



Test Report

Date : 2020-08-07
No. : HM20070006

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Applicant: AB CIRCLE LIMITED
Room 609, Cross Office Uchisaiwaicho,
1-18-6, Nishi-Shimbashi, Minatoku,
Tokyo, Japan 105-003

Manufacturer: AB CIRCLE LIMITED
Room 609, Cross Office Uchisaiwaicho,
1-18-6, Nishi-Shimbashi, Minatoku,
Tokyo, Japan 105-003

Description of Sample(s): Product: Contactless Smart Card Reader
Brand Name: AB Circle Limited
Model Number: CIR415A

Date Sample(s) Received: 2020-07-02

Date Tested: 2020-07-15 to 2020-07-22

Statement: The result included is only for the 2.4GHz RF part of the product.
The test result in this report refers exclusively to the presented test model / sample.
The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in Article 2 Paragraph 1 Item 19 of the Certification and MIC Notice No. 88 Appendix No. 43. The test equipment used to perform the test is calibrated and traceable to International system of units (SI) or other recognized National metrology institute.

Remark(s): ---


LEUNG Kwun Hang, Joey
Authorized Signatory



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1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.

1.1.1 Test Location

10 Dai Wang Street, Taipo Industrial Estate, New Territories, Hong Kong

1.2 Equipment Under Test [EUT]

Description of Sample(s)

Product:	Contactless Smart Card Reader
Manufacturer:	AB CIRCLE LIMITED Room 609, Cross Office Uchisaiwaicho, 1-18-6, Nishi-Shimbashi, Minatoku, Tokyo, Japan 105-003
Brand Name:	AB Circle Limited
Model Number:	CIR415A
Hardware Version:	V1.0
Software Version:	V1.0
Input Voltage:	Powered by USB = 5Vd.c

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is 2.4G BLE card reader, modulation by IC; and modulation type is GFSK. The EUT was set to test mode during test, the testing frequency was controlled by test software - nRFgo Studio used during tests.

1.3 Date of Order

2020-07-02

1.4 Submitted Sample(s):

2 Samples

1.5 Test Duration

2020-07-15 to 2020-07-22

1.6 Country of Origin

China

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1.7 Product Details

1.7.1 RF Module 1

Class of Unit:	Article 2 paragraph 1 item 19		
Frequency Range:	2402-2480MHz		
Channel Number:	39		
Modulation:	GFSK		
Duty Cycle:	Up to 100%		
ID Code:	DE:6D:95:7F:E4:78		
Operating mode:	Continuous		
Power Source:	5Vd.c	Voltage (nom):	5.0Vd.c
		Extreme high:	5.5Vd.c.
		Extreme low:	4.5Vd.c.
Declared Output Power:	1mW (0dBm)		

1.8 Table for Filed Antenna

Module 1

Ant.	Brand	Model Number	Antenna Type	Connector	Gain (dBi)
1	N/A	2.4G ANT	PCB antenna	N/A	-1.61

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2.0 Technical Details

2.1 Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency
2400-2483.5MHz	0	2402MHz
	1	2404MHz
	:	:
	18	2438MHz
	19	2440MHz
	20	2442MHz
	:	:
	37	2478MHz
	38	2480MHz

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2.2 Test Standards and Results Summary Tables

Applied Standard: MIC public notice 88:2004, annex 43					
Part	Rule Section	Description of Test	Test Result		
			Pass	Fail	N/A
3.1	5	Unwanted Emission Intensity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	6	Antenna Power Error	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3	7	Limitation of Collateral Emission of Receiver	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4	---	Occupied Bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5	---	Radiated Emission	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6	---	Conducted Emission	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7	---	Radio Interference Prevention Capability Measurement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note 1: MIC Ordinance Regulating Radio Equipment Section 3.17 of Article 49.20

Test Items	Uncertainty	Remark
Frequency Error / 99% & 90% Bandwidth	$\pm 8.5 \times 10^{-8}$	Confidence levels of 95%
Antenna Power	$\pm 0.8\text{dB}$	Confidence levels of 95%
TX-RX Spurious Emissions	$\pm 0.5\text{dB}$	Confidence levels of 95%
Transmission Antenna Gain	$\pm 2.6\text{dB}$	Confidence levels of 95%
Temperature	$\pm 0.7^\circ\text{C}$	Confidence levels of 95%
Humidity	$\pm 3.2\%$	Confidence levels of 95%
DC/AC Power Source	$\pm 1.4\%$	Confidence levels of 95%

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2.3 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst case rate with respect to the specific test item.

Investigation has been done on all the possible configurations for searching the worst cases.

The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Frequency Error	Un-modulation	-	0/19/38
Occupied Bandwidth (99%)	GFSK	1Mbps	0/19/38
Spread-Spectrum Bandwidth (90%)	GFSK	1Mbps	0/19/38
Unwanted Emission Intensity	GFSK	1Mbps	0/19/38
Antenna Power Error	GFSK	1Mbps	0/19/38
Limitation of Emission of Receiver	GFSK	1Mbps	0/19/38
Transmission Antenna Gain	-	-	-
Transmission Radiation Angle Width	-	-	-
Radio Interference Prevention Capability	GFSK	1Mbps	0/19/38
Hopping Frequency Dwell Time	-	-	-

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3.0 Test Results

3.1 Unwanted Emission Intensity Measurement

3.1.1 Limit

Item	Limits
Tx Spurious Emission	$\leq 0.25\mu\text{W}$ (30MHz – 1000MHz)
	$\leq 2.5\mu\text{W}$ ($f > 1000\text{MHz}$ and $2387\text{MHz} < f$; $2496.5\text{MHz} < f$)
	$\leq 25\mu\text{W}$ ($2387\text{MHz} \leq f < 2400\text{MHz}$) and ($2483.5\text{MHz} < f \leq 2496.5\text{MHz}$)

3.1.2 Measurement Instruments and Setting

Please refer to section 4 of equipment list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	100kHz (Frequency below 1000MHz and frequency band near operating range) 1MHz (Frequency above 1000MHz)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.1.3 Test Procedures

- 1) EUT have transmitted the maximum modulation signal and fixed channelize.
- 2) Setting of SA is following as: RB: 100kHz / VB: 100kHz / AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
- 3) Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than $2.5\mu\text{W}$.
- 4) SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss + 10dB (for RBW correction from 100kHz to 1MHz) shall be less than $25\mu\text{W}$.
- 5) SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz. Then to mark peak reading value + cable loss + 10dB (for RBW correction from 100kHz to 1MHz) shall be less than $25\mu\text{W}$.
- 6) Setting of SA is following as: RB: 1MHz / VB: 1MHz / AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
- 7) Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than $2.5\mu\text{W}$.
- 8) SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz. Then to mark peak reading value + cable loss shall be less than $2.5\mu\text{W}$

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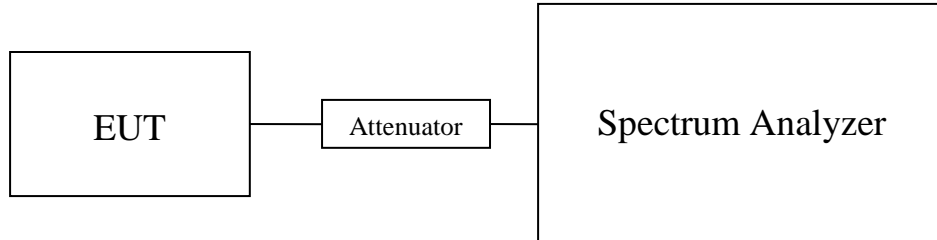
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3.1.4 Test Setup Layout



3.1.5 Test Deviation

There is no deviation with the original standard.

3.1.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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3.1.7 Results of Unwanted Emission Intensity

Ambient Temperature: 21°C

Relative Humidity: 49%

Test Voltage (V)		Normal Voltage =5.0Vd.c.			
Test Frequency (MHz)		2402	2440	2480	
Unwanted Emission Frequency (MHz)	*1	48.1	48.1	48.4	
	*2	2274.7	2312.1	2352.3	
	*3	2399.9	2395.1	2396.6	
	*4	2485.6	2487.9	2484.0	
	*5	2530.5	2568.5	2607.5	
Cable Loss (dB)	*1	0.2	0.2	0.2	Refer to calibration
	*2	0.9	0.9	0.9	
	*3	0.9	0.9	0.9	
	*4	0.9	0.9	0.9	
	*5	0.9	0.9	0.9	
Spectrum Raw (dBm)	*1	-64.6	-65.0	-62.8	Below 1GHz RBW and VBW = 100kHz Over 1GHz RBW and VBW = 1MHz Max TX time mode
	*2	-52.8	-54.2	-53.5	
	*3	-50.0	-59.9	-60.1	
	*4	-63.1	-63.4	-59.8	
	*5	-58.7	-61.5	-60.6	
Unwanted Emission Intensity (dBm)	*1	-64.4	-64.8	-62.6	Limit $\leq 0.25\mu\text{W}$ (-36dBm)
	*2	-51.9	-53.3	-52.6	Limit $\leq 2.5\mu\text{W}$ (-26dBm)
	*3	-49.1	-59.0	-59.2	Limit $\leq 25\mu\text{W}$ (-16dBm)
	*4	-62.2	-62.5	-58.9	Limit $\leq 25\mu\text{W}$ (-16dBm)
	*5	-57.8	-60.6	-59.7	Limit $\leq 2.5\mu\text{W}$ (-26dBm)
Unwanted Emission Intensity (μW)	*1	0.0004	0.0003	0.0005	Limit $\leq 0.25\mu\text{W}$ (-36dBm)
	*2	0.0065	0.0047	0.0055	Limit $\leq 2.5\mu\text{W}$ (-26dBm)
	*3	0.0123	0.0013	0.0012	Limit $\leq 25\mu\text{W}$ (-16dBm)
	*4	0.0006	0.0006	0.0013	Limit $\leq 25\mu\text{W}$ (-16dBm)
	*5	0.0017	0.0009	0.0011	Limit $\leq 2.5\mu\text{W}$ (-26dBm)

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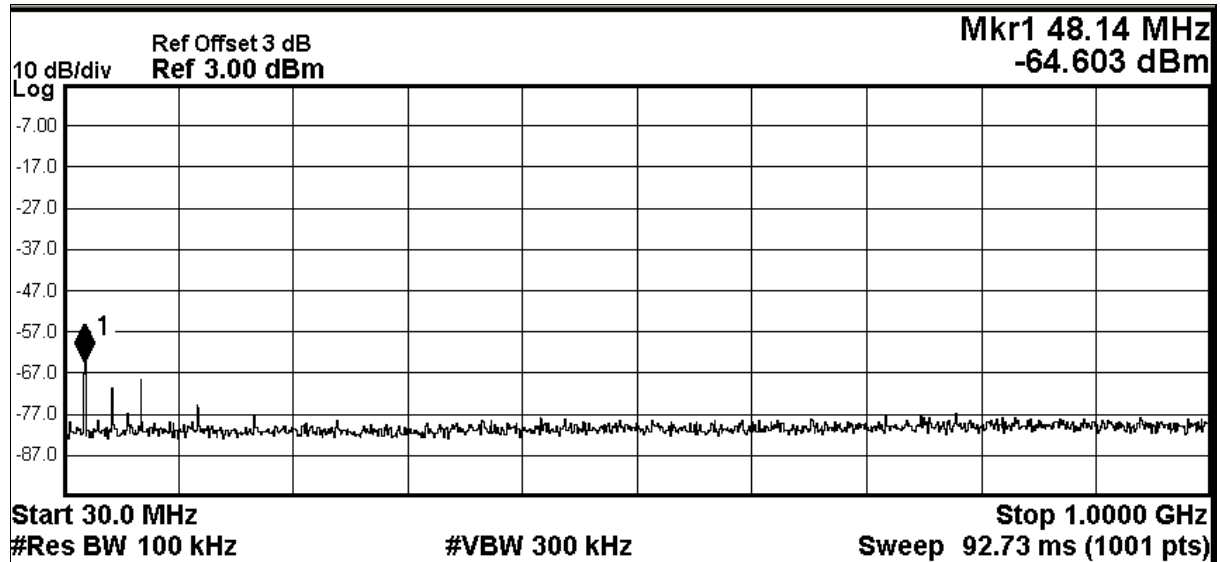
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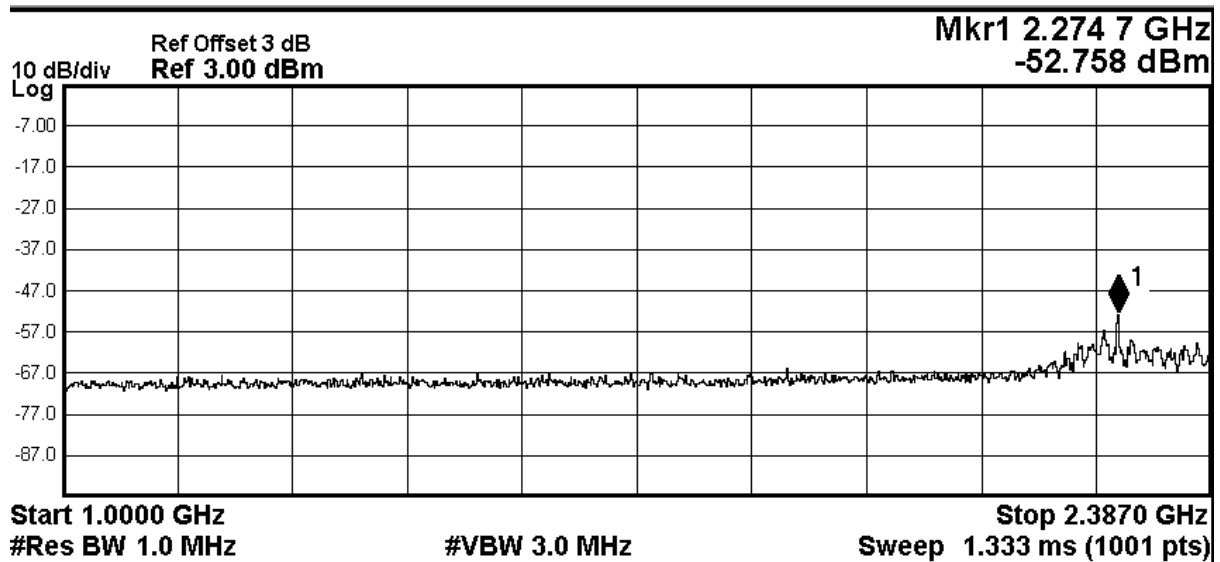
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Lowest Channel (2402MHz)

