

TEST REPORT

Eurofins KCTL Co.,Ltd.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr

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KCTL

1. Client

Name : Samsung Electronics Co., Ltd.

• Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677,

Rep. of Korea

Date of Receipt : 2024-12-10

2. Use of Report : Certification

3. Name of Product / Model : Tablet PC / SM-X358U

4. Manufacturer / Country of Origin : Samsung Electronics Co., Ltd. / Vietnam

5. FCC ID : A3LSMX358U

6. Date of Test : 2025-01-02 to 2025-03-19

7. Location of Test : ■ Permanent Testing Lab □ On Site Testing

(Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

8. Test method used: FCC Part 15 Subpart C, 15.247

9. **Test Result** : Refer to the test result in the test report

Tested by Technical Manager

Affirmation

Name : Euijung Kim (Sapature) | Name : Harim Lee

2025-03-21

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REPORT REVISION HISTORY

Date	Revision	Page No
2025-03-21	Originally issued	-

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G

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Statement concerning the uncertainty of the measurement systems used for the tests
may be required by the product standard or client)
Internal procedure used for type testing through which traceability of the measuring uncertainty nas been established:
Procedure number, issue date and title: Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.
☑ Statement not required by the standard or client used for type testing

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1. General information

Client : Samsung Electronics Co., Ltd.

Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Manufacturer : Samsung Electronics Co., Ltd.

Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Factory : Samsung Electronics Vietnam Thai Nguyen Co., Ltd

Address : Yen Binh Industrial Park, Dong Tien Ward, Pho Yen Town, Thai Nguyen Province, Vietnam

Laboratory : Eurofins KCTL Co.,Ltd.

Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132

VCCI Registration No.: R-20080, G-20078, C-20059, T-20056

CAB Identifier: KR0040 ISED Number: 8035A KOLAS No.: KT231

2. Device information

Equipment under test : Tablet PC Model : SM-X358U

Modulation technique : Bluetooth Low Energy : GFSK

Number of channels : 40 ch Power source : DC 3.85 V

Antenna specification : Antenna 1 : LDS Antenna

Antenna 2 : LDS Antenna

Antenna gain : Antenna 1 : -4.50 dBi

Antenna 2 : -4.00 dBi

Frequency range : 2 402 Mb ~ 2 480 Mb

Software version : X358U.001 Hardware version : REV1.0

Test device serial No. : Conducted : R32Y10023WK

Radiated: R32Y1002DZF, R32Y1002WQV

Operation temperature : 0 $^{\circ}$ C ~ 35 $^{\circ}$ C

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2.1. Frequency/channel operations

This device contains the following capabilities: Bluetooth Low Energy

Ch.	Frequency (Mb)
37	2 402
17	2 440
39	2 480

Table 2.1-1. Bluetooth Low Energy (1M/125k/500k)

Ch.	Frequency (畑)
00	2 404
17	2 440
36	2 478

Table 2.1-2. Bluetooth Low Energy (2M)

2.2. Simultaneous Tx Condition

The device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the Bluetooth, WLAN 2.40½, 5 0½ or 6 0½ bands simultaneously on each antenna.

Simultaneous Tx condition – not RSDB

Mode	# of TX	WLAN 2.4 GHz		WLAN 5, 6 GHz		Bluetooth		Report
Wode	# 01 17	ANT 1	ANT 2	ANT 1	ANT 2	ANT 1	ANT 2	Neport
WLAN + Bluetooth	2	-	0	-	1	0	ı	\checkmark
WLAN + Bluetooth	3	-	-	0	0	0	1	1
WLAN + Bluetooth	3	-	1	0	0	1	0	-

Notes.

- 1. Simultaneous condition was performed as a worst case which is configured as a combination of lowest margin for each mode during radiated spurious emission.
- 2. For simultaneous spurious emission test result, please refer to 15.247_ax test report.

