TEST REPORT

FCC ID: UB8-ECHO5 / IC: 6607A-ECHO5

Applicant : **Deliberant LLC**

Address : **138 Mountain Brook Dr Canton, GA 30115 United States**

Equipment under Test (EUT):

Name : Broadband Digital Transmission System
Model : DLB ECHO 5, DLB ECHO 5D

Standards : FCC PART 15, SUBPART C: 2013 (Section 15.247) /
IC RSS-210 ISSUE 8 with amendment June 2010

Report No. : CST-TCB140725045

Date of Test : August7- August 12, 2014

Date of Issue : August 13, 2014

Test Result :	**PASS ***

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

Authorized Signature

(Mark Zhu)
General Manager

The manufacture should ensure that all the products in series production are in conformity with the product sample detailed in this report.

If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of Shenzhen Certification Technology Service Co., Ltd. Or test done by Shenzhen Certification Technology Service Co., Ltd. Approvals in connection with, distribution or use of the product described in this report must be approved by Shenzhen Certification Technology Service Co., Ltd. Approvals in writing.

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Description **Page**

1 General Information

1.1 Description of Device (EUT)

Trade Name	:	N/A
EUT	:	Broadband Digital Transmission System
Model No.		DLB ECHO 5, DLB ECHO 5D
DIFF.	:	Models are electrically identical except the antenna, DLB ECHO 5 is product with 15dBi antenna ; DLB ECHO 5D is product with 27 or 24 dBi antenna
Antenna	:	Antenna configuration1: Unique MIMO Antenna [Panel antenna (2 antenna packaging inside)], directional gain is 15dBi (12dBi per transmission chain). Antenna configuration 2: Unique MIMO Antenna [Dish of diameter 65cm + Panel antenna], directional gain is 27 dBi. Antenna configuration 3: Unique MIMO Antenna [Dish of diameter 45cm+ Panel antenna], directional gain is 24 dBi
Operation Type	:	Fixed, Point to Point Operation.
Operation Frequency	:	IEEE 802.11a: 5745MHz-5825MHz IEEE 802.11n HT20: 5745MHz-5825MHz IEEE 802.11n HT40: 5755MHz-5795MHz
Channel number	:	EEE 802.11a 5.8GHz band :5Channels IEEE 802.11n HT20 5.8GHz band: 5 Channels IEEE 802.11n HT40 5.8GHz band: 2Channels
Modulation type	:	IEEE 802.11n :OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11a :OFDM(64QAM, 16QAM, QPSK, BPSK)
Power Supply	:	DC 24V Supply by POE adaptor with 120V/60Hz input
Adapter		Model No.:GRT-240050A, AY012E-ZF243
Applicant	:	Deliberant LLC
Address	:	138 Mountain Brook Dr Canton, GA 30115 United States
Manufacturer	:	Deliberant LLC
Address	:	138 Mountain Brook Dr Canton, GA 30115 United States

1.2 Description of Test Facility

Shenzhen Certification Technology Service Co., Ltd.
2F, Building B, East Area of Nanchang Second Industrial Zone,
Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China
FCC Registered No.:197647
IC Registered No.:8528B

2 EMC Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
3m Semi-Anechoic	ETS-LINDGREN	N/A	SEL0017	Nov. 16, 13	1Year
Spectrum analyzer	Agilent	E4443A	MY46185649	Oct. 31, 13	1Year
Receiver	R&S	ESCI	100492	Oct. 31, 13	1Year
Receiver	R&S	ESCI	101202	Oct. 31, 13	1Year
Bilog Antenna	Sunol	JB3	A121206	Mar.12, 14	1Year
Horn Antenna	EMCO	3115	640201028-06	Mar.12, 14	1Year
ETS Horn Antenna	ETS	3160	SEL0076	Mar.12, 14	1Year
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	Feb.20, 14	1Year
L.I.S.N.	SCHWARZBECK	NSLK8126	8126466	Oct. 31, 13	1Year
Cable	Resenberger	N/A	No.1	Oct. 31, 13	1Year
Cable	SCHWARZBECK	N/A	No.2	Oct. 31, 13	1Year
Cable	SCHWARZBECK	N/A	No.3	Oct. 31, 13	1Year
Power Meter	Anritsu	ML2487A	6K00001491	Oct. 31, 13	1Year
Power sensor	Anritsu	ML2491A	32516	Oct. 31, 13	1Year
Pre-amplifier	SCHWARZBECK	BBV9743	9743-019	Oct. 31, 13	1Year
Pre-amplifier	Quietek	AP-180C	CHM-0602012	Oct. 31, 13	1Year

3 Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The test procedure used was ANSI Standard C63.4-2003 using a 50 u H LISN. Both Lines were observed. The bandwidth of the receiver was 10kHz with an appropriate sweep speed. The ambient temperature of the EUT was 25℃with a humidity of 58%.

RADIATION INTERFERENCE: The test procedure used was ANSI Standard C63.4-2003 using a ANRITSU spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a micro volt at the output of the antenna. The resolution bandwidth was 100kHz and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3MHz above 1 GHz. The ambient temperature of the EUT was 25℃with a humidity of 58%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer and cable loss. The antenna correction factors and cable loss are stated in terms of dB. The gain of the Pre-selector was accounted for in the Spectrum Analyzer Meter Reading.
Example:
Freq (MHz) METER READING + ACF + CABLE = FS
33.20 dBuV + 10.36 dB + 0.9 dB= 44.46 dBuV/m @ 3m
ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSI Standard C63.4-2003 10.1.7 with the EUT 40 cm from the vertical ground wall.

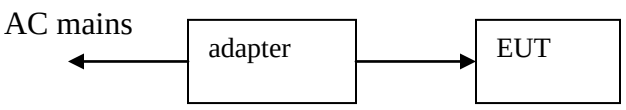
4 Summary of Measurement

4.1 Summary of test result

Test Item	Test Requirement	Standards Paragraph	Result
Spurious Emission	FCC PART 15 : 2013& IC RSS-210	Section 15.247&15.209 & A8	Compliance
Conduction Emission	FCC PART 15: 2013& IC RSS Gen	Section 15.207&7.2.4	Compliance
Bandwidth Test	FCC PART 15:2013& IC RSS-210 IC RSS Gen	Section 15.247& A8 & 4.6.1	Compliance
Peak Power	FCC PART 15:2013& IC RSS-210	Section 15.247& A8	Compliance
Power Density	FCC PART 15:2013& IC RSS-210	Section 15.247& A8	Compliance
Band Edge	FCC PART 15:2013& IC RSS-210	Section 15.247& A8	Compliance
Antenna Requirement	FCC PART 15 : 2013& IC RSS Gen	Section 15.203&7.1.4	Compliance

Note: The EUT has been tested as an independent unit. And Continual Transmitting in maximum power (The adapter be used during Test)

4.2 Test connection



4.3 Assistant equipment used for test

Description	:	Adapter
Manufacturer	:	N/A
Model No.	:	GRT-240050A, AY012E-ZF243

4.4 Test mode

Dutycycle :100% Keeping MIMO TX mode			
Mode	data rate (Mpbs)(see Note)	Channel	Frequency (MHz)
IEEE 802.11 n/HT20 with 5.8G	6.5	CH149	5745
	6.5	CH157	5785
	6.5	CH165	5825
IEEE 802.11 n/HT40 with 5.8G	13.5	CH151	5755
	13.5	CH159	5795
IEEE 802.11a with 5.8G	6	CH149	5745
	6	CH157	5785
	6	CH165	5825
Note: According exploratory test, EUT will have maximum output power in those data rate, those data rate were used for all test.			

4.5 Channel list

For IEEE 802.11 a with 5.8G					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
CH149	5745	CH157	5785	CH165	5825
CH153	5765	CH161	5805		

For IEEE 802.11n/HT20 with 5.8G					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
CH149	5745	CH157	5785	CH165	5825
CH153	5765	CH161	5805		

For IEEE 802.11n/HT40 with 5.8G					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
CH151	5755	CH159	5795		

4.6 Test Conditions

Temperature range	21-25℃
Humidity range	40-75%
Pressure range	86-106kPa

4.7 Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB	Polarize: V
	2.57dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	1×10-9	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2℃	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

5 Spurious Emission

5.1 Radiation Emission

5.1.1 Radiation Emission Limits(15.209)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

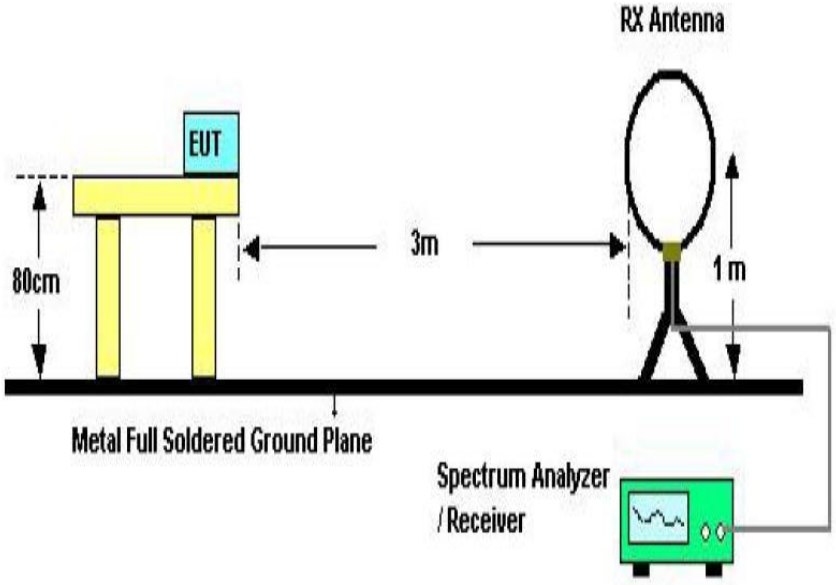
Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

NOTE:

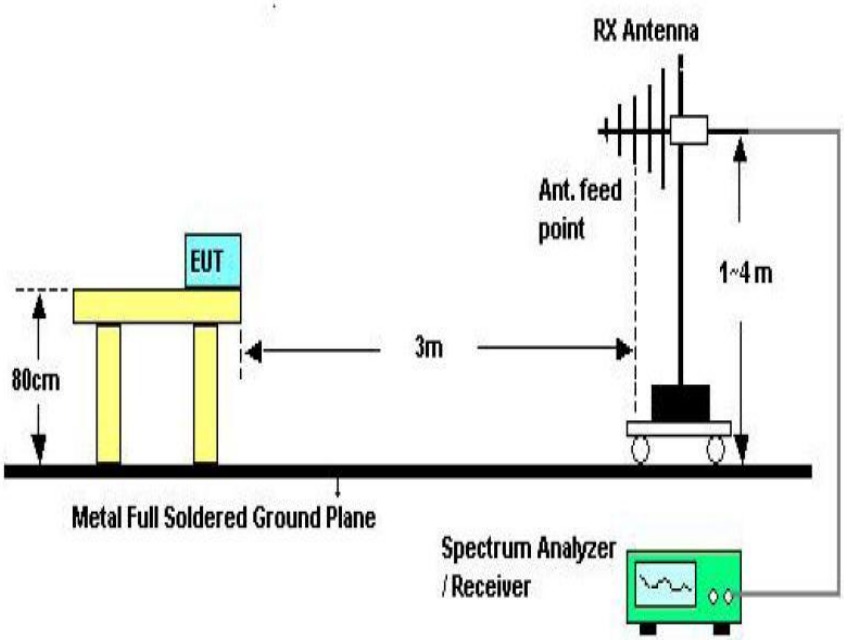
a) The tighter limit applies at the band edges.
b) Emission Level (dB uV/m)=20log Emission Level (uV/m)

5.1.2 Test Setup

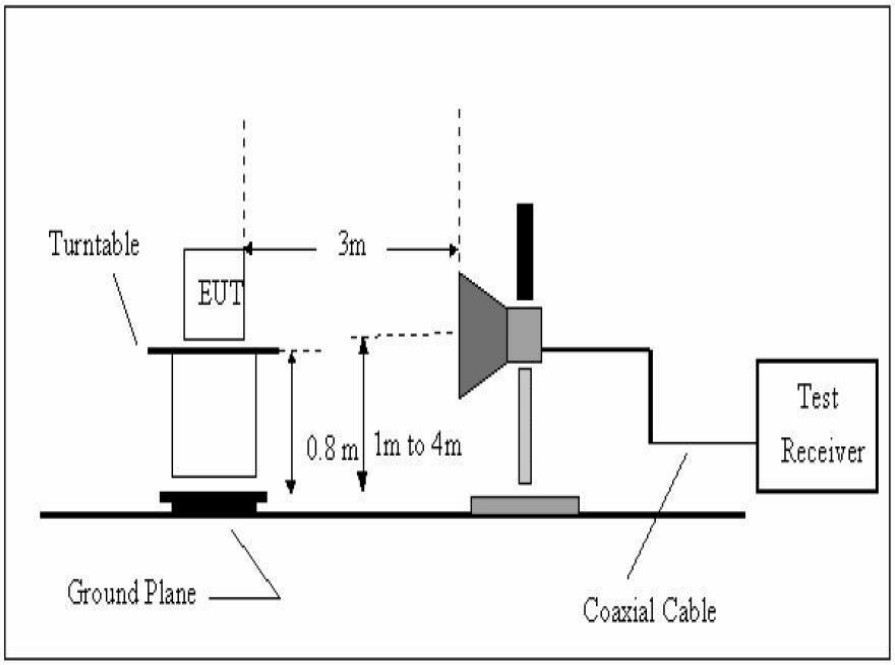
See the next page



Below 30MHz Test Setup



Above 30MHz Test Setup



Above 1GHz Test Setup

5.1.3 Test Procedure

a) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground, The table was rotated 360 degrees to determine the position of the highest radiation
b) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set of make measurement.
c) The initial step in collecting conducted emission data is a spectrum analyzer Peak detector mode pre-scanning the measurement frequency range. Significant Peaks are then marked. and then OP Detector mode premeasured
d) If Peak value comply with QP limit Below 1GHz.The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.
e) For the actual test configuration, please see the test setup photo.

5.1.4 Test Equipment Setting For emission test Result

9KHz~150KHz	RBW 200Hz	VBW1KHz
150KHz~30MHz	RBW 9KHz	VBW 30KHz
30MHZ~1GHz	RBW 120KHz	VBW 300KHz
Above 1GHz	RBW 1MHz	VBW 3MHz

5.1.5 Test Condition

MIMO Continual Transmitting in maximum power.

5.1.6 Test Result

We have scanned the 9KHz from 25GHz to the EUT.
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
All three antenna configurations were tested and reported.

