

FCC TEST REPORT

(Part 15, Subpart C)

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

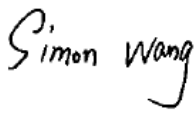
Manufacturer or Supplier:	MUNIC
Address:	100 Avenue de Stalingrad 94800 Villejuif – France
Product:	telematics embedded system
Brand Name:	MUNIC
Model Name:	C4MAX-4MUSAA_V8
FCC ID:	A6GC4MAX-4MUSAAV8
Date of tests:	Nov. 01, 2022 ~ Nov. 14, 2022

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: Nov. 14, 2022	 Date: Nov. 14, 2022

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Test Report No.: W7L-P22100017RF05

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P22100017RF05	Original release	Nov. 14, 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 : 1.Except RSE , other data please refer to Appendix 1 (for BLE) and Appendix 2 (for WIFI-2.4G)

2.The power table are not updated, Because the same as for original case power in Verified power.



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 (9kHz~30MHz)	±2.68dB
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	C4MAX-4MUSAA_V8
NOMINAL VOLTAGE	5.0/13.0/27.0Vdc(adapter or host equipment) 3.7Vdc (Li-ion, battery)
MODULATION	DSSS, OFDM, GFSK
TRANSMISSION RATE	802.11b: 11/ 5.5/ 2.0 / 1.0 Mbps 802.11g: 54/ 48/ 36 / 24 / 18 / 9/ 6 Mbps 802.11n20: up to 65 Mbps 802.11n40: up to 135 Mbps BT_LE: 1 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20/ HT40) 2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	WLAN: 96.38mW (Maximum) BT-LE: 4.40mW (Maximum)
ANTENNA TYPE	Internal Antenna with 1.3dBi gain
HW VERSION	HC4MAX-4MUSAA_V8.01
SW VERSION	SC4MAX-4MUSAA_V8.01
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A
EXTREME TEMPERATURE	-20-55 °C
EXTREME VOLTAGE	8V - 32V

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.



2. 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

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

4. List of Accessory:

ACCESSORIES	BRAND	MODEL	SPECIFICATION
Battery 1	Howell	HWE711260H	Capacity : 450mAh
Battery 2	Akkutronics	711260-PTLC	Capacity : 450mAh



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	9	OFDM	MCS0
BT-LE	0 to 39	39	GFSK	1.0



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

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 HT20	1 to 11	11	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, 11	DSSS	1.0
802.11g	1 to 11	1, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 11	OFDM	MCS0
802.11n HT40	3 to 9	3, 6, 9	OFDM	MCS0
BT-LE	0 to 39	0, 39	GFSK	1

**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	CCK	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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	23deg. C, 70%RH	DC 5/13/27V By DC Source	Star Le
RE≥1G	23deg. C, 70%RH	DC 5/13/27V By DC Source	Star Le
PLC	25deg. C, 52%RH	DC 3.7V By Battery	James Fu
APCM	25deg. C, 60%RH	DC 3.7V By Battery	James Fu



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 [%]
		ANT1
WIFI 2.4GHz	11B	100.00
	11G	100.00
	11N20	100.00
	11N40	100.00
BT LE	BT4.0	83.60

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	Mar. 02,22	Mar. 01,23
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 24,22	Feb. 23,23

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.

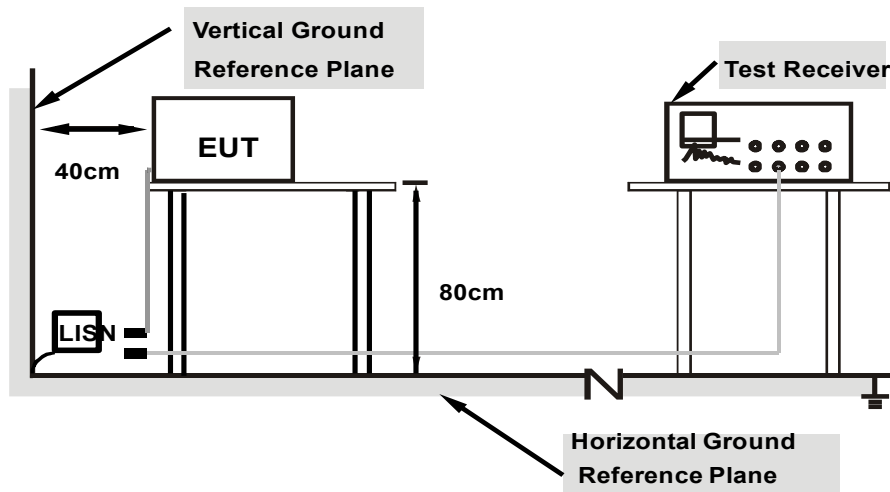
NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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

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



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	26deg. C, 51%RH
Tested By	Carl xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	8.42	56.00	47.58	L1	ON	9.7
0.150000	21.32	---	66.00	44.68	L1	ON	9.7
1.968000	---	5.92	46.00	40.08	L1	ON	9.7
1.968000	7.87	---	56.00	48.13	L1	ON	9.7
3.476000	---	3.34	46.00	42.66	L1	ON	9.7
3.476000	4.70	---	56.00	51.30	L1	ON	9.7
10.300000	---	13.06	50.00	36.94	L1	ON	9.8
10.300000	17.35	---	60.00	42.65	L1	ON	9.8
11.776000	---	16.43	50.00	33.57	L1	ON	9.8
11.776000	20.75	---	60.00	39.25	L1	ON	9.8
18.216000	---	14.92	50.00	35.08	L1	ON	9.8
18.216000	19.19	---	60.00	40.81	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.

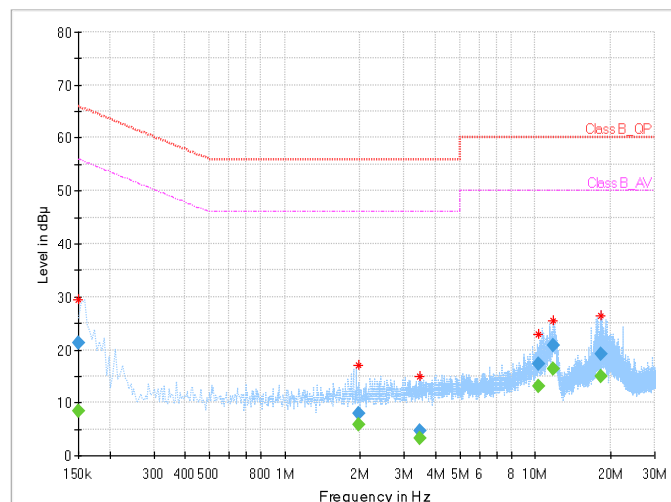
3. The emission levels of other frequencies were very low against the limit.

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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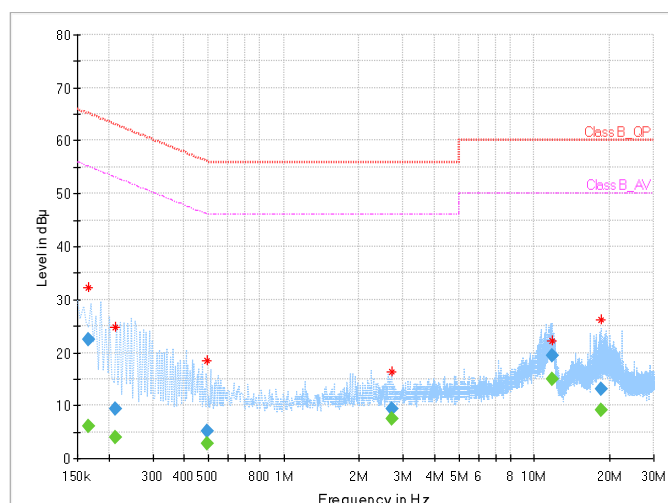
Test Report No.: W7L-P22100017RF05

Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	26deg. C, 51%RH
Tested By	Carl xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.166000	---	6.00	55.16	49.16	N	ON	9.7
0.166000	22.42	---	65.16	42.74	N	ON	9.7
0.212000	---	4.00	53.13	49.13	N	ON	9.7
0.212000	9.41	---	63.13	53.71	N	ON	9.7
0.492000	---	2.72	46.13	43.41	N	ON	9.7
0.492000	5.05	---	56.13	51.08	N	ON	9.7
2.688000	---	7.43	46.00	38.57	N	ON	9.8
2.688000	9.28	---	56.00	46.72	N	ON	9.8
11.736000	---	14.98	50.00	35.02	N	ON	9.8
11.736000	19.49	---	60.00	40.51	N	ON	9.8
18.456000	---	9.22	50.00	40.78	N	ON	9.9
18.456000	13.21	---	60.00	46.79	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	00161965	Mar. 04,22	Mar. 03,23
Horn Antenna	ETS-LINDGREN	3117	00168728	Apr. 01, 22	Mar. 31, 23
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 24, 22	Aug. 23, 23
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. 02,22	Jun. 01,23
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 26,22	Apr. 25,23
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 01,22	May. 31,23
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 01,22	May. 31,23
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 29,22	Apr. 28,23
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 24,22	Aug. 23,23
Power Meter	Anritsu	ML2495A	1506002	Feb. 24,22	Feb. 23,23
Power Sensor	Anritsu	MA2411B	1339352	Feb. 24,22	Feb. 23,23
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-051	Feb 14,20	Feb. 13,23

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 3 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

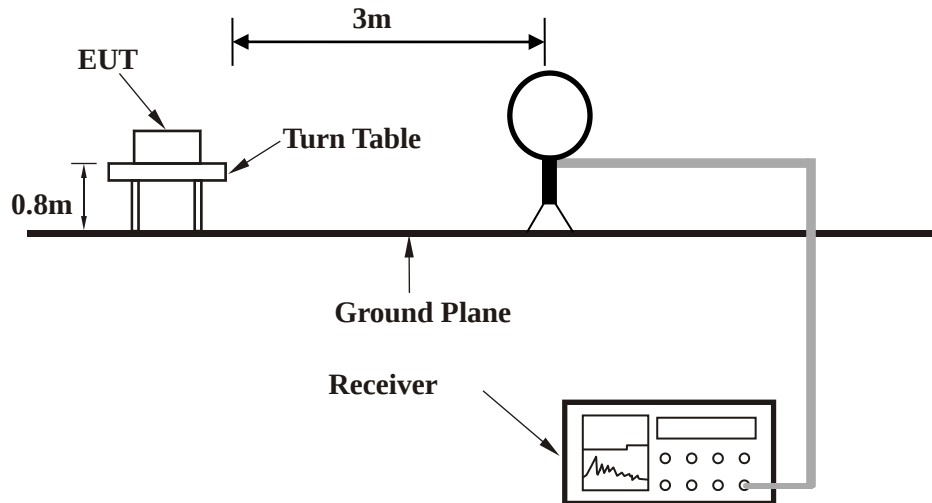


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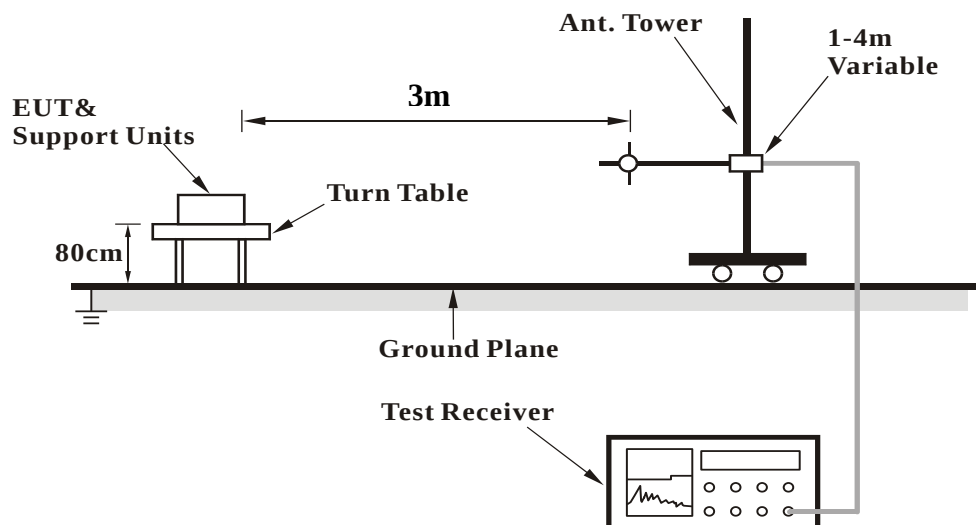
Test Report No.: W7L-P22100017RF05

