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TEST REPORT

Test Result:	Pass*
Date of Issue:	2020-01-03
Date of Test:	2019-12-13 to 2020-01-02
Date of Receipt:	2019-12-12
Standards:	47 CFR Part 15, Subpart D
HVIN:	35-201286BU
FCC ID:	EW780-1993-00
Trade mark:	Vtech
*	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Model No.:	DM1212 BU, DM1212-2 BU, DM1212-ab BU 🔹
EUT Name:	DECT Audio Baby monitor
Equipment Under Test (EUT)):
Address of Factory:	VTech Science Park, Xia Ling Bei Management Zone, Liaobu, Dongguan, Guangdong, China
Factory:	VTech (Dongguan) Telecommunications Limited.
Address of Manufacturer:	23/F., Tai Ping Ind Center Block 1, 57 Ting Kok Rd Tai Po NT Hong Kong
Manufacturer:	VTech Telecommunications Ltd
Address of Applicant:	23/F., Tai Ping Ind Center Block 1, 57 Ting Kok Rd Tai Po NT Hong Kong
Applicant:	VTech Telecommunications Ltd
Application No.:	HKEM1912001228AT

* In the configuration tested, the EUT complied with the standards specified above.

Keny. XM

Keny Xu EMC Laboratory Manager



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Revision Record						
Version Chapter Date Modifier Remar						
01		2020-01-06		Original		

Authorized for issue by:		
	Vincent Chen	
	Vincent Chen /Project Engineer	
	Evic Fu	
	Eric Fu /Reviewer	



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2 Test Summary

Test Item	FCC Test Requirement	Result
Antenna Requirement	15.317;15.203	Pass
Power Line Conducted Emission	15.207(a)	Pass
Digital Modulation Techniques	15.319(b)	Pass
Channel Frequencies	15.303	Pass
Automatic discontinuation of transmission	15.319(f)	Pass
Emission Bandwidth	15.323(a)	Pass
In-band emissions	15.323(d)	Pass
Out-of-band emissions	15.323(d)	Pass
Peak Transmit Power and Antenna Gain	15.319(c)(e); 15.31(e)	Pass
Power Spectral Density	15.319(d)	Pass
Carrier frequency stability	15.323(f)	Pass
Frame repetition stability	15.323(e)	Pass
Frame period and jitter	15.323(e)	Pass
Monitoring threshold, Least interfered channel	15.323(c)(2)(5)(9)	Pass
Monitoring of intended transmit window and maximum reaction time	15.323(c)(1)	Pass
Threshold monitoring bandwidth	15.323(c)(7)	Pass
Reaction time and monitoring interval	15.323(c)(1)(5)(7)	Pass
Access criteria test interval	15.323(c)(4)(6)	Pass
Access Criteria functional test	15.323(c)(4)(6)	Pass
Acknowledgements	15.323(c)(4)	Pass
Transmission duration	15.323(c)(3)	Pass
Dual access criteria	15.323(c)(10)	Pass
Alterative monitoring interval	15.323(c)(11)(12)	N/A ¹
Spurious Emissions (Radiated)	15.319(g); 15.209(a)	Pass

¹ The client declares that the tested equipment does not implement this provision

Remark:

Model No.: DM1212 BU, DM1212-2 BU, DM1212-ab BU

Only the model DM1212 BU was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on color and model No. and others as below:

a=any alphanumeric character or blank is presenting number of parent unit.

b = any alphanumeric character or blank is presenting color of enclosure.



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4 General Information

4.1 Details of E.U.T.

Power supply:	Adapter 1 model: S003AKU0600040			
	Input: AC 100-120V. 60Hz. 150mA			
	Output: DC 6V, 400mA			
	Adapter 2 model: VT05UUS06040			
	Input: AC 100-120V, 60Hz, 150mA			
	Output: DC 6V, 400mA			
	Both adapters are tested, only show the worst adapter's data in this report.			
Frequency Range:	1921.536 to 1928.448 MHz			
Number of Channels:	5 RF Channels, $5 \times 12 = 60$ TDMA Duplex Channels			
Type of Modulation:	Digital (Gaussian Frequency Shift Keying)			
Modulation Technique:	GFSK			
Antenna Connector:	None			
Antenna Gain:	0dBi			
Number of Antennas:	2			
Antenna Diversity	Yes			
Supported:				
Hardware Version:	35-201313BU			
Software Version:	B004B1103			

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel(CH4)	1921.536 MHz
The Middle channel(CH2)	1924.992 MHz
The Highest channel(CH0)	1928.448 MHz

4.2 Test Environment and Mode

Operating Environment:	
Temperature:	22.3 °C
Humidity:	53.2 % RH
Atmospheric Pressure:	1015 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.



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4.3 Description of Support Units

The EUT has been tested with associated equipment below:

Description	Manufacturer	Model No.	Serial No.
Audio Baby monitor	Vtech	DM1212 PU	NA

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty	
1	Radio Frequency	± 7.25 x 10 ⁻⁸	
2	Duty cycle	± 0.37%	
3	Occupied Bandwidth	± 3%	
4	RF conducted power	± 0.75dB	
5	RF power density	± 2.84dB	
6	Conducted Spurious emissions	± 0.75dB	
7	DE Dedicted newer	± 4.5dB (Below 1GHz)	
/	RF hadiated power	± 4.8dB (Above 1GHz)	
0	Dedicted Spurious optication test	± 4.5dB (Below 1GHz)	
0	Radiated Spundus emission test	± 4.8dB (Above 1GHz)	
9	Temperature test	± 1 ℃	
10	Humidity test	± 3%	
11	Supply voltages	± 1.5%	
12	Time	± 3%	



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4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Fax: +86 755 2671 0594 Tel: +86 755 2601 2053

No tests were sub-contracted.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

FCC – Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



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Equipment List 5

Conducted Emissions at Mains Terminals (150kHz-30MHz)						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
Shielding Room	ChangZhou ZhongYu	GB-88	SEM001-06	2019-06-13	2022-06-12	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM024-01	2019-07-11	2020-07-10	
LISN	Rohde & Schwarz	ENV216	SEM007-01	2019-09-24	2020-09-23	
LISN	ETS-LINDGREN	3816/2	SEM007-02	2019-04-01	2020-03-31	
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2019-04-01	2020-03-31	
Digital Radiocommunication Tester	Rohde & Schwarz	CMD60	/	2019-09-24	2020-09-24	

Radiated Emissions (30MHz-1GHz)						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM025-01	2019-07-11	2020-07-10	
EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2019-09-24	2020-09-23	
BiConiLog Antenna (26- 3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26	
Pre-amplifier (0.1- 1300MHz)	Agilent Technologies	8447D	SEM005-01	2019-04-01	2020-03-31	
Digital Radiocommunication Tester	Rohde & Schwarz	CMD60	/	2019-09-24	2020-09-24	

Radiated Spurious Emission							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12		
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A		
Coaxial Cable	SGS N/A		SEM026-01	2019-07-11	2020-07-10		
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2019-04-12	2020-04-11		
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12		



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Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	ompliance tions Systems PAP-0126 SEM004-11 Inc.		2019-09-24	2020-09-23
Pre-amplifier (18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2019-04-01	2020-03-31
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2019-04-01	2020-03-31
Digital Radio communication Tester	Rohde & Schwarz	CMD60	/	2019-09-24	2020-09-24
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2019-09-24	2020-09-23
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