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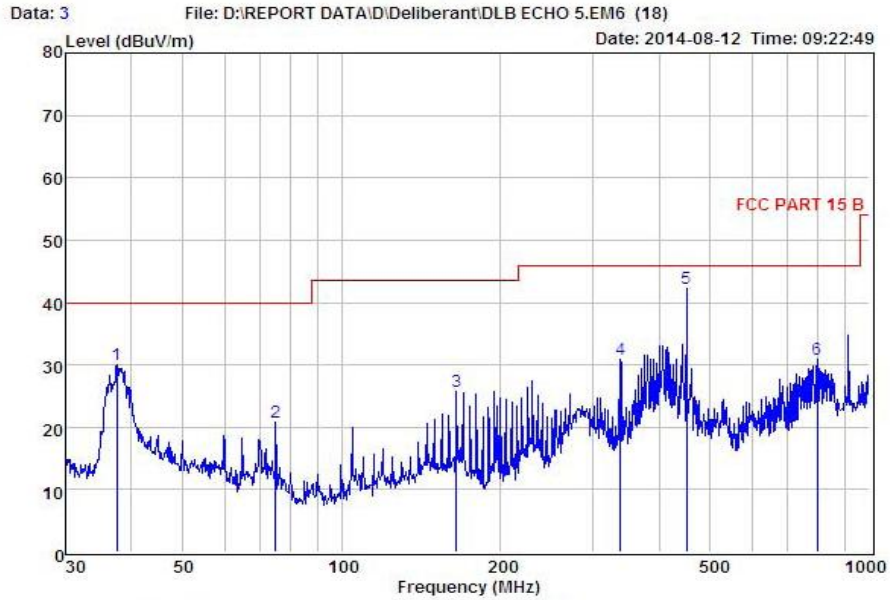

Condition : FCC PART 15 B 3m POL: HORIZONTAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode :
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 25.2°C
Hum : 56%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	37.55	42.02	13.73	25.74	0.08	30.09	40.00	-9.91	Peak
2	74.92	37.49	9.90	26.78	0.25	20.86	40.00	-19.14	Peak
3	164.91	38.55	13.76	26.91	0.42	25.82	43.50	-17.68	Peak
4	337.22	40.89	13.61	24.25	0.71	30.96	46.00	-15.04	Peak
5	451.14	49.75	15.99	24.50	1.08	42.32	46.00	-3.68	Peak
6	796.18	34.43	20.68	25.66	1.40	30.85	46.00	-15.15	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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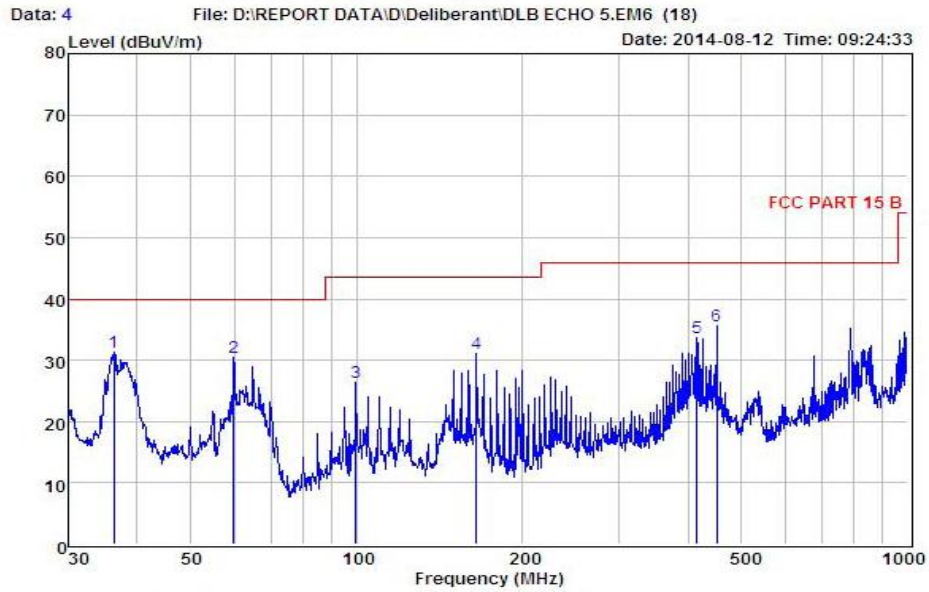


Condition : FCC PART 15 B 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode :
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 25.2°C
Hum : 56%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	36.25	43.51	13.39	25.66	0.11	31.35	40.00	-8.65	Peak
2	59.86	45.43	12.75	27.87	0.24	30.55	40.00	-9.45	Peak
3	99.88	42.64	10.15	26.84	0.46	26.41	43.50	-17.09	Peak
4	164.91	43.81	13.76	26.91	0.42	31.08	43.50	-12.42	Peak
5	414.72	42.13	15.08	24.44	0.84	33.61	46.00	-12.39	Peak
6	451.14	43.05	15.99	24.50	1.08	35.62	46.00	-10.38	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

From 1G-40GHz with 15dBi configuration:
IEEE 802.11a with 5.8G

EUT	Broadband Digital Transmission System	**Model Name**	DLB ECHO 5
Temperature	26°C	**Relative Humidity**	56%
Pressure	960hPa	**Test voltage**	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	V	37.88	---	2.36	40.24	---	74.00	54.00	-33.76	Peak
17235	V	37.30	---	4.52	41.82	---	74.00	54.00	-32.18	Peak
N/A										

EUT	Broadband Digital Transmission System	**Model Name**	DLB ECHO 5
Temperature	26°C	**Relative Humidity**	56%
Pressure	960hPa	**Test voltage**	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	H	37.32	---	2.36	39.68	---	74.00	54.00	-34.32	Peak
17235	H	37.31	---	4.52	41.83	---	74.00	54.00	-32.17	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	V	37.96	---	2.36	40.32	---	74.00	54.00	-33.68	Peak
17355	V	36.63	---	4.52	41.15	---	74.00	54.00	-32.85	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	H	38.57	---	2.36	40.93	---	74.00	54.00	-33.07	Peak
17355	H	36.84	---	4.52	41.36	---	74.00	54.00	-32.64	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	V	37.51	---	2.36	39.87	---	74.00	54.00	-34.13	Peak
17475	V	37.63	---	4.52	42.15	---	74.00	54.00	-31.85	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	H	38.48	---	2.36	40.84	---	74.00	54.00	-33.16	Peak
17475	H	35.15	---	4.52	39.67	---	74.00	54.00	-34.33	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

IEEE 802.11n/HT20 with 5.8G

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	V	38.75	---	2.36	41.11	---	74.00	54.00	-32.89	Peak
17235	V	37.80	---	4.52	42.32	---	74.00	54.00	-31.68	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	H	38.96	---	2.36	41.32	---	74.00	54.00	-32.68	Peak
17235	H	36.04	---	4.52	40.56	---	74.00	54.00	-33.44	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	V	38.56	---	2.36	40.92	---	74.00	54.00	-33.08	Peak
17355	V	35.22	---	4.52	39.74	---	74.00	54.00	-34.26	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	H	36.71	---	2.36	39.07	---	74.00	54.00	-34.93	Peak
17355	H	36.67	---	4.52	41.19	---	74.00	54.00	-32.81	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	V	38.05	---	2.36	40.41	---	74.00	54.00	-33.59	Peak
17475	V	35.66	---	4.52	40.18	---	74.00	54.00	-33.82	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	H	37.12	---	2.36	39.48	---	74.00	54.00	-34.52	Peak
17475	H	36.29	---	4.52	40.81	---	74.00	54.00	-33.19	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

IEEE 802.11n/HT40 with 5.8G

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11510	V	37.56	---	2.36	39.92	---	74.00	54.00	-34.08	Peak
17265	V	36.21	---	4.52	40.73	---	74.00	54.00	-33.27	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11510	H	37.88	---	2.36	40.24	---	74.00	54.00	-33.76	Peak
17265	H	36.89	---	4.52	41.41	---	74.00	54.00	-32.59	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11590	V	37.47	---	2.36	39.83	---	74.00	54.00	-34.17	Peak
17385	V	35.82	---	4.52	40.34	---	74.00	54.00	-33.66	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11590	H	37.37	---	2.36	39.73	---	74.00	54.00	-34.27	Peak
17385	H	36.30	---	4.52	40.82	---	74.00	54.00	-33.18	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

From 1G-40GHz with 27dBi antenna configuration:
IEEE 802.11a with 5.8G

EUT	Broadband Digital Transmission System	**Model Name**	DLB ECHO 5D
Temperature	26°C	**Relative Humidity**	56%
Pressure	960hPa	**Test voltage**	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	V	37.58	---	2.36	39.94	---	74	54	34.06	Peak
17235	V	36.5	---	4.52	41.02	---	74	54	32.98	Peak
N/A										

EUT	Broadband Digital Transmission System	**Model Name**	DLB ECHO 5D
Temperature	26°C	**Relative Humidity**	56%
Pressure	960hPa	**Test voltage**	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	H	37.15	---	2.36	39.51	---	74	54	34.49	Peak
17235	H	36.48	---	4.52	41.00	---	74	54	33.00	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	V	37.85	---	2.36	40.21	---	74	54	33.79	Peak
17355	V	36.89	---	4.52	41.41	---	74	54	32.59	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	H	38.71	---	2.36	41.07	---	74	54	32.93	Peak
17355	H	35.62	---	4.52	40.14	---	74	54	33.86	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	V	37.26	---	2.36	39.62	---	74	54	34.38	Peak
17475	V	37.32	---	4.52	41.84	---	74	54	32.16	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	H	38.12	---	2.36	40.48	---	74	54	33.52	Peak
17475	H	36.03	---	4.52	40.55	---	74	54	33.45	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

IEEE 802.11n/HT20 with 5.8G

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	V	37.65	---	2.36	40.01	---	74	54	33.99	Peak
17235	V	37.12	---	4.52	41.64	---	74	54	32.36	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	H	38.12	---	2.36	40.48	---	74	54	33.52	Peak
17235	H	36.32	---	4.52	40.84	---	74	54	33.16	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	V	37.56	---	2.36	39.92	---	74	54	34.08	Peak
17355	V	35.41	---	4.52	39.93	---	74	54	34.07	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	H	37.12	---	2.36	39.48	---	74	54	34.52	Peak
17355	H	36.71	---	4.52	41.23	---	74	54	32.77	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	V	37.65	---	2.36	40.01	---	74	54	33.99	Peak
17475	V	36.15	---	4.52	40.67	---	74	54	33.33	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	H	36.85	---	2.36	39.21	---	74	54	34.79	Peak
17475	H	35.79	---	4.52	40.31	---	74	54	33.69	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

IEEE 802.11n/HT40 with 5.8G

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11510	V	37.59	---	2.36	39.95	---	74	54	34.05	Peak
17265	V	36.03	---	4.52	40.55	---	74	54	33.45	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11510	H	37.52	---	2.36	39.88	---	74	54	34.12	Peak
17265	H	36.78	---	4.52	41.30	---	74	54	32.70	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11590	V	37.26	---	2.36	39.62	---	74	54	34.38	Peak
17385	V	35.91	---	4.52	40.43	---	74	54	33.57	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5D
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11590	H	37.13	---	2.36	39.49	---	74	54	34.51	Peak
17385	H	36.26	---	4.52	40.78	---	74	54	33.22	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

From 1G-40GHz with 24dBi antenna configuration:
IEEE 802.11a with 5.8G

EUT	Broadband Digital Transmission System	**Model Name**	DLB ECHO 5
Temperature	26°C	**Relative Humidity**	56%
Pressure	960hPa	**Test voltage**	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	V	37.12	---	2.36	39.48	---	74	54	34.52	Peak
17235	V	36.29	---	4.52	40.81	---	74	54	33.19	Peak
N/A										

EUT	Broadband Digital Transmission System	**Model Name**	DLB ECHO 5
Temperature	26°C	**Relative Humidity**	56%
Pressure	960hPa	**Test voltage**	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	H	37.15	---	2.36	39.51	---	74	54	34.49	Peak
17235	H	36.29	---	4.52	40.81	---	74	54	33.19	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	V	36.75	---	2.36	39.11	---	74	54	34.89	Peak
17355	V	36.13	---	4.52	40.65	---	74	54	33.35	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	H	37.65	---	2.36	40.01	---	74	54	33.99	Peak
17355	H	35.03	---	4.52	39.55	---	74	54	34.45	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	V	36.85	---	2.36	39.21	---	74	54	34.79	Peak
17475	V	36.46	---	4.52	40.98	---	74	54	33.02	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	H	37.85	---	2.36	40.21	---	74	54	33.79	Peak
17475	H	36.14	---	4.52	40.66	---	74	54	33.34	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

IEEE 802.11n/HT20 with 5.8G

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	V	37.06	---	2.36	39.42	---	74	54	34.58	Peak
17235	V	36.75	---	4.52	41.27	---	74	54	32.73	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11490	H	37.62	---	2.36	39.98	---	74	54	34.02	Peak
17235	H	35.89	---	4.52	40.41	---	74	54	33.59	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	V	37.12	---	2.36	39.48	---	74	54	34.52	Peak
17355	V	36.03	---	4.52	40.55	---	74	54	33.45	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Mid		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11570	H	36.85	---	2.36	39.21	---	74	54	34.79	Peak
17355	H	36.73	---	4.52	41.25	---	74	54	32.75	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	V	37.15	---	2.36	39.51	---	74	54	34.49	Peak
17475	V	36.35	---	4.52	40.87	---	74	54	33.13	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11650	H	36.79	---	2.36	39.15	---	74	54	34.85	Peak
17475	H	36.23	---	4.52	40.75	---	74	54	33.25	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

IEEE 802.11n/HT40 with 5.8G

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11510	V	37.23	---	2.36	39.59	---	74	54	34.41	Peak
17265	V	36.39	---	4.52	40.91	---	74	54	33.09	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX Low		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11510	H	37.15	---	2.36	39.51	---	74	54	34.49	Peak
17265	H	36.41	---	4.52	40.93	---	74	54	33.07	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11590	V	37.15	---	2.36	39.51	---	74	54	34.49	Peak
17385	V	36.32	---	4.52	40.84	---	74	54	33.16	Peak
N/A										

EUT	Broadband Digital Transmission System	Model Name	DLB ECHO 5
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	DC 24V From adapter
Test Mode	MIMO TX High		

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11590	H	37.03	---	2.36	39.39	---	74	54	34.61	Peak
17385	H	36.37	---	4.52	40.89	---	74	54	33.11	Peak
N/A										

Notes: AV Means AV detector test data, Peak Means Peak detector test data.
Emissions attenuated more than 20 dB below the permissible value are not reported.

6 POWER LINE CONDUCTED EMISSION

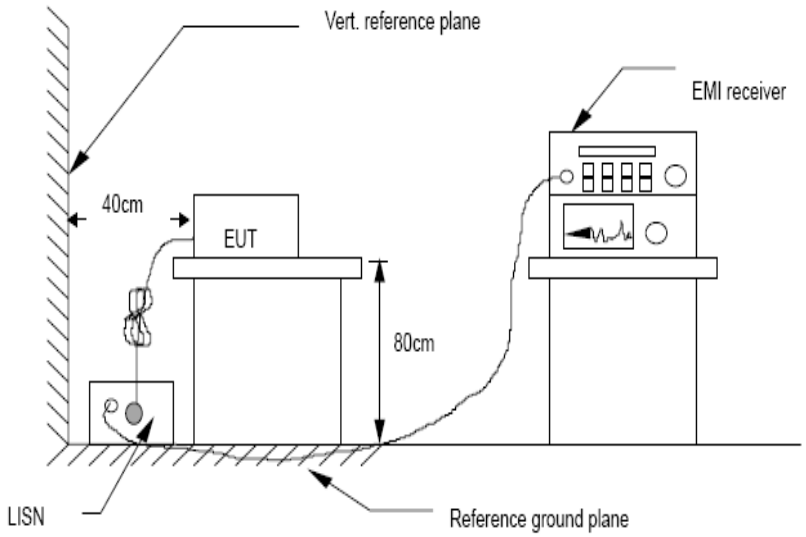
6.1 Conducted Emission Limits(15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3. The limit decreases in line with the logarithm of the frequency in the rang of 0.15 to 0.50 MHz.

6.2 Test Setup



6.3 Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4-2003 on Conducted Emission Measurement.
The bandwidth of test receiver (R & S ESCDLB ECHO 50) is set at 9 kHz.