3.2.5 TEST SETUP

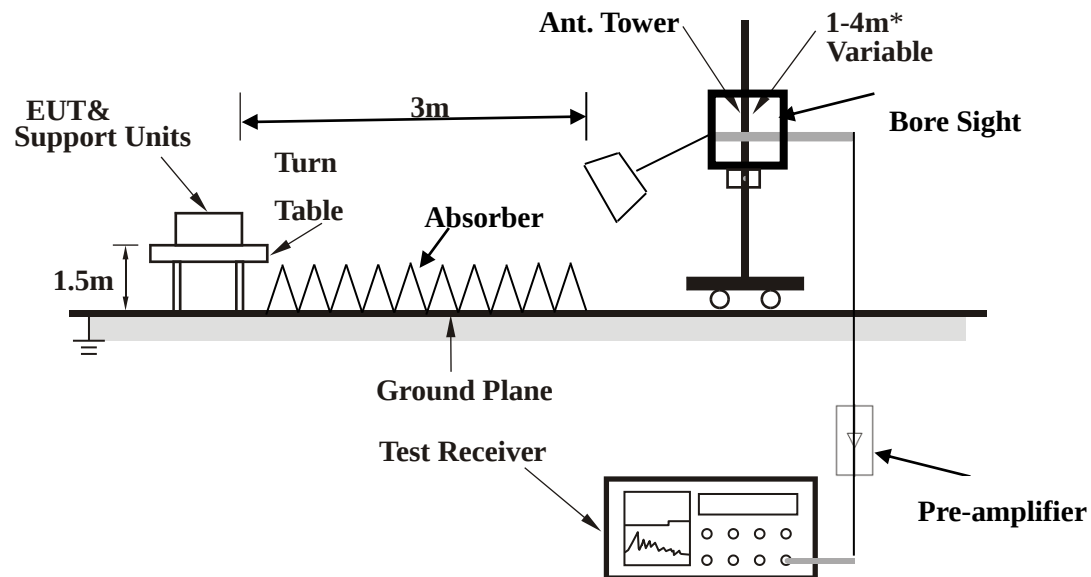
<Frequency Range 9KHz~30MHz >



< 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).

3.2.6 EUT OPERATING CONDITIONS

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



3.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

Note: For frequency below 30MHz, the emission was tested 20db below the limit so the data not recorded in the sheet.

30 MHz – 1GHz data:

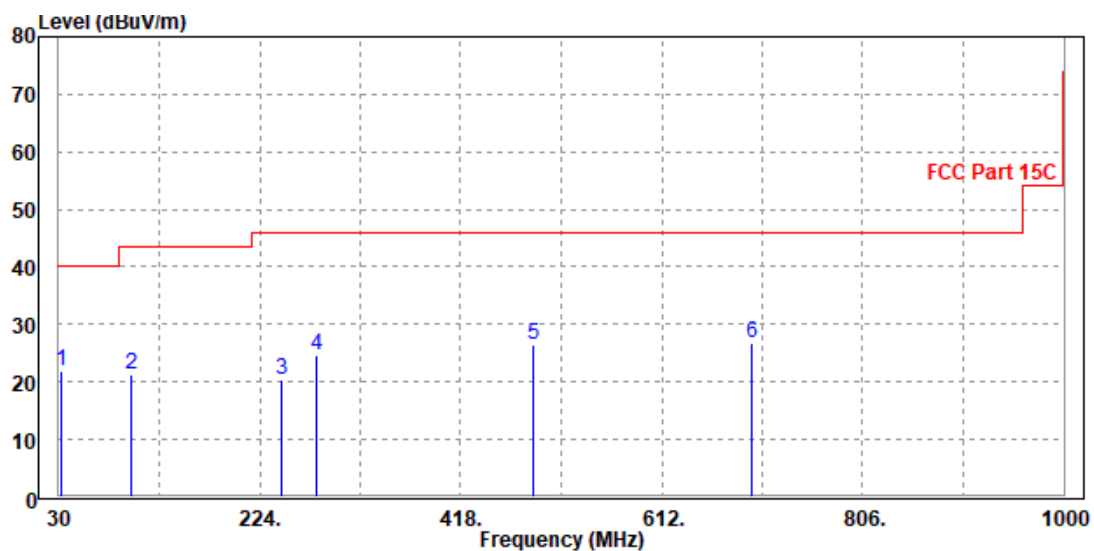
802.11n (40MHz)

CHANNEL	TX Channel 9	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
32.65	21.93	39.43	40	-18.07	19.59	0.32	37.41	100	0	Peak
100.81	21.44	47.28	43.5	-22.06	10.46	0.53	36.83	100	0	Peak
244.37	20.4	42.61	46	-25.6	13.25	0.82	36.28	100	0	Peak
279.29	24.55	46.15	46	-21.45	13.79	0.88	36.27	100	0	Peak
487.84	26.47	44	46	-19.53	17.87	1.2	36.6	100	0	Peak
698.33	26.9	41.05	46	-19.1	21.57	1.48	37.2	100	0	Peak

REMARKS:

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





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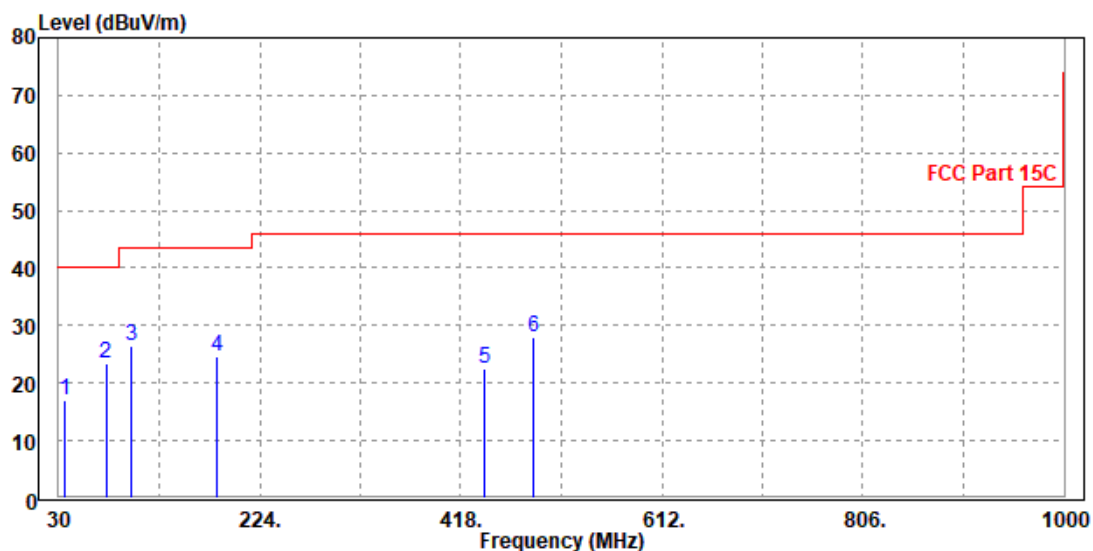
Test Report No.: W7L-P22100017RF05

CHANNEL	TX Channel 9	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
35.65	16.91	36.84	40	-23.09	17.07	0.33	37.33	100	0	Peak
75.59	23.41	52.08	40	-16.59	7.82	0.48	36.97	100	0	Peak
100.81	26.43	53.65	43.5	-17.07	9.08	0.53	36.83	100	0	Peak
183.26	24.51	48.93	43.5	-18.99	11.25	0.71	36.38	100	0	Peak
440.31	22.58	41.13	46	-23.42	16.82	1.13	36.5	100	0	Peak
487.84	27.86	45.82	46	-18.14	17.44	1.2	36.6	100	0	Peak

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-P22100017RF05

ABOVE 1GHz WORST-CASE DATA:

Note: For higher frequency, the emission is too low to be detected.

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	52.07	60.11	74	-21.93	31.75	6.18	45.97	175	195	Peak
2390	45.11	53.15	54	-8.89	31.75	6.18	45.97	175	195	Average
2412	110.36	118.29	/	/	31.82	6.21	45.96	175	195	Peak
2412	104.82	112.75	/	/	31.82	6.21	45.96	175	195	Average
2483.5	55.07	62.64	74	-18.93	32.05	6.31	45.93	175	195	Peak
2483.5	44.57	52.14	54	-9.43	32.05	6.31	45.93	175	195	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	51.59	59.24	74	-22.41	32.14	6.18	45.97	100	285	Peak
2390	44.47	52.12	54	-9.53	32.14	6.18	45.97	100	285	Average
2412	103.7	111.26	/	/	32.19	6.21	45.96	100	285	Peak
2412	98.11	105.67	/	/	32.19	6.21	45.96	100	285	Average
2483.5	52.83	60.09	74	-21.17	32.36	6.31	45.93	100	285	Peak
2483.5	44.96	52.22	54	-9.04	32.36	6.31	45.93	100	285	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-P22100017RF05

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	53.14	61.18	74	-20.86	31.75	6.18	45.97	130	195	Peak
2390	44.77	52.81	54	-9.23	31.75	6.18	45.97	130	195	Average
2437	109.7	117.51	/	/	31.9	6.24	45.95	130	195	Peak
2437	104.11	111.92	/	/	31.9	6.24	45.95	130	195	Average
2483.5	53.85	61.42	74	-20.15	32.05	6.31	45.93	130	195	Peak
2483.5	44.58	52.15	54	-9.42	32.05	6.31	45.93	130	195	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	52.09	59.74	74	-21.91	32.14	6.18	45.97	100	285	Peak
2390	44.35	52	54	-9.65	32.14	6.18	45.97	100	285	Average
2437	103.54	111	/	/	32.25	6.24	45.95	100	285	Peak
2437	97.97	105.43	/	/	32.25	6.24	45.95	100	285	Average
2483.5	52.7	59.96	74	-21.3	32.36	6.31	45.93	100	285	Peak
2483.5	45.09	52.35	54	-8.91	32.36	6.31	45.93	100	285	Average

