

Radio Test Report (SRD)

Report No.: RJBCBB-WTW-P20120637-4

Test Model: 2QA4100

Received Date: Dec. 18, 2020

Test Date: Jan. 26, 2021

Issued Date: Feb. 1, 2021

Applicant: HTC Corporation

Address: No. 88, Sec. 3, Zhongxing Rd. Xindian Dist., New Taipei City 231, Taiwan

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Release Control Record

Issue No.	Description	Date Issued
RJBCBB-WTW-P20120637-4	Original release.	Feb. 1, 2021

1 Certificate of Conformity

Product: Headset

Brand: VIVE

Test Model: 2QA4100

Sample Status: Engineering sample

Applicant: HTC Corporation

Test Date: Jan. 26, 2021

Standards: ARIB STD-T66 (V3.7), MIC notice 88 Appendix 43

Certification Ordinance Article 2-1-19

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Annie Chang, **Date:** Feb. 1, 2021

Annie Chang / Senior Specialist

Approved by : Rex Lai, **Date:** Feb. 1, 2021

Rex Lai / Associate Technical Manager

2 Summary of Test Results

The EUT has been tested according to the following specifications:

Notice 88 Appendix 43 Reference	ARIB STD- T66 Ref.	Report Reference	Parameter	Test Results (Note)
General Provisions				
C	3.2 (4)	4.1	Frequency tolerance	C
D	3.2 (7)	4.2	Occupied bandwidth	C
E	3.2 (6)	4.4	Spurious emissions	C
Transmitting Equipment				
F	--	4.4	Antenna power	C
--	--	--	SAR	NA
Transmitting Antenna				
--	--	3.5	Type, configuration, etc. of transmitting antenna	C
--	--	3.5	Direction pattern of transmitting antenna	C
Receiving Equipment				
G	3.3 (1)	4.5	Spurious emissions of receiver	C
--	--	3.5	Refer to all articles for transmitting antenna	C
Operating Frequency 2400 to 2483.5MHz				
--	3.7 (1)	3.4	High Frequency/modulation section cannot be opened easily	C
--	3.1 (1)	3.1	Communication method	C
--	3.2 (1)a	3.1	Modulation method	C
--	3.2 (1)a	3.1	Spread spectrum method	NA
--	3.2 (2)	4.4	Antenna power	C
--	3.6 (2)	4.4	Absolute gain of transmitting antenna	C
--	3.6 (2)	4.4	Angular width of principal radiation (AWPR)	NA
--	3.2 (10)	--	Number of carriers within 1 MHz bandwidth in OFDM	NA
--	3.2 (8)	--	Diffusion bandwidth	NA
--	3.2 (9)	--	Spreading factor	NA
--	3.2 (11)	--	Frequency retention time (FH employed)	NA
--	3.4.1(1)	4.6	Interference Prevention Function	C
--	3.4.1(3)	--	Carrier Sense Capability	NA

Note:

1. C = Conform NC = Not Conform NT = Not Tested NA = Not Applicable
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Cal. Method
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 8, 2020	Sep. 7, 2021	ETC	c)
ROHDE & SCHWARZ Signal Generator	SMR 40	100231	Jul. 7, 2020	Jul. 6, 2021	ETC	c)
Anritsu Power Sensor	MA2411B	0738404	Apr. 13, 2020	Apr. 12, 2021	ETC	c)
Anritsu Power Meter	ML2495A	0842014	Apr. 13, 2020	Apr. 12, 2021	ETC	c)
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 16, 2020	Jun. 15, 2021	ETC	c)
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 22, 2020	Jul. 21, 2021	ETC	c)
KEYSIGHT MXG Vector Signal Generator	N5182B	MY53052658	May 10, 2020	May 9, 2021	ETC	c)

NOTE: Calibration Method

- a) : Calibration conducted by the National Institute of Information and Communications Technology ~NICT~ or a designated calibration agency under Article 102-18 paragraph (1) ~ TELEC EngeneeringCenter, Intertek Japan K.K., Keysight Technologies, Inc ~.
- b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the MeasurementLaw (Law No. 51 of 1992) ~Japan Calibration Service Syste~
- c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted bythe NICT or a designated calibration agency under Article 102-18 paragraph (1) ~ TELEC EngeneeringCenter, Intertek Japan K.K., Keysight Technologies, Inc ~.
- d) : Calibration conducted by using other equipment that listed above from a) to c)

2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in TR 100 028-1.

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

Parameter	Uncertainty
Occupied Bandwidth	206.50 Hz
Spurious emissions	3.93 dB
Output power density	1.11 dB
Out of band radiated power	3.93 dB
Frequency Tolerance	603.76 Hz

2.3 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Headset
Brand	VIVE
Test Model	2QA4100
Status of EUT	Engineering sample
Nominal Voltage	11Vdc
Modulation Type	GFSK
Operating Frequency	2402 ~ 2480MHz
Number of Channel	40
Rated RF Output Power	2mW
Conducted RF Output Power	1.959mW
Radiated RF Output Power	2.466mW
Antenna Type	PIFA antenna with 1dBi gain
Antenna Connector	IPEX MHF5/HIROSE X.FL-R-SMT
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

40 channels are provided to this EUT:

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

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

By means of test software provided by manufacture, the power levels during the tests were set according to the following codes:

Channel	Power setting
0	0
19	0
39	0

3.3 Test Conditions

Test Conditions		Voltage (Vdc)
V_{normal}	-	11
$V_{\text{max.}}$	+10%	12.1
$V_{\text{min.}}$	-10%	9.9

Note: After checking the fluctuation of input voltage to the circuit of the radio part (excluding the power supply) of the equipment to be tested, the fluctuation less than +/- 1 % when input voltage from an external supply into the equipment fluctuates +/- 10%, therefore, the test is carried out only at the normal voltage.

Test modes are presented in the report as below:

Test Item	Environmental Conditions
Frequency Tolerance	25 deg.C, 60% RH
Occupied Bandwidth	25 deg.C, 60% RH
Spurious Emissions for Transmitter	25 deg.C, 60% RH
Antenna Power	25 deg.C, 60% RH
Spurious Emissions for Receiver	25 deg.C, 60% RH
Interference Prevention Function	25 deg.C, 60% RH

3.4 Assembly

The EUT used a kind of particular screw, which could not be operated by a tool bought in the market. Only means of brute force will be able to open it.