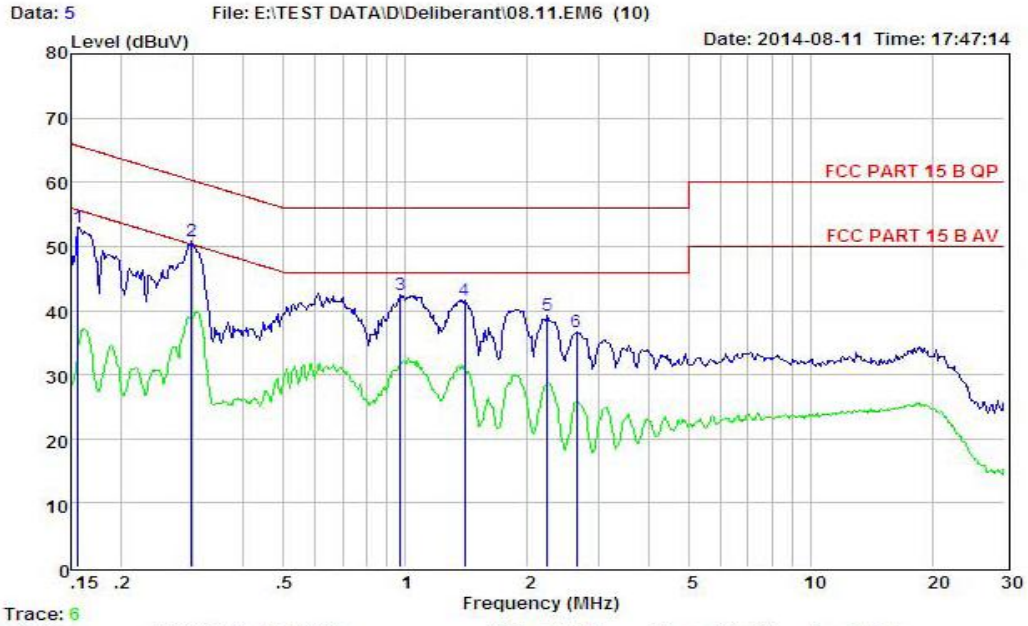
6.4 Test Results

MIMO TX MODE

PASS

Detailed information please refer to the following page.

Shenzhen Certification Technology Service Co., Ltd.
2F, Building B, East Area of Nanchang Second Industrial Zone,
Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China
Tel: 4006786199 Fax: +86-755-26736857
Website: http://www.cessz.com Email:Service@cessz.com

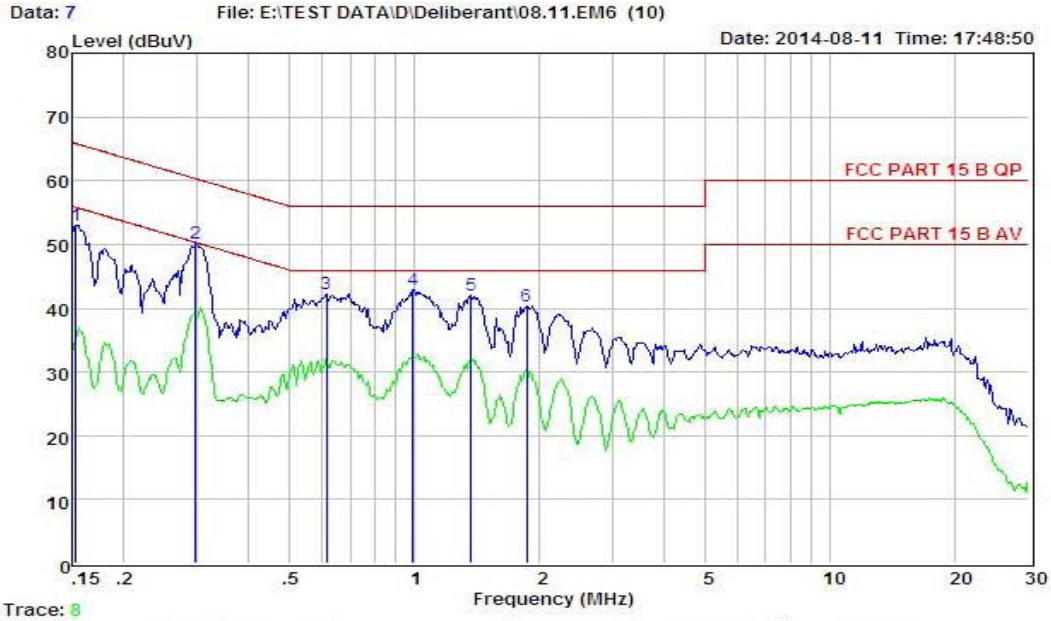


Condition : FCC PART 15 B QP POL: LINE Temp:24 ℃ Hum:56 %
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : TX
Power : AC 120V/60Hz
Test Engineer:
Remark :

Item	Freq	Read	LISN Factor	Preamp Factor	Cable Lose	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	0.156	43.04	0.03	-9.72	0.10	52.89	65.65	-12.76	Peak
2	0.297	40.96	0.03	-9.72	0.10	50.81	60.32	-9.51	Peak
3	0.974	32.58	0.04	-9.71	0.10	42.43	56.00	-13.57	Peak
4	1.403	31.84	0.05	-9.71	0.10	41.70	56.00	-14.30	Peak
5	2.237	29.37	0.06	-9.70	0.10	39.23	56.00	-16.77	Peak
6	2.650	26.82	0.06	-9.70	0.11	36.69	56.00	-19.31	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

Shenzhen Certification Technology Service Co., Ltd.
2F, Building B, East Area of Nanchang Second Industrial Zone
Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. Chi
Tel: 4006786199 Fax: +86-755-26736857
Website: http://www.cessz.com Email:Service@cessz.com



Condition : FCC PART 15 B QP POL: NEUTRAL Temp:24 ℃ Hum:56 %
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : TX
Power : AC 120V/60Hz
Test Engineer:
Remark :

Item	Freq	Read	LISN Factor	Preamp Factor	Cable Lose	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	0.153	43.16	0.03	-9.72	0.10	53.01	65.82	-12.81	Peak
2	0.297	40.41	0.03	-9.72	0.10	50.26	60.32	-10.06	Peak
3	0.614	32.37	0.03	-9.72	0.10	42.22	56.00	-13.78	Peak
4	0.989	33.13	0.04	-9.71	0.10	42.98	56.00	-13.02	Peak
5	1.367	32.13	0.05	-9.71	0.10	41.99	56.00	-14.01	Peak
6	1.858	30.53	0.05	-9.70	0.10	40.38	56.00	-15.62	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

7 Conducted Maximum Output Power

7.1 Test limit

Please refer section15.247.

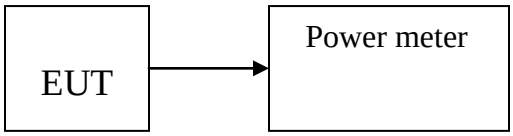
Regulation 15.247(b) the limit of Maximum Peak Output Power Measurement is 1W (30dBm)

7.2 Test Procedure

Details see the KDB 558074 D01 DTS Meas Guidance v03r02

7.2.1 Place the EUT on the table and set it in transmitting mode.
7.2.2 Connected the EUT's antenna port to peak power meter by 20dB attenuator.
7.2.3 Measure out each mode and each bands peak output power of EUT.
Note: The cable loss and attenuator loss were offset into measure device as amplitude offset. Details see the KDB 558074 D01 DTS Meas Guidance v03r02.

7.3 Test Setup



7.4 Test Results

PASS

Detailed information please see the following page.

15 dBi antenna configuration:

EUT: Broadband Digital Transmission System		M/N: DLB ECHO 5		
Test date: 2014-08-12	Test site: RF site		Tested by: Simple Guan	
Mode	Frequency (MHz)	PK Output power (dBm)	Limit (dBm)	Margin (dB)
IEEE 802.11 a with 5.8G	CH149:5745	24.84	30	5.16
	CH157:5785	25.06	30	4.94
	CH165:5825	24.79	30	5.21
IEEE 802.11 n/HT20 with 5.8G	CH149:5745	24.95	30	5.05
	CH157:5785	25.36	30	4.64
	CH165:5825	25.01	30	4.99
IEEE 802.11 n/HT40 with 5.8G	CH151:5755	25.39	30	4.61
	CH159:5795	25.26	30	4.74
Note: This test with port 0 antenna.				
Conclusion: PASS				

EUT: Broadband Digital Transmission System		M/N: DLB ECHO 5		
Test date: 2014-08-12	Test site: RF site		Tested by: Simple Guan	
Mode	Frequency (MHz)	PK Output power (dBm)	Limit (dBm)	Margin (dB)
IEEE 802.11 a with 5.8G	CH149:5745	24.96	30	5.04
	CH157:5785	25.23	30	4.77
	CH165:5825	24.86	30	5.14
IEEE 802.11 n/HT20 with 5.8G	CH149:5745	24.99	30	5.01
	CH157:5785	25.53	30	4.47
	CH165:5825	25.24	30	4.76
IEEE 802.11 n/HT40 with 5.8G	CH151:5755	25.57	30	4.43
	CH159:5795	25.76	30	4.24
Note: This test with port 1 antenna.				
Conclusion: PASS				

EUT: Broadband Digital Transmission System		M/N: DLB ECHO 5		
Test date: 2014-08-12	Test site: RF site		Tested by: Simple Guan	
Mode	Frequency (MHz)	PK Output power (dBm)	Limit (dBm)	Margin (dB)
IEEE 802.11 a with 5.8G	CH149:5745	27.91	30	2.09
	CH157:5785	28.16	30	1.84
	CH165:5825	27.84	30	2.16
IEEE 802.11 n/HT20 with 5.8G	CH149:5745	27.98	30	2.02
	CH157:5785	28.46	30	1.54
	CH165:5825	28.14	30	1.86
IEEE 802.11 n/HT40 with 5.8G	CH151:5755	28.49	30	1.51
	CH159:5795	28.53	30	1.47
Note: 1 This result is sum of power with port 0 and port 1 antenna. 2 According to KDB 662911, Result power = $10\log(10^{ant0/10}+10^{ant1/10})$ 3 Result unit: W, The end PK Output power result is converted to units of dBm				
Conclusion: PASS				

27dBi and 24dBi antenna configurations:

EUT: Broadband Digital Transmission System		M/N: DLB ECHO 5D		
Test date: 2014-08-12	Test site: RF site		Tested by: Simple Guan	
Mode	Frequency (MHz)	PK Output power (dBm)	Limit (dBm)	Margin (dB)
IEEE 802.11 a with 5.8G	CH149:5745	19.74	30	10.26
	CH157:5785	19.86	30	10.14
	CH165:5825	19.29	30	10.71
IEEE 802.11 n/HT20 with 5.8G	CH149:5745	19.25	30	10.75
	CH157:5785	19.66	30	10.34
	CH165:5825	19.11	30	10.89
IEEE 802.11 n/HT40 with 5.8G	CH151:5755	19.39	30	10.61
	CH159:5795	19.26	30	10.74
Note: This test with port 0 antenna.				
Conclusion: PASS				

EUT: Broadband Digital Transmission System		M/N: DLB ECHO 5D		
Test date: 2014-08-12	Test site: RF site		Tested by: Simple Guan	
Mode	Frequency (MHz)	PK Output power (dBm)	Limit (dBm)	Margin (dB)
IEEE 802.11 a with 5.8G	CH149:5745	17.96	30	12.04
	CH157:5785	18.23	30	11.77
	CH165:5825	17.86	30	12.14
IEEE 802.11 n/HT20 with 5.8G	CH149:5745	17.99	30	12.01
	CH157:5785	18.53	30	11.47
	CH165:5825	18.24	30	11.76
IEEE 802.11 n/HT40 with 5.8G	CH151:5755	18.57	30	11.43
	CH159:5795	18.76	30	11.24
Note: This test with port 1 antenna.				
Conclusion: PASS				

EUT: Broadband Digital Transmission System		M/N: DLB ECHO 5D		
Test date: 2014-08-12	Test site: RF site		Tested by: Simple Guan	
Mode	Frequency (MHz)	PK Output power (dBm)	Limit (dBm)	Margin (dB)
IEEE 802.11 a with 5.8G	CH149:5745	21.95	30	8.05
	CH157:5785	22.13	30	7.87
	CH165:5825	21.64	30	8.36
IEEE 802.11 n/HT20 with 5.8G	CH149:5745	21.68	30	8.32
	CH157:5785	22.14	30	7.86
	CH165:5825	21.71	30	8.29
IEEE 802.11 n/HT40 with 5.8G	CH151:5755	22.01	30	7.99
	CH159:5795	22.03	30	7.97
Note: 1 This result of sum of power with port 0 and port 1 antenna. 2 According to KDB 662911, Result power = $10\log(10^{ant0/10}+10^{ant1/10})$ 3 Result unit: W, The end PK Output power result is converted to units of dBm				
Conclusion: PASS				

8 PEAK POWER SPECTRAL DENSITY

8.1 Test limit

8.1.1 Please refer section15.247.

8.1.2 For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

8.1.3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

8.2 Method of measurement

Details see the KDB 558074 D01 DTS Meas Guidance v03r02

8.2.1 Place the EUT on the table and set it in transmitting mode.

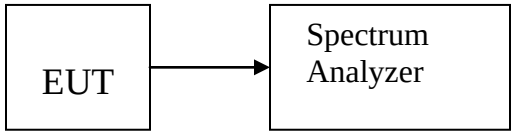
8.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

8.2.3 Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, span=5-30%EBW, detail see the test plot.

8.2.4 Record the max reading.

8.2.5 Repeat the above procedure until the measurements for all frequencies are completed.

8.3 Test Setup



8.4 Test Results

PASS.

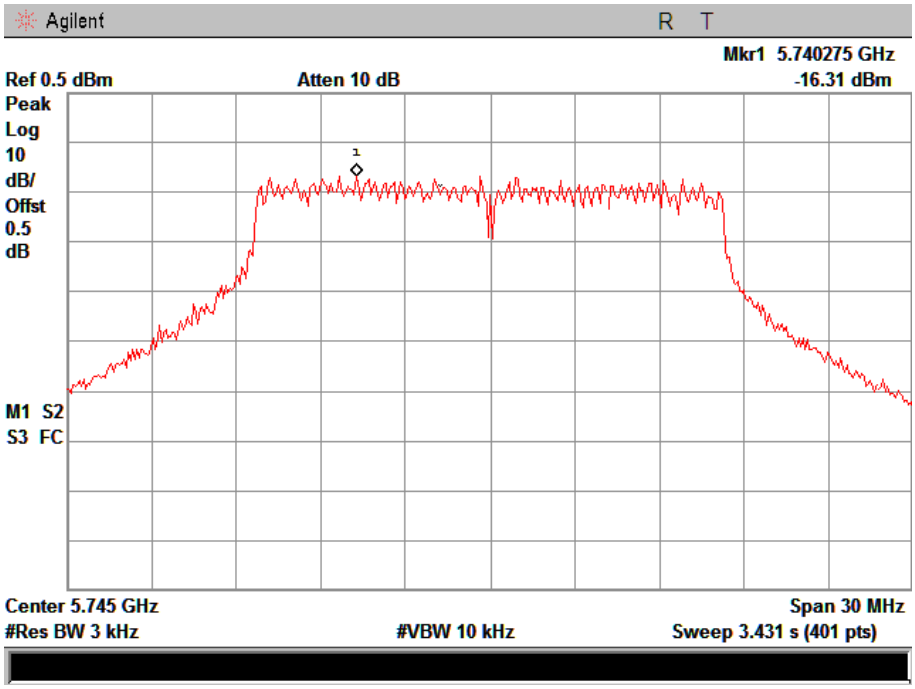
Maximum output power for 15 dBi antenna configuration set up was used for PSD test:

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
IEEE 802.11 a with 5.8G:				
Low	5745	-16.31	8	PASS
Mid	5785	-16.24	8	PASS
High	5825	-16.50	8	PASS
IEEE 802.11 n/HT40 with 5.8G:				
Low	5745	-16.33	8	PASS
Mid	5785	-16.88	8	PASS
High	5825	-17.82	8	PASS
IEEE 802.11 n/HT40 with 5.8G:				
Low	5755	-18.39	8	PASS
High	5795	-19.75	8	PASS
Note: This test with port 0 antenna.				