30MHz – 1GHz



1GHz – 2.387GHz



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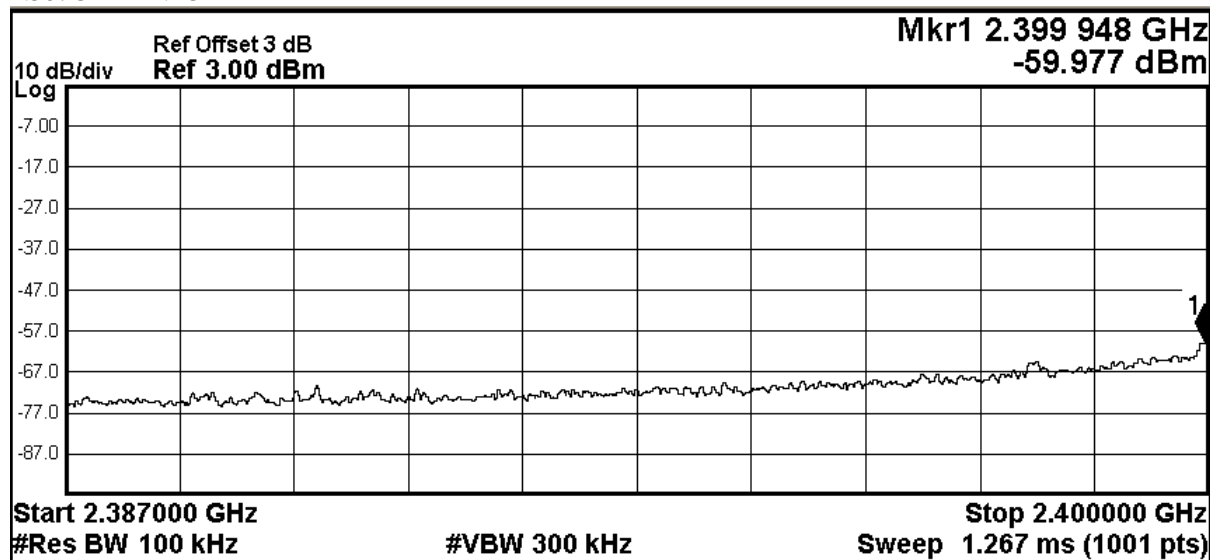
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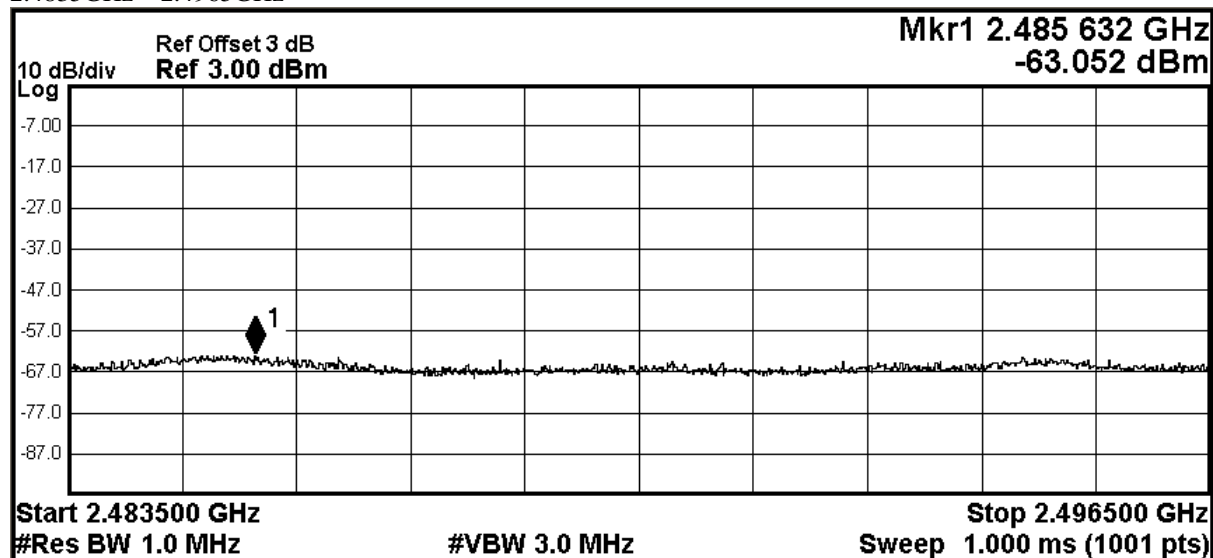
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2.387GHz - 2.4GHz



The 10 dB correction factor of converting RBW from 100k to 1MHz added in table at Page 11

2.4835GHz – 2.4965GHz



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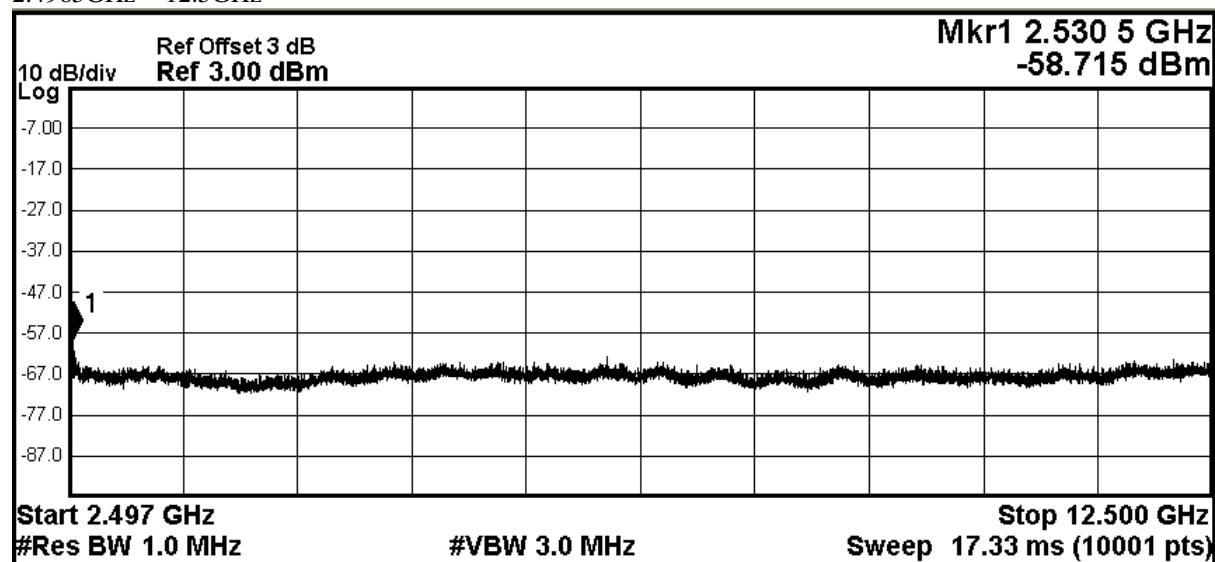
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Lowest Channel (2402MHz)

2.4965GHz - 12.5GHz



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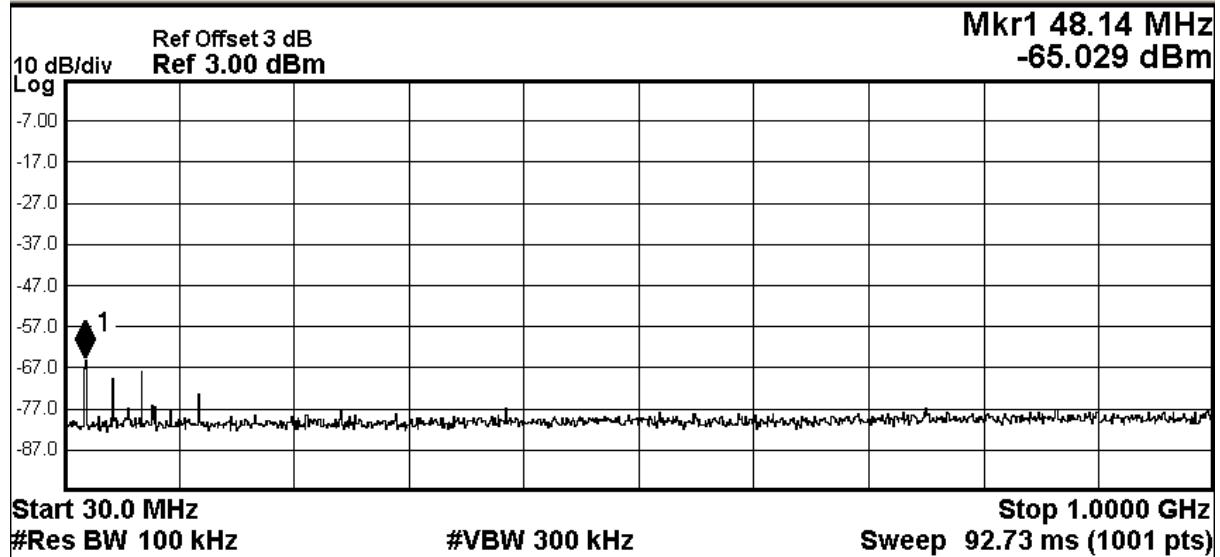
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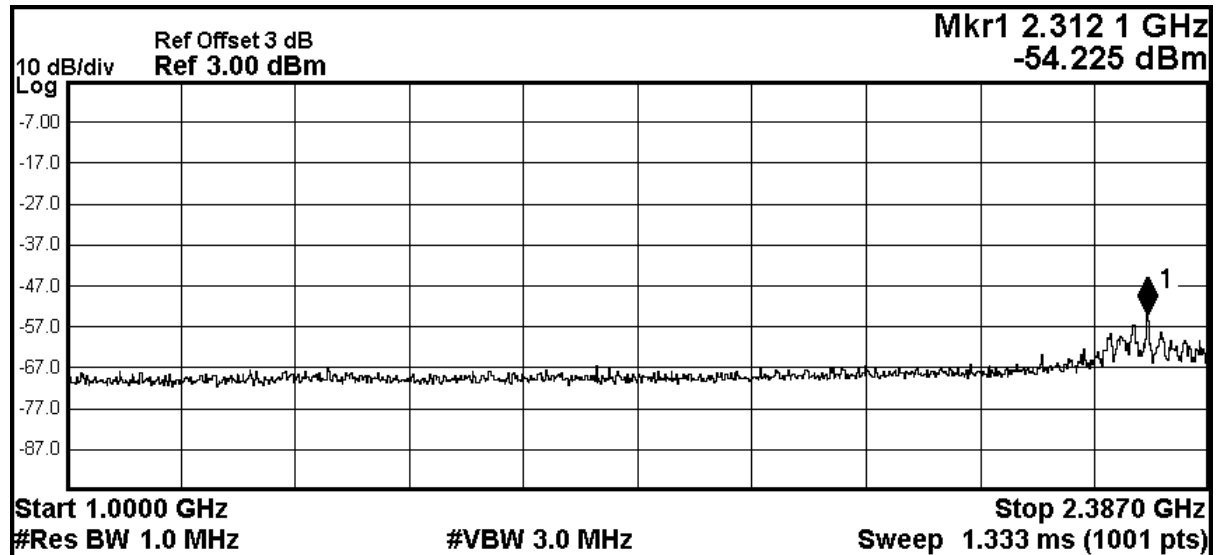
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Middle Channel (2440MHz)

