



Test Report No.: PSU-QBJ2408220111RF04



Certificate #6613.01

FCC TEST REPORT

(Part 15, Subpart C)

Applicant:	MUNIC
Address:	39 Avenue de Paris 94800 Villejuif – France

Manufacturer or Supplier:	MUNIC
Address:	39 Avenue de Paris 94800 Villejuif – France
Product:	telematics embedded system ALARM.COM CAR CONNECTOR
Brand Name:	MUNIC ALARM.COM
Model Name:	C4D-4MUSAC_V8 ADC-CC110
FCC ID:	A6GC4D-4MUSACV8
Date of tests:	Aug. 23, 2024 ~ Sep. 20, 2024

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

FCC Part 15, Subpart C, Section 15.247
 ANSI C63.10-2020

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

Prepared by Hanwen Xu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department

Date: Sep. 20, 2024

Date: Sep. 20, 2024

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

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TABLE OF CONTENTS

RELEASE CONTROL RECORD	5
1 SUMMARY OF TEST RESULTS	6
1.1 MEASUREMENT UNCERTAINTY	7
2 GENERAL INFORMATION	8
2.1 GENERAL DESCRIPTION OF EUT	8
2.2 DESCRIPTION OF TEST MODES	10
2.2.1 CONFIGURATION OF SYSTEM UNDER TEST	11
2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	11
2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS	13
2.4 DESCRIPTION OF SUPPORT UNITS	13
3 TEST TYPES AND RESULTS	14
3.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT	14
3.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT	14
3.1.2 TEST INSTRUMENTS	15
3.1.3 TEST PROCEDURES	17
3.1.4 DEVIATION FROM TEST STANDARD	17
3.1.5 TEST SETUP	18
3.1.6 EUT OPERATING CONDITIONS	19
3.1.7 TEST RESULTS	20
3.2 NUMBER OF HOPPING FREQUENCY USED	52
3.2.1 LIMIT OF HOPPING FREQUENCY USED	52
3.2.2 TEST SETUP	52
3.2.3 TEST INSTRUMENTS	52
3.2.4 TEST PROCEDURES	53
3.2.5 DEVIATION FROM TEST STANDARD	53
3.2.6 TEST RESULTS	53
3.3 DWELL TIME ON EACH CHANNEL	54
3.3.1 LIMIT OF DWELL TIME USED	54
3.3.2 TEST SETUP	54
3.3.3 TEST INSTRUMENTS	54
3.3.4 TEST PROCEDURES	54
3.3.5 DEVIATION FROM TEST STANDARD	55
3.3.6 TEST RESULTS	55
3.4 CHANNEL BANDWIDTH	56
3.4.1 LIMITS OF CHANNEL BANDWIDTH	56



Test Report No.: PSU-QBJ2408220111RF04

3.4.2	TEST SETUP	56
3.4.3	TEST INSTRUMENTS.....	56
3.4.4	TEST PROCEDURE.....	56
3.4.5	DEVIATION FROM TEST STANDARD	56
3.4.6	EUT OPERATING CONDITION	57
3.4.7	TEST RESULTS	57
3.5	HOPPING CHANNEL SEPARATION	58
3.5.1	LIMIT OF HOPPING CHANNEL SEPARATION	58
3.5.2	TEST SETUP	58
3.5.3	TEST INSTRUMENTS.....	58
3.5.4	TEST PROCEDURES	58
3.5.5	DEVIATION FROM TEST STANDARD	58
3.5.6	TEST RESULTS	59
3.6	MAXIMUM OUTPUT POWER	60
3.6.1	LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT	60
3.6.2	TEST SETUP	60
3.6.3	TEST INSTRUMENTS.....	60
3.6.4	TEST PROCEDURES	60
3.6.5	DEVIATION FROM TEST STANDARD	61
3.6.6	EUT OPERATING CONDITION	61
3.6.7	TEST RESULTS	62
3.6.7.1	MAXIMUM PEAK OUTPUT POWER	62
3.6.7.2	AVERAGE OUTPUT POWER (FOR REFERENCE).....	63
3.7	OUT OF BAND MEASUREMENT	64
3.7.1	LIMITS OF OUT OF BAND MEASUREMENT	64
3.7.2	TEST INSTRUMENTS.....	64
3.7.3	TEST PROCEDURE	64
3.7.4	DEVIATION FROM TEST STANDARD	64
3.7.5	EUT OPERATING CONDITION	64
3.7.6	TEST RESULTS	64
4	PHOTOGRAPHS OF THE TEST CONFIGURATION	65
5	MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	66
6	APPENDIX	67
	20DB EMISSION BANDWIDTH.....	67
	TEST RESULT	67
	TEST GRAPHS.....	67



Test Report No.: PSU-QBJ2408220111RF04

OCCUPIED CHANNEL BANDWIDTH	71
TEST RESULT	71
TEST GRAPHS	72
MAXIMUM CONDUCTED OUTPUT POWER	76
TEST RESULT	76
CARRIER FREQUENCY SEPARATION	77
TEST RESULT	77
TEST GRAPHS	77
TIME OF OCCUPANCY	79
TEST RESULT	79
TEST GRAPHS	80
NUMBER OF HOPPING CHANNELS	85
TEST RESULT	85
TEST GRAPHS	85
BAND EDGE MEASUREMENTS	87
TEST RESULT	87
TEST GRAPHS	87
CONDUCTED SPURIOUS EMISSION	94
TEST RESULT	94
TEST GRAPHS	95
DUTY CYCLE	109
TEST RESULT	109
TEST GRAPHS	109



Test Report No.: PSU-QBJ2408220111RF04

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-QBJ2408220111RF04	Original release	Sep. 20, 2024



Test Report No.: PSU-QBJ2408220111RF04

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C		
STANDARD	TEST TYPE AND LIMIT	RESULT
15.207	AC Power Conducted Emission	Compliance
15.247(a)(1) (iii)	Number of Hopping Frequency Used	Compliance
15.247(a)(1) (iii)	Dwell Time on Each Channel	Compliance
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	Compliance
15.247(b)	Maximum Peak Output Power	Compliance
15.247(d)& 15.209	Transmitter Radiated Emissions	Compliance
15.247(d)	Out of band Measurement	Compliance
15.203	Antenna Requirement	Compliance

NOTE:

1. If the Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.
2. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

*Test Lab Information Reference

Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

Lab Address:

Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province

Accredited Test Lab Cert 6613.01

The FCC Site Registration No. is 434559; The Designation No. is CN1325.



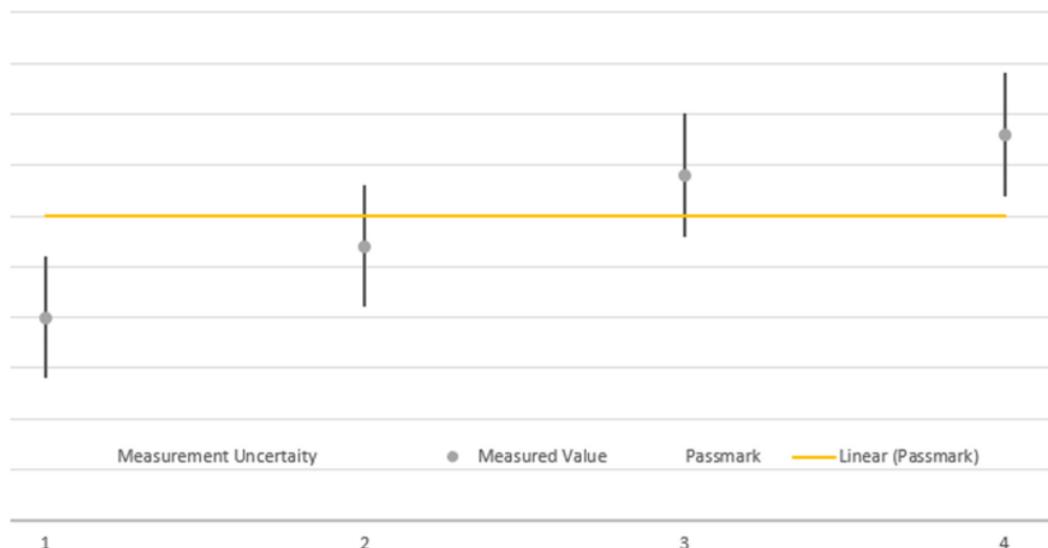
Test Report No.: PSU-QBJ2408220111RF04

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	$\pm 2.70\text{dB}$
Radiated emissions (9KHz~30MHz)	$\pm 2.68\text{dB}$
Radiated emissions (30MHz~1GHz)	$\pm 4.98\text{dB}$
Radiated emissions (1GHz ~6GHz)	$\pm 4.70\text{dB}$
Radiated emissions (6GHz ~18GHz)	$\pm 4.60\text{dB}$
Radiated emissions (18GHz ~40GHz)	$\pm 4.12\text{dB}$
Conducted emissions	$\pm 4.01\text{dB}$
Occupied Channel Bandwidth	$\pm 43.58\text{KHz}$
Conducted Output power	$\pm 2.06\text{dB}$
Power Spectral Density	$\pm 0.85\text{ dB}$

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



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	above pass mark	within pass mark	Failed
4	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT*	telematics embedded system ALARM.COM CAR CONNECTOR
BRAND NAME*	MUNIC ALARM.COM
MODEL NAME*	C4D-4MUSAC_V8 ADC-CC110
NOMINAL VOLTAGE*	DC 13.5V/27V
MODULATION TECHNOLOGY	FHSS
MODULATION TYPE	GFSK, 8DPSK, $\pi/4$ DQPSK
OPERATING FREQUENCY	2402MHz~2480MHz
NUMBER OF CHANNEL	79
MAX. OUTPUT POWER	5.13mW (Max. Measured)
ANTENNA TYPE*	Stamped metal antenna, SMD with 0.17dBi gain
HW VERSION*	HC4D-4MUSAC_V8.01
SW VERSION*	SC4D-4MUSAC_V8.01
I/O PORTS*	Refer to user's manual
CABLE SUPPLIED*	N/A

NOTE:

1. *Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
4. Antenna gain and EUT conducted cable loss are provided by the customer, and the laboratory will record the results based on these items that involve these two parameters.
5. The differences between model C4D-4MUSAC_V8 and ADC-CC110 are as following.

Description	1st	2rd
Product name	Telematic Embedded System	ALARM.COM CAR CONNECTOR
Brand Name	MUNIC	ALARM.COM
Model Name	C4D-4MUSAC_V8	ADC-CC110



Test Report No.: PSU-QBJ2408220111RF04

BUREAU VERITAS		Use of a different product name (ALARM.COM CAR CONNECTOR), model name (ADC-CC110) and a different trademark (ALARM.COM) for marketing and client requirements.
Differences	/	

6. List of Accessory:

ACCESSORIES	BRAND	MODEL	SPECIFICATION
Battery	Howell	Li-polymer 552535H	Capacity : Li-ion, 450mAh



Test Report No.: PSU-QBJ2408220111RF04

2.2 DESCRIPTION OF TEST MODES

79 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		



Test Report No.: PSU-QBJ2408220111RF04

2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 4 photograph 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 X axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

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

Where RE<1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission

RE≥1G: Radiated Emission above 1GHz
APCM: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- The following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
-	0 to 78	39	FHSS	π/4-DQPSK	2DH5

RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- The following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
-	0 to 78	0, 39, 78	FHSS	GFSK	1DH5
-	0 to 78	0, 39, 78	FHSS	π/4 DQPSK	2DH5
-	0 to 78	0, 39, 78	FHSS	8DPSK	3DH5



Test Report No.: PSU-QBJ2408220111RF04

BUREAU
VERITAS

POWER LINE CONDUCTED EMISSION TEST:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture) and packet type.
- The following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
-	0 to 78	78	FHSS	$\pi/4$ -DQPSK	2DH5

ANTENNA PORT CONDUCTED MEASUREMENT:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- The following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0, 39, 78	FHSS	GFSK	DH1/DH3/DH5
0 to 78	0, 39, 78	FHSS	$\pi/4$ DQPSK	2DH1/2DH3/2DH5
0 to 78	0, 39, 78	FHSS	8DPSK	3DH1/3DH3/3DH5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	23deg. C, 70%RH	DC 13.5V/27V By DC Source	Hanwen Xu
RE≥1G	23deg. C, 70%RH	DC 13.5V/27V By DC Source	Hanwen Xu
PLC	25deg. C, 52%RH	DC 13.5V/27V By DC Source	Hanwen Xu
APCM	25deg. C, 60%RH	DC 13.5V/27V By DC Source	Hanwen Xu



Test Report No.: PSU-QBJ2408220111RF04

2.3 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

ANSI C63.10-2020

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.

2.4 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	DC Source	HYELEC	HY3010B	551016	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable, 1.0m;



3 TEST TYPES AND RESULTS

3.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

3.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE 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). Other emissions shall be at least 20dB below the highest level of the desired power.

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB_{uV}/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.



Test Report No.: PSU-QBJ2408220111RF04

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.30,22	Aug.29,24
Pre-Amplifier	R&S	SCU18F1	100815	Aug.29,24	Aug.28,26
Pre-Amplifier	R&S	SCU08F1	101028	Jan.22,24	Jan.21,26
Signal Generator	R&S	SMB100A	182185	Mar.29,24	Mar.28,26
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESW44	101973	Mar.28,24	Mar.27,26
Bilog Antenna	SCHWARZBEC K	VULB 9163	1264	Dec.26,23	Dec.25,25
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.21,24	Aug.20,26
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Jul.15,24	Jul.14,26
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,22	Aug.21,24
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.21,24	Aug.20,26
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.22,24	Feb.21,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun. 19,24	Jun.18,26
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	N/A	N/A
DC Source	HYELEC	HY3010B	551016	Aug.31,22	Aug.30,24
DC Source	HYELEC	HY3010B	551016	Aug.30,24	Aug.29,26
Hygrothermograph	DELI	20210528	SZ014	Sep.06,22	Sep.05,24
Hygrothermograph	DELI	20210528	SZ014	Sep.05,24	Sep.04,26
6DB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A



Test Report No.: PSU-QBJ2408220111RF04

BUREAU VERITAS					
CABLE	R&S	W13.02	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W12.14	N/A	Apr.27,24	Apr.26,25

NOTE:

1. The calibration interval of the above test instruments is 12/ 24/ 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 434559; The Designation No. is CN1325.



3.1.3 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 at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit.
5. All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

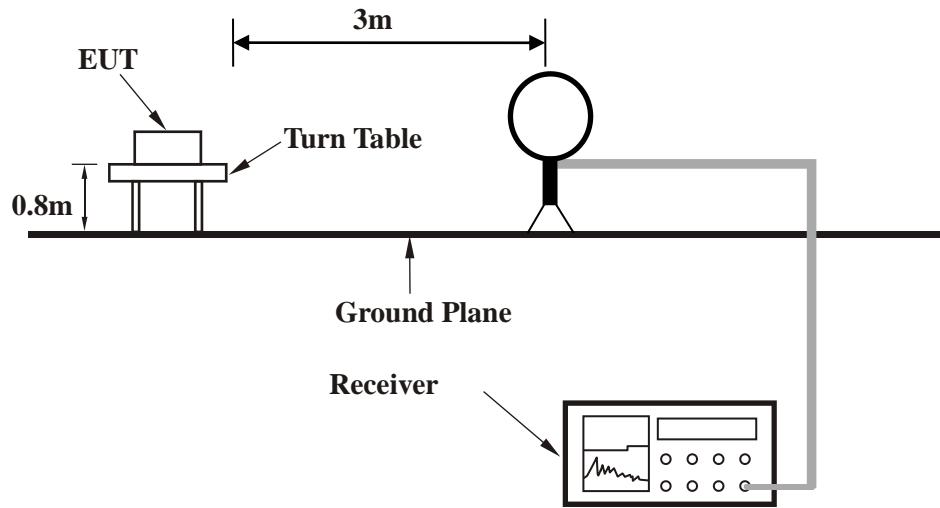


Test Report No.: PSU-QBJ2408220111RF04

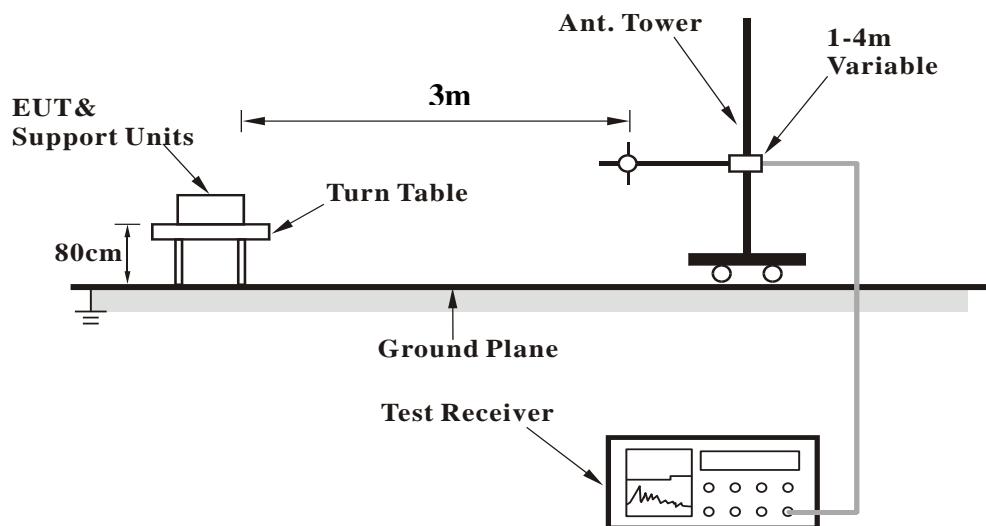
BUREAU
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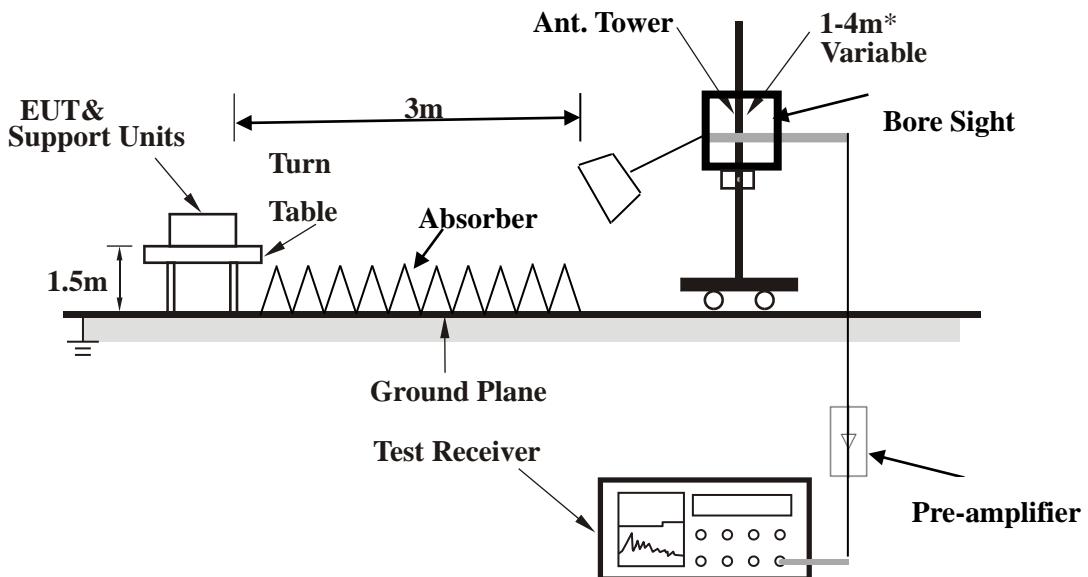
3.1.5 TEST SETUP

<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).

3.1.6 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.