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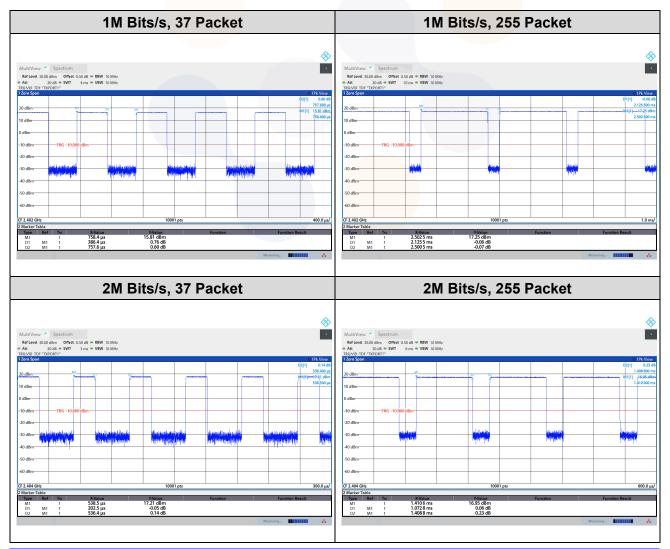
2.3. Duty Cycle Factor

ANT1

Test mode	Period	Period On time		cycle	Duty Cycle Factor	
rest mode	(ms)	(ms)	(Linear)	(%)	(dB)	
1M Bits/s, 37 Packet	0.758	0.386	0.510 0	51.00	2.92	
1M Bits/s, 255 Packet	2.501	2.126	0.850 0	85.00	0.71	
2M Bits/s, 37 Packet	0.536	0.203	0.377 5	37.75	4.23	
2M Bits/s, 255 Packet	1.409	1.073	0.761 5	76.15	1.18	
125k Bits/s, 37 Packet	4.109	3.097	0.753 6	75.36	1.23	
125k Bits/s, 255 Packet	18.064	17.049	0.943 8	94.38	0.25	
500k Bits/s, 37 Packet	1.818	1.064	0.585 1	58.51	2.33	
500k Bits/s, 255 Packet	5.305	4.549	0.857 4	85.74	0.67	

Notes.

- 1. Duty cycle (Linear) = Ton time / Period
- 2. DCF(Duty cycle factor) = 10log(1/duty cycle)
- 3. DCF is not compensated to average result if the duty cycle is more than 98%

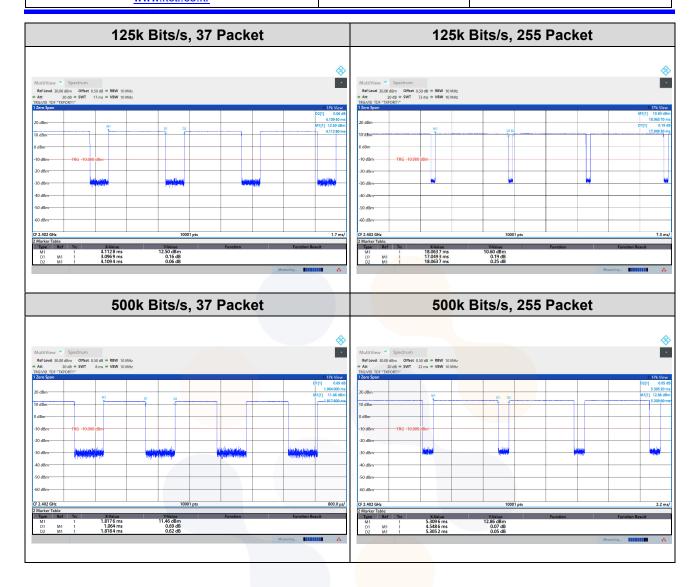


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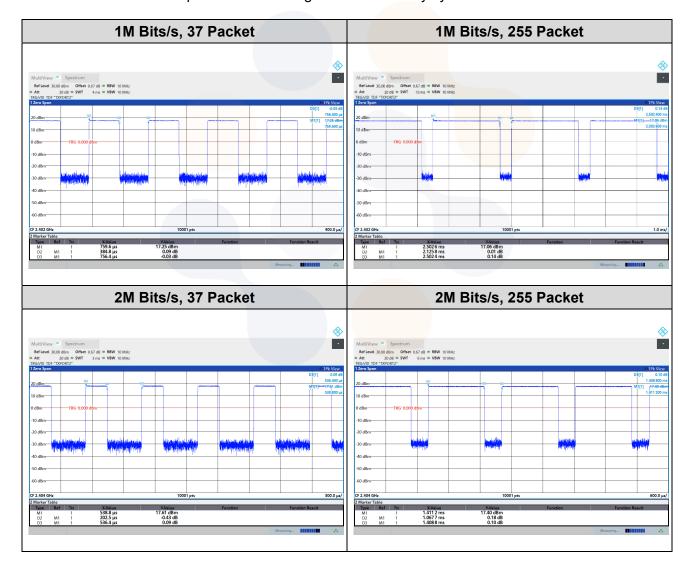


ANT2

Test mode	Period On time (ms) (ms)		Duty cycle		Duty Cycle Factor
rest mode			(Linear)	(%)	(dB)
1M Bits/s, 37 Packet	0.756	0.385	0.508 7	50.87	2.94
1M Bits/s, 255 Packet	2.503	2.126	0.849 4	84.94	0.71
2M Bits/s, 37 Packet	0.536	0.203	0.377 5	37.75	4.23
2M Bits/s, 255 Packet	1.409	1.068	0.757 9	75.79	1.20

Notes.