30MHz – 1GHz



1GHz – 2.387GHz



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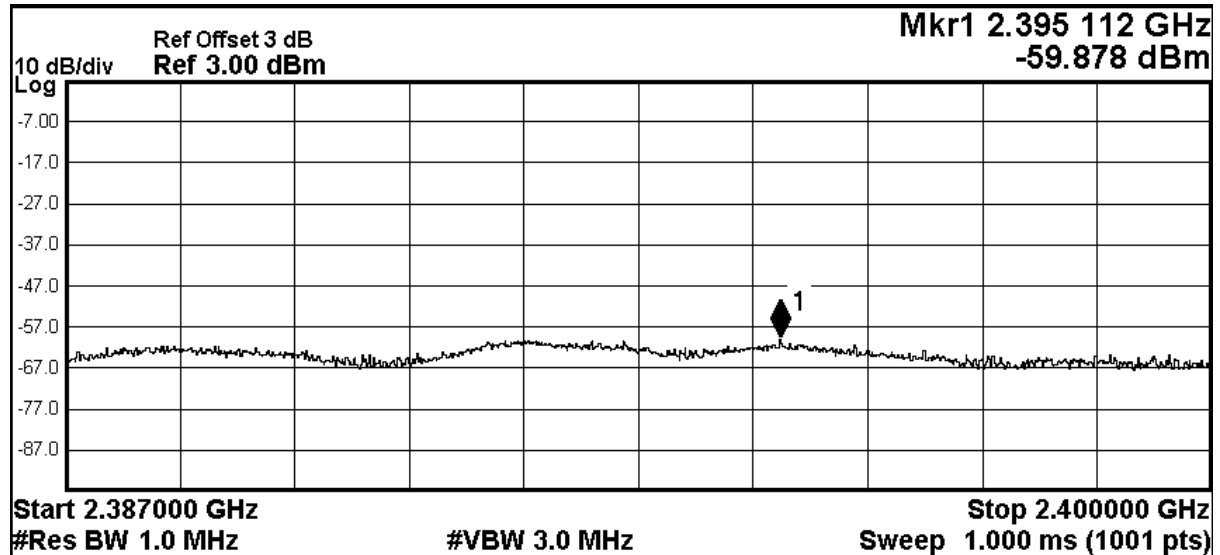
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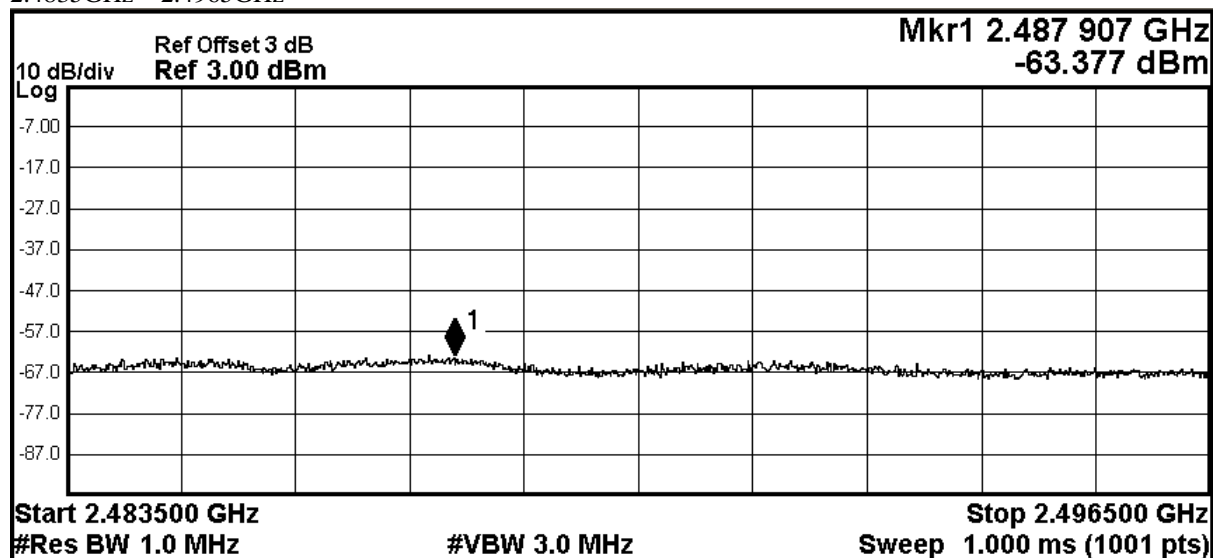
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Middle Channel (2440MHz)

2.387GHz - 2.4GHz



2.4835GHz – 2.4965GHz



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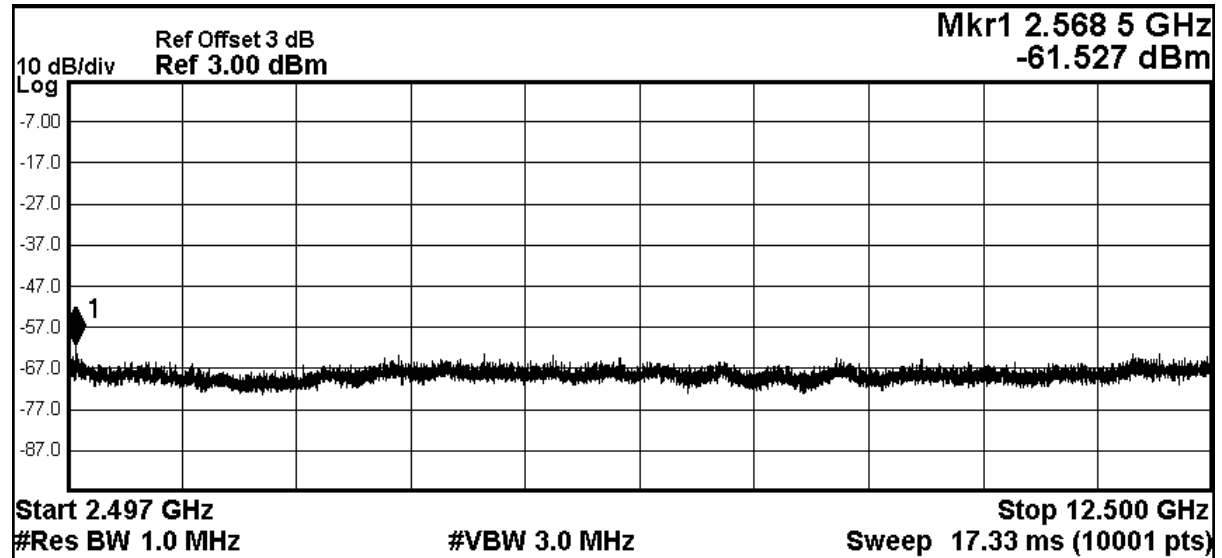
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Middle Channel (2440MHz)

2.4965GHz - 12.5GHz



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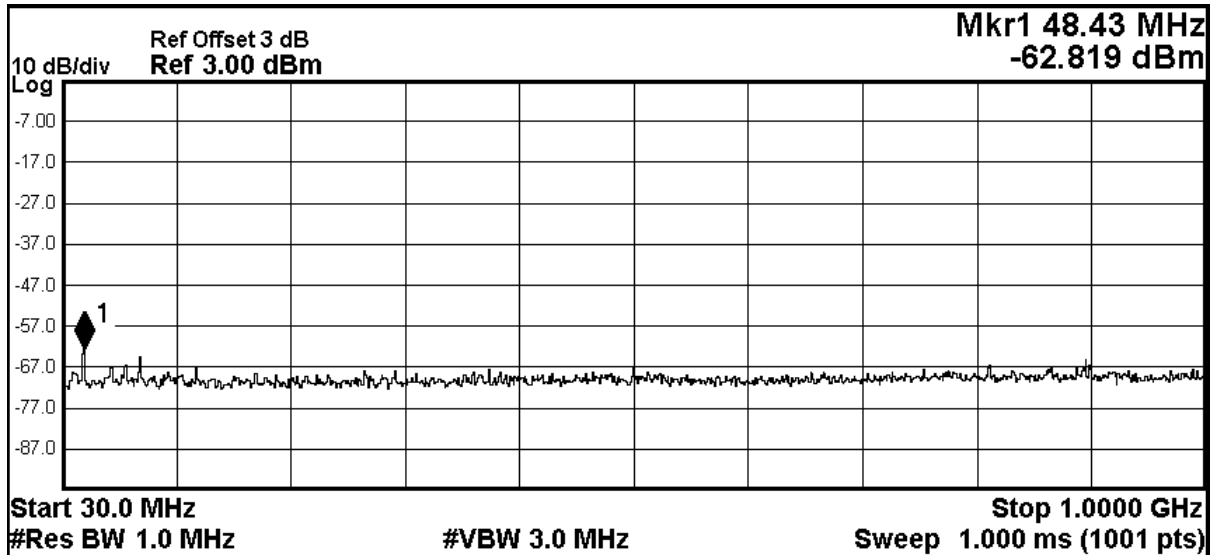
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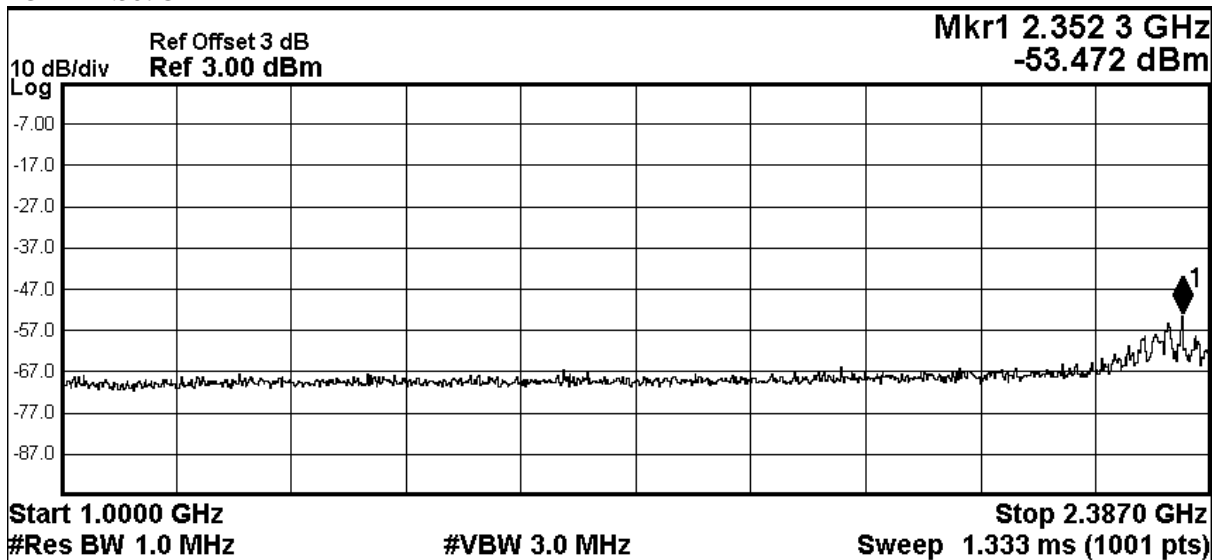
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Highest Channel (2480MHz)

30MHz – 1GHz



1GHz – 2.387GHz



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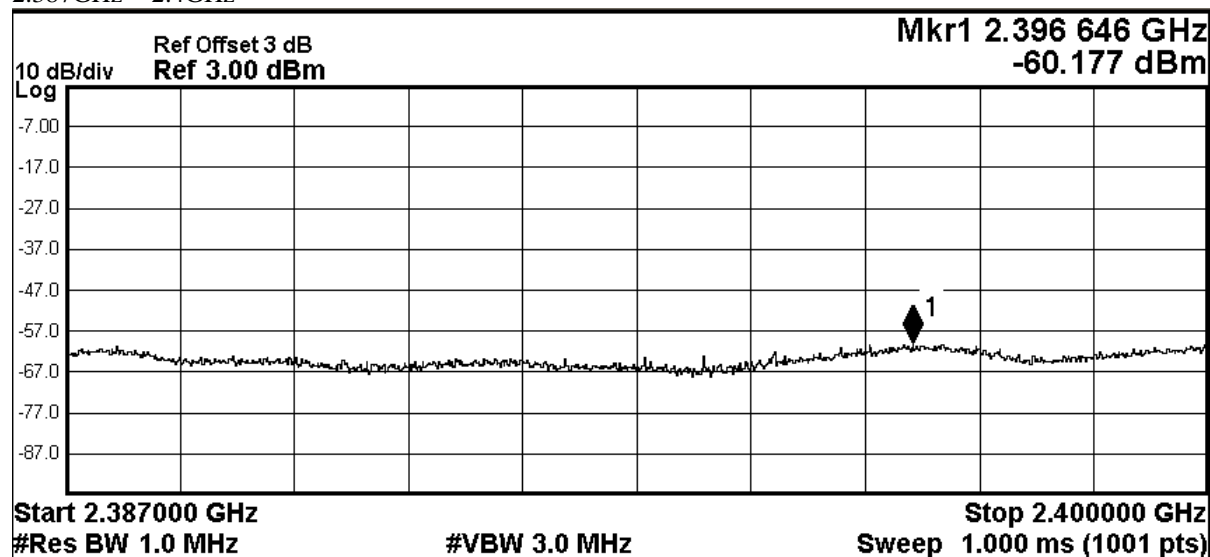
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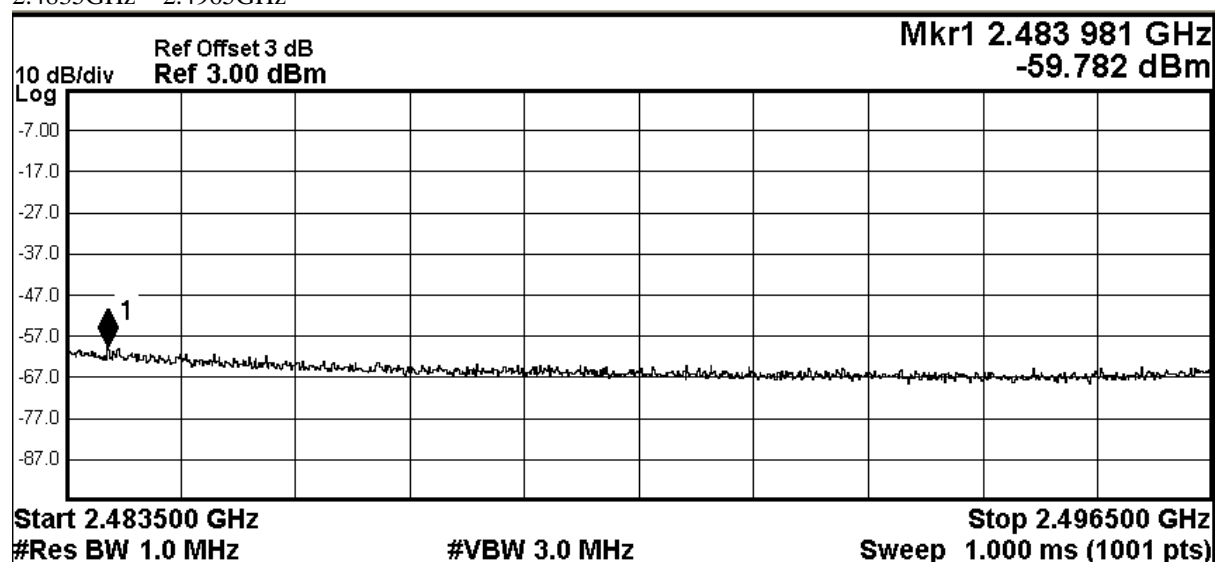
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Highest Channel (2480MHz)