Test Report No.: PSU-QBJ2408220111RF04

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3.1.7 TEST RESULTS

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

BT_π/4-DQPSK

CHANNEL	Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+: QPK Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	43.726	30.56	40.0	9.44	-11.94	H	359.1	1.0
1	59.585	25.57	40.0	14.43	-13.76	H	132.2	1.0
1	92.565	27.46	43.5	16.04	-15.13	H	354.2	2.0
1	195.822	37.03	43.5	6.47	-13.09	H	5.8	1.0
1	367.124	24.2	46.0	21.8	-10.33	H	0.8	2.0
1	598.129	26.85	46.0	19.15	-6.29	H	358.8	1.0



REMARKS:

1. Emission Level(dBuV/m) = Read Level(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 = Limit value – Emission level



Test Report No.: PSU-QBJ2408220111RF04

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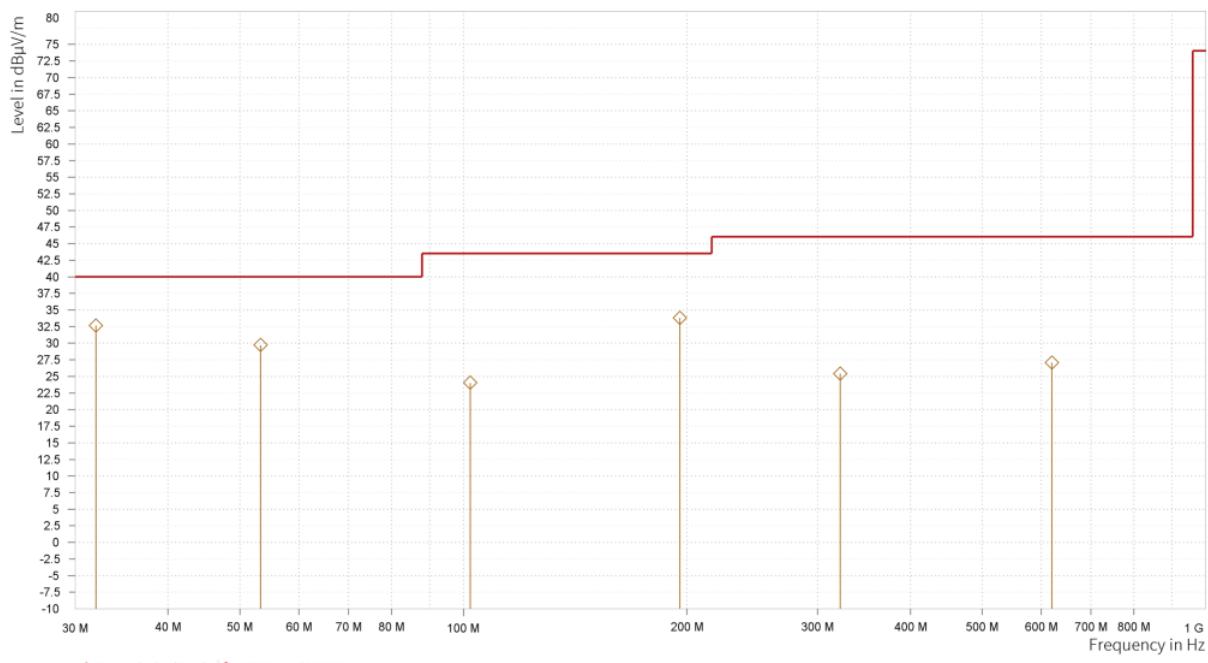
CHANNEL	Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+: QPK Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	31.989	32.64	40.0	7.36	-15.03	V	132.1	1.0
1	53.28	29.71	40.0	10.29	-12.23	V	132.1	1.0
1	102.12	24.04	43.5	19.46	-13.86	V	1.0	1.0
1	195.579	33.81	43.5	9.69	-13.11	V	92.8	2.0
1	321.776	25.42	46.0	20.58	-10.65	V	1.0	1.0
1	620.536	27.06	46.0	18.94	-5.65	V	268.4	1.0

REMARKS:

1. Emission Level(dBuV/m) = Read Level(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 = Limit value – Emission level.





Test Report No.: PSU-QBJ2408220111RF04

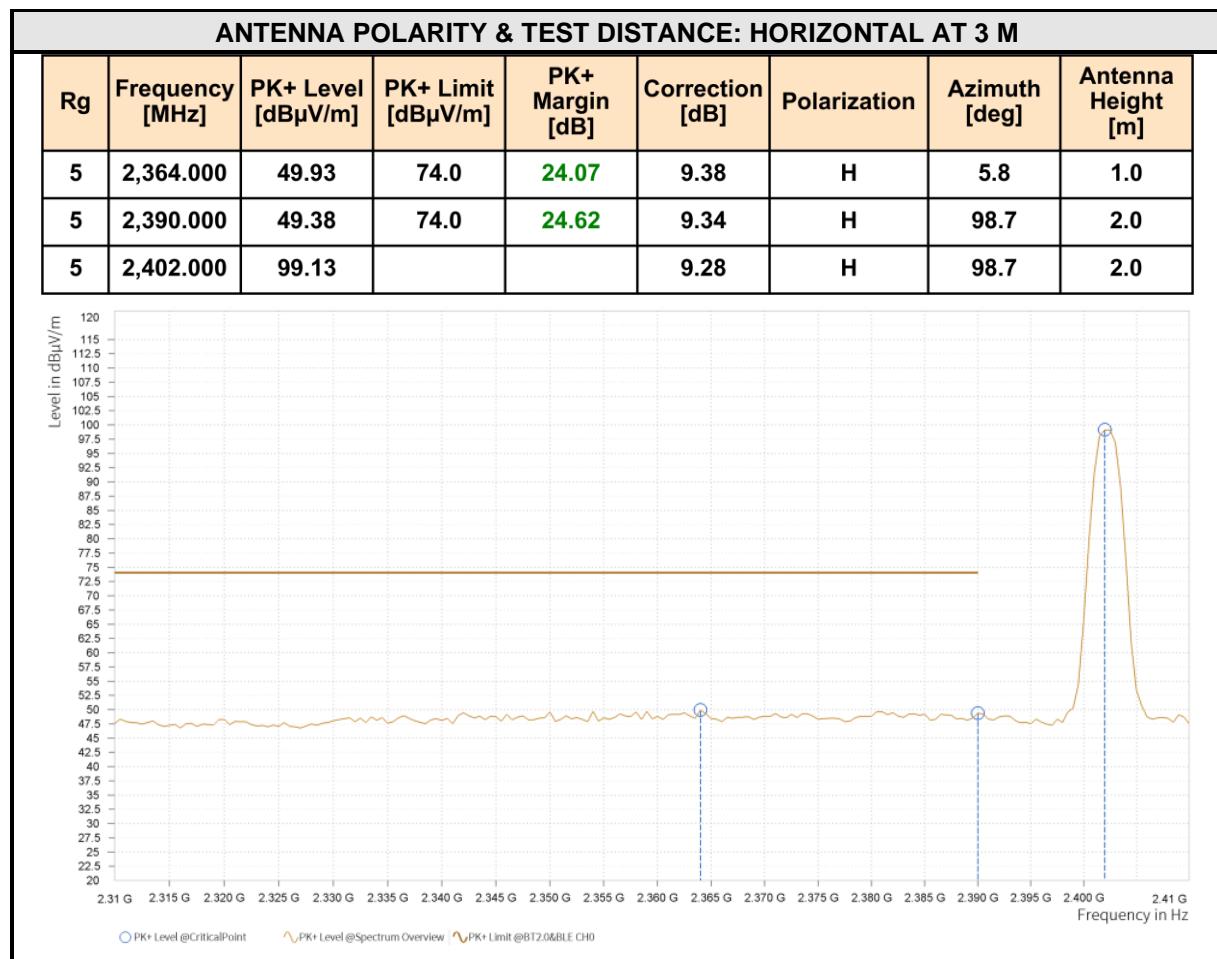
BUREAU
VERITAS

ABOVE 1GHz WORST-CASE DATA:

Note: All other emissions that greater than 20dB below the limit were not recorded.

BT_GFSK

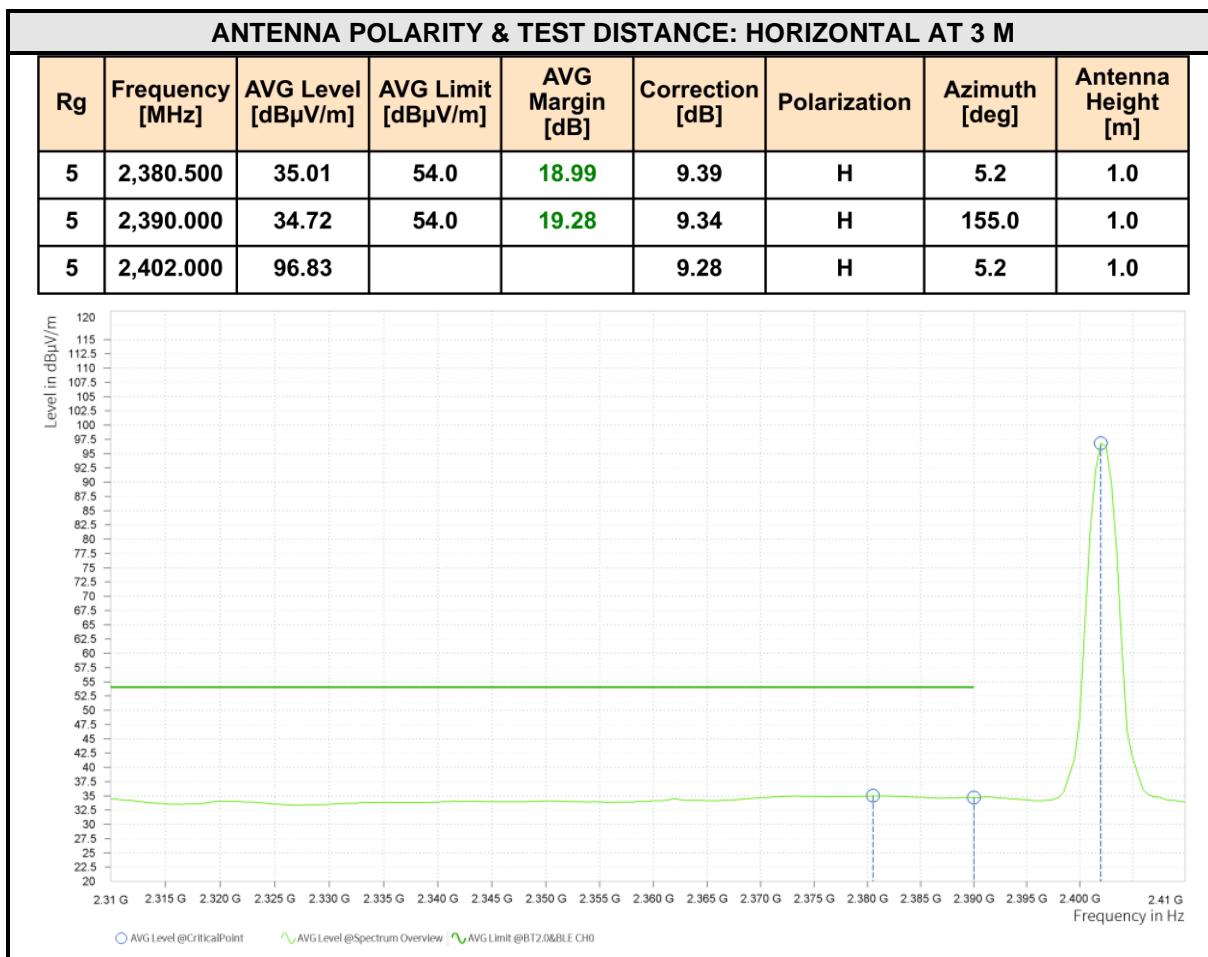
CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)





Test Report No.: PSU-QBJ2408220111RF04

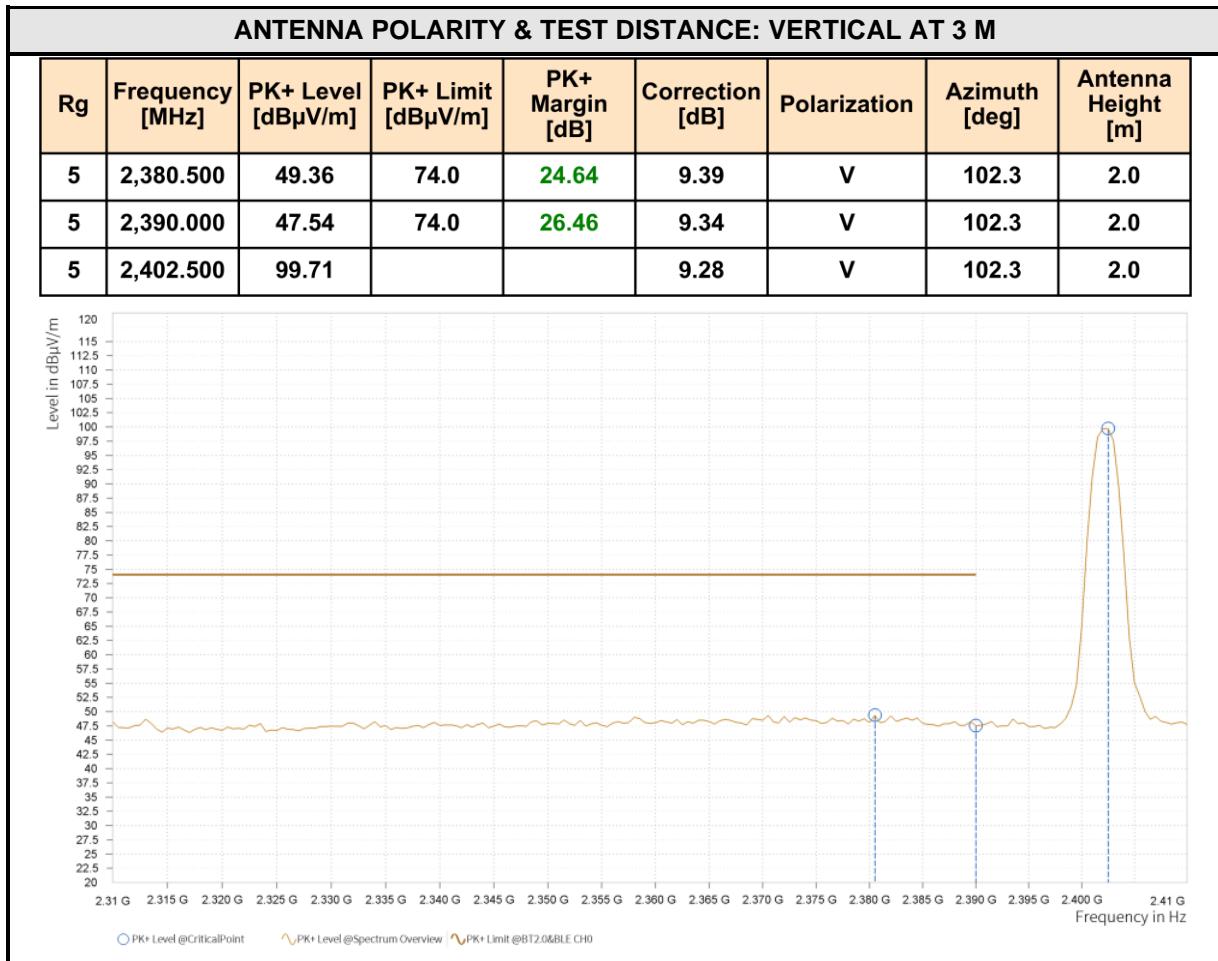
BUREAU
VERITAS





Test Report No.: PSU-QBJ2408220111RF04

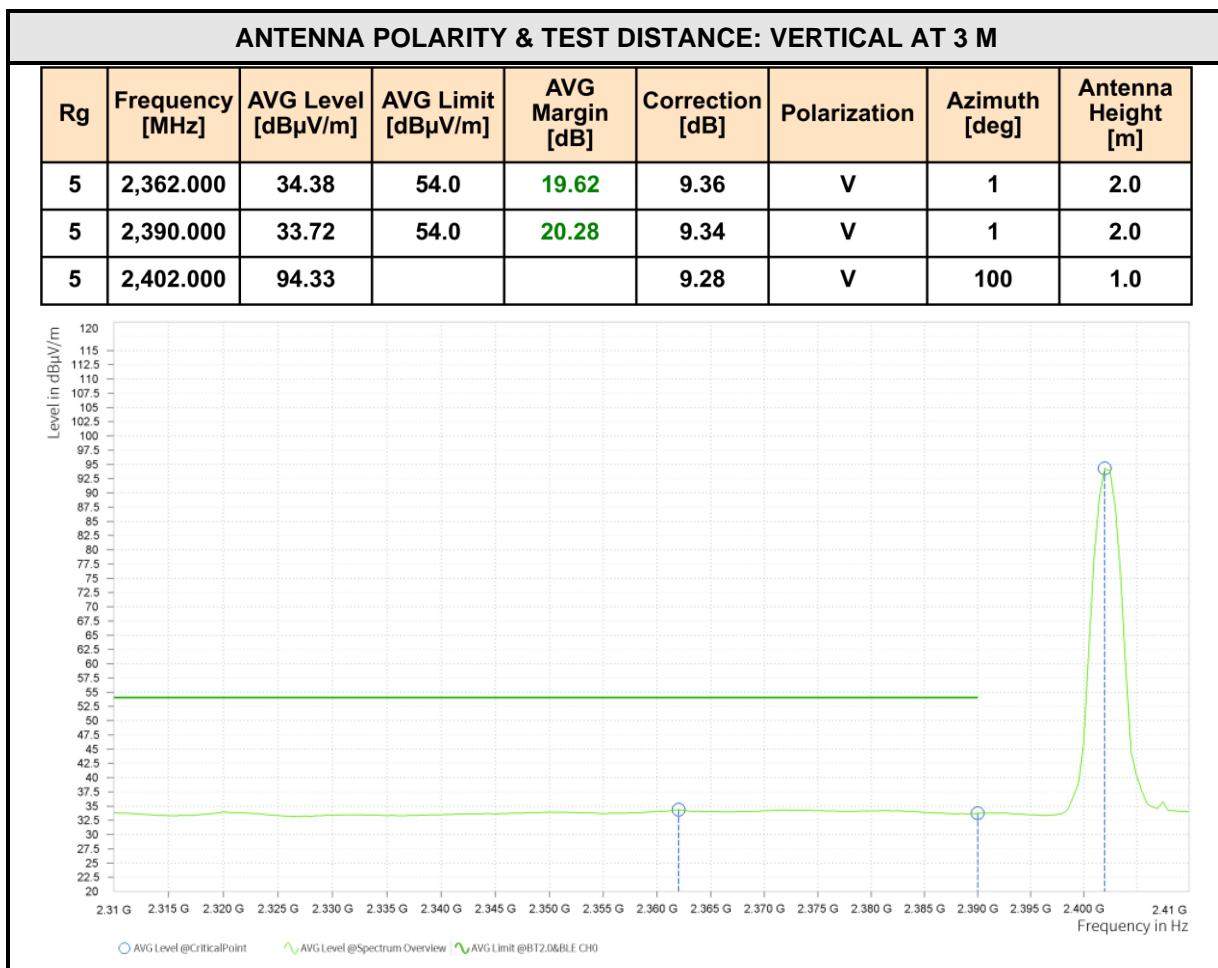
BUREAU
VERITAS





Test Report No.: PSU-QBJ2408220111RF04

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VERITAS



REMARKS:

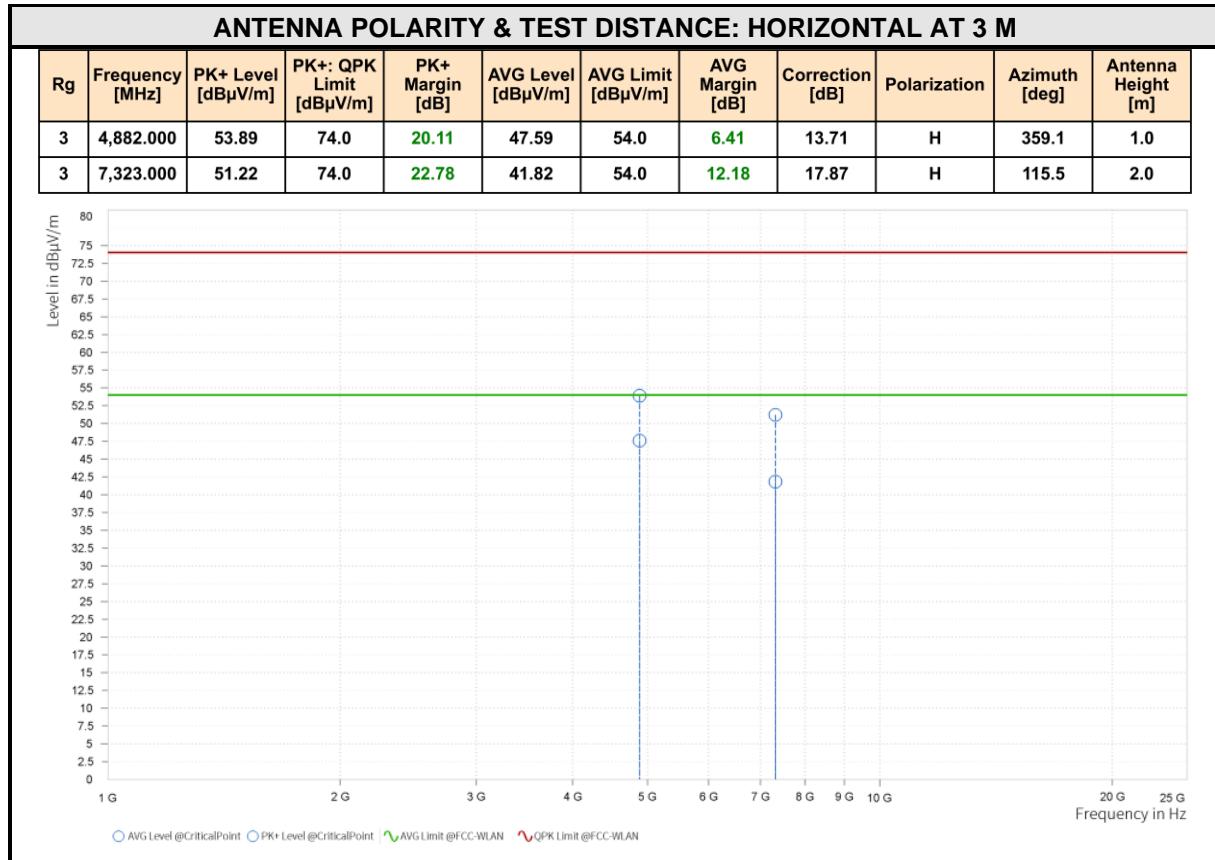
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Limit value - Emission level.
2. 2402MHz: Fundamental frequency.