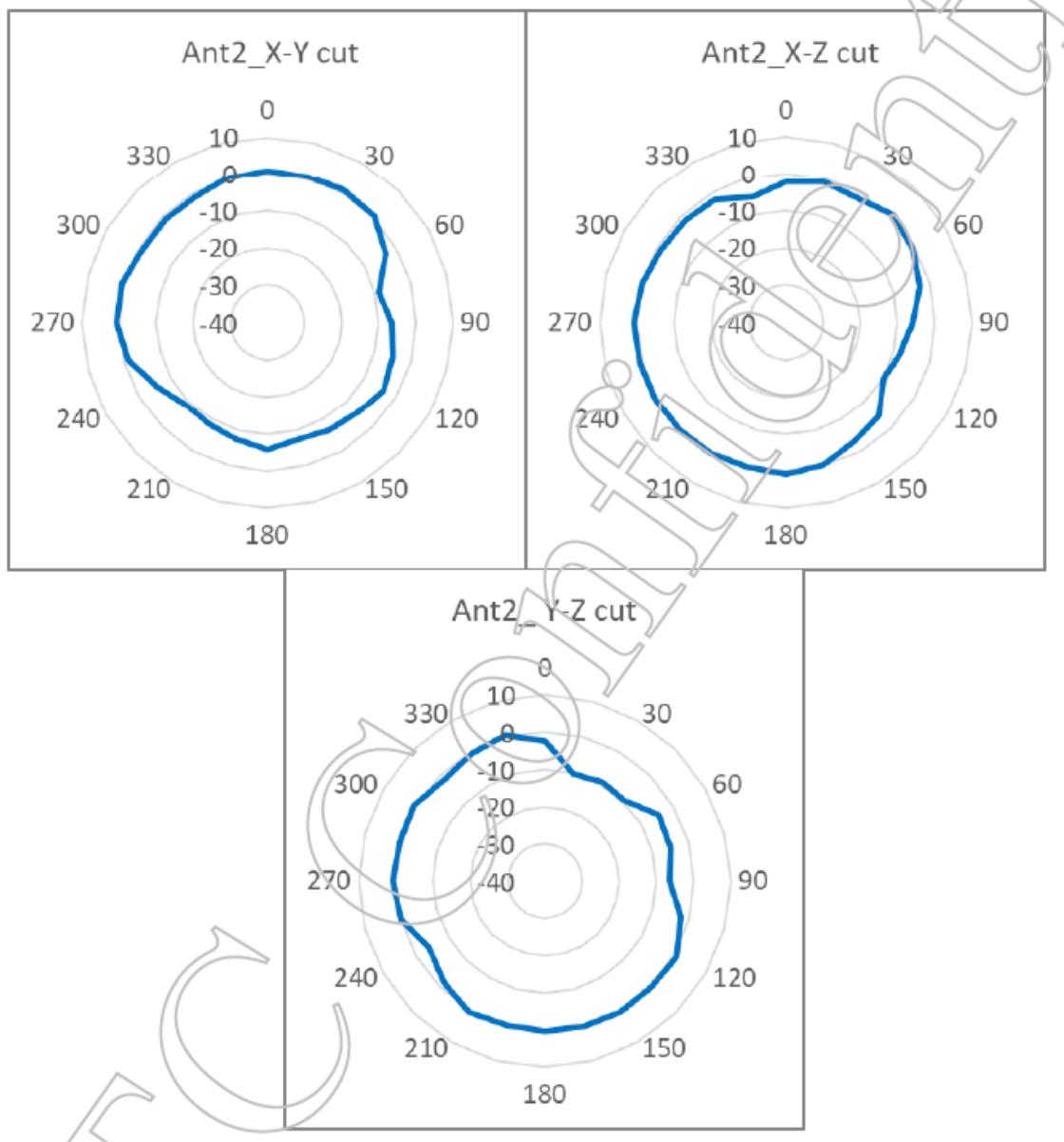
3.5 Antenna Specifications

3.5.1 Antenna Gain

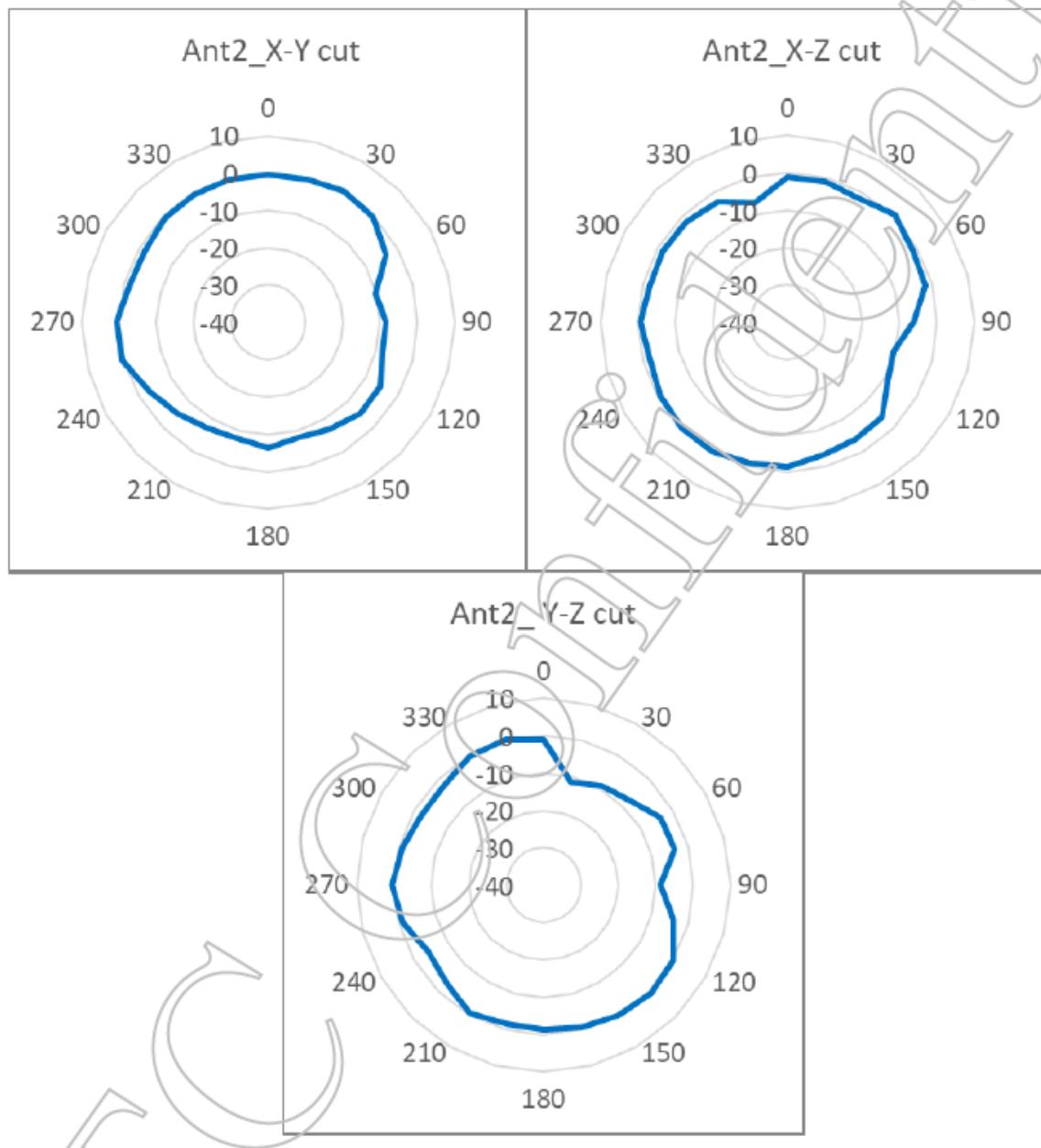
Antenna Type	Max. Gain (dBi)
PIFA	1

3.5.2 Antenna Pattern

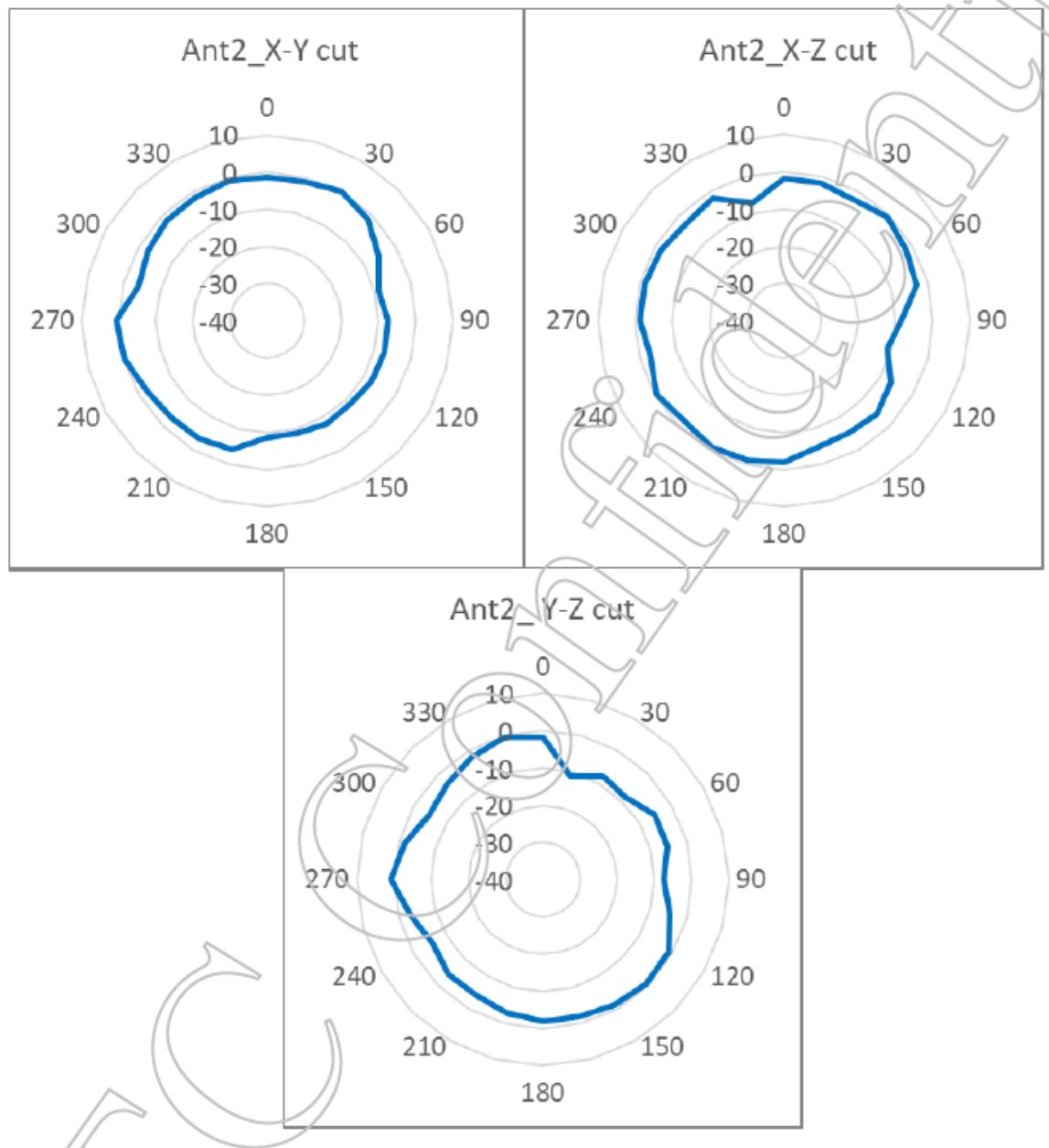
2402 MHz



2440 MHz



2480 MHz



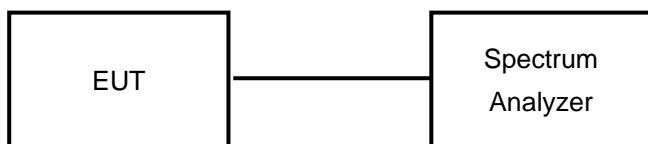
4 Test Results

4.1 Frequency Tolerance Measurement

4.1.1 Limits of Frequency Tolerance Measurement

Tolerance of frequency shall be +/- 50ppm

4.1.2 Test Setup



4.1.3 Test Results

Channel	Frequency (MHz)	V_{normal}		V_{max.}		V_{min.}	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
0	2402	2401.987602	-5.161	2401.987542	-5.186	2401.987553	-5.181
19	2440	2439.987102	-5.286	2439.987127	-5.275	2439.986952	-5.347
39	2480	2479.986853	-5.301	2479.986780	-5.330	2479.986772	-5.333