REMARKS:

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



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Test Report No.: W7L-P22100017RF05

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	51.93	59.97	74	-22.07	31.75	6.18	45.97	130	195	Peak
2390	44.88	52.92	54	-9.12	31.75	6.18	45.97	130	195	Average
2462	108.88	116.56	/	/	31.98	6.28	45.94	130	195	Peak
2462	103.32	111	/	/	31.98	6.28	45.94	130	195	Average
2483.5	53.2	60.77	74	-20.8	32.05	6.31	45.93	130	195	Peak
2483.5	45.28	52.85	54	-8.72	32.05	6.31	45.93	130	195	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	52.04	59.69	74	-21.96	32.14	6.18	45.97	100	285	Peak
2390	44.18	51.83	54	-9.82	32.14	6.18	45.97	100	285	Average
2462	103.66	111.01	/	/	32.31	6.28	45.94	100	285	Peak
2462	98.15	105.5	/	/	32.31	6.28	45.94	100	285	Average
2483.5	53.64	60.9	74	-20.36	32.36	6.31	45.93	100	285	Peak
2483.5	44.56	51.82	54	-9.44	32.36	6.31	45.93	100	285	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-P22100017RF05

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	55.11	63.15	74	-18.89	31.75	6.18	45.97	175	195	Peak
2390	47.65	55.69	54	-6.35	31.75	6.18	45.97	175	195	Average
2412	105.15	113.08	/	/	31.82	6.21	45.96	175	195	Peak
2412	98.37	106.3	/	/	31.82	6.21	45.96	175	195	Average
2483.5	52.75	60.32	74	-21.25	32.05	6.31	45.93	175	195	Peak
2483.5	44.89	52.46	54	-9.11	32.05	6.31	45.93	175	195	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	52.73	60.38	74	-21.27	32.14	6.18	45.97	100	290	Peak
2390	44.81	52.46	54	-9.19	32.14	6.18	45.97	100	290	Average
2412	98.45	106.01	/	/	32.19	6.21	45.96	100	290	Peak
2412	91.43	98.99	/	/	32.19	6.21	45.96	100	290	Average
2483.5	52.1	59.36	74	-21.9	32.36	6.31	45.93	100	290	Peak
2483.5	44.49	51.75	54	-9.51	32.36	6.31	45.93	100	290	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-P22100017RF05

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	52.59	60.63	74	-21.41	31.75	6.18	45.97	130	195	Peak
2390	45.44	53.48	54	-8.56	31.75	6.18	45.97	130	195	Average
2437	104.61	112.42	/	/	31.9	6.24	45.95	130	195	Peak
2437	97.76	105.57	/	/	31.9	6.24	45.95	130	195	Average
2483.5	52.3	59.87	74	-21.7	32.05	6.31	45.93	130	195	Peak
2483.5	44.88	52.45	54	-9.12	32.05	6.31	45.93	130	195	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	52.47	60.12	74	-21.53	32.14	6.18	45.97	100	285	Peak
2390	44.6	52.25	54	-9.4	32.14	6.18	45.97	100	285	Average
2437	98.44	105.9	/	/	32.25	6.24	45.95	100	285	Peak
2437	91.49	98.95	/	/	32.25	6.24	45.95	100	285	Average
2483.5	52.12	59.38	74	-21.88	32.36	6.31	45.93	100	285	Peak
2483.5	44.77	52.03	54	-9.23	32.36	6.31	45.93	100	285	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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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	52.57	60.61	74	-21.43	31.75	6.18	45.97	130	195	Peak
2390	44.6	52.64	54	-9.4	31.75	6.18	45.97	130	195	Average
2462	103.95	111.63	/	/	31.98	6.28	45.94	130	195	Peak
2462	97.13	104.81	/	/	31.98	6.28	45.94	130	195	Average
2483.5	55.27	62.84	74	-18.73	32.05	6.31	45.93	130	195	Peak
2483.5	48.07	55.64	54	-5.93	32.05	6.31	45.93	130	195	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	52.22	59.87	74	-21.78	32.14	6.18	45.97	100	285	Peak
2390	44.69	52.34	54	-9.31	32.14	6.18	45.97	100	285	Average
2462	98.8	106.15	/	/	32.31	6.28	45.94	100	285	Peak
2462	91.85	99.2	/	/	32.31	6.28	45.94	100	285	Average
2483.5	52.68	59.94	74	-21.32	32.36	6.31	45.93	100	285	Peak
2483.5	45.28	52.54	54	-8.72	32.36	6.31	45.93	100	285	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-P22100017RF05

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	56.21	64.25	74	-17.79	31.75	6.18	45.97	175	195	Peak
2390	48.51	56.55	54	-5.49	31.75	6.18	45.97	175	195	Average
2412	105.41	113.34	/	/	31.82	6.21	45.96	175	195	Peak
2412	98.21	106.14	/	/	31.82	6.21	45.96	175	195	Average
2483.5	52.74	60.31	74	-21.26	32.05	6.31	45.93	175	195	Peak
2483.5	45.08	52.65	54	-8.92	32.05	6.31	45.93	175	195	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	52.25	59.9	74	-21.75	32.14	6.18	45.97	100	285	Peak
2390	44.6	52.25	54	-9.4	32.14	6.18	45.97	100	285	Average
2412	98.67	106.23	/	/	32.19	6.21	45.96	100	285	Peak
2412	91.56	99.12	/	/	32.19	6.21	45.96	100	285	Average
2483.5	51.99	59.25	74	-22.01	32.36	6.31	45.93	100	285	Peak
2483.5	44.49	51.75	54	-9.51	32.36	6.31	45.93	100	285	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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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	52.24	60.28	74	-21.76	31.75	6.18	45.97	195	130	Peak
2390	44.88	52.92	54	-9.12	31.75	6.18	45.97	195	130	Average
2437	105.1	112.91	/	/	31.9	6.24	45.95	195	130	Peak
2437	97.8	105.61	/	/	31.9	6.24	45.95	195	130	Average
2483.5	53.44	61.01	74	-20.56	32.05	6.31	45.93	195	130	Peak
2483.5	44.98	52.55	54	-9.02	32.05	6.31	45.93	195	130	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	51.51	59.16	74	-22.49	32.14	6.18	45.97	100	285	Peak
2390	44.84	52.49	54	-9.16	32.14	6.18	45.97	100	285	Average
2437	98.6	106.06	/	/	32.25	6.24	45.95	100	285	Peak
2437	91.46	98.92	/	/	32.25	6.24	45.95	100	285	Average
2483.5	53.43	60.69	74	-20.57	32.36	6.31	45.93	100	285	Peak
2483.5	44.58	51.84	54	-9.42	32.36	6.31	45.93	100	285	Average

REMARKS:

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



**BUREAU
VERITAS**

Test Report No.: W7L-P22100017RF05

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	52.87	60.91	74	-21.13	31.75	6.18	45.97	130	195	Peak
2390	44.64	52.68	54	-9.36	31.75	6.18	45.97	130	195	Average
2462	104.52	112.2	/	/	31.98	6.28	45.94	130	195	Peak
2462	97.35	105.03	/	/	31.98	6.28	45.94	130	195	Average
2483.5	57.03	64.6	74	-16.97	32.05	6.31	45.93	130	195	Peak
2483.5	48.4	55.97	54	-5.6	32.05	6.31	45.93	130	195	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	51.54	59.19	74	-22.46	32.14	6.18	45.97	100	285	Peak
2390	44.07	51.72	54	-9.93	32.14	6.18	45.97	100	285	Average
2462	98.91	106.26	/	/	32.31	6.28	45.94	100	285	Peak
2462	92.36	99.71	/	/	32.31	6.28	45.94	100	285	Average
2483.5	53.02	60.28	74	-20.98	32.36	6.31	45.93	100	285	Peak
2483.5	45.28	52.54	54	-8.72	32.36	6.31	45.93	100	285	Average

REMARKS:

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



**BUREAU
VERITAS**

Test Report No.: W7L-P22100017RF05

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	53.51	61.55	74	-20.49	31.75	6.18	45.97	100	195	Peak
2390	46.28	54.32	54	-7.72	31.75	6.18	45.97	100	195	Average
2422	100.74	108.63	/	/	31.85	6.22	45.96	100	195	Peak
2422	93.62	101.51	/	/	31.85	6.22	45.96	100	195	Average
2483.5	53.64	61.21	74	-20.36	32.05	6.31	45.93	100	195	Peak
2483.5	45.21	52.78	54	-8.79	32.05	6.31	45.93	100	195	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	52.15	59.8	74	-21.85	32.14	6.18	45.97	105	145	Peak
2390	45.01	52.66	54	-8.99	32.14	6.18	45.97	105	145	Average
2422	97.71	105.24	/	/	32.21	6.22	45.96	105	145	Peak
2422	91.18	98.71	/	/	32.21	6.22	45.96	105	145	Average
2483.5	52.3	59.56	74	-21.7	32.36	6.31	45.93	105	145	Peak
2483.5	44.47	51.73	54	-9.53	32.36	6.31	45.93	105	145	Average

REMARKS:

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



**BUREAU
VERITAS**

Test Report No.: W7L-P22100017RF05

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	53.15	61.19	74	-20.85	31.75	6.18	45.97	100	195	Peak
2390	45.13	53.17	54	-8.87	31.75	6.18	45.97	100	195	Average
2437	100.21	108.02	/	/	31.9	6.24	45.95	100	195	Peak
2437	93.48	101.29	/	/	31.9	6.24	45.95	100	195	Average
2483.5	53.73	61.3	74	-20.27	32.05	6.31	45.93	100	195	Peak
2483.5	45.08	52.65	54	-8.92	32.05	6.31	45.93	100	195	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	51.95	59.6	74	-22.05	32.14	6.18	45.97	145	145	Peak
2390	44.8	52.45	54	-9.2	32.14	6.18	45.97	145	145	Average
2437	97.7	105.16	/	/	32.25	6.24	45.95	145	145	Peak
2437	90.91	98.37	/	/	32.25	6.24	45.95	145	145	Average
2483.5	54.4	61.66	74	-19.6	32.36	6.31	45.93	145	145	Peak
2483.5	45.2	52.46	54	-8.8	32.36	6.31	45.93	145	145	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-P22100017RF05

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	52.62	60.66	74	-21.38	31.75	6.18	45.97	100	195	Peak
2390	45.17	53.21	54	-8.83	31.75	6.18	45.97	100	195	Average
2452	99.87	107.61	/	/	31.95	6.26	45.95	100	195	Peak
2452	92.68	100.42	/	/	31.95	6.26	45.95	100	195	Average
2483.5	56.43	64	74	-17.57	32.05	6.31	45.93	100	195	Peak
2483.5	49.49	57.06	54	-4.51	32.05	6.31	45.93	100	195	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	52.73	60.38	74	-21.27	32.14	6.18	45.97	145	145	Peak
2390	44.57	52.22	54	-9.43	32.14	6.18	45.97	145	145	Average
2452	98.39	105.8	/	/	32.28	6.26	45.95	145	145	Peak
2452	91.51	98.92	/	/	32.28	6.26	45.95	145	145	Average
2483.5	54.41	61.67	74	-19.59	32.36	6.31	45.93	145	145	Peak
2483.5	46.41	53.67	54	-7.59	32.36	6.31	45.93	145	145	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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VERITAS**