Test Report No.: PSU-QBJ2408220111RF04

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



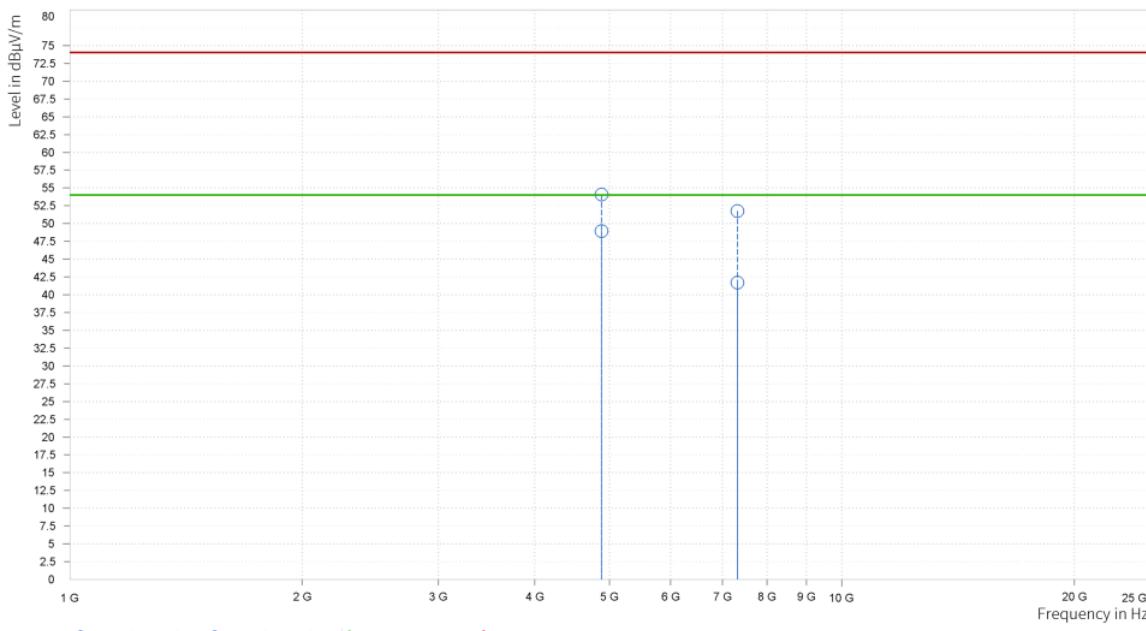


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+: QPK Limit [dB μ V/m]	PK+ Margin [dB]	AVG Level [dB μ V/m]	AVG Limit [dB μ V/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,882.000	54.09	74.0	19.91	48.94	54.0	5.06	13.71	V	1	1.0
3	7,323.000	51.75	74.0	22.25	41.69	54.0	12.31	17.87	V	1	2.0



REMARKS:

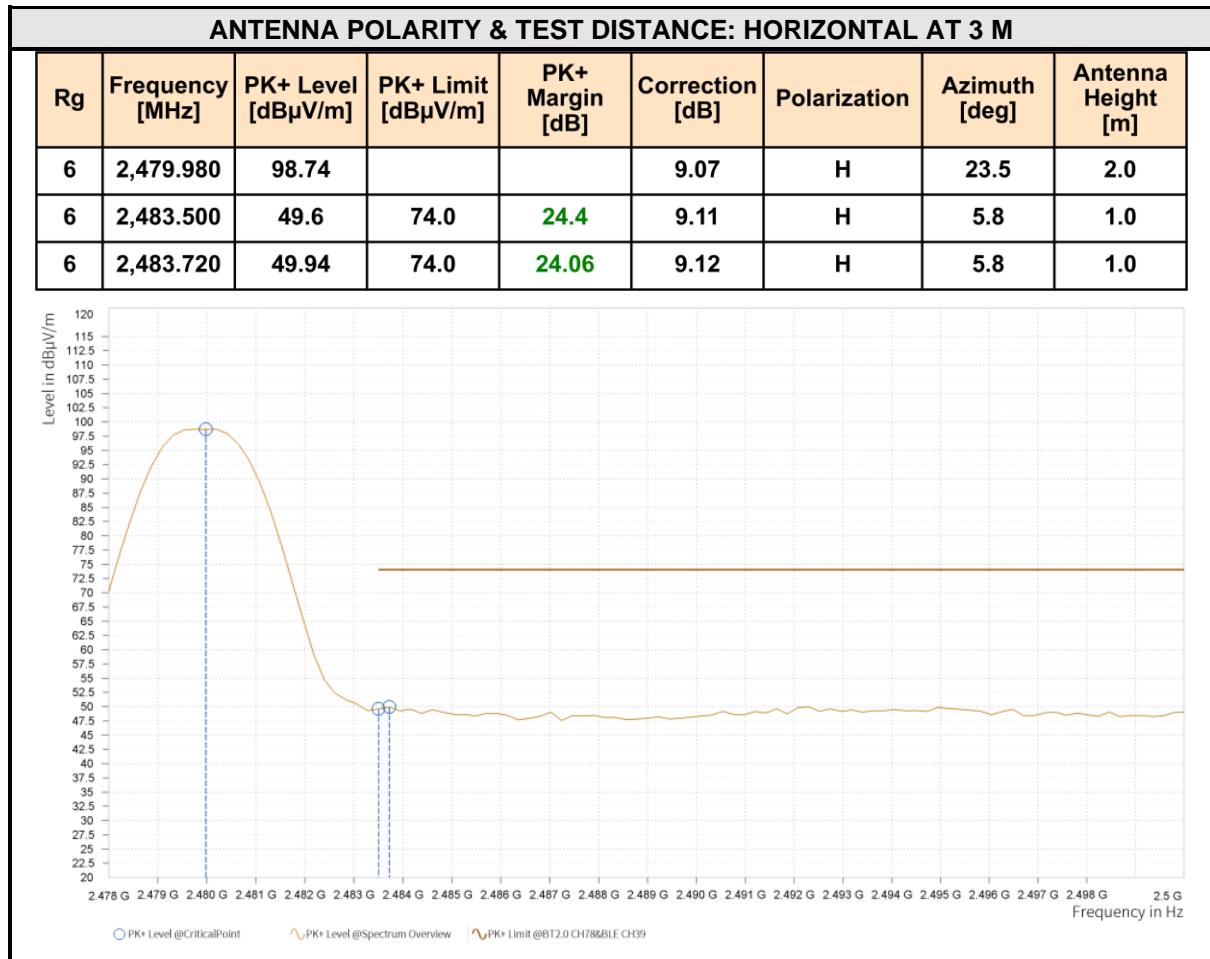
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Limit value – Emission level.
2. 2402MHz: Fundamental frequency.



Test Report No.: PSU-QBJ2408220111RF04

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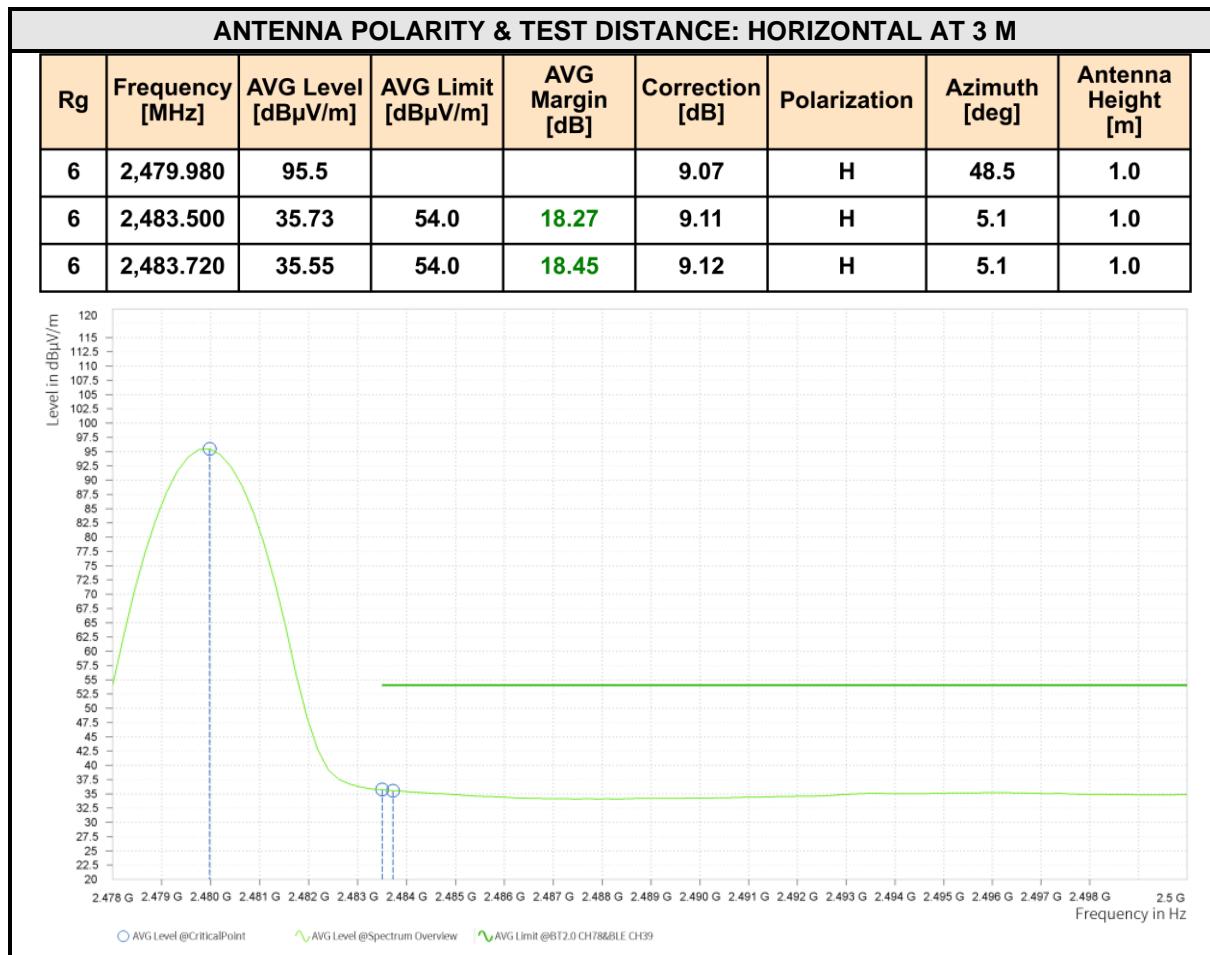
CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)





Test Report No.: PSU-QBJ2408220111RF04

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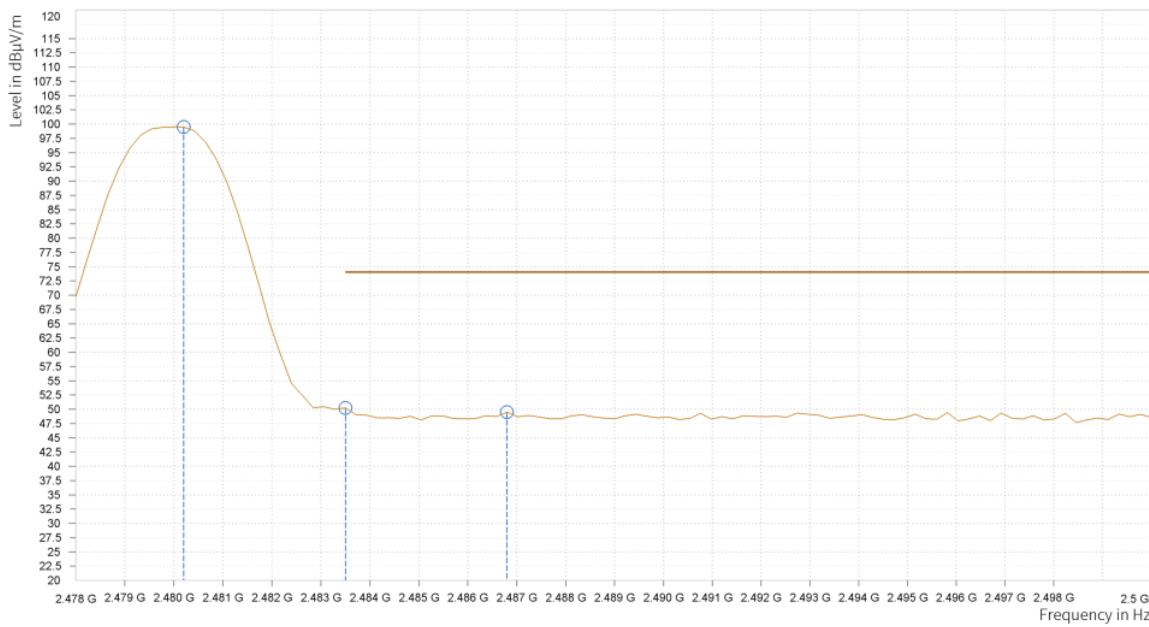


Test Report No.: PSU-QBJ2408220111RF04

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ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,480.200	99.49			9.07	V	68.9	2.0
6	2,483.500	50.25	74.0	23.75	9.11	V	354.2	2.0
6	2,486.800	49.48	74.0	24.52	9.15	V	99.9	1.0



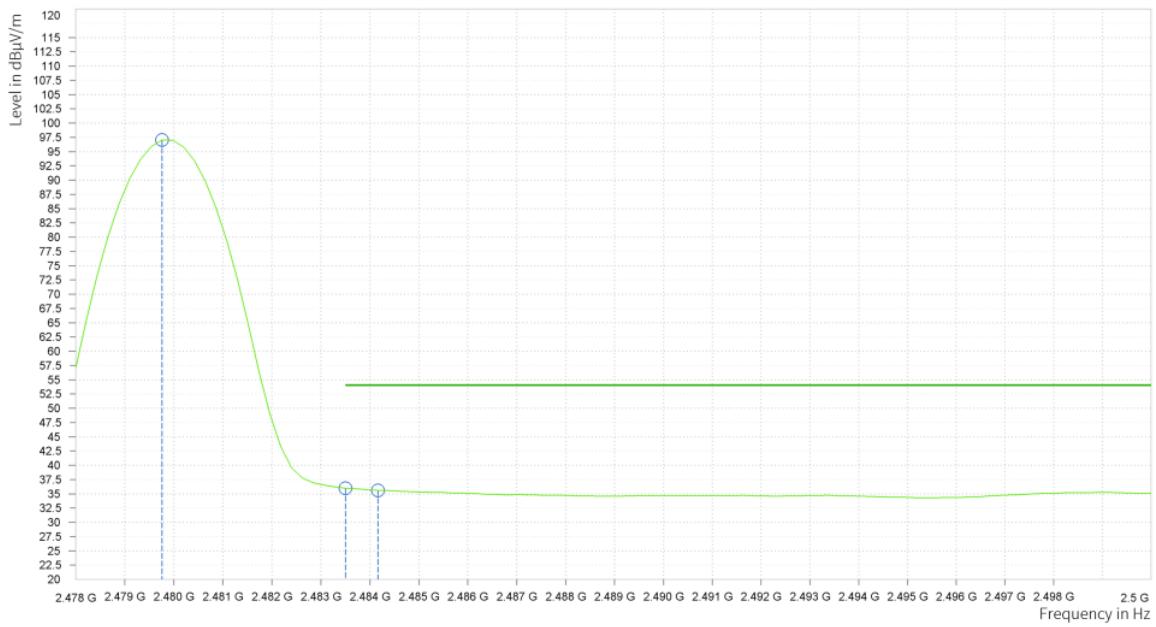


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dB μ V/m]	AVG Limit [dB μ V/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.760	97.03			9.07	V	239.9	2.0
6	2,483.500	35.98	54.0	18.02	9.11	V	290.0	2.0
6	2,484.160	35.6	54.0	18.4	9.12	V	290.0	2.0



REMARKS:

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

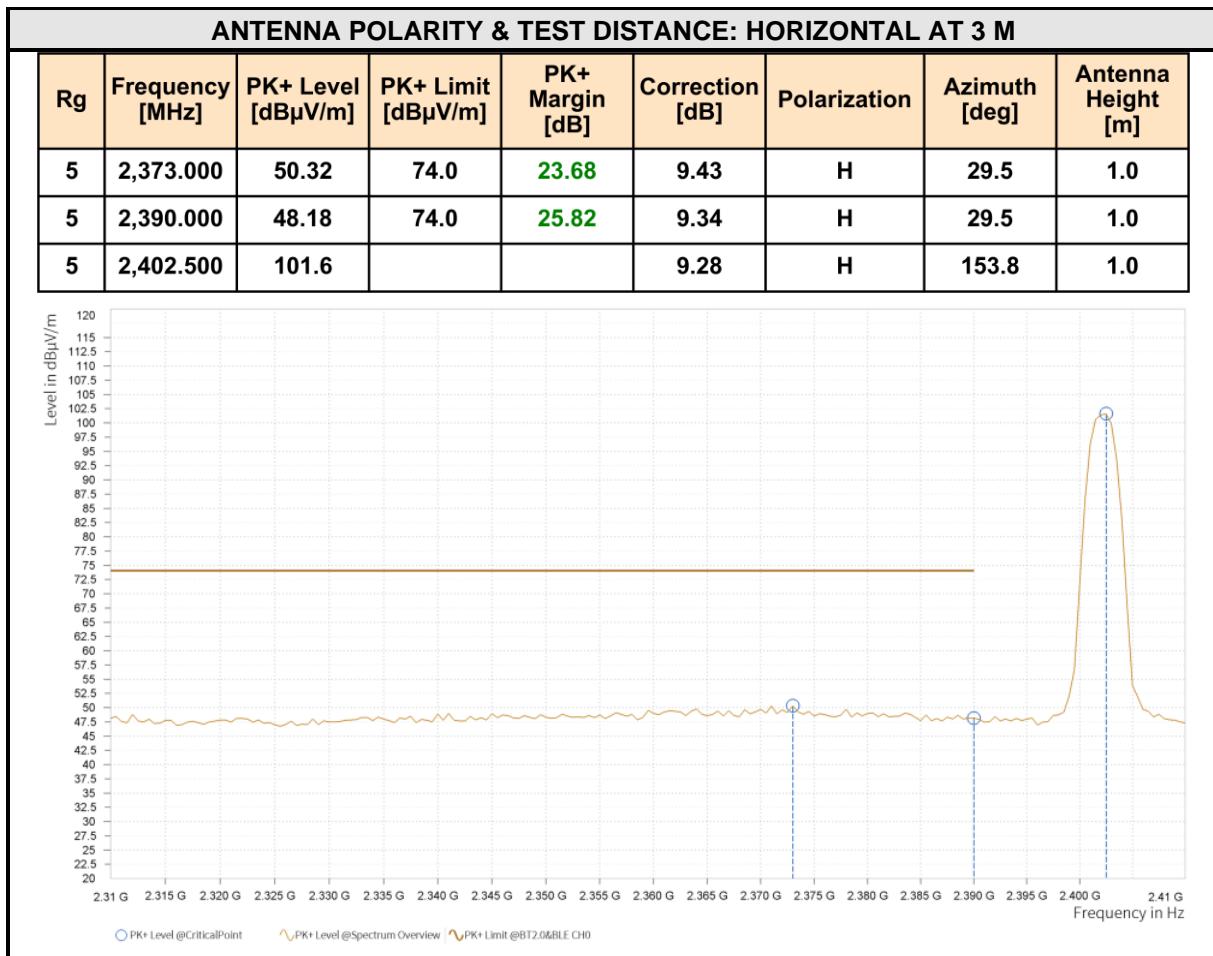


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

BT_π/4-DQPSK

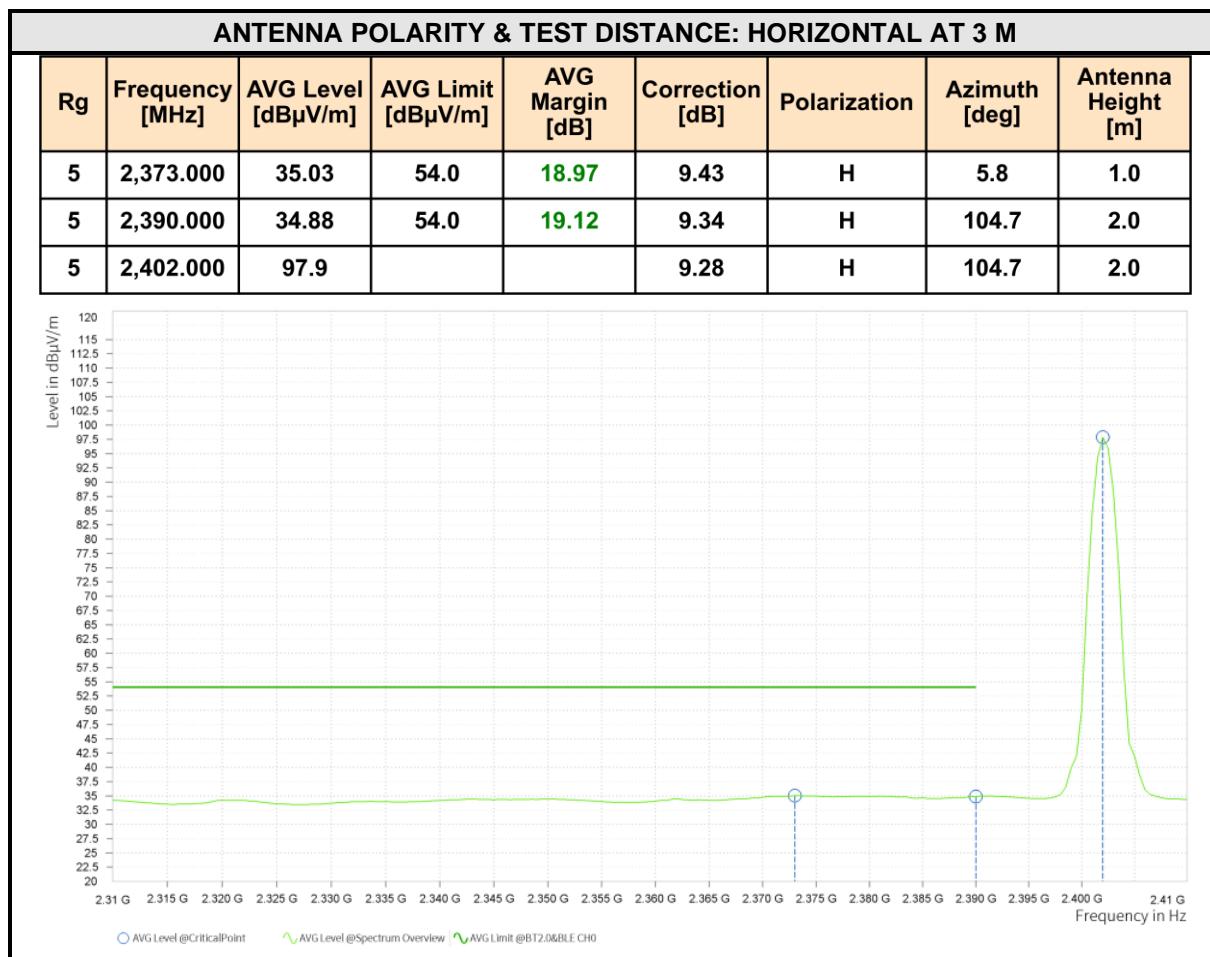
CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)





Test Report No.: PSU-QBJ2408220111RF04

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VERITAS



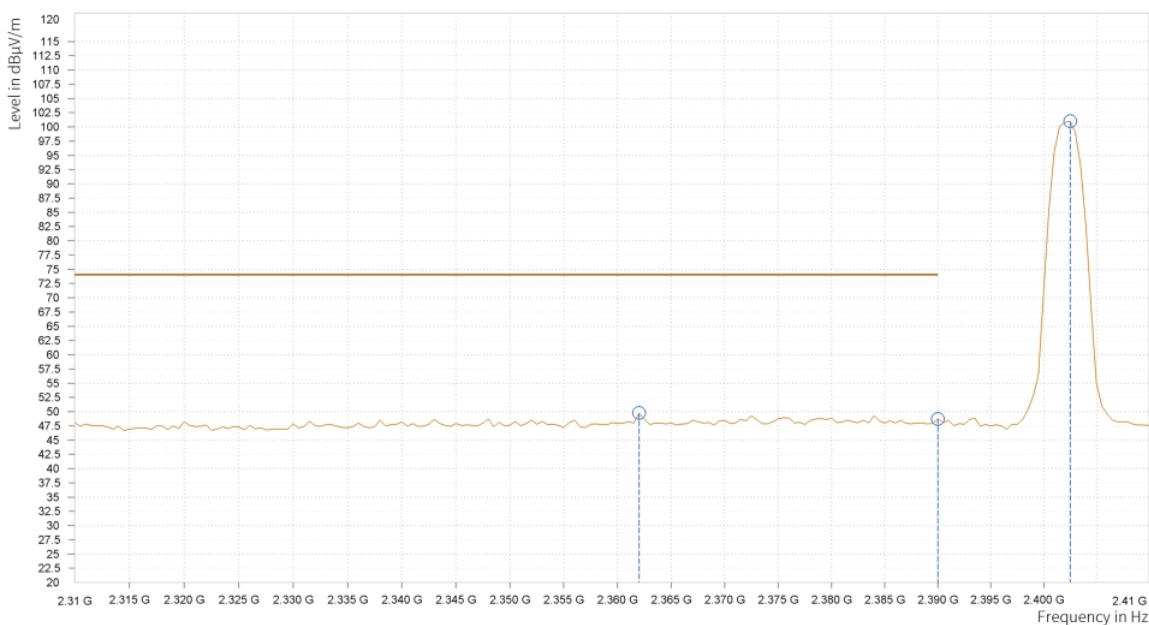


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

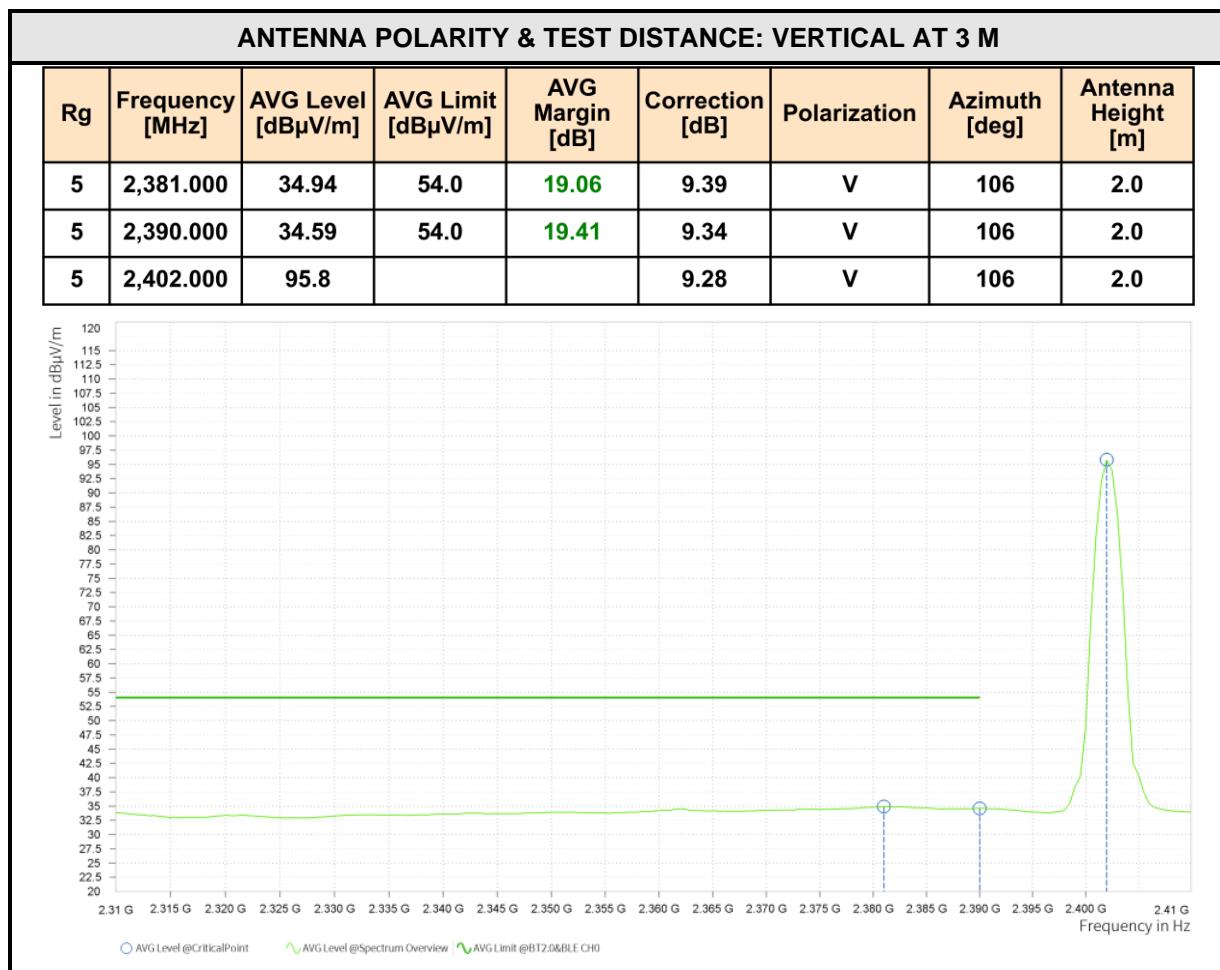
Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,362.000	49.76	74.0	24.24	9.36	V	0.9	2.0
5	2,390.000	48.73	74.0	25.27	9.34	V	104.8	2.0
5	2,402.500	101.02			9.28	V	6.5	1.0





Test Report No.: PSU-QBJ2408220111RF04

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VERITAS



REMARKS:

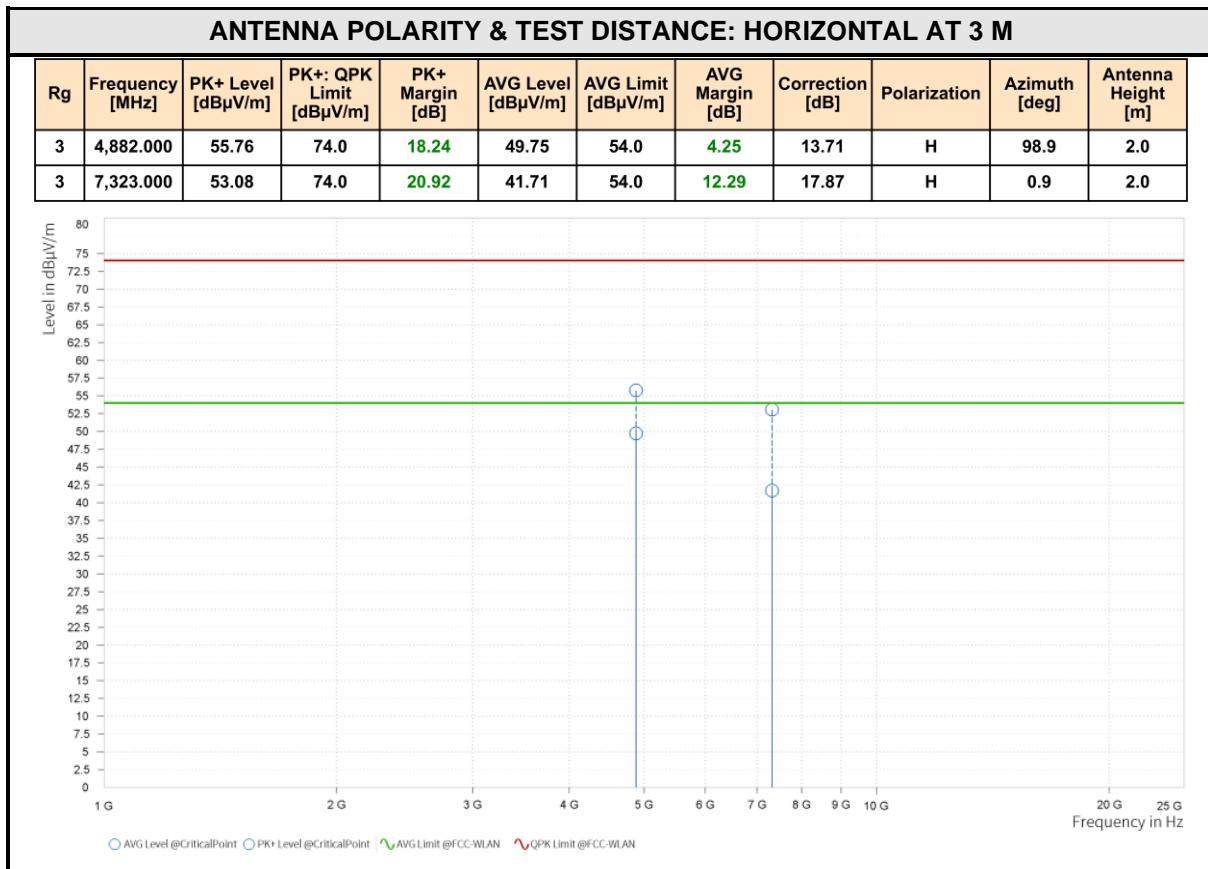
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Limit value - Emission level.
2. 2402MHz: Fundamental frequency.



Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

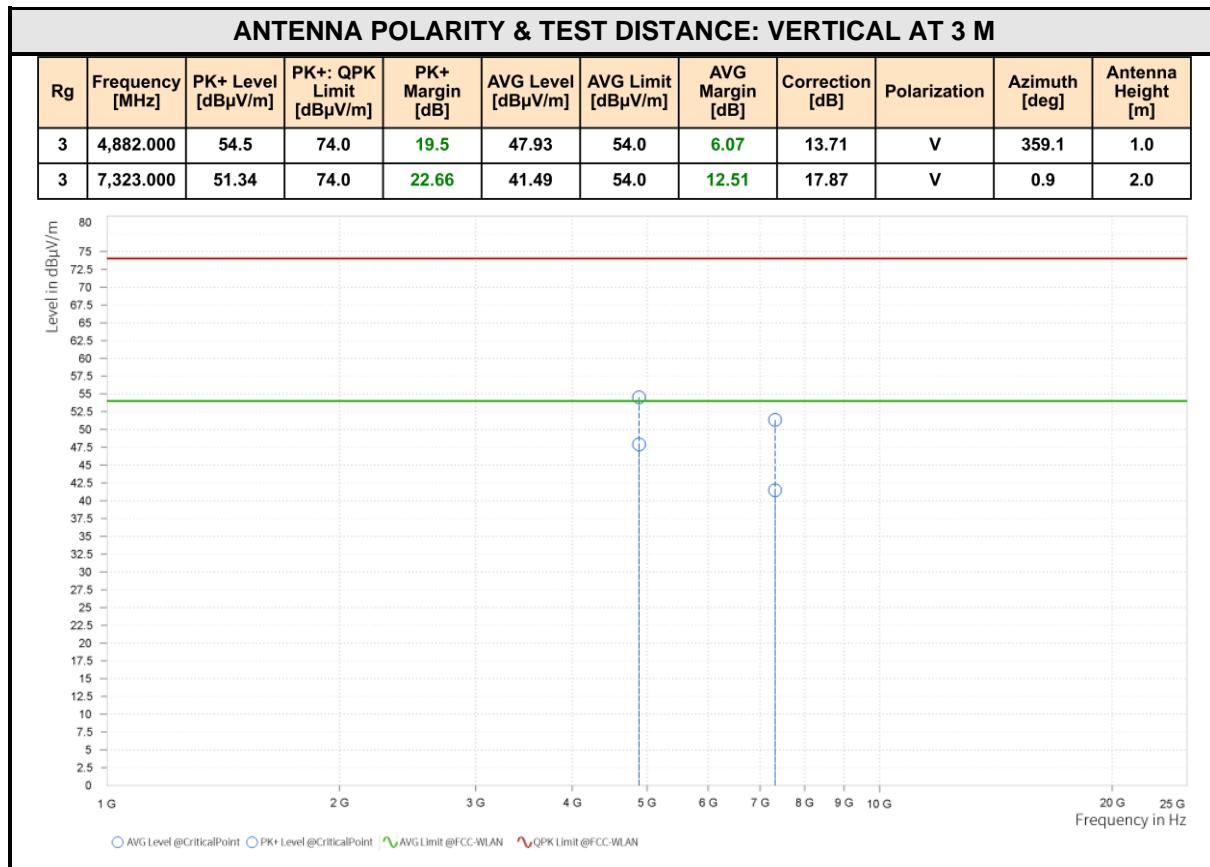
CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		





Test Report No.: PSU-QBJ2408220111RF04

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VERITAS



REMARKS:

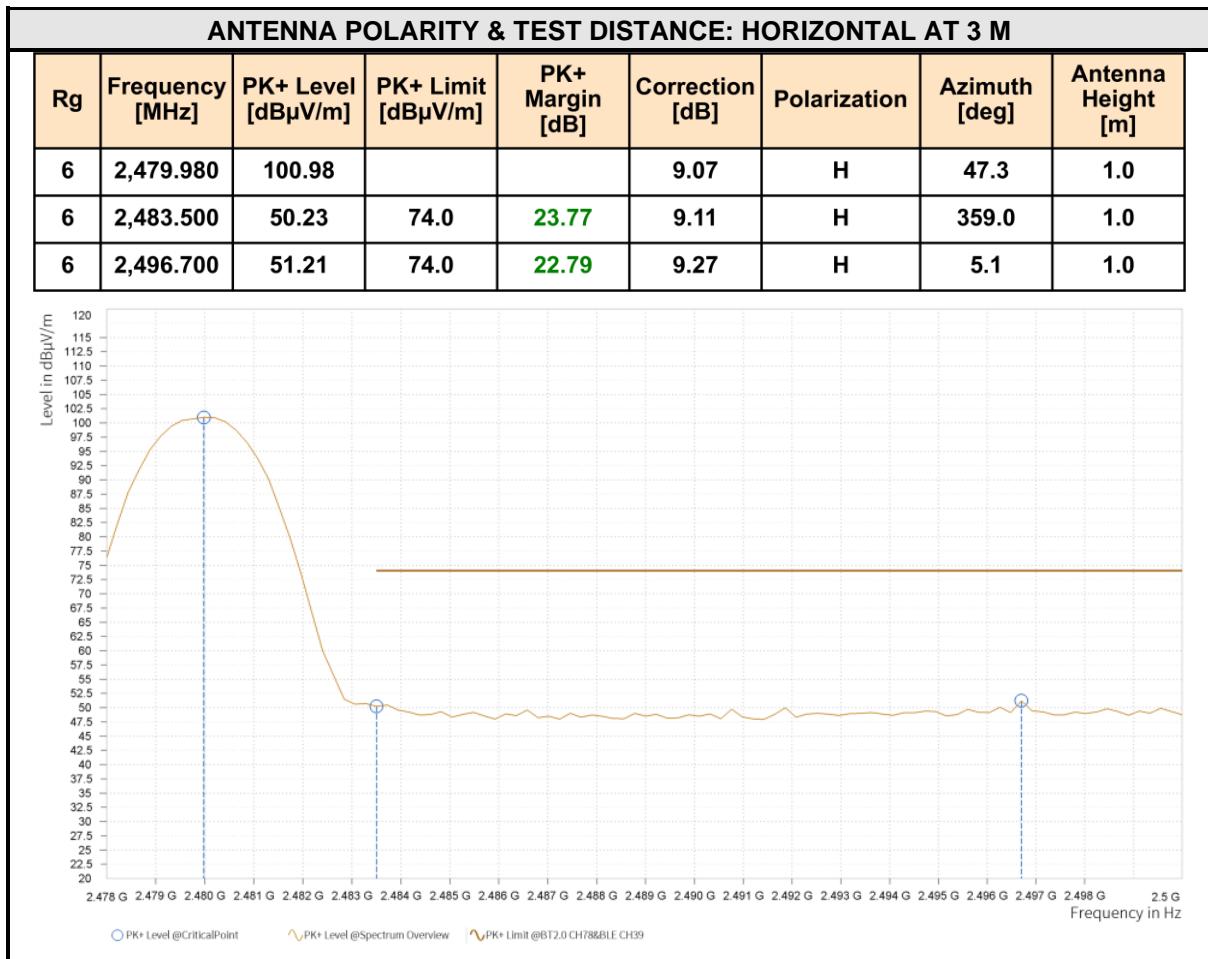
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Limit value – Emission level.
2. 2441MHz: Fundamental frequency.



Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

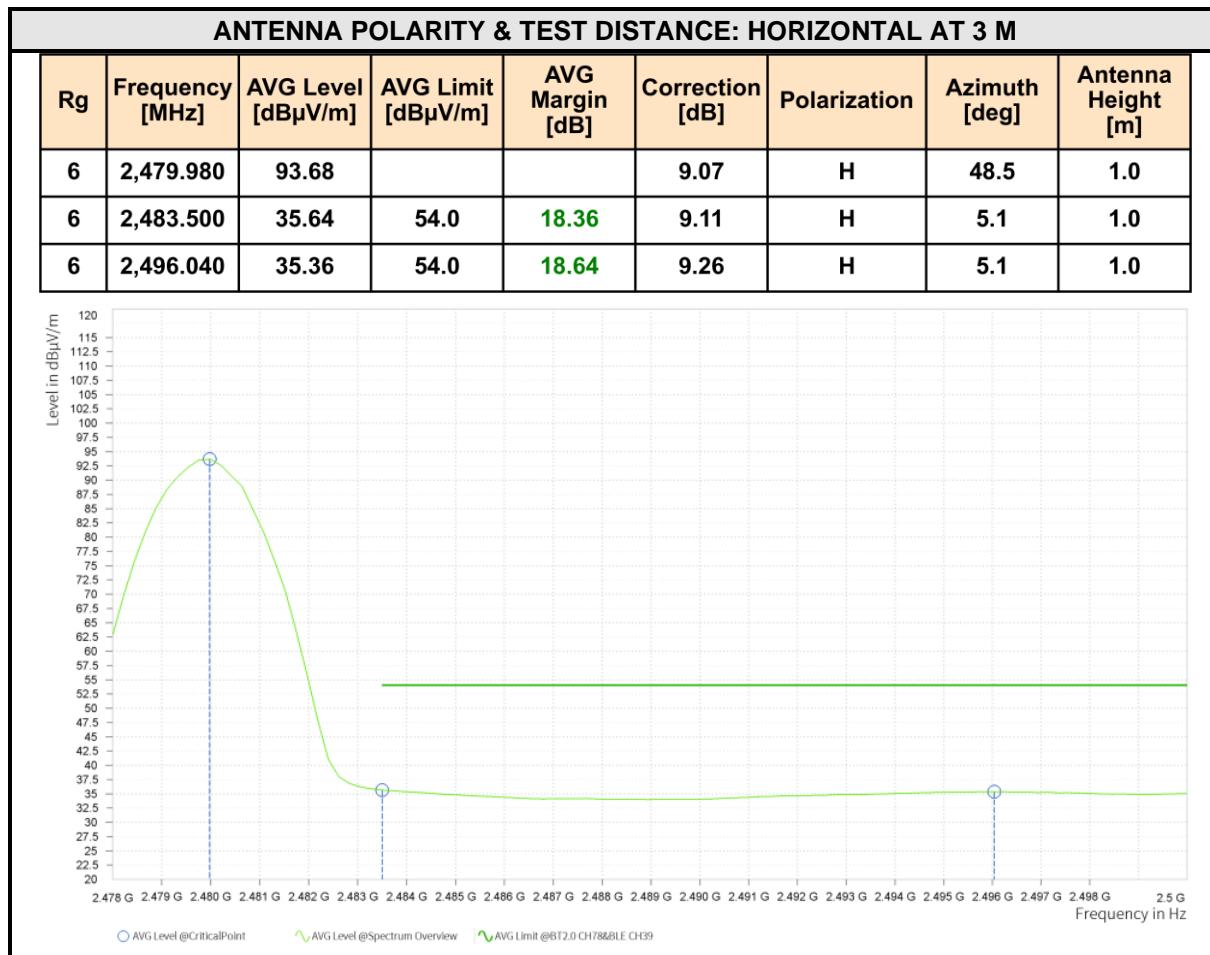
CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		





Test Report No.: PSU-QBJ2408220111RF04

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VERITAS



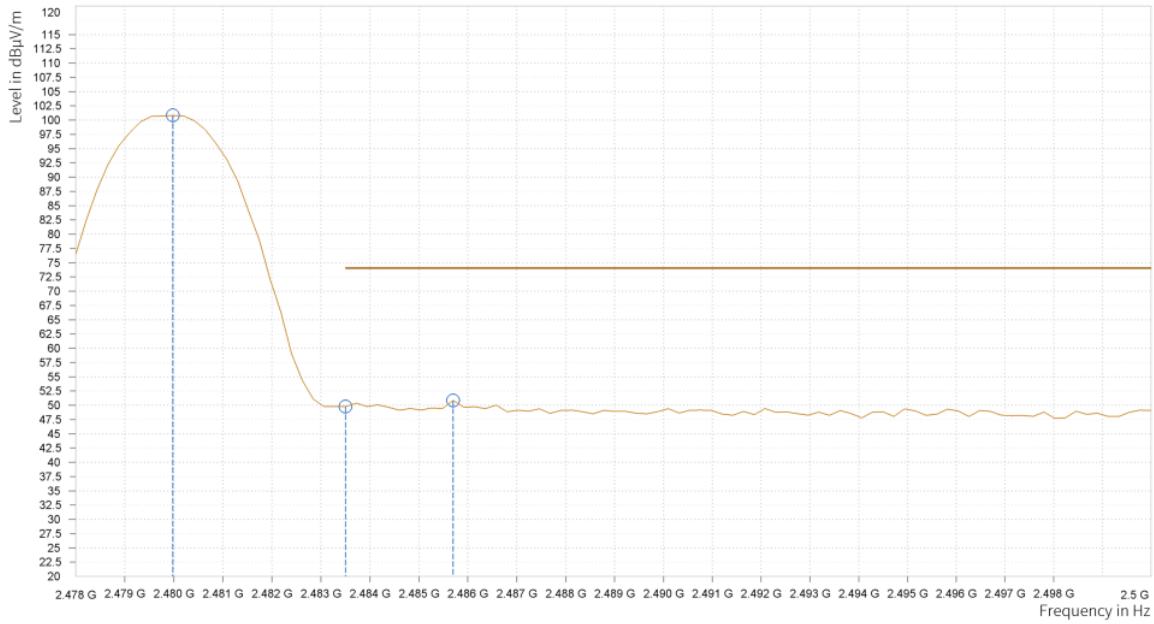


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	100.81			9.07	V	153.8	1.0
6	2,483.500	49.75	74.0	24.25	9.11	V	5.8	1.0
6	2,485.700	50.83	74.0	23.17	9.14	V	255.4	2.0



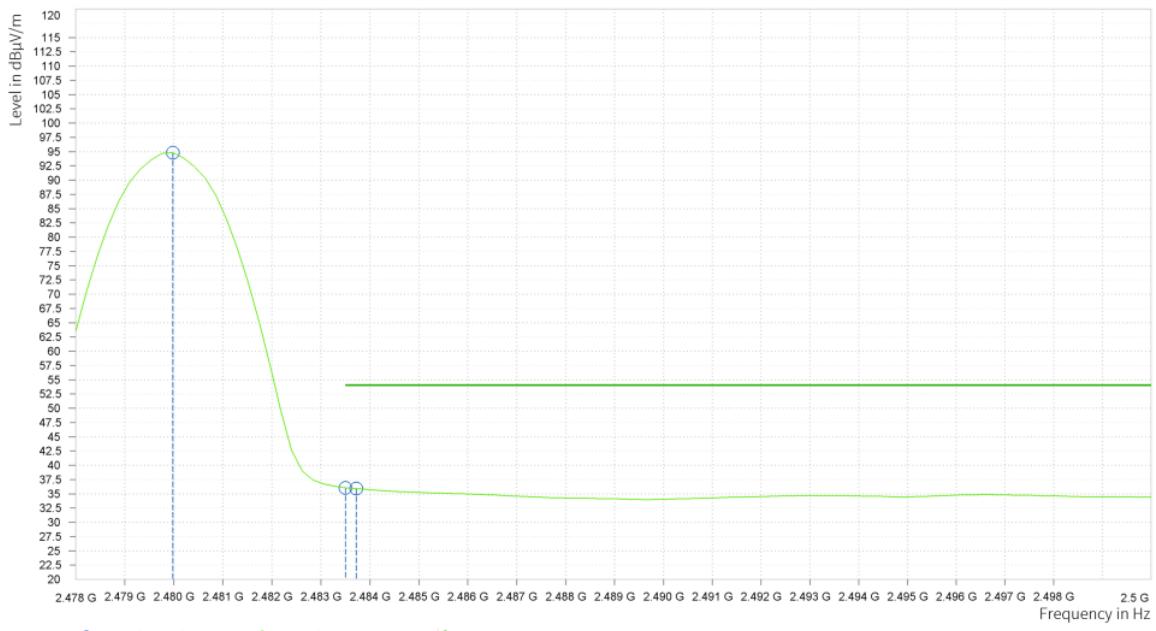


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dB μ V/m]	AVG Limit [dB μ V/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	94.81			9.07	V	258.9	2.0
6	2,483.500	36.05	54.0	17.95	9.11	V	258.9	2.0
6	2,483.720	35.9	54.0	18.1	9.12	V	258.9	2.0



REMARKS:

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

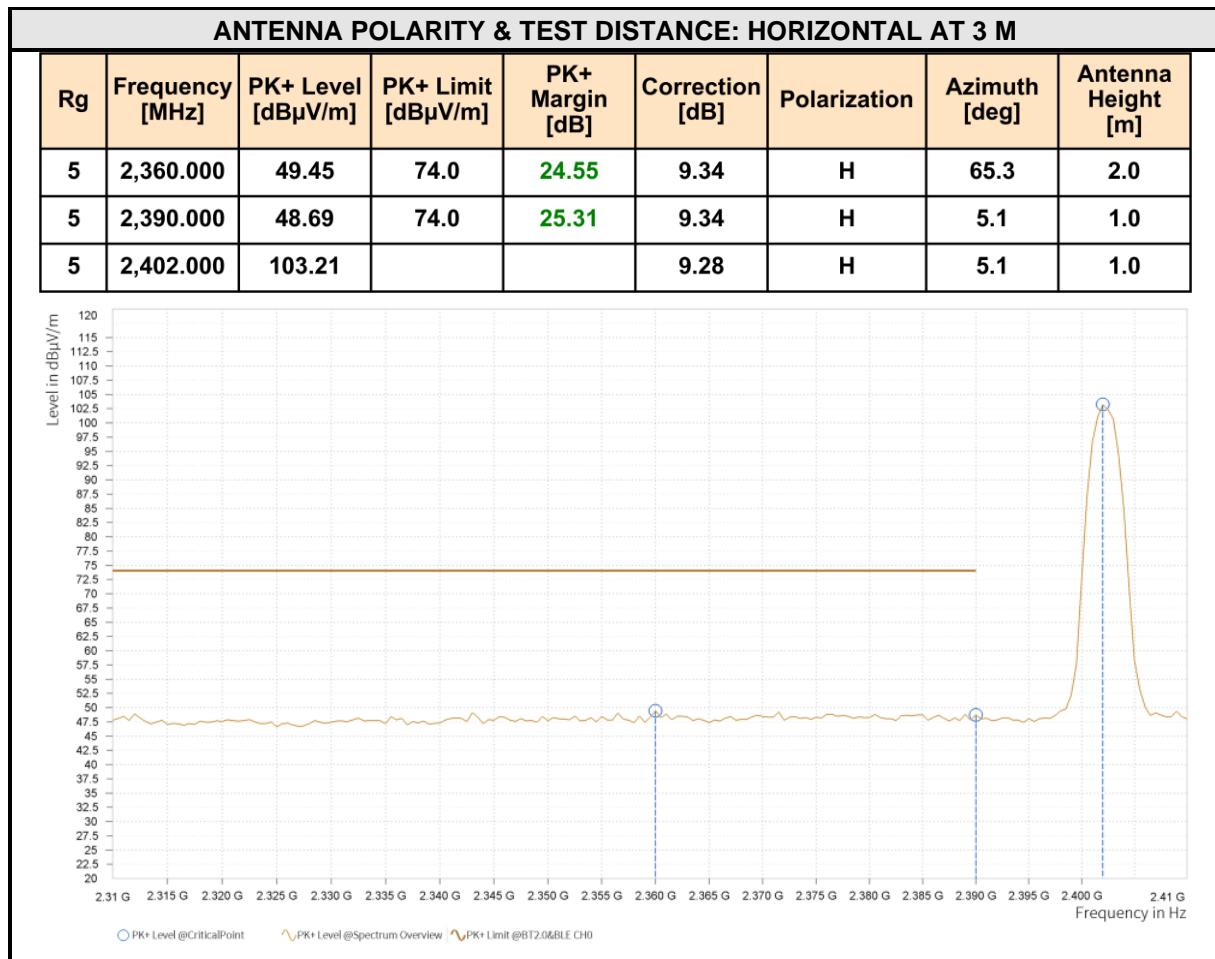


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

BT_8DPSK

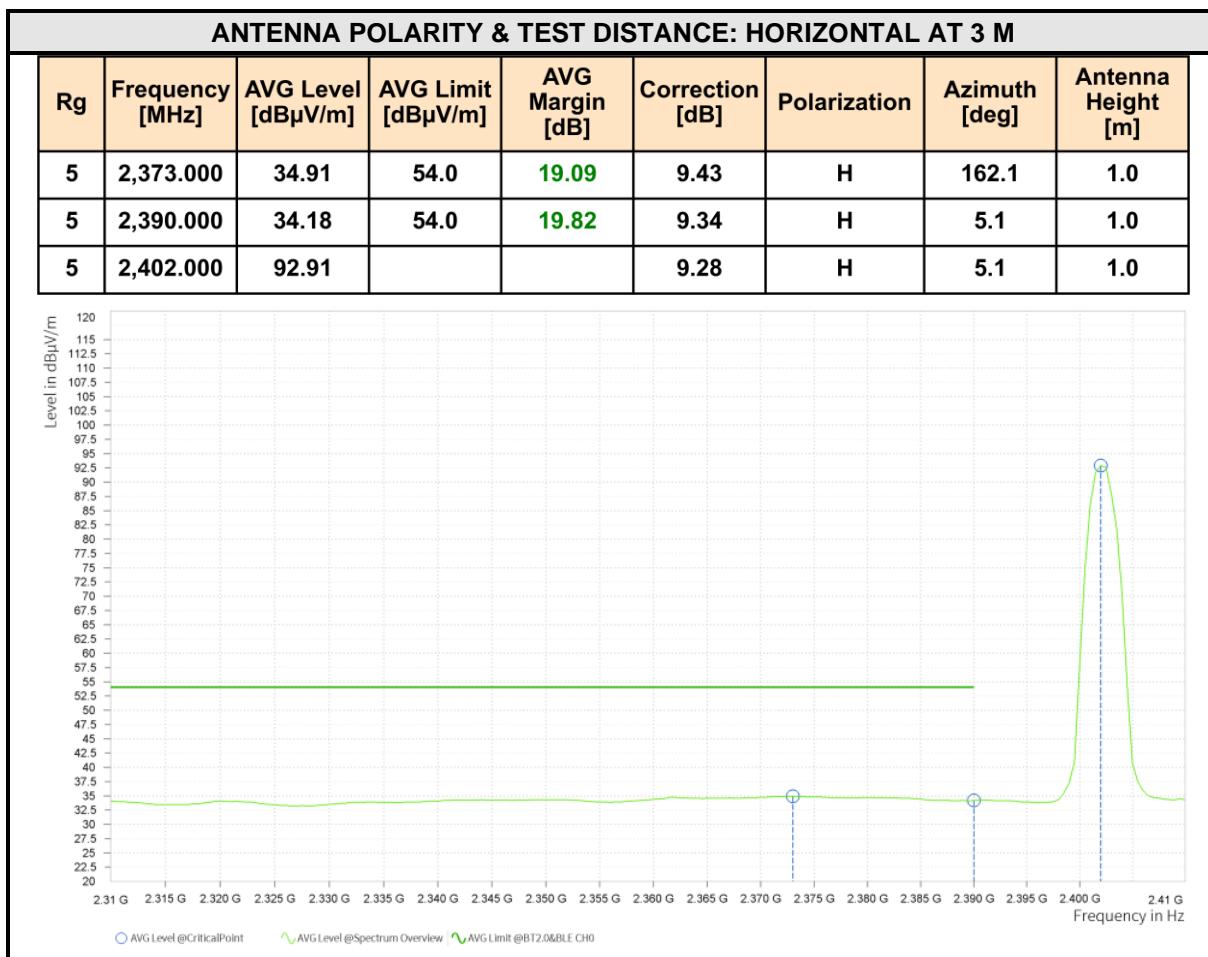
CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)