4.2 Occupied Bandwidth Measurement (99% power bandwidth)

4.2.1 Limits of Occupied Bandwidth Measurement

Item	Limit
Occupied bandwidth	<26MHz

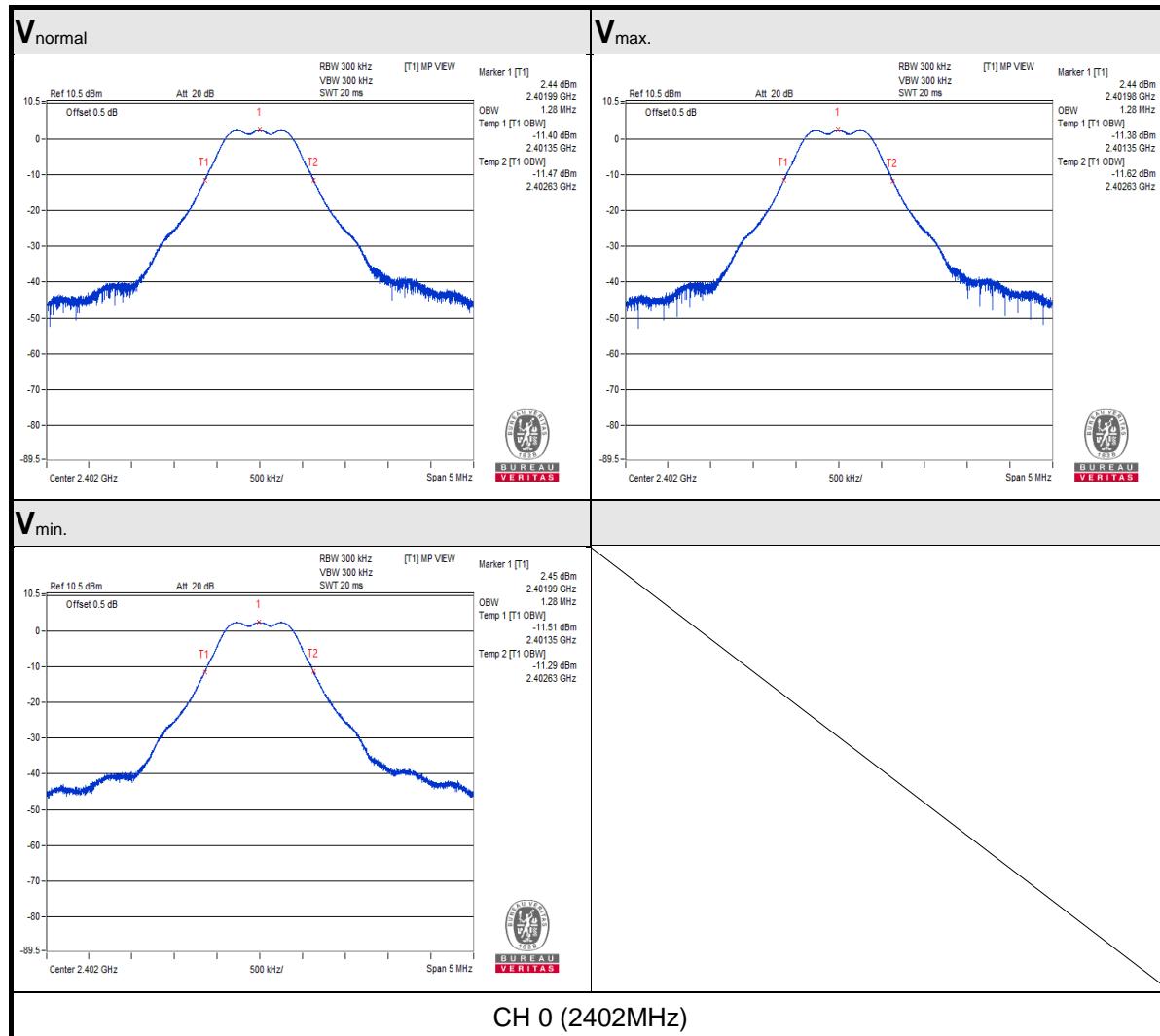
4.2.2 Test Setup

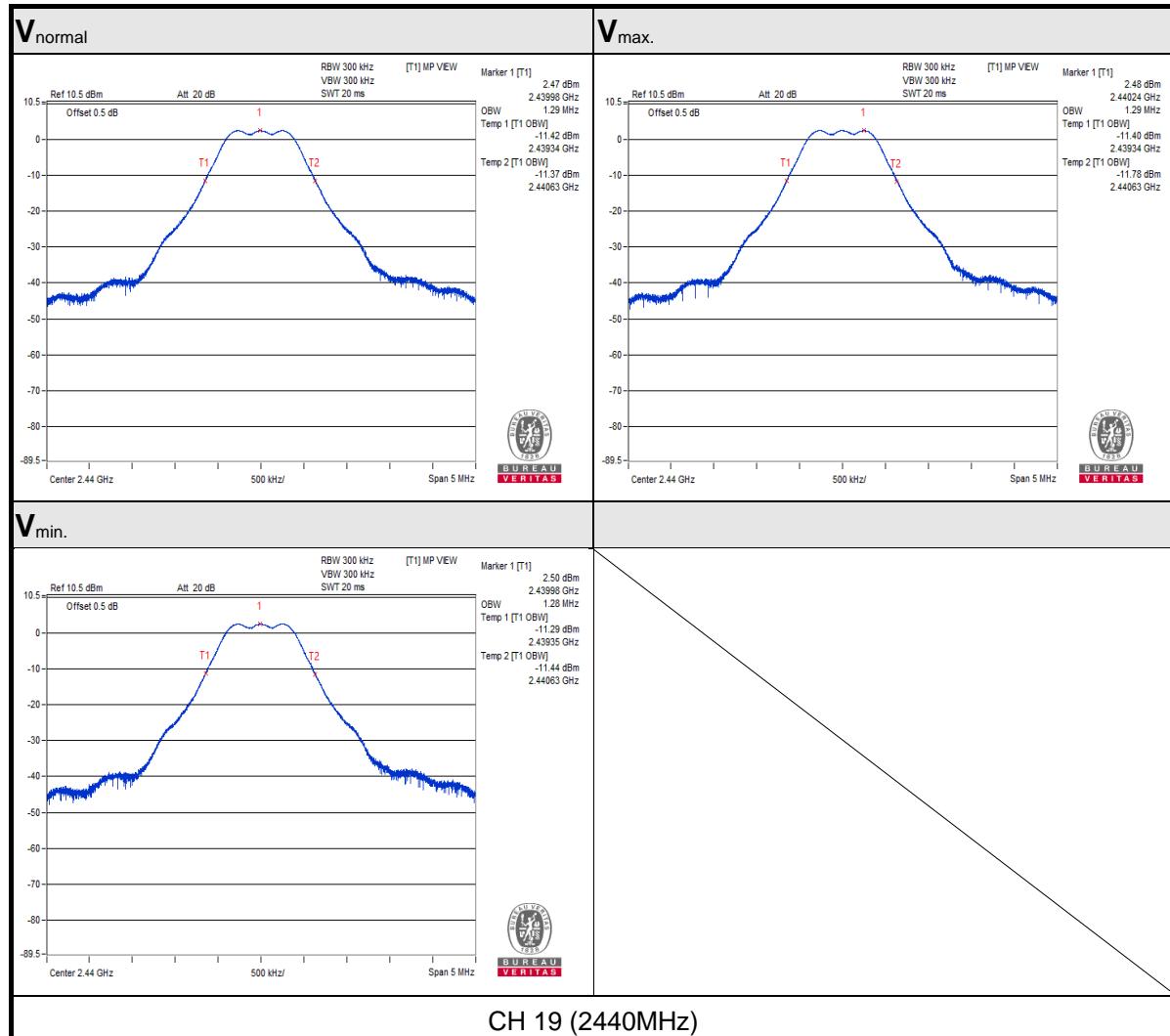


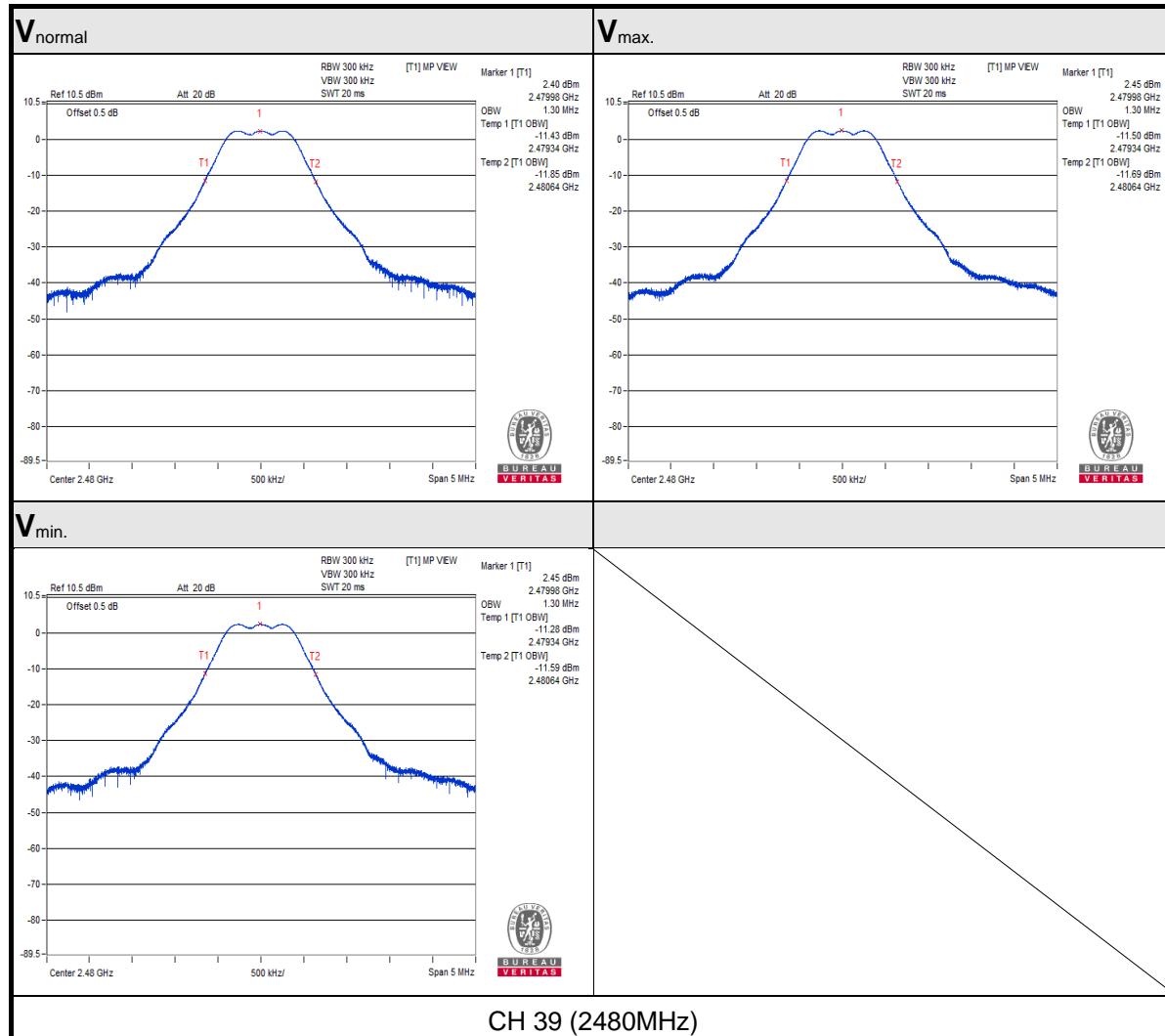
4.2.3 Test Results

Channel	Frequency (MHz)	V_{normal}	V_{max.}	V_{min.}
		Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
0	2402	1.28	1.28	1.28
19	2440	1.29	1.29	1.28
39	2480	1.30	1.30	1.30

NOTE: For the test plots please refer to the below pages.







4.3 Spurious Emissions for Transmitter Measurement

4.3.1 Limits of Spurious Emissions

Frequencies (MHz)	Limit
Operating frequency 2400 to 2483.5MHz	
30.0MHz to 1000.0MHz	\leq 0.25 uW/100kHz
1000.0MHz to 2387MHz	\leq 2.5 uW/MHz
2387.0MHz to 2400.0MHz	\leq 25 uW/MHz
2483.5MHz to 2496.5MHz	\leq 25 uW/MHz
2496.5MHz to 12500.0MHz	\leq 2.5 uW/MHz

