TEST REPORT

Report No.	:	AZ0039303(7)	Date :	30 Aug 2020
Application No.	:	LW033348(0)		
Applicant	:	Racefit International Company Ltd Unit 541, 5/F, Enterprise Place, No. 5 Science Park West Avenue, Hong Kong Science Park, Shatin, N.T.		
Sample Description	:	One(1) item of submitted sample stated to be Sensor module with BT 4.0 Rating : 3.7V Rechargeable battery No. of submitted sample : Four (4) piece (s)		
Date Received	:	10 Aug 2020		
Test Period	:	12 Aug 2020 – 26 Aug 2020		
Test Requested	:	FCC Certification for FCC Part 15, subpart C		
Test Method	:	47 CFR Part 15 (10-1-17 Edition), ANSI C63.10 – 2013, ANSI C63.4 – 2014		
Test Engineer	:	Mr. Leung Shu Kan, Ken		
Conclusion	:	The submitted sample was found to comply with technical requirement of FCC Part 15 Subpart C, section 15.247.		

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____ Page 1 of 44

Mr. WONG Lap-pong, Andrew
Manager

FCC ID: 2ARFZCRE001B1

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1 Product Information

1.1 General Information

Primary function	:	Bluetooth communication
Power supply	:	DC 3.7V
RF related function	:	Bluetooth communication
Electric Accessories sold with	:	NIL
Interconnection cable associated sold with	:	NIL
Operating condition	:	Not specified
Model difference	:	Not applicable

1.2 Technical Information

Operating Frequency	:	2402 – 2480MHz
Digital Modulation	:	Widband modulation
Modulation	:	GFSK
Number of Channel	:	40
Channel Bandwidth	:	1MHz
Occupied Bandwidth	:	762.376kHz
Signal Type	:	Data
Number of Antenna	:	One
Antenna Type	:	PCB Type Antenna
Antenna Gain	:	1.5 dBi
Rated Input Voltage	:	DC 3.7V
RF Technology Used	:	BLE
Simplex or Duplex	:	Half-duplex
Adaptivity	:	FHSS adaptivity

1.3 Associated Electric Accessories Informatin

NIL

1.4 Associated Cables

NIL

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2.0 Equipment Units Tested (EUT)

Product Description	:	Sensor module with BT 4.0
Serial No.	:	Not specified
Sample Type	:	Production Sample and engineering sample
Sample No.	:	RW040414-001
Rationale of selection	:	Only one model number

3.0 Location of Test Facility

CMA Industrial Development Foundation Ltd.
Room 1302, Yan Hing Centre,
9-13 Wong Chuk Yeung,
Fo Tan, Shatin,
New Territories
Hong Kong.

FCC Accredited Lab (Designation Number: HK0004)

FCC ID: 2ARFZCRE001B1

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4.0 List of test equipment, supporting equipment and cables

4.1 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	Rohde & Schwarz	ESCI	100152	15 Jan 2021	1Year
Spectrum Analyzer	R&S	FSV40	100964	29 Oct 2020	1Year
Biconical Antenna	Rohde & Schwarz	HK116	837414/004	20 Oct 2020	2Years
Log Periodic Antenna	Teseq	UPA6109	43666	20 Oct 2020	2Years
Loop Antenna	EMCO	6502	00056620	29 Oct 2020	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	02 Feb 2023	3Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	02 Feb 2023	3Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	15 Sep 2021	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	12 Sep 2021	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	07 May 2021	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	07 May 2021	1Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	14 Jan 2022	2Years
Rohde & Schwarz TS8997 Testing System					
Spectrum Analyzer	Rohde & Schwarz	FSV 40	101190	30 Oct 2021	2Years
Generator	Rohde & Schwarz	SMB100A	103230	24 Oct 2020	2Years
OSP	Rohde & Schwarz	OSP	OSP120 V02	29 Jun 2021	2Years

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5.0 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

Radiated emissions

Frequency	Uncertainty (U_{lab})
30MHz ~ 200MHz (Horizontal)	4.59dB
30MHz ~ 200MHz (Vertical)	4.49dB
200MHz ~1000MHz (Horizontal)	4.94dB
200MHz ~1000MHz (Vertical)	4.97dB
1GHz ~6GHz	4.52dB
6GHz ~18GHz	4.58dB

Line-conducted emissions

Frequency	Uncertainty (U_{lab})
150kHz~30MHz	2.80dB

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6.0 Measurement

6.1 General Test condition

Temperature	:	27.2ºC
Test Voltage	:	DC 3.7V
Humidity	:	53.5%
Atmosphere Pressure	:	101.0kPa

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6.2 Output Power

6.2.1 Measurement

Requirement	:	FCC Part 15 §15.247(b) (1)
Measuring procedure	:	ANSI C63.10:2013, section 11.9.1
Hopping mode	:	Disable
Modulation tested	:	GFSK
Channel tested for non-hopping mode	:	2402MHz, 2440MHz, 2480MHz
Additional measuring procedure	:	Nil
Remark	:	Nil

6.2.2 Final Result

Maximum peak conducted output power

Maximum peak conducted output power	Limit(s)	Result	Modulation
-6.0dBm	≤30.0dBm	PASS	GFSK

Remark: Detail test result and equipment setting refer to appendix A, A3, A10, A14.

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6.3 Power Spectral Density

6.3.1 Measurement

Requirement	:	FCC Part 15 §15.247(a)
Measuring procedure	:	ANSI C63.10:2013, section 11.10
Hopping mode	:	Disable
Modulation tested	:	GFSK
Channel tested for non-hopping mode	:	2402MHz, 2440MHz, 2480MHz
Additional measuring procedure	:	Nil
Remark	:	Nil

6.3.2 Final Result

Maximum peak conducted output power

Maximum peak conducted output power density	Limit(s)	Result	Modulation
-22.940dBm	≤8.0dBm	PASS	GFSK

Remark: 1) Detail test result and equipment setting refer to appendix A, A6, A13, A17.

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6.4 6dB Bandwidth

6.4.1 Measurement

Requirement	:	FCC Part 15 §15.247(a)
Measuring procedure	:	ANSI C63.10:2013, section 11.8
Hopping mode	:	Disable
Modulation tested	:	GFSK
Channel tested for non-hopping mode	:	2402MHz, 2440MHz, 2480MHz
Additional measuring procedure	:	Nil
Remark	:	Nil

6.4.2 Final Result

Maximum peak conducted output power

6dB bandwidth	Limit(s)[1]	Result	Modulation
762.376kHz	≥500kHz	PASS	GFSK

Remark: 1) Detail test result and equipment setting refer to appendix A, A4, A5, A11, A12, A15, A16.

