TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**EN 300 328 V2.2.2 (2019-07)**
Report No.:	REBBUI-WTW-P22100653-5
Product:	11ax RTL8851BE Combo module
Brand:	REALTEK
Model No.:	RTL8851BE
Received Date:	2022/10/25
Test Date:	2022/12/14 ~ 2023/3/24
Issued Date:	2023/4/28
Applicant:	Realtek Semiconductor Corp.
Address:	No. 2, Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Approved by: _____ , **Date:** **2023/4/28**

May Chen / Manager

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Prepared by : Vito Lung / Specialist

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Release Control Record

Issue No.	Description	Date Issued
REBBUI-WTW-P22100653-5	Original release.	2023/4/28

1 Certificate

Product:	11ax RTL8851BE Combo module
Brand:	REALTEK
Test Model:	RTL8851BE
Sample Status:	Engineering sample
Applicant:	Realtek Semiconductor Corp.
Test Date:	2022/12/14 ~ 2023/3/24
Standard:	EN 300 328 V2.2.2 (2019-07)

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.

2 Summary of Test Results

EN 300 328 V2.2.2		
Clause	Test Item	Result
4.3.2.2	RF Output Power	Pass
4.3.2.3	Power Spectral Density	Pass
4.3.2.4	Duty cycle, Tx-sequence, Tx-gap	Not Applicable
4.3.2.5	Medium Utilization (MU) Factor	Not Applicable
4.3.2.6	Adaptivity	Pass
4.3.2.7	Occupied Channel Bandwidth	Pass
4.3.2.8	Transmitter Unwanted Emissions in the out-of-band Domain	Pass
4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain up to 1 GHz	Pass
4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain above 1 GHz	Pass
4.3.2.10	Receiver Spurious Emissions up to 1 GHz	Pass
4.3.2.10	Receiver Spurious Emissions above 1 GHz	Pass
4.3.2.11	Receiver Blocking	Pass
4.3.2.12	Geo-location capability	Not Applicable

Notes:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Parameter	Uncertainty (±)
Occupied Channel Bandwidth	1.132×10^{-4} %
RF output power, conducted	1.371 dB
Power Spectral Density, conducted	1.371 dB
Unwanted Emissions, conducted	2.5 dB
All emissions, radiated	4.9 dB
Temperature	0.12 °C
Supply voltages	0.3%
Time	2.53%

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	11ax RTL8851BE Combo module
Brand	REALTEK
Test Model	RTL8851BE
Status of EUT	Engineering sample
Power Supply Rating	3.3 Vdc from host equipment
Temperature Operating Range	-20 °C ~ 70 °C
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Up to 2 Mbps
Operating Frequency	2.402 GHz ~ 2.48 GHz
Number of Channel	40
Output Power (e.i.r.p.)	11.06 dBm
EUT Category	Adaptive Equipment without the possibility to switch to a non-adaptive mode
Adaptive Operational Mode	Load Based Equipment(Not using any of the mechanisms referenced)
Receiver Category	Category 1

Note:

1. The EUT has below HW SKU configuration, as below table:

SKU No.	Product name	HW Configuration
1	11ax RTL8851BE Combo module	PCIe + USB interface + Dual antenna port
2		PCIe + USB interface + Single antenna port
Note: For spurious emissions: From the above HW SKUs, the worse case was found in **SKU No.: 2**. Therefore only the test data of the SKU was recorded in this report.		

2. There are Bluetooth and WLAN (2.4 GHz & 5 GHz) technology used for the EUT.
3. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (5 GHz)	Bluetooth
2	WLAN(2.4 GHz)	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

4. 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 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna NO.	Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length
1	Chain 1	REALTEK	RTK-ANT-0022	3.4	2.4~2.4835GHz	PIFA	IPEX4	300mm
				5	5.15~5.85GHz			
	Chain 2	REALTEK	RTK-ANT-0022	3.4	2.4~2.4835GHz	PIFA	IPEX4	300mm
				5	5.15~5.85GHz			
2	Chain 1	Aristotle	RFA-27-C38H1-MHF4300	3	2.4~2.4835GHz	Dipole	IPEX4	300mm
				5	5.15~5.85GHz			
	Chain 2	Aristotle	RFA-27-C38H1-MHF4300	3	2.4~2.4835GHz	Dipole	IPEX4	300mm
				5	5.15~5.85GHz			
3	Chain 1	LYNwave	ALX22F-120AA0-00	3.2	2.4~2.4835GHz	Monopole	IPEX4	200mm
				4	5.15~5.85GHz			
	Chain 2	LYNwave	ALX22F-120AA0-00	3.2	2.4~2.4835GHz	Monopole	IPEX4	200mm
				4	5.15~5.85GHz			
Note: Max. gain was selected for the final test, except for the spurious emissions test and Adaptivity.								

*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.

3.3 Channel List

BT-LE channels:

RF Channel	RF Center Frequency	Channel Index	Channels Type for BT 5.x		Channels Type for BT 4.x
			Maximum Data Rate 2Mbps	Maximum Data Rate 1Mbps	Maximum Data Rate 1Mbps
0	2402 MHz	37		●	●
1	2404 MHz	0	●		●
2	2406 MHz	1	●		●
3	2408 MHz	2	●		●
4	2410 MHz	3	●		●
5	2412 MHz	4	●		●
6	2414 MHz	5	●		●
7	2416 MHz	6	●		●
8	2418 MHz	7	●		●
9	2420 MHz	8	●		●
10	2422 MHz	9	●		●
11	2424 MHz	10	●		●
12	2426 MHz	38		●	●
13	2428 MHz	11	●		●
14	2430 MHz	12	●		●
15	2432 MHz	13	●		●
16	2434 MHz	14	●		●
17	2436 MHz	15	●		●
18	2438 MHz	16	●		●
19	2440 MHz	17	●		●
20	2442 MHz	18	●		●
21	2444 MHz	19	●		●
22	2446 MHz	20	●		●
23	2448 MHz	21	●		●
24	2450 MHz	22	●		●
25	2452 MHz	23	●		●
26	2454 MHz	24	●		●
27	2456 MHz	25	●		●
28	2458 MHz	26	●		●
29	2460 MHz	27	●		●
30	2462 MHz	28	●		●
31	2464 MHz	29	●		●
32	2466 MHz	30	●		●
33	2468 MHz	31	●		●
34	2470 MHz	32	●		●
35	2472 MHz	33	●		●
36	2474 MHz	34	●		●
37	2476 MHz	35	●		●
38	2478 MHz	36	●		●
39	2480 MHz	39		●	●

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. PIFA/Monopole ANT can be used in the following ways: X / Y / Z axis. Pre-scan in these ways and find the worst case as a representative test condition. 2. EUT has two types of patterns. dual port sampling(1Tx Diversity)/single port sampling(Fixed Chain1). Pre-scan in these ways to find the worst case as a representative test condition. 3. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.
Worst Case:	1. PIFA/Monopole ANT the worst case was found when positioned on (X / Y / Z axis): Transmitter Unwanted Emissions in the Spurious Domain up to 1 GHz Z axis worst ; Transmitter Unwanted Emissions in the Spurious Domain above 1 GHz Z axis worst. 2. dual port sampling/single port sampling types Worst Condition: Single port sampling

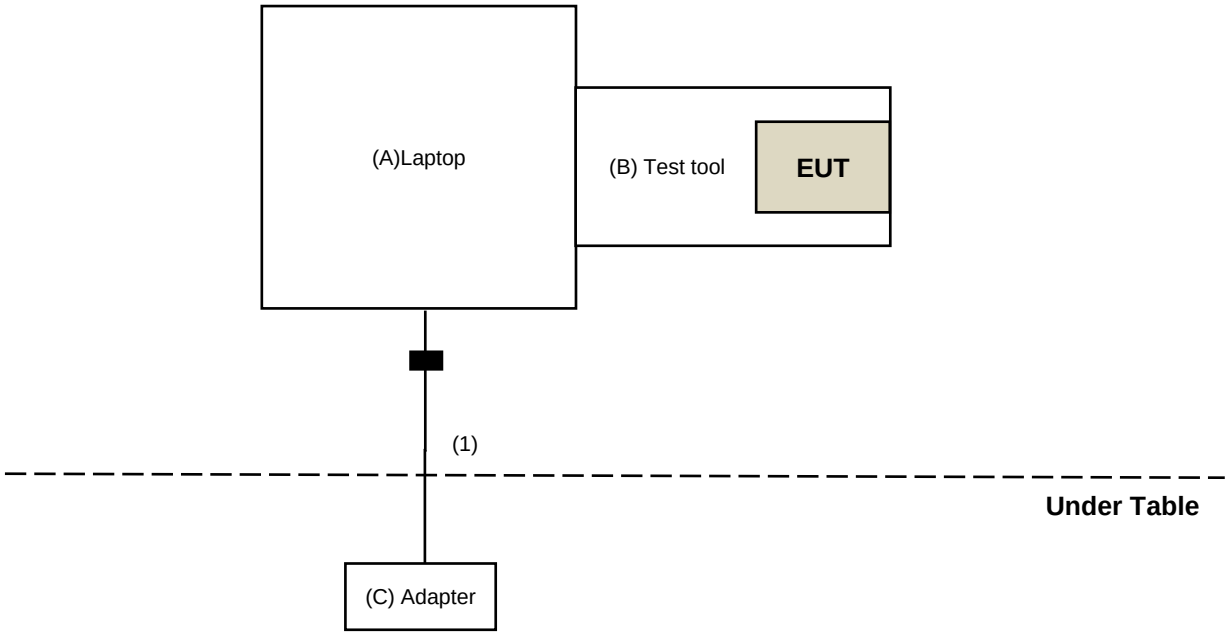
Following channel(s) was (were) selected for the final test as listed below:

Test Item	EUT Configure Mode	Power Profile	Mode	Tested Channel	Modulation	Data Rate Parameter	Special requirements
RF Output Power / Power Spectral Density	-	Low Power	BT-LE 1M	0, 19, 39	GFSK	1Mb/s	-
			BT-LE 2M	1, 19, 38	GFSK	2Mb/s	
		High Power	BT-LE 1M	0, 19, 39	GFSK	1Mb/s	-
			BT-LE 2M	1, 19, 38	GFSK	2Mb/s	
Adaptivity	-	-	BT-LE 1M	0, 39	GFSK	1Mb/s	- Add Test low antenna gain
Occupied Channel Bandwidth	-	Low Power	BT-LE 1M	0, 39	GFSK	1Mb/s	-
			BT-LE 2M	1, 38	GFSK	2Mb/s	
		High Power	BT-LE 1M	0, 39	GFSK	1Mb/s	-
			BT-LE 2M	1, 38	GFSK	2Mb/s	
Transmitter Unwanted Emissions in the out-of-band Domain	-	Low Power	BT-LE 1M	0, 39	GFSK	1Mb/s	-
			BT-LE 2M	1, 38	GFSK	2Mb/s	
		High Power	BT-LE 1M	0, 39	GFSK	1Mb/s	-
			BT-LE 2M	1, 38	GFSK	2Mb/s	
Transmitter Unwanted Emissions in the Spurious Domain up to 1 GHz	A	High Power	BT-LE 1M	39	GFSK	1Mb/s	-
	B						
	C						
Transmitter Unwanted Emissions in the Spurious Domain above 1 GHz	A	High Power	BT-LE 1M	0, 39	GFSK	1Mb/s	-
	B						
	C						
Receiver Spurious Emissions up to 1 GHz	A	-	Receiver	39	-	-	-
	B						
	C						
Receiver Spurious Emissions above 1 GHz	A	-	Receiver	0, 39	-	-	-
	B						
	C						
Receiver Blocking	-	-	BT-LE 1M	0, 39	GFSK	1Mb/s	- Add Test Worst Pmin
EUT Configure Mode:	A	with Dipole Antenna					
	B	with PIFA Antenna					
	C	with Monopole Antenna					
Note: Bluetooth output power is divided into Low Power(6dBm) and High Power(12dBm), both need to be tested.							