4.3.2 Test Setup

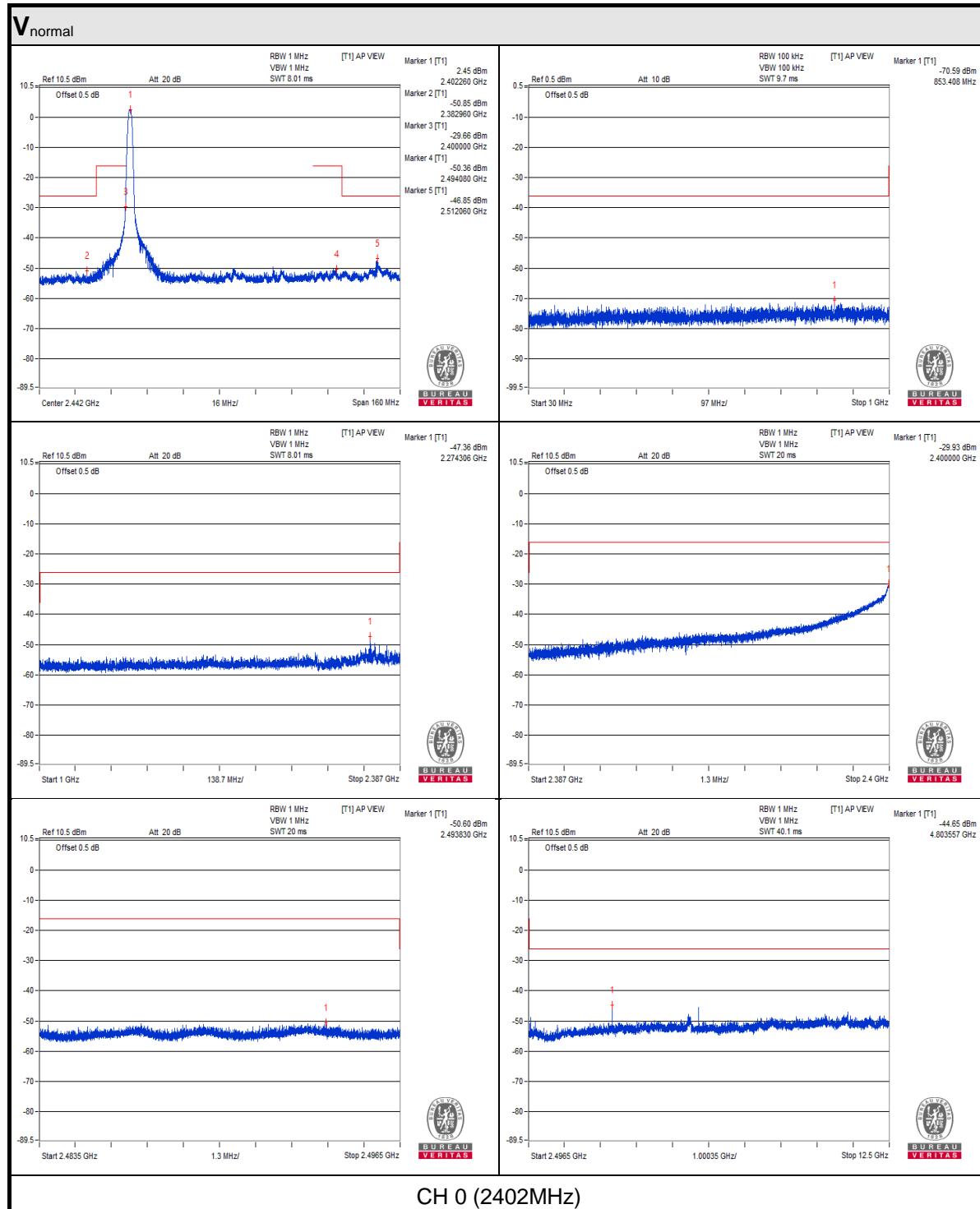


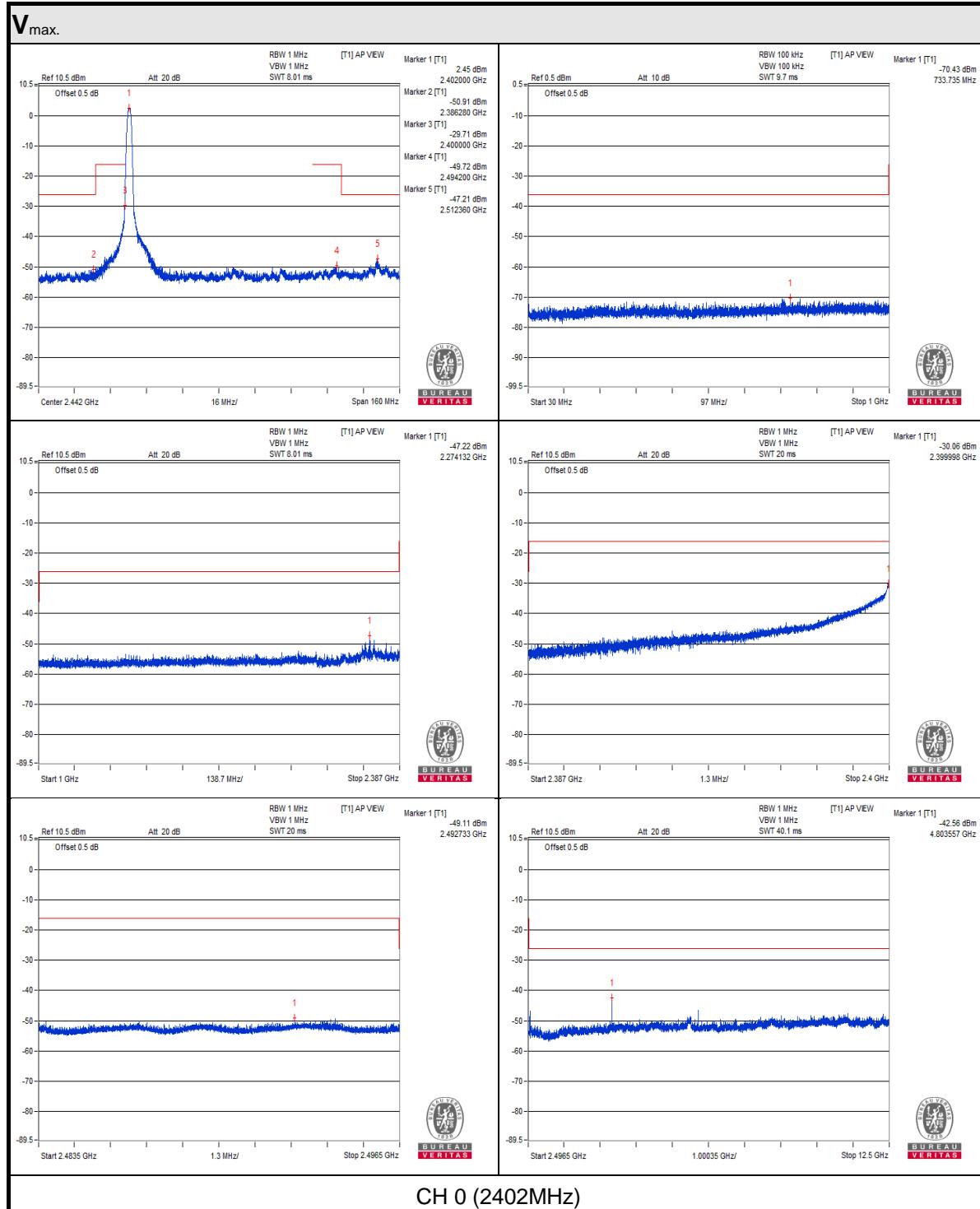
4.3.3 Test Results

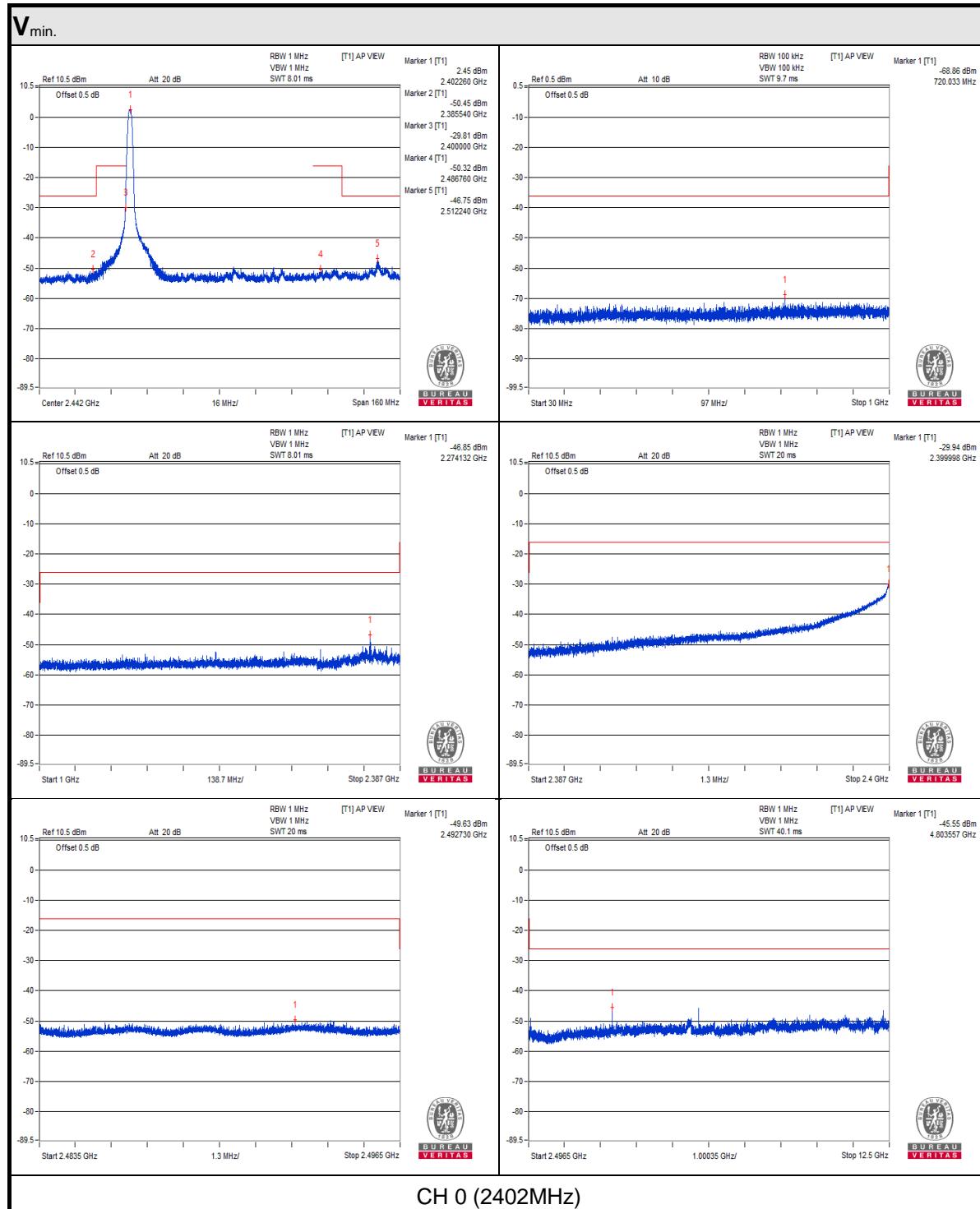
TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V_{normal}	30MHz to 1000MHz	853.408	0.000087	0.25	PASS
	1000MHz to 2387MHz	2274.306	0.018365	2.5	PASS
	2387MHz to 2400MHz	2400.000	1.016249	25	PASS
	2483.5MHz to 2496.5MHz	2493.830	0.008710	25	PASS
	2496.5MHz to 12500MHz	4803.557	0.034277	2.5	PASS
$V_{max.}$	30MHz to 1000MHz	733.735	0.000091	0.25	PASS
	1000MHz to 2387MHz	2274.132	0.018967	2.5	PASS
	2387MHz to 2400MHz	2399.998	0.986279	25	PASS
	2483.5MHz to 2496.5MHz	2492.733	0.012274	25	PASS
	2496.5MHz to 12500MHz	4803.557	0.055463	2.5	PASS
$V_{min.}$	30MHz to 1000MHz	720.033	0.000130	0.25	PASS
	1000MHz to 2387MHz	2274.132	0.020654	2.5	PASS
	2387MHz to 2400MHz	2399.998	1.013911	25	PASS
	2483.5MHz to 2496.5MHz	2492.730	0.010889	25	PASS
	2496.5MHz to 12500MHz	4803.557	0.027861	2.5	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V_{normal}	30MHz to 1000MHz	998.908	0.000092	0.25	PASS
	1000MHz to 2387MHz	2311.755	0.026363	2.5	PASS
	2387MHz to 2400MHz	2393.137	0.010328	25	PASS
	2483.5MHz to 2496.5MHz	2486.156	0.009638	25	PASS
	2496.5MHz to 12500MHz	4879.833	0.056105	2.5	PASS
$V_{max.}$	30MHz to 1000MHz	939.617	0.000087	0.25	PASS
	1000MHz to 2387MHz	2312.102	0.021528	2.5	PASS
	2387MHz to 2400MHz	2393.329	0.010328	25	PASS
	2483.5MHz to 2496.5MHz	2485.924	0.011535	25	PASS
	2496.5MHz to 12500MHz	4879.833	0.050816	2.5	PASS
$V_{min.}$	30MHz to 1000MHz	717.851	0.000093	0.25	PASS
	1000MHz to 2387MHz	2312.102	0.012331	2.5	PASS
	2387MHz to 2400MHz	2393.254	0.009204	25	PASS
	2483.5MHz to 2496.5MHz	2486.790	0.009954	25	PASS
	2496.5MHz to 12500MHz	4879.833	0.045499	2.5	PASS

