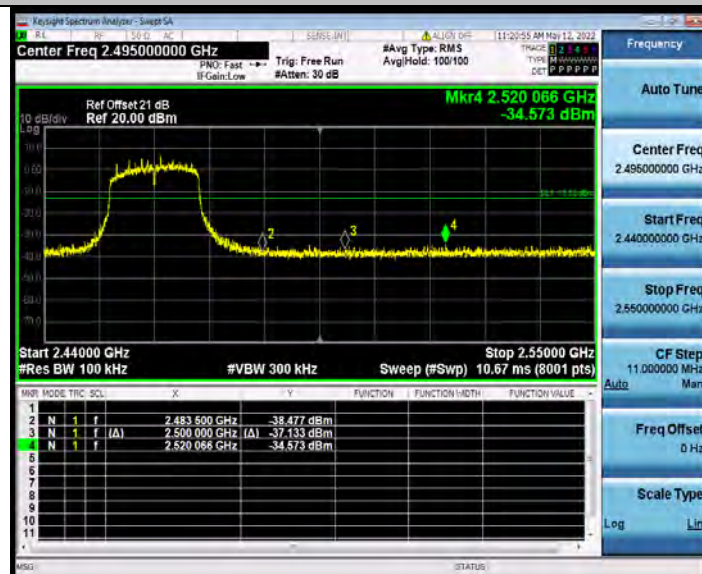


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Test Report No.: W7L-P22040029RF02



11N20SISO_Ant1_High_2462



11N40SISO_Ant1_Low_2422



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Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_High_2452



**CONDUCTED SPURIOUS EMISSION****TEST RESULT**

TestMode	Antenna	Freq(MHz)	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	30~1000	7.85	-43.73	≤-12.15	PASS
			1000~26500	7.85	-27.69	≤-12.15	PASS
		2437	30~1000	7.35	-43.92	≤-12.65	PASS
			1000~26500	7.35	-28.17	≤-12.65	PASS
		2462	30~1000	8.07	-43.44	≤-11.93	PASS
			1000~26500	8.07	-28.38	≤-11.93	PASS
11G	Ant1	2412	30~1000	6.13	-44.35	≤-13.87	PASS
			1000~26500	6.13	-28.16	≤-13.87	PASS
		2437	30~1000	6.70	-43.85	≤-13.3	PASS
			1000~26500	6.70	-28.44	≤-13.3	PASS
		2462	30~1000	6.41	-43.8	≤-13.59	PASS
			1000~26500	6.41	-28.26	≤-13.59	PASS
11N20SISO	Ant1	2412	30~1000	6.20	-43.67	≤-13.8	PASS
			1000~26500	6.20	-27.33	≤-13.8	PASS
		2437	30~1000	6.15	-44	≤-13.85	PASS
			1000~26500	6.15	-28.1	≤-13.85	PASS
		2462	30~1000	6.48	-44.67	≤-13.52	PASS
			1000~26500	6.48	-27.99	≤-13.52	PASS
11N40SISO	Ant1	2422	30~1000	4.50	-43.61	≤-15.5	PASS
			1000~26500	4.50	-27.59	≤-15.5	PASS
		2437	30~1000	3.37	-43.85	≤-16.63	PASS
			1000~26500	3.37	-28.05	≤-16.63	PASS
		2452	30~1000	2.57	-44.05	≤-17.43	PASS
			1000~26500	2.57	-28.34	≤-17.43	PASS



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VERITAS

Test Report No.: W7L-P22040029RF02

TEST GRAPHS

11B_Ant1_2412_30~1000



11B_Ant1_2412_1000~26500

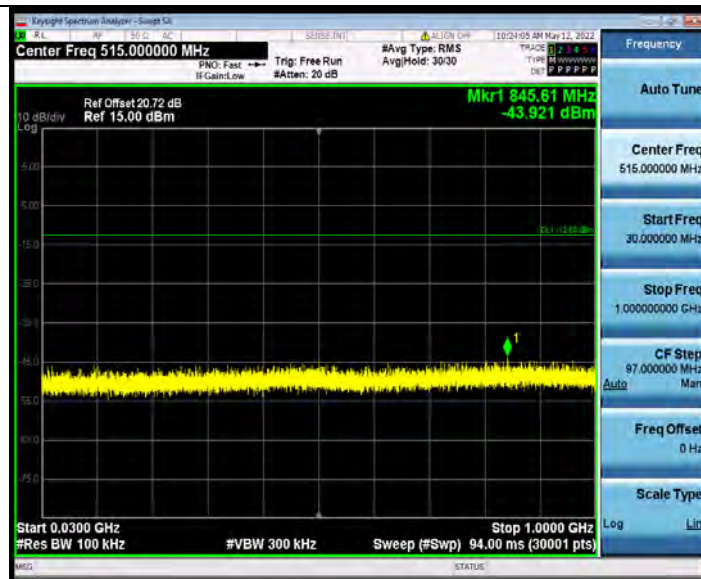


11B_Ant1_2437_30~1000



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Test Report No.: W7L-P22040029RF02