3.5 Test Program Used and Operation Descriptions

Controlling software (Bluetooth RF test tool (5.3.2.49)) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.6 Connection Diagram of EUT and Peripheral Devices



3.7 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	Dell	Latitude 7430	8C19NN3	N/A	Provided by Lab
B	Test tool	Realtek	N/A	N/A	N/A	Supplied by applicant
C	Adapter	DELL	LA90PM111	N/A	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.8	NO	1	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
MXG X-Series RF Vector Signal Generator Keysight	N5182B	MY53052700	2022/7/18	2023/7/17
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
PSG analog signal generator (from 250 kHz to 50 GHz) Keysight	E8257D	MY53401987	2022/6/21	2023/6/20
PXA Signal Analyzer(3 Hz to 50 GHz) Keysight	N9030A	MY54490570	2022/6/20	2023/6/19
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Temperature & Humidity Chamber TERCHY	MHU-225AU	911033	2022/11/18	2023/11/17

Notes:

1. The test was performed in Oven room 1.
2. Tested Date: 2022/12/14

4.2 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
MXG X-Series RF Vector Signal Generator Keysight	N5182B	MY53052700	2022/7/18	2023/7/17
PSG analog signal generator (from 250 kHz to 50 GHz) Keysight	E8257D	MY53401987	2022/6/21	2023/6/20
PXA Signal Analyzer(3 Hz to 50 GHz) Keysight	N9030A	MY54490570	2022/6/20	2023/6/19
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room 1.
2. Tested Date: 2022/12/14

4.3 Adaptivity

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bluetooth Simulator (up to Version 4.0) Anritsu	MT8852B	1218002	2022/5/24	2023/5/23
Combiner / Splitter (Model:ZN2PD-9G) Mini-Circuits	ZN2PD-9G	ZN2PD-9G	2022/6/9	2023/6/8
MXG Vector signal generator KEYSIGHT	N5182B	MY53052282	2023/1/6	2024/1/5
N9030B - PXA Signal Analyzer KEYSIGHT	N9030B	MY57140488	2023/3/6	2024/3/5
PXA KEYSIGHT	N9030B	MY57140953	2022/7/1	2023/6/30
Signal Analyzer R&S	FSV7	104056	2022/5/20	2023/5/19
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24

Notes:

1. The test was performed in Adaptivity room.
2. Tested Date: 2023/3/24

4.4 Occupied Channel Bandwidth

Refer to section 4.2 to get information of the instruments.

4.5 Transmitter Unwanted Emissions in the out-of-band Domain

Refer to section 4.2 to get information of the instruments.

4.6 Transmitter Unwanted Emissions in the Spurious Domain up to 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208411	N/A	N/A
Power Meter Anritsu	ML2495A	0824006	2022/5/9	2023/5/8
		1529002	2022/6/22	2023/6/21
Preamplifier Agilent	8447D	2944A10663	2022/4/25	2023/4/24
PSG analog signal generator (from 250 kHz to 50 GHz) Keysight	E8257D	MY53401987	2022/6/21	2023/6/20
Pulse Power Sensor Anritsu	MA2411B	1339443	2022/5/29	2023/5/28
		1726432	2022/5/29	2023/5/28
PXA Signal Analyzer(3 Hz to 50 GHz) Keysight	N9030A	MY54490570	2022/6/20	2023/6/19
Software	ADT_Radiated_V7.6.15.9.5	N/A	N/A	N/A
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-162	2022/10/20	2023/10/19

Notes:

1. The test was performed in RF Fully Chamber No. 1.
2. Tested Date: 2022/12/30

4.7 Transmitter Unwanted Emissions in the Spurious Domain above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208542	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120 D	9120D-1479	2022/11/13	2023/11/12
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
	ML2496A	1529003	2022/8/8	2023/8/7
Pre-Amplifier Agilent 8449B (1 to 26.5GHz) Agilent	8449B	3008A01922	2022/8/15	2023/8/14
PSG analog signal generator (from 250 kHz to 50 GHz) Keysight	E8257D	MY53401987	2022/6/21	2023/6/20
Pulse Power Sensor Anritsu	MA2411B	1339443	2022/5/29	2023/5/28
		1726432	2022/5/29	2023/5/28
Software	ADT_Radiated_V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9030A	MY54490520	2022/8/5	2023/8/4

Notes:

1. The test was performed in RF Fully Chamber No. 2.
2. Tested Date: 2022/12/19 ~ 2022/12/27

4.8 Receiver Spurious Emissions up to 1 GHz

Refer to section 4.6 to get information of the instruments.

4.9 Receiver Spurious Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208542	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120 D	9120D-1479	2022/11/13	2023/11/12
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
	ML2496A	1529003	2022/8/8	2023/8/7
Pre-Amplifier Agilent 8449B (1 to 26.5GHz) Agilent	8449B	3008A01922	2022/8/15	2023/8/14
PSG analog signal generator (from 250 kHz to 50 GHz) Keysight	E8257D	MY53401987	2022/6/21	2023/6/20
Pulse Power Sensor Anritsu	MA2411B	1339443	2022/5/29	2023/5/28
		1726432	2022/5/29	2023/5/28
Software	ADT_Radiated_V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9030A	MY54490520	2022/8/5	2023/8/4

Notes:

1. The test was performed in RF Fully Chamber No. 2.
2. Tested Date: 2022/12/19 ~ 2022/12/20

4.10 Receiver Blocking

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bluetooth Simulator (up to Version 4.0) Anritsu	MT8852B	1218002	2022/5/24	2023/5/23
Combiner / Splitter (Model:ZN2PD-9G) Mini-Circuits	ZN2PD-9G	ZN2PD-9G	2022/6/9	2023/6/8
MXG -X Vector Signal Generator KEYSIGHT	N5182B	MY57301272	2022/3/13	2023/3/12
N9030B - PXA Signal Analyzer KEYSIGHT	N9030B	MY57140938	2022/3/15	2023/3/14
Signal Analyzer R&S	FSV7	104056	2022/5/20	2023/5/19
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24

Notes:

1. The test was performed in Adaptivity room.
2. Tested Date: 2023/1/17

5 Limits of Test Items

5.1 RF Output Power

Condition	Frequency Band	Limit (e.i.r.p.)
Under all test conditions	2400 ~ 2483.5 MHz	20 dBm

5.2 Power Spectral Density

Condition	Frequency Band	Limit (e.i.r.p.)
Under normal conditions	2400 ~ 2483.5 MHz	10 dBm / 1 MHz

5.3 Adaptivity

Applicability of adaptive requirements and limit for wide band modulation techniques

Requirement	Operational Mode			
	DAA mechanism	LBT mechanism		
		Frame Based Equipment	Load Based Equipment (Base on 'Spectrum Sharing' mechanisms)	Load Based Equipment (Not using any of the mechanisms referenced)
Minimum Clear Channel Assessment (CCA) Time	NA	18 us	(see note 1)	18 us
Maximum Channel Occupancy (COT) Time	40 ms	1 ms - 10 ms	(see note 1)	13 ms
Minimum Idle Period	5% of COT	5% of COT	(see note 1)	18 us (see note 2)
Extended CCA check	NA	NA	(see note 1)	18 us – 160 us
Short Control Signalling Transmissions	Maximum duty cycle of 10 % within an observation period of 50 ms (see note 3)			

NOTE 1: Load Based Equipment may implement an LBT based spectrum sharing mechanism based on the Clear Channel Assessment (CCA) mode using energy detect as described in IEEE 802.11™ [i.3], clause 10 clause 11, clause 15,clause 16, clause 18 and clause 19, or in IEEE 802.15.4™ [i.4], clause 5, clause 6 and clause 10

NOTE 2: The Idle Period in between transmissions is considered to be the CCA or the Extended CCA check as there are no transmissions during this period.

NOTE 3: Adaptive equipment may or may not have Short Control Signalling Transmissions.

Threshold Level for LBT mechanism (Load Based Equipment)	
Maximum transmit power (P_H) EIRP dBm	**Threshold level (TL) (see notes 1 and 2)**
20	-70 dBm / MHz

NOTE 1: For a 20 dBm e.i.r.p. transmitter the CCA threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G).

NOTE 2: For power levels less than 20 dBm e.i.r.p. the CCA threshold level may be relaxed to:
$TL = -70 \text{ dBm/MHz} + 10 \times \log_{10}(100 \text{ mW} / P_{out})$; (P_{out} in mW e.i.r.p.)

Unwanted signal parameters for LBT mechanism (Load Based Equipment)		
Wanted signal mean power from companion device	**Unwanted signal frequency (MHz)**	**Unwanted signal power (dBm)**
sufficient to maintain the link (see note 2)	2 395 or 2 488.5 (see note 1)	-35 (see note 3)

NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483.5 MHz. See clause 5.4.6.1.

NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz.

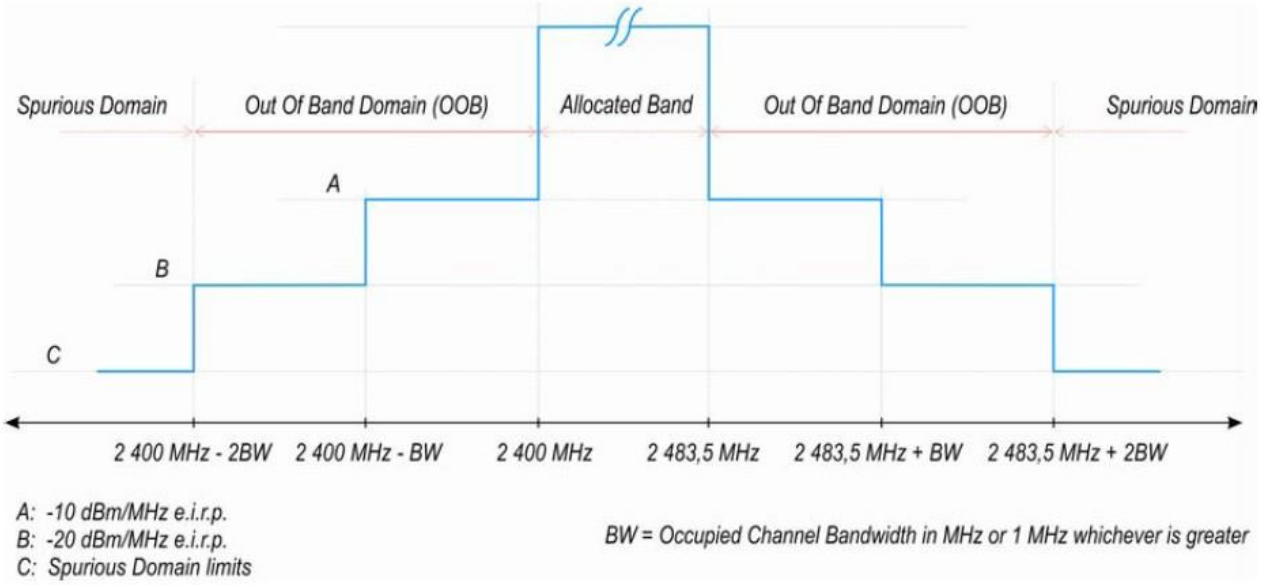
NOTE 3: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.

5.4 Occupied Channel Bandwidth

Condition		Limit
All types of equipment		Shall fall completely within the band 2400 to 2483.5 MHz.
Additional requirement	For non-adaptive non-FHSS system and e.i.r.p >10 dBm.	Less than 20 MHz
	For non-adaptive Frequency Hopping system and e.i.r.p >10 dBm.	Less than 5 MHz

5.5 Transmitter Unwanted Emissions in the out-of-band Domain

Condition	Limit
Under normal conditions	The transmitter unwanted emissions in the out-of-band domain shall not exceed the values provided by the mask in below figure.



5.6 Transmitter Unwanted Emissions in the Spurious Domain up to 1 GHz

Frequency Range	Maximum Power Limit	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87.5 MHz	-36 dBm	100 kHz
87.5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz

Note: These limits are e.r.p. for emissions up to 1 GHz.