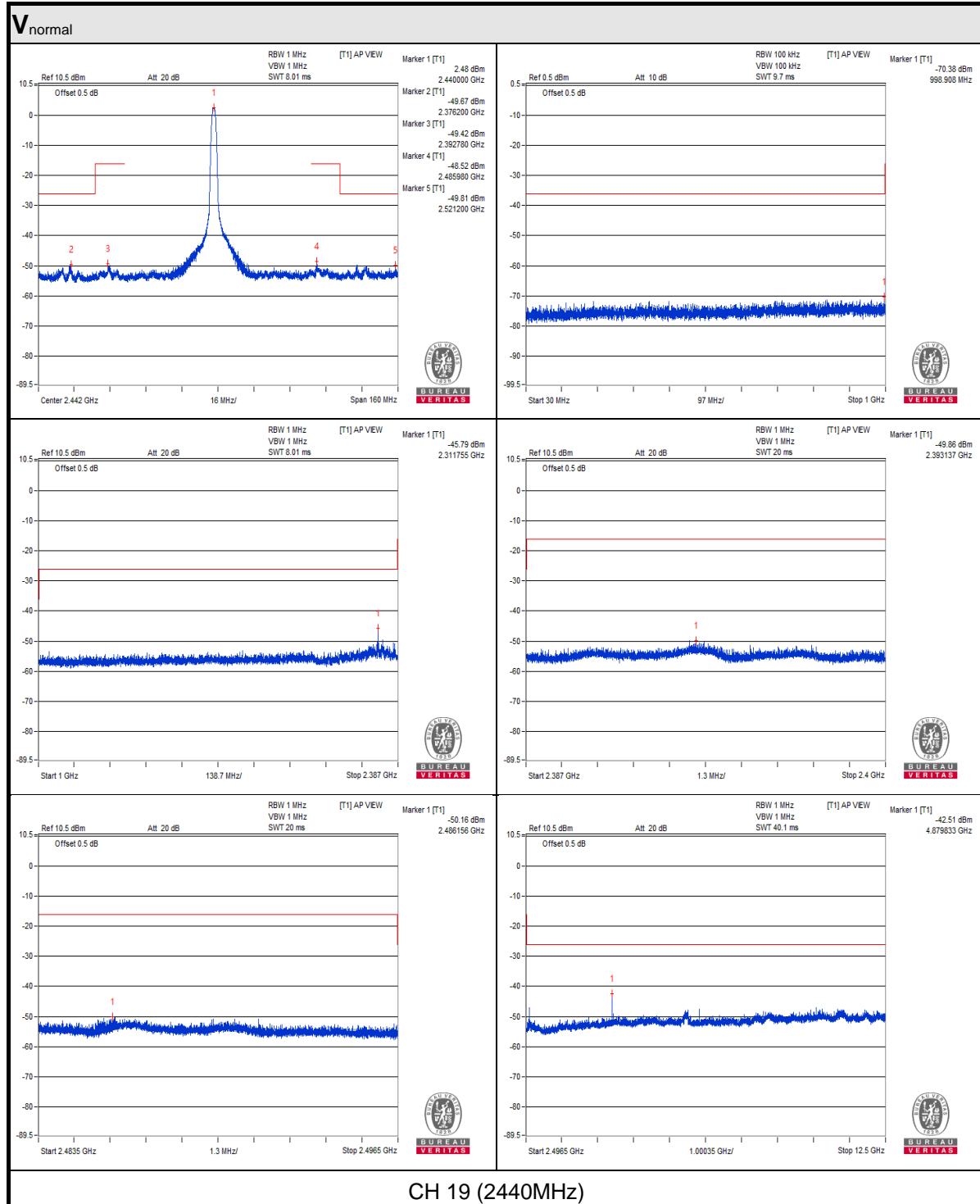
TEST CHANNEL		CH 39 (2480MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V_{normal}	30MHz to 1000MHz	990.785	0.000085	0.25	PASS
	1000MHz to 2387MHz	2352.151	0.024099	2.5	PASS
	2387MHz to 2400MHz	2387.238	0.007962	25	PASS
	2483.5MHz to 2496.5MHz	2483.524	0.264241	25	PASS
	2496.5MHz to 12500MHz	4959.861	0.070307	2.5	PASS
V_{max.}	30MHz to 1000MHz	963.140	0.000100	0.25	PASS
	1000MHz to 2387MHz	2352.498	0.015276	2.5	PASS
	2387MHz to 2400MHz	2391.494	0.007638	25	PASS
	2483.5MHz to 2496.5MHz	2483.524	0.257040	25	PASS
	2496.5MHz to 12500MHz	4959.861	0.043954	2.5	PASS
V_{min.}	30MHz to 1000MHz	721.731	0.000124	0.25	PASS
	1000MHz to 2387MHz	2351.631	0.018967	2.5	PASS
	2387MHz to 2400MHz	2387.643	0.008570	25	PASS
	2483.5MHz to 2496.5MHz	2483.565	0.255270	25	PASS
	2496.5MHz to 12500MHz	4959.861	0.069183	2.5	PASS

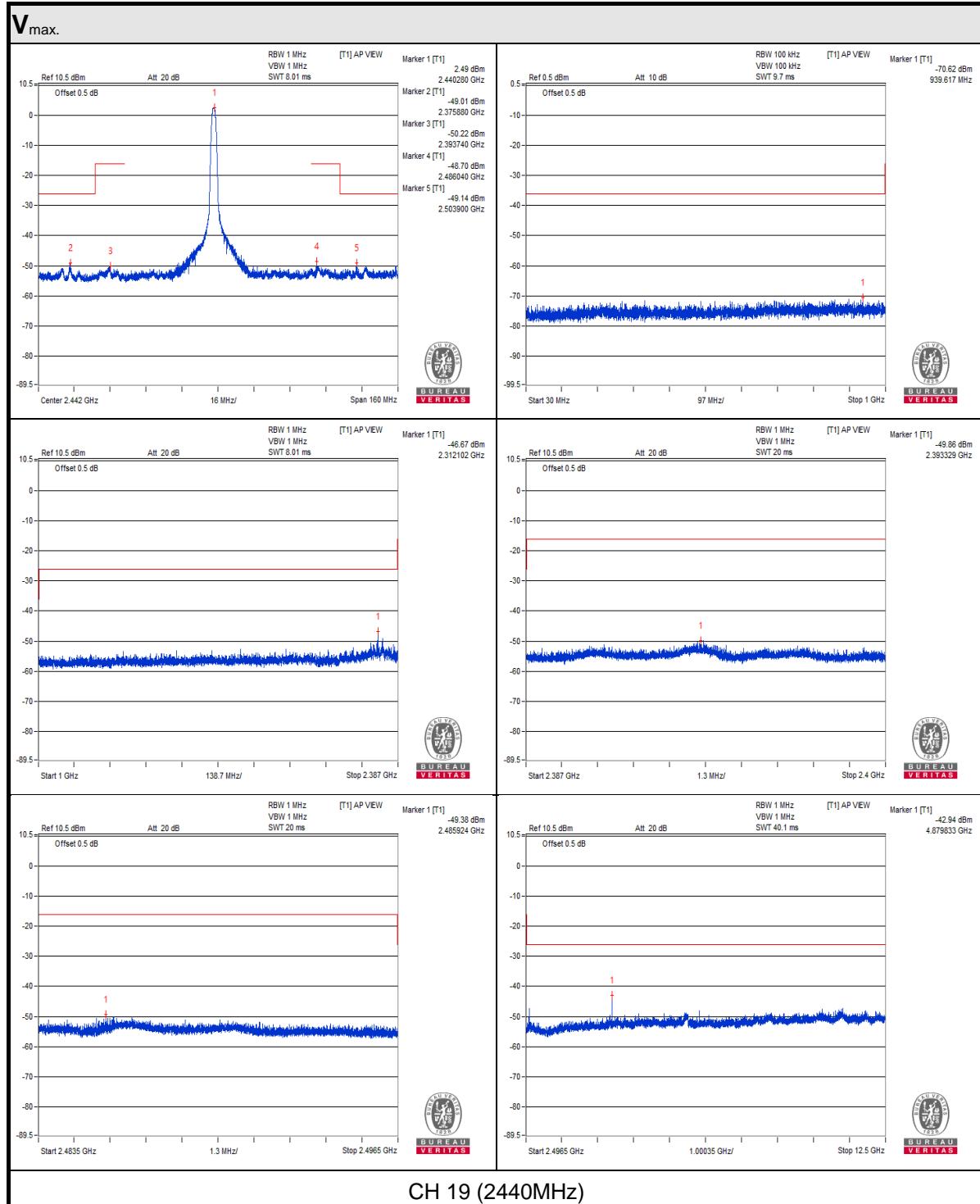
NOTE: The spectrum plots are attached on the following pages.

