RADIO TEST REPORT

FCC ID	:	UDX-600119010
Equipment	:	LTE Gateway
Brand Name	:	CISCO
Model Name	:	MG41E-HW, MG41-HW
Applicant	:	Cisco Systems 170 West Tasman Drive, San Jose, CA 95134 USA
Manufacturer	:	Cisco Systems 170 West Tasman Drive, San Jose, CA 95134 USA
Standard	:	FCC Part 96.47

The product was received on Nov. 18, 2020, and testing was started from Apr. 06, 2021 and completed on Apr. 07, 2021 . We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in FCC Part 96.47, and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FG050716-08AF	01	Initial issue of report	May 07, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3	96.47	End User Device additional requirement	PASS	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Wendy Pan

1 General Description

1.1 Product Feature of Equipment Under Test

EUT Type	EUD
Power Type	From power adapter or PoE
EUT supports Radios application	LTE

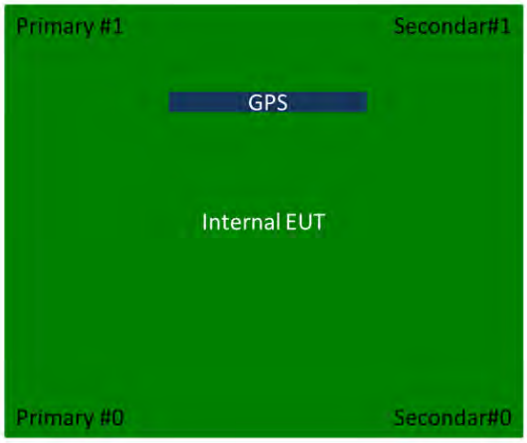
1.2 Antenna Information

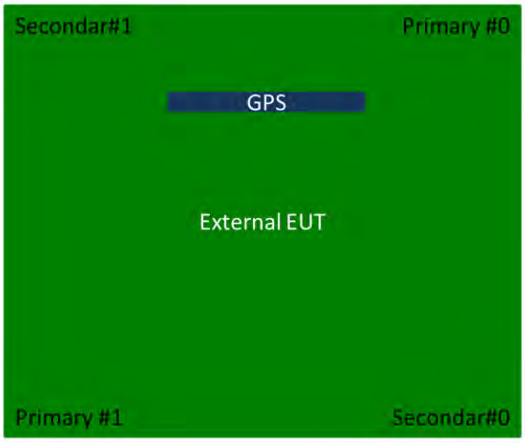
Set	Ant.	Port		Brand	Model Name	Type	Connector	Antenna Gain (dBi)	Remark
1	1	1, Primary #0		CISCO	N/A	PIFA	I-PEX	Note 1	Internal
	2	2, Primary #1		CISCO	N/A	PIFA	I-PEX		
	3	3, Secondary #0		CISCO	N/A	PIFA	I-PEX		
	4	4, Secondary #1		CISCO	N/A	PIFA	I-PEX		
Set	**Ant.**	**Port**		**Brand**	**Model Name**	**Type**	**Connector**	**Antenna Gain (dBi)**	**Remark**
2	1	1, Primary #0	Up	CISCO	MA-ANT-C1-A	Dipole	Reversed-SMA	These antennas don't support band 48.	External
	2	2, Secondary #1	Up	CISCO	MA-ANT-C1-A	Dipole	Reversed-SMA		
	3	3, Primary #1	Down	CISCO	MA-ANT-C1-A	Dipole	Reversed-SMA		
	4	4, Secondary #0	Down	CISCO	MA-ANT-C1-A	Dipole	Reversed-SMA		
3	1	1, Primary #0	Up	CISCO	MA-ANT-C1-B	Panel	Reversed-SMA		External
	2	2, Secondary #1	Up	CISCO	MA-ANT-C1-B	Panel	Reversed-SMA		
	3	3, Primary #1	Down	CISCO	MA-ANT-C1-B	Panel	Reversed-SMA		
	4	4, Secondary #0	Down	CISCO	MA-ANT-C1-B	Panel	Reversed-SMA		

Note1:

Set	Band	Port	Antenna Gain (dBi)	Remark
1	LTE Band 48	2, Primary #1 TX, RX	1.09	1TX/2RX
		4, Secondary #1 RX	2.72	

Note: The above information was declared by manufacturer.





1.3 Table for Multiple Listing

The EUT has two model names which are identical to each other in all aspects except for the following table:

EUT	Model Name	Antenna
EUT 1	MG41-HW	Internal antenna
EUT 2	MG41E-HW	External antenna (Equip with the below combination of antenna: 1. Set 2 antenna 2. Set 3 up + Set 3 down antenna)

Note: The above information was declared by manufacturer.