5.7 Transmitter Unwanted Emissions in the Spurious Domain above 1 GHz

Frequency Range	Maximum Power Limit	Bandwidth
1 GHz to 12.75 GHz	-30 dBm	1 MHz

Note: These limits are e.i.r.p. for emissions above 1 GHz.

5.8 Receiver Spurious Emissions up to 1 GHz

Frequency Range	Maximum Power Limit	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz

Note: These limits are e.r.p. for emissions up to 1 GHz.

5.9 Receiver Spurious Emissions above 1 GHz

Frequency Range	Maximum Power Limit	Bandwidth
1 GHz to 12.75 GHz	-47 dBm	1 MHz

Note: These limits are e.i.r.p. for emissions above 1 GHz.

5.10 Receiver Blocking

<table>
<tr><th colspan="4">Receiver Category 1 Equipment</th></tr>
<tr><th>Wanted signal mean power from companion device (dBm) (see notes 1 to 4)</th><th>Blocking Signal Frequency (MHz)</th><th>Blocking Signal Power (dBm) (see note 4)</th><th>Type of blocking signal</th></tr>
<tr><td>(-133 dBm + 10 × $\log_{10}$(OCBW)) or -68 dBm whichever is less (see note 2)</td><td>2 380
2 504</td><td rowspan="2">-34</td><td rowspan="2">CW</td></tr>
<tr><td>(-139 dBm + 10 × $\log_{10}$(OCBW)) or -74 dBm whichever is less (see note 3)</td><td>2 300
2 330
2 360
2 524
2 584
2 674</td></tr>
<tr><td colspan="4">NOTE 1: OCBW is in Hz.
NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.
NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 20 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.
NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured / positioned as recorded in clause 5.4.3.2.2.</td></tr>
</table>

6 Test Arrangements

6.1 RF Output Power

Test procedure refer to chapter 5.4.2 of EN 300 328 V2.2.2.

Measurement Method	Conducted measurement

6.2 Power Spectral Density

Test procedure refer to chapter 5.4.3 of EN 300 328 V2.2.2.

Measurement Method	Conducted measurement
Option 2: For equipment with continuous transmission capability	

6.3 Adaptivity

Test procedure refer to chapter 5.4.6 of EN 300 328 V2.2.2.

Measurement Method	Conducted measurement

6.4 Occupied Channel Bandwidth

Test procedure refer to chapter 5.4.7 of EN 300 328 V2.2.2.

Measurement Method	Conducted measurement

6.5 Transmitter Unwanted Emissions in the out-of-band Domain

Test procedure refer to chapter 5.4.8 of EN 300 328 V2.2.2.

Measurement Method	Conducted measurement

6.6 Transmitter Unwanted Emissions in the Spurious Domain up to 1 GHz

Test procedure refer to chapter 5.4.9 of EN 300 328 V2.2.2.

Measurement Method	Radiated measurement

6.7 Transmitter Unwanted Emissions in the Spurious Domain above 1 GHz

Test procedure refer to chapter 5.4.9 of EN 300 328 V2.2.2.

Measurement Method	Radiated measurement

6.8 Receiver Spurious Emissions up to 1 GHz

Test procedure refer to chapter 5.4.10 of EN 300 328 V2.2.2.

Measurement Method	Radiated measurement

6.9 Receiver Spurious Emissions above 1 GHz

Test procedure refer to chapter 5.4.10 of EN 300 328 V2.2.2.

Measurement Method	Radiated measurement

6.10 Receiver Blocking

Test procedure refer to chapter 5.4.11 of EN 300 328 V2.2.2.

Measurement Method	Conducted measurement

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Dolly Chung

BT-LE 1M Low Power

Channel	Frequency (MHz)	EIRP (dBm)			Limit (dBm)	Test Result
		Test Conditions				
		25 ℃	-20 ℃	70 ℃		
0	2402	9.76	9.98	9.52	20	Pass
19	2440	9.60	9.92	9.34	20	Pass
39	2480	9.46	9.82	9.16	20	Pass

BT-LE 2M Low Power

Channel	Frequency (MHz)	EIRP (dBm)			Limit (dBm)	Test Result
		Test Conditions				
		25 ℃	-20 ℃	70 ℃		
1	2404	9.78	9.98	9.53	20	Pass
19	2440	9.59	9.94	9.33	20	Pass
38	2478	9.61	9.95	9.41	20	Pass

BT-LE 1M High Power

Channel	Frequency (MHz)	EIRP (dBm)			Limit (dBm)	Test Result
		Test Conditions				
		25 ℃	-20 ℃	70 ℃		
0	2402	10.00	10.22	9.76	20	Pass
19	2440	9.93	10.25	9.67	20	Pass
39	2480	10.03	10.39	9.73	20	Pass

BT-LE 2M High Power

Channel	Frequency (MHz)	EIRP (dBm)			Limit (dBm)	Test Result
		Test Conditions				
		25 ℃	-20 ℃	70 ℃		
1	2404	10.86	11.06	10.61	20	Pass
19	2440	10.65	11.00	10.39	20	Pass
38	2478	10.70	11.04	10.50	20	Pass

7.2 Power Spectral Density

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Dolly Chung

BT-LE 1M Low Power

Channel	Frequency (MHz)	EIRP PSD (dBm/MHz)	PSD Limit (dBm)	Test Result
0	2402	9.70	10	Pass
19	2440	9.54	10	Pass
39	2480	9.40	10	Pass

BT-LE 2M Low Power

Channel	Frequency (MHz)	EIRP PSD (dBm/MHz)	PSD Limit (dBm)	Test Result
1	2404	8.69	10	Pass
19	2440	8.62	10	Pass
38	2478	8.53	10	Pass

BT-LE 1M High Power

Channel	Frequency (MHz)	EIRP PSD (dBm/MHz)	PSD Limit (dBm)	Test Result
0	2402	9.93	10	Pass
19	2440	9.87	10	Pass
39	2480	9.97	10	Pass

BT-LE 2M High Power

Channel	Frequency (MHz)	EIRP PSD (dBm/MHz)	PSD Limit (dBm)	Test Result
1	2404	9.73	10	Pass
19	2440	9.65	10	Pass
38	2478	9.64	10	Pass

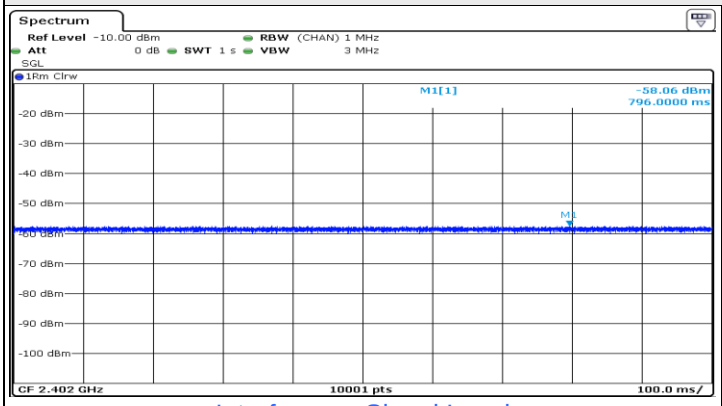
7.3 Adaptivity

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Stan Shih

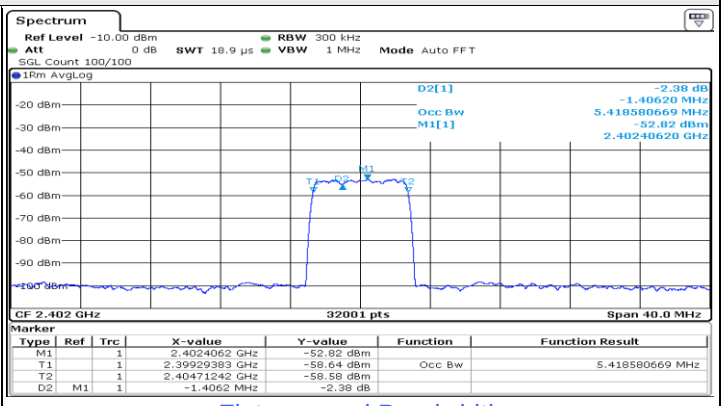
EUT Information		
Product	**Model No.**	**Software/Firmware Version**
RTL8851BE	RTL8851BE	8664.1.1005.2022

Detection Threshold Level
The maximum EIRP is 11.06 dBm (12.76 mW) and antenna gain is 3 dBi. Detection Threshold level= -70 dBm/MHz + 10×log(100 mW / Pout (12.76 mW)) + G (3 dBi) = -58.06 dBm/MHz The interference signal level to the EUT is lower than -58.06 dBm/MHz at the antenna connector.