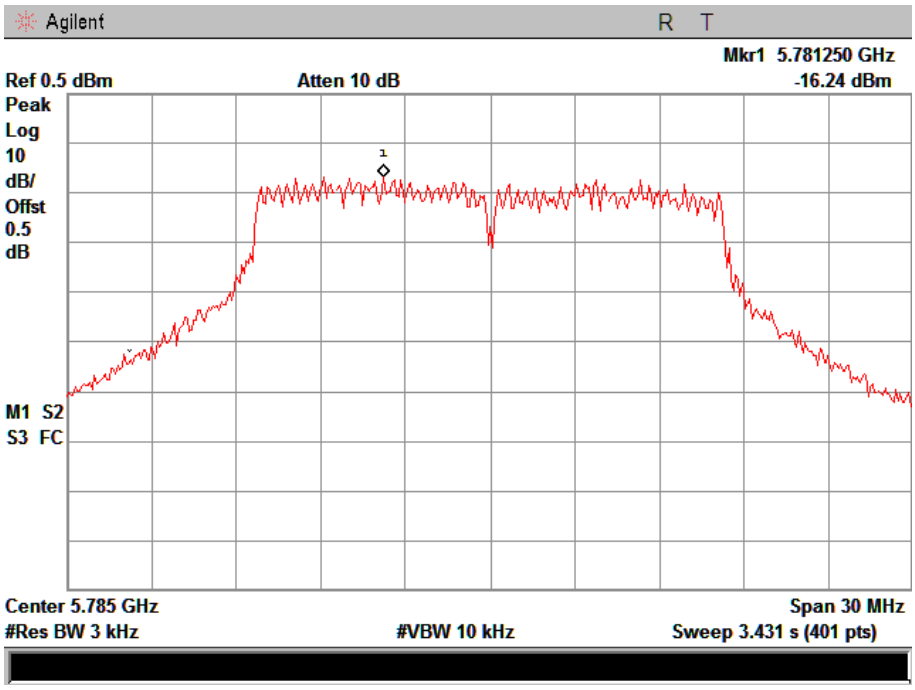
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
IEEE 802.11 a with 5.8G:				
Low	5745	-16.64	8	PASS
Mid	5785	-16.66	8	PASS
High	5825	-16.74	8	PASS
IEEE 802.11 n/HT40 with 5.8G:				
Low	5745	-16.52	8	PASS
Mid	5785	-16.70	8	PASS
High	5825	-17.62	8	PASS
IEEE 802.11 n/HT40 with 5.8G:				
Low	5755	-19.88	8	PASS
High	5795	-18.88	8	PASS
Note: This test with port 1 antenna.				

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
IEEE 802.11 a with 5.8G:				
Low	5745	-13.46	8	PASS
Mid	5785	-13.43	8	PASS
High	5825	-13.61	8	PASS
IEEE 802.11 n/HT40 with 5.8G:				
Low	5745	-13.41	8	PASS
Mid	5785	-13.78	8	PASS
High	5825	-14.71	8	PASS
IEEE 802.11 n/HT40 with 5.8G:				
Low	5755	-16.06	8	PASS
High	5795	-16.28	8	PASS
Note: 1 This result is sum of PSD with port 0 and port 1 antenna. 2 According to KDB 662911, Result power = $10\log(10^{ant0/10}+10^{ant1/10})$ 3 Result unit: W, The end PK Output power result is converted to units of dBm.				

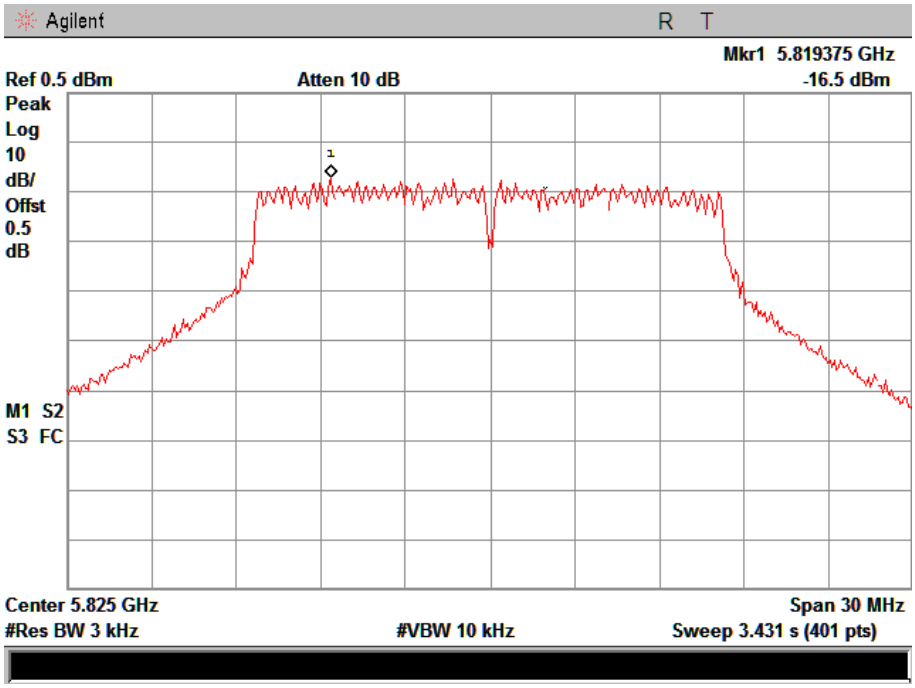
Port 0antenna
IEEE 802.11a
CH Low:



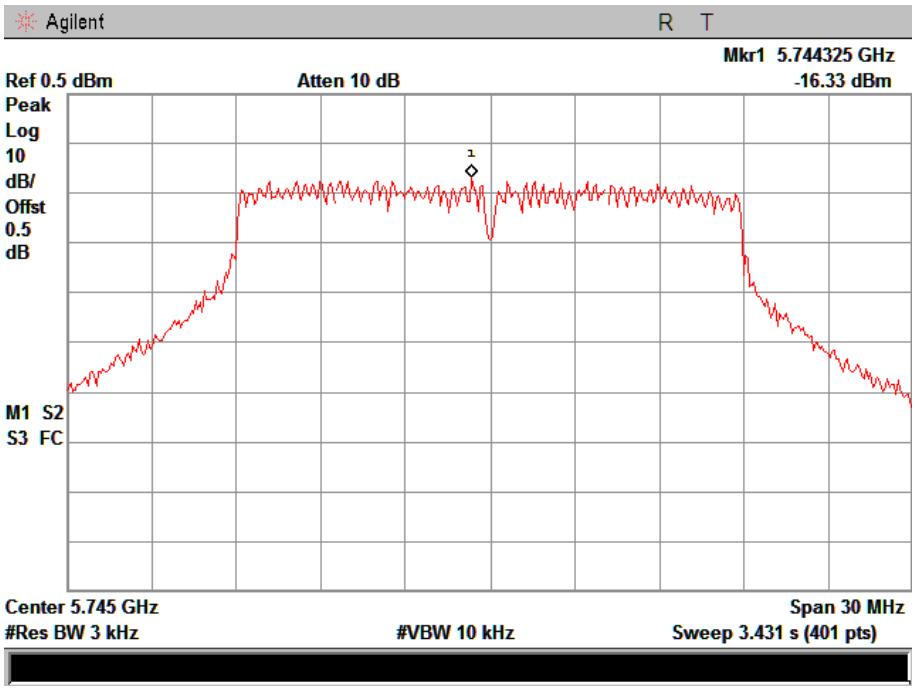
CH Mid:



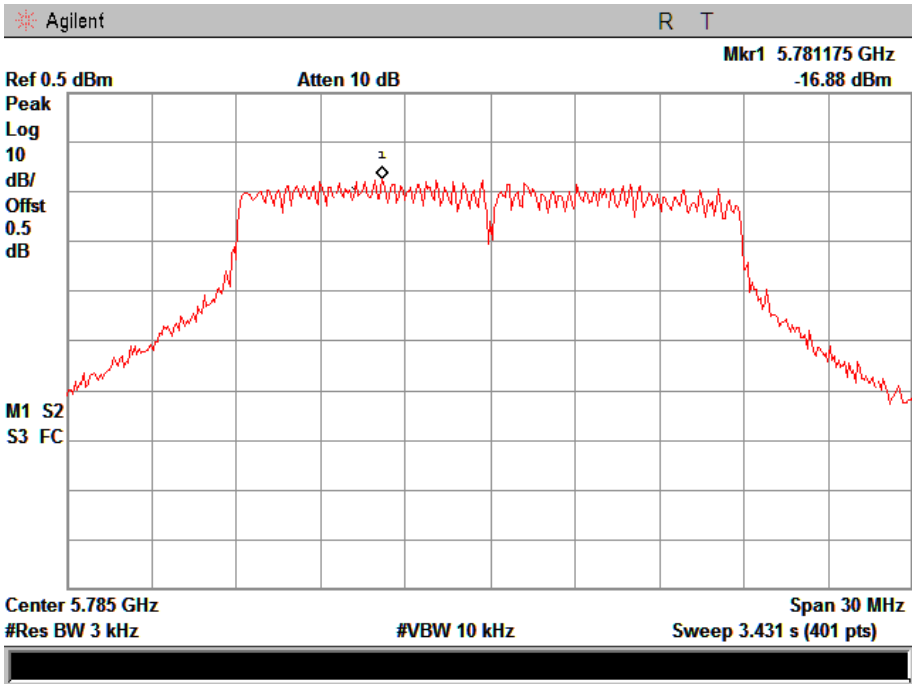
CH High:



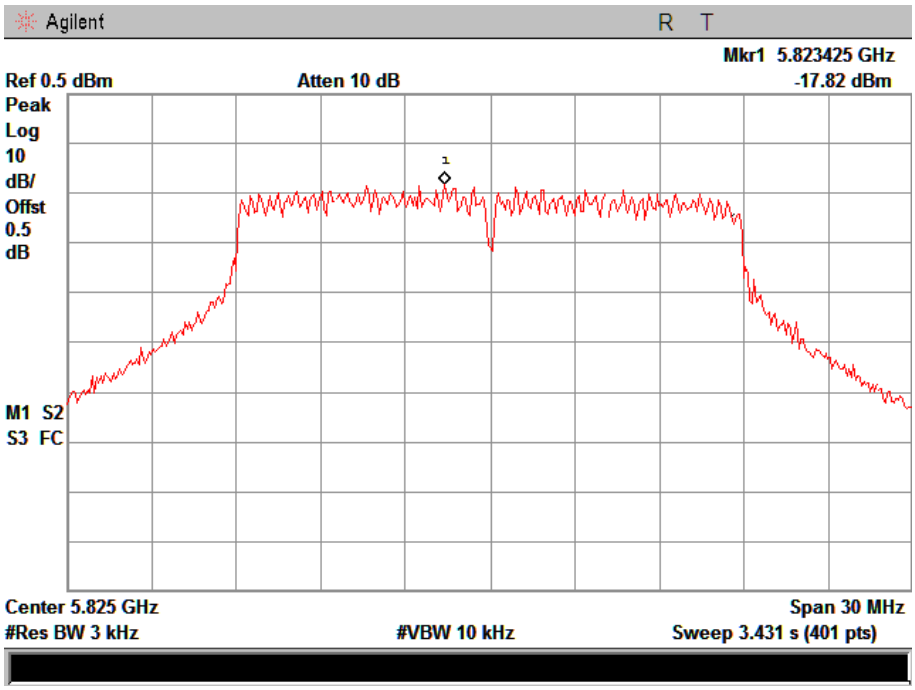
IEEE 802.11n HT20
CH Low:



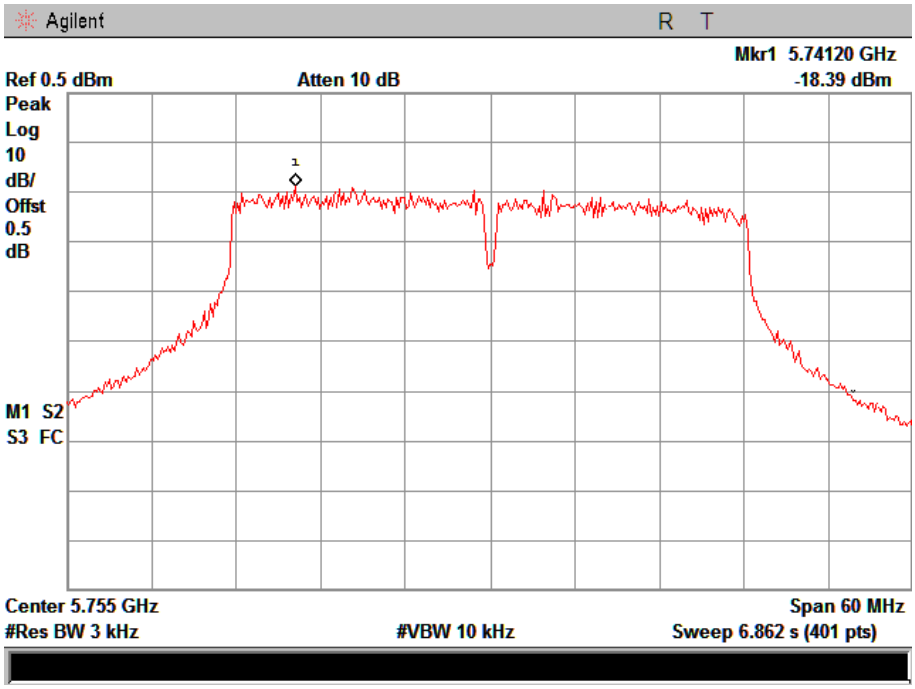
CH Mid:



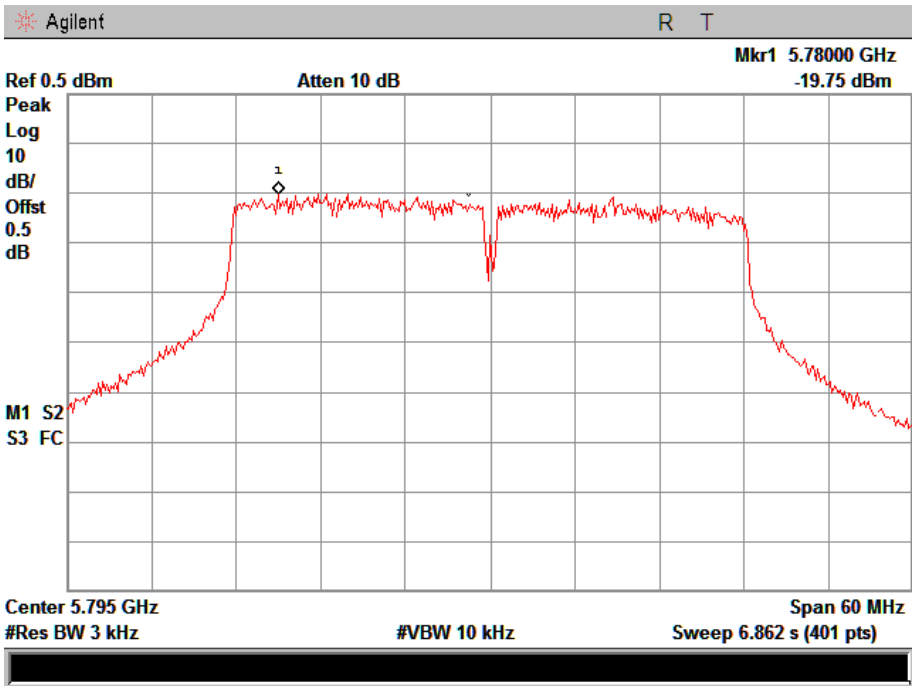
CH High:



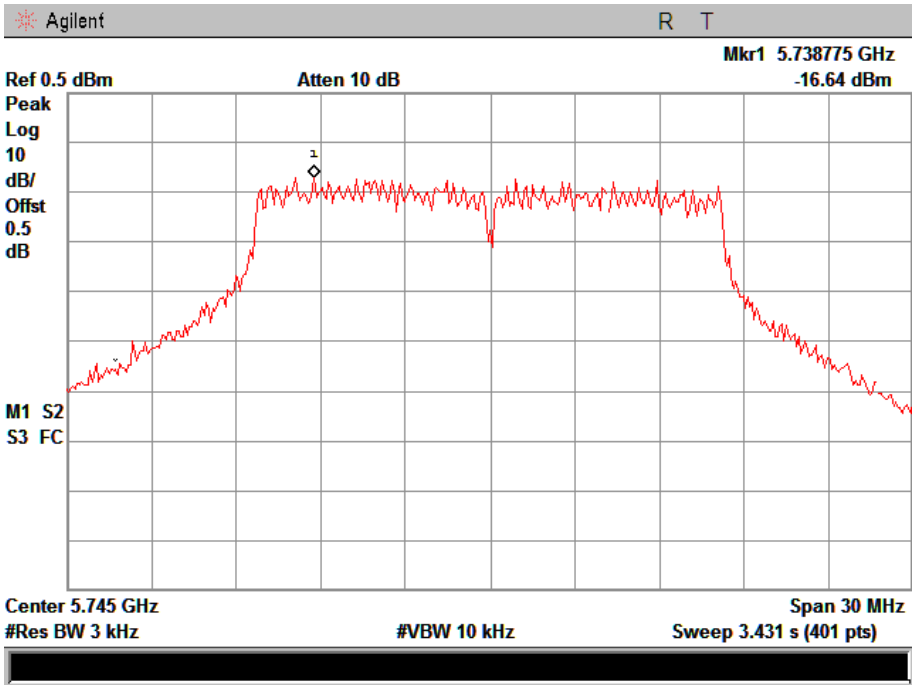
IEEE 802.11n HT40:
CH Low:



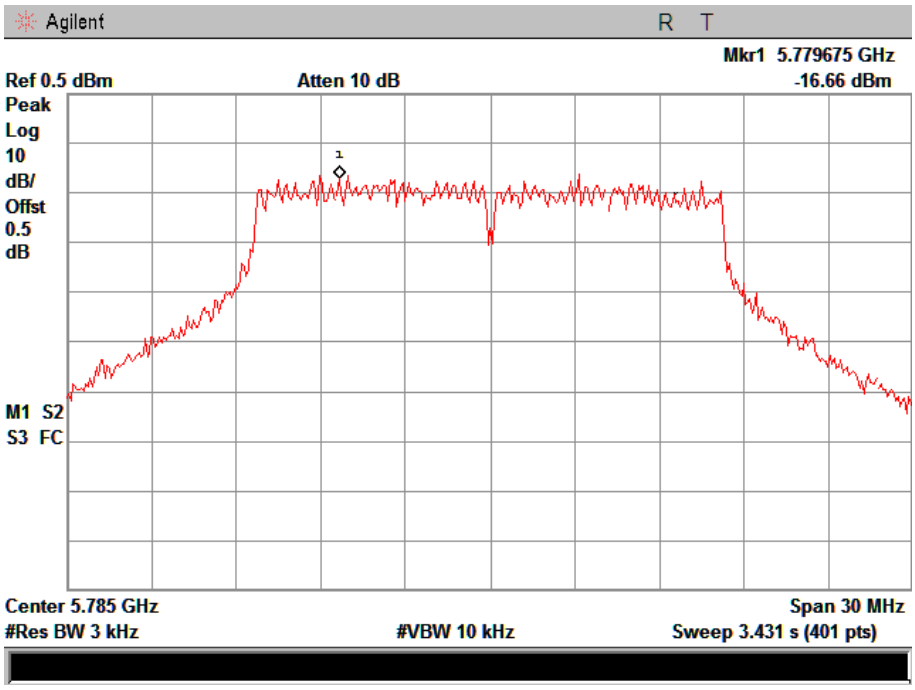
CH High:



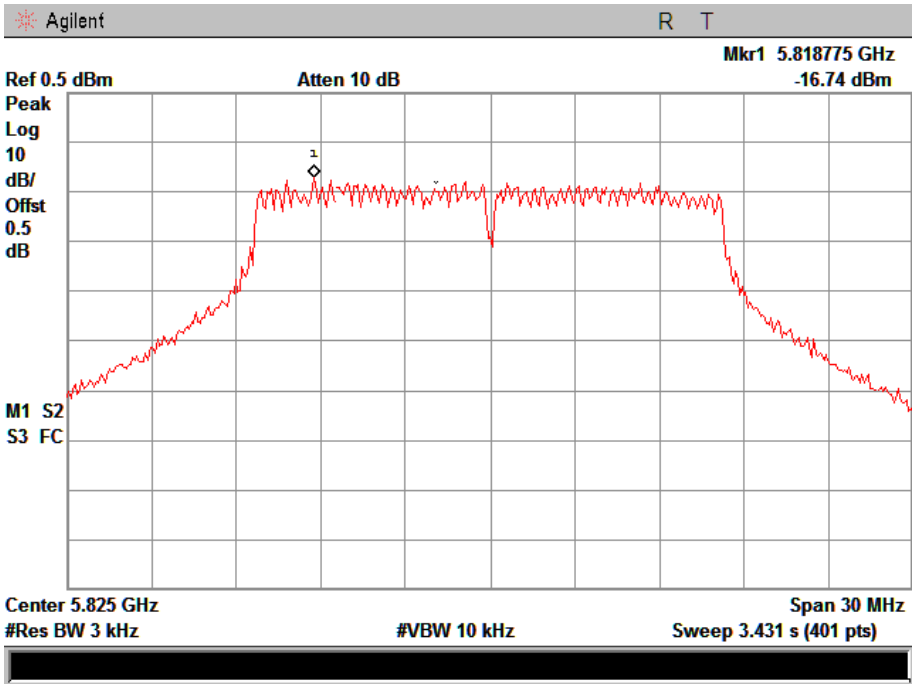
port 1 antenna
IEEE 802.11a:
CH Low:



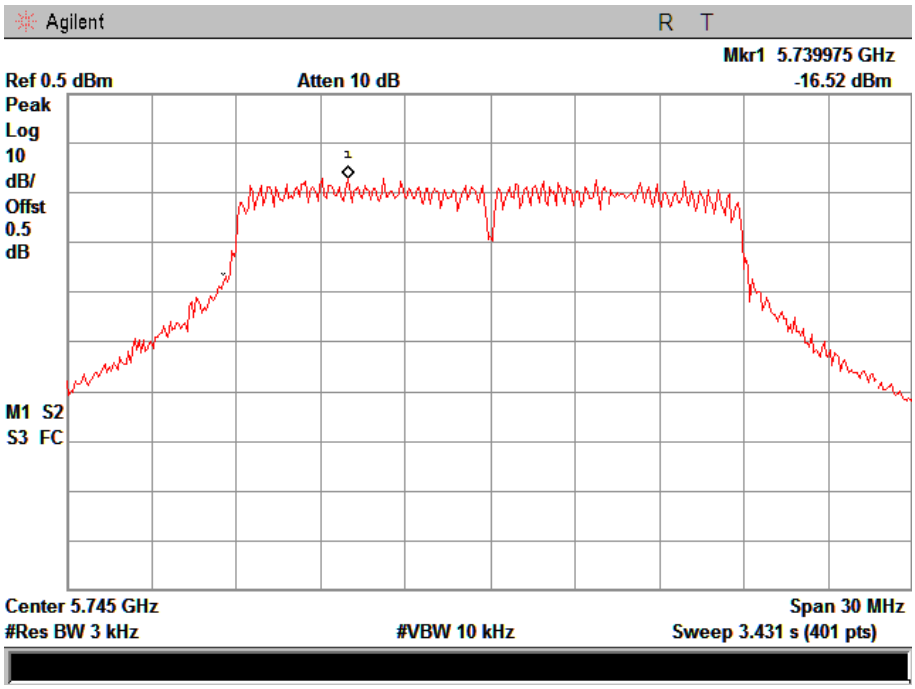
CH Mid:



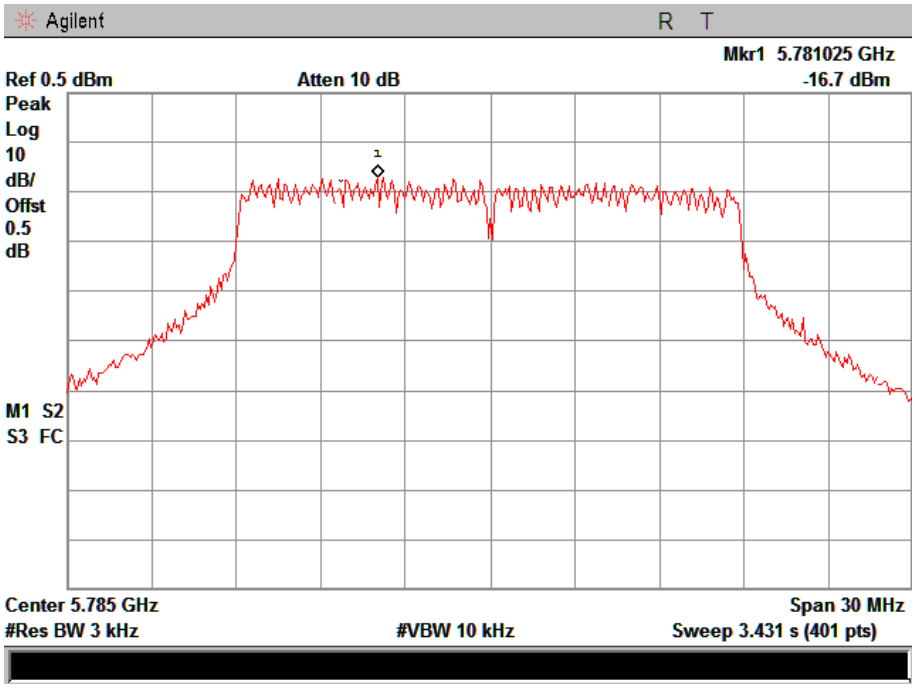
CH High:



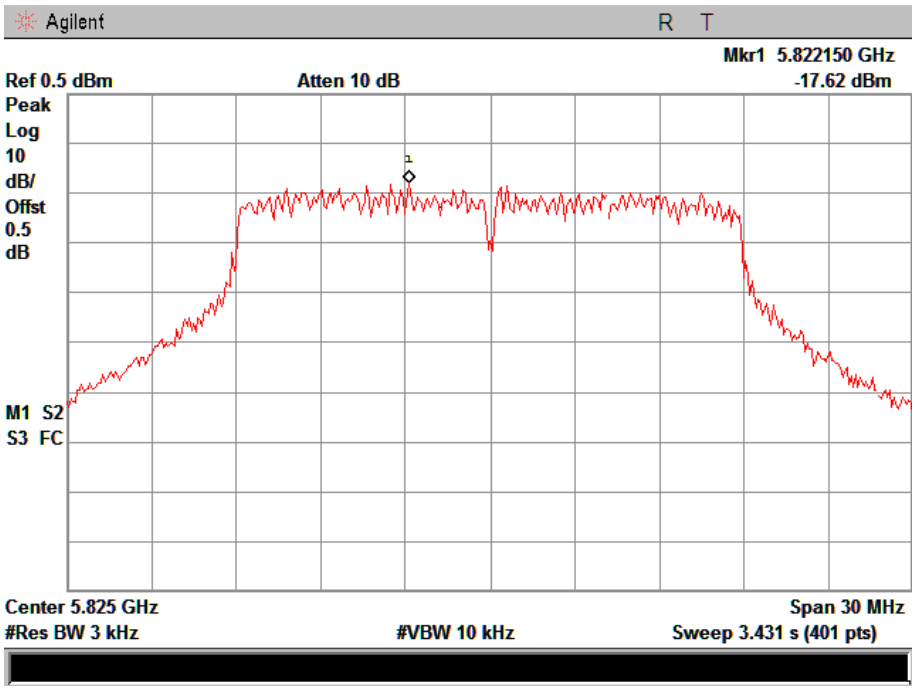
IEEE 802.11n HT20:
CH Low:



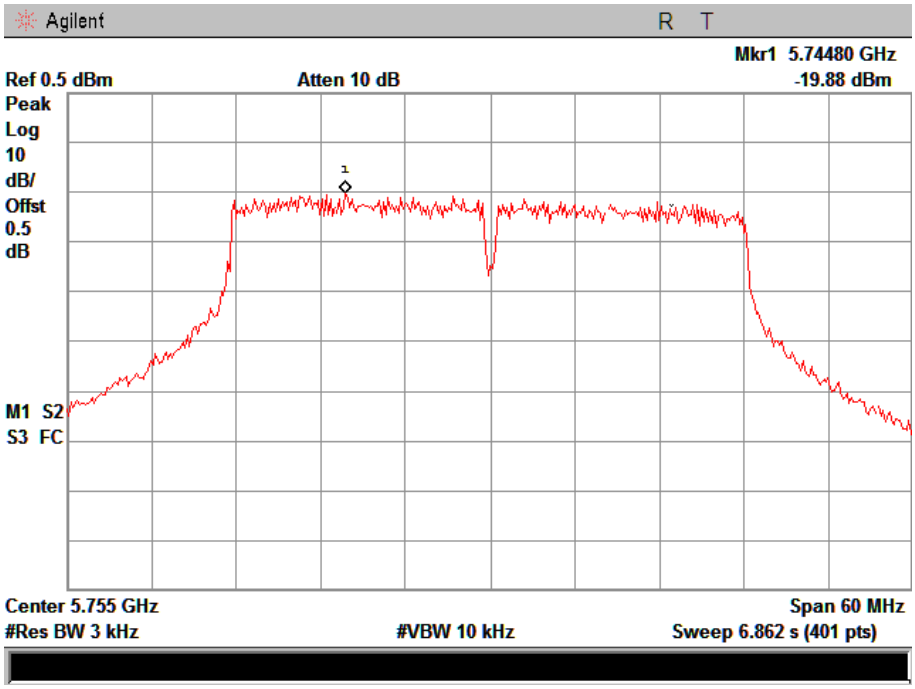
CH Mid:



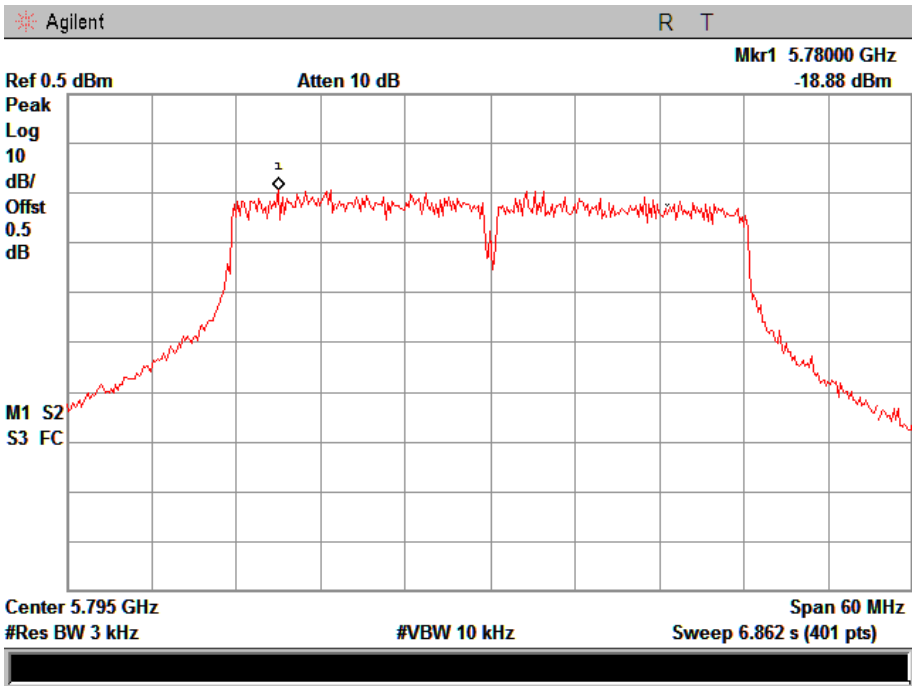
CH High:



IEEE 802.11n HT40:
CH Low:



CH High:



9 Bandwidth

9.1 Test limit

Please refer section15.247

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

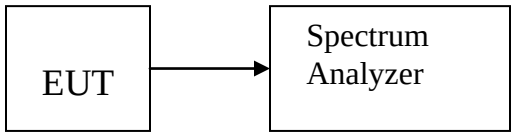
9.2 Method of measurement

Details see the KDB 558074 D01 DTS Meas Guidance v03r02

a)The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

b) The test receiver set RBW = 100 kHz, VBW≥3RBW, Sweep time set auto, detail see the test plot.