Test Report No.: W7L-P22100017RF05

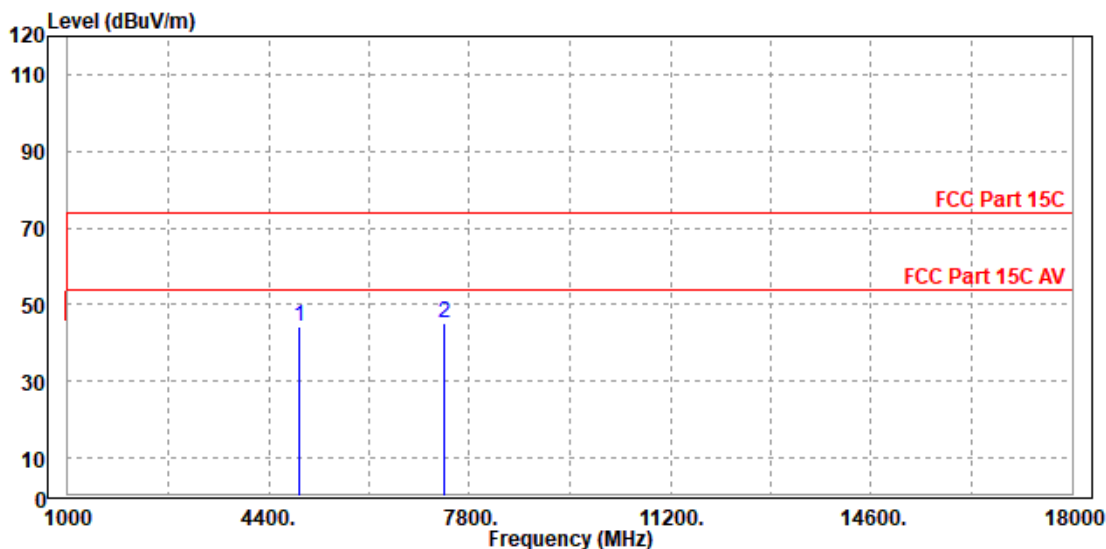
Worst case harmonic:

802.11n (40MHz)

CHANNEL	TX Channel 9	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	4904.000	44.37	45.66	74.00	-29.63	-1.29	Peak	Horizontal
2 PP	7358.000	45.07	43.17	74.00	-28.93	1.90	Peak	Horizontal



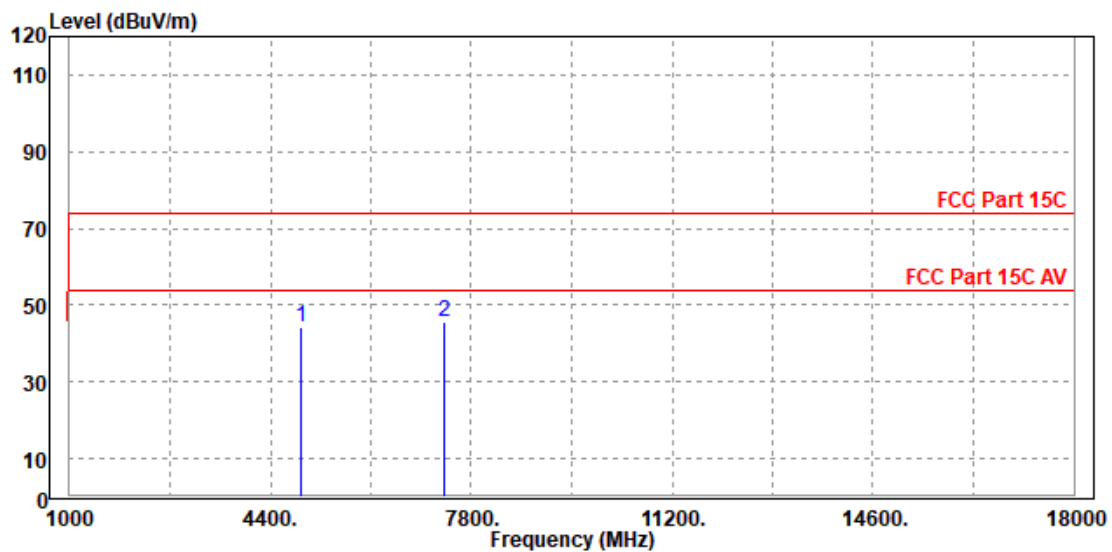


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VERITAS

Test Report No.: W7L-P22100017RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	Freq	Level	Read Level	Limit	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	4910.000	44.33	45.41	74.00	-29.67	-1.08	Peak	Vertical
2 PP	7356.000	45.81	43.85	74.00	-28.19	1.96	Peak	Vertical



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.



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VERITAS**

Test Report No.: W7L-P22100017RF05

BELOW 1GHz WORST-CASE DATA:

Note: For frequency below 30MHz, the emission was tested 20db below the limit so the data not recorded in the sheet.

30 MHz – 1GHz data:

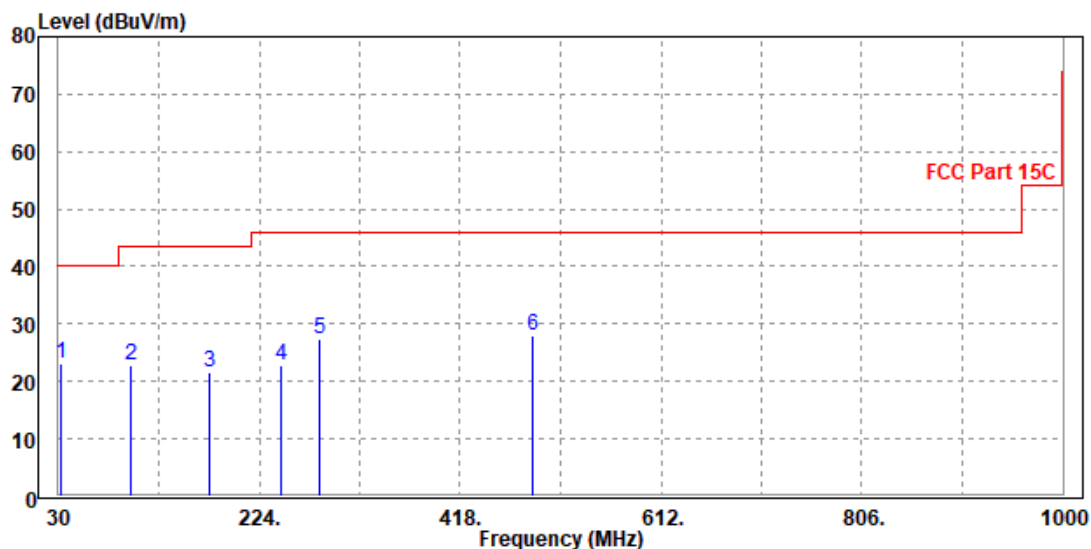
BT 4.0

CHANNEL	TX Channel 39	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
31.94	23.07	40.29	40	-16.93	19.89	0.32	37.43	100	0	Peak
100.81	22.79	48.63	43.5	-20.71	10.46	0.53	36.83	100	0	Peak
176.47	21.49	45.9	43.5	-22.01	11.31	0.7	36.42	100	0	Peak
244.37	22.85	45.06	46	-23.15	13.25	0.82	36.28	100	0	Peak
282.2	27.38	48.95	46	-18.62	13.82	0.88	36.27	100	0	Peak
487.84	28.02	45.55	46	-17.98	17.87	1.2	36.6	100	0	Peak

REMARKS:

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





**BUREAU
VERITAS**

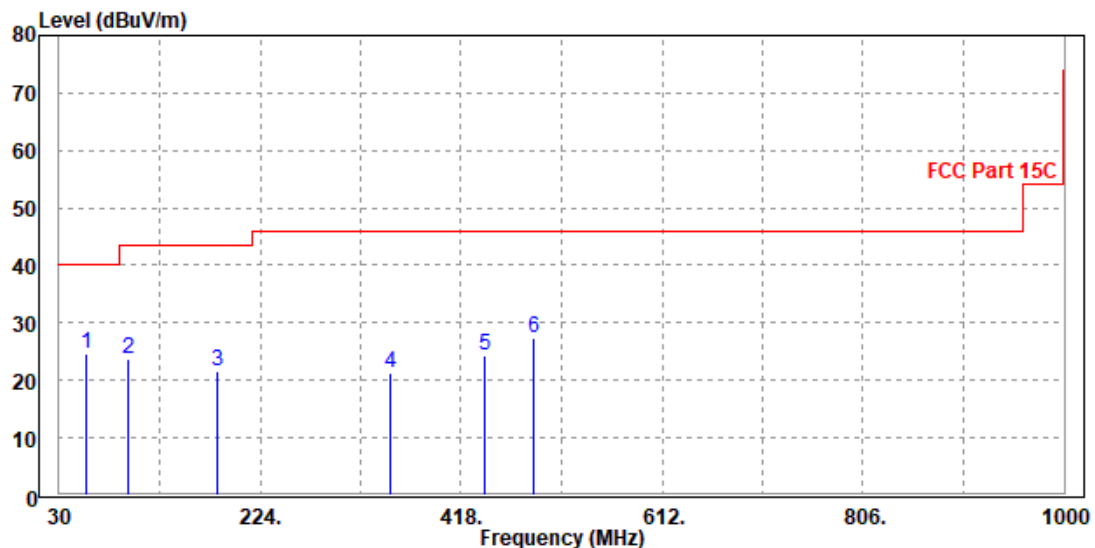
Test Report No.: W7L-P22100017RF05

CHANNEL	TX Channel 39	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
56.19	24.58	52.09	40	-15.42	9.02	0.43	36.96	100	0	Peak
96.48	23.83	51.25	43.5	-19.67	8.92	0.52	36.86	100	0	Peak
183.26	21.56	45.98	43.5	-21.94	11.25	0.71	36.38	100	0	Peak
349.13	21.34	41.56	46	-24.66	15.13	0.99	36.34	100	0	Peak
440.31	24.45	43	46	-21.55	16.82	1.13	36.5	100	0	Peak
487.84	27.49	45.45	46	-18.51	17.44	1.2	36.6	100	0	Peak

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-P22100017RF05

ABOVE 1GHz TEST DATA

Note: For higher frequency, the emission is too low to be detected.

BT4.0

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	50.4	58.44	74	-23.6	31.75	6.18	45.97	100	195	Peak
2390	43.39	51.43	54	-10.61	31.75	6.18	45.97	100	195	Average
2402	101.69	109.68	/	/	31.79	6.19	45.97	100	195	Peak
2402	100.77	108.76	/	/	31.79	6.19	45.97	100	195	Average
2483.5	51.02	58.59	74	-22.98	32.05	6.31	45.93	100	195	Peak
2483.5	44.48	52.05	54	-9.52	32.05	6.31	45.93	100	195	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	52.02	59.67	74	-21.98	32.14	6.18	45.97	115	145	Peak
2390	43.75	51.4	54	-10.25	32.14	6.18	45.97	115	145	Average
2402	103.62	111.24	/	/	32.16	6.19	45.97	115	145	Peak
2402	101.95	109.57	/	/	32.16	6.19	45.97	115	145	Average
2483.5	51.4	58.66	74	-22.6	32.36	6.31	45.93	115	145	Peak
2483.5	44.25	51.51	54	-9.75	32.36	6.31	45.93	115	145	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2402MHz: Fundamental frequency.