11B_Ant1_2437_1000~26500

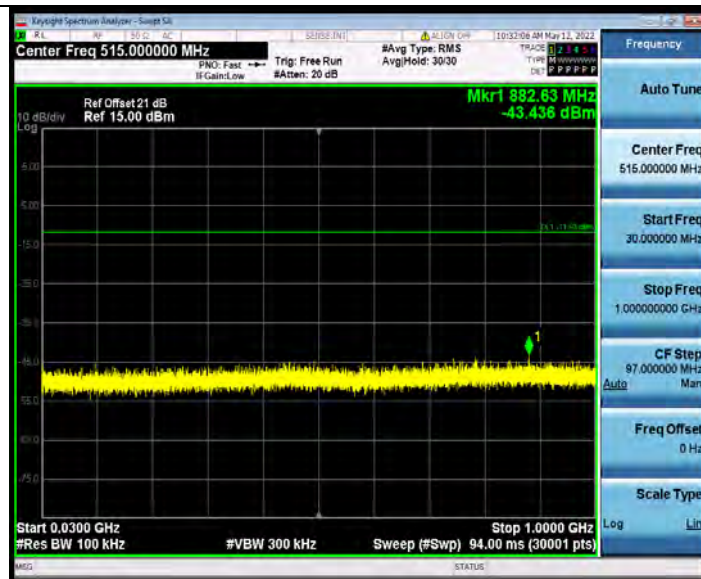


11B_Ant1_2462_30~1000



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Test Report No.: W7L-P22040029RF02



11B_Ant1_2462_1000~26500

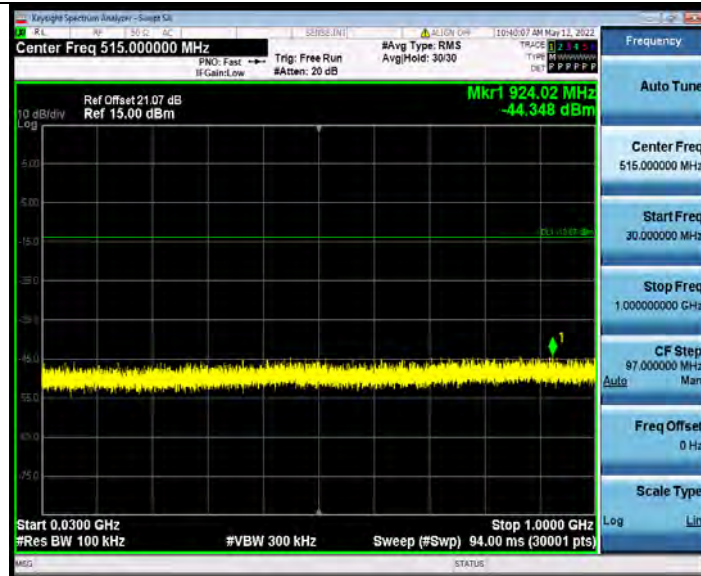


11G_Ant1_2412_30~1000



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Test Report No.: W7L-P22040029RF02



11G_Ant1_2412_1000~26500

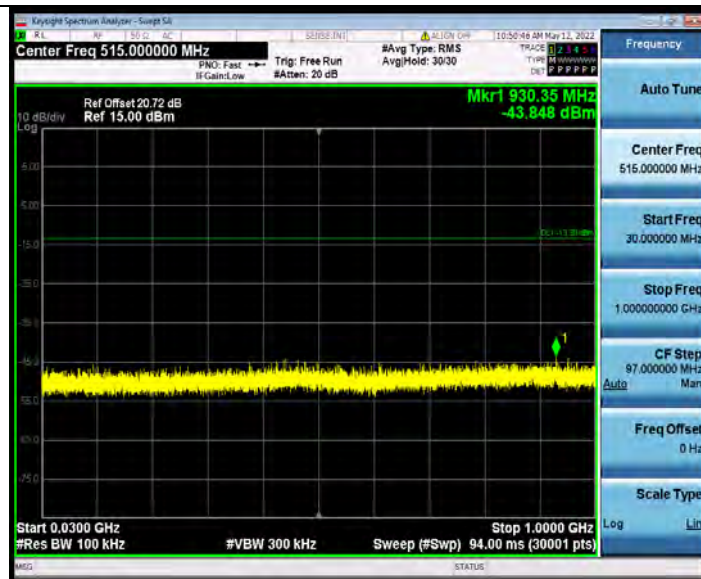


11G_Ant1_2437_30~1000



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Test Report No.: W7L-P22040029RF02



11G_Ant1_2437_1000~26500

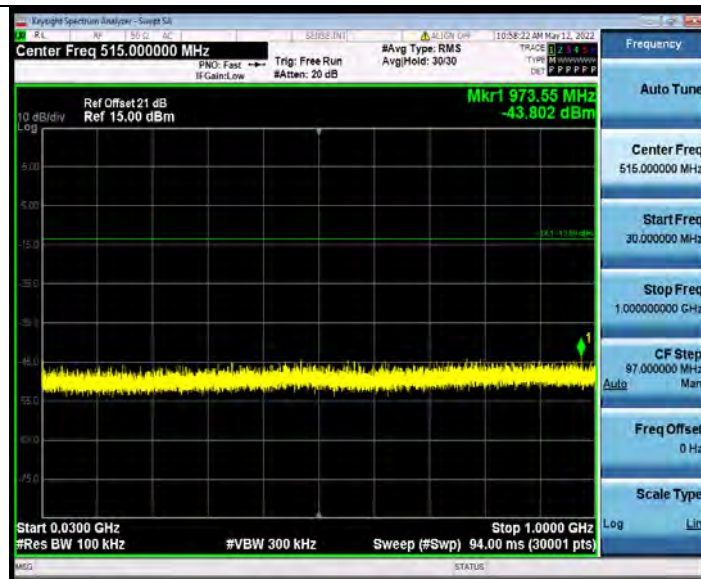


11G_Ant1_2462_30~1000



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Test Report No.: W7L-P22040029RF02