RF conducted test								
Test Equipment	Manufacturer	Model No. Inventory No.		Cal. date	Cal. Due date			
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2019-09-24	2020-09-23			
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12 2019-04-12		2020-04-11			
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2019-04-25	2020-04-25			
Power Meter	Rohde & Schwarz	NRVS	SEM014-02 2019-09-		2020-09-23			
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2019-04-02	2020-04-01			
Coaxial Cable	SGS	N/A	SEM031-01	2019-07-11	2020-07-10			
Digital Radiocommunication Tester	Rohde & Schwarz	CMD60	/	2019-09-24	2020-09-24			
Splitter	MACOM	2090-6214-00	SEL0226	2019-03-06	2020-03-06			
Signal Generator	Agilent	N5173B	SEM006-05	2019-09-28	2020-09-27			
Signal Generator	Rohde & Schwarz	SML02	SEM006-07	2019-09-24	2020-09-23			
Signal Generator	Rohde & Schwarz	SMB100A	SEM006-11	2019-04-01	2020-03-31			
Signal Generator	Agilent	N5171B	SEM006-13	2019-04-12	2020-04-11			



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General used equipment							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-26	2020-09-25		
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-26	2020-09-25		
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-26	2020-09-25		
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2019-04-04	2020-04-03		



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Test results and Measurement Data 6

6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15.317, 15.203				
15.203 requirement:					
An intentional radiator shall be	designed to ensure that no antenna other than that furnished by the				
responsible party shall be used	responsible party shall be used with the device. The use of a permanently attached antenna or of an				
antenna that uses a unique co	antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so				
that a broken antenna can be	that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical				
connector is prohibited.	connector is prohibited.				
EUT Antenna:					
The antenna is integrated on t	he main PCB and no consideration of replacement. The best case gain				
of the antenna is 0dBi.					

6.2 Digital Modulation Techniques

Standard requirement: 47 CFR Part 15.319(b)			
Requirement:			
All transmissions must use only digital modulation techniques.			
The EUT uses Multi Carrier / T modulation. For further details	ime Division Multiple Access / Time Division Duplex and Digital GFSK see the operational description provided by the applicant.		



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6.3 Automatic discontinuation of transmission

Test Requirement:	47 CFR Part 15.319(f)
Test Method:	Declared by manufacture
Requirement:	The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.
Test Results:	Pass

The following tests simulate the reaction of the EUT in case of either absence of information to transmit or operational failure after a connection with the companion device is established.

Number	Test	EUT Reaction	Verdict
1	Power removed from EUT	NA	Pass
2	Switch Off EUT	NA	Pass
3	Hook-On by EUT	A	Pass
4	Power Removed from Companion Device	NA	Pass
5	Switch Off Companion Device	С	Pass
6	Hook-On by Companion Device	С	Pass

A - Connection breakdown, Cease of all transmissions

B - Connection breakdown, EUT transmits control and signaling information

C - Connection breakdown, Companion Device transmits control and signaling information

N/A - Not Applicable (EUT/Companion Device does not have On/Off switch and cannot perform Hook-On) Note: For more information please refer to declaration letter.



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Test Requirement:	47 CFR Part 15.207					
Test Method:	ANSI C63.4: 2014					
Test Frequency Range:	150kHz to 30MHz					
Limit:	Frequency range (MHz)					
	Frequency range (MHZ)	Quasi-peak	Average			
	Frequency range (MHz) 0.15-0.5 0.5-5 0.5-30		56 to 46*			
	0.5-5	56	46			
	5-30	60	50			
	* Decreases with the logarithm	n of the frequency.				
Test Procedure:	 The mains terminal disturb shielded room. The EUT was connected to Impedance Stabilization Ne linear impedance. The pow connected to a second LIS reference plane in the sam measured. A multiple sock power cables to a single LI exceeded. The tabletop EUT was place the ground reference plane EUT was placed on the ho The test was performed wi rear of the EUT shall be 0. plane. The vertical ground horizontal ground reference the boundary of the unit un plane for LISNs mounted of distance was between the All other units of the EUT a m from the LISN 2. In order to find the maximu equipment and all of the in to ANSI C63.4: 2014 on co Remark: LISN=Read Leve 	conducted in a pugh a LISN 1 (Line a $50\Omega/50\mu$ H + 5Ω units of the EUT were d to the ground or the unit being d to connect multiple of the LISN was not c table 0.8m above g arrangement, the ice plane, erence plane. The round reference onded to the as placed 0.8 m from b a ground reference ference plane. This ISN 1 and the EUT. ent was at least 0.8 we positions of e changed according t. Factor				

6.4 Conducted Emissions



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Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



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Adapter 2 model: VT05UUS06040 Line:Live Line



Site : Shielding Room Condition: Line Job No. : 01228AT Test mode: a

		Cable	LISN	Read		Limit	0ver	
	Freq	Loss	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.2455	0.03	9.59	4.39	14.01	51.91	-37.90	Average
2	0.2455	0.03	9.59	23.76	33.38	61.91	-28.53	QP
3	0.2730	0.04	9.59	9.56	19.19	51.03	-31.84	Average
4	0.2730	0.04	9.59	26.94	36.57	61.03	-24.46	QP
5	0.9136	0.09	9.60	5.10	14.79	46.00	-31.21	Average
6	0.9136	0.09	9.60	22.61	32.30	56.00	-23.70	QP
7	1.7253	0.14	9.61	10.48	20.23	46.00	-25.77	Average
8	1.7253	0.14	9.61	24.90	34.65	56.00	-21.35	QP
9	4.2018	0.16	9.65	9.54	19.35	46.00	-26.65	Average
10	4.2018	0.16	9.65	21.94	31.75	56.00	-24.25	QP
11	6.7691	0.17	9.72	7.81	17.70	50.00	-32.30	Average
12	6.7691	0.17	9.72	21.18	31.07	60.00	-28.93	QP



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Line:Neutral Line



Site :	Shielding	Room
Condition:	Neutral	
Job No. :	01228AT	
Test mode:	а	

		Cable	LISN	Read		Limit	0ver	
	Freq	Loss	Factor	Level	Level	Line	Limit	Remark
-	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1598	0.01	9.55	12.78	22.34	55.47	-33.13	Average
2	0.1598	0.01	9.55	30.20	39.76	65.47	-25.71	QP
3	0.2575	0.03	9.54	9.75	19.32	51.51	-32.19	Average
4	0.2575	0.03	9.54	29.24	38.81	61.51	-22.70	QP
5	0.5265	0.06	9.54	11.15	20.75	46.00	-25.25	Average
6	0.5265	0.06	9.54	27.29	36.89	56.00	-19.11	QP
7	1.4640	0.13	9.56	14.93	24.62	46.00	-21.38	Average
8	1.4640	0.13	9.56	24.98	34.67	56.00	-21.33	QP
9	2.1783	0.16	9.56	9.10	18.82	46.00	-27.18	Average
10	2.1783	0.16	9.56	23.09	32.81	56.00	-23.19	QP
11	9.1557	0.17	9.80	11.58	21.55	50.00	-28.45	Average
12	9.1557	0.17	9.80	27.53	37.50	60.00	-22.50	QP