1.4 Accessories

Accessories			
Equipment Name	**Brand Name**	**Model Name**	**Rating**
Adapter	Cisco	MA-PWR-30W-US	INPUT:100-240Vac~50-60Hz, 0.8A MAX OUTPUT: 12Vdc, 2.5A, 30W
Bracket*1			

1.5 Support Equipment

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	WLAN AP	Netgear	R7500	PY314300288
B	Switch	Panasonic	Switch-S9GPWR	N/A
C	Desktop PC (EPC)	Shuttle	XH110G	N/A
D	CBSD	Ruckus	Q410	S9GQ410US01
E	Notebook	DELL	E4300	N/A
F	Notebook	DELL	E4300	N/A

1.6 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 96.47
- FCC KDB 940660 D01 Part 96 CBRS Eqpt v02

The following reference test guidance is not within the scope of accreditation of TAF.

- WINNF-18-IN-00178_CBRS End User Device as UUT Test Guidelines V1.0

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

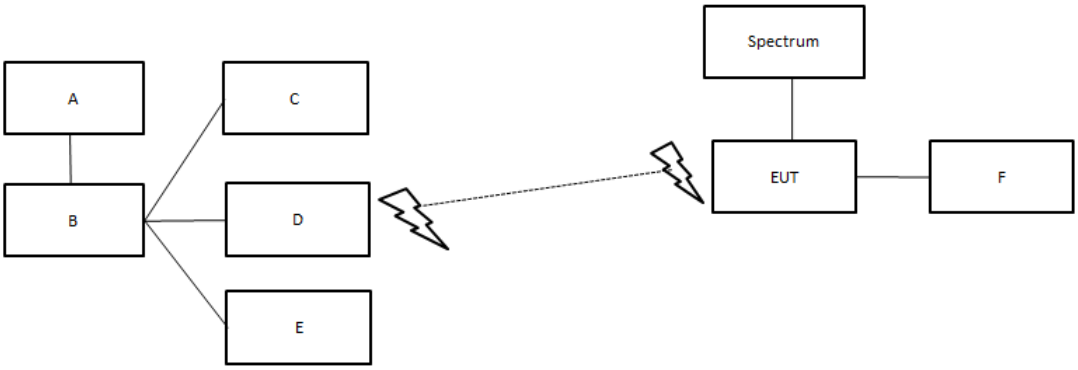
1.7 Testing Location

Testing Location Information		
Test Lab.：Sporton International Inc. Hsinchu Laboratory		
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)	
(TAF: 3787)	TEL: 886-3-656-9065	FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.	
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.	

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH01-CB	Jeff Wu	21.8~22.4 / 54~64	Apr. 06, 2021 ~ Apr. 07, 2021

2 Test Configuration of Equipment Under Test

2.1 Connection Diagram of Test System



Item	Connection	Shielded	Length
1	RJ-45 cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	1.5m