11G_Ant1_2462_1000~26500

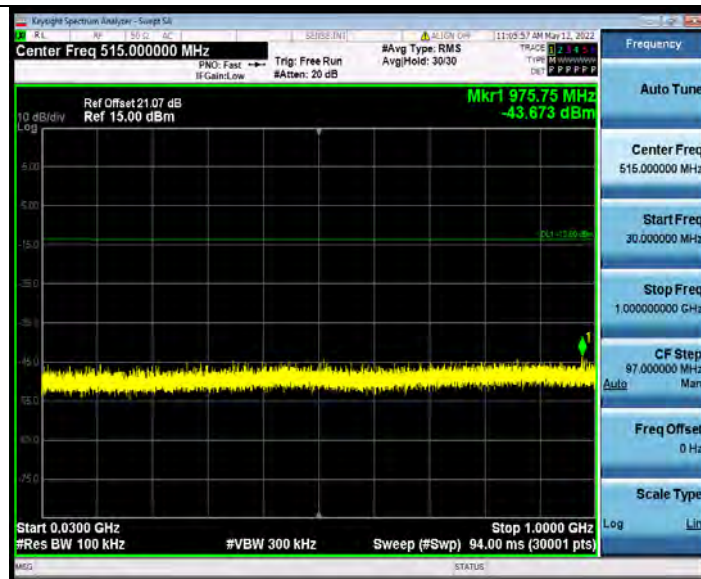


11N20SISO_Ant1_2412_30~1000



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Test Report No.: W7L-P22040029RF02



11N20SISO_Ant1_2412_1000~26500



11N20SISO_Ant1_2437_30~1000



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VERITAS

Test Report No.: W7L-P22040029RF02



11N20SISO_Ant1_2437_1000~26500

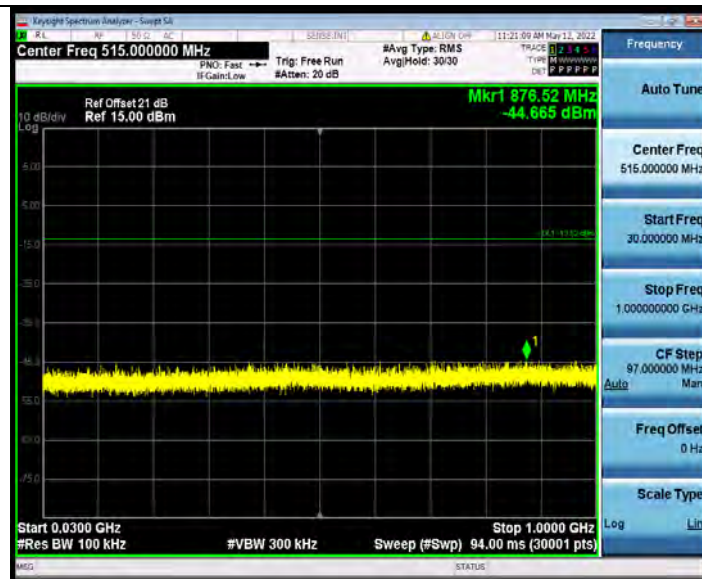


11N20SISO_Ant1_2462_30~1000



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Test Report No.: W7L-P22040029RF02



11N20SISO_Ant1_2462_1000~26500



11N40SISO_Ant1_2422_30~1000



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VERITAS

Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2422_1000~26500

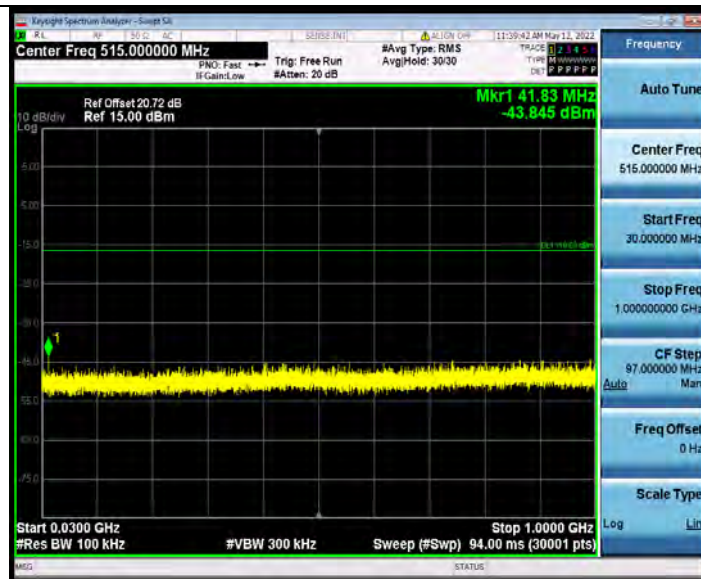


11N40SISO_Ant1_2437_30~1000



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Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2437_1000~26500