Plots of Interference Signal



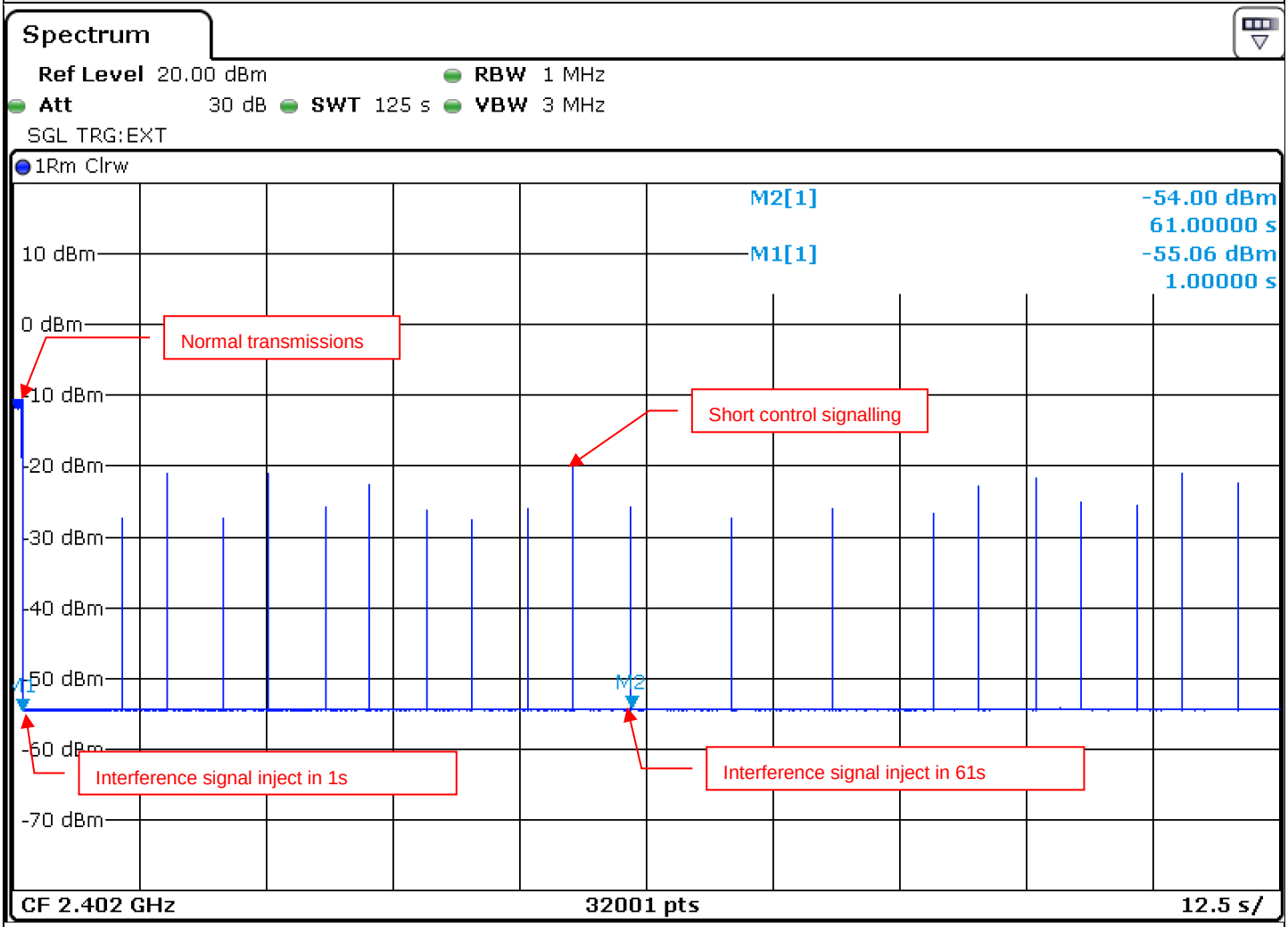
Interference Signal Level



Flatness and Bandwidth

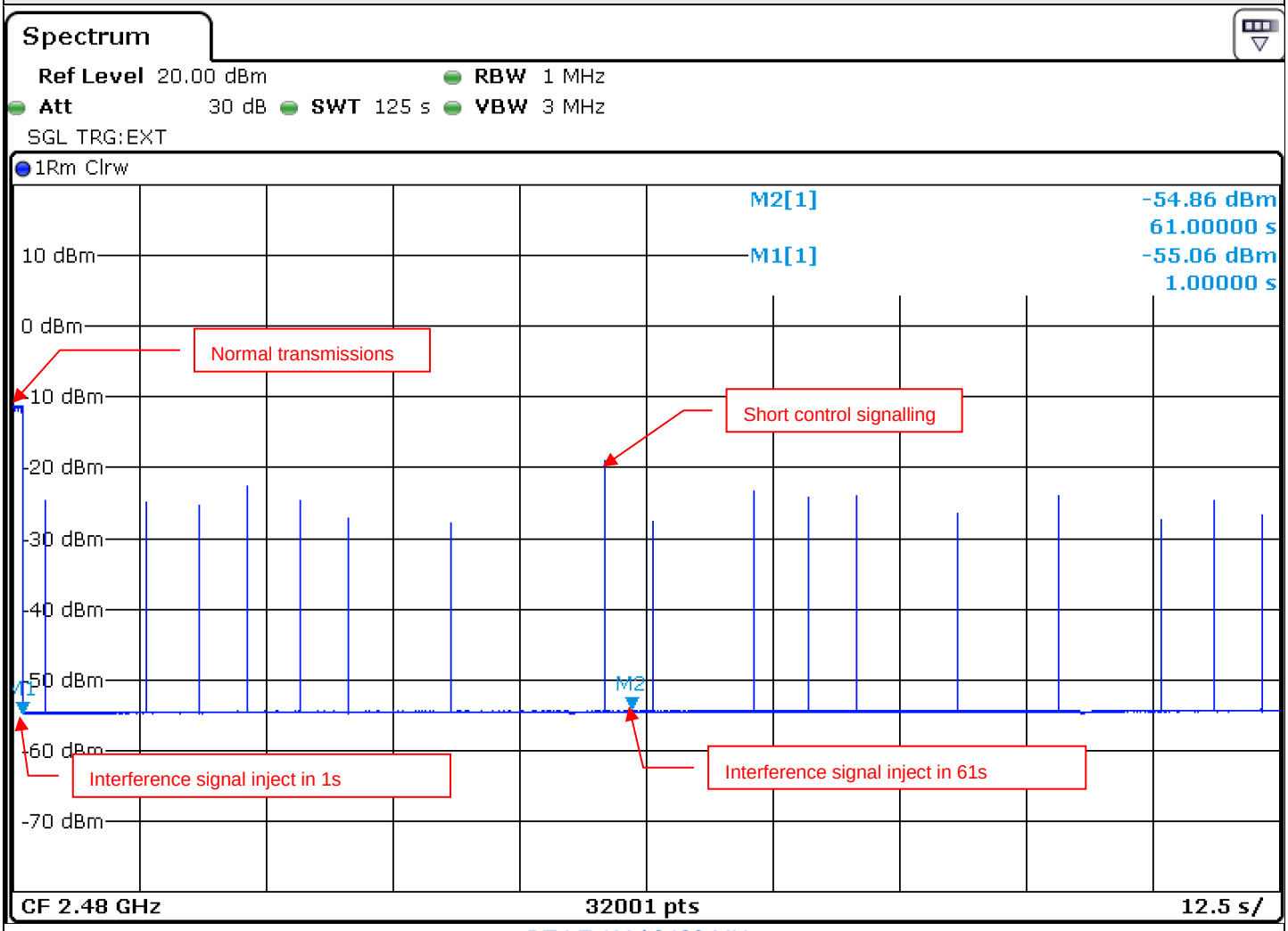
For Adaptivity

Operation Mode	Operating Frequency (Low Channel, MHz)	Operating Frequency (High Channel, MHz)	Test Result
BT-LE 1M	2402	2480	Pass
Plots of Adaptivity			



BT-LE 1M / 2402 MHz

Plots of Adaptivity

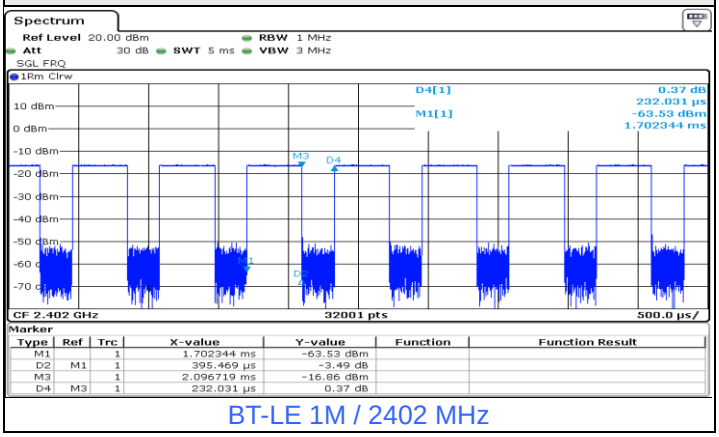


BT-LE 1M / 2480 MHz

For Channel Occupancy Time and Idle Period

Operation Mode	Operating Frequency (MHz)	The Channel Occupancy Time (ms)		Minimum Idle Period (us)		Test Result
		Value	Limit	Value	Limit	
BT-LE 1M	2402	0.4	13	232.03	18	Pass

Plots of Channel Occupancy Time and Idle Period

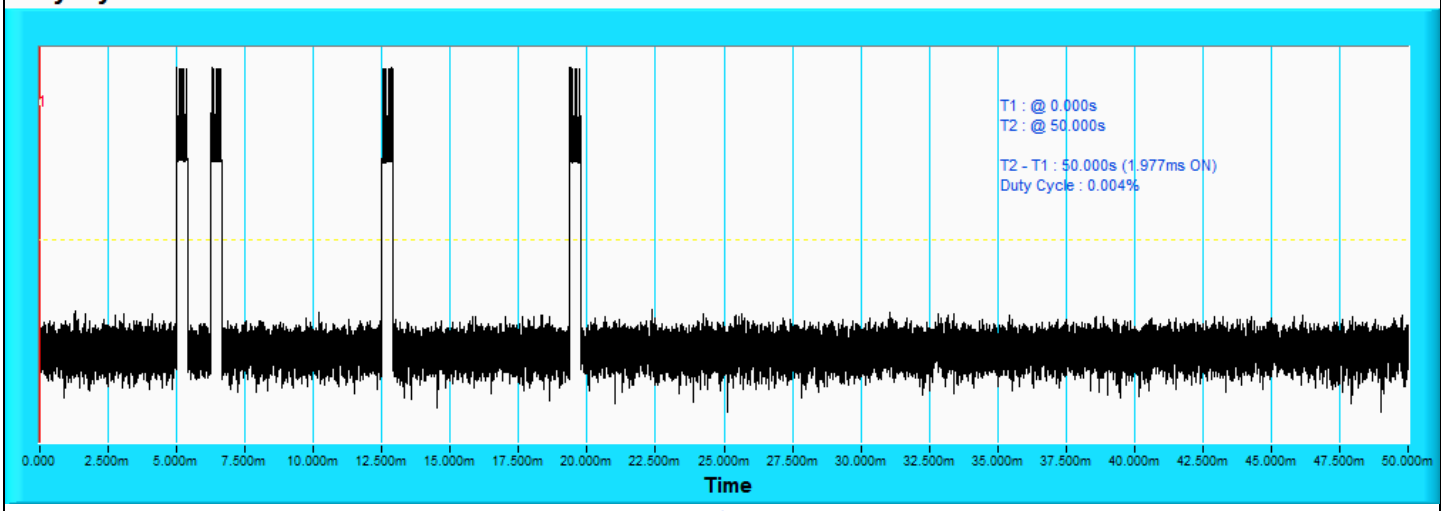


BT-LE 1M / 2402 MHz

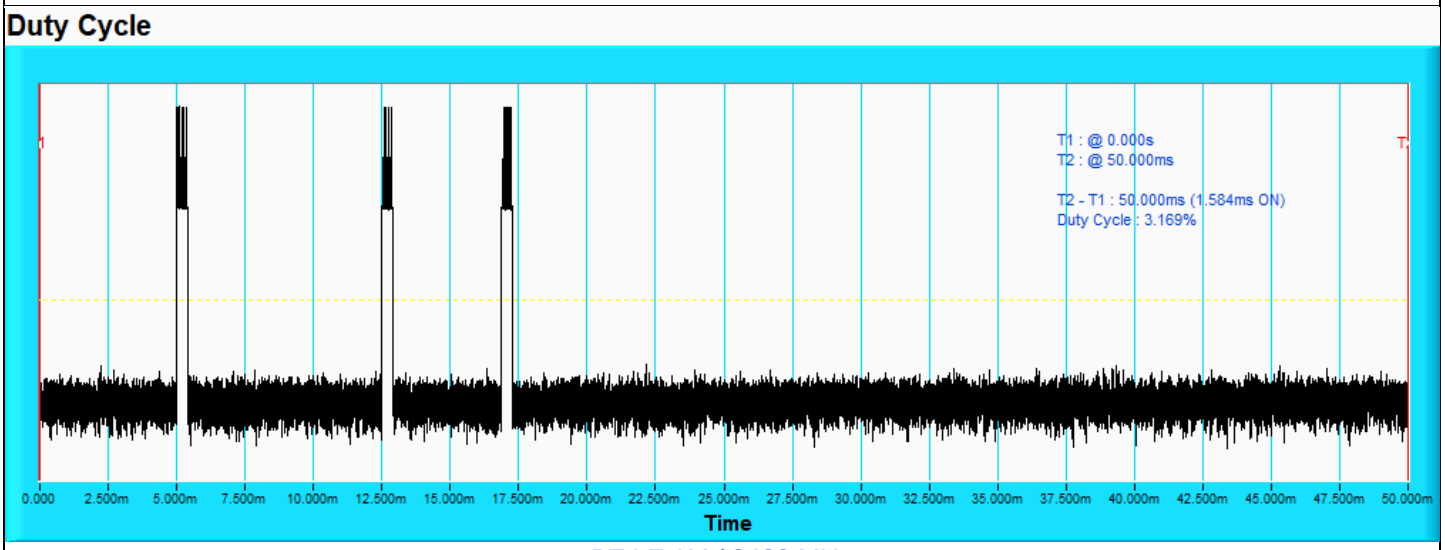
For Short Control Signalling Transmission

Operation Mode	Operating Frequency (MHz)	SCST Total On Time (ms)	SCST Limit (ms)	Test Result
BT-LE 1M	2402	1.98	5	Pass
	2480	1.58	5	Pass

Plots of Short Control Signalling Transmission



BT-LE 1M / 2402 MHz



BT-LE 1M / 2480 MHz

For Unwanted Signal Interference

Operation Mode	Operating Frequency (MHz)	Wanted Signal Mean Power From Companion Device (dBm)	Unwanted Signal Frequency (MHz)	Unwanted CW Signal Power (dBm)	Test Result
BT-LE 1M	2402	-50	2488.5	-31.6	Pass
	2480	-50	2395	-31.6	Pass

Note: In conducted measurements, the unwanted signal power level has to be corrected for the (in-band) antenna assembly gain (G) at the antenna connector. The antenna gain is 3.4 dBi.