2.387GHz - 2.4GHz



2.4835GHz – 2.4965GHz



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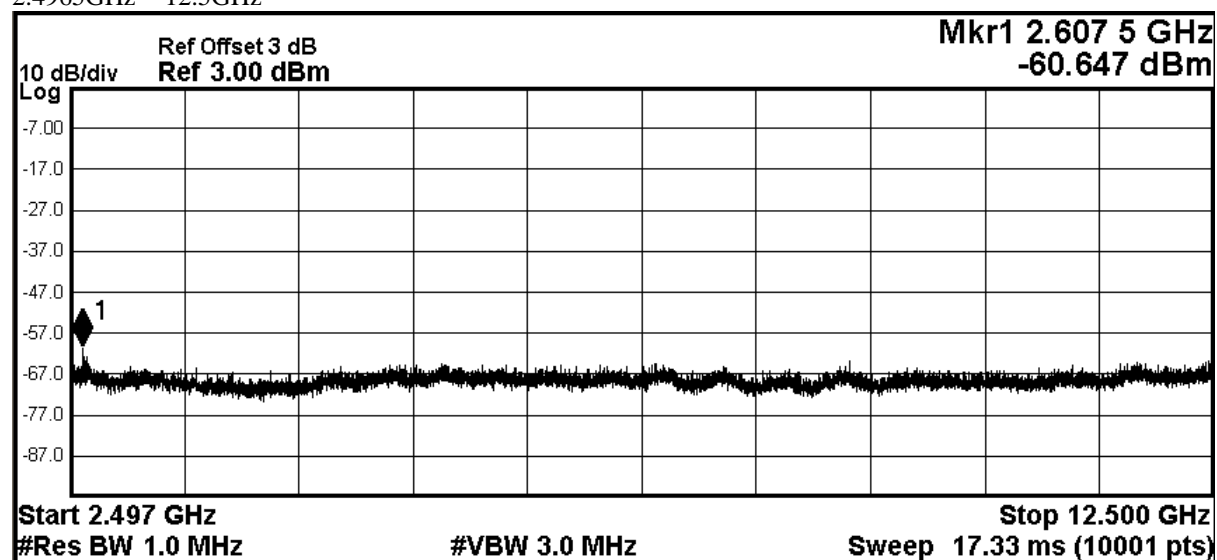
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Highest Channel (2480MHz)

2.4965GHz - 12.5GHz



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3.2 Antenna Power Error Measurement

3.2.1 Limit

Item	Limits
Antenna Power Density	$\leq 3\text{mW/MHz}$ (FH from 2427 – 2470.75MHz) $\leq 10\text{mW/MHz}$ (OFDM, DS from 2400 – 2483.5MHz) $\leq 10\text{mW}$ (Other from 2400 – 2483.5MHz)
Antenna Power Error	+20%, -80% (Base on manufacture declare antenna power density)

3.2.2 Measurement Instruments and Setting

Please refer to section 4 of equipment list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135s ~ 26s
Used Average Sensor	NRV-Z55

3.2.3 Test Procedures

- 1) EUT have transmitted continuous maximum power
- 2) The antenna power is equal to the power meter value dBm + cable loss dB + 10 log (1/pulse time) dB + 10 log 10 (1/Spread Spectrum Bandwidth) dB and shall be less than limits
- 3) Antenna Power Error is definition that actual measure antenna power tolerance between +20% to 80% power range that base on manufacturer declare the conducted power density.

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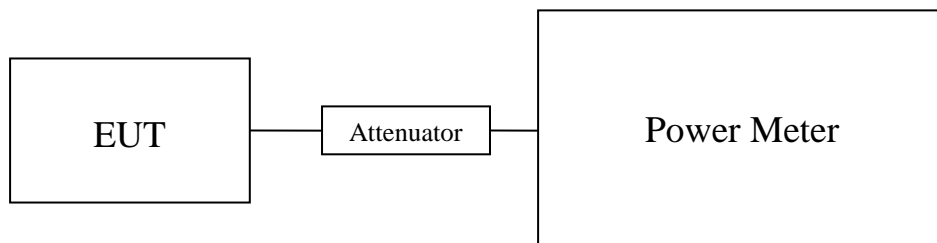
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3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuous transmission mode.

3.2.7 Results of Antenna Power Error

Ambient Temperature: 21°C

Relative Humidity: 49%

Test Voltage (V)	Normal Voltage = 5.0Vd.c.			
Declared Output power (dBm)	0.0	0.0	0.0	Provided by Manufacturer
Declared Output power (mW)	1.0000	1.0000	1.0000	
Test Frequency (MHz)	2402	2441	2480	
Power measured RAW from EUT (dBm)	-3.7	-5.8	-7.3	
Cable Loss (dB)	1	1	1	Refer to calibration
Duty Cycle Factor (dB)	0.0	0.0	0.0	Duty Cycle = 10*log(1/duty cycle)
Antenna Power (Conducted) (dBm)	-2.7	-4.8	-6.3	Limit = 10mW (other from 2400 - 2483.5MHz)
Antenna Power (Conducted) (mW)	0.5370	0.3311	0.2344	
Antenna Power Error (mW)	-0.4630	-0.6689	-0.7656	Limit = +20% to -80%
Antenna Power Error (%)	-46.3	-66.9	-76.6	
Transmitter On _{Time} (ms)	N/A			
Transmitter (On+OFF) _{Time} (ms)	N/A			
Transmitter Duty Cycle (%)	100.00			
Radio Interference Prevention Function	ID code: DE:6D:95:7F:E4:78			Limit ≥48bit
	Carrier Sense: Not applicable			

Antenna Power Error (%) = (Antenna Power (Conducted) - Declared Antenna Power) / Declared Antenna Power * 100%

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3.3 Limitation of Collateral Emission of Receiver Measurement

3.3.1 Limit

Item	Limits
Rx Spurious Emission	$\leq 4\text{nW}$ ($f < 1\text{GHz}$)
	$\leq 20\text{nW}$ ($1\text{GHz} \leq f$)

3.3.2 Measurement Instruments and Setting

Please refer to section 4 of equipment list in this report. The following table is the setting of the spectrum. Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100kHz (below 1GHz emission) / 1MHz (above 1GHz emissions)
VB	300kHz (below 1GHz emission) / 3MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3 Test Procedures

- 1) EUT have a continuous reception mode and fixed only one channelize.
- 2) Setting of SA is following as RB/VB: 100kHz (below 1GHz emission) / 1MHz (above 1GHz emissions)/AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive Peak / Trace mode: Max. hold
- 3) SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW.
- 4) SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW.
- 5) If power level of lower emissions are more than 1/10 of limit (0.4nW for $f < 1\text{GHz}$, 2nW for $f \geq 1\text{GHz}$), all those are to be indicated in the 2nd and 3rd lines. If other are 1/10 or less more of the limit, no necessary to be indicated.

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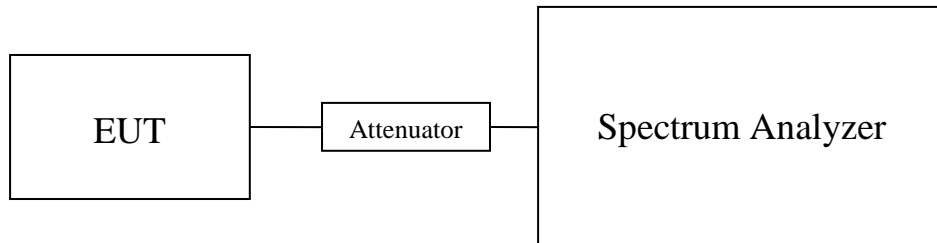
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3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously reception mode.

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3.3.7 Results of Limitation of Collateral Emission of Receiver

Ambient Temperature: 21°C

Relative Humidity: 49%

Test Voltage (V)		Normal Voltage = 5.0Vd.c.			
Test Frequency (MHz)		2402	2440	2480	
Spurious Emission Frequency (MHz)	*1	48.0	48.0	48.4	30-1000MHz, Maximum emission and all emission beyond 1/10 of the limitation must be indicated.
	*1				
	*2	3126.4	6929.4	3070.0	1-12.5GHz, Maximum emission and all emission beyond 1/10 of the limitation must be indicated.
	*2				
Cable Loss (dB)	*1	0.2	0.2	0.2	Refer to calibration
	*1				
	*2	1.6	2.6	1.6	
	*2				
Spectrum Raw (dBm)	*1	-65.3	-64.9	-62.6	
	*1				
	*2	-63.7	-63.9	-64.3	
	*2				
Spurious Emission Intensity (dBm)	*1	-65.1	-64.7	-62.4	Limit≤4nW (-54dBm)
	*1				RBW and VBW=100kHz
	*2	-62.1	-61.3	-62.7	Limit≤20nW (-47dBm)
	*2				RBW and VBW = 1MHz
Spurious Emission Intensity (nW)	*1	0.31	0.34	0.58	Limit≤4nW (-54dBm)
	*1				RBW and VBW=100kHz
	*2	0.62	0.74	0.54	Limit≤20nW (-47dBm)
	*2				RBW and VBW = 1MHz

*1: Frequency Band 1 ($30 \leq f \leq 1000\text{MHz}$)

*2: Frequency Band 2 ($1 < f \leq 12.5\text{GHz}$)

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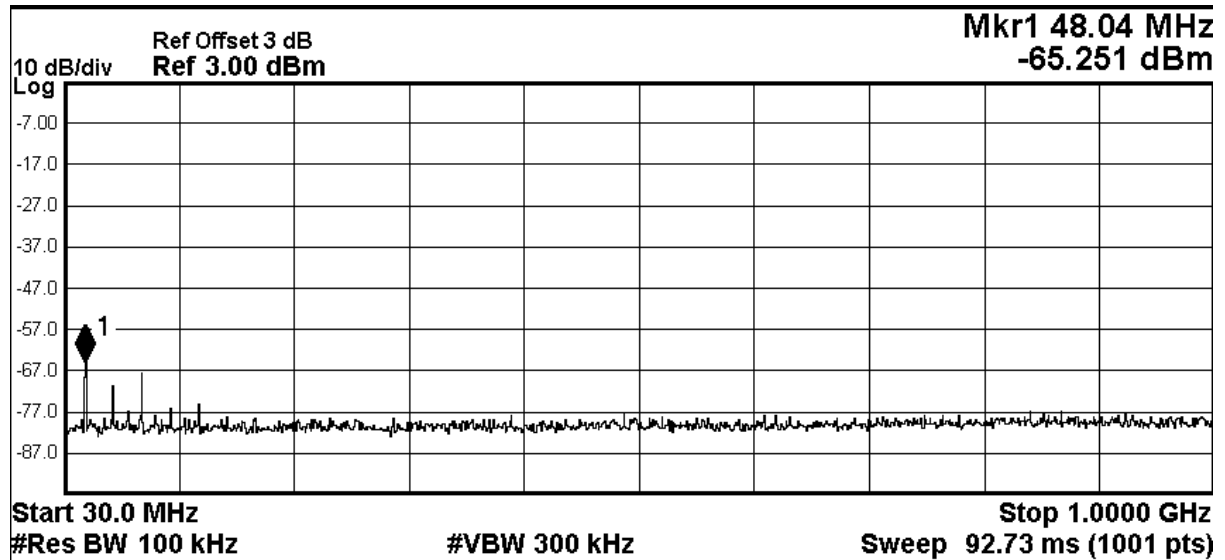