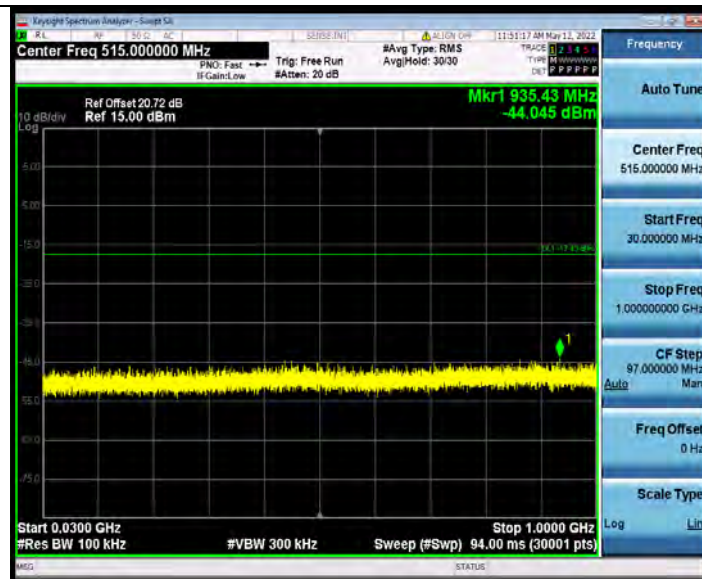


11N40SISO_Ant1_2452_30~1000



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Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2452_1000~26500





**BUREAU
VERITAS**

Test Report No.: W7L-P22040029RF02

DUTY CYCLE

TEST RESULT

TestMode	Antenna	Freq(MHz)	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Verdict
11B	Ant1	2412	12.42	12.52	99.20	---
		2437	12.44	12.58	98.89	---
		2462	12.44	12.58	98.89	---
11G	Ant1	2412	2.06	2.17	94.93	---
		2437	2.06	2.18	94.50	---
		2462	2.06	2.20	93.64	---
11N20SISO	Ant1	2412	1.92	2.08	92.31	---
		2437	1.92	2.09	91.87	---
		2462	1.92	2.07	92.75	---
11N40SISO	Ant1	2422	0.95	1.11	85.59	---
		2437	0.94	1.08	87.04	---
		2452	0.94	1.12	83.93	---

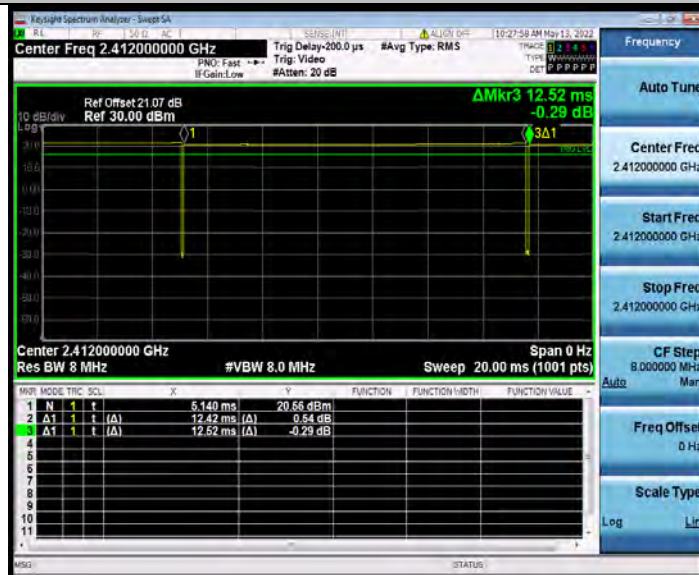


BUREAU
VERITAS

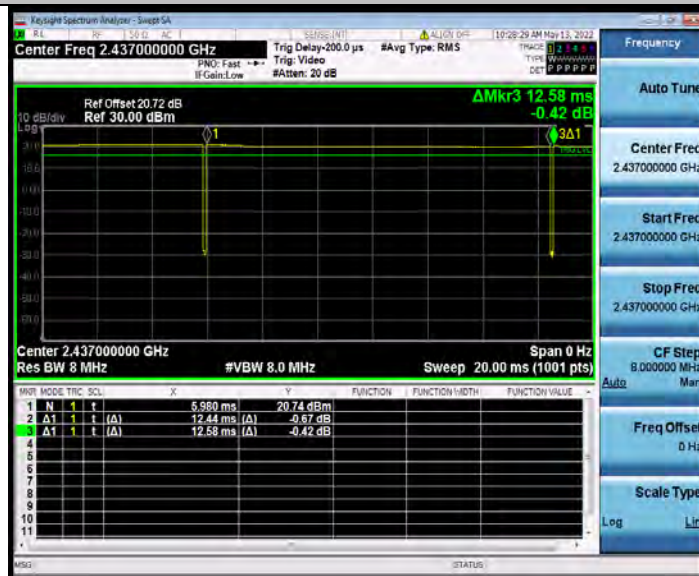
Test Report No.: W7L-P22040029RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