Test Report No.: PSU-QBJ2408220111RF04

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VERITAS



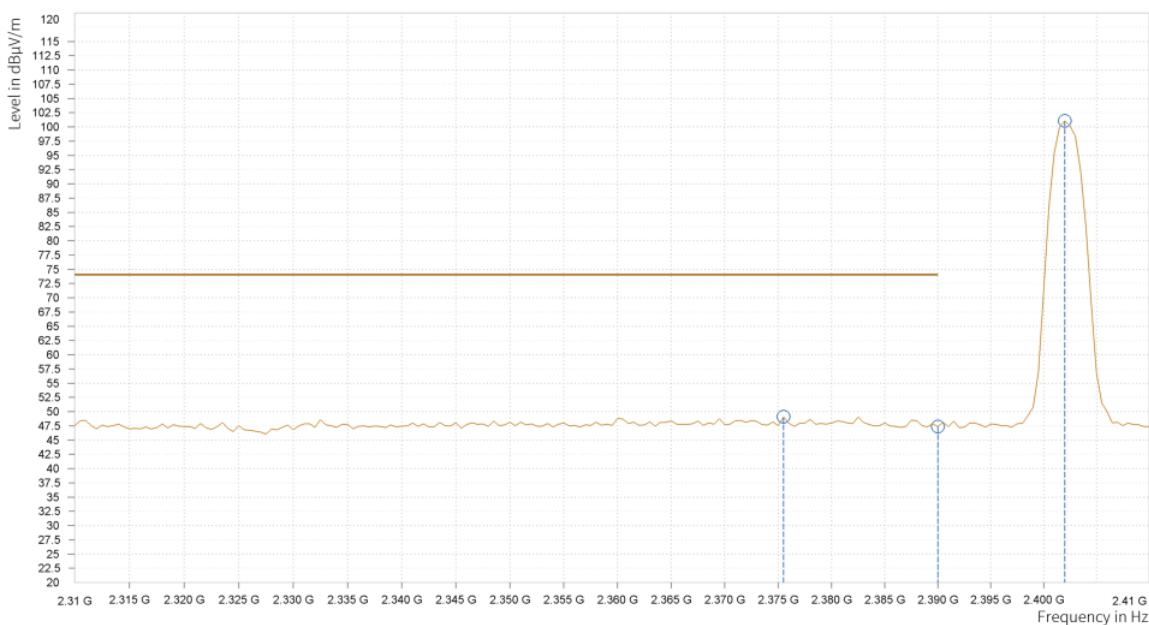


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

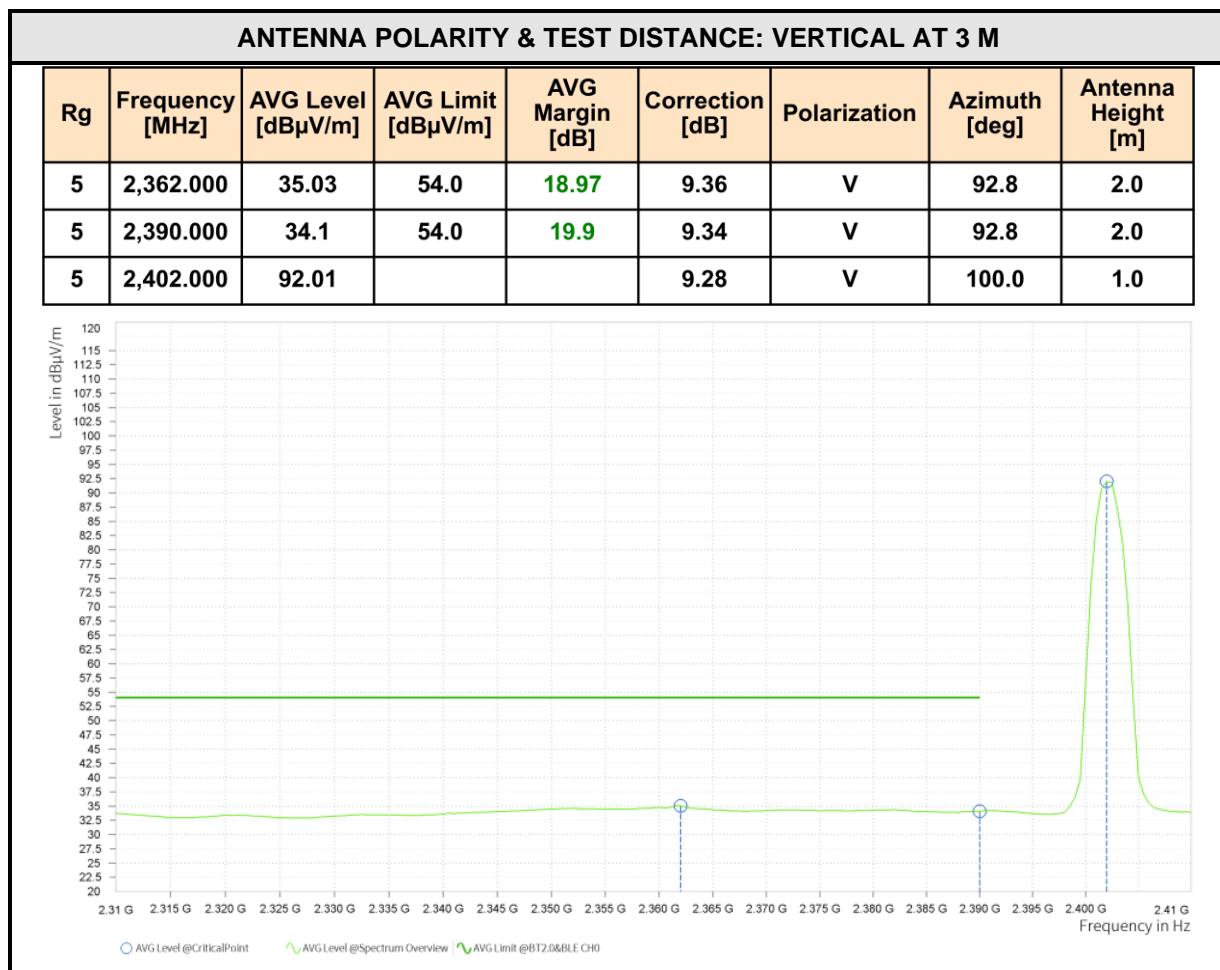
Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,375.500	49.08	74.0	24.92	9.42	V	355.5	2.0
5	2,390.000	47.35	74.0	26.65	9.34	V	355.5	2.0
5	2,402.000	101.08			9.28	V	49.7	1.0





Test Report No.: PSU-QBJ2408220111RF04

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VERITAS



REMARKS:

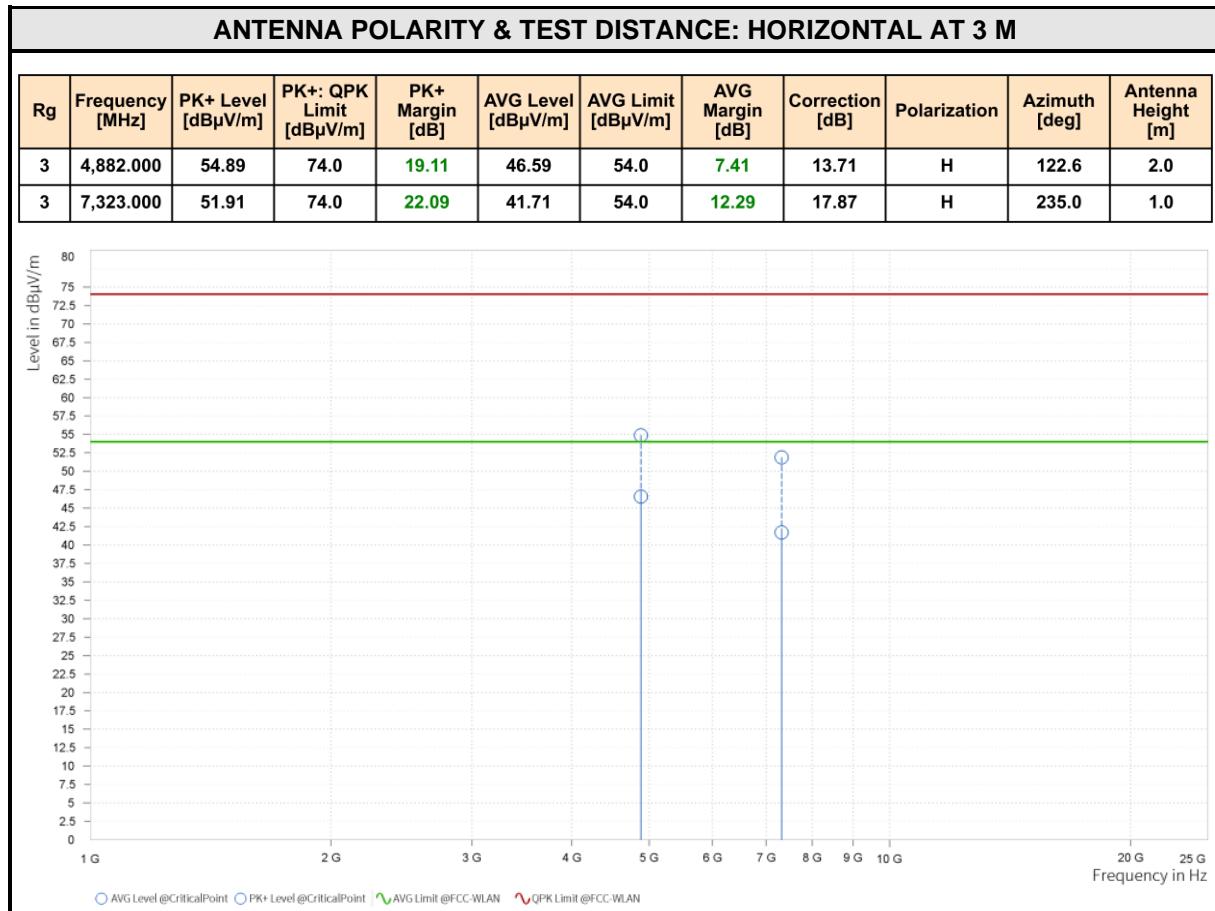
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Limit value – Emission level.
2. 2402MHz: Fundamental frequency.



Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

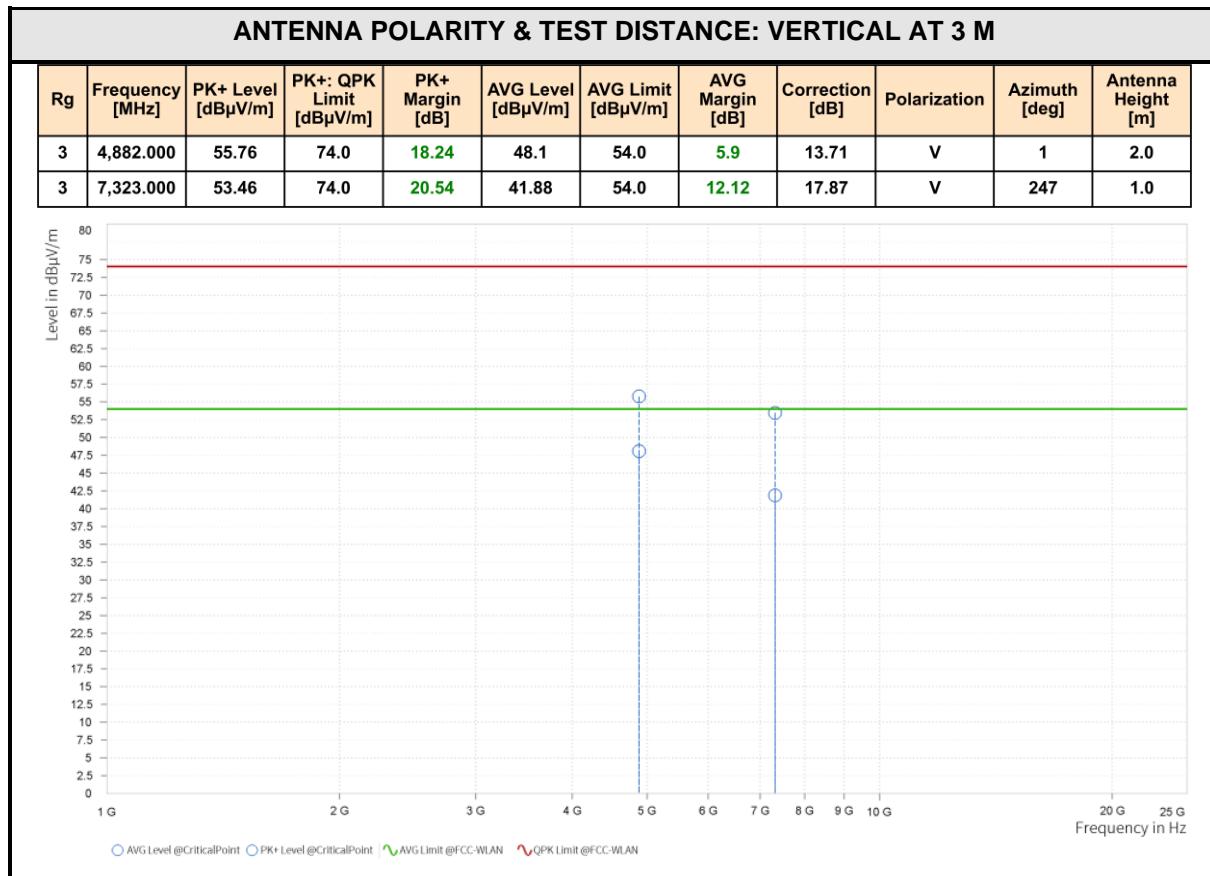
CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)





Test Report No.: PSU-QBJ2408220111RF04

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VERITAS



REMARKS:

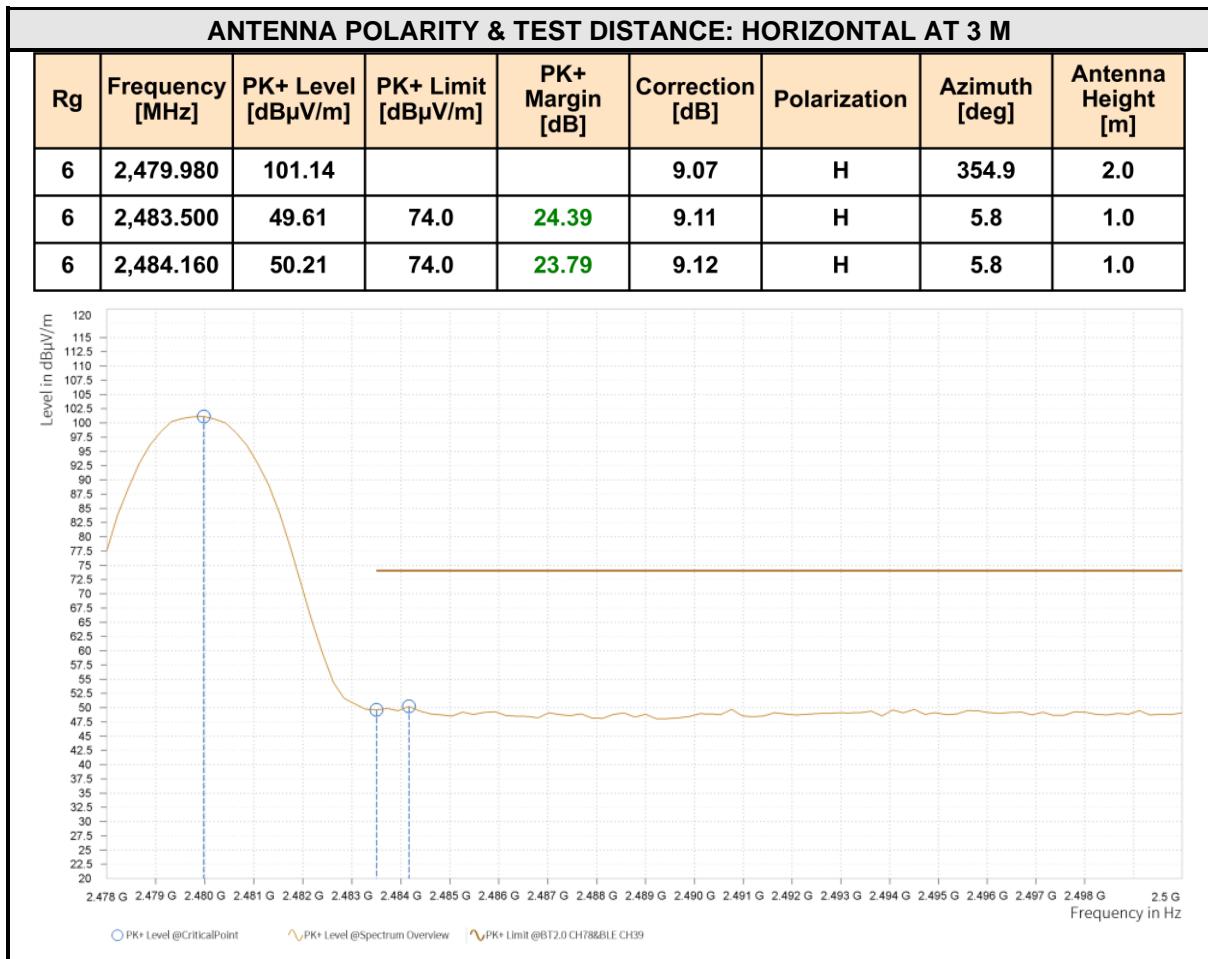
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Limit value - Emission level.
2. 2441MHz: Fundamental frequency.



Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

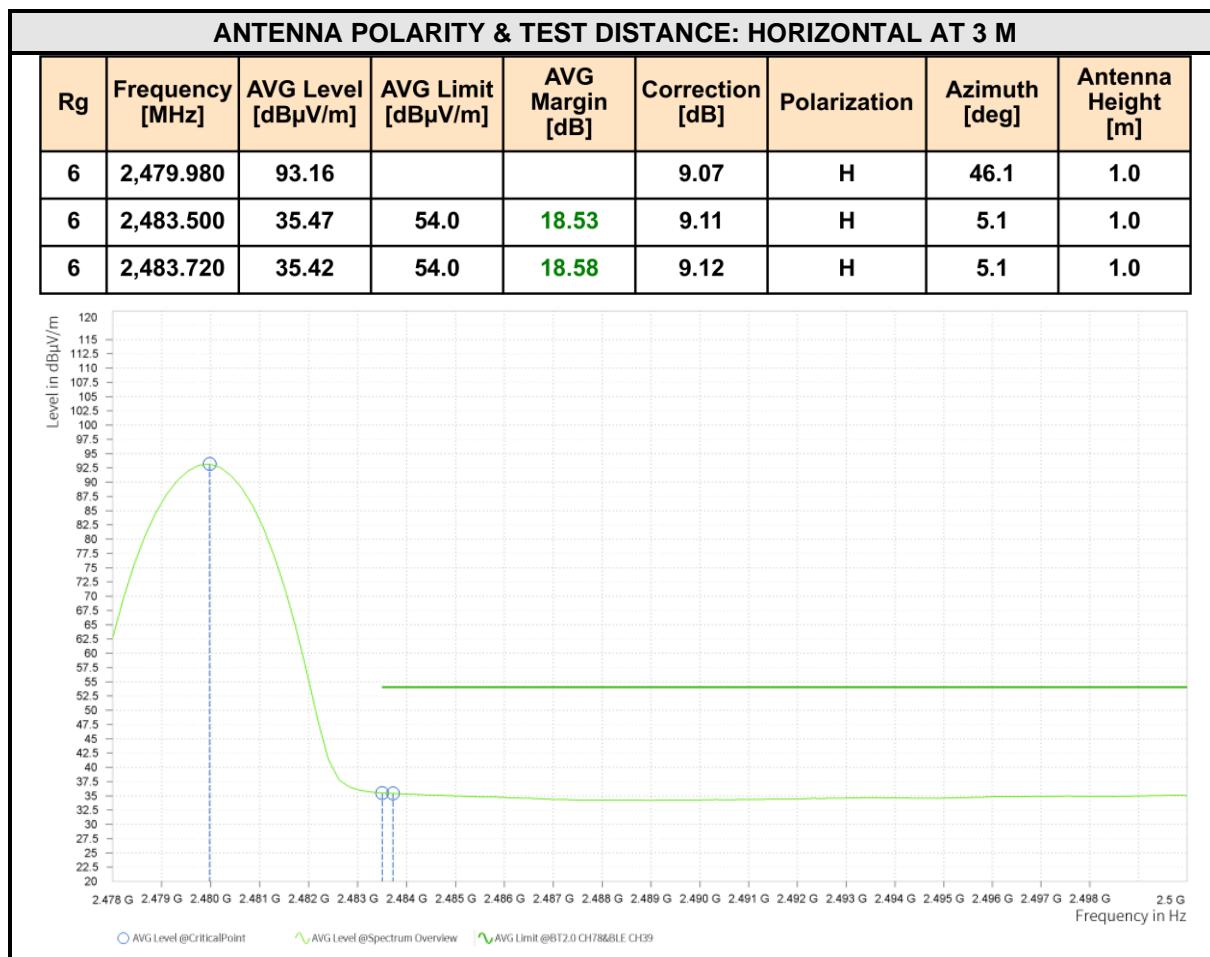
CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		





Test Report No.: PSU-QBJ2408220111RF04

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VERITAS



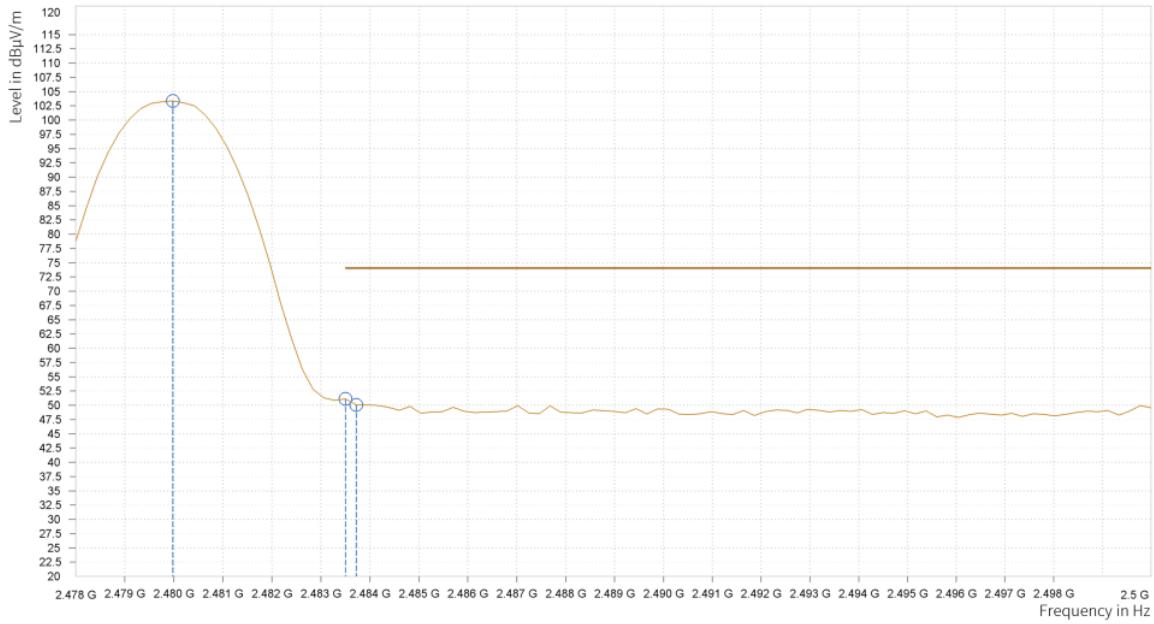


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	103.37			9.07	V	255.4	2.0
6	2,483.500	51.11	74.0	22.89	9.11	V	255.4	2.0
6	2,483.720	50.07	74.0	23.93	9.12	V	255.4	2.0