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6.5 Peak Power Output

Test Requirement:	47 CFR Part 15.319(c)(e), 15.31(e)		
Test Method:	ANSI C63.17: 2013		
Limit:	Peak transmit power shall not exceed 100 microwatts multiplied by the square root of the emission bandwidth in Hertz.		
	The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3dBi.		
Test Procedure:	RBW: ≥ Emission bandwidth		
	Video bandwidth: ≥ RBW		
	Span: Zero		
	Center frequency: Nominal center frequency of transmit carrier		
	Amplitude scale: Log (linear may be used if analyzer has sufficient linear dynamic range and accuracy)		
	Detection: Peak detection		
	Trigger: Video		
	Sweep rate: Sufficiently rapid to permit the transmit pulse to be resolved accurately		
Test Setup:			
	CMD60 SA Spliter		
	EUT		
Test Mode:	Transmitting mode		
Instruments Used:	Refer to section 5.0 for details		
ANT0:	•		

Channel	Frequency (MHz)	Measured Peak Transmit	Limit	Results
		Power (dBm)	(dBm)	
Lowest	1921.536	20.25	20.84	Pass
Middle	1924.992	20.19	20.84	Pass
Highest	1928.448	20.26	20.84	Pass

ANT1:

Channel	Frequency (MHz)	Measured Peak Transmit Power (dBm)	Limit (dBm)	Results
Lowest	1921.536	20.73	20.84	Pass
Middle	1924.992	20.79	20.84	Pass
Highest	1928.448	20.80	20.84	Pass

The plots of peak transmit power are saved as below.



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Plots of peak transmit power: ANT0 Lowest channel, Traffic carrier



Middle channel, Traffic carrier

Keysight Spectrum	ctrum Analyzer - Swept SA							
Marker 1	RF 50 Ω AC 373.000 μs		SENSE:INT	#Avg Type	LOG-Pwr	04:34:13 PI TRAC	MDec 19, 2019	Peak Search
10 dB/div	Ref Offset 4.2 dB Ref 30.00 dBm	PNO: Fast ↔→ IFGain:Low	#Atten: 40 dB	Avg Hold:>	100/100	Mkr1 3	73.0 µs 19 dBm	Peak Criteria►
20.0					∮ ¹			Peak Table ►
0.00								Continuous Peak Search On Off
-10.0								
-20.0								Pk-Pk Search
-40.0							M MM	Min Search
-60.0								More
Center 1.9 Res BW 3	024992000 GHz .0 MHz	#VBW \$	3.0 MHz		Sweep (S 500.0 µs (pan 0 Hz 1001 pts)	2 of 2
MSG					STATUS			



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Highest channel, Traffic carrier

Keysight Spectrum Analyzer - Swept SA				
LX/ RL RF 50 Ω AC	SENSE:1	NT ALIGN OFF #Avg Type: Log-Pw	04:36:13 PM Dec 19, 2019 TRACE 1 2 3 4 5 6	Peak Search
	PNO: Fast ↔ Trig: Video IFGain:Low #Atten: 40 dE	Avg Hold:>100/100	DET PPPPP	
Ref Offset 4.2 dB 10 dB/div Ref 30.00 dBm			Mkr1 380.0 µs 20.261 dBm	Peak Criteria►
20.0				Peak Table ►
0.00				Continuous Peak Search On Off
-10.0				
-20.0				Pk-Pk Search
-40.0			[`] ?"}+IL]Hef ^{-I} +LIELHE/HefIL]THIELHE/HEFIL]HE/HEFIL 	
-60.0				Min Search
Center 1.928448000 GHz	#\/B\// 2.0 MHz	Swaan	Span 0 Hz	More 2 of 2
MSG	##D## 8.0 MI12	Sweep	us	



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Plots of peak transmit power: ANT1 Lowest channel, Traffic carrier



Middle channel, Traffic carrier

Keysight Spe	ectrum Analyzer - Swept SA							- ē 🔀
LX/RL	RF 50 Ω AC		SENSE:INT	Ava Type	ALIGN OFF	04:38:09 P	MDec 19, 2019	Peak Search
		PNO: Fast ↔→ IFGain:Low	Trig: Video #Atten: 40 dB	Avg Hold:	>100/100	TYI Di		
10 dB/div	Ref Offset 4.2 dB Ref 30.00 dBm					Mkr1 3 20.7	80.0 µs 85 dBm	Peak Criteria►
20.0					Ŷ ¹			Peak Table ►
10.0								Continuous
0.00								Peak Search On Off
-10.0								
-20.0							TRIG LVL	
-30.0					Ì			Pk-Pk Search
-40.0						pythick the print of the print	M huith Anna Anna Anna Anna Anna Anna Anna Ann	
-50.0								Min Search
-60.0								
Center 1	924992000 GHz						nan () Hz	More 2 of 2
Res BW 3	.0 MHz	#VBW 8	.0 MHz		Sweep :	500.0 µs ((1001 pts)	
MSG					STATUS	5		



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Highest channel, Traffic carrier

Keysight Sp	ectrum Analyzer - Swept SA					
L <mark>XI</mark> RL	RF 50 Ω AC		SENSE:INT	ALIGN OFF	04:38:40 PM Dec 19, 2019	Peak Search
		PNO: Fast +	Trig: Video	Avg Hold:>100/100	TYPE MWWWWW	
		IFGain:Low	#Atten: 40 dB		DET	Book Critoria
	Ref Offset 4.2 dB				Mkr1 373.0 µs	Fear Gillenar
10 dB/div Log	Ref 30.00 dBm				20.796 dBm	
				1		
20.0						Peak Table ►
10.0						Continuous
						Peak Search
0.00						<u>On</u> Off
-10.0						
-20.0					TRIG L VL	
-30.0						Pk-Pk Search
					when many and a start of the	
-40.0						
						Mine On analy
-50.0						win Search
co o						
-60.0						
						Nore 2 of 2
Center 1.	928448000 GHz				Span 0 Hz	2 07 2
Res BW 3	3.0 MHz	#VBW	8.0 MHz	Sweep	500.0 µs (1001 pts)	
MSG				STATU	S	



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6.6 Emission Bandwidth B

Test Requirement:	47 CFR Part 15.323(a)
Test Method:	ANSI C63.17: 2013
Limit:	The Emission Bandwidth B shall be larger than 50 kHz and less than 2.5 MHz.
	No requirements for 6 and 12 dB Bandwidth, these values are only used for testing Monitoring Bandwidth if the Simple Compliance test fails (ANSI C63.17, clause 7.4).
Test Procedure:	RBW: Approximately 1% of the emission bandwidth (a rough estimate may be obtained from peak power level measurement, or use manufacturer's declared value)
	Video bandwidth: \geq 3 × the RBW
	Center frequency: Nominal center frequency of channel
	Span: \geq 2 × the expected emission bandwidth
	Sweep time: Coupled to frequency span and RBW
	Amplitude scale: Log
	Detection: Peak detection with maximum hold enabled
Test Setup:	CMD60 SA Spliter
	EUT
Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.0 for details

ANT0:

Channel	Frequency (MHz)	Emission Bandwidth B (MHz)
Lowest	1921.536	1.47
Middle	1924.992	1.47
Highest	1928.448	1.47

ANT1:

Channel	Frequency (MHz)	Emission Bandwidth B (MHz)
Lowest	1921.536	1.47
Middle	1924.992	1.47
Highest	1928.448	1.47