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VERITAS**

Test Report No.: W7L-P22100017RF05

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	51.81	59.85	74	-22.19	31.75	6.18	45.97	100	195	Peak
2390	43.97	52.01	54	-10.03	31.75	6.18	45.97	100	195	Average
2440	102.25	110.04	/	/	31.91	6.25	45.95	100	195	Peak
2440	100.03	107.82	/	/	31.91	6.25	45.95	100	195	Average
2483.5	52.76	60.33	74	-21.24	32.05	6.31	45.93	100	195	Peak
2483.5	44.6	52.17	54	-9.4	32.05	6.31	45.93	100	195	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	58.9	74	-22.75	32.14	6.18	45.97	115	145	Peak
2390	43.36	51.01	54	-10.64	32.14	6.18	45.97	115	145	Average
2440	98.01	105.45	/	/	32.26	6.25	45.95	115	145	Peak
2440	97.01	104.45	/	/	32.26	6.25	45.95	115	145	Average
2483.5	52.6	59.86	74	-21.4	32.36	6.31	45.93	115	145	Peak
2483.5	44.17	51.43	54	-9.83	32.36	6.31	45.93	115	145	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-P22100017RF05

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	50.72	58.76	74	-23.28	31.75	6.18	45.97	100	195	Peak
2390	43.95	51.99	54	-10.05	31.75	6.18	45.97	100	195	Average
2480	102.05	109.64	/	/	32.04	6.3	45.93	100	195	Peak
2480	101.27	108.86	/	/	32.04	6.3	45.93	100	195	Average
2483.5	51.5	59.07	74	-22.5	32.05	6.31	45.93	100	195	Peak
2483.5	45.96	53.53	54	-8.04	32.05	6.31	45.93	100	195	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	50.83	58.48	74	-23.17	32.14	6.18	45.97	115	145	Peak
2390	43.97	51.62	54	-10.03	32.14	6.18	45.97	115	145	Average
2480	99.51	106.79	/	/	32.35	6.3	45.93	115	145	Peak
2480	98.19	105.47	/	/	32.35	6.3	45.93	115	145	Average
2483.5	52.22	59.48	74	-21.78	32.36	6.31	45.93	115	145	Peak
2483.5	45.17	52.43	54	-8.83	32.36	6.31	45.93	115	145	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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VERITAS**

Test Report No.: W7L-P22100017RF05

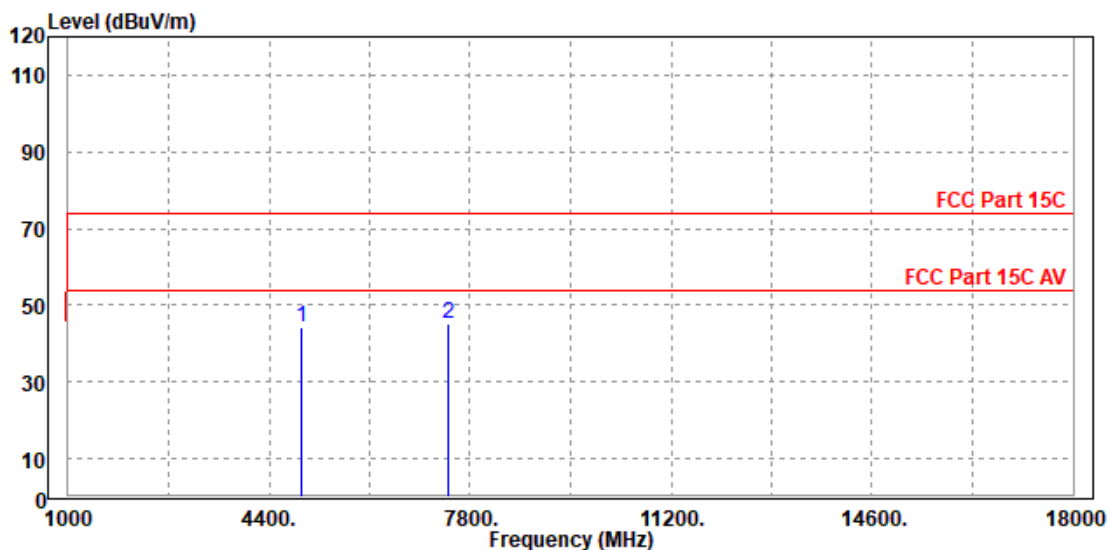
Worst case harmonic:

BT4.0

CHANNEL	TX Channel 39	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	4960.000	44.35	45.54	74.00	-29.65	-1.19	Peak	Horizontal
2 PP	7443.000	45.28	43.30	74.00	-28.72	1.98	Peak	Horizontal



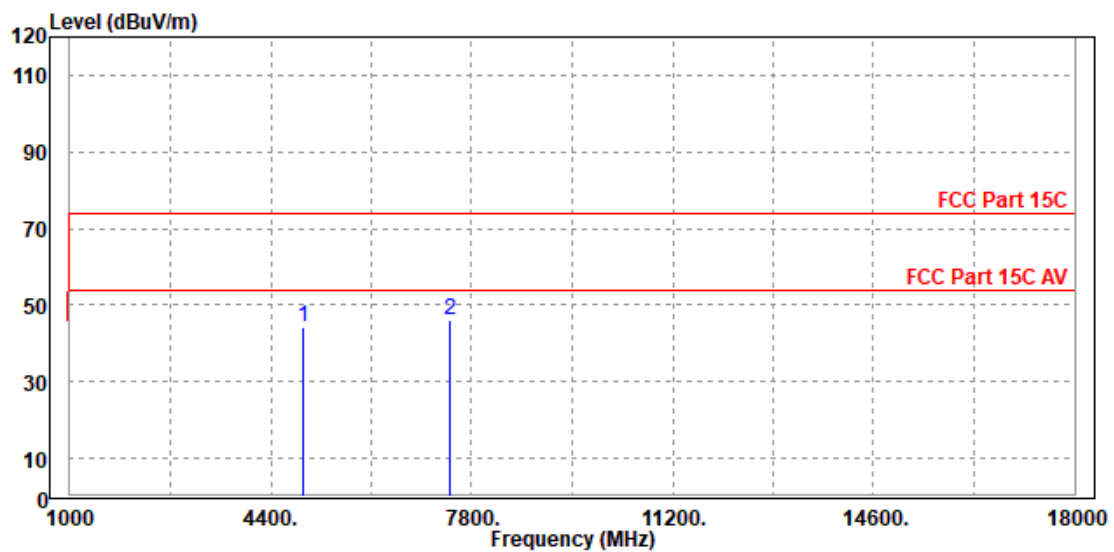


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VERITAS

Test Report No.: W7L-P22100017RF05

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	4961.000	44.34	45.33	74.00	-29.66	-0.99	Peak	Vertical
2 PP	7440.000	46.13	44.12	74.00	-27.87	2.01	Peak	Vertical



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.



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. 24,22	Feb. 23,23
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 24,22	Feb. 23,23
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Apr. 25,22	Apr. 24,23
Power Sensor	ANRITSU	MA2411B	1339352	Feb. 24,22	Feb. 23,23

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

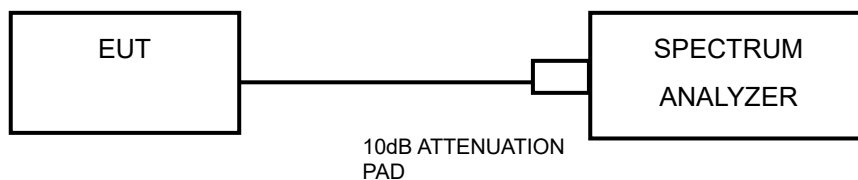
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (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-P22100017RF05

3.3.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.



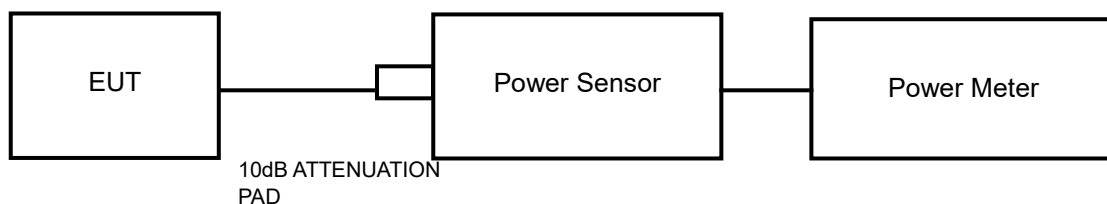
3.4 CONDUCTED OUTPUT POWER

3.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

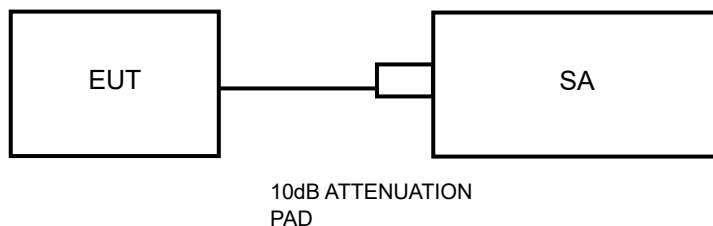
For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

3.4.2 TEST SETUP

BT:



2.4G wifi:



3.4.3 TEST INSTRUMENTS

Refer to section 3.2.2 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.



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3.4.7 TEST RESULTS

3.4.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix1/2 Of this test report.



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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.

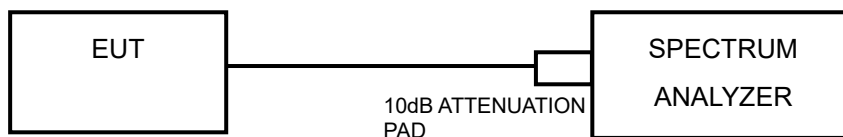


3.5 POWER SPECTRAL DENSITY MEASUREMENT

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-P22100017RF05

3.5.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.

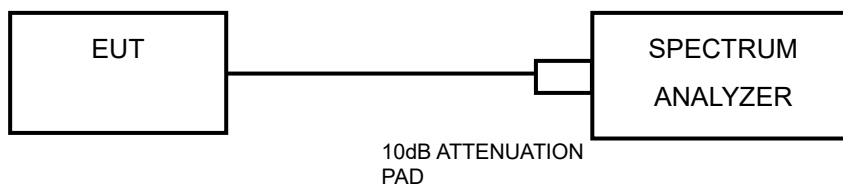


3.6 OUT OF BAND EMISSION MEASUREMENT

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 Appendix 1/2 Of this test report.



Test Report No.: W7L-P22100017RF05

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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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.