3 End User Device additional requirement

3.1 Test Requirement

FCC Part 96.47

(a) End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

(1) An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

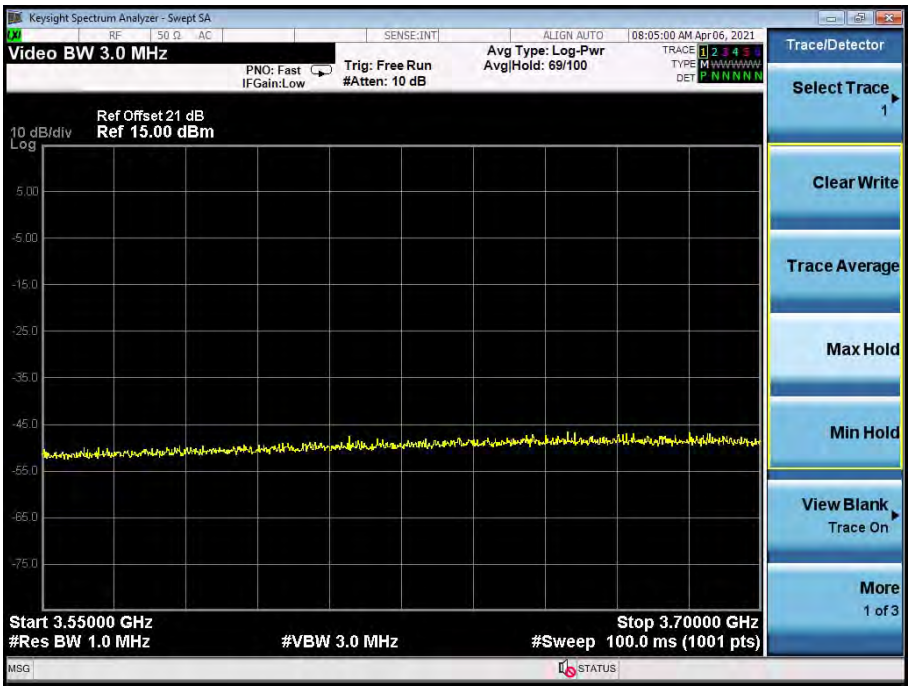
3.2 Test Procedure

Following procedure can be done by applying WINNF-18-IN-00178_CBRS End User Device as UUT Test Guidelines V1.0, use the certified CBSD as companion device to show compliance with Part 96.47 requirement for End User Device (EUD):

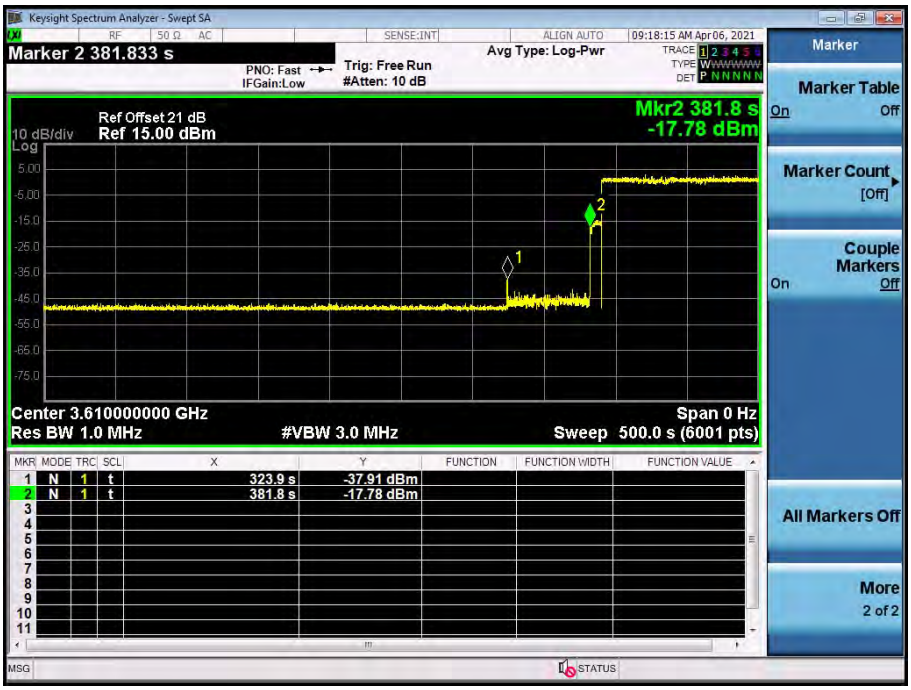
1. Intial Power ON EUT for 300 seconds and check EUT does not transmit in CBRS band.
2. Reboot EUT for 300 seconds.
3. Set CBSD operation in 3600-3620MHz and power level 0dBm/MHz.
4. Check EUT initial RF transmit time in CBRS band
5. Check EUT Tx frequency.
6. Check EUT Tx power level.
7. Disable CBSD service and check EUT stops transmission wihin 10 seconds.
8. Set CBSD operation in 3650-3660MHz and power level 37dBm/MHz.
9. Check EUT Tx frequency.
10. Check EUT Tx power level.

3.3 Test Result

[Step 1] Intial Power ON EUT for 300 seconds and check EUT does not transmit in CBRS band.