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Emission Bandwidth: ANT0

Lowest channel:

Keysight Spectrum Analyzer - Occupied BW						
LX RL RF 50 Ω AC		SENSE:INT	ALIGN OFF	05:06:56 P	MDec 19, 2019	Frequency
Center Freq 1.921536000 G	Z Cente	er Freq: 1.921536000 GH Free Run AvalH	lz Iold: 50/50	Radio Std	: None	rioquorioy
#IF	Gain:Low #Atter	n: 40 dB		Radio Dev	vice: BTS	
			Mkr4	4 0 2 4 8	28 64-	
Ref Offset 4.2 dB			IVIKT I	47 4		
10 dB/div Ref 30.00 dBm				17.4	94 abm	
20.0		<u> </u>				Conton From
20.0	d a					Center Freq
10.0	hr w		. ^			1.921536000 GHz
0.00	↓	· _ · •	1 mg			
-10.0			<u> </u>			
20.0						
			1	r	William .	
-30.0					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
-40.0					Y	
-50.0						
co.o.						
-60.0						
Center 1.922 GHz				Sn	an 3 MHz	
#Res BW 30 kHz	#	VBW 100 kHz		#S	weep 1s	CF Step
						300.000 KHZ
Occupied Bandwidth		Total Power	26.4	l dBm		Auto
1.21	15 MHZ					Freq Offset
Tronomit From Free	47 070 kli-			0.00 %		0 Hz
Transmit Freq Error	17.279 KHZ	% of OBW Pd	wer 99	9.00 %		
x dB Bandwidth	1.466 MHz	x dB	-26.	00 dB		
MSG			STATUS	s		

Middle channel:





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Highest channel: Kevsight Spectrum Analyzer - Occupied BV SENSE:INT ALIGN OFF Center Freq: 1.928448000 GHz Trig: Free Run Avg|Hold: 50/50 #Atten: 40 dB 05:10:14 PM Dec 19, 2019 Radio Std: None Frequency Center Freq 1.928448000 GHz ₩IFGain:Low Radio Device: BTS 1.928445 GHz 17.029 dBm Mkr1 Ref Offset 4.2 dB Ref 30.00 dBm 10 dB/div .og **Center Freq** 1.928448000 GHz W My La Center 1.928 GHz #Res BW 30 kHz Span 3 MHz #Sweep 1 s CF Step 300.000 kHz #VBW 100 kHz Man Auto **Total Power** 26.4 dBm **Occupied Bandwidth** 1.2178 MHz **Freq Offset** 0 Hz 19.467 kHz % of OBW Power 99.00 % **Transmit Freq Error** x dB Bandwidth 1.468 MHz x dB -26.00 dB STATUS



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Emission Bandwidth: ANT1 Lowest channel:



Middle channel:





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Highest channel: Keysight Spectrum Analyzer - Occupied BV SENSE:INT ALIGN OFF Center Freq: 1.928448000 GHz Trig: Free Run Avg|Hold: 50/50 #Atten: 40 dB 04:52:03 PM Dec 19, 2019 Radio Std: None Frequency Center Freq 1.928448000 GHz ₩IFGain:Low Radio Device: BTS Mkr1 1.928463 GHz Ref Offset 4.2 dB Ref 30.00 dBm 18.119 dBm 10 dB/div .og **Center Freq** 1.928448000 GHz VA Heren M Center 1.928 GHz #Res BW 30 kHz Span 3 MHz #Sweep 1 s CF Step 300.000 kHz #VBW 100 kHz Man Auto **Total Power** 27.1 dBm **Occupied Bandwidth** 1.2161 MHz **Freq Offset** 0 Hz 18.588 kHz % of OBW Power 99.00 % **Transmit Freq Error** x dB Bandwidth 1.467 MHz x dB -26.00 dB STATUS



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6.7 Power Spectral Density

Test Requirement:	47 CFR Part 15.319(d)
Test Method:	ANSI C63.17: 2013
Limit:	FCC:
	Power spectral density shall not exceed 3 milliwatts in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz
Test Procedure:	RBW: 3 kHz
	Video bandwidth: ≥ 3 × RBW
	Span: Zero span at frequency with the maximum level (frequency determined in 6.1.3 if the same type of signal (continuous versus burst) was used in 6.1.3)
	Center frequency: Spectral peak as determined in 6.1.3
	Sweep time: For burst signals, sufficient to include essentially all of the maximum length burst at the output of a 3 kHz filter (e.g., maximum input burst duration plus 600 µs). For continuous signals, 20 ms.
	Amplitude scale: Log power
	Detection: Sample detection and averaged for a minimum of 100 sweeps
	Trigger: External or internal
Test Setup:	CMD60 SA Spliter
	EUT
Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.0 for details

Test Results:

ANT0:

Channel	Frequency (MHz)	Power Spectral Density	Limit	Results
		(dBm/3 kHz)	(dBm/3 kHz)	
Lowest	1921.536	1.55	4.8	Pass
Highest	1928.448	1.02	4.8	Pass

ANT1:

1.				
Channel	Frequency (MHz)	Power Spectral Density	Limit	Results
		(dBm/3 kHz)	(dBm/3 kHz)	
Lowest	1921.536	-6.80	4.8	Pass
Highest	1928.448	1.69	4.8	Pass



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Highest channel:



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Power Spectral Density: ANT1 Lowest channel:





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6.8 In-Band Unwanted Emissions, Conducted

Test Requirement:	47 CFR Part 15.323(d)
Test Method:	ANSI C63.17: 2013
Limit:	B < f ≤ 2B : at least 30 dB below max. permitted peak power
	$2B < f \le 3B$: at least 50 dB below max. permitted peak power
	$3B < f \le UPCS$ Band Edge : at least 60 dB below max. permitted peak power
Test Procedure:	RBW: Approximately 1% of the emission bandwidth (B)
	Video bandwidth: 3 × RBW
	Sweep time: The sweep time shall be sufficiently slow that the swept
	frequency rate shall not exceed one RBW per three transmit bursts.
	Number of sweeps: Sufficient to stabilize the trace
	Amplitude scale: Log
	Detection: Peak detection and max hold enabled
	Span: Approximately equal to 3.5 B
Test Setup:	CMD60 SA Spliter
	EUT
Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.0 for details

Test Results:

ANT0:

ANT1:

Channel	Frequency (MHz)	Results		
Lowest	1921.536	Pass		
Middle	1924.992	Pass		
Highest	1928.448	Pass		
Channel	Frequency (MHz)	Results		
Lowest	1921.536	Pass		
Middle	1924.992	Pass		
Highest	1928.448	Pass		

The plots of the unwanted emission inside the sub-band are as below.