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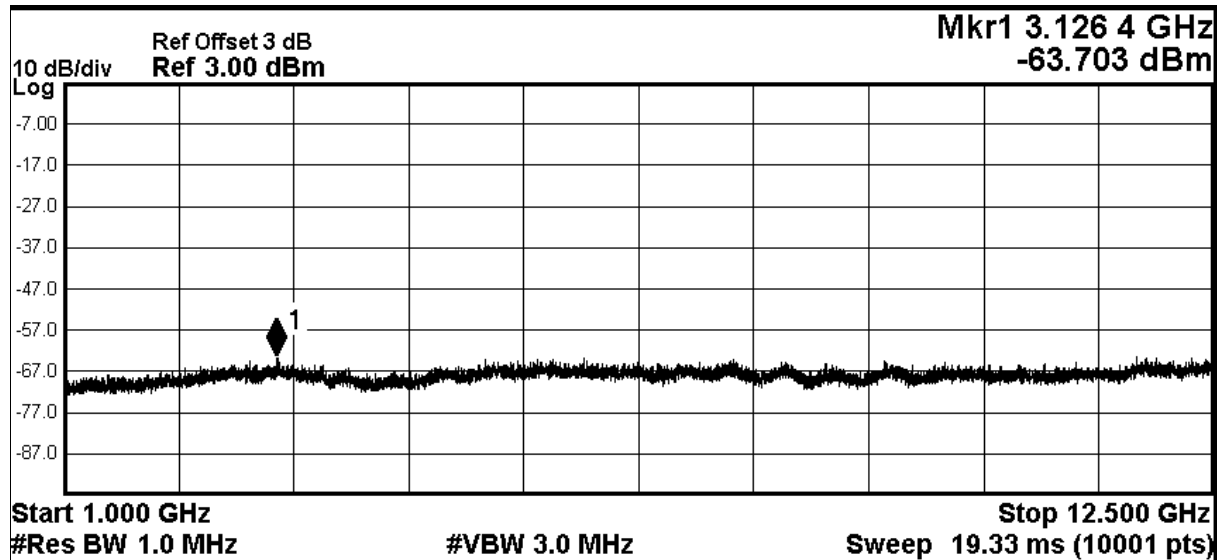
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Lowest Channel (2402MHz)
30MHz – 1GHz



1GHz – 12.5GHz



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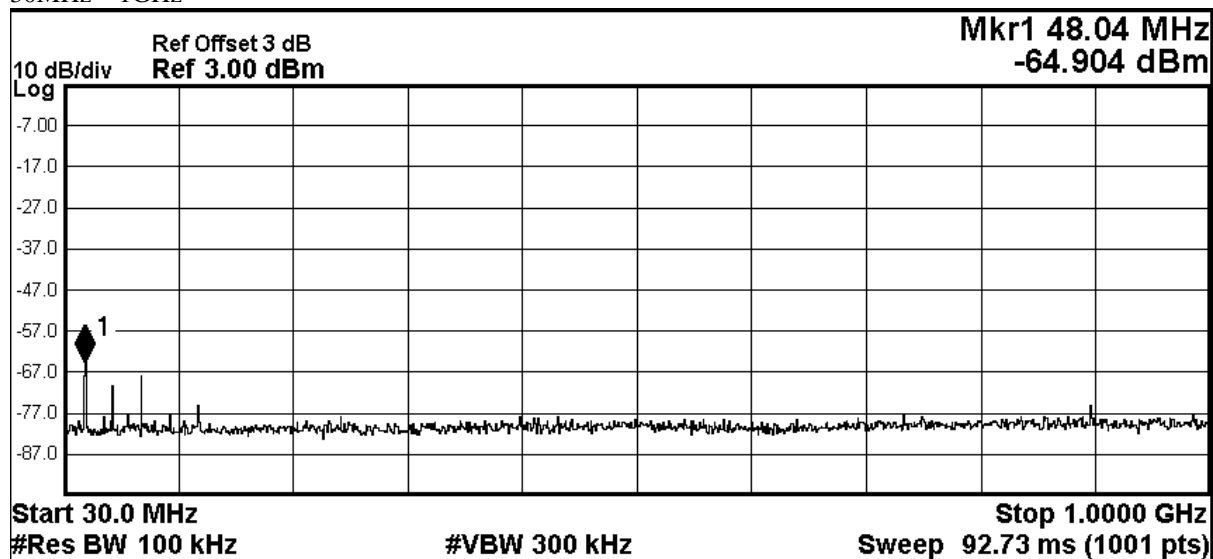
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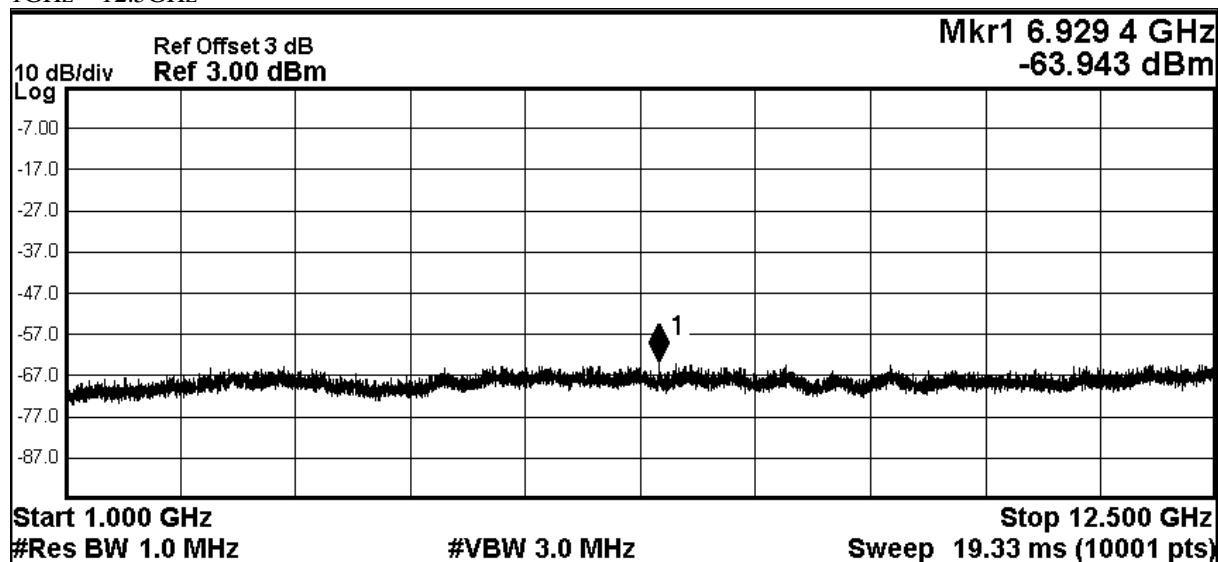
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Middle Channel (2440MHz)

30MHz – 1GHz



1GHz – 12.5GHz



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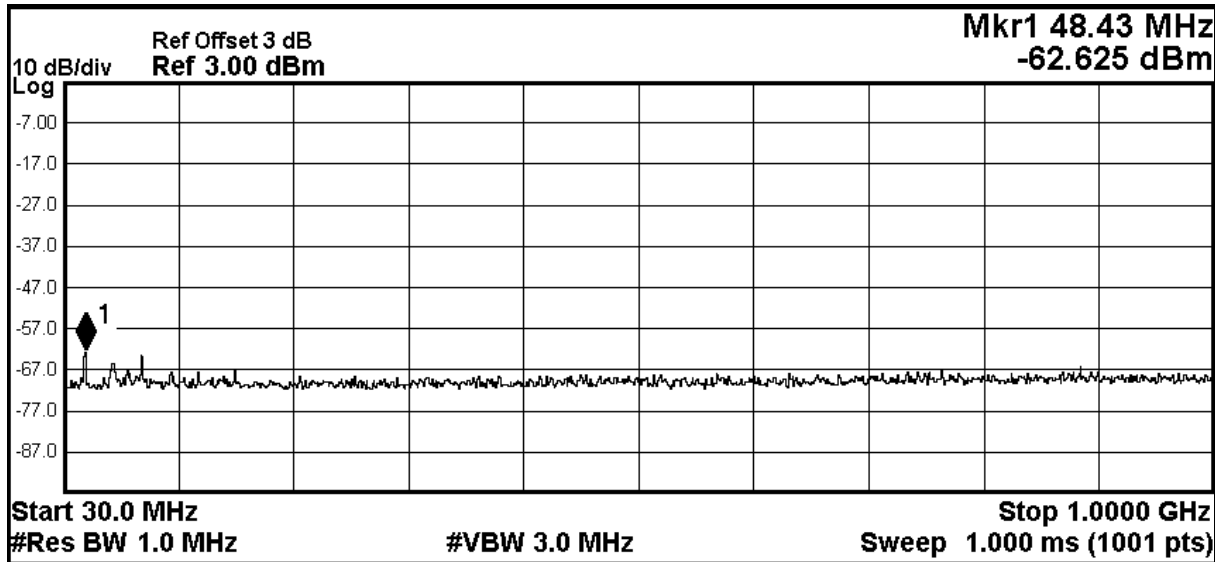
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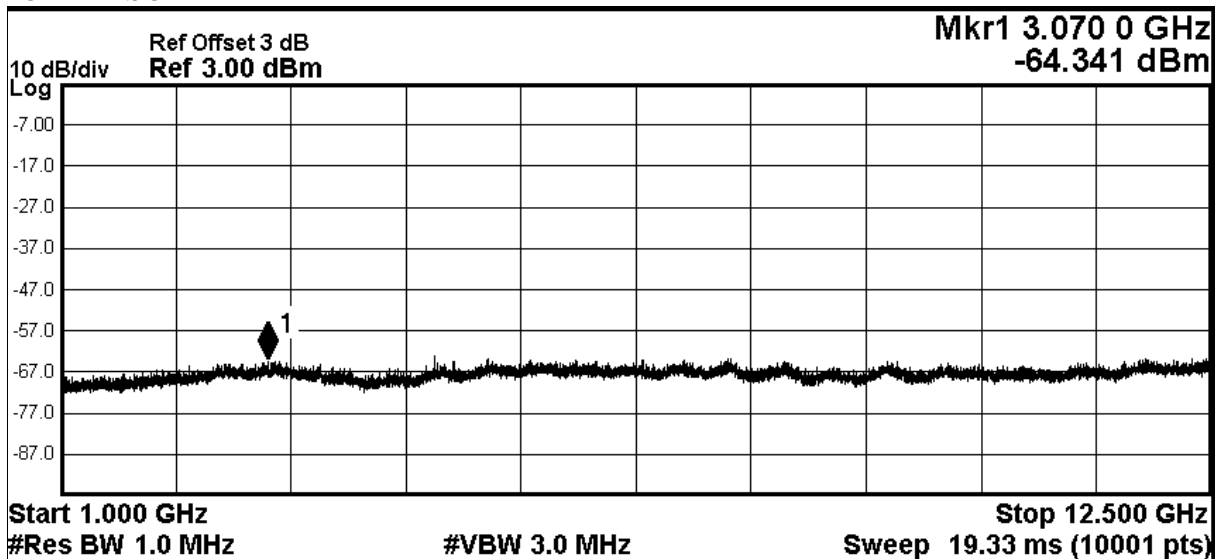
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Highest Channel (2480MHz)

30MHz – 1GHz



1GHz – 12.5GHz



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3.4 Occupied Bandwidth

3.4.1 Limit

Item	Limits
Occupied Bandwidth	Within 2400 – 2483.5MHz

3.4.2 Measuring Instruments and Setting

Please refer to section 4 of equipment list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	30kHz/100kHz
Span	At least 1.5 times of the OBW
Sweep	Single
Detector	Peak

3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 30kHz and VBW to 100kHz.
3. Set the center frequency on any frequency would be measure and set the frequency span wide enough to measure the OBW and SBW
4. Max hold the trace and record the results

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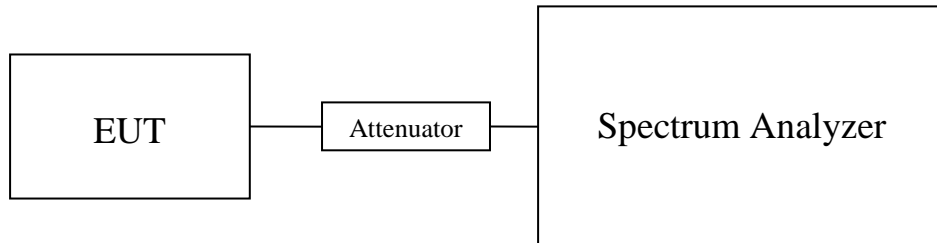
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3.4.4 Test Setup Layout



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuous transmitting mode.