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6.5 Band-edge measurement

6.5.1 Measurement

Requirement	:	FCC Part 15 §15.247(d)
Measuring procedure	:	ANSI C63.10:2013, section 11.13 and 6.10
Hopping mode	:	Disable
RBW	:	100kHz
VBW	:	300kHz
Frequency range	:	2310 – 2483.5MHz and 2400 – 2500MHz
Modulation tested	:	GFSK
Channel tested for non-hopping mode	:	2402MHz for lowed band edge and 2480MHz for higher band edge
Additional measuring procedure	:	For lower band edge (2400MHz) 1. Using the “Measurement 1” setting shown below the scan plot within the frequency span from 2400 – 2483.5MHz to measure the maximum peak value of fundamental 2. Using the “Measurement 2” setting shown below the scan plot within the freqeuncy span from 2310 – 2400MHz to measure the bandedge reading 3. Compare that reading in procedure with the limit which equal to the measured maximum peak in procedure 1 minus 20dB For Upper bandedge (2483.5MHz) 1. Using the “Measurement 1” setting shown below the scan plot within the frequency span from 2400 – 2483.5MHz to measure the maximum peak value of fundamental 2. Using the “Measurement 2” setting shown below the scan plot within the freqeunc y span from 2483.5 – 2500MHz to measure the bandedge reading 3. Compare that reading in procedure with the limit which equal to the measured maximum peak in procedure 1 minus 20dB

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6.5.2 Final Result

Bandedge frequency for lower bandedge (Worst Case)	Worst case (dBc)[2]	Detector	Limit[1] (dBc)	Result	Worst case
2399.925000MHz	48.0	Peak	≥20.0	PASS	GFSK
Bandedge frequency for higher bandedge (Worst Case)	Worst case in (dBc)[2]	Detector	Limit[1]	Result	Worst case
2483.775000MHz	52.5	Peak	≥20.0	PASS	GFSK

Remark: 1) The limit is based on the transmitter demonstrated compliance with peak conducted power limit on section 6.2.2 of this report.
2) The Worst case dBc is the peak values measured in procedure 1 minus the worst case bandedge emission
3) Detail test result and equipment setting refer to appendix A, A7-9, A18-20.

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6.6 Conducted Spurious emission (Transmitter)

6.6.1 Measurement

Requirement	:	FCC Part 15 §15.247(d)
Measuring procedure	:	ANSI C63.10:2013, section 5.5, 5.6, 7.8.8 and 11.12.2.1
Hopping mode	:	Disable
RBW	:	Refer to pre-measurement and final measurement setting
Detector	:	Refer to pre-measurement and final measurement setting
Modulation tested	:	GFSK
Channel tested for non-hopping mode	:	2402MHz, 2426MHz, 2480MHz
Additional measuring procedure	:	1) Setup engineering sample to channel 2402MHz to perform the measurement according to ANSI C63.10, section 7.8.8 with pre-measurement setting 2) If the pre-measurement is over the limit, the final measurement is performed for the specific frequency according to final measurement setting or restricted band frequency 3) For non-restricted band frequency, peak detector and 100kHz RBW will be used for final measurement. 4) Repeat the procedure 1 to 3 for channel frequency of 2426MHz and 2480MHz
Remark	:	Nil

6.6.2 Final Result

Worst case spurious emission frequency	Worst case spurious emission power[1]	Limit[2]	Margin	Result	Worst case mode
2485.750000MHz	-47.0dBm	-41.2dBm	5.8dB	PASS	GFSK

Remark: 1) Spurious emission power = measured conducted power + antnenna gain(dBi) +ground reflection factor according to ANSI C63.10 section 11.12.2.2 for restricted band emission.

2) For restricted band emission, limit = restricted band field strength limit (dBuV/m) + 4,7dB – 104.8dB according to ANSI C63.10 section 11.12.2.2 For non-restricted band , limit = SPD/100kHz – 20dB.

3) Detail test result and equipment setting refer to appendix A, A21-29.

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6.7 Radiated Spurious emission (Transmitter)

6.7.1 Measurement

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 0.4m and 0.8m high above the ground for below 1GHz measurement and 1.5m high above the ground for above 1GHz measurement. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

For 30MHz to 300MHz, biconical antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. And the reference point of antenna shall be 1 m above the ground. Same procedure for frequency 300MHz to 1000MHz but Log-periodic antenna is used for final measurements.

For above 1GHz, horn antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. Preamplifier and High Pass filter was used for measurements. The reference point of antenna shall be 1 m above the ground.

The device was rotated through three X, Y, Z orthogonal to determine which attitude and configuration produce the highest emission during measurement for Radiated Emission measurement.

The Frequencies from fundamental up to the tenth harmonics were investigated, and emissions more 20dB below limit were not reported.

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6.7.2 Final Result

Test mode: Transmission mode

Polarization	Frequency (MHz)	Reading at 3m (dBµV)	Transducer Factor (dB/m)	Field Strength at 3m[1] (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)	Detector (PK/ QP/AV)
H	2400.000	69.4	-4.6	64.8	74.0	-9.2	PK
H	2400.000	42.6	-4.6	38.0	54.0	-16.0	AV
V	2400.000	65.1	-4.6	60.5	74.0	-13.5	PK
V	2400.000	41.6	-4.6	37.0	54.0	-17.0	AV
H	2483.500	54.7	-4.6	50.1	54.0	-3.9	PK
V	2483.500	54.8	-4.6	50.2	54.0	-3.8	PK
H	4804.288	35.4	3.2	38.6	54.0	-15.4	PK
V	4804.400	35.0	3.2	38.2	54.0	-15.8	PK
H	4880.163	35.6	3.2	38.8	54.0	-15.2	PK
V	4879.526	35.3	3.2	38.5	54.0	-15.5	PK
H	4960.112	35.9	3.8	39.7	54.0	-14.3	PK
V	4959.641	35.6	3.8	39.4	54.0	-14.6	PK
H	7205.706	33.8	10.4	44.2	54.0	-9.8	PK
V	7205.551	34.7	10.4	45.1	54.0	-8.9	PK
H	7319.836	34.4	10.4	44.8	54.0	-9.2	PK
V	7320.383	35.4	10.4	45.8	54.0	-8.2	PK
H	7439.905	35.0	10.4	45.4	54.0	-8.6	PK
V	7440.033	34.4	10.4	44.8	54.0	-9.2	PK

Remark: 1) Field Strength = Reading + transducer factor.
2) Other emission with more than 20dB margin are not reported in this report.
3) For emission above 1GHz, the Peak test data is compared with Average limit if the Peak measured is lower than Average limit.