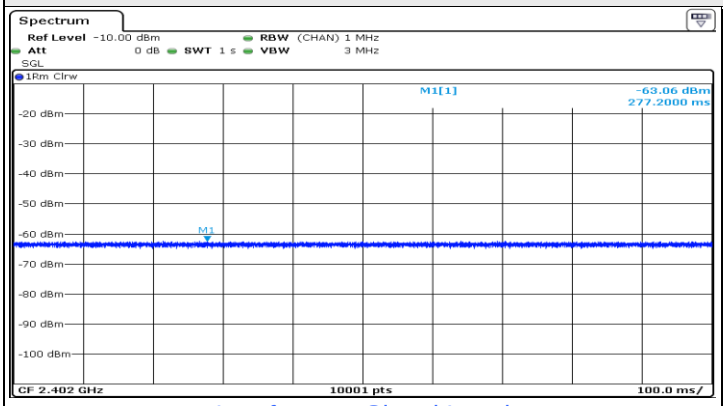
Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Stan Shih

Test Results for reference by client's requirement.

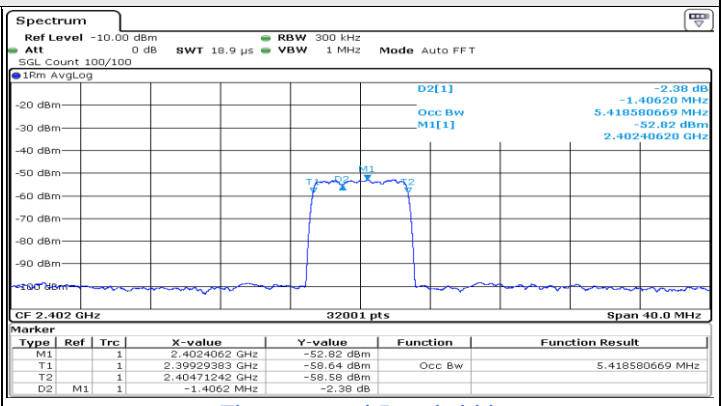
EUT Information		
Product	**Model No.**	**Software/Firmware Version**
RTL8851BE	RTL8851BE	8664.1.1005.2022

Detection Threshold Level
The maximum EIRP is 11.06 dBm (12.76 mW) and antenna gain is -2 dBi. Detection Threshold level= -70 dBm/MHz + 10×log(100 mW / Pout (12.76 mW)) + G (-2 dBi) = -63.06 dBm/MHz The interference signal level to the EUT is lower than -63.06 dBm/MHz at the antenna connector.

Plots of Interference Signal



Interference Signal Level

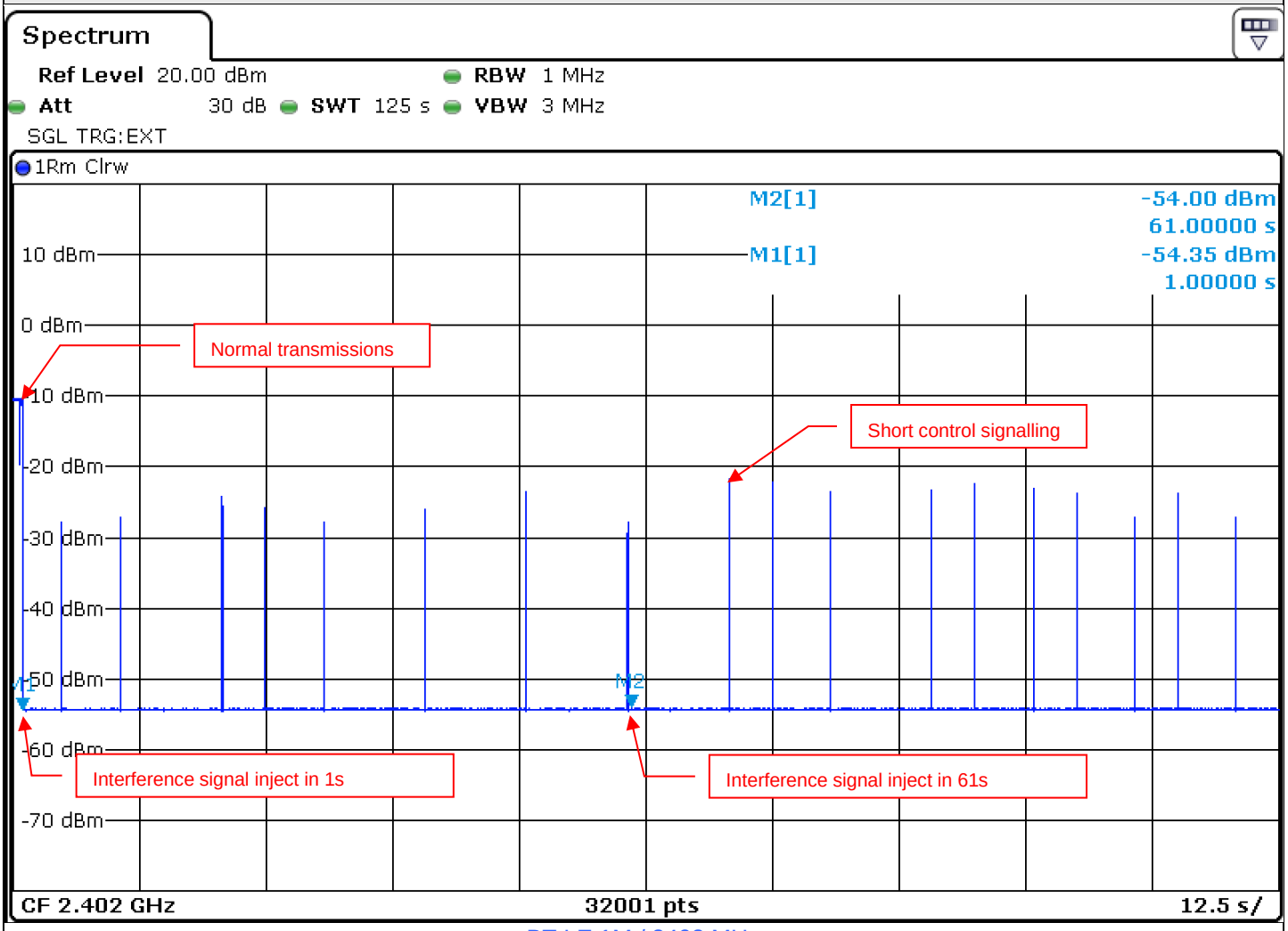


Flatness and Bandwidth

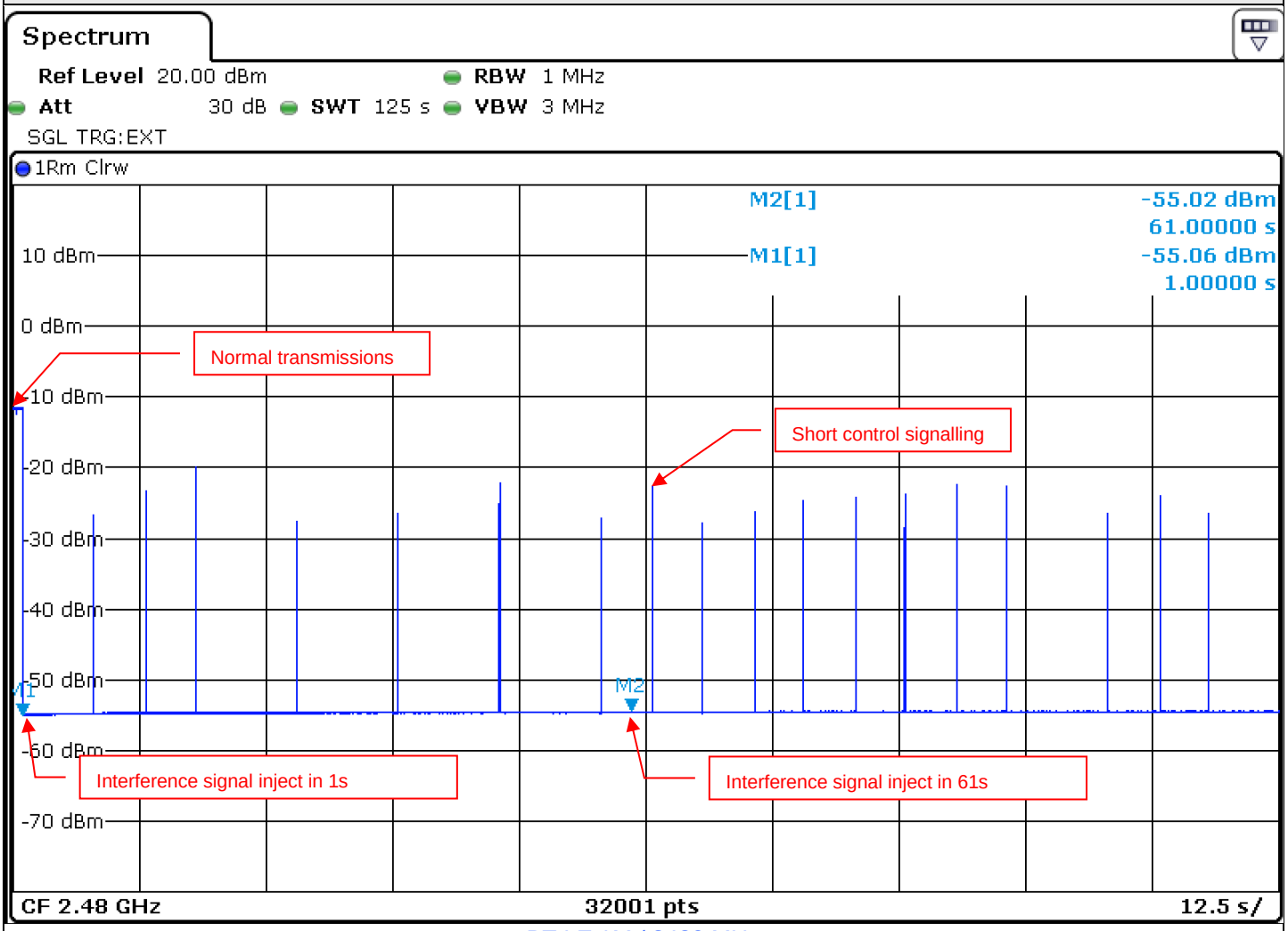
For Adaptivity

Operation Mode	Operating Frequency (Low Channel, MHz)	Operating Frequency (High Channel, MHz)	Test Result
BT-LE 1M	2402	2480	Pass