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Test Plot of In-Band Unwanted Emissions: ANT0 Lowest channel:



Middle channel:





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Highest channel:





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Test Plot of In-Band Unwanted Emissions: ANT1 Lowest channel:



Middle channel:





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Highest channel:







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6.9 Out-of-band Emissions, Conducted

Test Requirement:	47 CFR Part 15.323(d)						
Test Method:	ANSI C63.17: 2013						
Limit:	f ≤ 1.25MHz outside UPCS band : ≤ -9.5dBm						
	$1.25MHz \le f \le 2.5MHz$ outside UPCS band : $\le -29.5 dBm$						
	$f \ge 2.5MHz$ outside UPCS band : $\le -39.5 dBm$						
Test Procedure:	RBW: Approximately 1% of the emission bandwidth (B)						
	Video bandwidth: 3 × RBW						
	Sweep time: The sweep time shall be sufficiently slow that the swept						
	frequency rate shall not exceed one RBW per three transmit bursts.						
	Number of sweeps: Sufficient to stabilize the trace						
	Amplitude scale: Log						
	Detection: Peak detection and max hold enabled						
	Span: Approximately equal to 3.5 B						
Test Setup:	CMD60 Spliter EUT						
Test Mode:	Transmitting mode						
Instruments Used:	Refer to section 5.0 for details						

Test Results:

ANT0:

/			
	Channel	Frequency (MHz)	Results
	Lowest	1921.536	Pass
	Middle	1924.992	Pass
	Highest	1928.448	Pass
ANT1:			•
	Channel	Frequency (MHz)	Results
	Lowest	1921.536	Pass
	Middle	1924.992	Pass
	Highest	1928.448	Pass

The plots of the unwanted emission inside the sub-band are as below.



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ANT0:

Test Plot of Out-of-Band Unwanted Emissions Lowest Channel:





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Keysight Spectrum An	alyzer - Swept SA								
	50 Ω AC 35000000 GHz		SEN	NSE:INT	#Avg Type	ALIGN OFF e: Log-Pwr	10:52:15 PI TRAC	MDec 22, 2019 E 1 2 3 4 5 6	Trace/Detector
PASS Ref 0 10 dB/div Ref 2	P IF IF 24.20 dB 24.20 dBm	NO: Wide ↔ Gain:Low	Trig: Free #Atten: 3	e Run 0 dB	Avg Hold:	: 100/100 kr1 1.93	30 169 3 -59.4	75 GHz	Select Trace
Trace 1 Pas	SS								Clear Write
-5.80									Trace Average
-15.8									Max Hole
-35.8									Min Hol
-55.81	าก.ก ส. เป็าโลก กิลเป็นไป	ath a was but	. A. Mark to . M	united a tille	u	M		I MA & MELL AM J	View Blank Trace On
Start 1.930000	GHz						Stop 1. <u>93</u>	5000 GHz	Mon 1 of 2
#Res BW 30 kH	Z	#VBW	100 kHz			Sweep 5	.333 ms (8001 pts)	





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Test Plot of Out-of-Band Unwanted Emissions Highest Channel:





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- ē 🛃								/ept SA	trum Analyzer - Sw	Keysight Spe	— К
Trace/Detector	MDec 22, 2019 CE 1 2 3 4 5 6	10:57:10 P TRA	ALIGN OFF	#Avg Typ	NSE:INT	SE			RF 50 Ω	RL op Fred	IXI F Sto
Select Trace		1 2.886	: 8/100 Mkr	Avg Hold	e Run 0 dB	Trig: Free #Atten: 3	NO:Fast ↔ Gain:Low	P IF 2 dB	Ref Offset 4.2	ASS	PA
	л авш	-55.0			•			dBm	Ref 24.20 c	dB/div	10 d Log
Clear Write										1.2	14.2
										20	4.20
Trace Averag										80	-5.80
										5.8	-15.8
Max Hole										5.8	-25.8
Min Hole										5.8	-35.8
										5.8	-45.8
View Blank	1									i.8	-55.8
Trace On	an tan ang ang ang ang ang ang ang ang ang a	addattatipikog		n an	alaa hooladdid aar	L _{ellesse} dila alber	ووالموالي المرادروا	Allehalle Healt of	had a had a had been de	a cistan	
Mor 1 of	din een ne de de een gebeekied.	ld hin an			تند (دانرینس) وزیر. ا	i, soo bini, ng bing bin	nider openindelation	enter de la contra de la contra La contra de la contra	halfed a part despite of the off the second s	5.8 <mark>yyatikina</mark> ti	-65.8
	0000 GHz (8001 nts)	Stop 3.	Sween			100 kHz	#VBW		50 GHz 30 kHz	art 1.93	Sta #Re
	ocor proj		STATUS			100 1112	<i>"</i> UD11				MSG





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ANT1:

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Keysight S	pectrum Analyzer - Si	wept SA									
Stop Fre	RF 50 9	Ω AC 0000 GHz		SEI	NSE:INT	#Avg Typ	ALIGN OFF	10:37:30 P TRAC	M Dec 22, 2019 E 1 2 3 4 5 6	F	requency
PASS	Ref Offset 4 Ref 24.20	P IF .2 dB dBm	NO: Wide ↔ Gain:Low	#Atten: 3	0 dB	AvgiHold:	kr1 1.9	34 407 5 -58.3	00 GHz 76 dBm		Auto Tune
14.2	ce 1 Pass									1.93	Center Free 32500000 GH
4.20										1.93	Start Fre 30000000 GH
-15.8										1.93	Stop Fre 35000000 GH
-35.8										Auto	CF Stej 500.000 kH Mai
-55.8	Mahaudh	handerster	your share	with Nerward	an na A.M	Manala	han wash	La Jakanan Maria	1 n.h. 111 milliona 11		Freq Offse 0 H
-65.8	20000 CH-							Stop 1 02		Log	Scale Type
#Res BW	30000 GHZ 30 kHz		#VBW	100 kHz			Sweep	5.00 1.93 5.333 ms (s	8000 GHZ 8001 pts)	209	

🔤 Keysig	ght Spect	rum Analyze	r - Swep	t SA									
Stop	Erea	RF 3 0000	50 Ω		,	SE	NSE:INT	#Avg T	ALIGN OFF	10:37:43 P	M Dec 22, 2019	Fr	equency
PASS	PNO: Fast ↔ IFGain:Low				➡ Trig: Fre #Atten: 3	e Run 0 dB	Avg Ho	id: 9/100	TY D			Auto Tuno	
10 dB/c	div	Ref Offse Ref 24.	et 4.2 c 20 dE	iB 3m					Mkr	1 2.886 -55.7	18 GHz 77 dBm		Auto Tune
14.2	Trace	1 Pass										(2.46	Center Freq 7500000 GHz
4.20 -												1.93	Start Freq 5000000 GHz
-15.8												3.00	Stop Freq 0000000 GHz
-35.8												106 <u>Auto</u>	CF Step 5.500000 MHz Man
-55.8 —	a tallan sh	nde en billet	<mark>ALAIN</mark>	Merinan			11. on the store	u			1 Institution (Arrow	l	F req Offset 0 Hz
-05.0 <mark>14</mark>	^{ئى} رىدا رايىتىرى		an of privil	in a faith an publication in a start and a start a	ult: Arkill millio								Scale Type
Start #Res	1.935 BW 3	0 GHz 0 kHz			#VB	W 100 kHz			Sweep	Stop 3. 1.123 s	0000 GHz (8001 pts)	Log	Lin
MSG									STATUS	6			