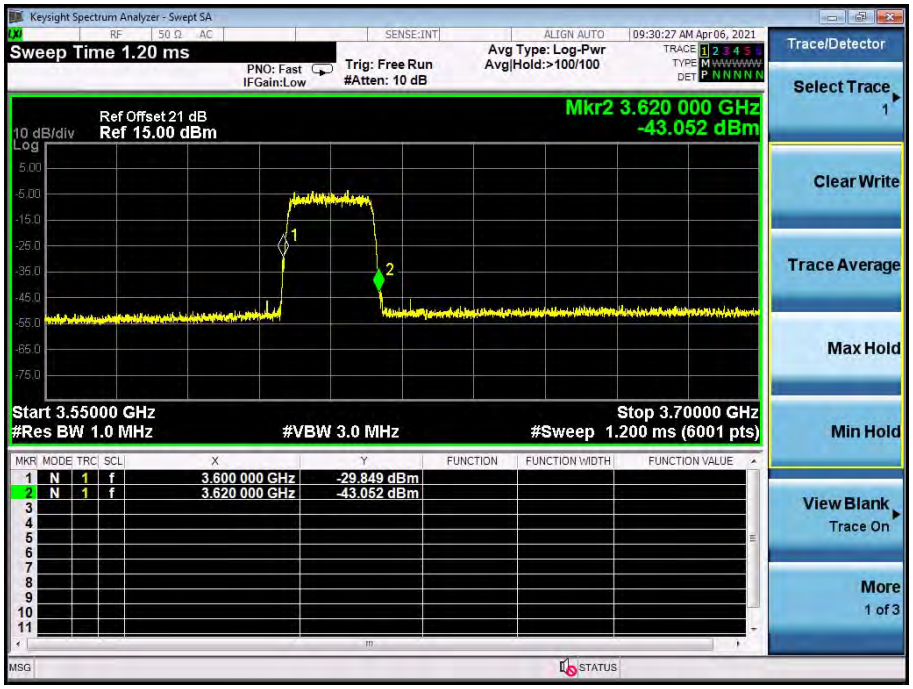


[Step 2] Reboot EUT for 300 seconds.
[Step 3] Set CBSD operation in 3600-3620MHz and power level 0dBm/MHz.
[Step 4] Check EUT initial RF transmit time in CBRS band.

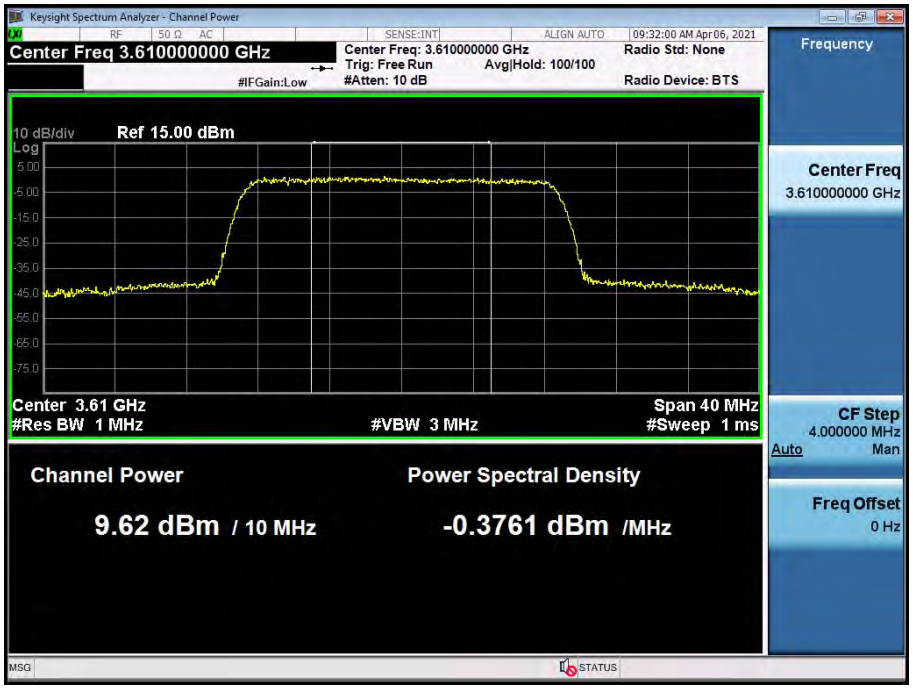


Note:
Marker 1: CBSD starts RF operation in CBRS band.
Marker 2: EUT starts RF operation in CBRS band.

[Step 5] Check EUT Tx frequency.