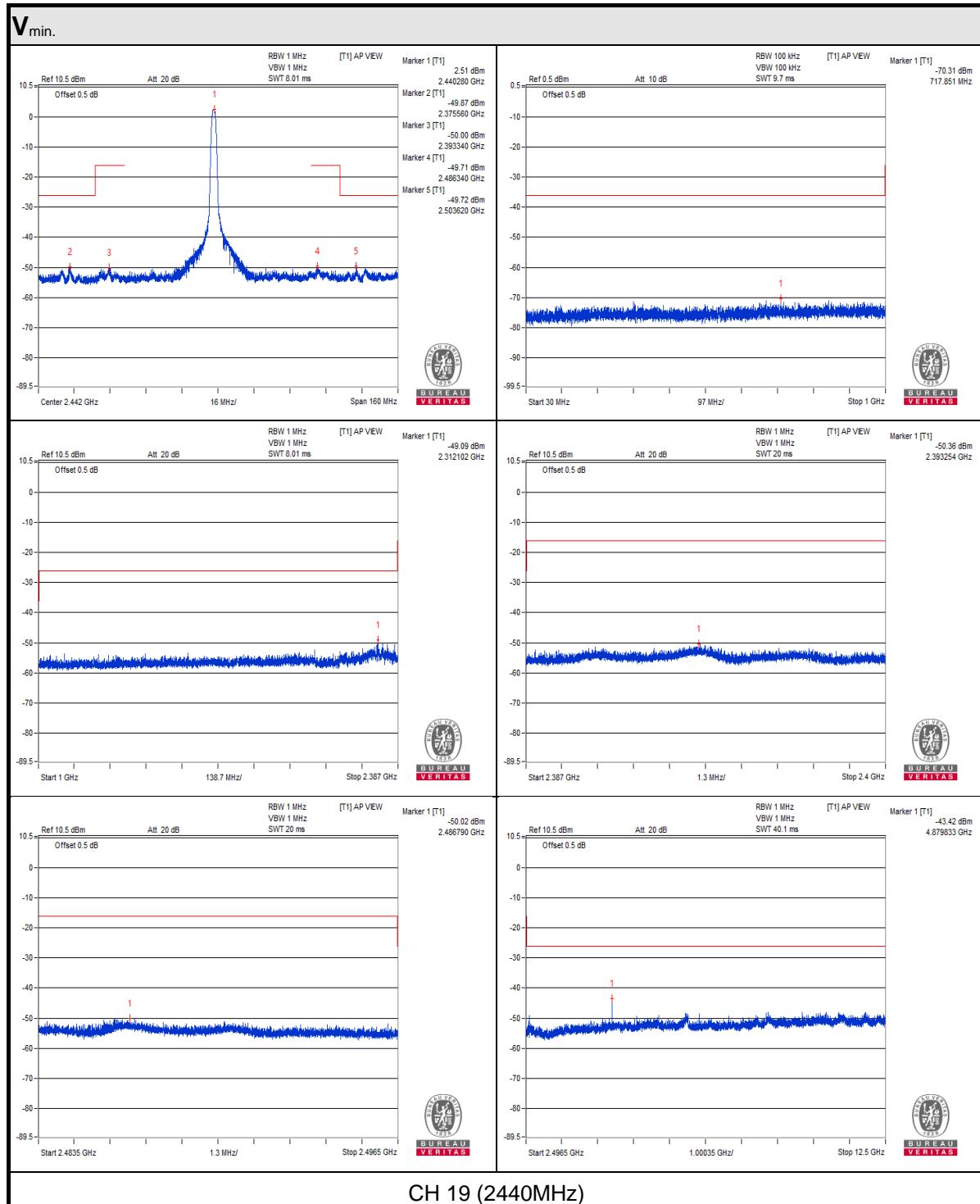


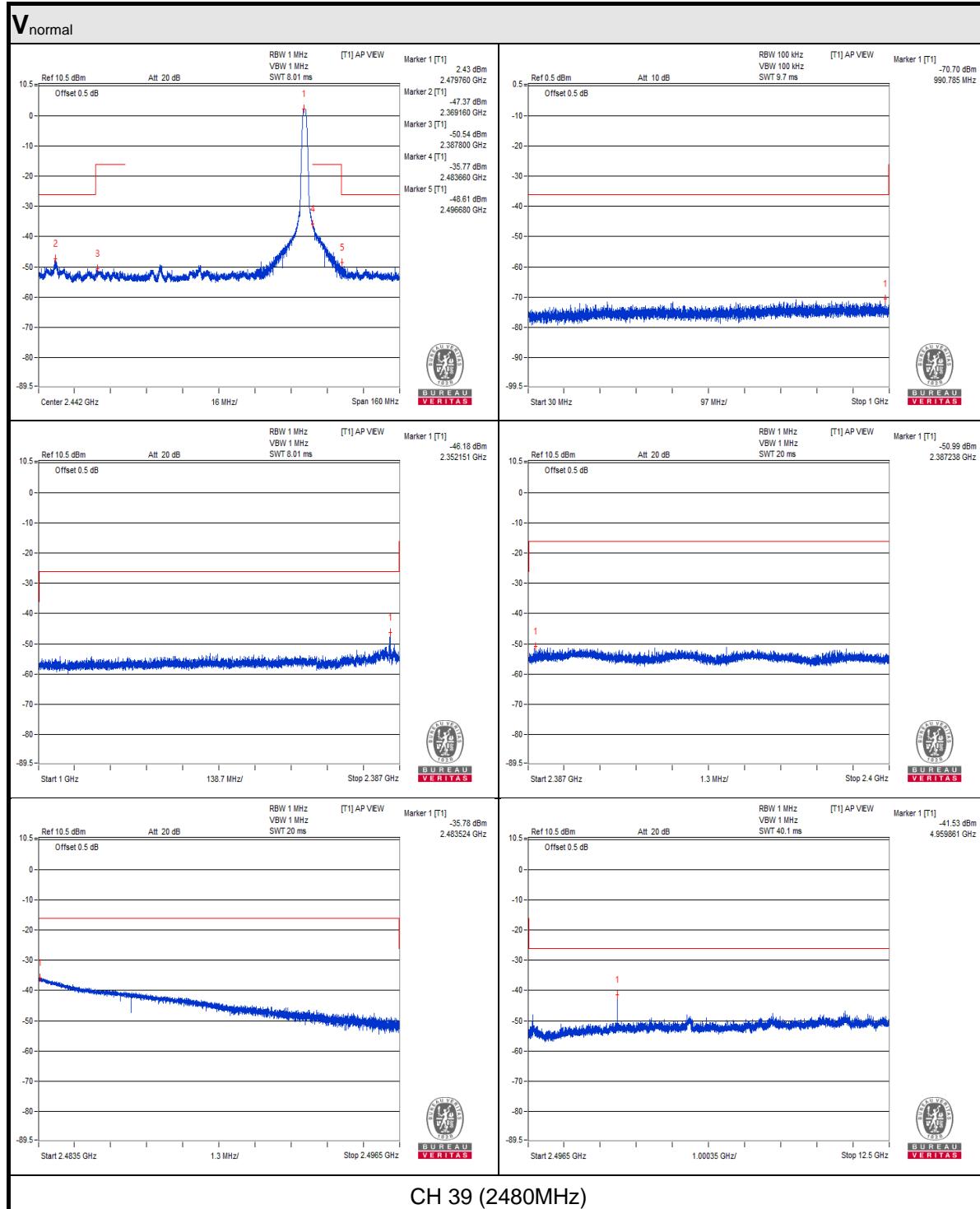


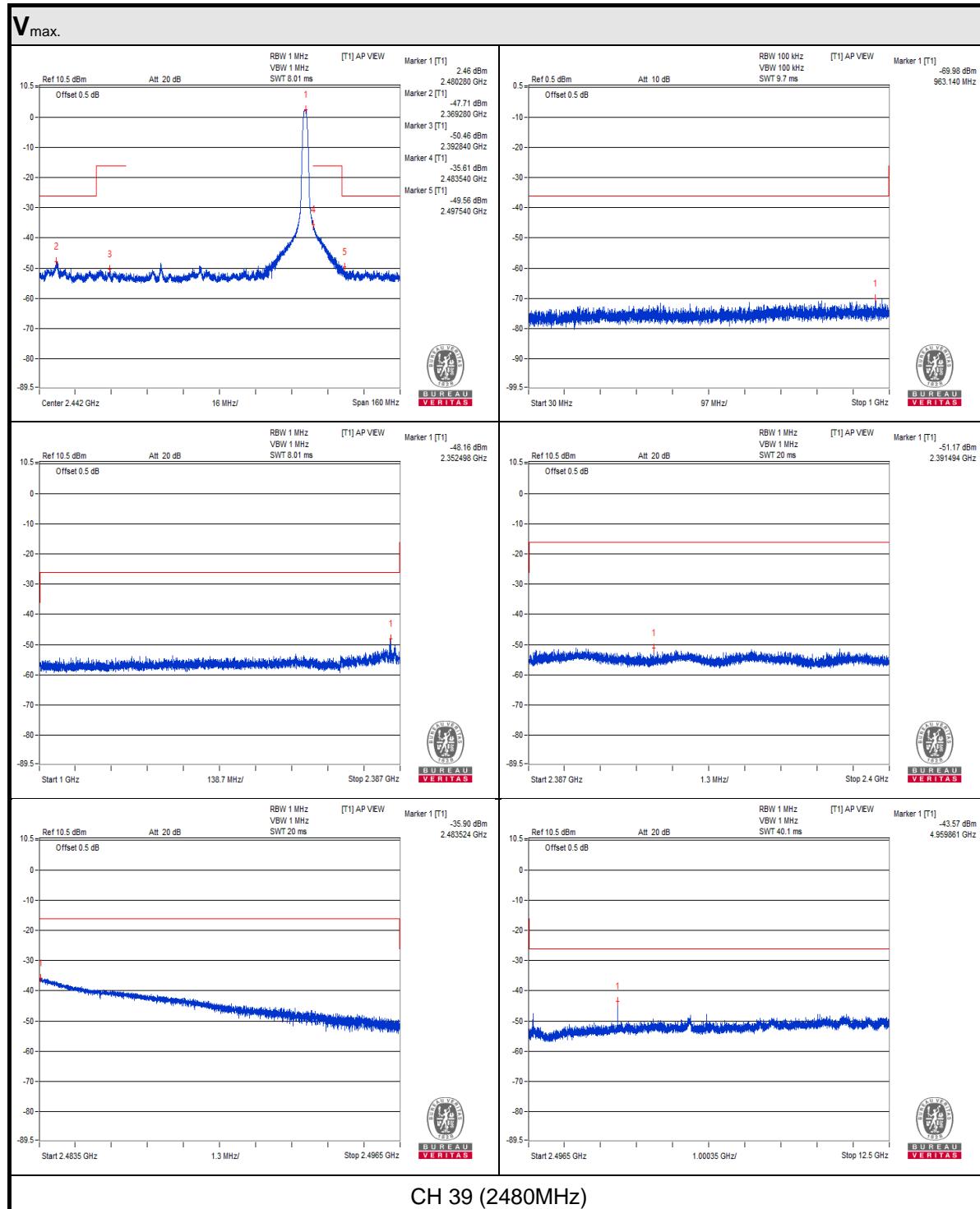


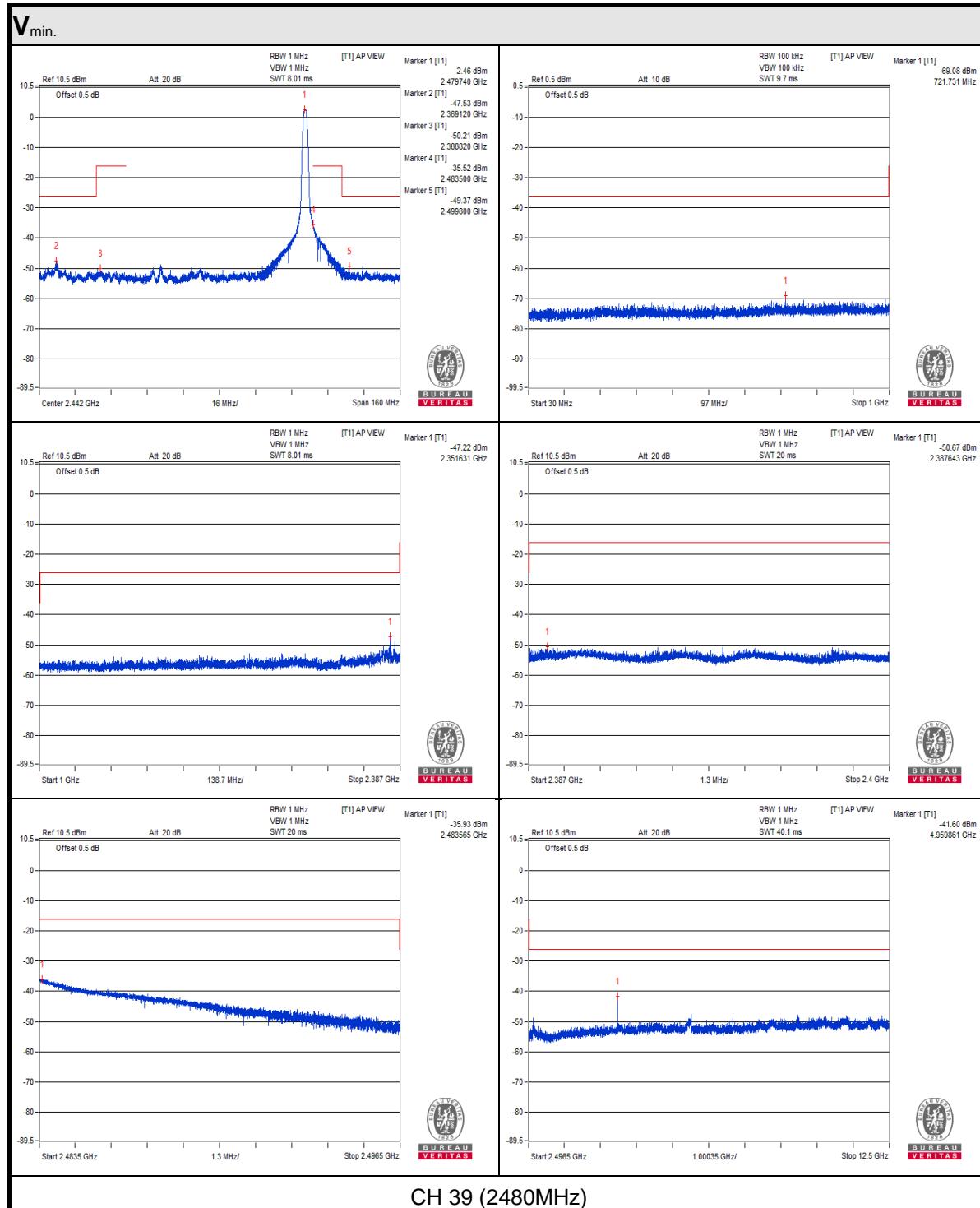












4.4 Antenna Power Measurement

4.4.1 Limits of Antenna Power

Modulation System	Frequency Band Used	Antenna Power (Max.)	EIRP Limit (Note 3)
DS	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 1)	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 2)	2400 – 2483.5 MHz	5 mW/MHz	9.13 dBm/MHz ~ 19.13 dBm/MHz (8.185 mW/MHz ~ 81.846 mW/MHz)
Other than the above	2400 – 2483.5 MHz	10 mW	12.14 dBm ~ 22.14 dBm (16.368 mW ~ 163.68 mW)

Note:

1. Occupied bandwidth is less than 26MHz
2. Occupied bandwidth is more than 26MHz and less than 38MHz
3. EIRP limit is variable by the HPBA, the HPBA (half-power beam width) of the antenna shall be $360/A$ degrees or less, where $A = \text{EIRP}/(2.14 \text{ dBi} + \text{"Antenna Power (limit)"})$.
4. Tolerance of antenna power shall be +20% (upper value) and -80% (lower value).