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Key:	sight Spe	ctrum /	Analyzer - S	Swept SA											
LXI RL	Ero/	RF	50	Ω AC	247			SEI	NSE:INT	#Ava Tvp	ALIGN OFF	10:49: r	:33 PM TRACE	Dec 22, 2019	Trace/Detector
PAS	S	Ref	Offset 4	1.2 dB	PN IFG	IO: Fast Sain:Low	•••	Trig: Free #Atten: 3	e Run 0 dB	Avg Hold:	>100/100 Mk	r1 2.8	TYPE DET	MWWWWW PPPPPP 17 GHz	Select Trace
10 dB Log r	/div	Ref	24.20	dBm								-52	2.49	2 dBm	
14.2 -	Irace	91P	ass												Clear Write
4 20 -															
-5.80 -															Trace Average
-15.8															Max Hold
-20.0															
-35.8															Min Hold
-45.8														1	
-55.8 -			. Lidata	0									_	`	View Blank
	la del de	l, de la					<u>den</u> j						, da na de la comunicación de la co	had disputed	nace on
-65.8															More
Start #Res	: 1.93 : BW_	50 G 30 k	Hz Hz			#VE	3W_	100 kHz			Sween	Stop	3.0 s(8	000 GHz 3001 pts)	1 of 3
MSG											STATU	JS			





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6.10 Carrier Frequency Stability

Test Requirement:	47 CFR Part 15.323(f)								
Test Method:	ANSI C63.17: 2013								
Limit:	maintained within +/-10 ppm at the following conditions:								
	1. Over 1 hour at nominal supply voltage and a temperature of +20 °C; 2. Over a variation in the primary supply voltage of 85 % to 115 % of nominal supply voltage at a temperature of +20 °C. This test does not apply to an EUT that is only powered by battery for operation; 3. Over a temperature variation of -20 °C to +50 °C or at extreme temperatures as declared by manufacturer, and at nominal supply voltage.								
Test Procedure:	Measurements are made in accordance with ANSI C63.17 sub-clause 6.2.1 The EUT and CMD60 is connected with shielded coaxial cable. The EUT is controlled by DECT Radio Communication Tester, CMD60, to use a fixed frequency channel during test as well as record the frequency offset. The transmission of EUT is in burst mode with pseudo-random data								
Test Setup:	CMD60 Spliter SA								
	EUT								
Test Mode:	Transmitting mode								
Instruments Used:	Refer to section 5.0 for details								

Test Results: Worst case ANT0

Carrier Frequency Stability over time at nominal temperature:

Average Mean Carrier Frequency (MHz)	Max. Diff. (kHz)	Min. Diff. (kHz)	Max. Dev. (ppm)	Limit(ppm)	Results
1924.991883	0.34	-0.46	0.42	±10	Pass

Carrier Frequency Stability over Power Supply Voltage at Nominal Temperature

Voltage	Measured Carrier Frequency (MHz)	Difference (kHz)	Deviation (ppm)	Limit(ppm)	Results
Vnom	1924.992	0	0	±10	Pass
85% of Vnom	1924.992	0.0	0.0	±10	Pass
115% of Vnom	1924.992	0.0	0.0	±10	Pass



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Temperature (℃)	Measured Carrier Frequency (MHz)	Difference (kHz)	Deviation (ppm)	Limit(ppm)	Results
-20 <i>°</i> C	1924.991	0.42	0.84	±10	Pass
+50°C	1924.991	-0.73	-1.13	±10	Pass

Carrier Frequency Stability over Temperature:

6.11 Frame Repetition Stability

Test Requirement:	47 CFR Part 15.323(e)	
Test Method:	ANSI C63.17: 2013	
Limit:	TDD:	
	EUT that implement time division for the purpose of maintaining a duplex connection shall maintain a frame-repetition rate whereby three times the standard deviation of the frequency stability shall not exceed 50 ppm, not including a shift of the mean;	
	TDMA:	
	EUT that further divides access in time shall maintain a frame-repetition rate whereby three times the standard deviation of the frequency stability shallnot exceed 10 ppm, not including a shift of the mean.	
Test Procedure:	X axis: Time	
	Time setting: Approximate frame period × 100	
	Y axis: Frequency	
	Center frequency: Nominal frame-repetition rate	
	Frequency span: Span large enough so that the full waveform is greater	
	than 50% but less than 100% of the display scale	
	Measurement time interval (gating time) :X (in units of frame period) where $X \le 1000$	
	Number of measurements: 1000/X (where X is the measurement interval in units of frame period)	
Test Setup:	CMD60 Spliter SA	
	EUT	
Test Mode:	Transmitting mode	
Instruments Used:	Refer to section 5.0 for details	

Test Results: Worst case ANT0

Maximum Frame Repetition Stability	Limit	Results
(ppm)	(ppm)	
<0.0001 and >-0.0001	±10	Pass



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6.12 Frame Period and Jitter

Test Requirement:	47 CFR Part 15.323(e)		
Test Method:	ANSI C63.17: 2013		
Limit:	Frame Period	20 or 10 ms	
	Max Jitter	25 µs	
	3 times St. Dev of Jitter	12.5 µs	
Test Procedure:	Measurements are made in accordance with ANSI C63.17 sub-clause 6.2.3. Test setup is shown in section 3.2 Figure 3.2.1. A spectrum analyzer measures the time duration between the rising edges of two consecutive frames. The measurements are taken over 100,000 frames. These measurement values are used to compute mean value and the difference between any two consecutive frame periods. The mean value is the frame period.		
Test Setup:	CMD60 Splite EUT	r SA	
Test Mode:	Transmitting mode		
Instruments Used:	Refer to section 5.0 for details		

Test Results: Worst case ANT0

Measured Maximum Jitter (µs)	Limit (µs)	Results
-0.156	±25	Pass



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6.13 Monitoring Threshold, Least Interfered Channel

Test Requirement:	47 CFR Part 15.323(c)(2)(5)(9)		
Test Method:	ANSI C63.17: 2013		
Limit:	Least Interfered Channel Procedure (LIC) may only be used by systems with more than 20 duplex system access channels. Systems with less than 20 duplex system access channels are not allowed to transmit when interferer level is above Lower Threshold.		
Test Procedure:	Please refer to accordance with ANSI C63.17 Clause 7.3.1, 7.3.3, 7.3.4		
Test Setup:	Spectrum Analyzer Multichannel Interference Generator Network Shielded Enclosure Companior Device Shielded Coaxial Cable		
Test Mode:	Transmitting mode		
Instruments Used:	Refer to section 5.0 for details		

Calculation of Monitoring Threshold Limit:

Monitoring Threshold (T) \leq -174 + 10 log₁₀ B + M + P_{max} - P_{EUT} dBm

Where =Measured Emission Bandwidth: 1.47x10⁶Hz В

- = 30 dB for Lower Monitoring Threshold (T_L), or Μ
 - = 50 dB for Upper Monitoring Threshold (T_{\cup})
- = 5 log₁₀ B 10 dBm P_{max}
- = Measured Peak Transmit Power: 20.8dBm PEUT

Monitoring Threshold Limits:

	FCC
Lower Monitoring Threshold ($T_L + U_M$) in dBm	-82.3
Upper Monitoring Threshold ($T_{U} + U_{M}$) in dBm	-62.3

NA - Not applicable



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Test Descriptions and Results: Worst case ANT1

Least Interfered Channel (LIC) Procedure Test, FCC 15.323(b), (c)(2) and (c)(5)

ANSI C63.17 clause 7.3.2 ref.	Observation	Results
b) f1 at TL + UM + 7 dB, f2 at TL + UM	Transmission always on f2	Pass
c) f1 at TL + UM, f2 at TL + UM +7 dB	Transmission always on f1	Pass
d) f1 at TL + UM + 1 dB, f2 at TL + UM - 6 dB	Transmission always on f2	Pass
e) f1 at TL + UM - 6 dB, f2 at TL + UM + 1 dB	Transmission always on f1	Pass