[Step 6] Check EUT Tx power level



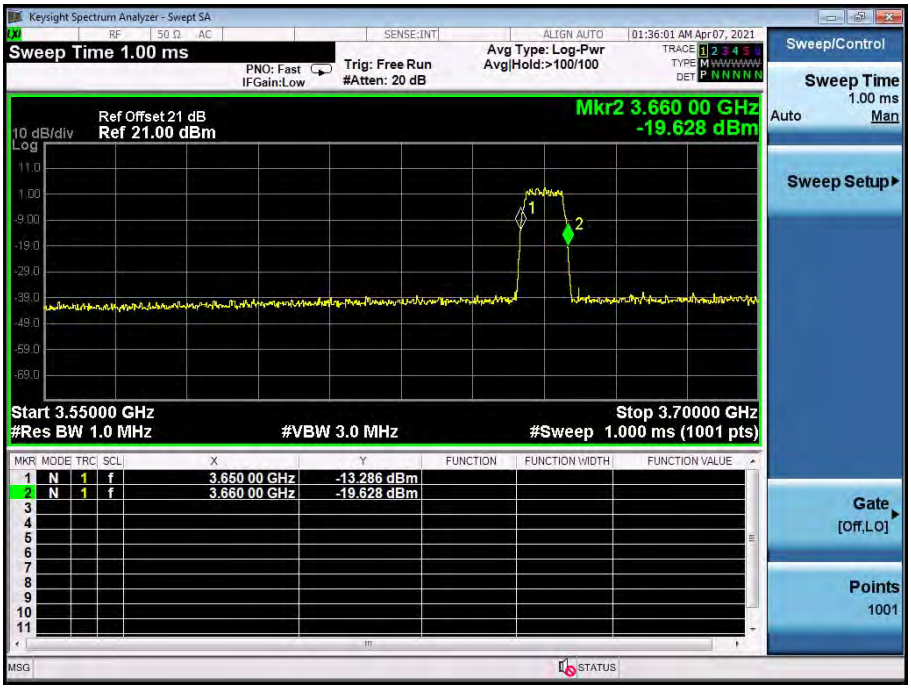
Step	Freq. (MHz)	Bandwidth (MHz)	Antenna Gain (dBi)	Port 1 (dBm/MHz)	maxEirp (dBm/MHz)	Result
6	3610	20	1.09	9.62	10.71	PASS

[Step 7] Disable CBSD service and check EUT stops transmission wihin 10 seconds.

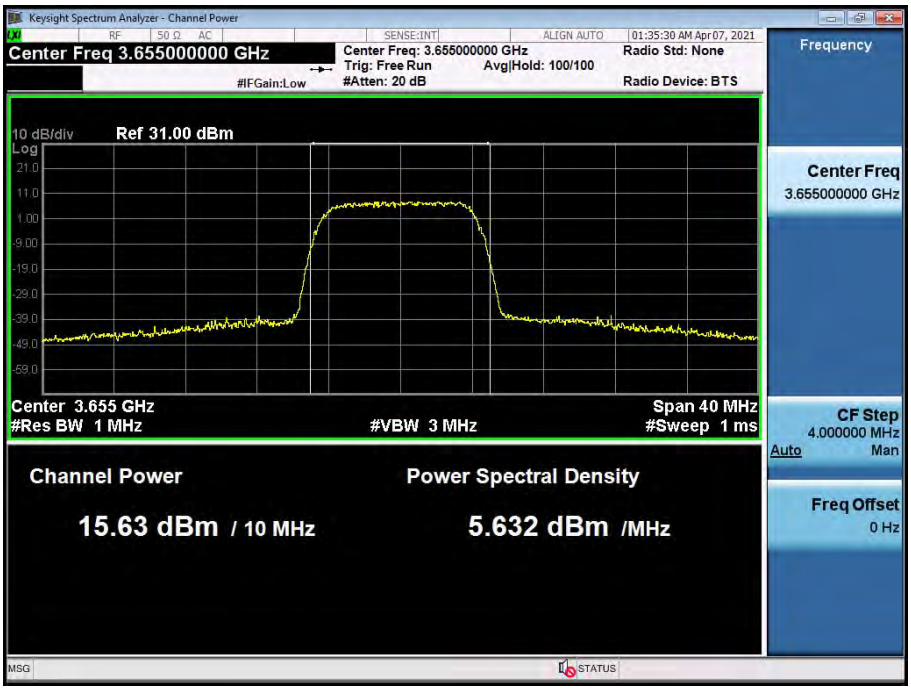
Note:
Marker 1: Trigger CBSD disable RF service.
Marker 2: EUT stops RF operation in CBRS band.
Marker 3: 10 seconds time limit for EUD to disable operation in this channel.

[Step 8] Set CBSD operation in 3650-3660MHz and power level 37dBm/MHz.

[Step 9] Check EUT Tx frequency.



[Step 10] Check EUT Tx power level



Step	Freq. (MHz)	Bandwidth (MHz)	Antenna Gain (dBi)	Port 1 (dBm/MHz)	maxEirp (dBm/MHz)	Result
10	3655	10	1.09	15.63	16.72	PASS

4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Signal analyzer	Agilent	N9010A	MY52220519	10kHz~44GHz	Mar. 19, 2021	Mar. 18, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Power Divider	STI	2 Way	DV-2way -05	1GHz ~ 8GHz	Mar. 01, 2021	Feb. 28, 2022	Conducted (TH01-CB)
RF Power Divider	STI	2 Way	DV-2way -06	1GHz ~ 8GHz	Mar. 01, 2021	Feb. 28, 2022	Conducted (TH01-CB)
RF Power Divider	MTJ	4 Way	DFS-01-DV-01	1GHz ~ 6GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Conducted Emission	2.8 dB	Confidence levels of 95%