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APPENDIX A Test Result

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FCC Part 47 §15.247 2400-2483.5 MHz 2016

DUT Information

Frequencies
2402 MHz (2402 MHz) 2440 MHz (2440 MHz) 2480 MHz (2480 MHz)

Bandwidths
1.1 MHz (1.1 MHz)

Power
0.000 dBm (0 dBm)

Beamforming Gain
0.000 dBm (0 dBm) 0 dB

Gain Tables
0.000 dBm (0 dBm) Port 1: 1.5;

DUT Settings

No. of transmission chains	1
Equipment Type	Other
Digital Modulation	Yes
Frequency Hopping	No

Hardware Setup: WMS Measurements\TS8997

Spectrum Analyzer:	SA FSV 40 (SA FSV 40) @ VISA (ADR TCPIP::192.168.48.148::inst0::instr), SN 1321.3008K39/101190, FW 2.30 SP4
Vector Generator:	VG SMBV100A (VG SMBV100A) @ VISA (ADR TCPIP::192.168.48.149::inst0::instr), SN 262024, FW 3.1.19.8-3.20.281.28.7
Generator:	SMB100A (SMB100A) @ VISA (ADR TCPIP::192.168.48.152::inst0::instr), SN 103230, FW 3.20.390.24 / Drv:Rev 2.21.0, 07/2016, CVI 2015
OSP:	OSP-B157W (OSP-B157W) @ VISA (ADR TCPIP::192.168.48.157::inst0::instr), SN 1527.1144.03 / 101057, FW 1.23.0.2

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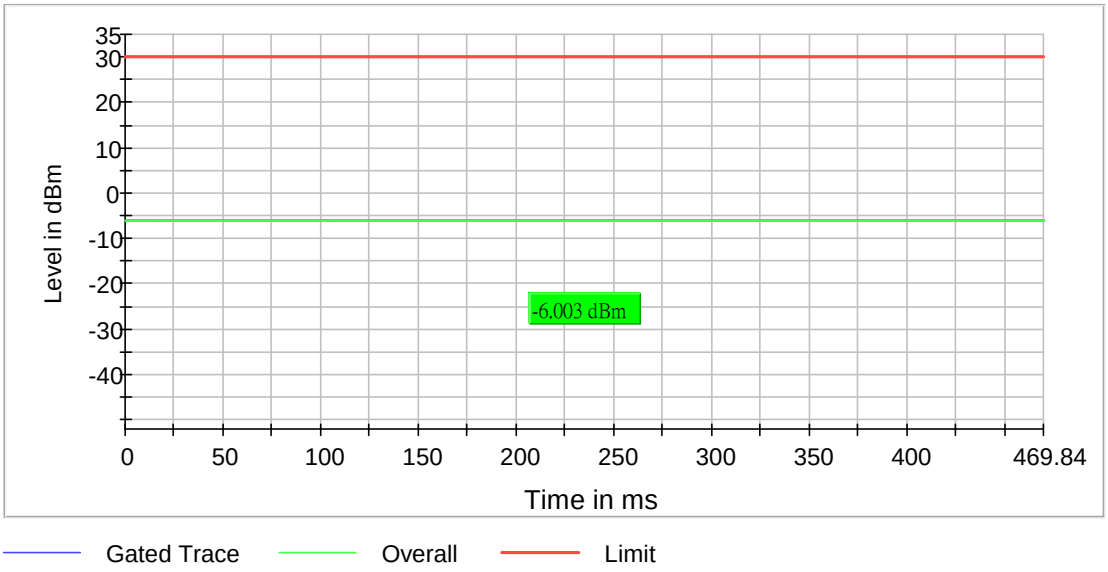
RF output power (2402 MHz)

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	DutyCycle (%)	Result
2402.000000	-6.0	30.0	46.854	PASS



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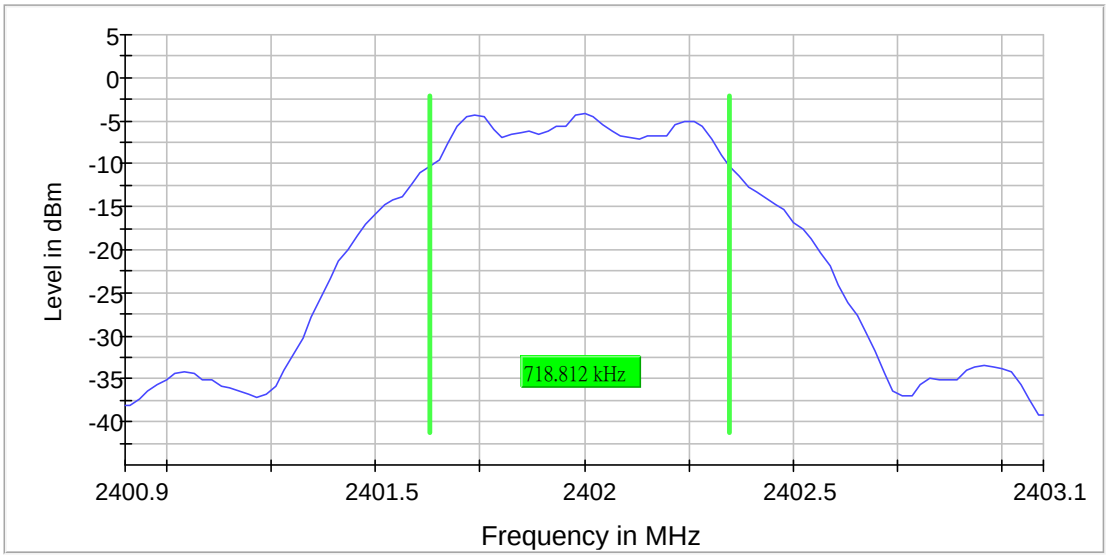
Minimum Emission Bandwidth 6 dB

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	0.718812	0.500000	---	2401.629703	2402.348515

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	-4.2	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40090 GHz	2.40090 GHz
Stop Frequency	2.40310 GHz	2.40310 GHz
Span	2.200 MHz	2.200 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 22
Sweeptime	19.009 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB

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Run	**7 / max. 150**	**max. 150**
Stable	**5 / 5**	**5**
Max Stable Difference	**0.15 dB**	**0.50 dB**

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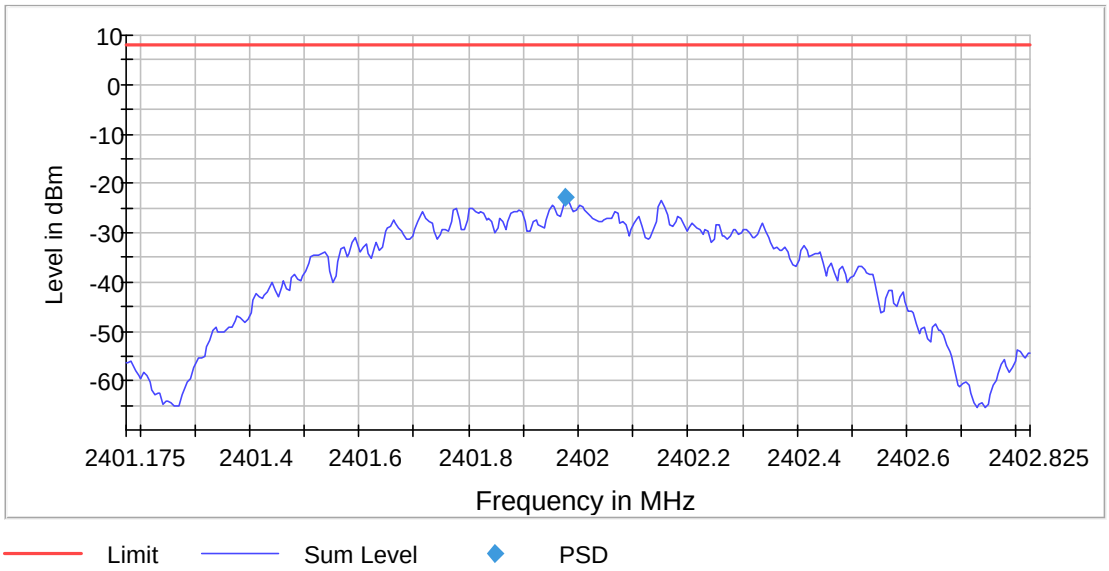
Power Spectral Density (2402 MHz)