4.4.2 Test Setup



4.4.3 Test Results

Voltage	Channel Number	Frequency (MHz)	Conducted RF Output Power (mW)	Radiated RF Output Power (mW)
V_{normal}	0	2402	1.914	2.41
	19	2440	1.910	2.405
	39	2480	1.884	2.372
$V_{\text{max.}}$	0	2402	1.892	2.382
	19	2440	1.871	2.355
	39	2480	1.816	2.286
$V_{\text{min.}}$	0	2402	1.959	2.466
	19	2440	1.950	2.455
	39	2480	1.959	2.466
Max. Limit (mW):			10	-
Rated Power (mW):			2	-
Tolerance of Antenna Power (mW):			0.4 ~ 2.4	-
Max. EIRP Limit (mW):			-	16.368

Note: 1. Antenna gain is 1 dBi.

2. The radiated RF output power density is a “calculated” value derived from the conducted value.
3. Formula: Radiated RF output power density = Conducted RF output power density + Antenna gain

4.5 Spurious Emissions for Receiver

4.5.1 Limits of Spurious Emissions for Receiver

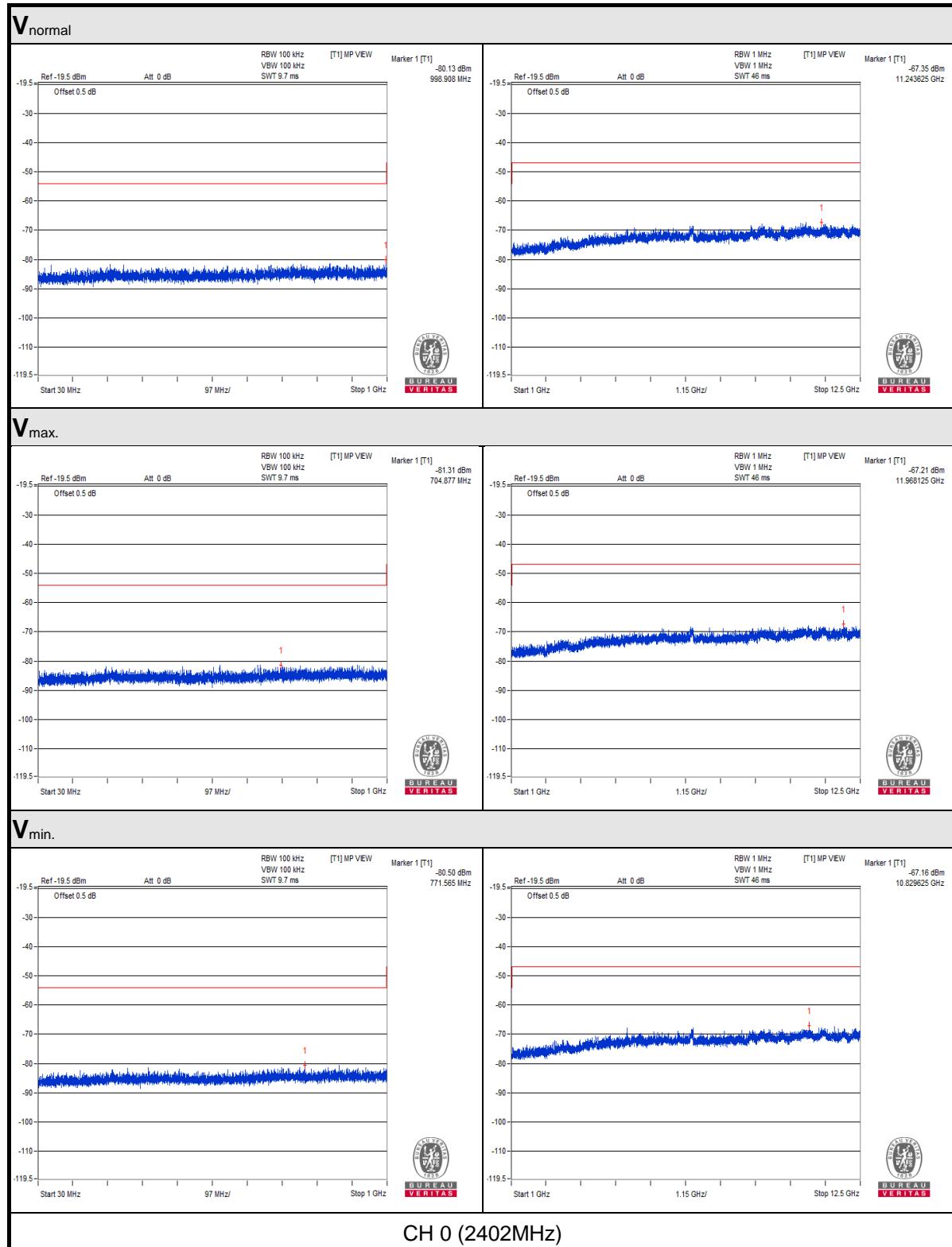
Frequencies (MHz)	Limit
Below 1GHz	$\leq 4\text{nW} (-54\text{dBm})$
Above 1GHz	$\leq 20\text{nW} (-47\text{dBm})$