BUREAU Test Report No.: W7L-P22100017RF05
VERITAS

6 Appendix 1 BLE

DTS BANDWIDTH

TEST RESULT

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.624	2401.676	2402.300	0.5	PASS
		2440	0.624	2439.672	2440.296	0.5	PASS
		2480	0.652	2479.656	2480.308	0.5	PASS



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Test Report No.: W7L-P22100017RF05

TEST GRAPHS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440

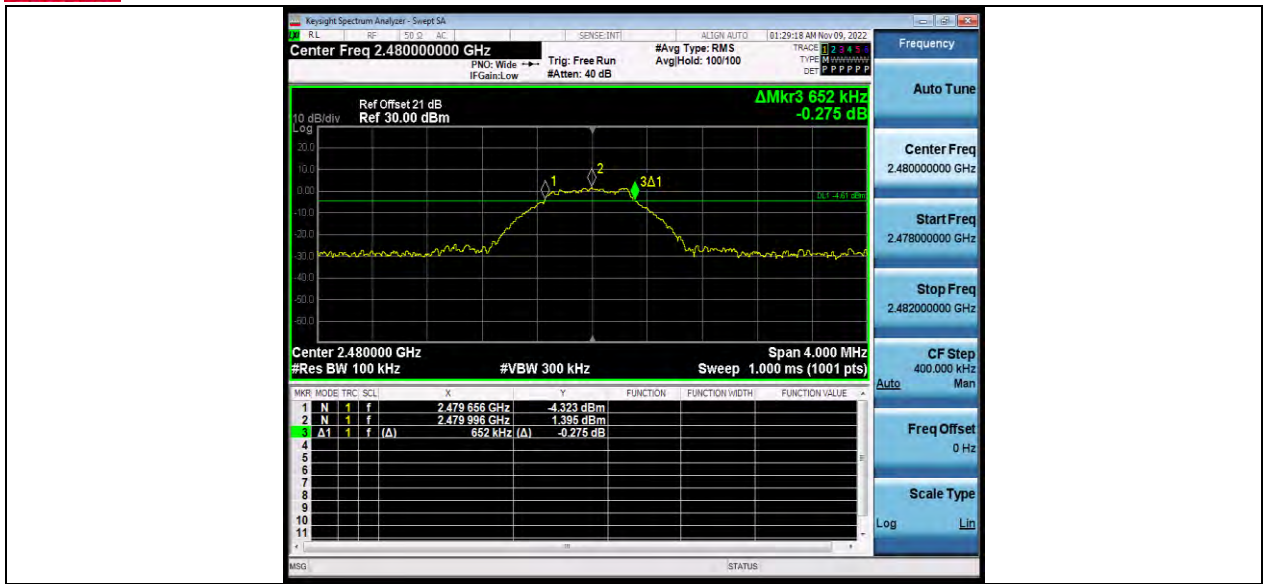


BLE_1M_Ant1_2480



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VERITAS

Test Report No.: W7L-P22100017RF05





Test Report No.: W7L-P22100017RF05

OCCUPIED CHANNEL BANDWIDTH

TEST RESULT

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0325	2401.4662	2402.4987	---	---
		2440	1.0426	2439.4585	2440.5011	---	---
		2480	1.0693	2479.4436	2480.5129	---	---

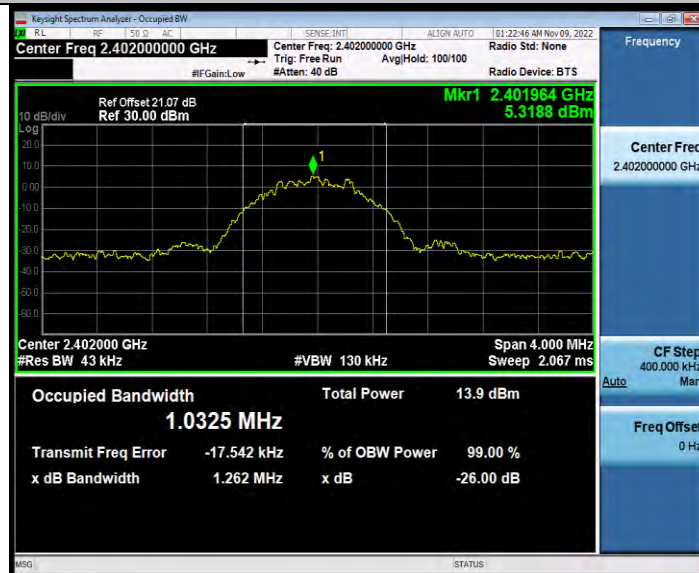


BUREAU
VERITAS

Test Report No.: W7L-P22100017RF05

TEST GRAPHS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



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

TestMode	Frequency [MHz]	Average Power [dBm]	Peak Power [dBm]	Peak Power [mW]	Conducted Limit [dBm]	EIRP [dBm]	EIRP [mW]	EIRP Limit [dBm]	Verdict	Power setting
BLE_1M	2402	5.88	5.91	3.90	≤30	7.21	5.26	≤36	PASS	6
	2440	6.42	6.43	4.40	≤30	7.73	5.93	≤36	PASS	6
	2480	5.88	5.93	3.92	≤30	7.23	5.28	≤36	PASS	6

Note : EIRP Power=Peak power+Gain



Test Report No.: W7L-P22100017RF05

MAXIMUM POWER SPECTRAL DENSITY

TEST RESULT

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-8.43	≤8.00	PASS
		2440	-11.49	≤8.00	PASS
		2480	-13.12	≤8.00	PASS



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Test Report No.: W7L-P22100017RF05

TEST GRAPHS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



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Test Report No.: W7L-P22100017RF05





Test Report No.: W7L-P22100017RF05

BAND EDGE MEASUREMENTS

TEST RESULT

TestMode	Antenna	ChName	Frequency [MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	5.78	-33.99	≤ -14.22	PASS
		High	2480	1.17	-34.28	≤ -18.83	PASS

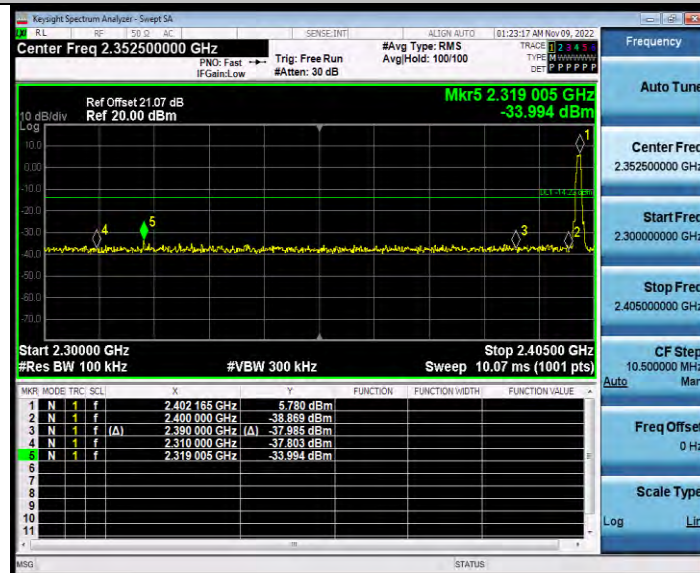


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VERITAS

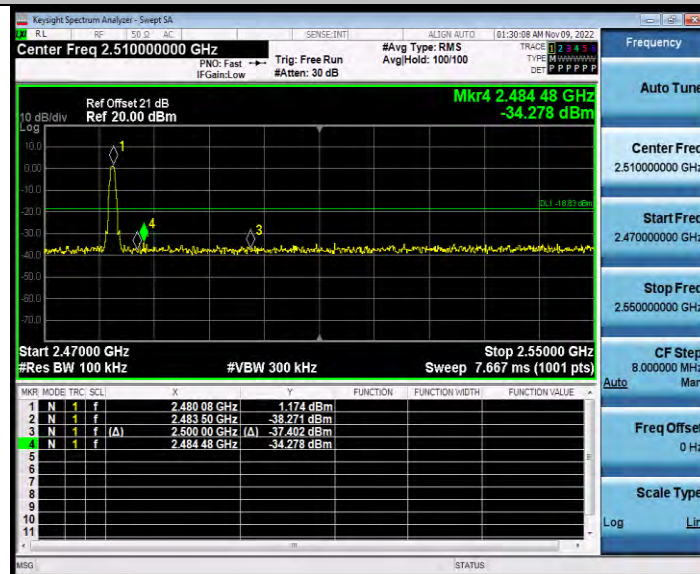
Test Report No.: W7L-P22100017RF05

TEST GRAPHS

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480





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Test Report No.: W7L-P22100017RF05

CONDUCTED SPURIOUS EMISSION

TEST RESULT

TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	5.40	5.40	---	PASS
			30~1000	5.40	-43.14	≤ -14.6	PASS
			1000~26500	5.40	-23.94	≤ -14.6	PASS
		2440	Reference	2.24	2.24	---	PASS
			30~1000	2.24	-42.32	≤ -17.76	PASS
			1000~26500	2.24	-23.6	≤ -17.76	PASS
		2480	Reference	0.86	0.86	---	PASS
			30~1000	0.86	-43.04	≤ -19.14	PASS
			1000~26500	0.86	-24.21	≤ -19.14	PASS



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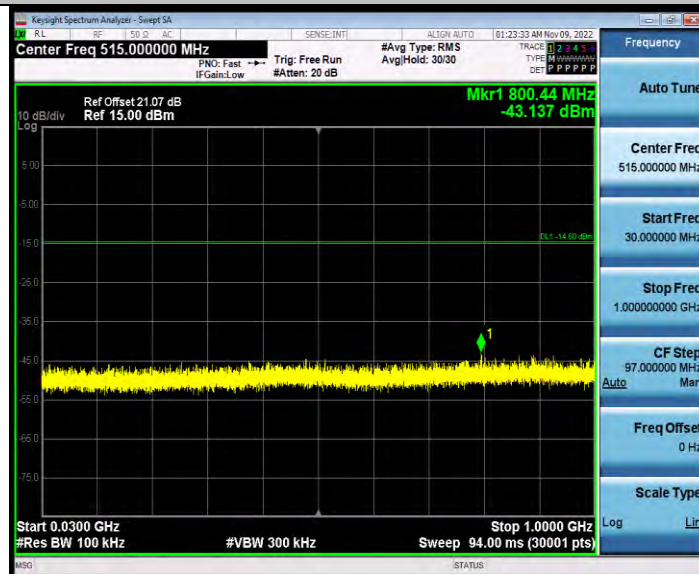
Test Report No.: W7L-P22100017RF05

TEST GRAPHS

BLE_1M_Ant1_2402_0~Reference



BLE_1M_Ant1_2402_30~1000



BLE_1M_Ant1_2402_1000~26500



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VERITAS

Test Report No.: W7L-P22100017RF05



BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~1000



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VERITAS

Test Report No.: W7L-P22100017RF05



BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_0~Reference



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VERITAS

Test Report No.: W7L-P22100017RF05



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



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VERITAS

Test Report No.: W7L-P22100017RF05





Test Report No.: W7L-P22100017RF05

DUTY CYCLE

TEST RESULT

TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]
BLE_1M	Ant1	2402	2.09	3.12	66.99
		2440	2.09	2.50	83.60
		2480	2.09	2.50	83.60