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2401.977500	-22.940	8.0	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40118 GHz	2.40118 GHz
Stop Frequency	2.40283 GHz	2.40283 GHz
Span	1.650 MHz	1.650 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	330	~ 330
Sweeptime	1.650 s	1.650 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable	0.11 dB	0.50 dB

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Band Edge low (2402 MHz)

Result

DUT Frequency (MHz)	Result
2402.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2402.025000	-4.2

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.925000	-54.0	19.8	-34.2	PASS
2399.975000	-54.2	20.0	-34.2	PASS
2399.875000	-54.3	20.1	-34.2	PASS
2399.775000	-54.3	20.1	-34.2	PASS
2399.825000	-54.4	20.2	-34.2	PASS
2399.725000	-55.3	21.1	-34.2	PASS
2399.275000	-55.8	21.6	-34.2	PASS
2399.225000	-55.9	21.7	-34.2	PASS
2399.325000	-56.6	22.4	-34.2	PASS
2399.175000	-57.0	22.8	-34.2	PASS
2399.675000	-57.1	22.9	-34.2	PASS
2399.425000	-57.1	22.9	-34.2	PASS
2399.375000	-57.2	23.0	-34.2	PASS
2399.475000	-57.5	23.3	-34.2	PASS
2399.625000	-57.8	23.6	-34.2	PASS

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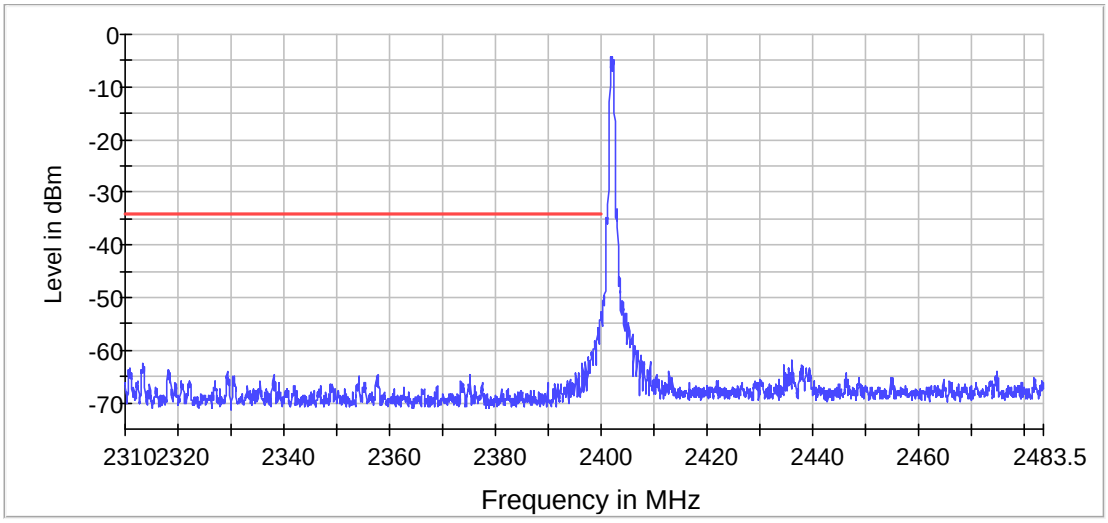

Measurement 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	1.800 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	10 / max. 150	max. 150
Stable	3 / 3	3
Max Stable	0.00 dB	0.50 dB

Measurement 2

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz

FCC ID: 2ARFZCRE001B1

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TEST REPORT

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SweepPoints	1670	~ 1670
Sweeptime	1.670 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	8 / max. 150	max. 150
Stable	3 / 3	3
Max Stable	0.18 dB	0.50 dB

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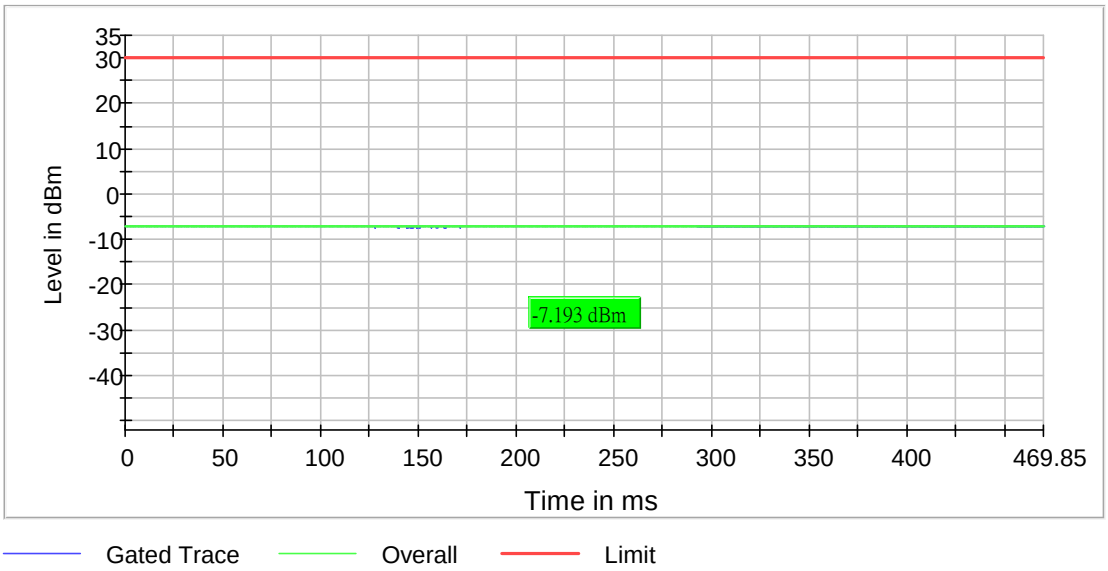
TEST REPORT

Report No. : AZ0039303(7) Date : 30 Aug 2020

RF output power (2440 MHz)

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	DutyCycle (%)	Result
2440.000000	-7.2	30.0	46.855	PASS