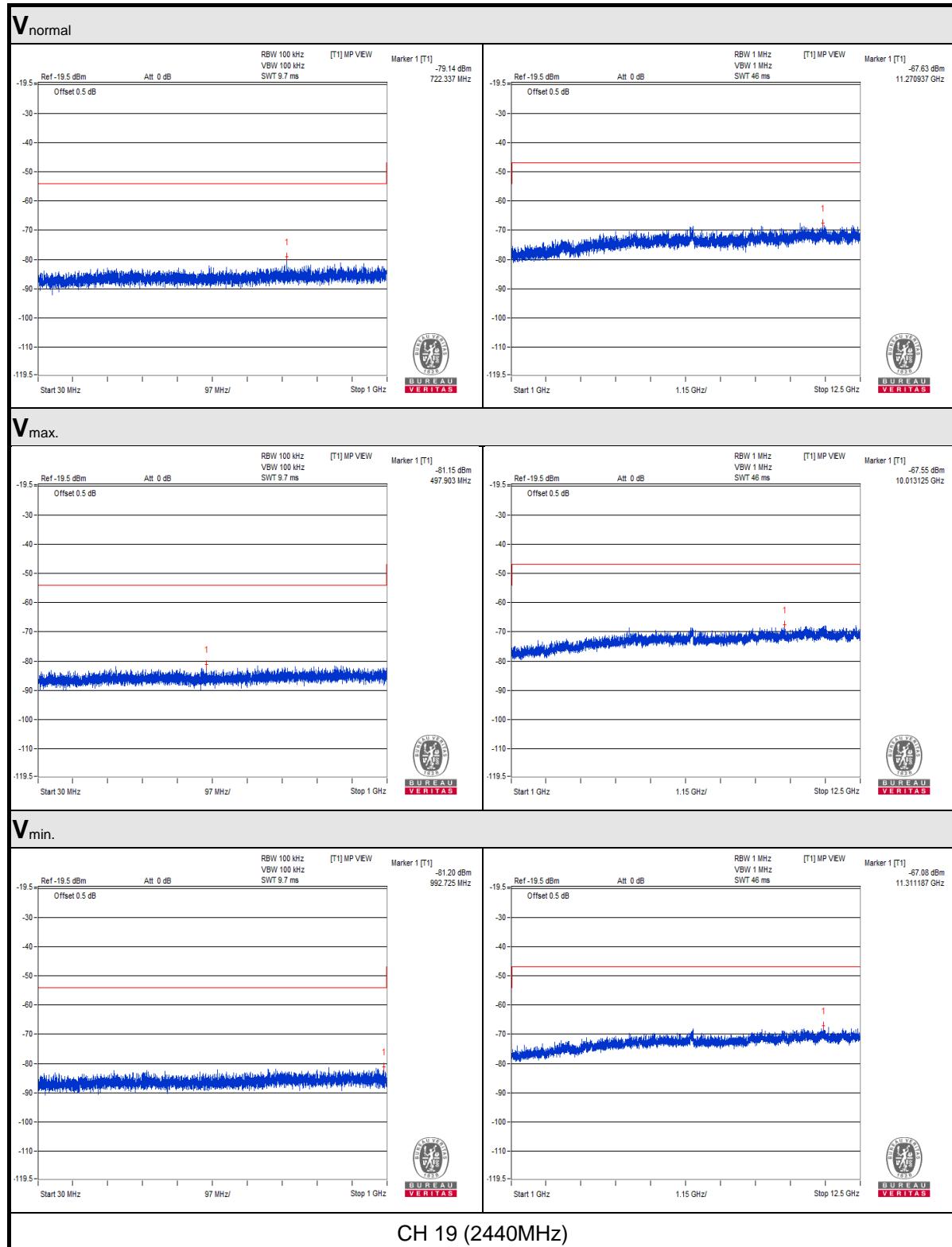
4.5.2 Test Setup

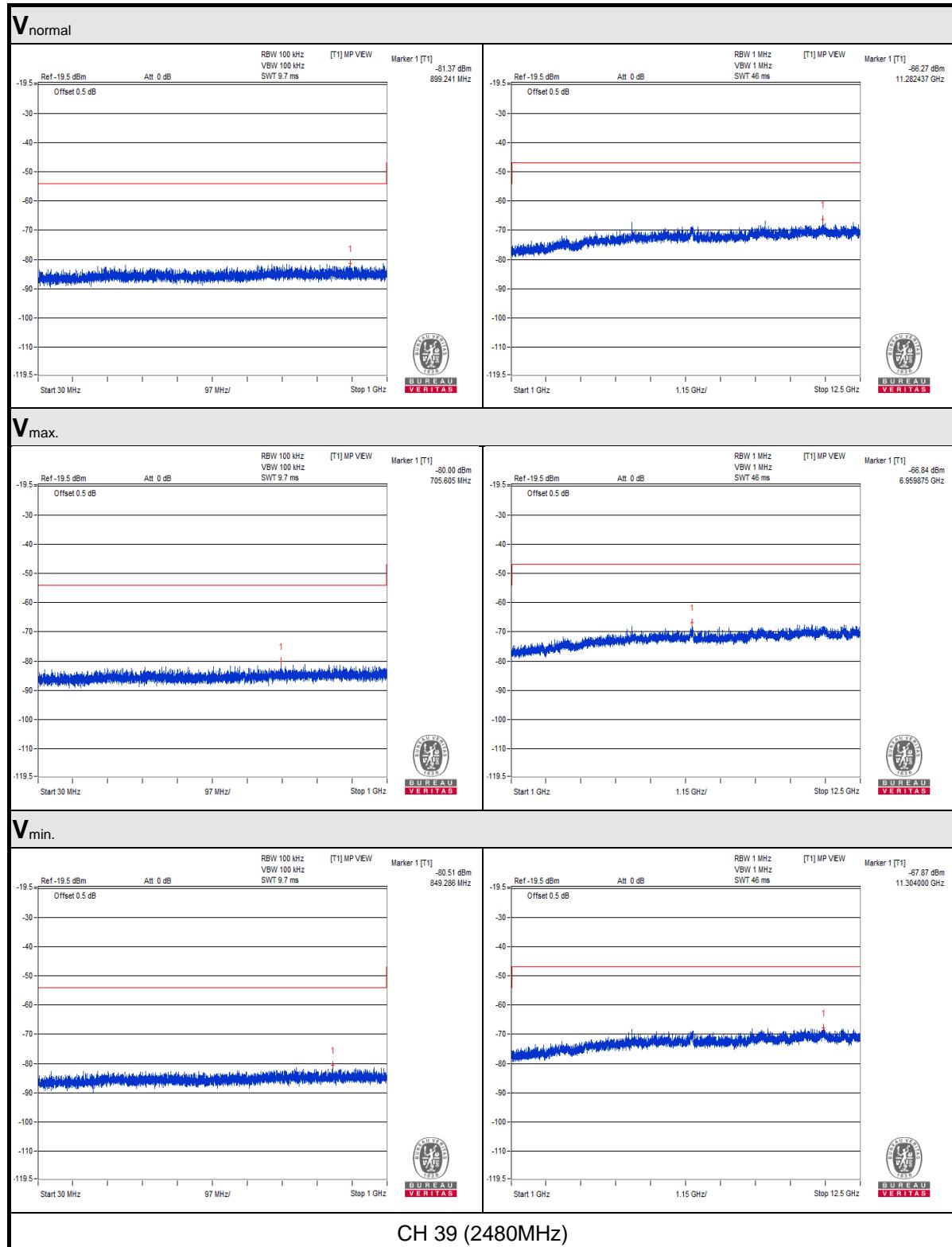


4.5.3 Test Result

TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(nW)	LIMIT (nW)	RESULT
V_{normal}	30MHz to 1000MHz	998.908	0.009705	4.0	PASS
	1000MHz to 12500MHz	11243.625	0.184077	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	704.877	0.007396	4.0	PASS
	1000MHz to 12500MHz	11968.125	0.190108	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	771.565	0.008913	4.0	PASS
	1000MHz to 12500MHz	10829.625	0.192309	20.0	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V_{normal}	30MHz to 1000MHz	722.337	0.012190	4.0	PASS
	1000MHz to 12500MHz	11270.937	0.172584	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	497.903	0.007674	4.0	PASS
	1000MHz to 12500MHz	10013.125	0.175792	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	992.725	0.007586	4.0	PASS
	1000MHz to 12500MHz	11311.187	0.195884	20.0	PASS
TEST CHANNEL		CH 39 (2480MHz)			
V_{normal}	30MHz to 1000MHz	899.241	0.007295	4.0	PASS
	1000MHz to 12500MHz	11282.437	0.236048	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	705.605	0.010000	4.0	PASS
	1000MHz to 12500MHz	6959.875	0.207014	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	849.286	0.008892	4.0	PASS
	1000MHz to 12500MHz	11304.000	0.163305	20.0	PASS





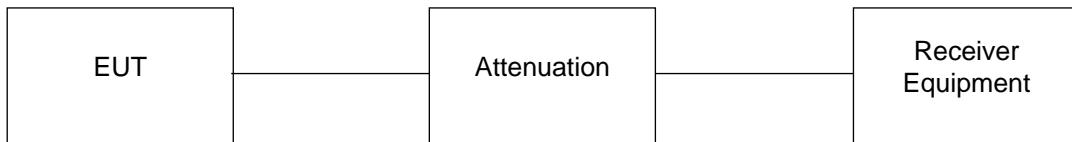


4.6 Interference Prevention Function

4.6.1 Limits of Interference Prevention Function

Radio equipment used mainly on the same premises and automatically transmits or receives identification code.

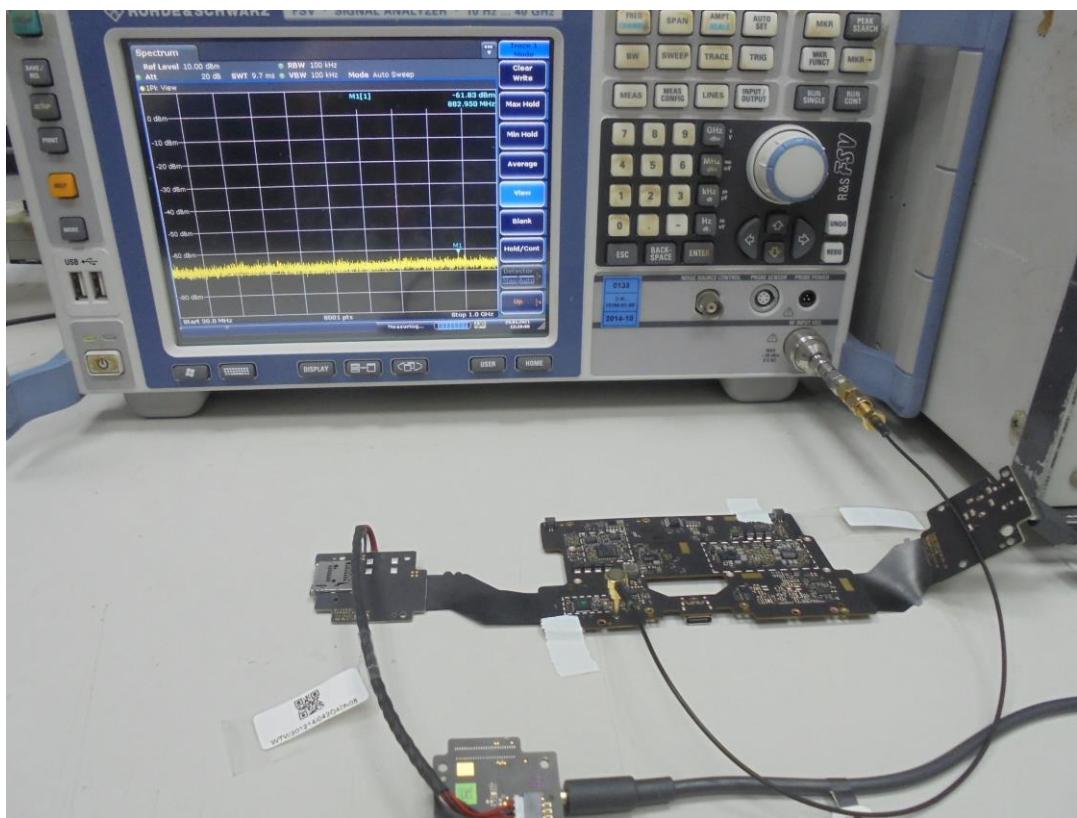
4.6.2 Test Setup



4.6.3 Test Results

Link Mode	Test Result
Normal	Pass

5 Photographs of the Test Configuration



Appendix - Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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