Plots of Adaptivity

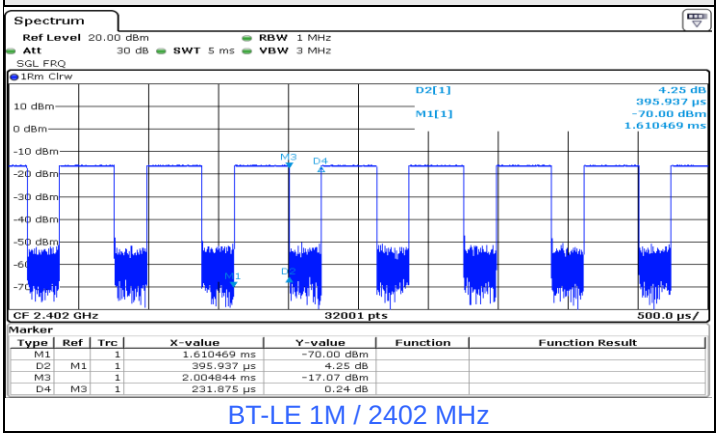


BT-LE 1M / 2402 MHz

Plots of Adaptivity

BT-LE 1M / 2480 MHz

For Channel Occupancy Time and Idle Period

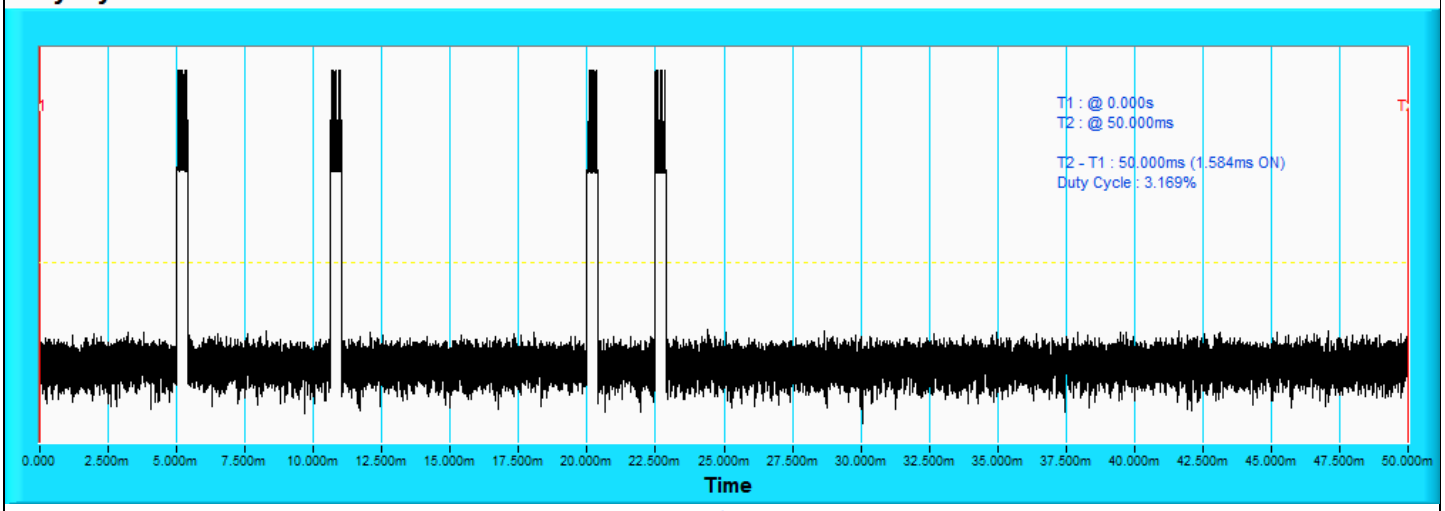
Operation Mode	Operating Frequency (MHz)	The Channel Occupancy Time (ms)		Minimum Idle Period (us)		Test Result
		Value	Limit	Value	Limit	
BT-LE 1M	2402	0.4	13	231.88	18	Pass

Plots of Channel Occupancy Time and Idle Period

BT-LE 1M / 2402 MHz

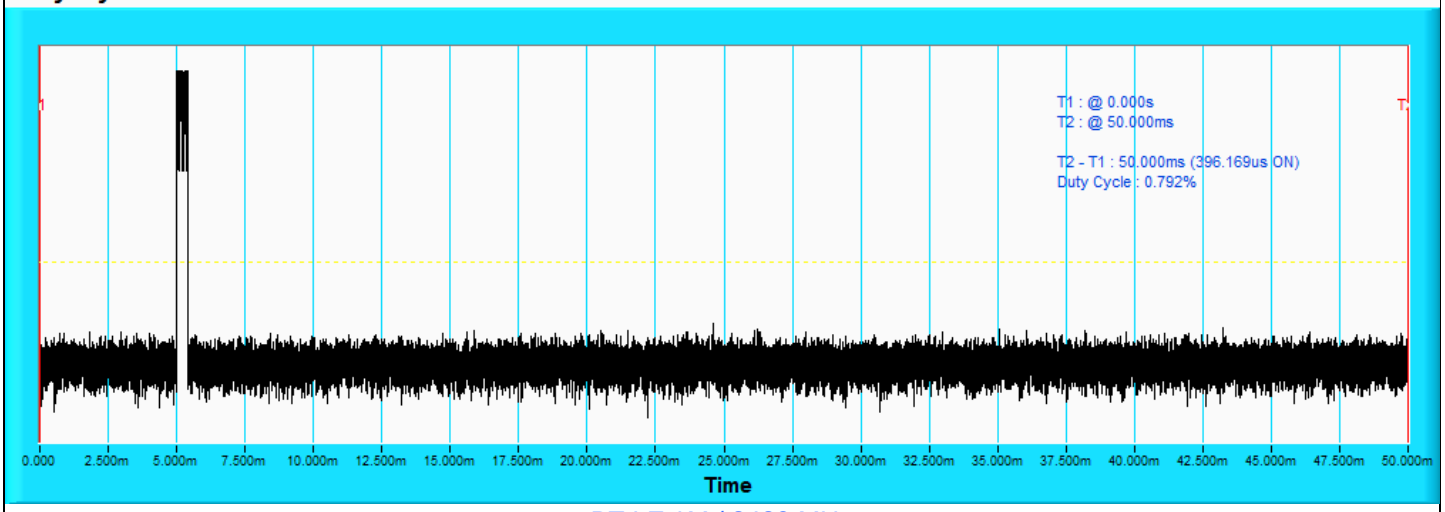
For Short Control Signalling Transmission

Operation Mode	Operating Frequency (MHz)	SCST Total On Time (ms)	SCST Limit (ms)	Test Result
BT-LE 1M	2402	1.58	5	Pass
	2480	0.4	5	Pass

Plots of Short Control Signalling Transmission



BT-LE 1M / 2402 MHz



BT-LE 1M / 2480 MHz

For Unwanted Signal Interference

Operation Mode	Operating Frequency (MHz)	Wanted Signal Mean Power From Companion Device (dBm)	Unwanted Signal Frequency (MHz)	Unwanted CW Signal Power (dBm)	Test Result
BT-LE 1M	2402	-50	2488.5	-31.6	Pass
	2480	-50	2395	-31.6	Pass

Note: In conducted measurements, the unwanted signal power level has to be corrected for the (in-band) antenna assembly gain (G) at the antenna connector. The antenna gain is 3.4 dBi.

7.4 Occupied Channel Bandwidth

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Dolly Chung

BT-LE 1M Low Power

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Measured Frequencies		Limit	Test Result
			FL (MHz)	FH (MHz)		
0	2402	1.04	2401.50	2402.54	FL > 2400 MHz and FH < 2483.5 MHz	Pass
39	2480	1.03	2479.50	2480.53		Pass

Notes:

1. FL is the lowest frequency of the 99% occupied bandwidth of power envelope.
2. FH is the highest frequency of the 99% occupied bandwidth of power envelope.

BT-LE 2M Low Power

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Measured Frequencies		Limit	Test Result
			FL (MHz)	FH (MHz)		
1	2404	2.06	2403.01	2405.07	FL > 2400 MHz and FH < 2483.5 MHz	Pass
38	2478	2.07	2476.99	2479.06		Pass

Notes:

1. FL is the lowest frequency of the 99% occupied bandwidth of power envelope.
2. FH is the highest frequency of the 99% occupied bandwidth of power envelope.

BT-LE 1M High Power

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Measured Frequencies		Limit	Test Result
			FL (MHz)	FH (MHz)		
0	2402	1.06	2401.48	2402.54	FL > 2400 MHz and FH < 2483.5 MHz	Pass
39	2480	1.05	2479.49	2480.54		Pass

Notes:

1. FL is the lowest frequency of the 99% occupied bandwidth of power envelope.
2. FH is the highest frequency of the 99% occupied bandwidth of power envelope.

BT-LE 2M High Power

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Measured Frequencies		Limit	Test Result
			FL (MHz)	FH (MHz)		
1	2404	2.09	2402.98	2405.07	FL > 2400 MHz and FH < 2483.5 MHz	Pass
38	2478	2.07	2476.99	2479.06		Pass

Notes:

1. FL is the lowest frequency of the 99% occupied bandwidth of power envelope.
2. FH is the highest frequency of the 99% occupied bandwidth of power envelope.

7.5 Transmitter Unwanted Emissions in the out-of-band Domain

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Dolly Chung

BT-LE 1M Low Power

Channel	Frequency (MHz)	Out-Of-Band Domain			Limit (dBm/MHz)	Test Result
		Frequency Range (MHz)	Worst Frequency (MHz)	Emission Level (dBm/MHz)		
0	2402	2397.92 ~ 2398.96	2398.46	-40.29	-20	Pass
		2398.96 ~ 2400	2399.50	-36.39	-10	Pass
39	2480	2483.5 ~ 2484.53	2484.00	-48.25	-10	Pass
		2484.53 ~ 2485.56	2485.03	-49.25	-20	Pass

BT-LE 2M Low Power

Channel	Frequency (MHz)	Out-Of-Band Domain			Limit (dBm/MHz)	Test Result
		Frequency Range (MHz)	Worst Frequency (MHz)	Emission Level (dBm/MHz)		
1	2404	2395.88 ~ 2397.94	2397.44	-40.42	-20	Pass
		2397.94 ~ 2400	2399.50	-39.34	-10	Pass
38	2478	2483.5 ~ 2485.57	2484.00	-48.83	-10	Pass
		2485.57 ~ 2487.64	2487.07	-49.55	-20	Pass

BT-LE 1M High Power

Channel	Frequency (MHz)	Out-Of-Band Domain			Limit (dBm/MHz)	Test Result
		Frequency Range (MHz)	Worst Frequency (MHz)	Emission Level (dBm/MHz)		
0	2402	2397.88 ~ 2398.94	2398.44	-40.19	-20	Pass
		2398.94 ~ 2400	2399.50	-36.00	-10	Pass
39	2480	2483.5 ~ 2484.55	2484.00	-48.03	-10	Pass
		2484.55 ~ 2485.6	2485.05	-49.09	-20	Pass

BT-LE 2M High Power

Channel	Frequency (MHz)	Out-Of-Band Domain			Limit (dBm/MHz)	Test Result
		Frequency Range (MHz)	Worst Frequency (MHz)	Emission Level (dBm/MHz)		
1	2404	2395.82 ~ 2397.91	2397.41	-40.30	-20	Pass
		2397.91 ~ 2400	2399.50	-39.23	-10	Pass
38	2478	2483.5 ~ 2485.57	2485.00	-48.62	-10	Pass
		2485.57 ~ 2487.64	2487.07	-49.32	-20	Pass

7.6 Transmitter Unwanted Emissions in the Spurious Domain up to 1 GHz

Mode A

BT-LE 1M

Spurious Emission Frequency Range	30 MHz ~ 1 GHz	**Operating Channel**	39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Jeff Hsieh		

Spurious Emission Level				
Frequency (MHz)	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
49.40	H	-67.44	-54.00	-13.44
49.40	V	-63.73	-54.00	-9.73
63.53	H	-70.35	-54.00	-16.35
63.53	V	-74.46	-54.00	-20.46
99.94	V	-69.27	-54.00	-15.27
103.07	H	-73.52	-54.00	-19.52
208.03	H	-72.02	-54.00	-18.02
221.51	V	-67.24	-54.00	-13.24
498.83	H	-76.86	-54.00	-22.86
499.88	V	-73.19	-54.00	-19.19
543.50	V	-74.77	-54.00	-20.77
543.55	H	-74.65	-54.00	-20.65
566.63	H	-77.06	-54.00	-23.06
566.68	V	-74.05	-54.00	-20.05
589.76	V	-73.30	-54.00	-19.30
595.44	H	-77.02	-54.00	-23.02
612.90	V	-74.63	-54.00	-20.63
636.08	H	-75.22	-54.00	-21.22
666.42	V	-74.43	-54.00	-20.43
675.67	H	-74.64	-54.00	-20.64

Mode B

BT-LE 1M

Spurious Emission Frequency Range	30 MHz ~ 1 GHz	**Operating Channel**	39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	24°C, 69% RH
Tested By	Ethan Hsu		