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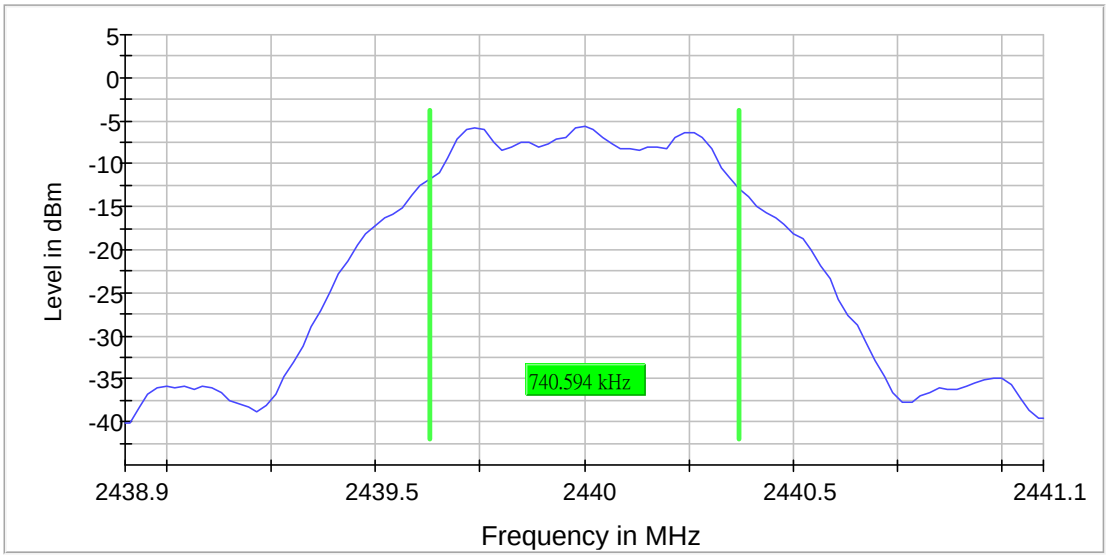
Minimum Emission Bandwidth 6 dB

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	0.740594	0.500000	---	2439.629703	2440.370297

DUT Frequency (MHz)	Max Level (dBm)	Result
2426.000000	-5.7	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43890 GHz	2.43890 GHz
Stop Frequency	2.44110 GHz	2.44110 GHz
Span	2.200 MHz	2.200 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 22
Sweeptime	19.009 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB

FCC ID: 2ARFZCRE001B1

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Run	**9 / max. 150**	**max. 150**
Stable	**5 / 5**	**5**
Max Stable Difference	**0.02 dB**	**0.50 dB**

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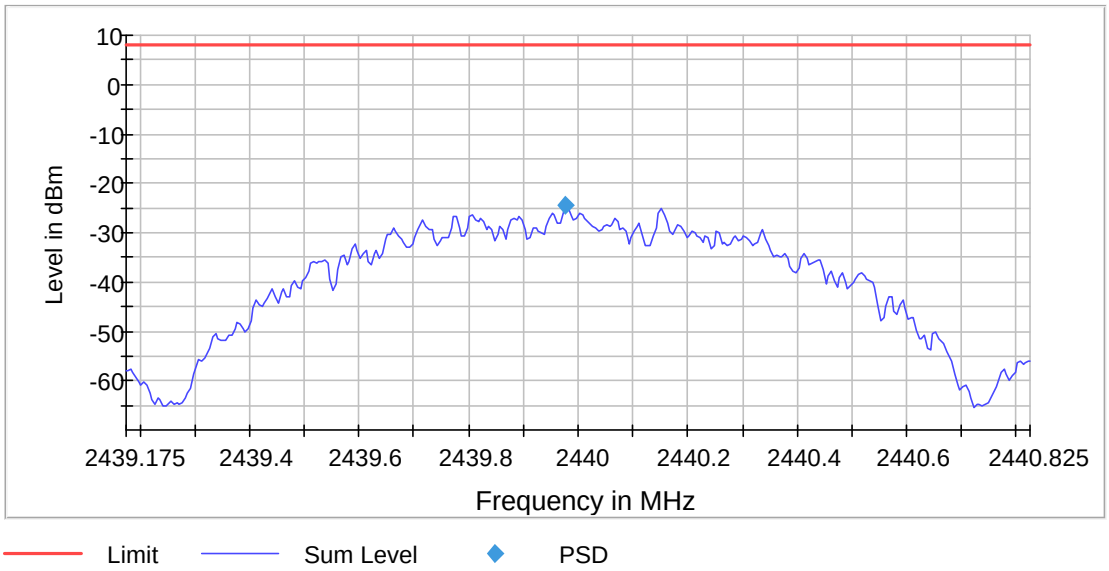
TEST REPORT

Report No. : AZ0039303(7) Date : 30 Aug 2020

Power Spectral Density (2440 MHz)

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2440.000000	2439.977500	-24.413	8.0	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43918 GHz	2.43918 GHz
Stop Frequency	2.44083 GHz	2.44083 GHz
Span	1.650 MHz	1.650 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	330	~ 330
Sweeptime	1.650 s	1.650 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable	0.13 dB	0.50 dB

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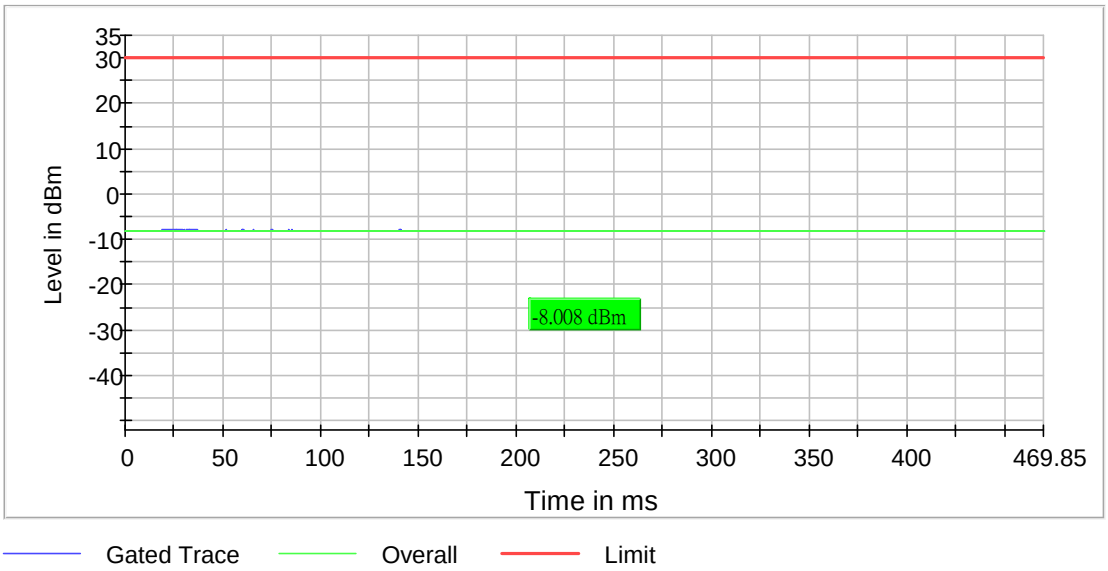
TEST REPORT