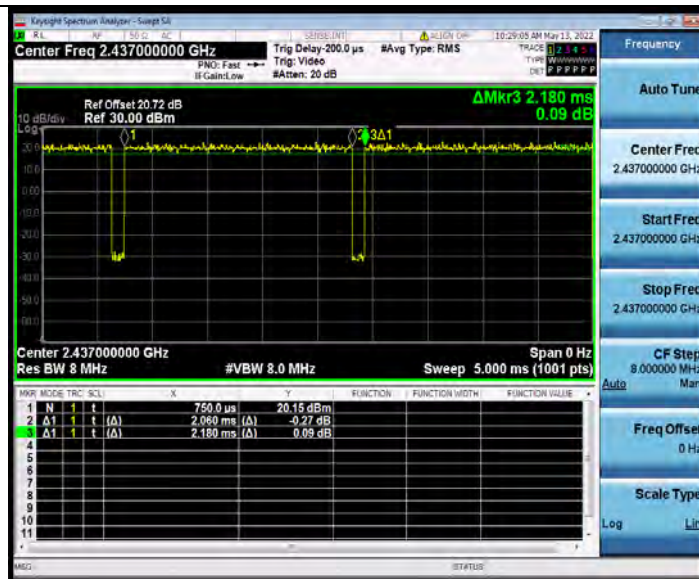
11B_Ant1_2462



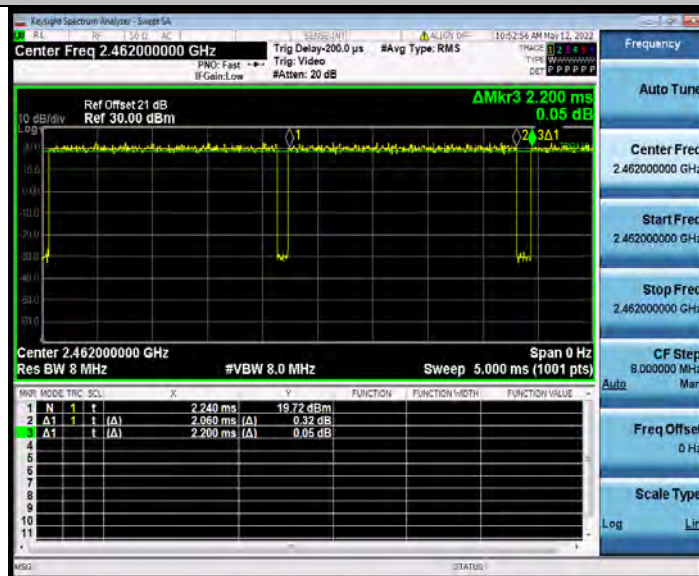


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VERITAS

Test Report No.: W7L-P22040029RF02



11G_Ant1_2462

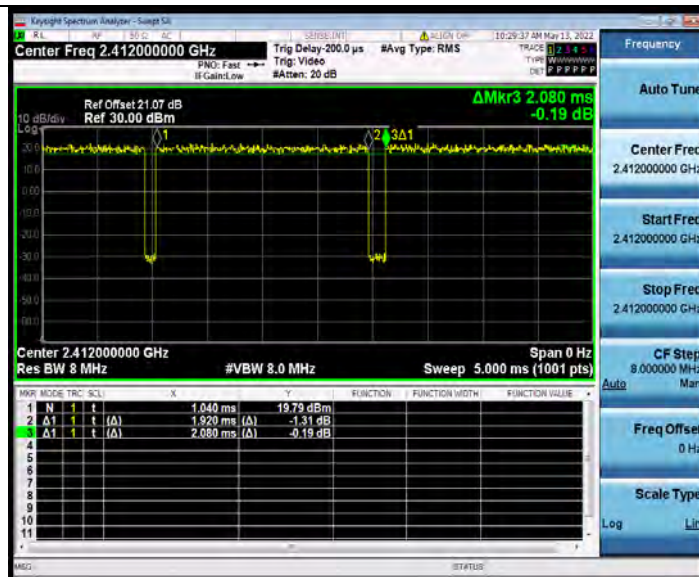


11N20SISO_Ant1_2412

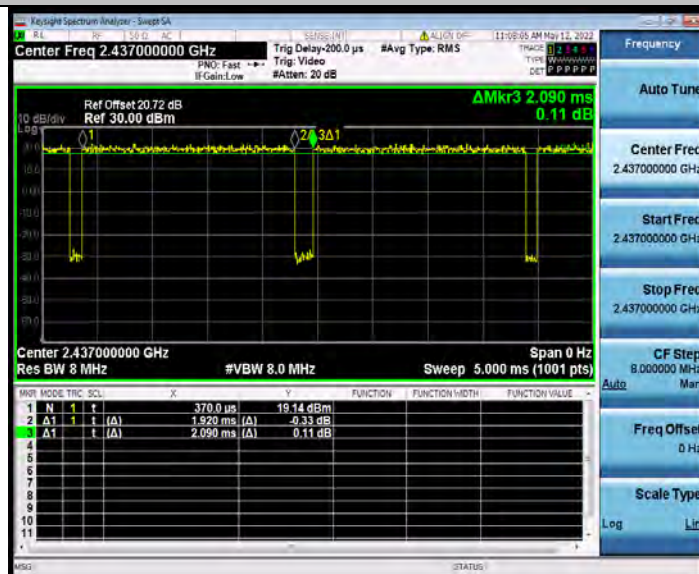


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VERITAS

Test Report No.: W7L-P22040029RF02



11N20SISO_Ant1_2437

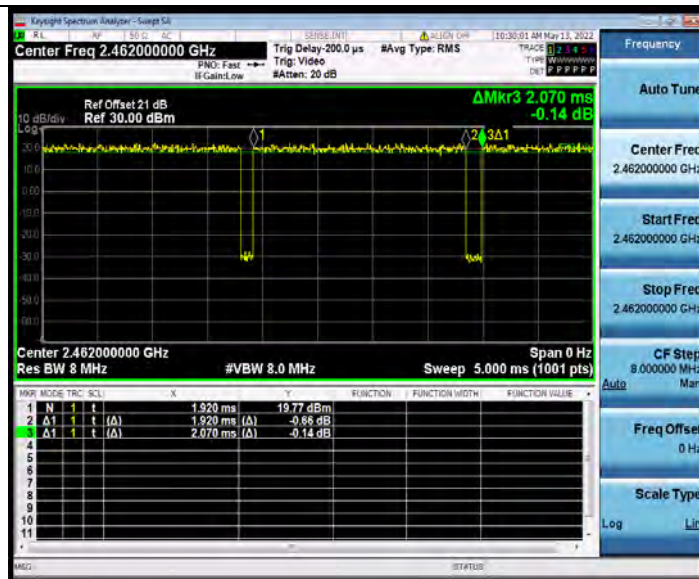


11N20SISO_Ant1_2462

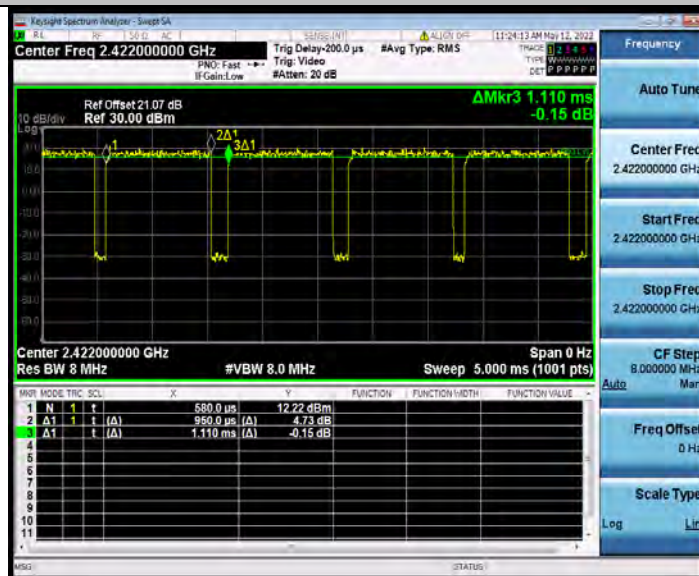


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Test Report No.: W7L-P22040029RF02



11N40SISO_Ant1_2422



11N40SISO_Ant1_2437





Test Report No.: W7L-P22040029RF02

Appendix 2: BLE

DTS BANDWIDTH

TEST RESULT

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.664	2401.664	2402.328	0.5	PASS
		2440	0.664	2439.664	2440.328	0.5	PASS