9.3 Test Setup



9.4 Test Results

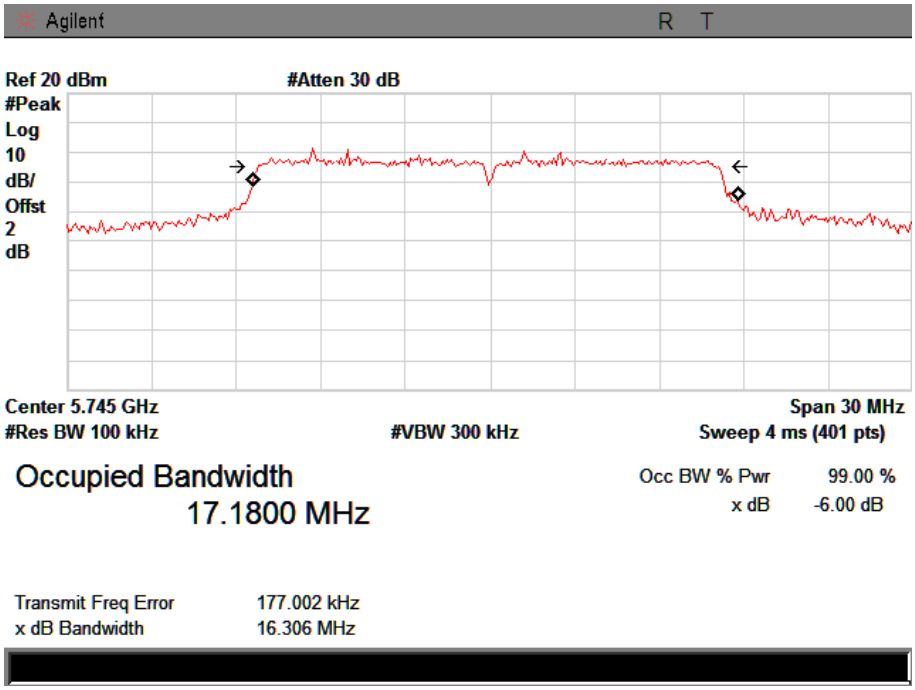
PASS.

Detailed information please see the following page.

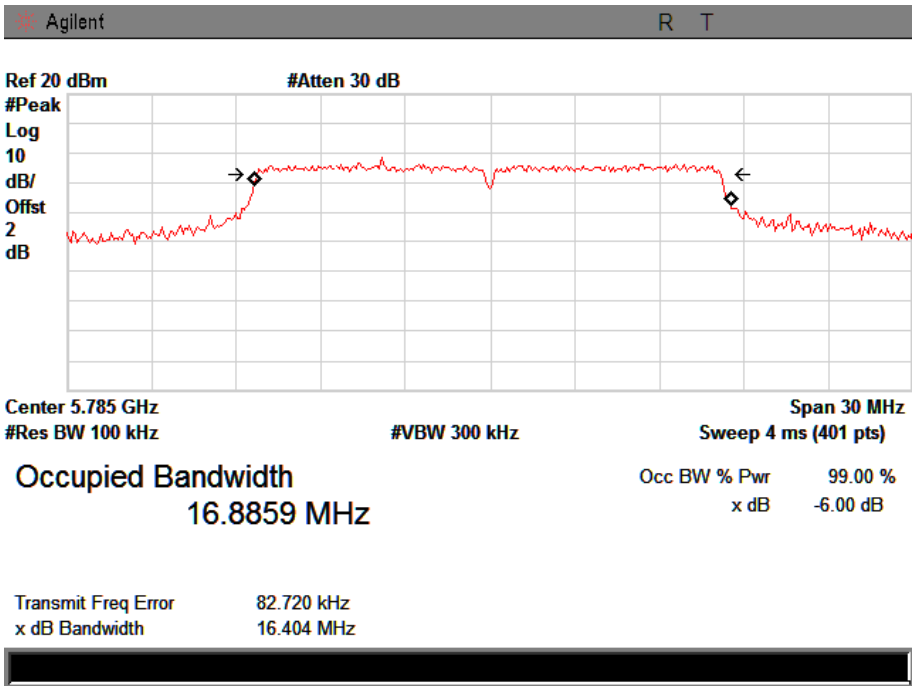
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
IEEE 802.11a with 5.8G:					
Low	5745	16.306	17.1800	0.5	PASS
Mid	5785	16.404	16.8859	0.5	PASS
High	5825	16.347	16.8749	0.5	PASS
IEEE 802.11n/HT20 with 5.8G:					
Low	5745	17.524	17.9122	0.5	PASS
Mid	5785	17.351	17.9354	0.5	PASS
High	5825	16.975	17.7881	0.5	PASS
IEEE 802.11n/HT40 with 5.8G:					
Low	5755	35.340	36.0637	0.5	PASS
High	5795	34.903	36.0138	0.5	PASS
Note: This test with port 0 antenna.					

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
IEEE 802.11a with 5.8G:					
Low	5745	16.294	19.9503	0.5	PASS
Mid	5785	16.358	17.0037	0.5	PASS
High	5825	16.385	16.6506	0.5	PASS
IEEE 802.11n/HT20 with 5.8G:					
Low	5745	17.045	19.0942	0.5	PASS
Mid	5785	16.933	17.9319	0.5	PASS
High	5825	17.380	17.7504	0.5	PASS
IEEE 802.11n/HT40 with 5.8G:					
Low	5755	35.014	36.0361	0.5	PASS
High	5795	34.353	36.1336	0.5	PASS
Note: This test with port 1 antenna.					

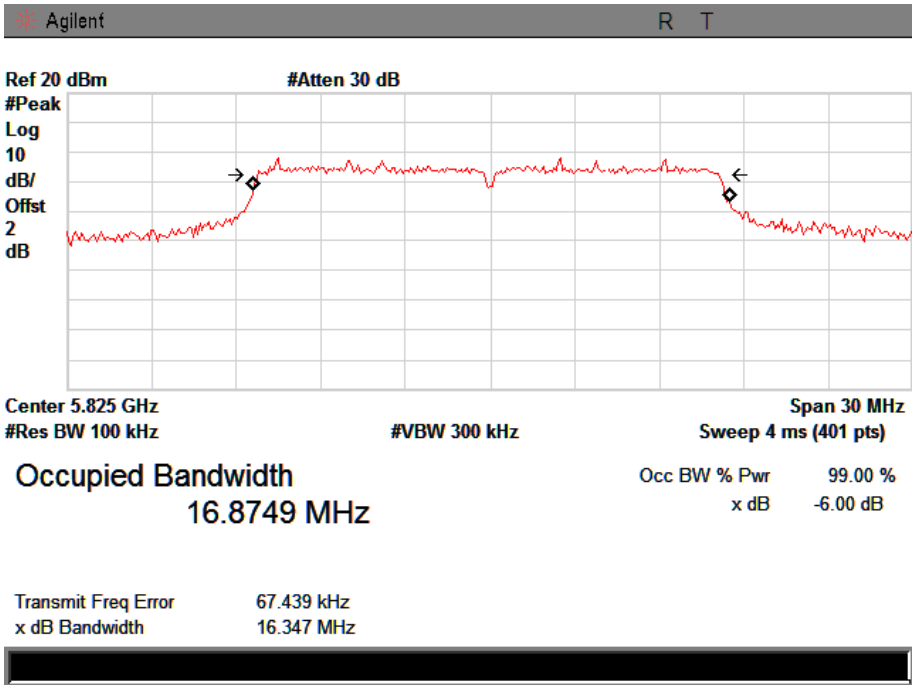
port 0 antenna
IEEE 802.11a:
CH Low :



CH Mid :

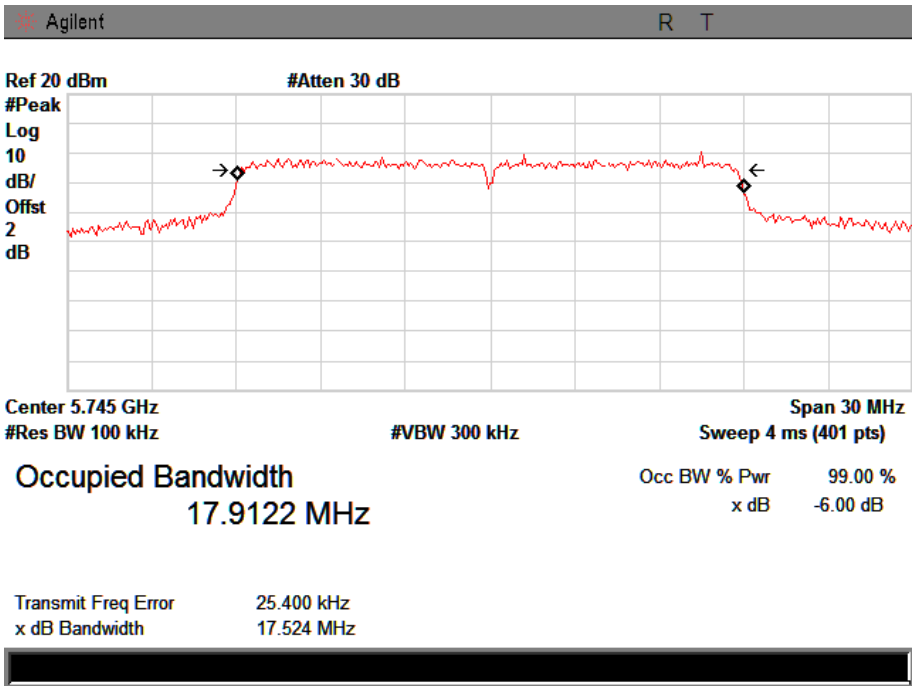


CH High :

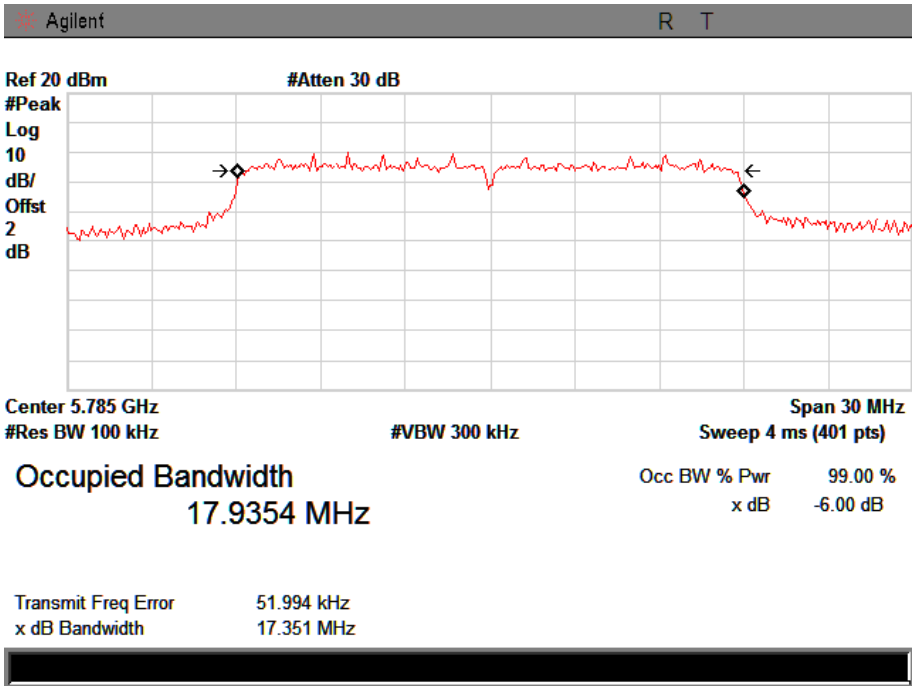


IEEE 802.11n HT20:

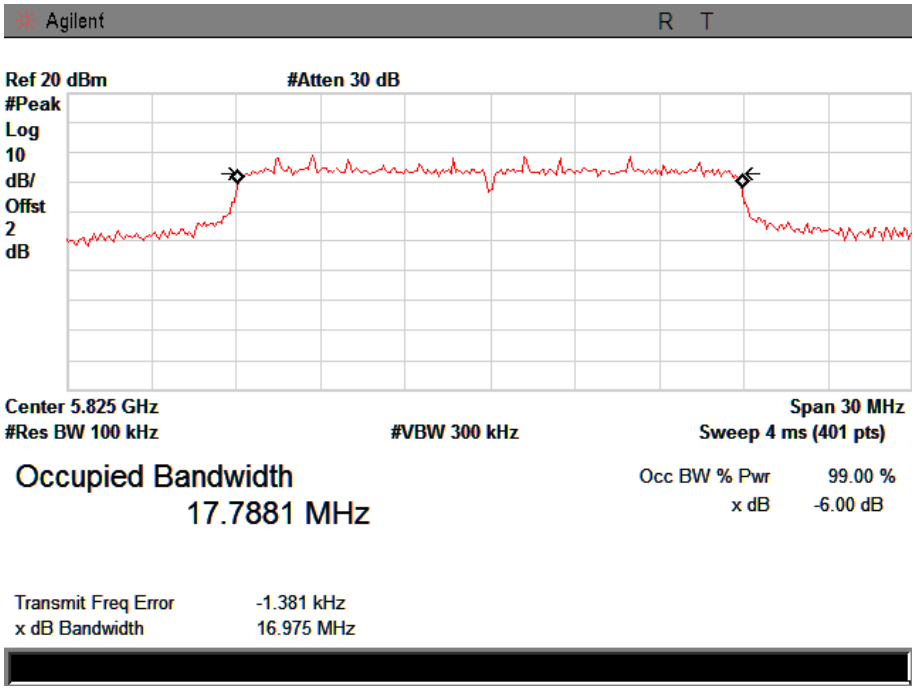
CH Low :



CH Mid :