NA - Not applicable

Selected Channel Confirmation, FCC 15.323(c)(1) and (5)

ANSI C63.17 clause 7.3.3	Observation	Results
b) Shall not transmit on f1	EUT transmits on f2	Pass
d) Shall not transmit on f2	EUT transmits on f1	Pass



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Test Requirement:	47 CFR Part 15.323(c)(7)	
Test Method:	ANSI C63.17: 2013	
Limit:	The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission.	
Test Procedure:	Please refer to accordance with ANSI C63.17 Clause 7.4.1	
Test Setup:	Spectrum Analyzer Multichannel Interference Generator Shielded Enclosure Companio Device Shielded Coaxial Cable	
Test Mode:	Transmitting mode	
Instruments Used:	Refer to section 5.0 for details	

6.14 Threshold Monitoring Bandwidth

Test Results: Worst case ANT0

Test performed	Observation	Results
Simple Compliance test, at ±30% of B	N/A	N/A
More Detailed Test, at ±6 dB points	N/A	N/A
More Detailed Test, at ±12 dB points	N/A	N/A

NA - Not applicable

*Remarks: Detailed Compliance Test was used to show the compliance of the EUT.



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6.15 Reaction Time and Monitoring Interval

Test Requirement:	47 CFR Part 15.323(c) (1) (5) (7)
Test Method:	ANSI C63.17: 2013
Limit:	The maximum reaction time must be required to be less than 50 μ s.
	If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall not be required to be less than 35 μ s.
Test Procedure:	Please refer to accordance with ANSI C63.17 Clause 7.5
Test Setup:	Spectrum Analyzer Multichannel Interference Generator Shielded Enclosure Companio Device Shielded Coaxial Cable
Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.0 for details

Test Results: Worst case ANT0

Pulse Width, ref. to ANSI C63.17 clause 7.5	Observation	Results
c) > largest of 50 μs	EUT transmits on f1	Pass
d) > largest of 35 µs	EUT transmits on f1	Pass

Comment: Since B is larger than 1.25 MHz the test was performed with pulse lengths of 50 µs and 35 µs.



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6.16 Time and Spectrum Window Access Procedure

Test Requirement:	47 CFR Part 15.323(c) (4) (6)
Test Method:	ANSI C63.17: 2013
Limit:	Once access to specific combined time and spectrum windows is obtained an acknowledgment from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgments must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgment, at which time the access criteria must be repeated.
	If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same windows after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available.
Test Procedure:	Please refer to accordance with ANSI C63.17 Clause 8.1.1, 8.2.1; 8.1.2 or 8.1.3.
Test Setup:	Shielded Enclosure Companior Device Shielded Coaxial Cable
Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.0 for details



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Test results: Worst case ANT0

Access Criteria, ref. to ANSI C63.17 clause 8.1.1, 8.2.1	Observation	Results
 b) Check that the EUT transmits on the interference free time-slot 	EUT transmits on the interference free time-slot	Pass
 b) The EUT must terminate or pause in its repetitive transmission of the control and signalling channel on the open channel to repeat the access criteria not less frequently than every 30 s 	Transmission paused every 1.08 s	Pass

If FCC 15.323(c)(6) option, If Random Waiting Interval is NOT implemented

Access Criteria, ref. to ANSI C63.17 clause 8.1.2	Observation	Results
 b) Check that the EUT changes to an interference-free slot when interference is introduced on the time slot in use 	EUT changes to the interference-free time-slot, and stays there	Pass

If FCC 15.323(c)(6) option, Only if Random Waiting Interval is implemented

Access Criteria, ref. to ANSI C63.17 clause 8.1.3	Observation	Results
b-d) Check that the EUT uses random waiting interval before continuing transmission on an interfered time slot	N/A	N/A

Comment: The tested EUT does not support the Random Waiting Interval option.



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6.17 Acknowledgements and Transmission Duration

Test Requirement:	47 CFR Part 15.323(c) (3) (4)
Test Method:	ANSI C63.17: 2013
Limit:	Occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria.
	Once access to specific combined time and spectrum windows is obtained an acknowledgement from a system participant must be received by the initiating transmitter within one second or transmission must cease.
	Periodic acknowledgements must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgement, at which time the access criteria must be repeated.
Test Procedure:	Please refer to accordance with ANSI C63.17 Clause 8.2
Test Setup:	CMD60 Spliter SA
Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.0 for details



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Test results: Worst case ANT0

Acknowledgements

Timing for EUTs using control and signaling channel type transmissions:

Conditions	Transmission Duration (seconds)	Limit (seconds)	Results
Time needed to repeat access criteria	NA	30	Pass

Timing for EUTs using communications channel type transmissions:

Conditions	Transmission Duration (seconds)	Limit (seconds)	Results
Activate EUT w/ companion device off	NA	1	NA
Time needed to cease Traffic Channel	5.1	30	Pass

NA - Not applicable

Transmission Duration

Measured Maximum Transmission Duration	Limit	Results
(minutes)	(minutes)	
320	480	Pass



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6.18 Dual Access Criteria Check

Test Requirement:	47 CFR Part 15.323(c) (10)
Test Method:	ANSI C63.17: 2013
Limit:	An initiating device may attempt to establish a duplex connection by monitoring both its intended transmit and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device.
Test Procedure:	Please refer to accordance with ANSI C63.17 Clause 8.3
Test Setup:	CMD60 Spliter SA EUT
Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.0 for details

Test results: Worst case ANT0

EUTs that implements the LIC procedure:

Test ref. to ANSI C63.17 clause 8.3.2	Observation	Results
b) EUT is restricted to a single carrier f1 for TDMA systems. The Test is Pass if EUT can transmit	EUT can transmit	Pass
c) d) Transmission on interference-free receive time/spectrum window	EUT transmits on interference free receive slot	Pass
e) f) Transmission on interference-free transmit time/spectrum window	EUT transmits on interference free transmit slot	Pass



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6.19 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15.319(g), 15.209(a)						
Test Method:	ANSI C63.4: 2014						
Test Site:	Measurement Distance:	3m (Semi-Aneo	choic Chambe	r)			
Receiver Setup:	Frequency	Frequency Detector RBW VBW Remark					
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak		
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average		
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak		
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak		
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average		
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak		
	30MHz-960MHz	Quasi-peak	100 kHz	300kHz	Quasi-peak		
	Above 960MHz	RMS	1MHz	3MHz	RMS		
Limit:	$f \le 1.25$ MHz outside UPCS band : ≤ -9.5 dBm						
(Spurious Emissions)	1.25MHz ≤ f ≤ 2.5MHz outside UPCS band : ≤ -29.5dBm						
	$f \ge 2.5MHz$ outside UPC FCC Rule 15.319(g) whi	$CS band : \leq -39$ $ch shall not exc$	9.5dBm or sha ceed the limits	all meet the of FCC Rule	requirement of 15.209		



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	360 degrees to find the maximum reading.
	6) The test-receiver system was set to Peak Detect Function and Specified
	Bandwidth with Maximum Hold Mode.
	7) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
	 Test the EUT in the lowest channel, the middle channel, the Highest channel
	 The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.
	10) Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting mode
Final Test Mode:	Pretest the EUT at Transmitting mode and Charge +Transmitting mode, found the Charge +Transmitting mode which it is worse case
	Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.0 for details



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The requirement of FCC Rule 15.209: Test Data: Adapter 2 model: VT05UUS06040 Below 1GHz:

Mode:a; Polarization:Horizontal



Condition: 3m HORIZONTAL Job No. : 01228AT Test mode: a

2 .