		2480	0.652	2479.680	2480.332	0.5	PASS



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Test Report No.: W7L-P22040029RF02

TEST GRAPHS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



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OCCUPIED CHANNEL BANDWIDTH

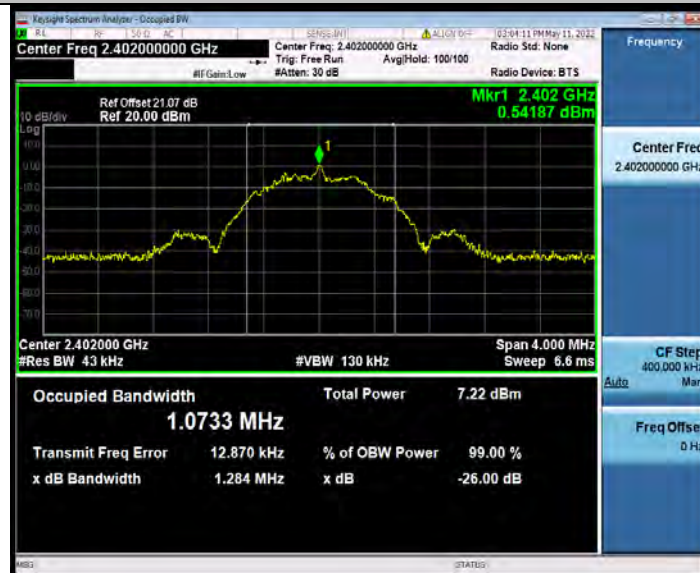
TEST RESULT

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0733	2401.476	2402.550	---	---
		2440	1.0718	2439.476	2440.548	---	---
		2480	1.0730	2479.475	2480.548	---	---

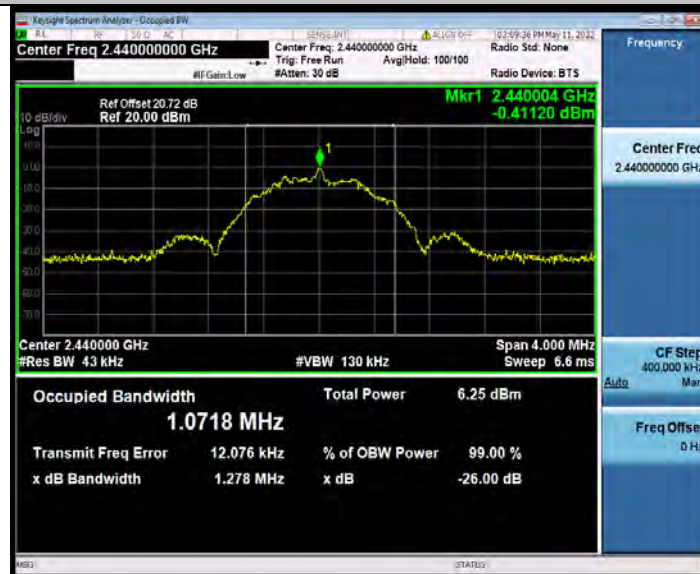


TEST GRAPHS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



BUREAU
VERITAS

Test Report No.: W7L-P22040029RF02



**MAXIMUM CONDUCTED OUTPUT POWER****TEST RESULT PEAK**

Test Mode	Antenna	Frequency [MHz]	Peak Power [dBm]	Peak Power [mW]	Limit [dBm]	Verdict	Power setting
BLE_1M	Ant1	2402	0.29	1.07	≤30	PASS	Default
		2440	-0.07	0.98	≤30	PASS	Default
		2480	-0.06	0.99	≤30	PASS	Default