3.4.7 Results of Occupied Bandwidth

Ambient Temperature: 21°C

Relative Humidity: 49%

Spread Factor:

Test Voltage (V)	Normal Voltage = 5.0Vd.c.			
Test Frequency (MHz)	2402	2440	2480	
Spread-Spectrum Bandwidth (MHz)	0.655	0.289	0.692	
Occupied Bandwidth	1.038	1.052	1.052	
Modulation Rate (Mbps)	N/A	N/A	N/A	
Spread Factor (MHz)	N/A	N/A	N/A	Spread Factor Limit \geq 5(FHSS or DSSS)

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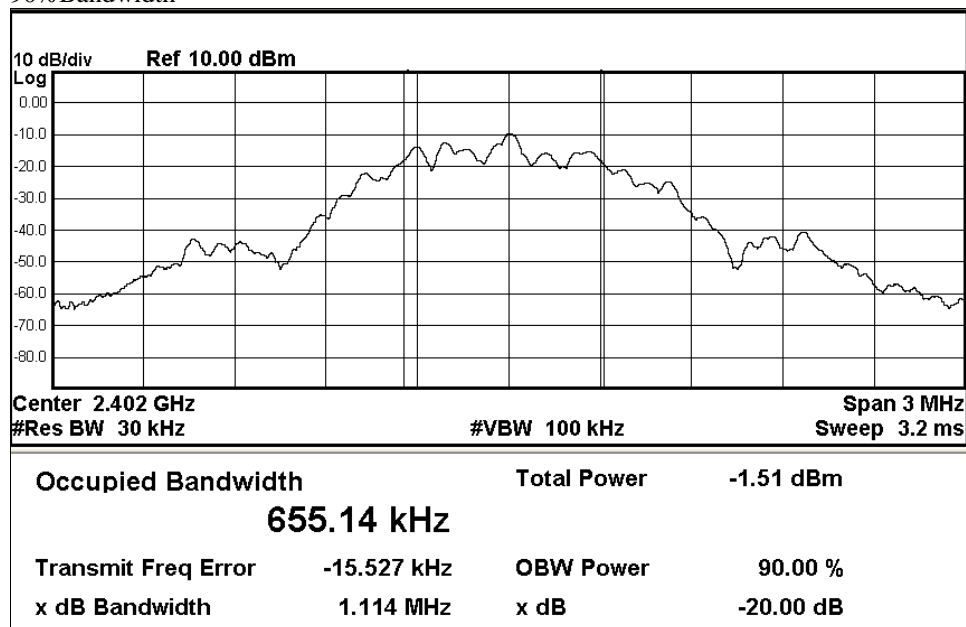
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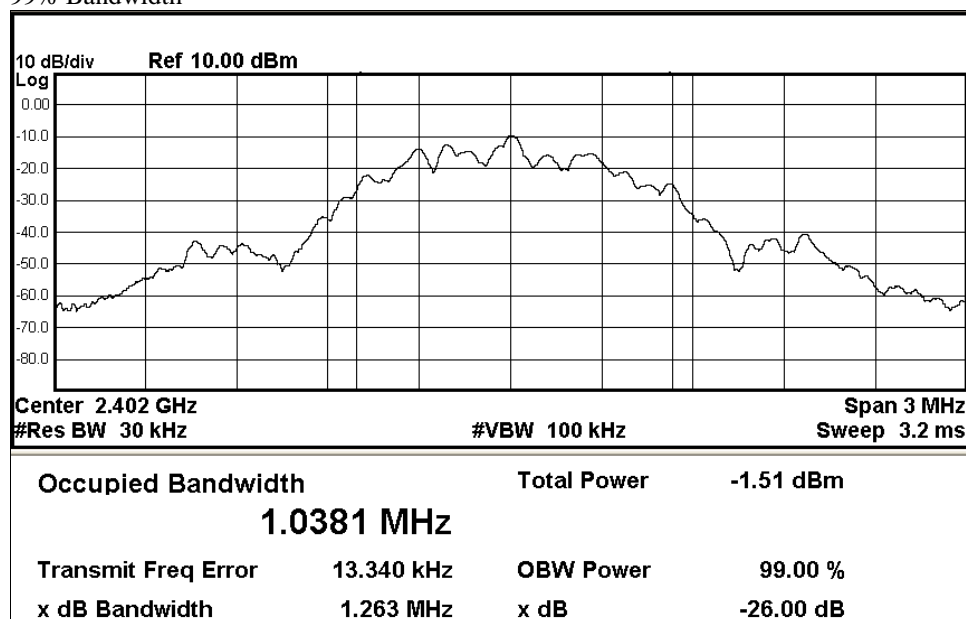
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Lowest Channel
90% Bandwidth

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99% Bandwidth



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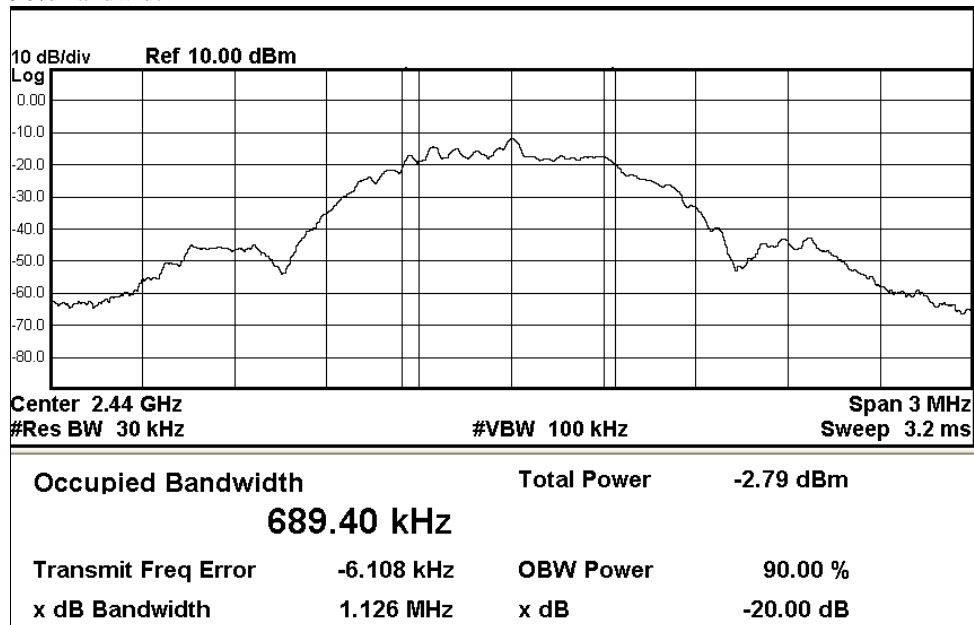
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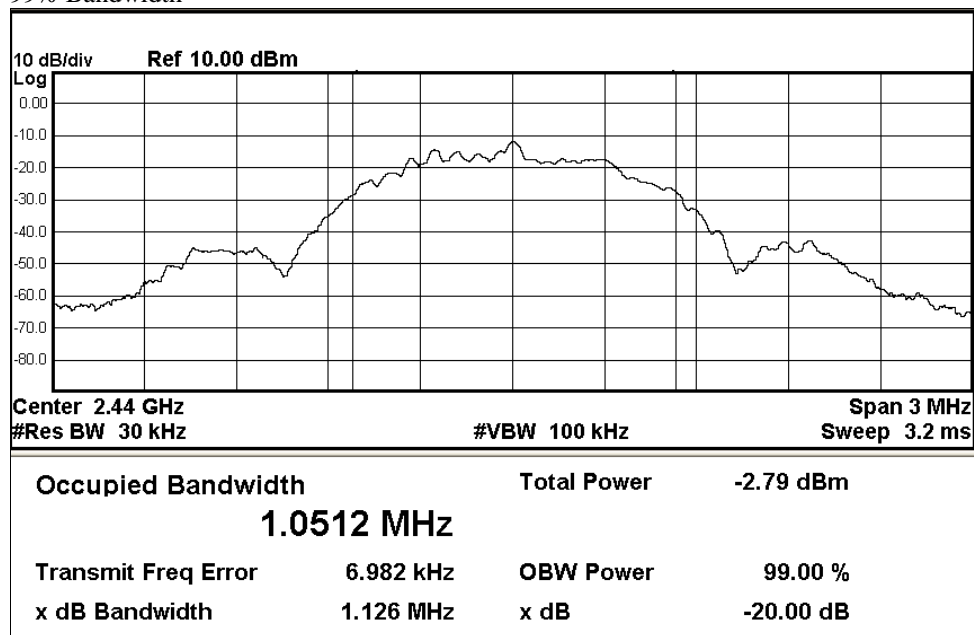
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Middle Channel

90% Bandwidth



99% Bandwidth



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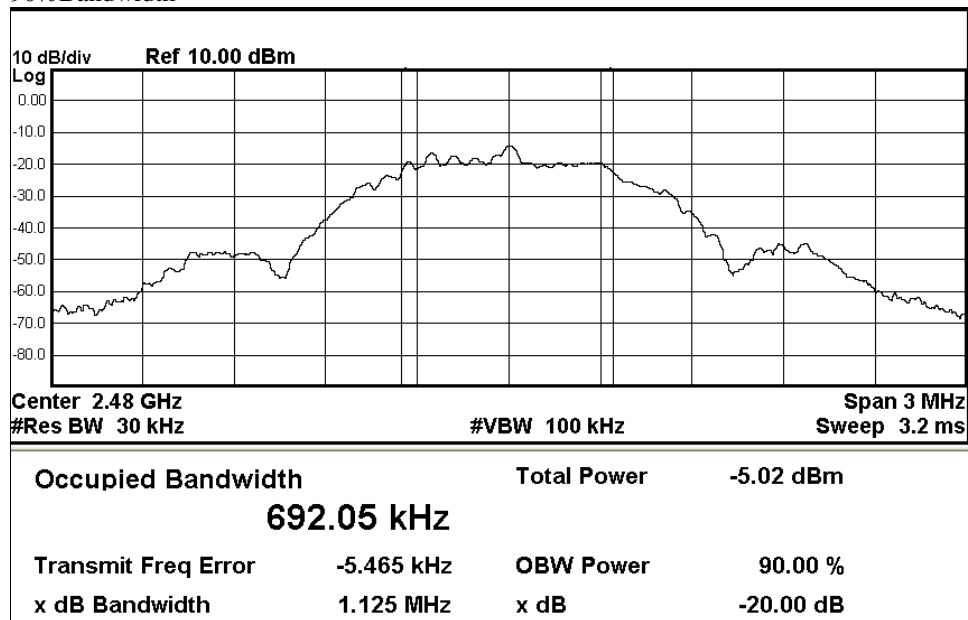


Test Report

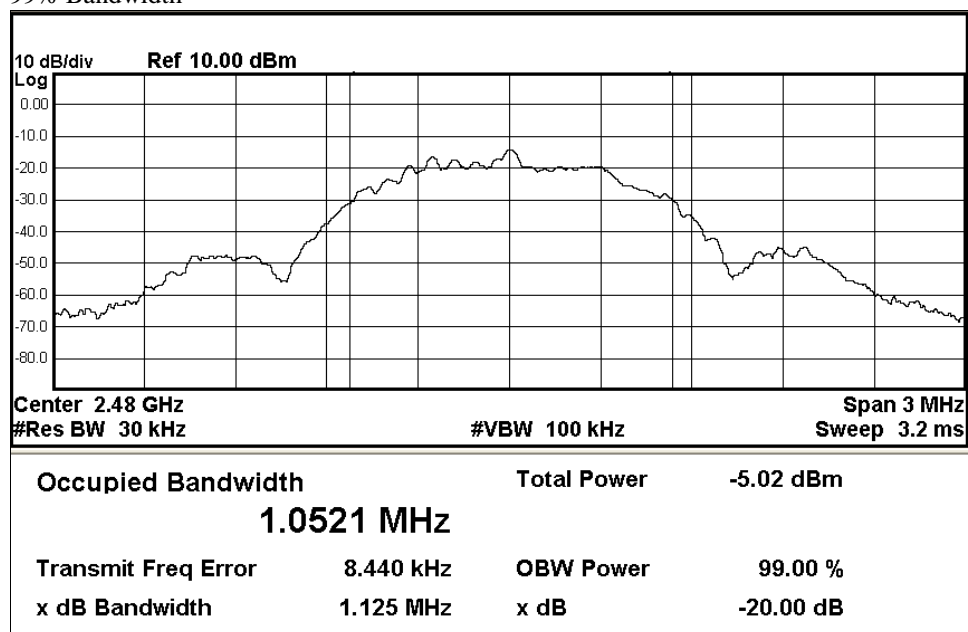
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Highest Channel
90% Bandwidth



99% Bandwidth



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3.5 Frequency Error Measurement

3.5.1 Limit:

Item	Limits
Frequency Tolerance	≤ 50 ppm

3.5.2 Measuring Instruments and Setting

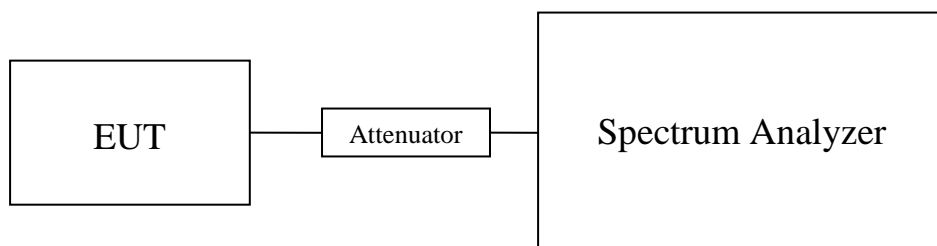
Please refer to section 4 of equipment list in this report. The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Span Frequency	1MHz
RB/VB	10kHz / 30kHz

3.5.3 Test Procedures

- 1) Frequency accuracy of SA shall be less than 10% of limits tolerance (5ppm)
- 2) Setting of SA is following as: RB: 10kHz / VB: 30kHz / SPAN: 1Mhz / AT: 10dB / Ref: 0dBm.
- 3) Center Frequency: The center frequency of testing for EUT
- 4) Sweep time: Auto
- 5) Sweep mode: Continuous sweep
- 6) Detect mode: Positive Peak
- 7) Mark Function
- 8) EUT have transmitted absence of modulation signal and fixed channelize. f is using the mark cursor to mark the peak frequency value. Fc is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and the limit is less than ± 50 ppm.