Spurious Emission Level				
Frequency (MHz)	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
49.40	H	-67.29	-54.00	-13.29
49.40	V	-63.58	-54.00	-9.58
63.48	V	-78.74	-54.00	-24.74
63.53	H	-74.32	-54.00	-20.32
99.94	V	-80.32	-54.00	-26.32
196.14	V	-78.06	-54.00	-24.06
208.18	H	-73.05	-54.00	-19.05
497.79	H	-79.62	-54.00	-25.62
497.79	V	-79.45	-54.00	-25.45
532.21	H	-79.26	-54.00	-25.26
542.66	V	-79.53	-54.00	-25.53
566.63	V	-79.47	-54.00	-25.47
566.68	H	-79.36	-54.00	-25.36
586.58	H	-79.40	-54.00	-25.40
595.53	V	-78.70	-54.00	-24.70
609.26	H	-80.18	-54.00	-26.18
612.85	V	-77.43	-54.00	-23.43
636.08	H	-78.75	-54.00	-24.75
659.16	H	-77.48	-54.00	-23.48
663.98	V	-78.62	-54.00	-24.62

Mode C

BT-LE 1M

Spurious Emission Frequency Range	30 MHz ~ 1 GHz	**Operating Channel**	39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	24°C, 69% RH
Tested By	Ethan Hsu		

Spurious Emission Level				
Frequency (MHz)	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
49.18	V	-63.80	-54.00	-9.80
49.31	H	-67.38	-54.00	-13.38
63.26	V	-78.96	-54.00	-24.96
63.31	H	-74.53	-54.00	-20.53
99.83	V	-80.54	-54.00	-26.54
196.02	V	-78.27	-54.00	-24.27
207.96	H	-73.17	-54.00	-19.17
497.57	H	-79.84	-54.00	-25.84
497.68	V	-79.57	-54.00	-25.57
532.09	H	-79.47	-54.00	-25.47
542.44	V	-79.65	-54.00	-25.65
566.41	V	-79.59	-54.00	-25.59
566.46	H	-79.58	-54.00	-25.58
586.36	H	-79.62	-54.00	-25.62
595.31	V	-78.92	-54.00	-24.92
609.04	H	-80.40	-54.00	-26.40
612.63	V	-77.65	-54.00	-23.65
635.86	H	-78.97	-54.00	-24.97
659.04	H	-77.70	-54.00	-23.70
663.75	V	-78.84	-54.00	-24.84

7.7 Transmitter Unwanted Emissions in the Spurious Domain above 1 GHz

Mode A

BT-LE 1M

Spurious Emission Frequency Range	1 GHz ~ 12.75 GHz	**Operating Channel**	0, 39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	22°C, 62% RH
Tested By	Spencer Liao		

Spurious Emission Level					
Channel	**Frequency (MHz)**	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
0	7206.04	V	-38.25	-30.00	-8.25
	7206.81	H	-45.20	-30.00	-15.20
	9608.00	H	-49.81	-30.00	-19.81
	9608.00	V	-48.03	-30.00	-18.03
39	7440.80	H	-37.83	-30.00	-7.83
	7440.80	V	-37.63	-30.00	-7.63
	9920.00	H	-46.89	-30.00	-16.89
	9920.00	V	-46.74	-30.00	-16.74

Mode B

BT-LE 1M

Spurious Emission Frequency Range	1 GHz ~ 12.75 GHz	Operating Channel	0, 39
Input Power (System)	230 Vac, 50 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Ethan Hsu		

Spurious Emission Level					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
0	7206.00	H	-46.18	-30.00	-16.18
	7206.00	V	-47.32	-30.00	-17.32
	9608.00	H	-53.23	-30.00	-23.23
	9608.00	V	-52.81	-30.00	-22.81
39	7440.00	H	-41.75	-30.00	-11.75
	7440.00	V	-41.80	-30.00	-11.80
	9920.00	H	-52.37	-30.00	-22.37
	9920.00	V	-52.11	-30.00	-22.11

Mode C

BT-LE 1M

Spurious Emission Frequency Range	1 GHz ~ 12.75 GHz	**Operating Channel**	0, 39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	22°C, 62% RH
Tested By	Ethan Hsu		

Spurious Emission Level					
Channel	**Frequency (MHz)**	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
0	7206.00	H	-44.57	-30.00	-14.57
	7206.00	V	-44.01	-30.00	-14.01
	9608.00	H	-51.72	-30.00	-21.72
	9608.00	V	-52.63	-30.00	-22.63
39	7440.00	H	-44.43	-30.00	-14.43
	7440.00	V	-42.72	-30.00	-12.72
	9920.00	H	-51.60	-30.00	-21.60
	9920.00	V	-51.55	-30.00	-21.55

7.8 Receiver Spurious Emissions up to 1 GHz

Mode A

Spurious Emission Frequency Range	30 MHz ~ 1 GHz	**Operating Channel**	39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	23°C, 67% RH
Tested By	Jeff Hsieh		

Spurious Emission Level				
Frequency (MHz)	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
49.40	H	-63.48	-57.00	-6.48
49.40	V	-63.77	-57.00	-6.77
63.53	H	-69.40	-57.00	-12.40
150.33	V	-68.09	-57.00	-11.09
150.43	H	-66.55	-57.00	-9.55
166.00	V	-64.01	-57.00	-7.01
166.60	H	-63.27	-57.00	-6.27
208.08	H	-66.57	-57.00	-9.57
222.16	V	-66.46	-57.00	-9.46
232.36	H	-66.46	-57.00	-9.46
232.36	V	-66.54	-57.00	-9.54
269.57	V	-69.55	-57.00	-12.55
299.21	V	-65.61	-57.00	-8.61
299.46	H	-60.83	-57.00	-3.83
428.35	H	-71.48	-57.00	-14.48
466.50	H	-68.72	-57.00	-11.72
836.89	V	-69.49	-57.00	-12.49
848.38	V	-69.61	-57.00	-12.61
959.96	H	-68.98	-57.00	-11.98
973.64	V	-69.84	-57.00	-12.84

Mode B

Spurious Emission Frequency Range	30 MHz ~ 1 GHz	**Operating Channel**	39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	24°C, 69% RH
Tested By	Ethan Hsu		

Spurious Emission Level				
Frequency (MHz)	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
49.40	H	-67.01	-57.00	-10.01
49.40	V	-63.35	-57.00	-6.35
63.53	H	-73.94	-57.00	-16.94
99.94	V	-79.86	-57.00	-22.86
166.00	H	-64.46	-57.00	-7.46
166.60	V	-73.78	-57.00	-16.78
198.08	V	-74.97	-57.00	-17.97
208.18	H	-72.17	-57.00	-15.17
221.36	V	-77.63	-57.00	-20.63
232.41	H	-68.12	-57.00	-11.12
427.90	V	-79.21	-57.00	-22.21
788.99	H	-73.97	-57.00	-16.97
839.97	H	-73.49	-57.00	-16.49
856.19	V	-74.14	-57.00	-17.14
870.97	V	-73.97	-57.00	-16.97
874.10	H	-73.92	-57.00	-16.92
924.54	H	-73.54	-57.00	-16.54
934.19	V	-72.56	-57.00	-15.56
971.70	V	-72.35	-57.00	-15.35
974.48	H	-72.63	-57.00	-15.63

Mode C

Spurious Emission Frequency Range	30 MHz ~ 1 GHz	Operating Channel	39
Input Power (System)	230 Vac, 50 Hz	Environmental Conditions	24°C, 69% RH
Tested By	Ethan Hsu		

Spurious Emission Level				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
49.18	H	-67.23	-57.00	-10.23
49.18	V	-63.57	-57.00	-6.57
63.31	H	-74.16	-57.00	-17.16
99.72	V	-80.08	-57.00	-23.08
165.78	H	-64.68	-57.00	-7.68
166.38	V	-74.00	-57.00	-17.00
197.86	V	-75.19	-57.00	-18.19
207.96	H	-72.39	-57.00	-15.39
221.14	V	-77.85	-57.00	-20.85
232.19	H	-68.34	-57.00	-11.34
427.68	V	-79.43	-57.00	-22.43
788.77	H	-74.19	-57.00	-17.19
839.75	H	-73.71	-57.00	-16.71
856.07	V	-74.26	-57.00	-17.26
870.75	V	-74.19	-57.00	-17.19
873.88	H	-74.14	-57.00	-17.14
924.32	H	-73.76	-57.00	-16.76
933.97	V	-72.78	-57.00	-15.78
971.58	V	-72.46	-57.00	-15.46
974.26	H	-72.85	-57.00	-15.85

7.9 Receiver Spurious Emissions above 1 GHz

Mode A

Spurious Emission Frequency Range	1 GHz ~ 12.75 GHz	**Operating Channel**	0, 39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	22°C, 62% RH
Tested By	Spencer Liao		

Spurious Emission Level					
Channel	**Frequency (MHz)**	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
0	6405.33	H	-55.28	-47.00	-8.28
	6405.33	V	-55.23	-47.00	-8.23
39	6613.33	H	-53.87	-47.00	-6.87
	6613.33	V	-53.82	-47.00	-6.82

Mode B

Spurious Emission Frequency Range	1 GHz ~ 12.75 GHz	**Operating Channel**	0, 39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	25°C, 64% RH
Tested By	Ethan Hsu		

Spurious Emission Level					
Channel	**Frequency (MHz)**	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
0	6405.00	H	-57.91	-47.00	-10.91
	6405.00	V	-57.17	-47.00	-10.17
39	6613.00	H	-57.79	-47.00	-10.79
	6613.00	V	-57.29	-47.00	-10.29

Mode C

Spurious Emission Frequency Range	1 GHz ~ 12.75 GHz	**Operating Channel**	0, 39
Input Power (System)	230 Vac, 50 Hz	**Environmental Conditions**	25°C, 64% RH
Tested By	Ethan Hsu		

Spurious Emission Level					
Channel	**Frequency (MHz)**	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
0	6405.00	H	-57.94	-47.00	-10.94
	6405.00	V	-57.04	-47.00	-10.04
39	6613.00	H	-57.62	-47.00	-10.62
	6613.00	V	-57.32	-47.00	-10.32

7.10 Receiver Blocking

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Thomas Liao

Receiver Category 1 Equipment	
Minimum Performance Criterion:	PER or FER ≦10%

Receiver Blocking Measure Of The Capability							
Operation Mode	**Operating Frequency (MHz)**	**Wanted Signal Mean Power From Companion Device (dBm) (Note 1 & 2)**	**Blocking Signal Frequency (MHz)**	**Blocking Signal Frequency Shift (MHz) (Note 3)**	**Blocking Signal Power (dBm) (Note 2)**	**PER(%)**	**Test Result**
BT LE-1M	2402	-69.43	2380	-	-30.6	2.7	Pass
		-75.43	2300	-	-30.6	2.5	Pass
			2330	-	-30.6	2.5	Pass
			2360	-	-30.6	2.9	Pass
	2480	-69.47	2504	-	-30.6	3.2	Pass
		-75.47	2524	-	-30.6	2.8	Pass
			2584	-	-30.6	2.5	Pass
			2674	-	-30.6	2.5	Pass

Notes:

1. Wanted signal level was calculated based on the formula, which corresponds to OCBW. OCBW at 2402 MHz is 1.04 MHz and at 2480 MHz is 1.03 MHz.
2. In conducted measurements, the blocking signal power level has to be corrected for the (in-band) antenna assembly gain (G) at the antenna connector. The antenna gain is 3.4 dBi.
3. If the performance criteria is not met, those frequencies of the blocking signal has been increased/decreased with a value equal to the Occupied Channel Bandwidth except the blocking frequencies 2380, 2504MHz shall be increased/decreased with a value equal to 10MHz also if the frequency offset is more than 7MHz, the level of the wanted signal shall be increased by 3dB.

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Thomas Liao

Test Results for reference by client's requirement.