Report No. : AZ0039303(7) Date : 30 Aug 2020

RF output power (2480 MHz)

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	DutyCycle (%)	Result
2480.000000	-8.0	30.0	46.854	PASS



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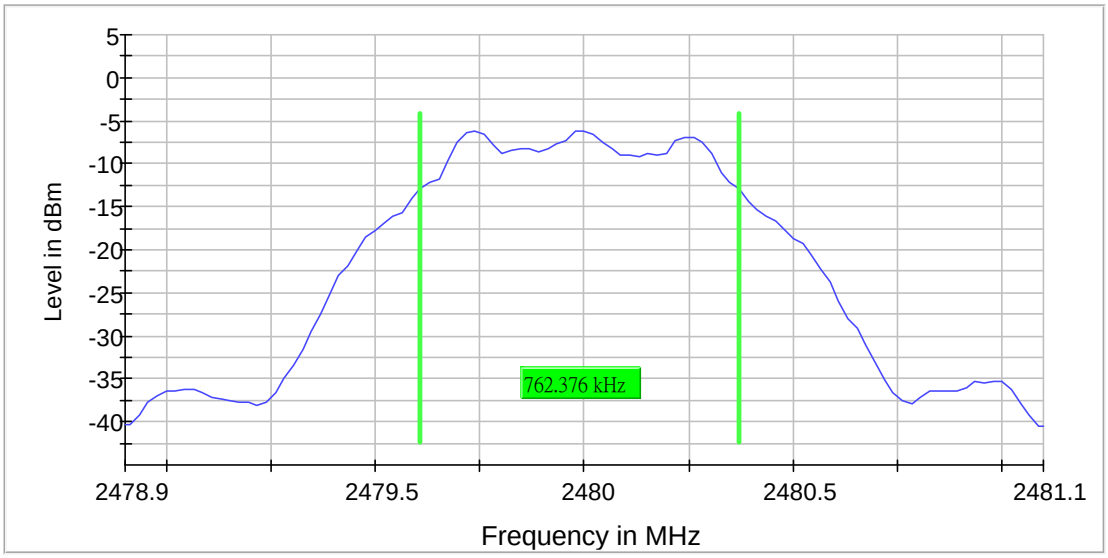
Minimum Emission Bandwidth 6 dB

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	0.762376	0.500000	---	2479.607921	2480.370297

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	-6.2	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47890 GHz	2.47890 GHz
Stop Frequency	2.48110 GHz	2.48110 GHz
Span	2.200 MHz	2.200 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 22
Sweeptime	19.009 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB

FCC ID: 2ARFZCRE001B1

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Run	**10 / max. 150**	**max. 150**
Stable	**5 / 5**	**5**
Max Stable Difference	**0.04 dB**	**0.50 dB**

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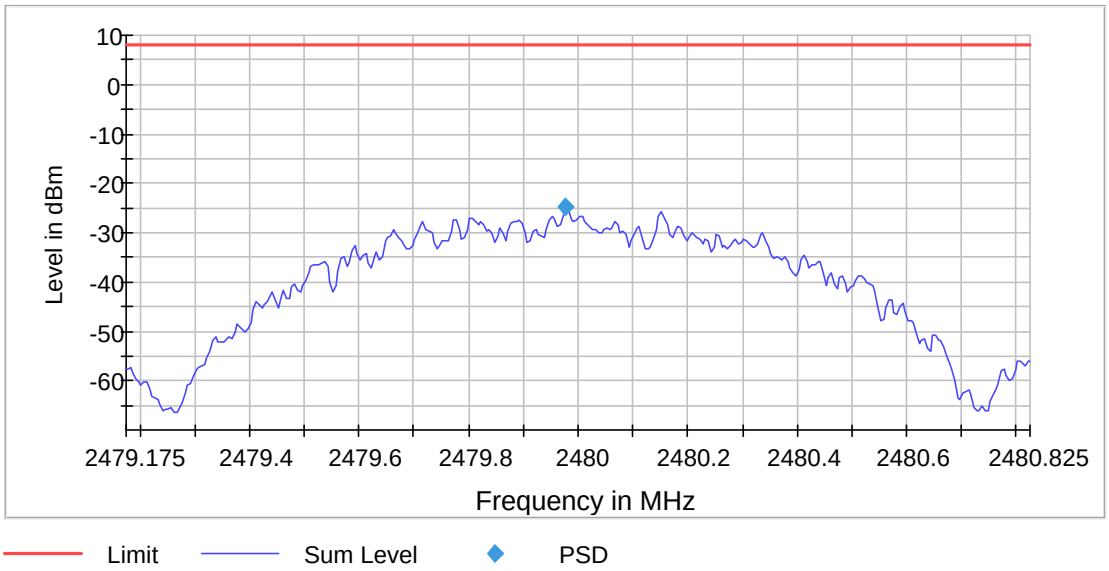
TEST REPORT

Report No. : AZ0039303(7) Date : 30 Aug 2020

Power Spectral Density (2480 MHz)

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2479.977500	-24.836	8.0	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47918 GHz	2.47918 GHz
Stop Frequency	2.48083 GHz	2.48083 GHz
Span	1.650 MHz	1.650 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	330	~ 330
Sweeptime	1.650 s	1.650 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable	0.14 dB	0.50 dB

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Band Edge high (2480 MHz)

Result

DUT Frequency (MHz)	Result
2480.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2480.025000	-6.2

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.775000	-58.5	22.3	-36.2	PASS
2483.825000	-58.7	22.5	-36.2	PASS
2483.725000	-58.7	22.5	-36.2	PASS
2483.675000	-59.3	23.1	-36.2	PASS
2483.875000	-59.5	23.3	-36.2	PASS
2483.925000	-59.9	23.7	-36.2	PASS
2483.625000	-60.0	23.8	-36.2	PASS
2483.575000	-60.4	24.2	-36.2	PASS
2484.375000	-60.6	24.4	-36.2	PASS
2484.325000	-60.7	24.5	-36.2	PASS
2484.925000	-60.8	24.6	-36.2	PASS
2484.875000	-60.9	24.7	-36.2	PASS
2484.225000	-60.9	24.7	-36.2	PASS
2484.425000	-60.9	24.7	-36.2	PASS
2484.275000	-60.9	24.7	-36.2	PASS