TEST RESULT AVERAGE

Test Mode	Antenna	Frequency [MHz]	Average Power [dBm]	Limit [dBm]	Verdict	Power setting
BLE_1M	Ant1	2402	-1.97	/	PASS	Default
		2440	-2.34	/	PASS	Default
		2480	-2.47	/	PASS	Default

MAXIMUM POWER SPECTRAL DENSITY**TEST RESULT**

TestMode	Antenna	Frequency [MHz]	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-13.58	≤8.00	PASS
		2440	-14.67	≤8.00	PASS
		2480	-14.3	≤8.00	PASS

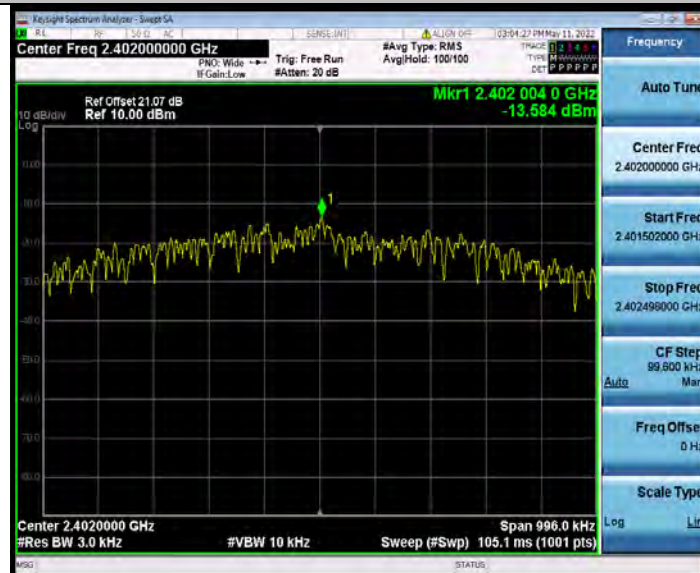


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VERITAS

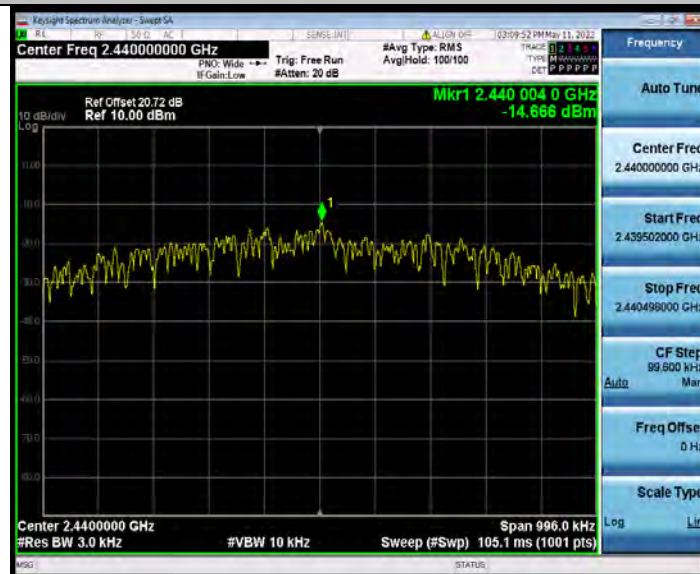
Test Report No.: W7L-P22040029RF02

TEST GRAPHS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



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Test Report No.: W7L-P22040029RF02





Test Report No.: W7L-P22040029RF02

REFERENCE LEVEL MEASUREMENT

TEST RESULT

TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
BLE_1M	Ant1	2402	2402.01	0.81
		2440	2440.00	-0.26
		2480	2480.00	0.04



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Test Report No.: W7L-P22040029RF02

TEST GRAPHS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



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Test Report No.: W7L-P22040029RF02





Test Report No.: W7L-P22040029RF02

BAND EDGE MEASUREMENTS

TEST RESULT

TestMode	Antenna	ChName	Frequency [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	Low	2402	0.81	-34.48	≤-19.19	PASS
		High	2480	0.04	-34.24	≤-19.96	PASS