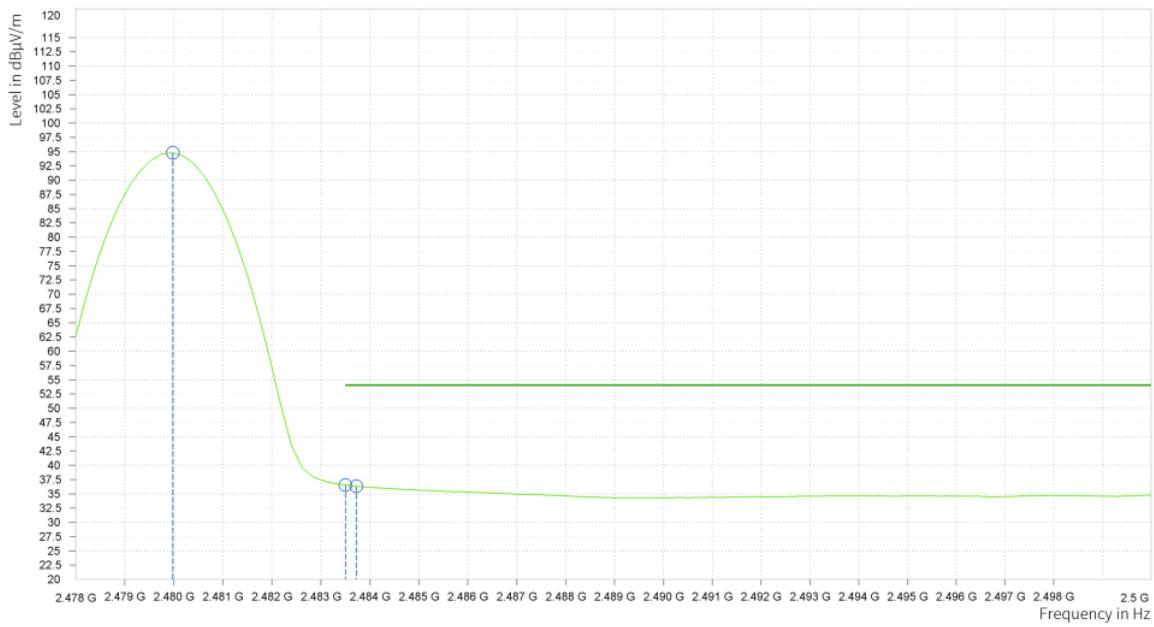


Test Report No.: PSU-QBJ2408220111RF04

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VERITAS

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dB μ V/m]	AVG Limit [dB μ V/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	94.79			9.07	V	261.3	2.0
6	2,483.500	36.56	54.0	17.44	9.11	V	261.3	2.0
6	2,483.720	36.32	54.0	17.68	9.12	V	261.3	2.0



REMARKS:

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



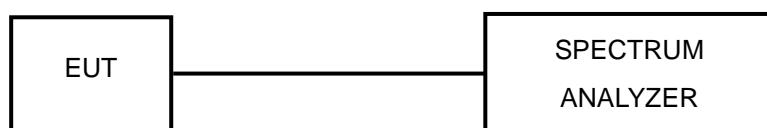
Test Report No.: PSU-QBJ2408220111RF04

3.2 NUMBER OF HOPPING FREQUENCY USED

3.2.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 channels frequencies, and should be equally spaced.

3.2.2 TEST SETUP



3.2.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	R&S	ESW 44	101973	Mar.28,24	Mar.27,26
Open Switch and Control Unit	R&S	OSP-B157W8	100836	N/A	N/A
Vector Signal Generator	R&S	SMBV100B	102176	Mar.29,24	Mar.28,26
Signal Generator	R&S	SMB100A03	182185	Mar.29,24	Mar.28,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.19,24	Jun.18,26
Hygrothermograph	DELI	20210528	SZ015	Sep.06,22	Sep.05,24
Hygrothermograph	DELI	20210528	SZ015	Sep.05,24	Sep.04,26
PC	LENOVO	E14	HRSW0024	N/A	N/A
CABLE	R&S	J12J103539-00 -1	SEP-03-20-0 69	Apr.27,24	Apr.26,25
CABLE	R&S	J12J103539-00 -1	SEP-03-20-0 70	Apr.27,24	Apr.26,25
Test Software	EMC32	EMC32	N/A	N/A	N/A
Temperature Chamber	votsch	VT4002	5856607810 0050	May.30,24	May.29,26
Power Meter	R&S	NRX	102380	Mar.28,24	Mar.27,26
Power Meter probe	R&S	NRP6A	102942	Mar.28,24	Mar.27,26

NOTE:

1. The calibration interval of the above test instruments is 12 /24 months and the calibrations are traceable to CEPREI/CHINA, GRRG/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.



Test Report No.: PSU-QBJ2408220111RF04

3.2.4 TEST PROCEDURES

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- d. Set the SA on View mode and then plot the result on SA screen.
- e. Repeat above procedures until all frequencies measured were completed.

3.2.5 DEVIATION FROM TEST STANDARD

No deviation.

3.2.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

Please Refer to Appendix Of this test report.



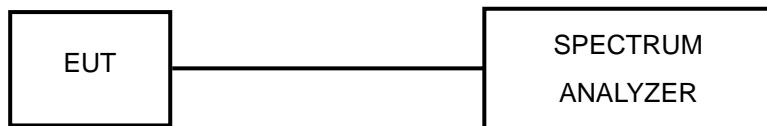
Test Report No.: PSU-QBJ2408220111RF04

3.3 DWELL TIME ON EACH CHANNEL

3.3.1 LIMIT OF DWELL TIME USED

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

3.3.2 TEST SETUP



3.3.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.3.4 TEST PROCEDURES

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- c. Adjust the center frequency of SA on any frequency to be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- e. Repeat above procedures until all different time-slot modes have been completed.



Test Report No.: PSU-QBJ2408220111RF04

3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

3.3.6 TEST RESULTS

Please Refer to Appendix Of this test report

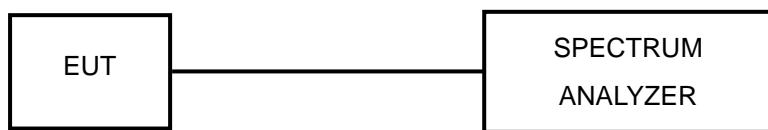


3.4 CHANNEL BANDWIDTH

3.4.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.4.4 TEST PROCEDURE

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.



Test Report No.: PSU-QBJ2408220111RF04

3.4.6 EUT OPERATING CONDITION

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

3.4.7 TEST RESULTS

Please Refer to Appendix Of this test report.

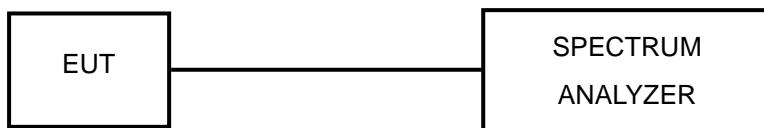


3.5 HOPPING CHANNEL SEPARATION

3.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25kHz or two-third of 20dB hopping channel bandwidth (whichever is greater).

3.5.2 TEST SETUP



3.5.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.5.4 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.



Test Report No.: PSU-QBJ2408220111RF04

3.5.6 TEST RESULTS

Please Refer to Appendix Of this test report.

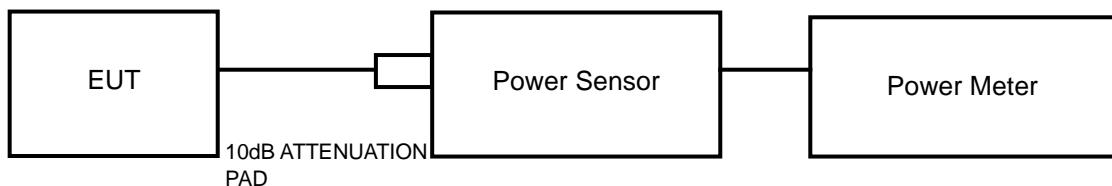


3.6 MAXIMUM OUTPUT POWER

3.6.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 125mW.

3.6.2 TEST SETUP



3.6.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.6.4 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.



Test Report No.: PSU-QBJ2408220111RF04

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.



Test Report No.: PSU-QBJ2408220111RF04

3.6.7 TEST RESULTS

3.6.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix Of this test report.



Test Report No.: PSU-QBJ2408220111RF04

3.6.7.2 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 Appendix Of this test report.



3.7 OUT OF BAND MEASUREMENT

3.7.1 LIMITS OF OUT OF BAND MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100KHz RBW).

3.7.2 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.7.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Spectrum Analyzer was set RBW to 100 kHz and VBW to 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. Detector = PEAK and Trace mode = Max Hold. The band edges was measured and recorded.

3.7.4 DEVIATION FROM TEST STANDARD

No deviation.

3.7.5 EUT OPERATING CONDITION

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

3.7.6 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 Of this test report.



Test Report No.: PSU-QBJ2408220111RF04

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



Test Report No.: PSU-QBJ2408220111RF04

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.



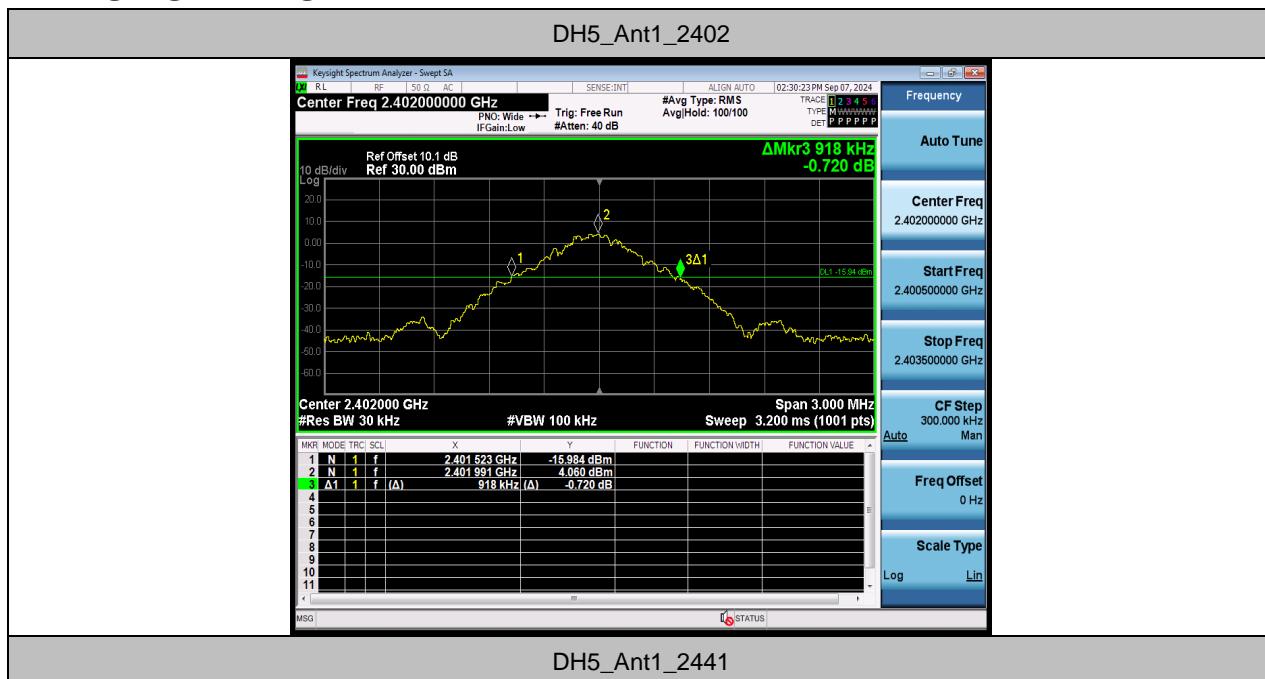
6 Appendix

20DB EMISSION BANDWIDTH

TEST RESULT

TestMode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.918	2401.523	2402.441	---	---
		2441	0.936	2440.520	2441.456	---	---
		2480	0.945	2479.517	2480.462	---	---
2DH5	Ant1	2402	1.317	2401.319	2402.636	---	---
		2441	1.320	2440.316	2441.636	---	---
		2480	1.335	2479.307	2480.642	---	---
3DH5	Ant1	2402	1.323	2401.322	2402.645	---	---
		2441	1.311	2440.325	2441.636	---	---
		2480	1.317	2479.322	2480.639	---	---

TEST GRAPHS





Test Report No.: PSU-QBJ2408220111RF04

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DH5_Ant1_2480



2DH5_Ant1_2402



Test Report No.: PSU-QBJ2408220111RF04

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2DH5_Ant1_2441



2DH5_Ant1_2480



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3DH5_Ant1_2402



3DH5_Ant1_2441



OCCUPIED CHANNEL BANDWIDTH

TEST RESULT

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.82938	2401.5654	2402.3947	---	---
		2441	0.83440	2440.5599	2441.3943	---	---
		2480	0.82948	2479.5598	2480.3892	---	---
2DH5	Ant1	2402	1.1818	2401.3875	2402.5693	---	---
		2441	1.1873	2440.3836	2441.5709	---	---
		2480	1.1902	2479.3810	2480.5712	---	---



Test Report No.: PSU-QBJ2408220111RF04

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3DH5	Ant1	2402	1.1892	2401.3845	2402.5737	---	---
		2441	1.1813	2440.3885	2441.5698	---	---
		2480	1.1942	2479.3811	2480.5753	---	---

TEST GRAPHS





Test Report No.: PSU-QBJ2408220111RF04

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2DH5_Ant1_2402



2DH5_Ant1_2441

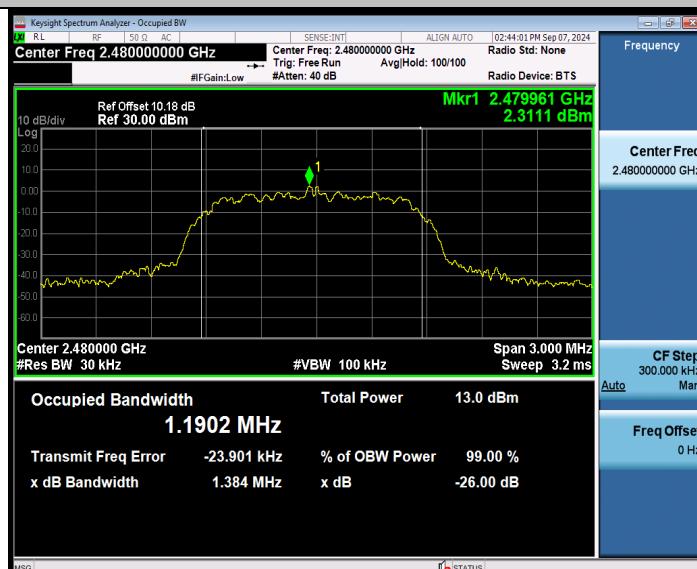


Test Report No.: PSU-QBJ2408220111RF04

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2DH5_Ant1_2480



3DH5_Ant1_2402



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3DH5_Ant1_2441



3DH5_Ant1_2480



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MAXIMUM CONDUCTED OUTPUT POWER

TEST RESULT

TestMode	Antenna	Frequency [MHz]	Average power [dBm]	Peak Power [dBm]	Peak power [mw]	Conducted Limit [dBm]	EIRP [dBm]	EIRP [mw]	EIRP Limit [dBm]	Verdict	Power Setting
DH5	Ant1	2402	6.71	6.75	4.73	≤20.97	6.92	4.92	≤36.00	PASS	Defult
		2441	7.09	7.1	5.13	≤20.97	7.27	5.33	≤36.00	PASS	Defult
		2480	7.04	7.05	5.07	≤20.97	7.22	5.27	≤36.00	PASS	Defult
2DH5	Ant1	2402	6.49	6.51	4.48	≤20.97	6.68	4.66	≤36.00	PASS	Defult
		2441	6.69	6.7	4.68	≤20.97	6.87	4.86	≤36.00	PASS	Defult
		2480	6.77	6.78	4.76	≤20.97	6.95	4.95	≤36.00	PASS	Defult
3DH5	Ant1	2402	6.5	6.55	4.52	≤20.97	6.72	4.70	≤36.00	PASS	Defult
		2441	6.67	6.7	4.68	≤20.97	6.87	4.86	≤36.00	PASS	Defult
		2480	6.73	6.72	4.70	≤20.97	6.89	4.89	≤36.00	PASS	Defult

Note: EIRP = Peak Power + Gain



Test Report No.: PSU-QBJ2408220111RF04

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CARRIER FREQUENCY SEPARATION

TEST RESULT

TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.85	≥0.630	PASS
2DH5	Ant1	Hop	1.036	≥0.890	PASS
3DH5	Ant1	Hop	1.006	≥0.882	PASS

TEST GRAPHS





Test Report No.: PSU-QBJ2408220111RF04

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3DH5_Ant1_Hop





Test Report No.: PSU-QBJ2408220111RF04

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TIME OF OCCUPANCY

TEST RESULT

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.376	320	0.12	≤ 0.4	PASS
DH3	Ant1	Hop	1.631	160	0.261	≤ 0.4	PASS
DH5	Ant1	Hop	2.879	106.67	0.307	≤ 0.4	PASS
2DH1	Ant1	Hop	0.386	320	0.124	≤ 0.4	PASS
2DH3	Ant1	Hop	1.640	160	0.262	≤ 0.4	PASS
2DH5	Ant1	Hop	2.888	106.67	0.308	≤ 0.4	PASS
3DH1	Ant1	Hop	0.388	320	0.124	≤ 0.4	PASS
3DH3	Ant1	Hop	1.638	160	0.262	≤ 0.4	PASS
3DH5	Ant1	Hop	2.891	106.67	0.308	≤ 0.4	PASS



Test Report No.: PSU-QBJ2408220111RF04

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TEST GRAPHS

DH1_Ant1_Hop



DH3_Ant1_Hop



DH5_Ant1_Hop

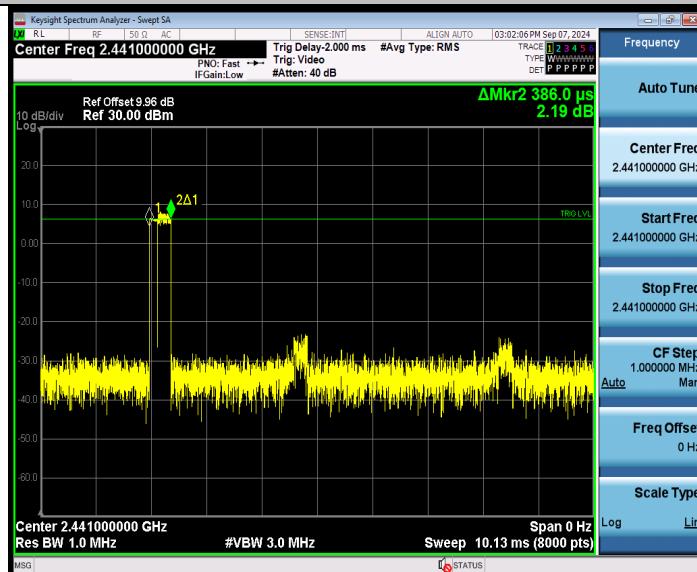


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2DH1_Ant1_Hop



2DH3_Ant1_Hop



Test Report No.: PSU-QBJ2408220111RF04

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2DH5_Ant1_Hop



3DH1_Ant1_Hop

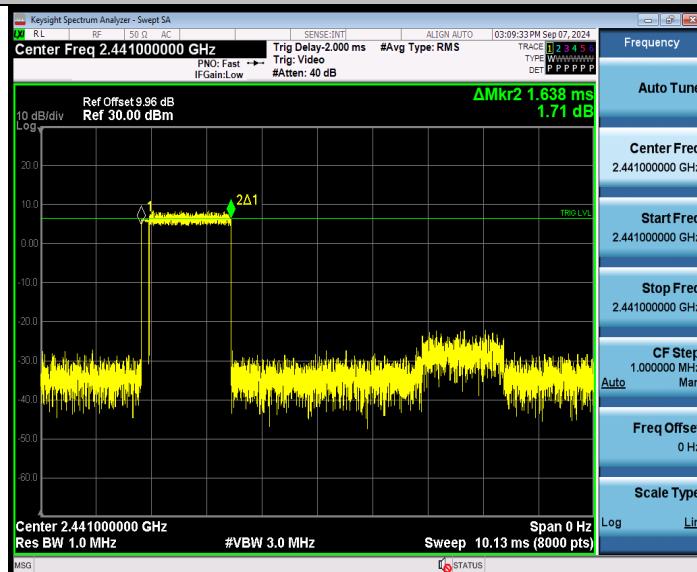


Test Report No.: PSU-QBJ2408220111RF04

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3DH3_Ant1_Hop

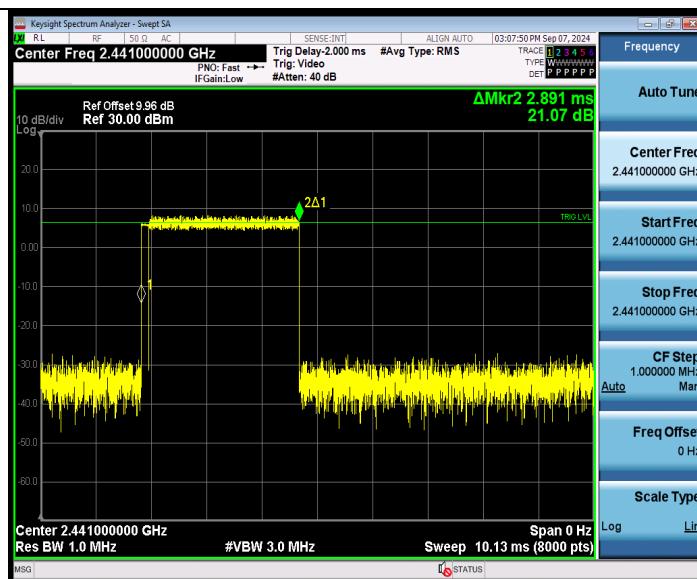


3DH5_Ant1_Hop



Test Report No.: PSU-QBJ2408220111RF04

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Test Report No.: PSU-QBJ2408220111RF04