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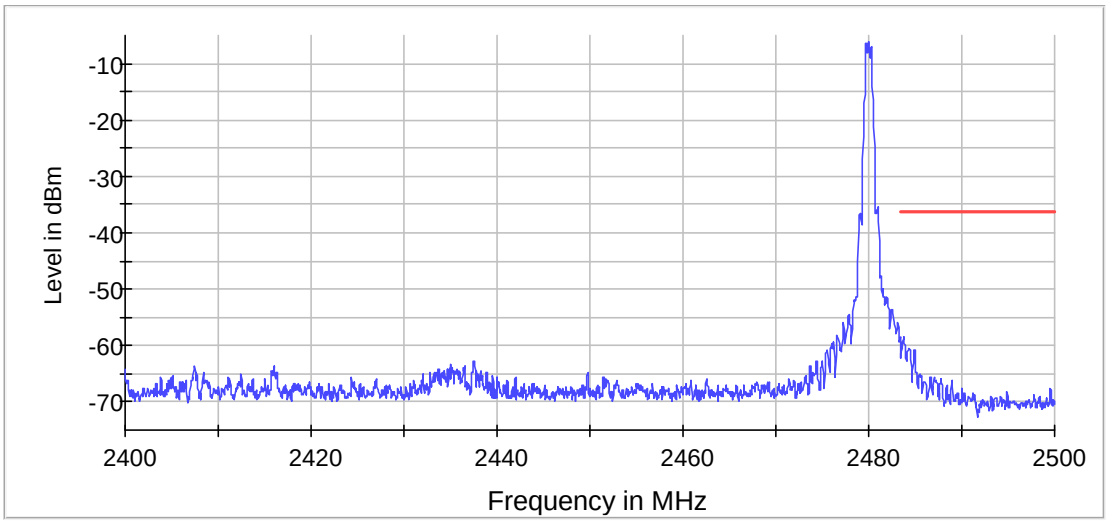

Measurement 1

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	1.670 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	6 / max. 150	max. 150
Stable	3 / 3	3
Max Stable	0.32 dB	0.50 dB

Measurement 2

Setting	Instrument Value	Target Value
Start Frequency	2.48350 GHz	2.48350 GHz
Stop Frequency	2.50000 GHz	2.50000 GHz
Span	16.500 MHz	16.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz

FCC ID: 2ARFZCRE001B1

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SweepPoints	330	~ 330
Sweeptime	37.969 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	5 / max. 150	max. 150
Stable	3 / 3	3
Max Stable	0.00 dB	0.50 dB

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TEST REPORT

Report No. : AZ0039303(7) Date : 30 Aug 2020

Tx Spurious Emission (2402 MHz)

Result

DUT Frequency (MHz)	Result
2402.000000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2398.250000	-43.7	9.3	-34.5
2399.750000	-44.1	9.6	-34.5
2397.750000	-45.0	10.5	-34.5
2398.750000	-45.9	11.5	-34.5
2273.750000	-54.4	13.2	-41.2
2274.250000	-55.3	14.1	-41.2
2396.750000	-49.1	14.6	-34.5
2396.250000	-49.1	14.6	-34.5
2399.250000	-49.5	15.1	-34.5
2294.750000	-57.7	16.5	-41.2
2274.750000	-57.9	16.7	-41.2
2388.750000	-58.2	17.0	-41.2
2275.250000	-59.0	17.8	-41.2
2288.250000	-59.3	18.1	-41.2
2293.750000	-59.6	18.4	-41.2

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	1000.000000	1	1
1000.000000	2400.000000	2	2
2400.000000	2483.500000	2	2
2483.500000	7000.000000	2	2
7000.000000	18000.000000	2	2
18000.000000	26000.000000	2	2

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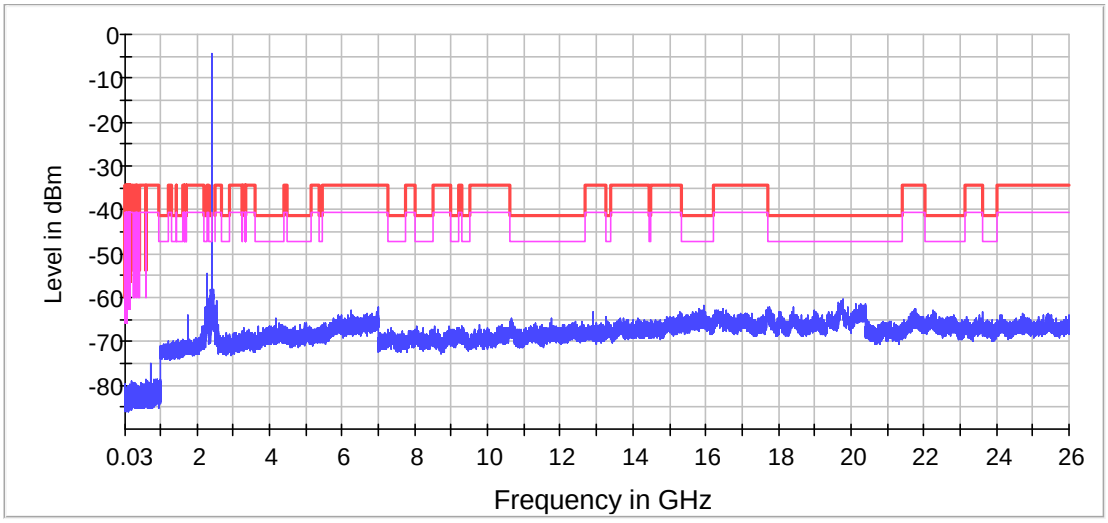

Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	19400	~ 19400
Sweeptime	19.400 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Pre Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	2800	~ 2800
Sweeptime	2.800 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30

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TEST REPORT

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Filter	**3 dB**	**3 dB**
Trace Mode	**Max Hold**	**Max Hold**
Sweeptype	**Sweep**	**AUTO**
Preamp	**off**	**off**
Stablemode	**Trace**	**Trace**
Stablevalue	**0.50 dB**	**0.50 dB**
Run	**7 / max. 150**	**max. 150**
Stable	**3 / 3**	**3**
Max Stable Difference	**0.00 dB**	**0.50 dB**

FCC ID: 2ARFZCRE001B1

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TEST REPORT

Report No. : AZ0039303(7) Date : 30 Aug 2020

Tx Spurious Emission (2440 MHz)

Result

DUT Frequency (MHz)	Result
2440.000000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