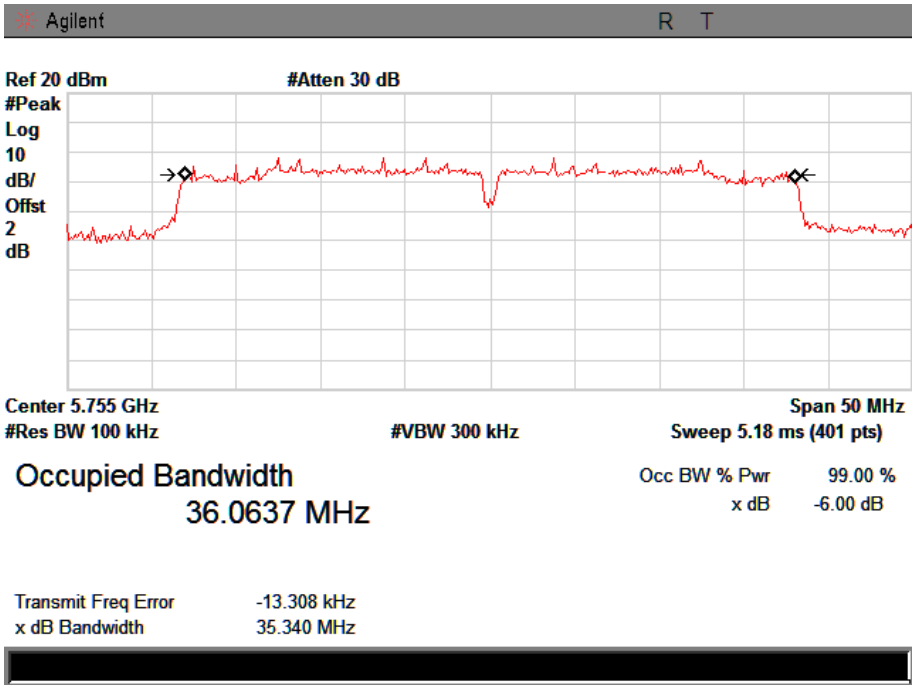


CH High :



IEEE 802.11n/HT40:

CH Low :



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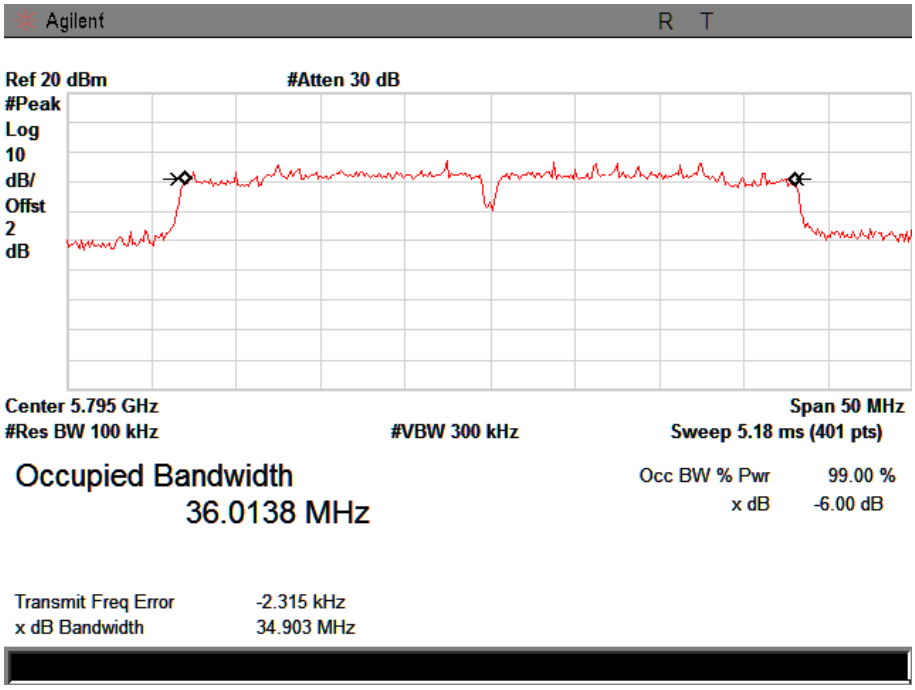
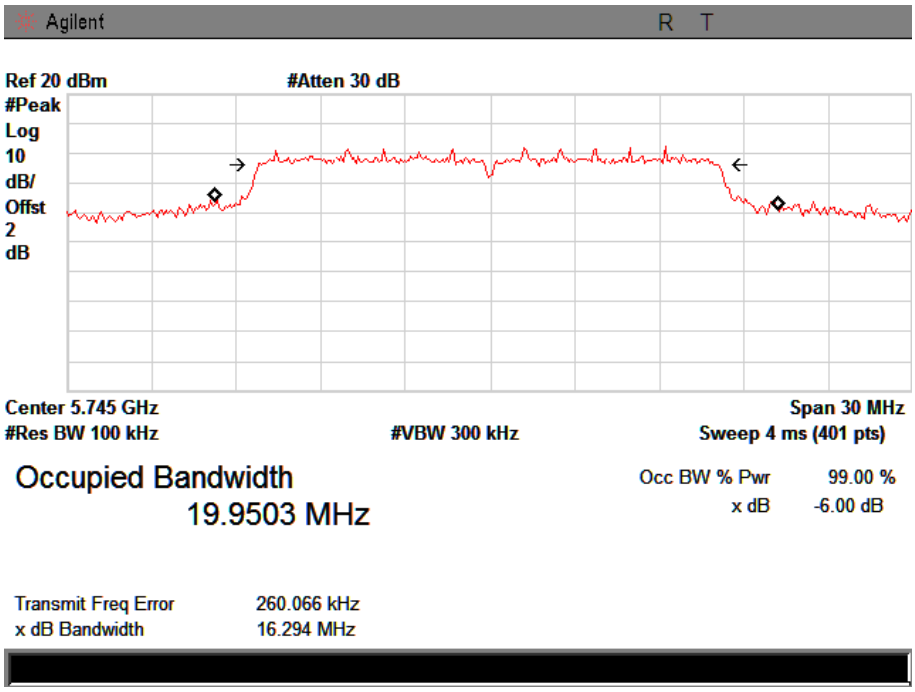
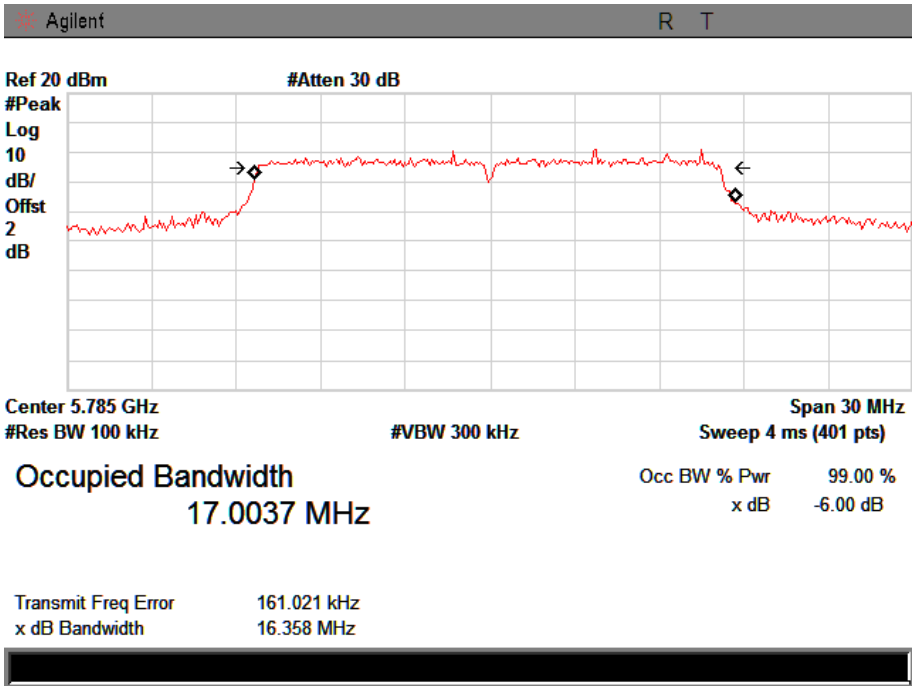


Port 1 antenna

IEEE 802.11b:
CH Low :



CH Mid :



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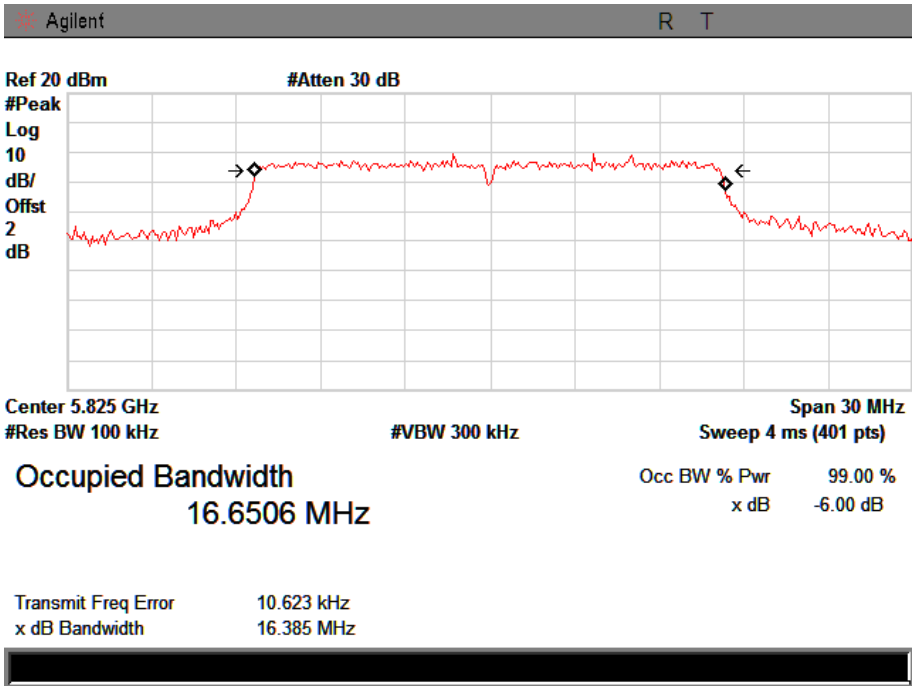
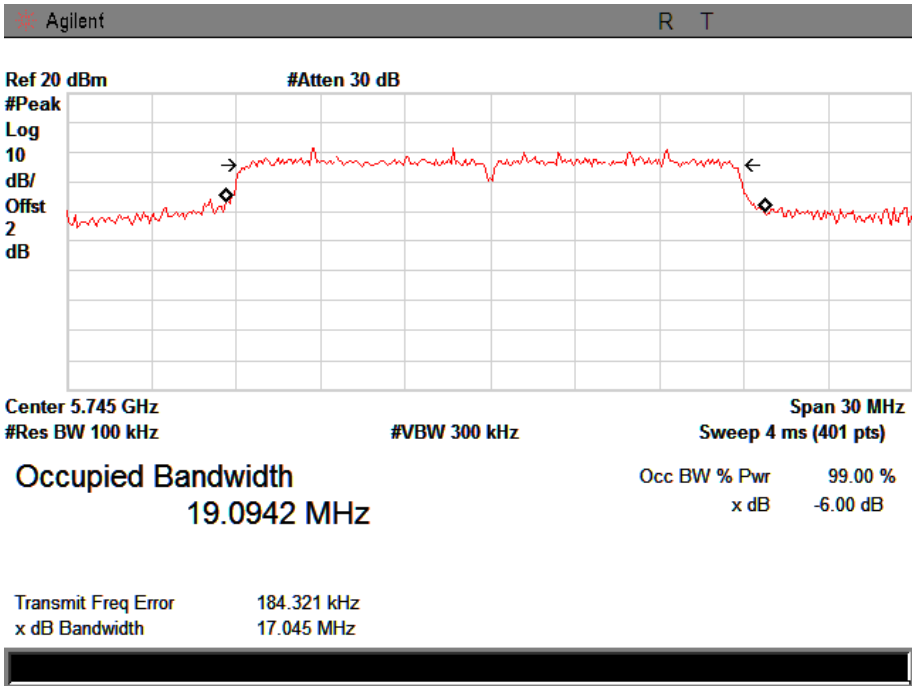
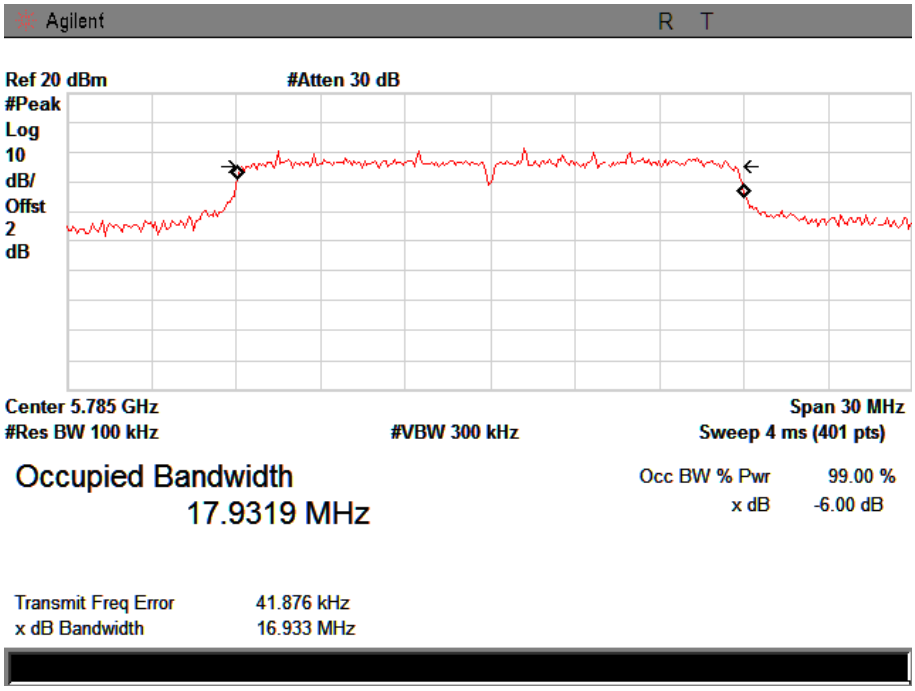


IEEE 802.11n HT20:

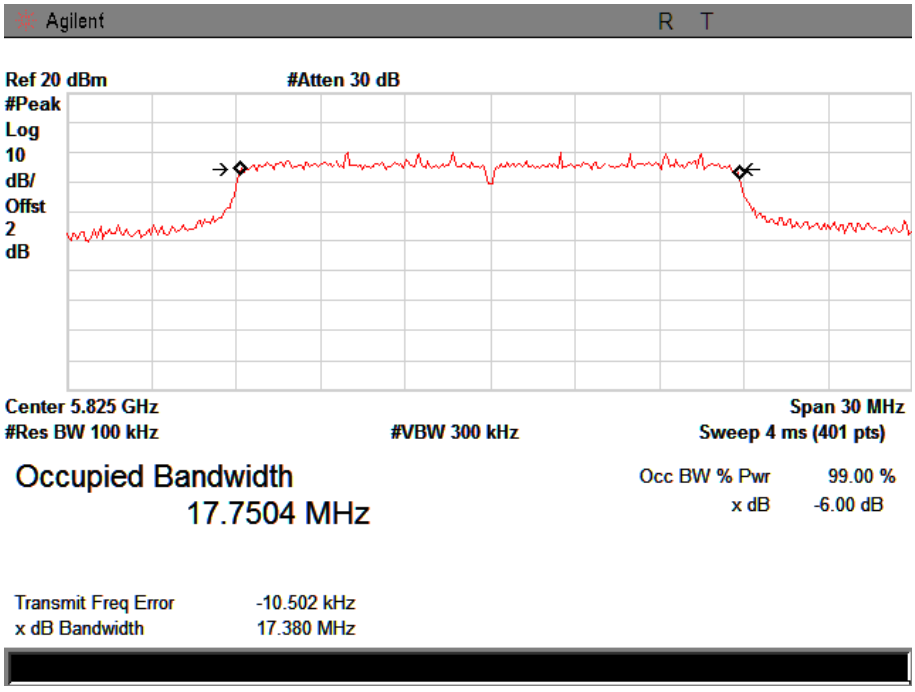
CH Low :



CH Mid :