	• •								
		Ant	Cable	Read		Limit	0ver		
	Freq	Factor	Loss	Level	Level	Line	Limit	Remark	
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	48.50	14.65	0.77	31.93	19.66	40.00	-20.34	QP	
2	56.20	13.56	0.80	28.18	14.86	40.00	-25.14	QP	
3	295.15	19.41	1.88	29.50	23.89	46.00	-22.11	QP	
4	524.55	25.13	2.63	26.21	26.05	46.00	-19.95	QP	
5	696.86	27.86	2.90	25.76	28.58	46.00	-17.42	QP	
6 pp	958.79	30.10	3.66	24.50	31.20	46.00	-14.80	QP	
								-	



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Mode:a; Polarization:Vertical



Condition:	3m VERTICAL
Job No. :	01228AT
Test mode:	а

		-
		· ·)
		_

	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Remark
-	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 2 nn	36.77 48.50	18.97 14.65	0.60	35.46	27.32	40.00	-12.68	QP OP
3	56.20	13.56	0.80	39.94	26.62	40.00	-13.38	QP QP
5 6	125.01 159.23	13.26 15.43	1.24	42.90	29.93 24.51	43.50 43.50	-13.57 -18.99	QP QP



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Above 1GHz: Worst case ANT0

Mode:a; Polarization:Horizontal



Site :	chamber
Condition:	3m HORIZONTAL
Job No :	01228AT\01229AT
Mode :	CH4

Note

le										
		Cable	Ant	Preamp	Read		Limit	0ver		
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark	
										_
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2782.060	3.87	29.99	41.12	47.79	40.53	74.00	-33.47	Peak	
2	3843.072	6.57	32.40	42.02	54.16	51.11	54.00	-2.89	Average	
3	3843.072	6.57	32.40	42.02	66.99	63.94	74.00	-10.06	Peak	
4	4930.721	7.05	34.12	42.85	48.69	47.01	74.00	-26.99	Peak	
5	5764.608	7.09	34.87	42.39	49.21	48.78	74.00	-25.22	Peak	
6	7686.144	8.61	36.45	41.34	46.42	50.14	74.00	-23.86	Peak	
7	10423.800	9.53	37.73	38.20	43.03	52.09	74.00	-21.91	Peak	



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Mode:a; Polarization:Vertical



Site :	chamber
Condition:	3m VERTICAL
Job No :	01228AT\01229AT
Mode :	CH4
Note :	

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2380.026	3.75	28.50	40.97	46.89	38.17	74.00	-35.83	Peak
2	3843.072	6.57	32.40	42.02	55.31	52.26	54.00	-1.74	Average
3	3843.072	6.57	32.40	42.02	69.42	66.37	74.00	-7.63	Peak
4	4776.419	6.70	33.94	42.75	48.39	46.28	74.00	-27.72	Peak
5	5764.608	7.09	34.87	42.39	50.50	50.07	74.00	-23.93	Peak
6	7686.144	8.61	36.45	41.34	46.65	50.37	74.00	-23.63	Peak
7	9021.160	9.21	37.22	39.48	44.37	51.32	74.00	-22.68	Peak



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Mode:a; Polarization:Horizontal



Site :	chamber
Condition:	3m HORIZONTAL
Job No :	01228AT\01229AT
Mode :	CH2
Note :	
	Cable Ant Decome

		Capte	Ant	Preamp	Kead		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2428.671	3.75	28.58	40.99	48.58	39.92	74.00	-34.08	Peak
2	3849.984	6.57	32.41	42.03	55.29	52.24	54.00	-1.76	Average
3	3849.984	6.57	32.41	42.03	70.02	66.97	74.00	-7.03	Peak
4	5002.497	6.98	34.20	42.90	49.56	47.84	74.00	-26.16	Peak
5	5774.976	7.04	34.88	42.38	50.17	49.71	74.00	-24.29	Peak
6	7699.968	8.61	36.46	41.34	46.43	50.16	74.00	-23.84	Peak
7	8969.161	8.88	37.19	39.56	46.69	53.20	74.00	-20.80	Peak



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Mode:a; Polarization:Vertical



Site :	chamber
Condition:	3m VERTICAL
Job No :	01228AT\01229AT
Mode :	CH2
Note :	

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2006.877	3.24	27.81	40.80	47.81	38.06	74.00	-35.94	Peak
2	3849.984	6.57	32.41	42.03	55.09	52.04	54.00	-1.96	Average
3	3849.984	6.57	32.41	42.03	67.42	64.37	74.00	-9.63	Peak
4	4916.490	7.07	34.10	42.84	48.33	46.66	74.00	-27.34	Peak
5	5774.976	7.04	34.88	42.38	48.99	48.53	74.00	-25.47	Peak
6	7699.968	8.61	36.46	41.34	47.36	51.09	74.00	-22.91	Peak
7	11269.860	9.63	37.85	38.59	43.86	52.75	74.00	-21.25	Peak



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Mode:a; Polarization:Horizontal



Site :	chamber
Condition:	3m HORIZONTAL
Job No :	01228AT\01229A1
Mode :	CHØ
Note :	

		Capte	Ant	Preamp	Kead		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2905.331	4.29	30.51	41.17	47.42	41.05	74.00	-32.95	Peak
2	3856.896	6.46	32.43	42.04	55.29	52.14	54.00	-1.86	Average
3	3856.896	6.46	32.43	42.04	67.92	64.77	74.00	-9.23	Peak
4	4930.721	7.05	34.12	42.85	48.79	47.11	74.00	-26.89	Peak
5	5785.344	7.04	34.89	42.37	47.86	47.42	74.00	-26.58	Peak
6	7713.792	8.61	36.47	41.33	45.55	49.30	74.00	-24.70	Peak
7	10126.820	9.80	37.85	38.06	43.29	52.88	74.00	-21.12	Peak



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Mode:a; Polarization:Vertical



Site :	chamber
Condition:	3m HORIZONTAL
Job No :	01228AT\01229AT
Mode :	CHØ
Note :	

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2393.824	3.66	28.52	40.97	46.84	38.05	74.00	-35.95	Peak
2	3856.896	6.46	32.43	42.04	55.88	52.73	54.00	-1.27	Average
3	3856.896	6.46	32.43	42.04	69.35	66.20	74.00	-7.80	Peak
4	4888.151	7.04	34.07	42.82	48.11	46.40	74.00	-27.60	Peak
5	5785.344	7.04	34.89	42.37	48.54	48.10	74.00	-25.90	Peak
6	7713.792	8.61	36.47	41.33	46.63	50.38	74.00	-23.62	Peak
7	9073.460	9.49	37.26	39.39	44.17	51.53	74.00	-22.47	Peak



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7 **Photographs**

7.1 **EUT Test Setup**

Please refer to setup photos.

7.2 EUT Constructional Details (EUT Photos)

Please refer to external and internal photos for details.

- End of the Report -



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