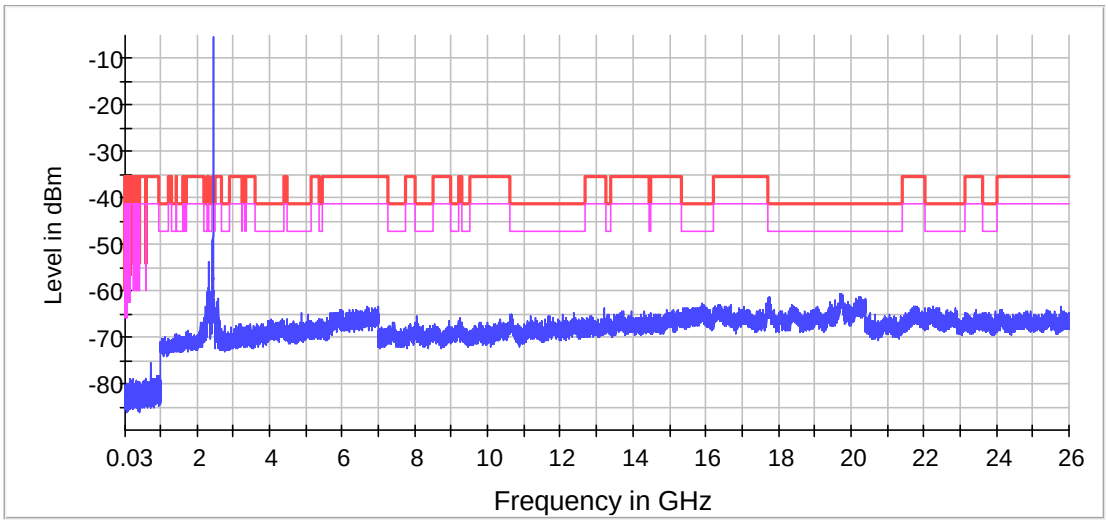
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2312.250000	-53.7	12.5	-41.2
2312.750000	-54.2	13.0	-41.2
2311.750000	-54.6	13.4	-41.2
2311.250000	-58.2	17.0	-41.2
2313.250000	-58.4	17.2	-41.2
2332.250000	-59.2	18.0	-41.2
2331.750000	-59.3	18.1	-41.2
2324.250000	-59.4	18.2	-41.2
2332.750000	-59.9	18.7	-41.2
2376.250000	-60.1	18.9	-41.2
2331.250000	-60.2	19.0	-41.2
2285.750000	-60.2	19.0	-41.2
2376.750000	-60.3	19.1	-41.2
2329.250000	-60.5	19.3	-41.2
2291.750000	-60.5	19.3	-41.2

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	1000.000000	1	1
1000.000000	2400.000000	2	2
2400.000000	2483.500000	2	2
2483.500000	7000.000000	2	2
7000.000000	18000.000000	2	2
18000.000000	26000.000000	2	2

FCC ID: 2ARFZCRE001B1

CMA Industrial Development Foundation Limited
Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.
Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmatesting.org Web Site: http://www.cmatesting.org



Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	19400	~ 19400
Sweeptime	19.400 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Pre Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	2800	~ 2800
Sweeptime	2.800 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30

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TEST REPORT

Report No. : AZ0039303(7) Date : 30 Aug 2020

Filter	**3 dB**	**3 dB**
Trace Mode	**Max Hold**	**Max Hold**
Sweeptype	**Sweep**	**AUTO**
Preamp	**off**	**off**
Stablemode	**Trace**	**Trace**
Stablevalue	**0.50 dB**	**0.50 dB**
Run	**12 / max. 150**	**max. 150**
Stable	**3 / 3**	**3**
Max Stable Difference	**0.00 dB**	**0.50 dB**

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TEST REPORT

Report No. : AZ0039303(7) Date : 30 Aug 2020

Tx Spurious Emission (2480 MHz)

Result

DUT Frequency (MHz)	Result
2480.000000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
2485.750000	-47.0	-73.8	-41.2	32.6	PASS

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2485.750000	-47.0	5.8	-41.2
2488.250000	-51.8	10.6	-41.2
2484.750000	-52.2	11.0	-41.2
2489.250000	-53.1	11.9	-41.2
2352.750000	-53.6	12.4	-41.2
2352.250000	-53.6	12.4	-41.2
2351.750000	-54.6	13.4	-41.2
2487.750000	-54.8	13.6	-41.2
2489.750000	-55.4	14.2	-41.2
2490.750000	-56.1	14.9	-41.2
2491.250000	-56.1	14.9	-41.2
2353.250000	-56.1	14.9	-41.2
2491.750000	-56.5	15.3	-41.2
2351.250000	-57.6	16.4	-41.2
2484.250000	-57.7	16.5	-41.2

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	1000.000000	1	1
1000.000000	2400.000000	2	2
2400.000000	2483.500000	2	2
2483.500000	7000.000000	2	2
7000.000000	18000.000000	2	2
18000.000000	26000.000000	2	2

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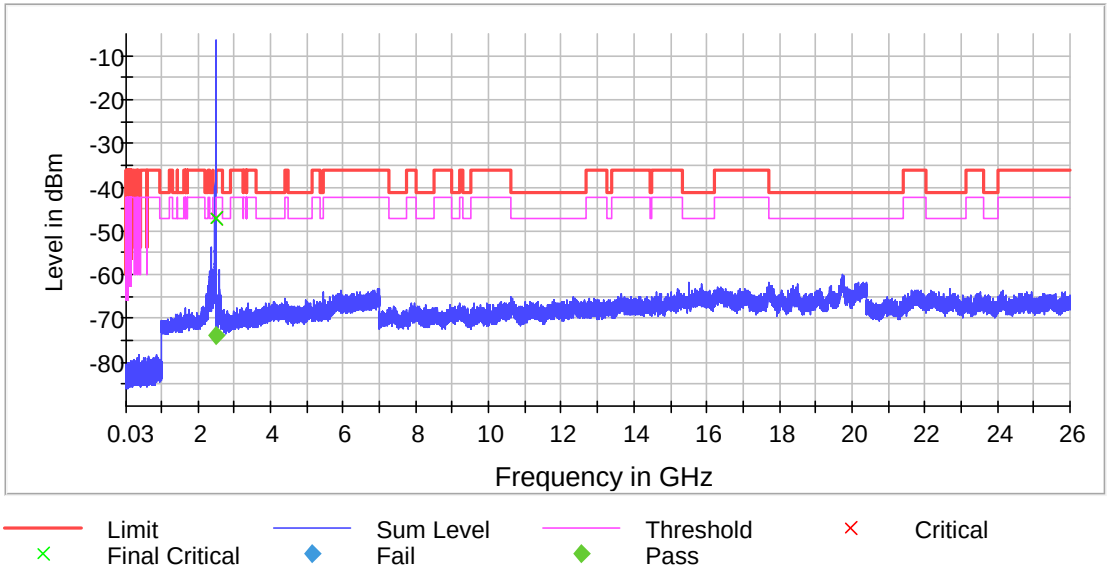

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VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	19400	~ 19400
Sweeptime	19.400 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Pre Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	2800	~ 2800
Sweeptime	2.800 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30

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Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	15 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Final Measurement 2

Setting	Instrument Value	Target Value
Span	ZeroSpan	ZeroSpan
RBW	1.000 MHz	~ 1.000 MHz
VBW	3.000 MHz	~ 3.000 MHz
SweepPoints	10001	~ 10001
Sweeptime	1.000 s	1.000 s
Reference Level	-40.000 dBm	-40.000 dBm
Attenuation	0.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off

***** End of Report *****

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