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NUMBER OF HOPPING CHANNELS

TEST RESULT

TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

TEST GRAPHS

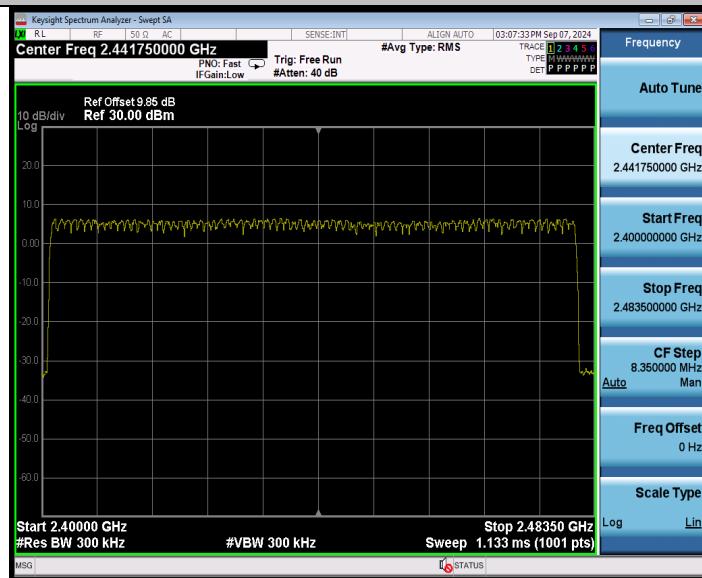




Test Report No.: PSU-QBJ2408220111RF04

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3DH5_Ant1_Hop





Test Report No.: PSU-QBJ2408220111RF04

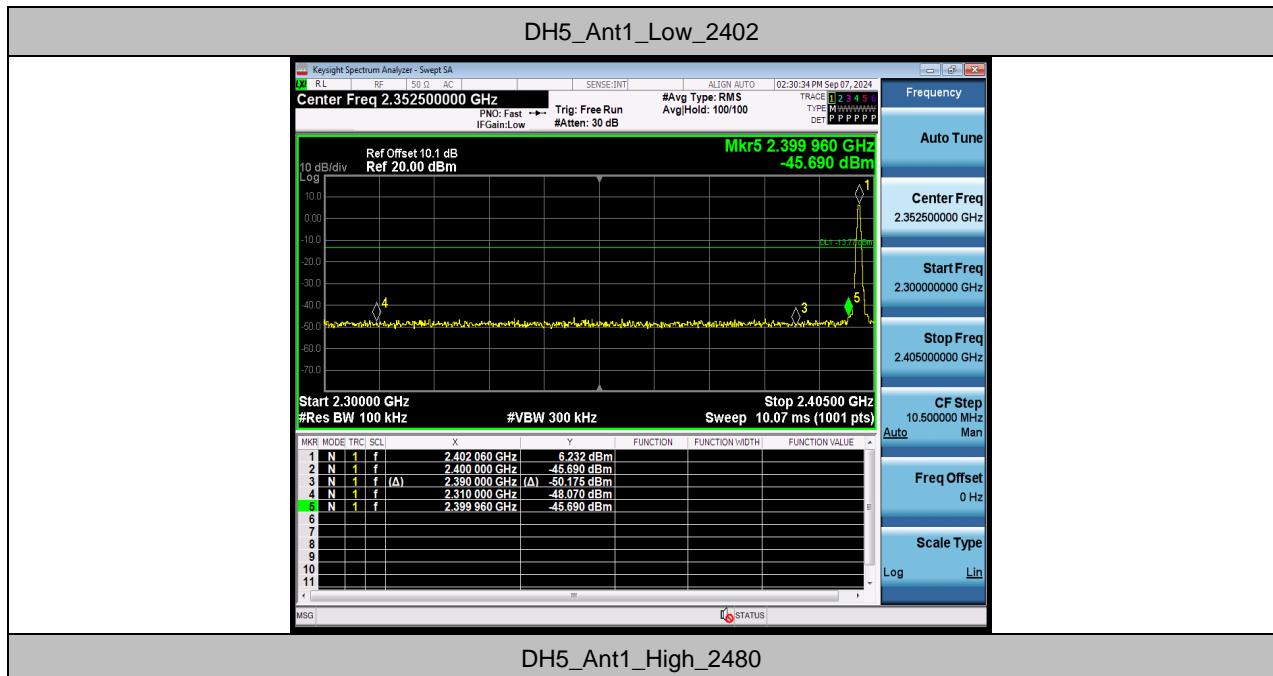
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BAND EDGE MEASUREMENTS

TEST RESULT

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	6.23	-45.69	≤-13.77	PASS
		High	2480	6.01	-44.53	≤-14	PASS
		Low	Hop_2402	4.20	-34.93	≤-15.8	PASS
		High	Hop_2480	6.20	-33.8	≤-13.8	PASS
2DH5	Ant1	Low	2402	3.98	-45.33	≤-16.02	PASS
		High	2480	5.79	-45.06	≤-14.22	PASS
		Low	Hop_2402	7.87	-35.19	≤-12.13	PASS
		High	Hop_2480	9.19	-34.44	≤-10.81	PASS
3DH5	Ant1	Low	2402	6.16	-45.69	≤-13.84	PASS
		High	2480	6.69	-45.31	≤-13.31	PASS
		Low	Hop_2402	6.03	-34.68	≤-13.98	PASS
		High	Hop_2480	8.76	-34.17	≤-11.24	PASS

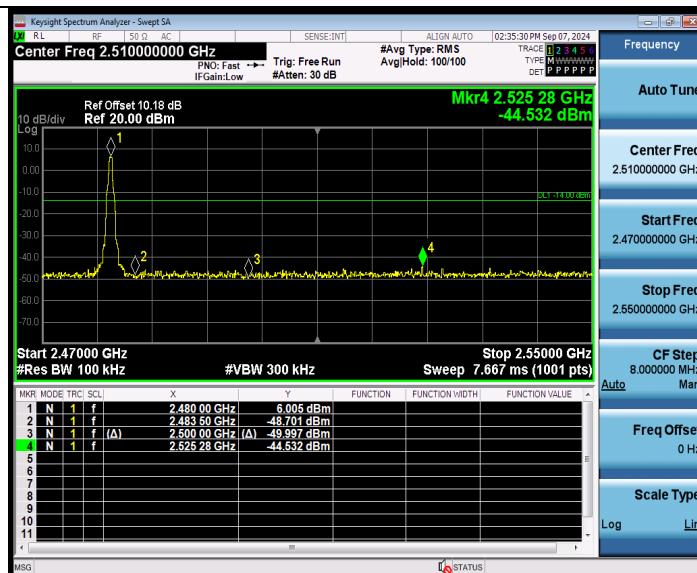
TEST GRAPHS



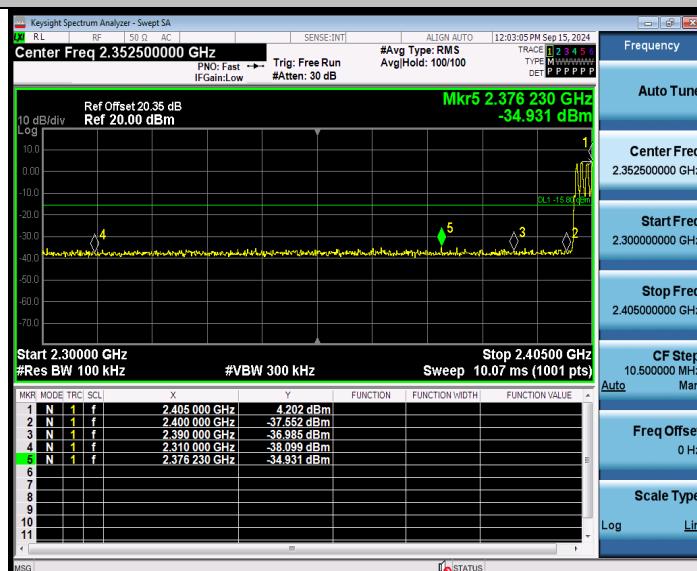


Test Report No.: PSU-QBJ2408220111RF04

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DH5_Ant1_Low_Hop_2402



DH5_Ant1_High_Hop_2480

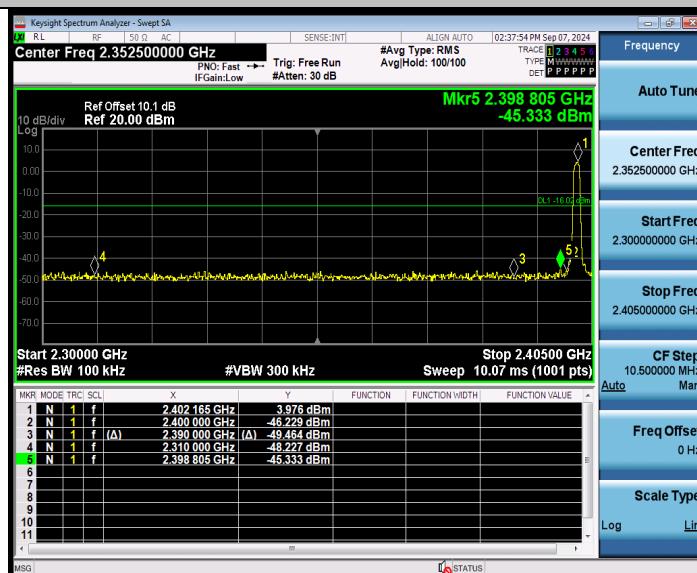


Test Report No.: PSU-QBJ2408220111RF04

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2DH5_Ant1_Low_2402

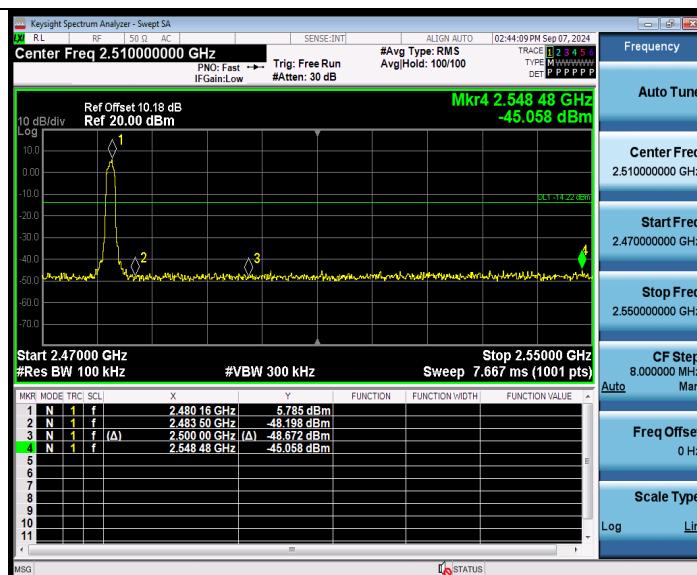


2DH5_Ant1_High_2480



Test Report No.: PSU-QBJ2408220111RF04

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2DH5_Ant1_Low_Hop_2402



2DH5_Ant1_High_Hop_2480



Test Report No.: PSU-QBJ2408220111RF04

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3DH5_Ant1_Low_2402

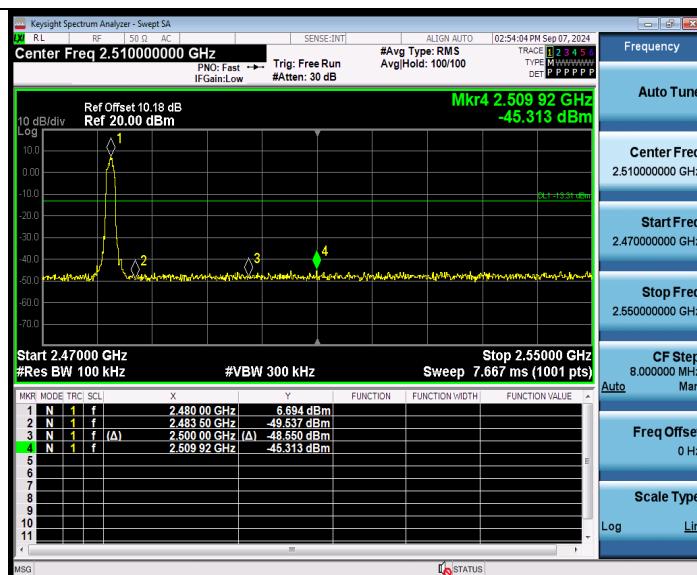


3DH5_Ant1_High_2480



Test Report No.: PSU-QBJ2408220111RF04

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3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_2480



Test Report No.: PSU-QBJ2408220111RF04

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CONDUCTED SPURIOUS EMISSION

TEST RESULT

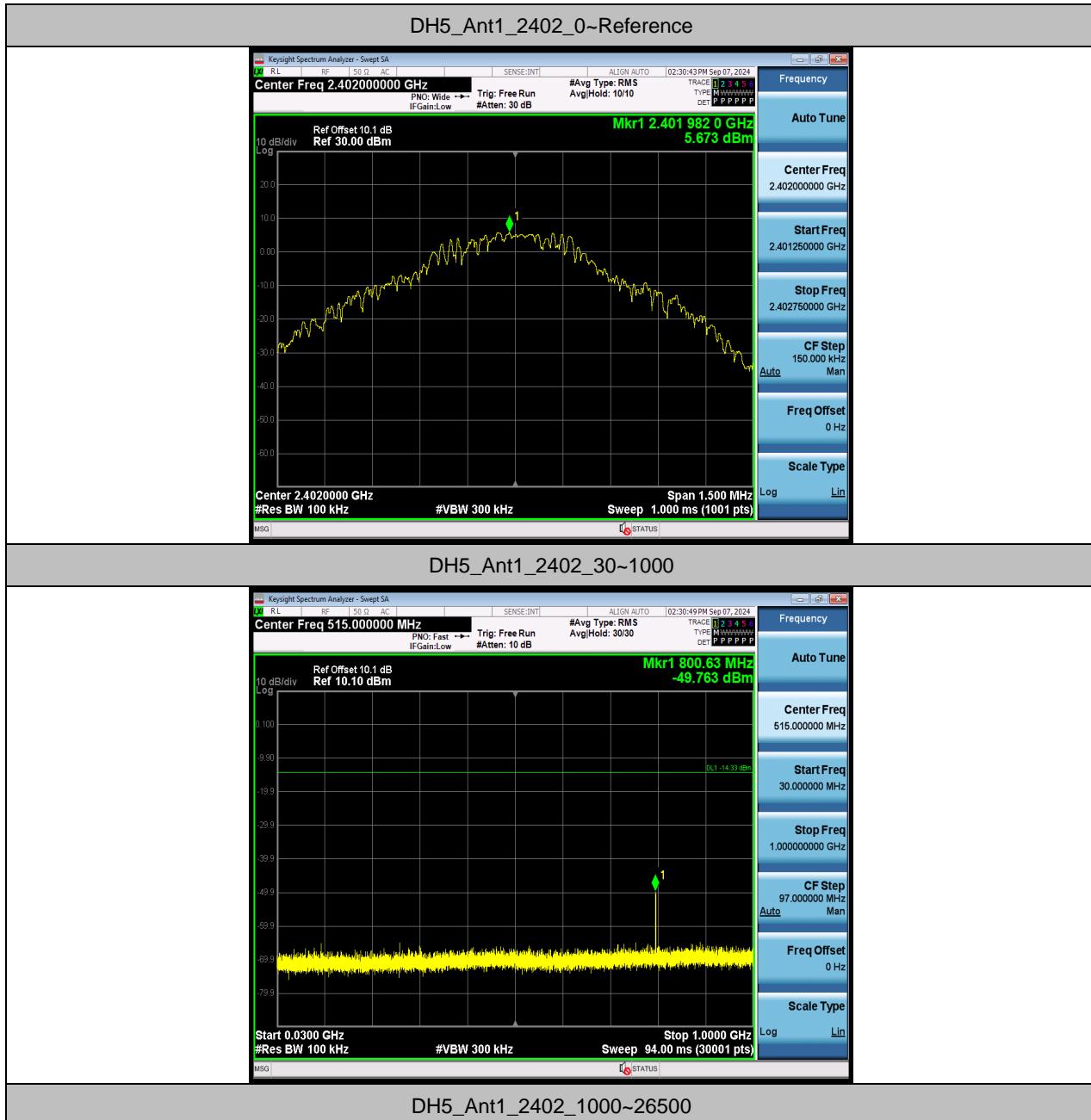
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	5.67	5.67	---	PASS
			30~1000	5.67	-49.76	≤-14.33	PASS
			1000~26500	5.67	-32.83	≤-14.33	PASS
		2441	Reference	5.17	5.17	---	PASS
			30~1000	5.17	-50.14	≤-14.83	PASS
			1000~26500	5.17	-32.79	≤-14.83	PASS
		2480	Reference	5.35	5.35	---	PASS
			30~1000	5.35	-49.57	≤-14.65	PASS
			1000~26500	5.35	-32.35	≤-14.65	PASS
2DH5	Ant1	2402	Reference	3.81	3.81	---	PASS
			30~1000	3.81	-51.88	≤-16.19	PASS
			1000~26500	3.81	-33.13	≤-16.19	PASS
		2441	Reference	3.15	3.15	---	PASS
			30~1000	3.15	-49.91	≤-16.85	PASS
			1000~26500	3.15	-34.74	≤-16.85	PASS
		2480	Reference	5.05	5.05	---	PASS
			30~1000	5.05	-50.86	≤-14.95	PASS
			1000~26500	5.05	-32.37	≤-14.95	PASS
3DH5	Ant1	2402	Reference	4.25	4.25	---	PASS
			30~1000	4.25	-51.91	≤-15.75	PASS
			1000~26500	4.25	-33.13	≤-15.75	PASS
		2441	Reference	3.69	3.69	---	PASS
			30~1000	3.69	-51.06	≤-16.31	PASS
			1000~26500	3.69	-33.8	≤-16.31	PASS
		2480	Reference	4.18	4.18	---	PASS
			30~1000	4.18	-50.72	≤-15.82	PASS
			1000~26500	4.18	-33.19	≤-15.82	PASS



Test Report No.: PSU-QBJ2408220111RF04

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TEST GRAPHS





Test Report No.: PSU-QBJ2408220111RF04

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DH5_Ant1_2441_0~Reference



DH5_Ant1_2441_30~1000



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DH5_Ant1_2441_1000~26500



DH5_Ant1_2480_0~Reference