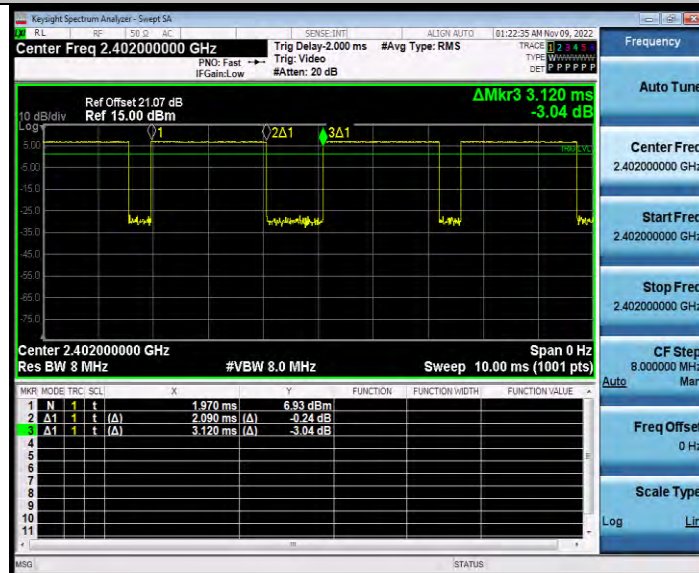


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VERITAS

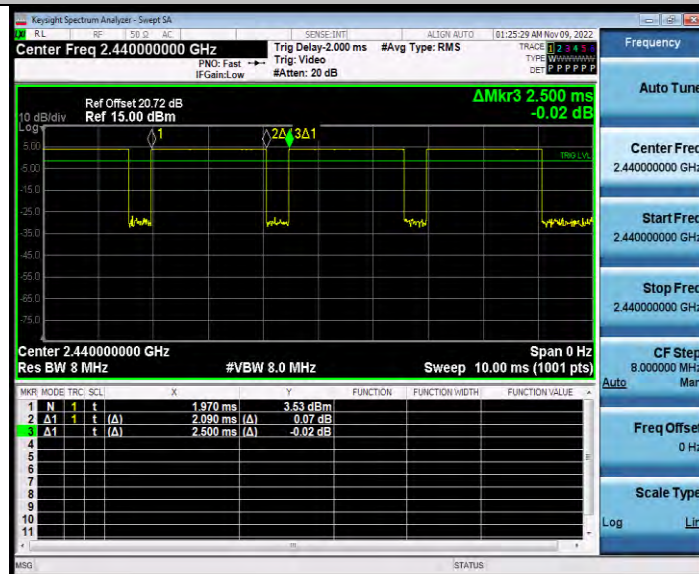
Test Report No.: W7L-P22100017RF05

TEST GRAPHS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440

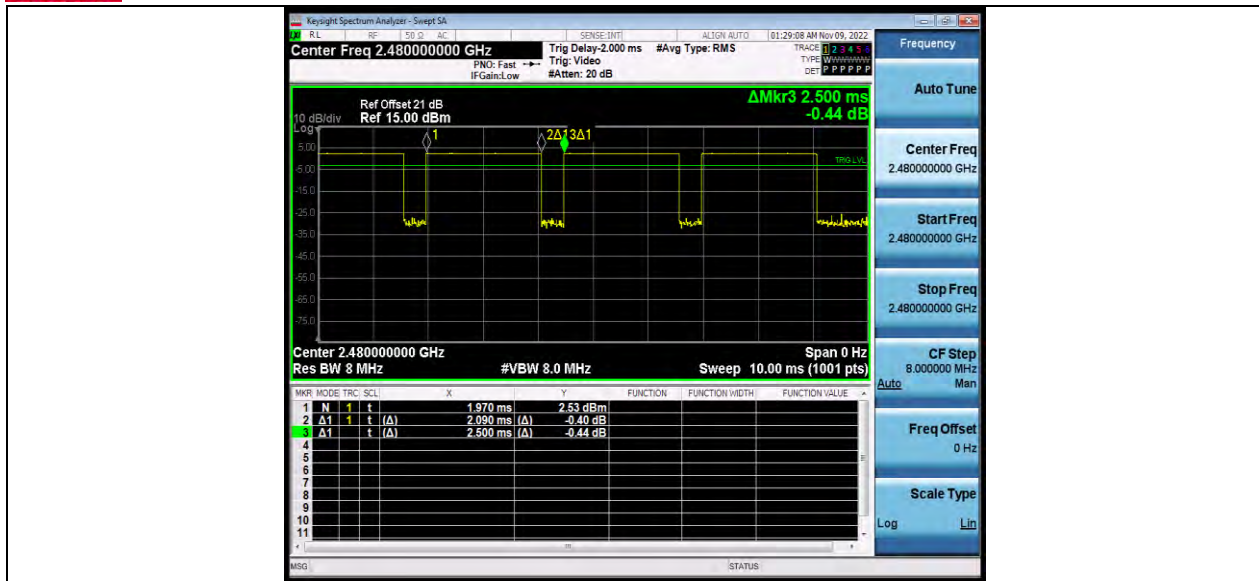


BLE_1M_Ant1_2480



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VERITAS

Test Report No.: W7L-P22100017RF05





7 Appendix 2 WLAN 2.4G

DTS BANDWIDTH

TEST RESULT

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.320	2407.000	2416.320	0.5	PASS
		2437	9.640	2432.320	2441.960	0.5	PASS
		2462	9.800	2457.200	2467.000	0.5	PASS
11G	Ant1	2412	16.440	2403.760	2420.200	0.5	PASS
		2437	16.440	2428.760	2445.200	0.5	PASS
		2462	16.400	2453.760	2470.160	0.5	PASS
11N20SISO	Ant1	2412	17.080	2403.440	2420.520	0.5	PASS
		2437	17.040	2428.480	2445.520	0.5	PASS
		2462	17.080	2453.440	2470.520	0.5	PASS
11N40SISO	Ant1	2422	32.240	2405.760	2438.000	0.5	PASS
		2437	32.000	2421.000	2453.000	0.5	PASS
		2452	32.240	2435.760	2468.000	0.5	PASS