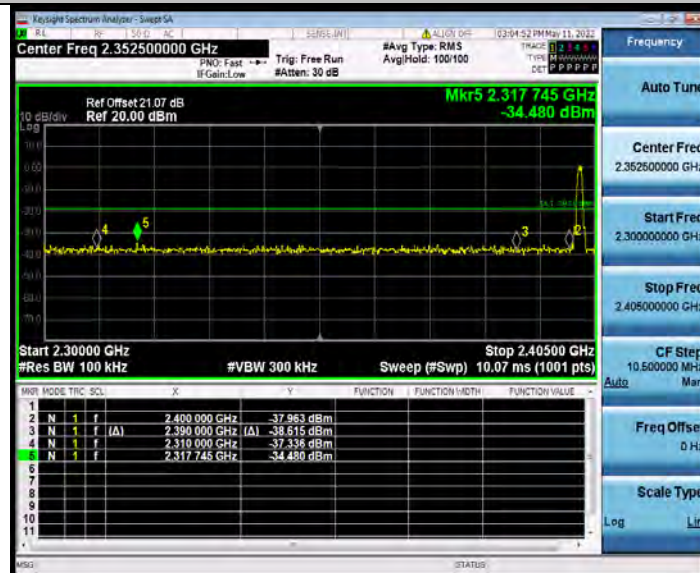


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VERITAS

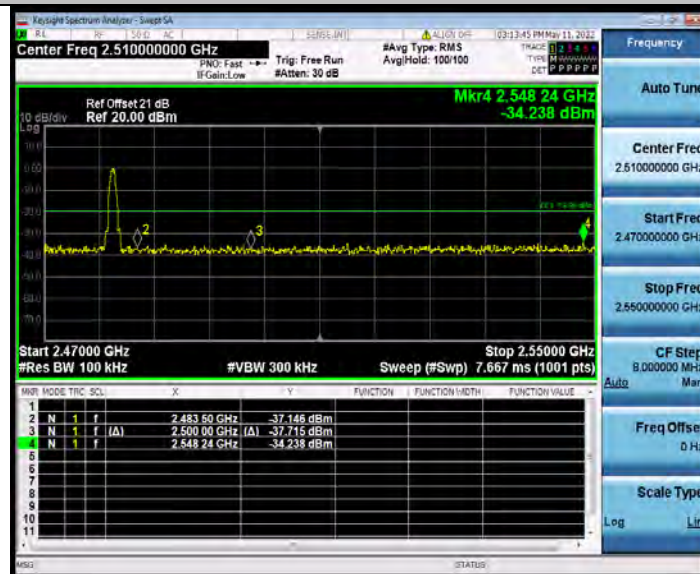
Test Report No.: W7L-P22040029RF02

TEST GRAPHS

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480





**BUREAU
VERITAS**

Test Report No.: W7L-P22040029RF02

CONDUCTED SPURIOUS EMISSION

TEST RESULT

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	0.81	-43.85	≤-19.19	PASS
			1000~26500	0.81	-27.88	≤-19.19	PASS
		2440	30~1000	-0.26	-43.56	≤-20.26	PASS
			1000~26500	-0.26	-27.44	≤-20.26	PASS
		2480	30~1000	0.04	-44.09	≤-19.96	PASS
			1000~26500	0.04	-26.76	≤-19.96	PASS



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VERITAS

Test Report No.: W7L-P22040029RF02

TEST GRAPHS

BLE_1M_Ant1_2402_30~1000



BLE_1M_Ant1_2402_1000~26500



BLE_1M_Ant1_2440_30~1000



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Test Report No.: W7L-P22040029RF02



BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_30~1000



BUREAU
VERITAS

Test Report No.: W7L-P22040029RF02



BLE_1M_Ant1_2480_1000~26500





Test Report No.: W7L-P22040029RF02

DUTY CYCLE

TEST RESULT

TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	0.41	0.63	65.08	1.87
		2440	0.41	0.62	66.13	1.80
		2480	0.41	0.62	66.13	1.80

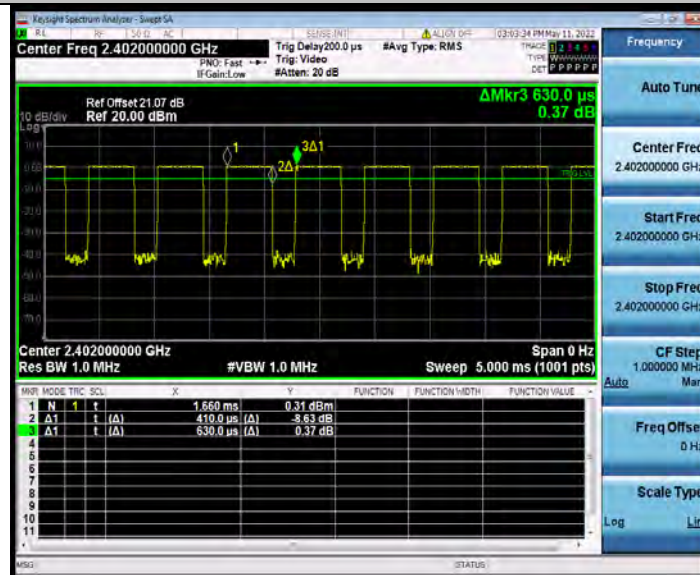


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VERITAS

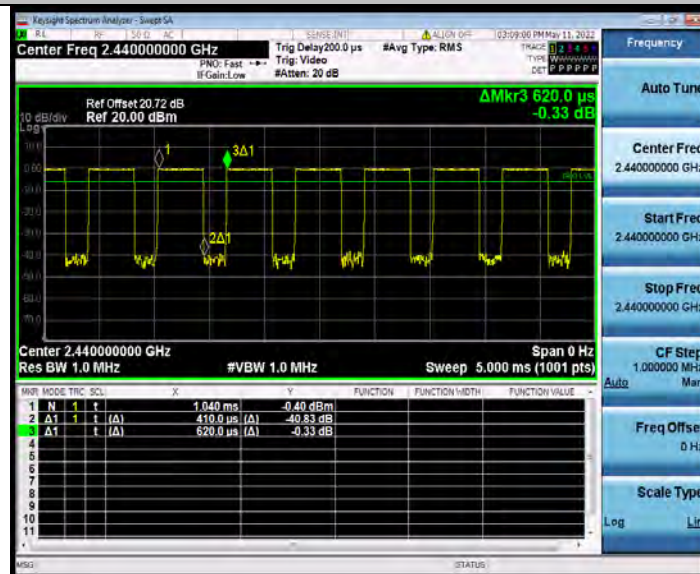
Test Report No.: W7L-P22040029RF02

TEST GRAPHS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



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VERITAS

Test Report No.: W7L-P22040029RF02