- 1. Duty cycle (Linear) = Ton time / Period
- DCF(Duty cycle factor) = 10log(1/duty cycle)
- 3. DCF is not compensated to average result if the duty cycle is more than 98%



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3. Antenna requirement

Requirement of FCC part section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

- The transmitter has permanently attached LDS Antenna (Internal antenna) on board.
- The E.U.T Complies with the requirement of §15.203, §15.247.



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4. Summary of tests

FCC Part section(s)	Parameter	Test Condition	Test results
15.247(b)(3)	Maximum Peak Output Power		Pass
15.247(e)	Peak Power Spectral Density		Pass
15.247(a)(2)	6 dB Channel Bandwidth	width Conducted	
15.207(a)	AC Conducted Emissions		Pass
15.247(d)	Conducted Spurious Emissions		Pass
15.205(a),	Spurious emission	Dadiated	Pass
15.209(a)	Band-edge, restricted band	Radiated	Pass

Notes:

- 1. All modes of operation and data rates were investigated. The sections represent the worst case emissions.
- 2. According to exploratory test no any obvious emission were detected from 9 klb to 30 Mlb. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
- 3. EUT was investigated in three orthogonal orientations X, Y and Z. it was determined that Y orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in Y orientation.
- 4. All configurations have been performed (Stand-alone, Stand-alone with TA, With accessories). Worst case: Stand-alone
- 5. The test procedure(s) in this report were performed in accordance as following.
 - ANSI C63.10-2013
 - KDB 558074 D01 v05r02
- 6. The worst-case data rate were:

ANT1: 1M Bits/s, Packet length 37 Bytes 2M Bits/s, Packet length 37 Bytes ANT2: 1M Bits/s, Packet length 37 Bytes 2M Bits/s, Packet length 37 Bytes

7. This device does not support Advertising channels (2402 MHz, 2426 MHz, 2480 MHz) at the BLE 2Mbps data rate.

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Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (±)			
Conducted RF Power	0.9 dB			
Conducted spurious emission	2.0 dB			
	Below 30 Mb	2.3 dB		
Radiated Emissions	30 Mb to 1 000 Mb	2.6 dB		
Natiated Effissions	1 000 Mb to 18 000 Mb	4.8 dB		
	Above 18 000 Mb	4.8 dB		
Conducted Emissions	150 kHz to 30 MHz	2.9 dB		

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Measurement results explanation example

The offset level is set in the spectrum analyzer to compensate the RF cable loss factor between EUT conducted output port and spectrum analyzer.

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With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Frequency (眦)	Factor(dB)	Frequency (脈)	Factor(dB)
30	10.28	11 000	13.38
50	9.72	12 000	13.92
100	10.67	13 000	13.79
200	10.18	14 000	13.47
300	9.89	15 000	13.28
400	9.75	16 000	13.30
500	10.06	17 000	13.34
600	10.56	18 000	13.34
700	11.06	19 000	13.31
800	11.74	20 000	13.48
900	12.40	21 000	13.51
1 000	12.65	22 000	13.40
2 000	13.33	23 000	13.50
3 000	12.96	24 000	13.56
4 000	13.08	25 000	13.77
5 000	13.48	26 000	14.12
6 000	14.65	26 500	16.21
7 000	13.49	27 000	14.37
8 000	12.49	28 000	13.95
9 000	10.28	29 000	13.38
10 000	9.72	30 000	13.92

Note:

Offset(dB) = RF cable loss(dB) + Attenuator(dB)

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7. Test res	ults			
7.1. Maximur	n peak output	power		
Test setup	7		1	
EUT		Attenuator		Power sensor

Limit

According to §15.247(b)(3),

For systems using digital modulation in the 902-928 Mz, 2 400-2 483.5 Mz, and 5 725-5 850 Mz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

According to §15.247(b)(4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test procedure

ANSI C63.10 - Section 11.9

Used test method is section 11.9.1.3 and 11.9.2.3.1

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Test settings

General

Section 15.247 permits the maximum conducted (average) output power to be measured as an alternative to the maximum peak conducted output power for demonstrating compliance to the limit. When this option is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth (see ANSI C63.10 for measurement guidance).