3.5.4 Test Setup Layout



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3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

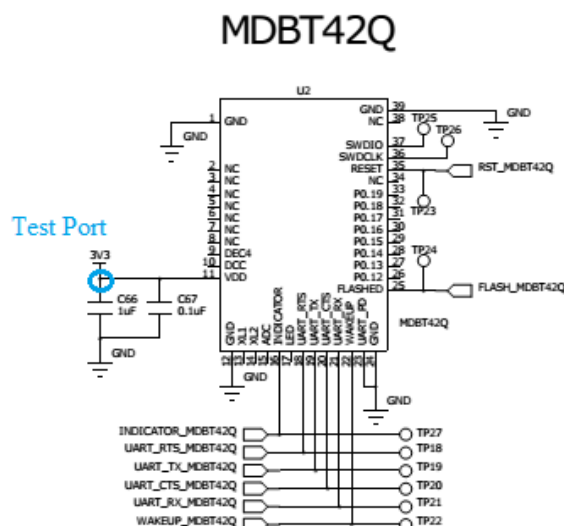
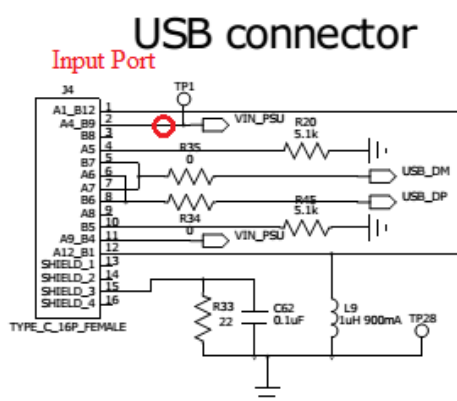
The EUT was placed on the test table and programmed in un-modulation function.

3.5.7 Results of Frequency Error Measurement

Ambient Temperature: 21°C

Relative Humidity: 49%

Voltage Fluctuation Test	Normal Voltage	High Voltage (Normal Voltage*110%)	Low Voltage (Normal Voltage*90%)
Input Voltage (V)	5.0	5.5	4.5
Output Voltage (V)	3.311	3.317	3.294
Voltage Variation (%)	--	0.18	-0.51



Note:

Voltage Variation (%) = (Output High or Low Voltage – Output Normal Voltage) / Output Normal Voltage x 100%. During the input supply voltage to the EUT from the external power source is varied by $\pm 10\%$, if output voltage has been confirmed that the fluctuation of power supply to the RF circuit of the EUT (excluding power source) is equal to or less the $\pm 1\%$. Exempt extremely high and low supply voltage condition tests, EUT only operated in normal voltage to test all regulations.

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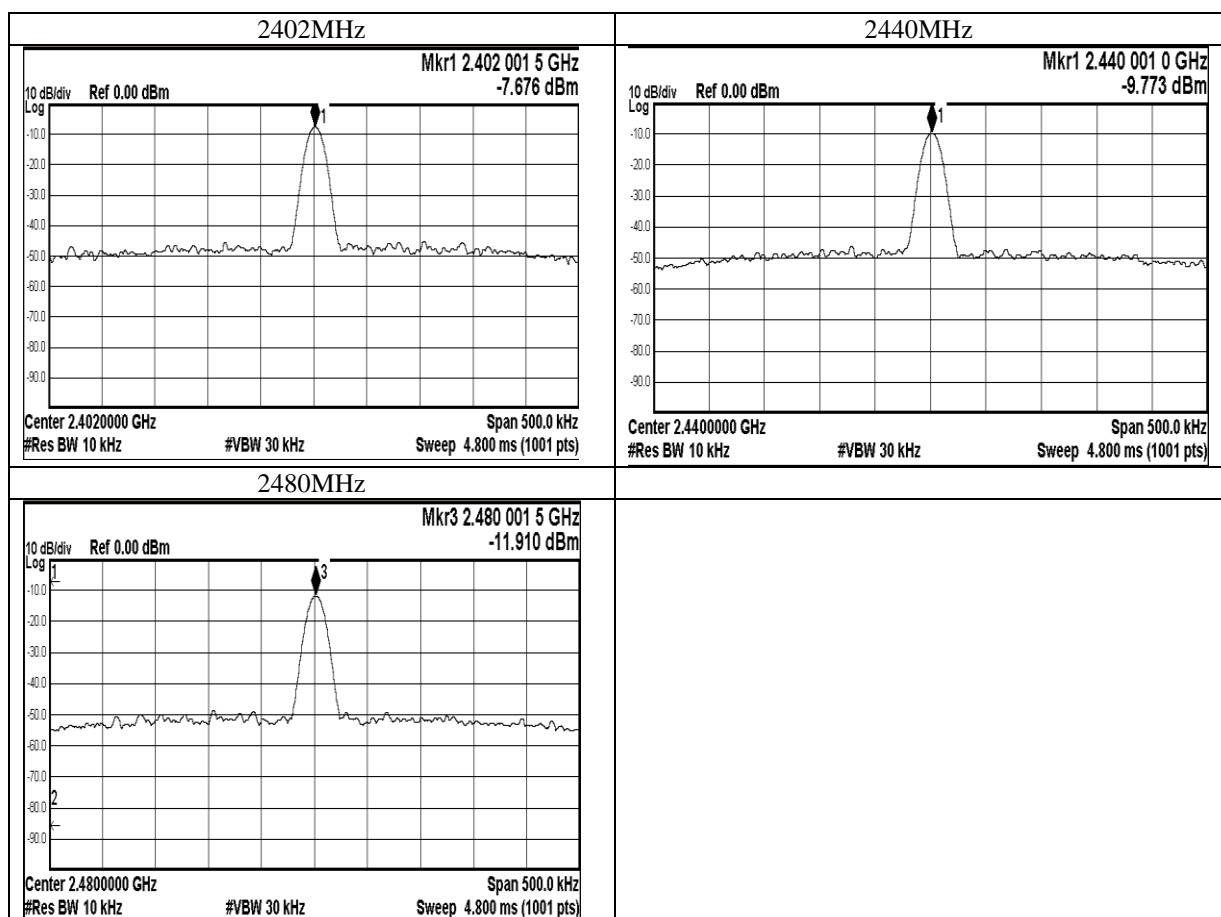
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Frequency Error:

Remark

Test Voltage (V)	Normal Voltage = 5.0Vd.c.				
Test Frequency (MHz)	2402.000	2440.000	2480.000	--	
Measured Frequency (MHz)	2402.002	2440.001	2480.002	--	
Frequency Error (ppm)	0.83	0.41	0.81	--	Limit ≤ 50ppm



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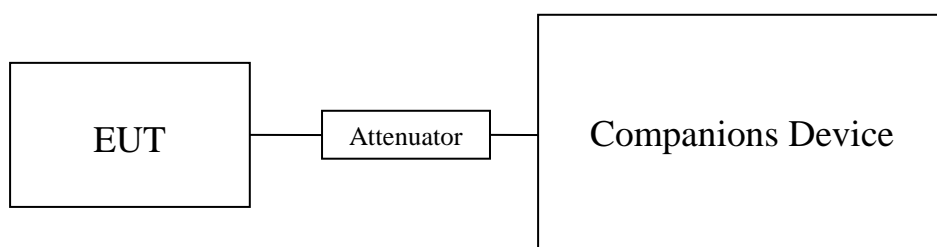
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3.7 Radio Interference Prevention Capability Measurement

3.7.1 Limit:

Item	Limits
ID code	≥48bits

3.7.2 Test Setup Layout



3.7.3 Test Results

Radio Interference Prevention Function	ID code: DE:6D:95:7F:E4:78	Limit ≥48bit
--	----------------------------	--------------



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Appendix A

List of Measuring Equipment

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL	CAL LAB
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A	N/A
EM217	ELECTRIC POWERED TURN TABLE	EMCO	2088	00029144	N/A	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2020/04/19	2021/04/19	CEPREI
EM318	USB Wideband Power Sensor	Agilent	U2022XA	MY53470001	2019/04/15	2021/04/15	CEPREI
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2020/05/13	2021/05/13	CEPREI
EM293	Spectrum Analyzer	Agilent Technologies	N9020A	MY50510152	2020/05/13	2021/05/13	CEPREI
EM319	Wireless Connectivity Test Set	Agilent	N4010A	MY47230512	N/A	N/A	N/A
EM328	Vector Signal Generator	Rohde & Schwarz	SMJ100A	101249	2018/11/18	2020/11/18	CEPREI
EM321	Power Splitter	Mini-Circuits	ZN2PD-9G-2	675800516	2020/05/13	2021/05/13	CEPREI
EM322	Power Splitter	Mini-Circuits	ZN2PD-9G-2	452400445	2020/05/13	2021/05/13	CEPREI
EM323	Power Splitter	Mini-Circuits	ZN2PD-9G-2	728000520	2020/05/13	2021/05/13	CEPREI

Remarks:-

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

Calibration laboratory information (CAL LAB)

CEPREI- CEPREI Calibration and Testing Center

Address: No. 110 Dongguanzhuang Road, Tianhe District, Guangzhou, China
Tel: 020-87237633

ETS-LINDGREN- ETS-LINDGREN An ESCO Technologies Company

Address: 1301 Arrow Point Drive, Cedar Park, Texas 78613, U.S.A.
Tel: 521 531 6400

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Tel: +852 2666 1888 Fax: +852 2664 4353 Email: hkstc@stc.group Website: www.stc.group

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Photographs of EUT

Front View of The Product



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Rear View of The Product



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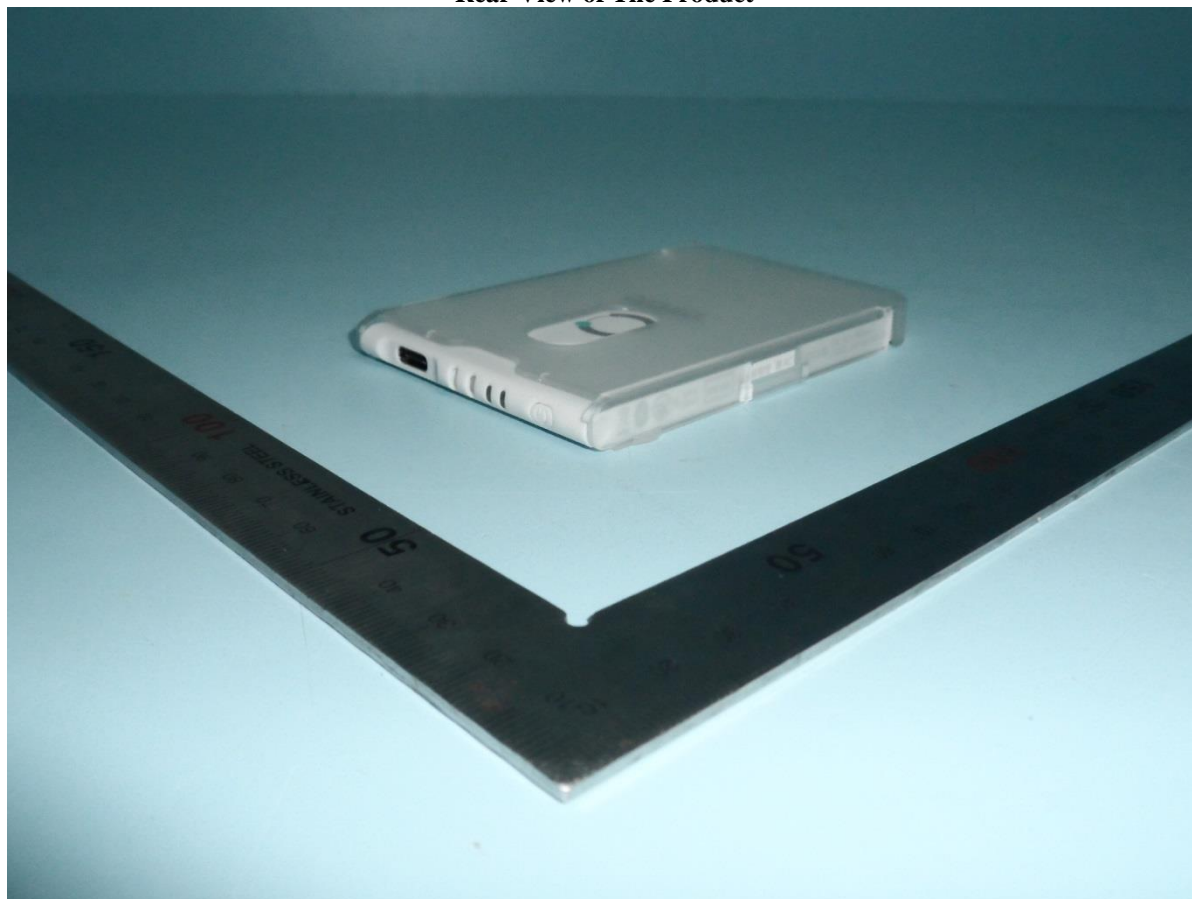