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VERITAS

Test Report No.: W7L-P22100017RF05

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462

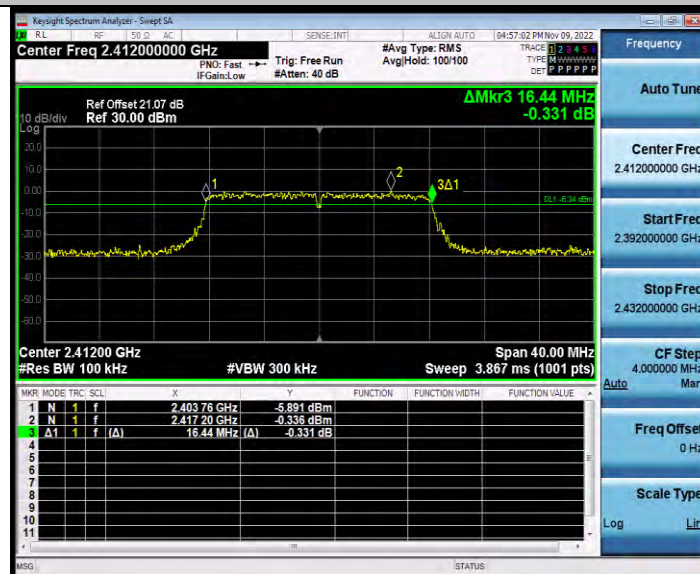


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VERITAS

Test Report No.: W7L-P22100017RF05



11G_Ant1_2412

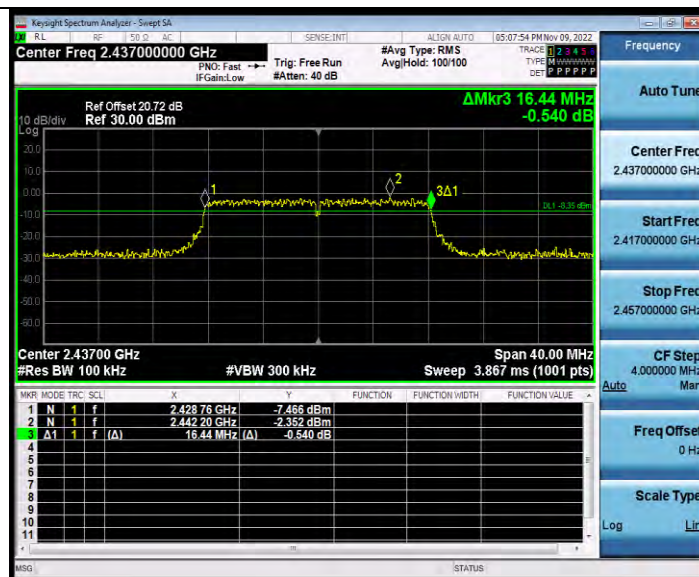


11G_Ant1_2437

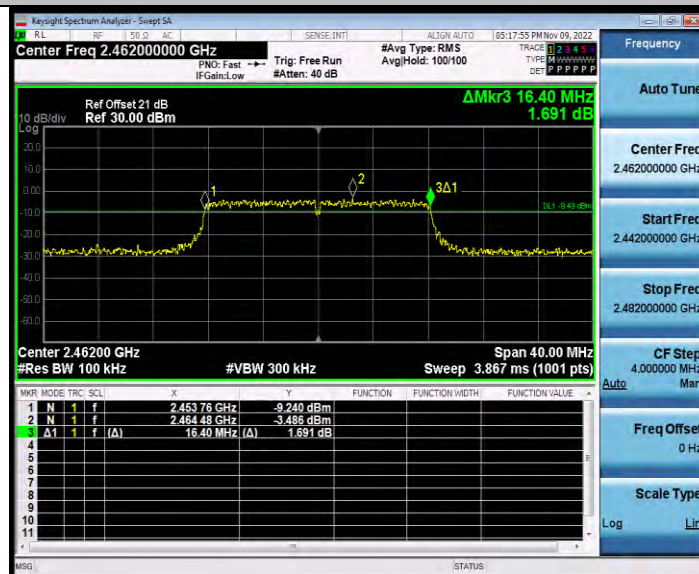


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VERITAS

Test Report No.: W7L-P22100017RF05



11G_Ant1_2462

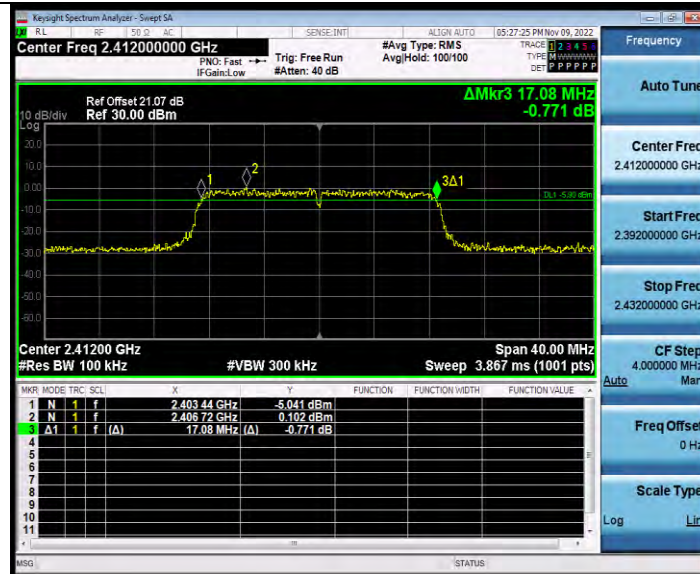


11N20SISO_Ant1_2412

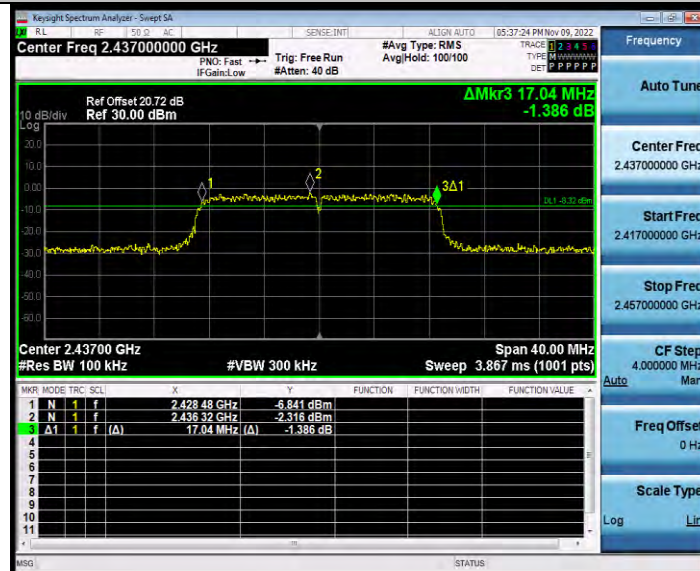


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VERITAS

Test Report No.: W7L-P22100017RF05



11N20SISO_Ant1_2437

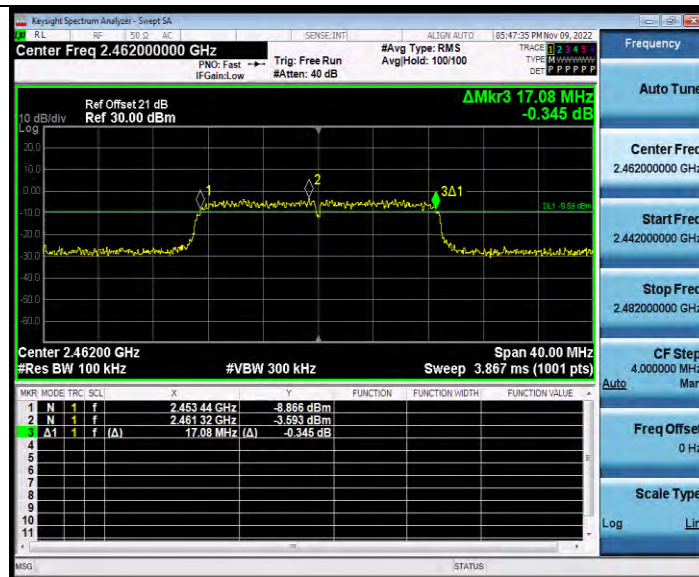


11N20SISO_Ant1_2462

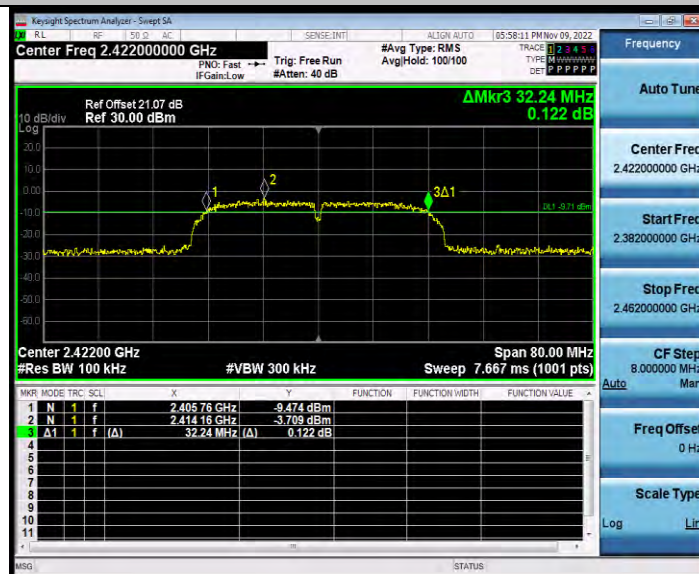


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VERITAS

Test Report No.: W7L-P22100017RF05



11N40SISO_Ant1_2422

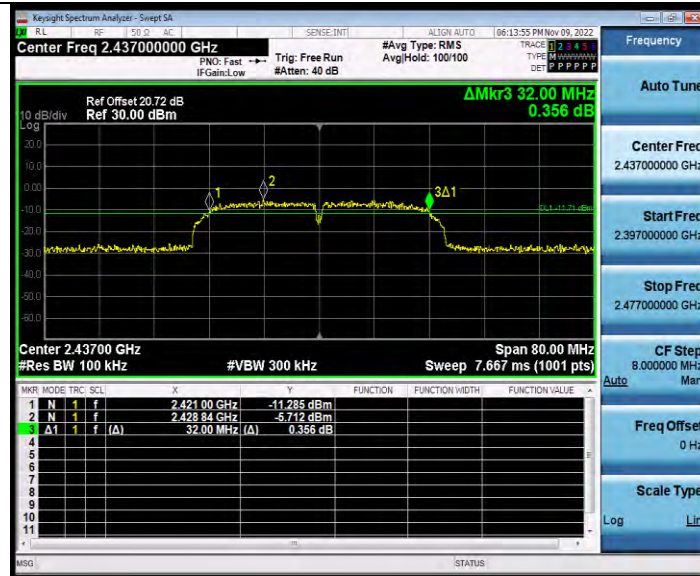


11N40SISO_Ant1_2437



BUREAU
VERITAS

Test Report No.: W7L-P22100017RF05



11N40SISO_Ant1_2452



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

TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13.354	2405.2116	2418.5656	---	---
		2437	13.596	2430.0932	2443.6892	---	---
		2462	13.739	2455.0629	2468.8019	---	---
11G	Ant1	2412	16.780	2403.6223	2420.4023	---	---
		2437	16.987	2428.5157	2445.5027	---	---
		2462	17.296	2453.3224	2470.6184	---	---
11N20SISO	Ant1	2412	17.505	2403.2181	2420.7231	---	---
		2437	17.655	2428.1498	2445.8048	---	---
		2462	17.983	2452.9283	2470.9113	---	---
11N40SISO	Ant1	2422	35.937	2404.0580	2439.9950	---	---
		2437	37.509	2418.3701	2455.8791	---	---
		2452	46.405	2428.4502	2474.8552	---	---

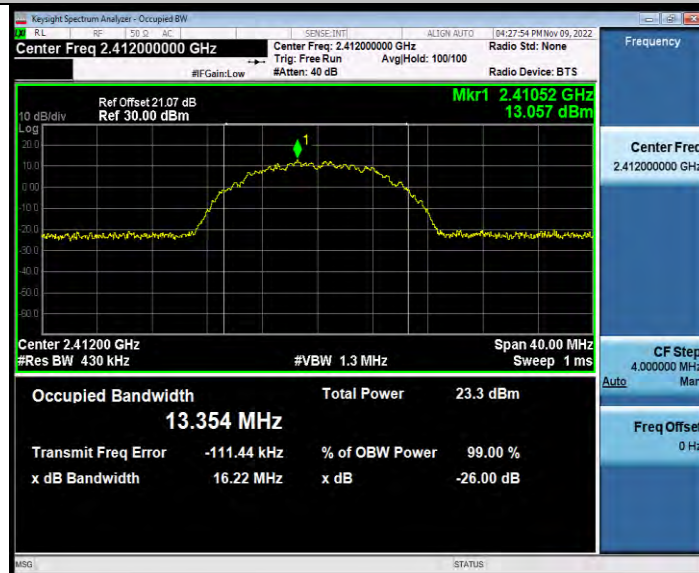


BUREAU
VERITAS

Test Report No.: W7L-P22100017RF05

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437

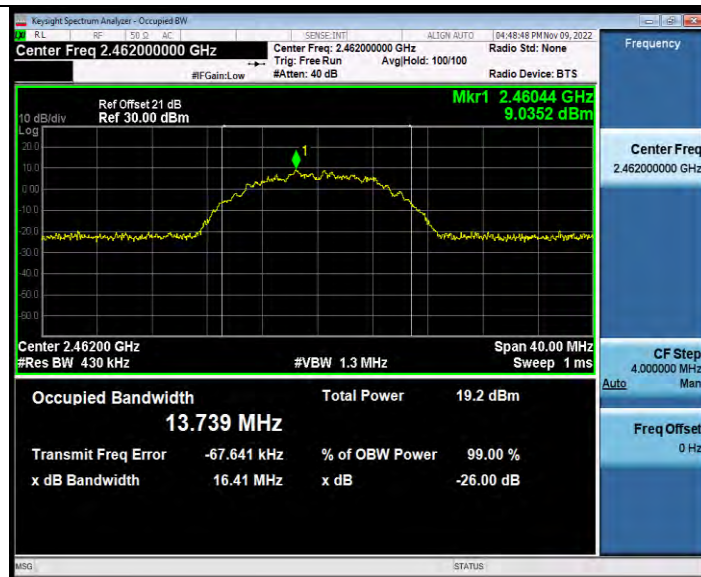


11B_Ant1_2462

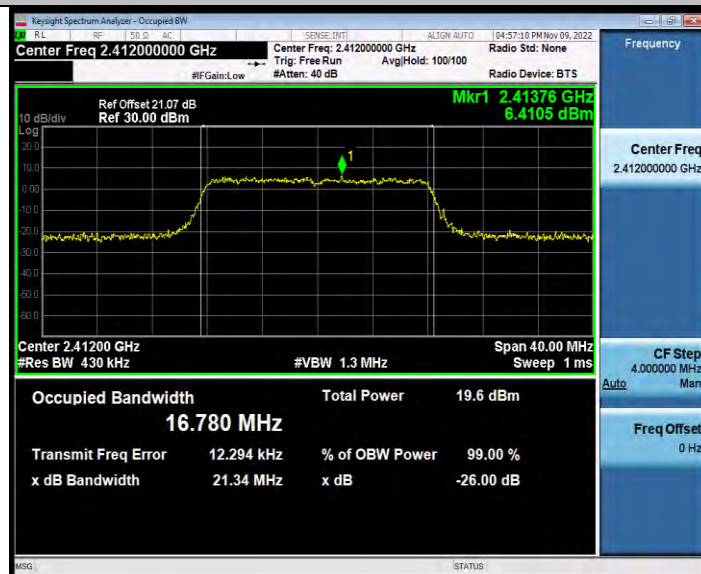


BUREAU
VERITAS

Test Report No.: W7L-P22100017RF05



11G_Ant1_2412



11G_Ant1_2437