When using a spectrum analyzer or EMI receiver to perform these measurements, it shall be capable of utilizing a number of measurement points in each sweep that is greater than or equal to twice the span/RBW to set a bin-to-bin spacing of ≤ RBW/2 so that narrowband signals are not lost between frequency bins.

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level. The intent is to test at 100 % duty cycle; however a small reduction in duty cycle (to no lower than 98 %) is permitted, if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

If continuous transmission (or at least 98 % duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level, with the transmit duration as long as possible, and the duty cycle as high as possible during which sweep triggering/signal gating techniques may be used to perform the measurement over the transmission duration.

11.9.1. Maximum peak conducted output power

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

11.9.1.1. RBW ≥ DTS bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- a) Set the RBW ≥ DTS bandwidth.
- b) Set VBW \geq [3 \times RBW].
- c) Set span \geq [3 \times RBW].
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

11.9.1.3. PKPM1 Peak power meter method

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

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11.9.2.3.1. Measurement using a power meter (PM)

Method AVGPM is a measurement using an RF average power meter, as follows:

- a) As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied:
 - 1) The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
 - 2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
 - 3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- b) If the transmitter does not transmit continuously, measure the duty cycle, D, of the transmitter output signal as described in 11.6.
- c) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.
- d) Adjust the measurement in dBm by adding [10 log(1/D)], where D is the duty cycle

Notes:

A peak responding power sensor is used, where the power sensor system video bandwidth is greater than the occupied bandwidth of the EUT.

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Test results

ANT1

F	Data rate (Bits/s)	Packet length	Measured output power (dBm)		Limit
Frequency(M b)		(Bytes)	Peak	Average	(dBm)
2 402	1M	37	16.75	13.61	
	I IVI	255	16.33	15.35	
	125k	37	7.43	5.89	
		255	7.41	6.84	
	500k	37	7.49	4.88	
	SUUK	255	7. <mark>44</mark>	6.46	
	1M	37	17.51	14.37	
	I IVI	255	17.04	16.06	
2 440	125k	37	8.26	6.75	
2 440		255	8.24	7.70	
	500k	37	8.34	5.74	1
		255	8.28	7.32	20.00
	1M	37	16.94	13.78	30.00
		255	16.49	15.50	
0.400	125k	37	6.79	5.22	
2 480		255	6.77	6.18	
	500k	37	6.86	4.22	
		255	6.80	5.80	
2.404		37	17.16	12.46	
2 404	2M	255	16.69	14.96	
2 440		37	17.88	13.17	
		255	17.36	15.62	1
2.479		37	17.45	12.75	
2 478		255	16.96	15.22	

Note.

Conducted output power (Average) = Reading value of average power + D.C.F.

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ANT2

Eroguepov(Mk)	Data rate (Bits/s)	Packet length (Bytes)	Measured outp	Limit	
Frequency(M b)			Peak	Average	(dBm)
2 402		37	16.49	13.24	
2 402		255	16.11	15.01	
2 440	1M	37	16.48	13.22	
2 440		255	16.17	15.05	
2 480		37	15.83	12.61	
		255	15.45	14.38	30.00
2 404	2M	37	16.88	12.11	30.00
2 404		255	16.88	12.13	
2 440		37	16.44	11.72	
		255	16.51	14.68	
2 478		37	16.42	14.62	
		255	16.00	14.24	

Note.

Conducted output power (Average) = Reading value of average power + D.C.F

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7.2. Peak Power Spectral Density

<u>Test setup</u>		
EUT	Attenuator	Spectrum analyzer

Limit

According to §15.247(e),

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 $\,\mathrm{dBm}$ in any 3 $\,\mathrm{klz}$ band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test procedure

ANSI C63.10 - Section 11.10.2

Test settings

Method PKPSD (peak PSD)

The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

- 1) Set analyzer center frequency to DTS channel center frequency.
- 2) Set the span to 1.5 times the DTS bandwidth.
- 3) Set the RBW to: 3 kHz \leq RBW \leq 100 kHz.
- 4) Set the VBW ≥ 3 x RBW.
- 5) Detector = peak.
- 6) Sweep time = auto couple.
- 7) Trace mode = max hold.
- 8) Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- 10) If measured value exceeds limit, reduce RBW (no less than 3 klb) and repeat.