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Rear View of The Product



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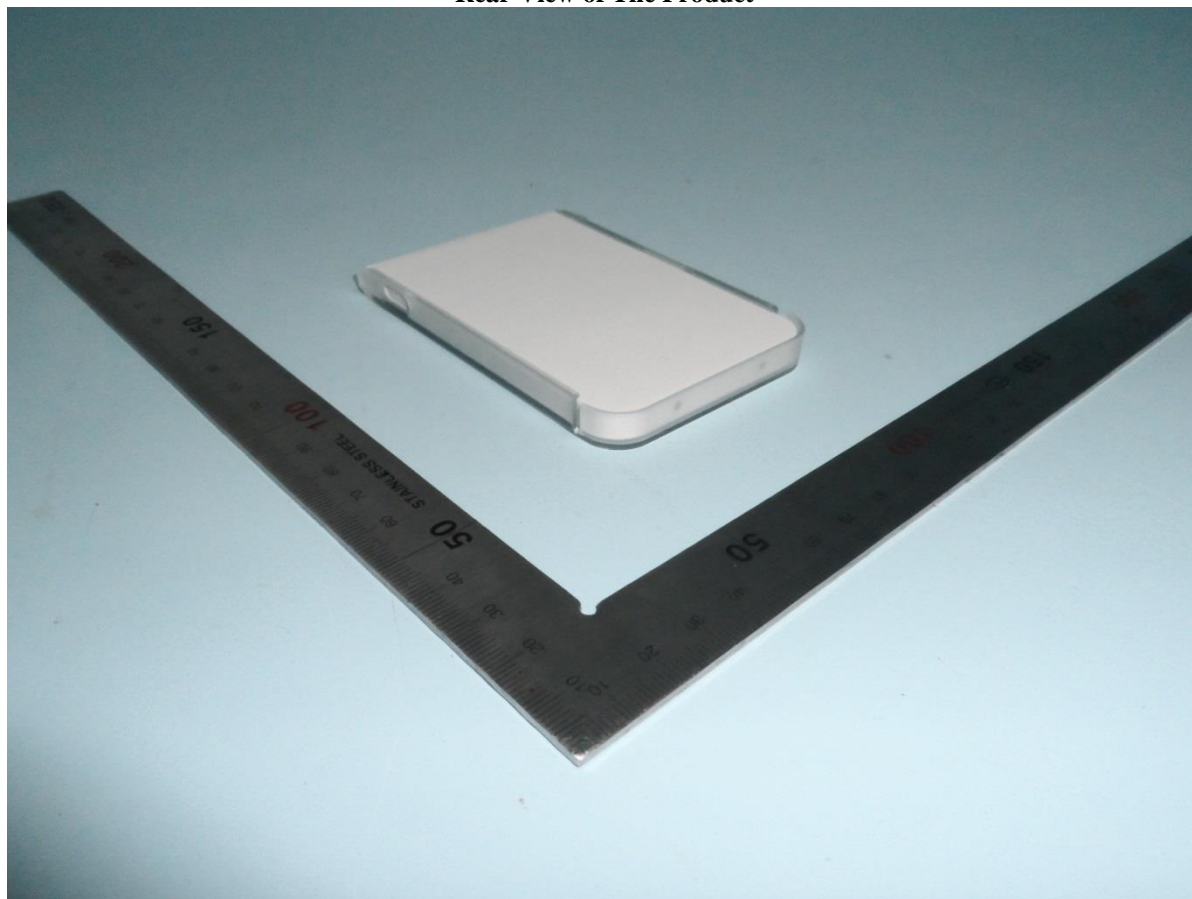
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Rear View of The Product



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Photograph(s) of EUT

Inner View (Overall)



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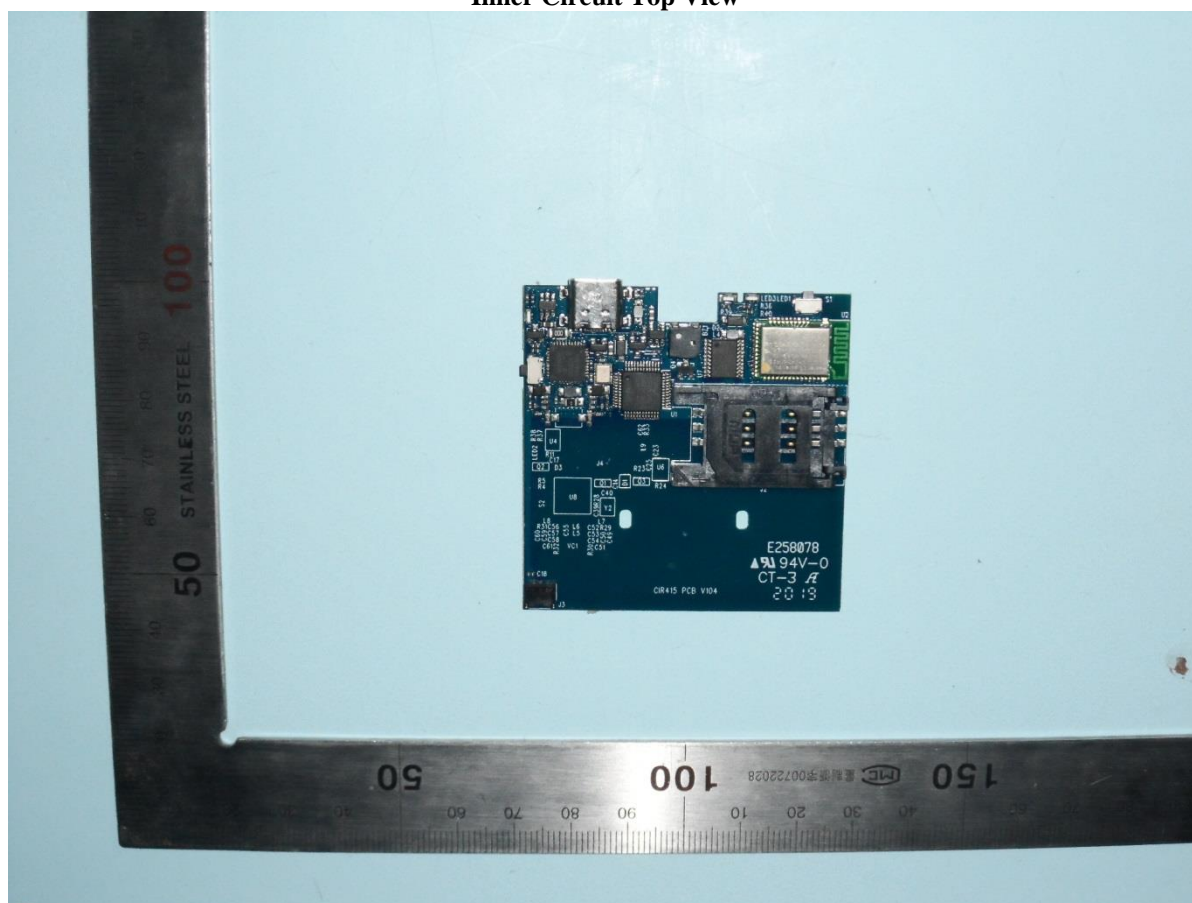
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Photograph(s) of EUT

Inner Circuit Top View



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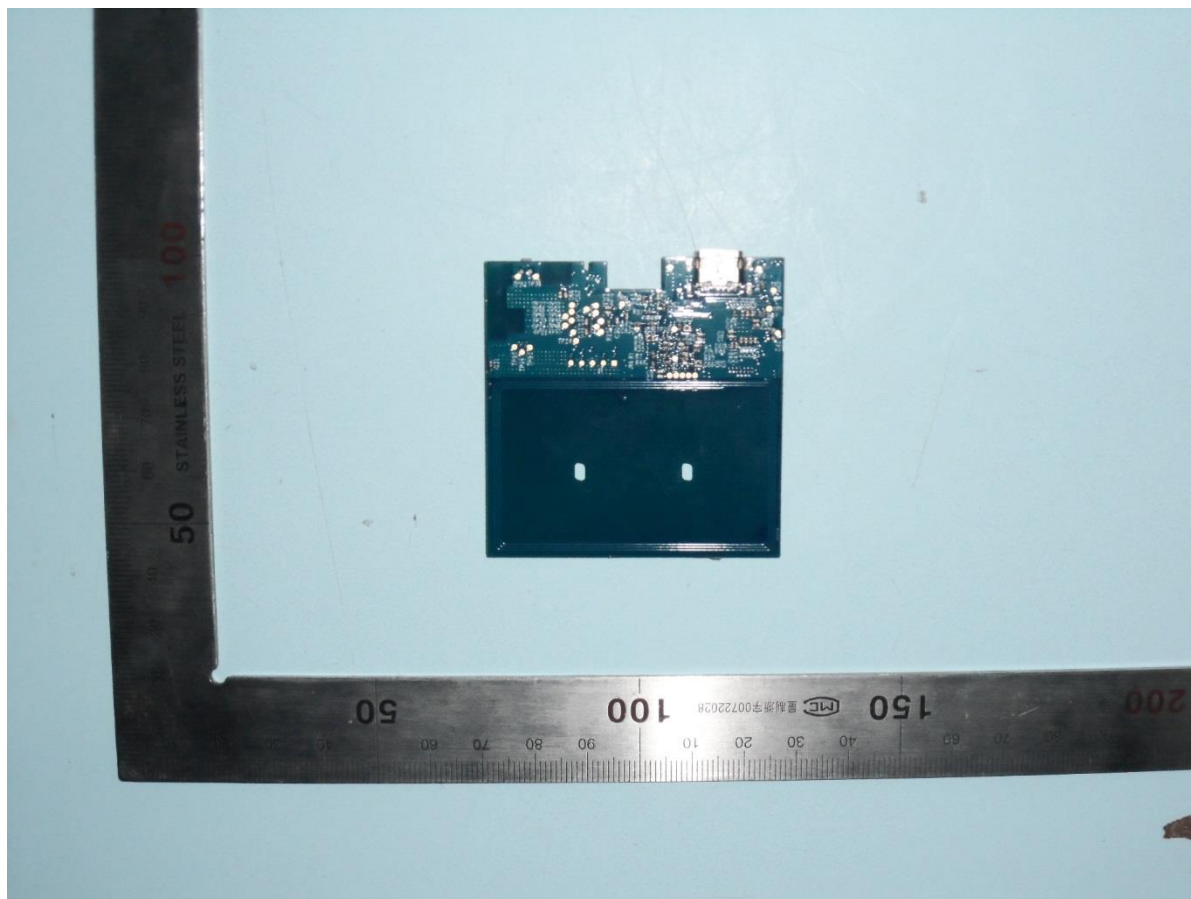
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Inner Circuit Bottom View



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Inner Circuit View (Antenna location)



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Photograph(s) of Test Setup



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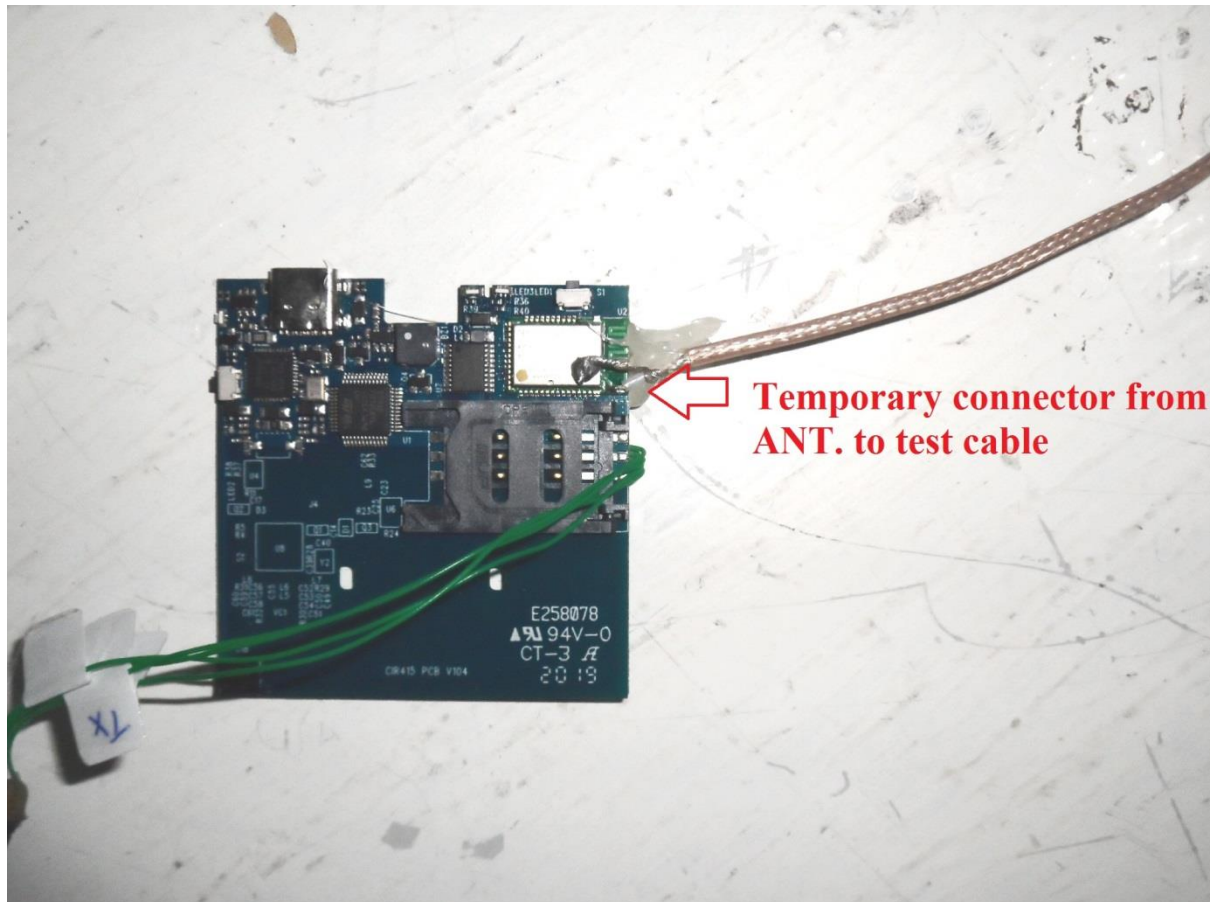
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Photograph(s) of Test Setup



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

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