Receiver Category 1 Equipment	
Minimum Performance Criterion:	PER or FER ≦10%

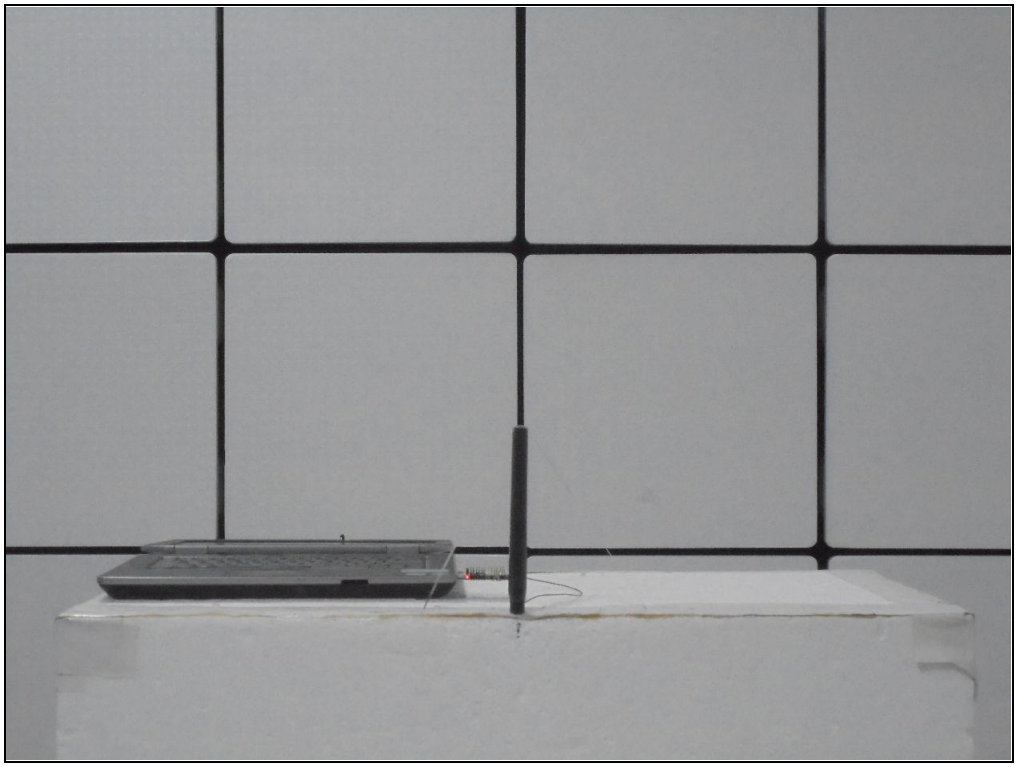
Receiver Blocking Measure Of The Capability							
Operation Mode	**Operating Frequency (MHz)**	**Worst Wanted Signal Mean Power From Companion Device (dBm) (Note 1 & 2)**	**Blocking Signal Frequency (MHz)**	**Blocking Signal Frequency Shift (MHz) (Note 3)**	**Blocking Signal Power (dBm) (Note 2)**	**PER(%)**	**Test Result**
BT LE-1M	2402	-91	2380	-	-30.6	2.5	Pass
		-92	2300	-	-30.6	2.7	Pass
			2330	-	-30.6	2.4	Pass
			2360	-	-30.6	2.9	Pass
	2480	-90	2504	-	-30.6	2.6	Pass
		-92	2524	-	-30.6	3.2	Pass
			2584	-	-30.6	2.4	Pass
			2674	-	-30.6	2.5	Pass

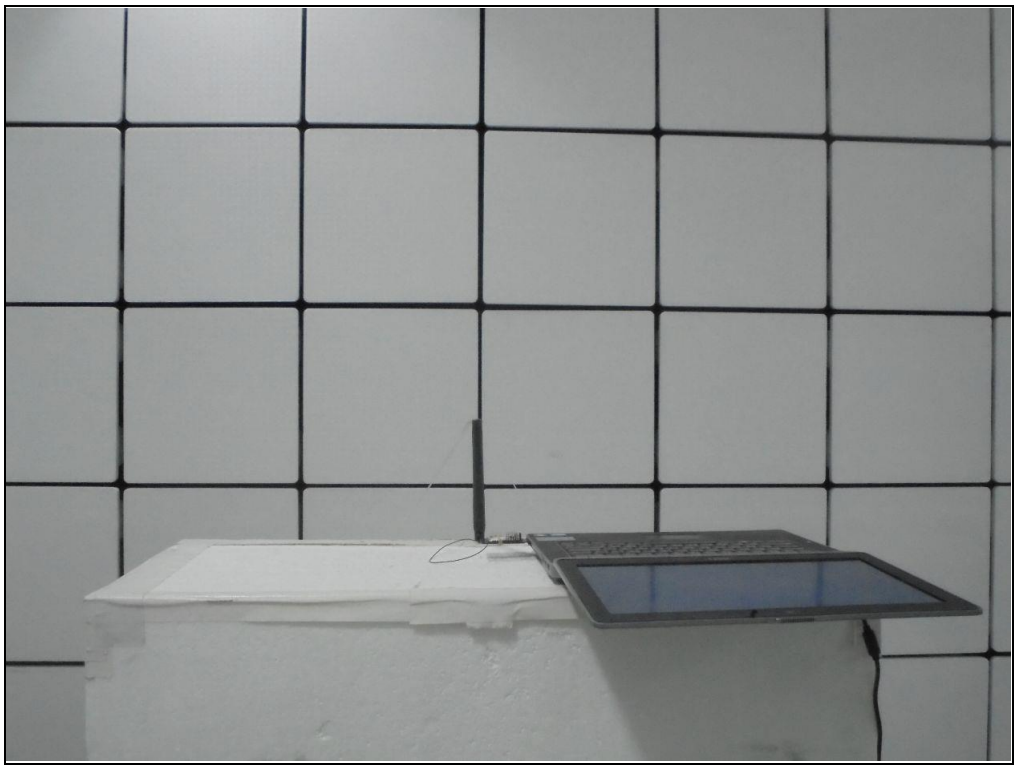
Notes:

1. Wanted signal level was calculated based on the formula, which corresponds to OCBW. OCBW at 2402 MHz is 1.04 MHz and at 2480 MHz is 1.03 MHz.
2. In conducted measurements, the blocking signal power level has to be corrected for the (in-band) antenna assembly gain (G) at the antenna connector. The antenna gain is 3.4 dBi.
3. If the performance criteria is not met, those frequencies of the blocking signal has been increased/decreased with a value equal to the Occupied Channel Bandwidth except the blocking frequencies 2380, 2504MHz shall be increased/decreased with a value equal to 10MHz also if the frequency offset is more than 7MHz, the level of the wanted signal shall be increased by 3dB.

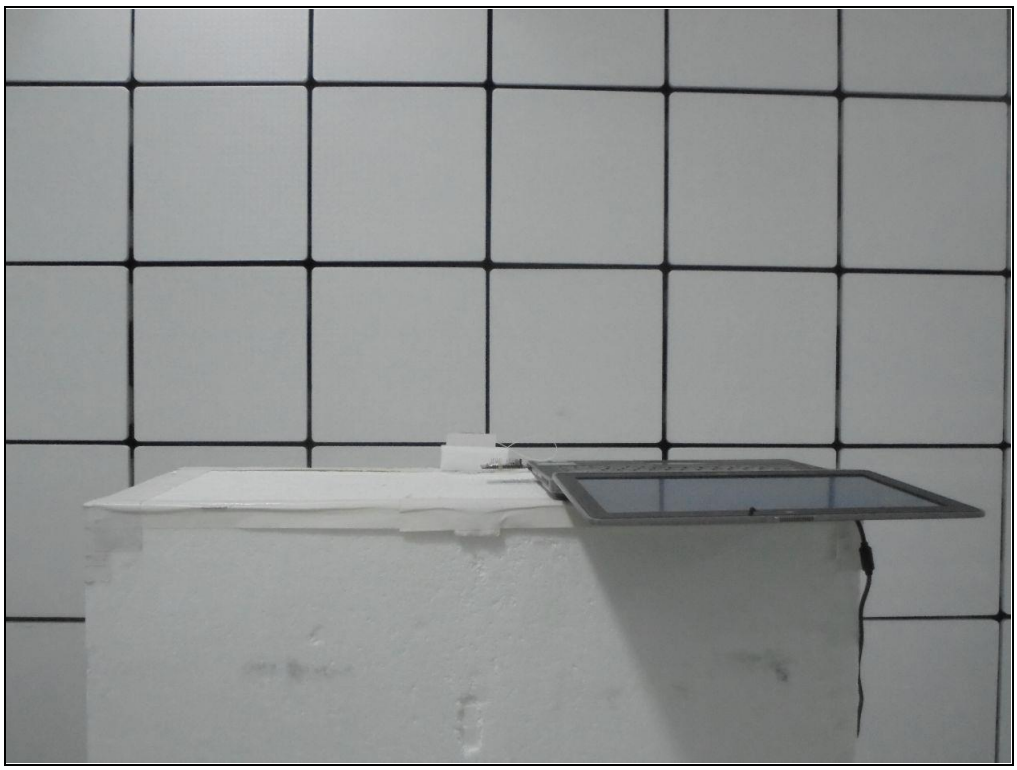
8 Pictures of Test Arrangements

Mode A

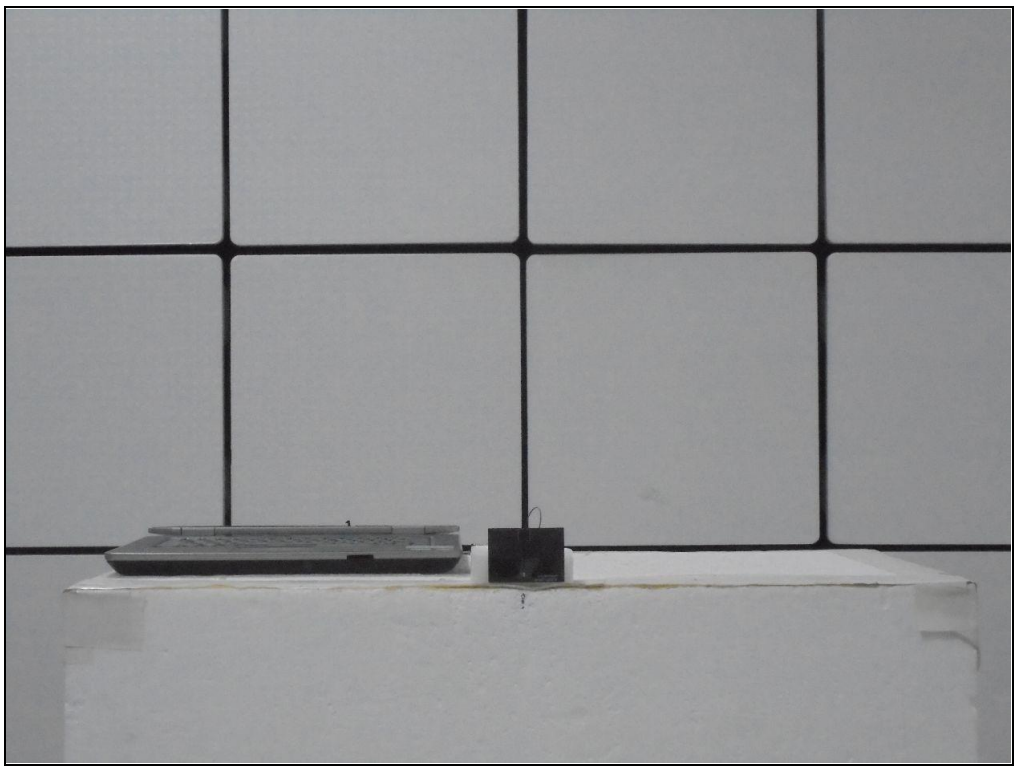




Mode B



Mode C



9 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 FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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