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Test results ANT1

	Data rate	Packet length	DCD/JD/2 IJL)	Limit/JDm/2 UL)	
Frequency(M b)	(Bits/s)	(Bytes)	PSD(dBm/3 kHz)	Limit(dBm/3 址)	
2 402			2.71		
2 440	1M	37	3.44		
2 480			2.59	o	
2 404			0.10	8	
2 440	2M	37	0.81		
2 478			0.13		

ANT2

/\\\				
Frequency(Mb)	Data rate (Bits/s)	Packet length (Bytes)	PSD(dBm/3 k批)	Limit(dBm/3 k批)
0.400	, ,	()	1.01	
2 402			1.61	
2 440	1M	37	1.54	
2 480			1.03	
2 404			-1.15	8
2 440	2M	37	-1.27	
2 478			-1.50	

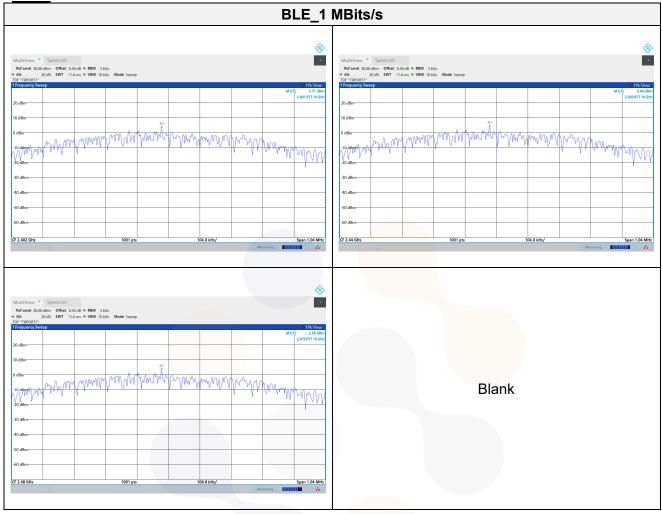
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ANT1



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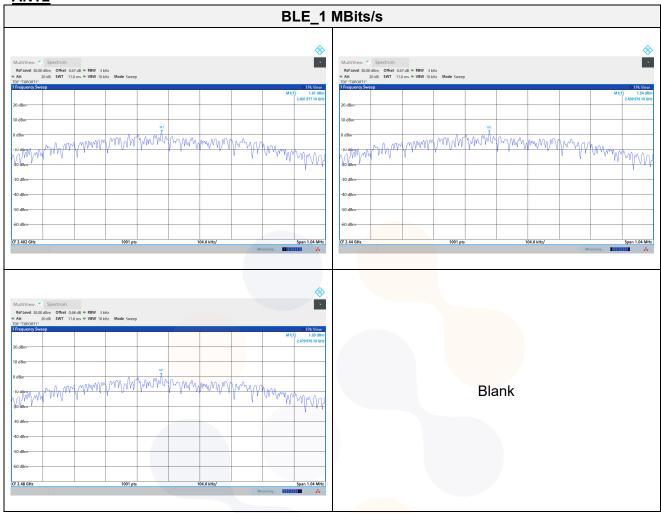
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ANT2



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7.3. 6 dB Bandwidth(DTS Channel Bandwidth)

Test setup	_		_	
EUT		Attenuator		Spectrum analyzer

Limit

According to §15.247(a)(2),

For Systems using digital modulation techniques may operate in the 902–928 Mb, 2 400–2 483.5 Mb, and 5 725–5 850 Mb bands. The minimum 6 dB bandwidth shall be at least 500 kb.

Test procedure

ANSI C63.10 - Section 11.8.2

Test settings

DTS bandwidth

One of the following procedures may be used to determine the modulated DTS bandwidth.

Option 1

- 1) Set RBW = 100 kHz.
- 2) Set the video bandwidth (VBW) \geq 3 x RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Sweep = auto couple.
- 6) Allow the trace to stabilize.
- 7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Option 2

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW \geq 3 \times RBW, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be \geq 6 dB.

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Test results ANT1

Frequency(Mb)	Data rate (Bits/s)	Packet length (Bytes)	6 dB Bandwidth(Mb)
2 402			0.690
2 440	1M	37	0.690
2 480			0.695
2 404			1.165
2 440	2M	37	1.165
2 478			1.165

ANT2

Frequency(쌘)	Data rate (Bits/s)	Packet length (Bytes)	6 dB Bandwidth(쌘)
2 402			0.685
2 440	1M	37	0.690
2 480			0.690
2 404			1.170
2 440	2M	37	1.175
2 478			1.165

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ANT1