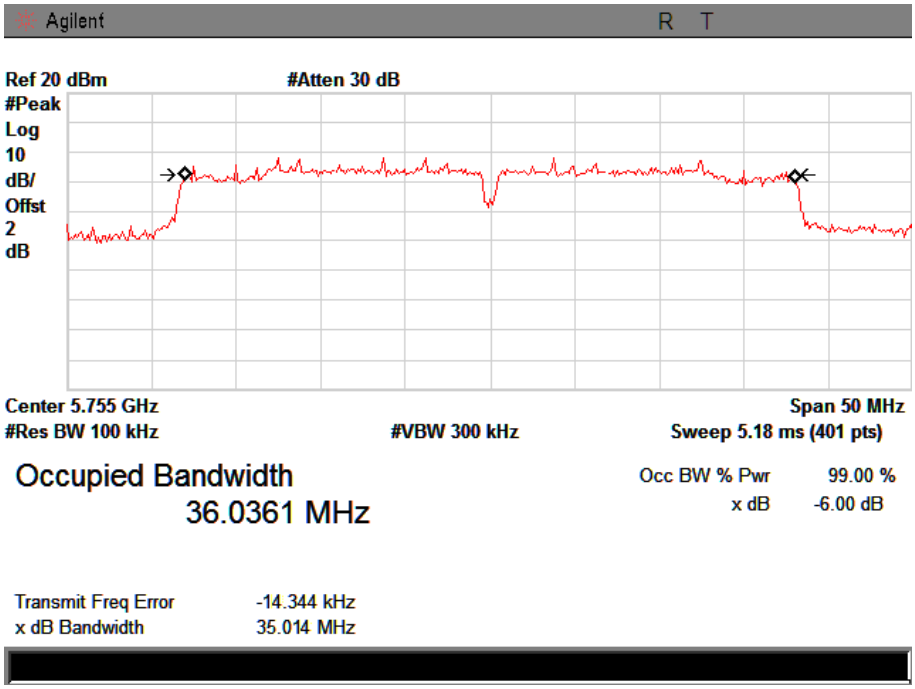


CH High :



IEEE 802.11n/HT40:

CH Low :



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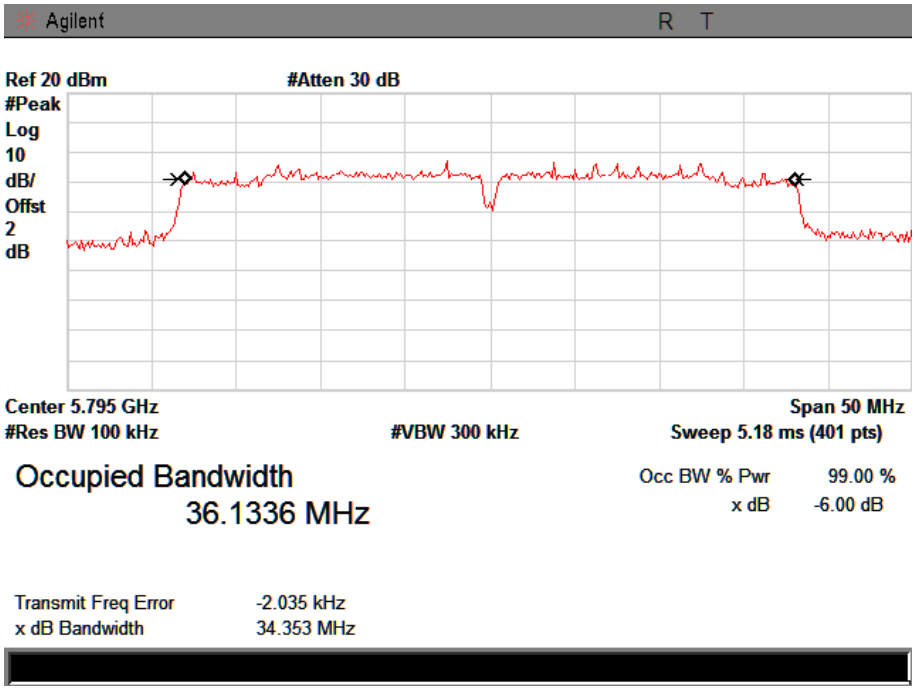

10 Band Edge Check

10.1 Test limit

Please refer section15.247

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz and 5725MHz to 5850MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

10.2 Test Procedure

12.2.1 Put the EUT on a 0.8m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission

12.2.2 Check the spurious emissions out of band.

12.2.3 RBW 1MHz ,VBW 3MHz ,peak detector for peak value , RBW 1MHz ,VBW 10Hz , peak detector for AV value.

10.3 Test Setup

Same as 5.2.2.

10.4 Test Result

PASS.

Detailed information please see the following page.

REMARK: EUT with 15dBi antenna configuration, EUT with 27dBi antenna configuration, and EUT with 24dBi antenna configuration have been tested, EUT with 15 dBi antenna configuration and EUT with 27 dBi antenna configuration were found as worse case and reported only.

15dBi panel antenna configuration:
IEEE 802.11a:
CH LOW :

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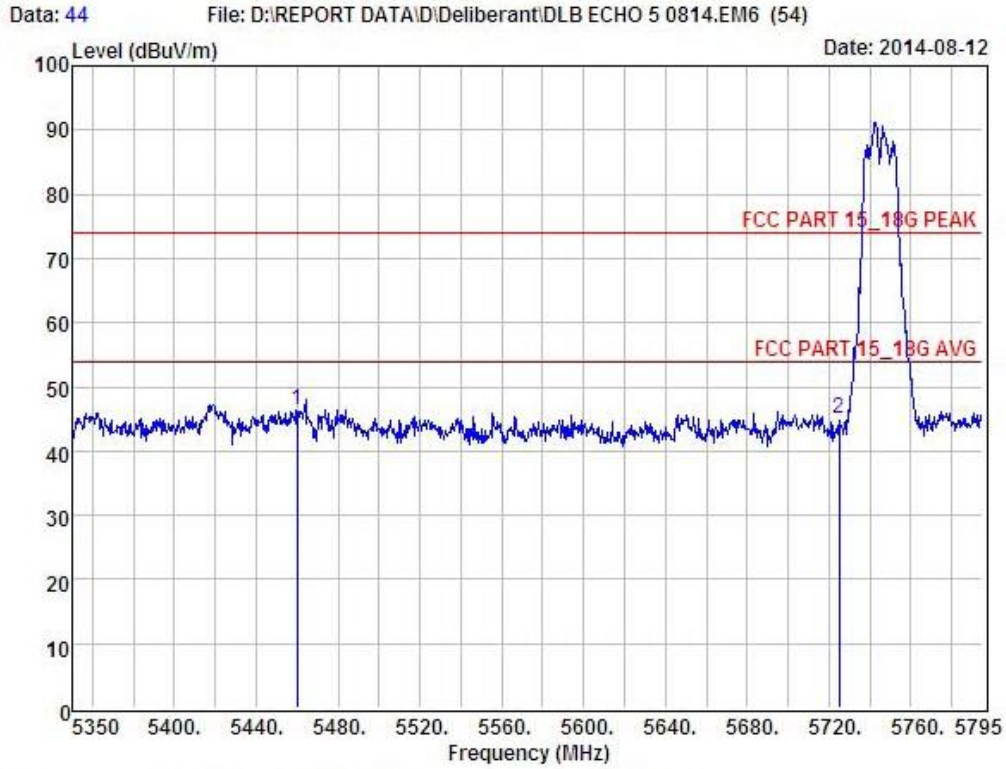
Website: http://www.cessz.com Email: Service@cessz.com




```
Condition      : FCC PART 15_18G PEAK 3m       POL: HORIZONTAL
EUT            : Broadband Digital Transmission System
Model No       : DLB ECHO 5
Test Mode      : 802.11a Low
Power          : DC 24V
Test Engineer  : Peter
Remark         :
Temp           : 24.2℃
Hum            : 54%
```

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	42.01	31.81	33.65	6.11	46.28	74.00	-27.72	Peak
2	5725.00	39.99	32.27	33.58	6.26	44.94	74.00	-29.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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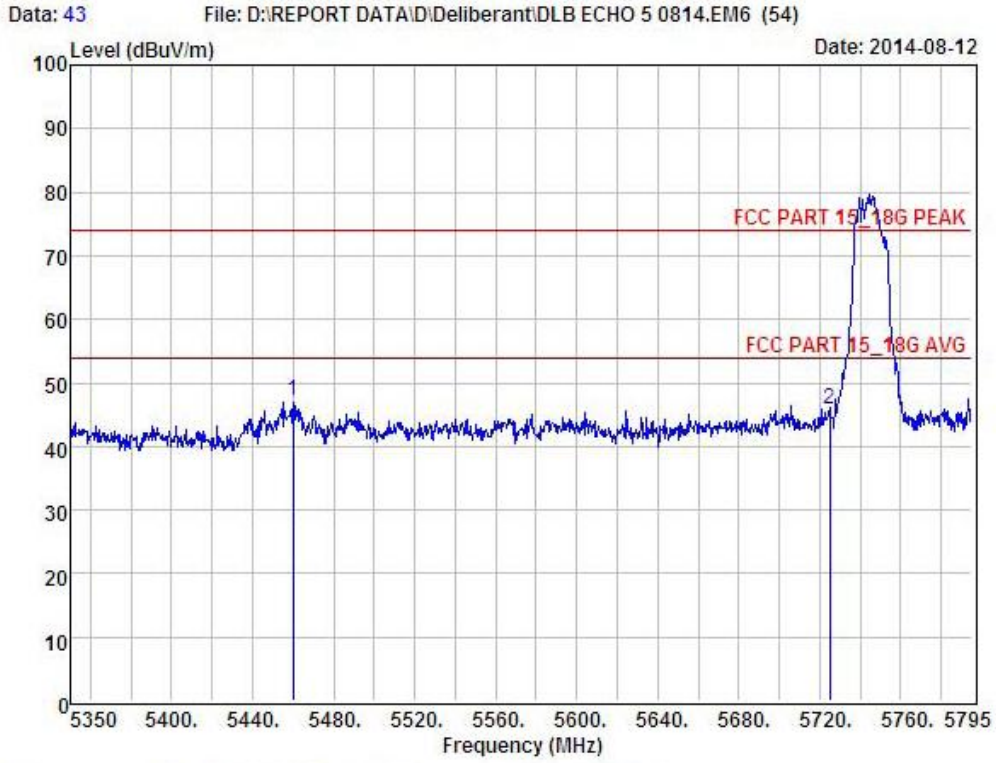

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11a Low
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	43.01	31.81	33.65	6.11	47.28	74.00	-26.72	Peak
2	5725.00	40.99	32.27	33.58	6.26	45.94	74.00	-28.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

CH High :

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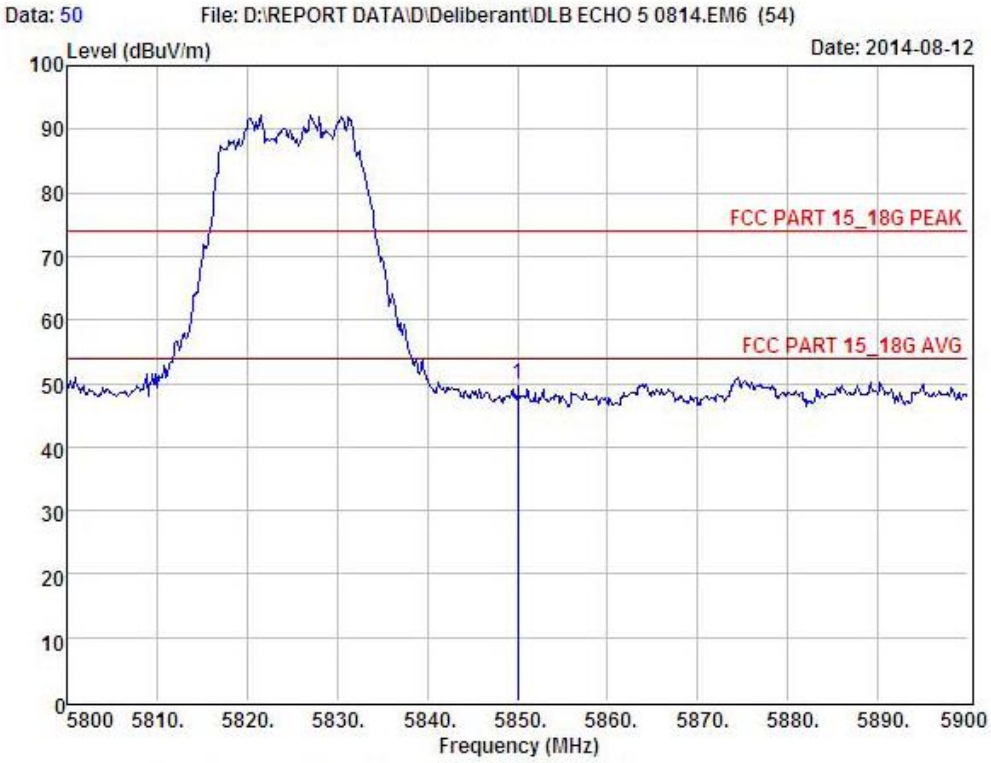


```
Condition      : FCC PART 15_18G PEAK 3m       POL: HORIZONTAL
EUT            : Broadband Digital Transmission System
Model No       : DLB ECHO 5
Test Mode      : 802.11a High
Power          : DC 24V
Test Engineer  : Peter
Remark         :
Temp           : 24.2℃
Hum            : 54%
```

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	44.59	32.50	33.64	6.33	49.78	74.00	-24.22	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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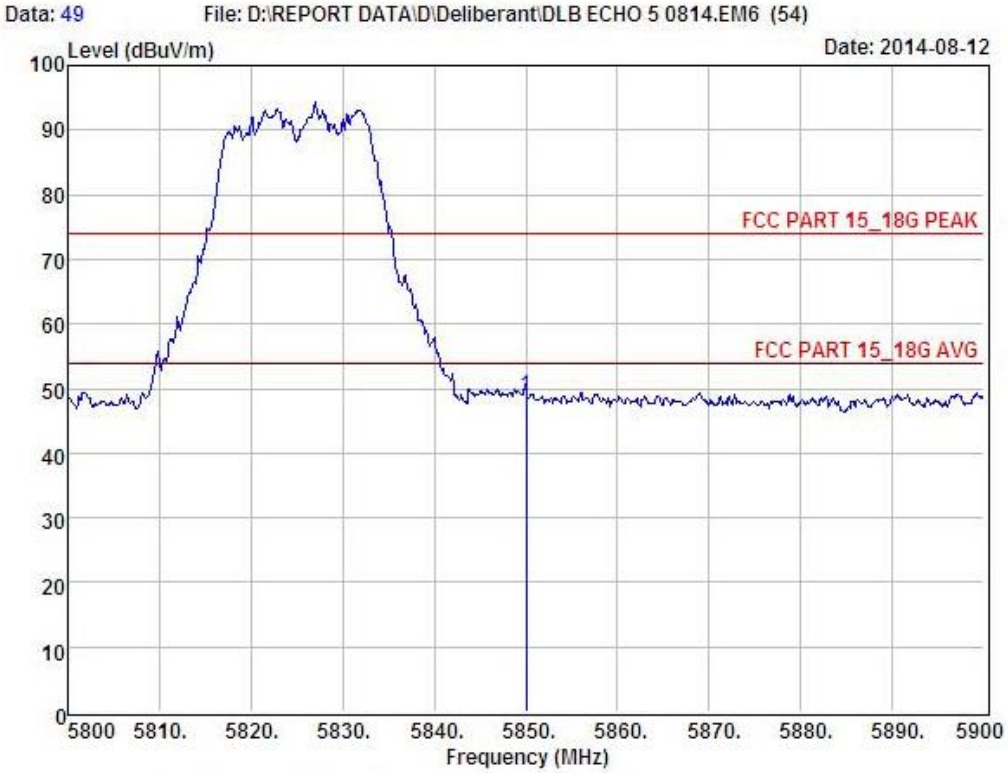

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11a High
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	43.57	32.50	33.64	6.33	48.76	74.00	-25.24	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

IEEE 802.11n HT20:
CH LOW :

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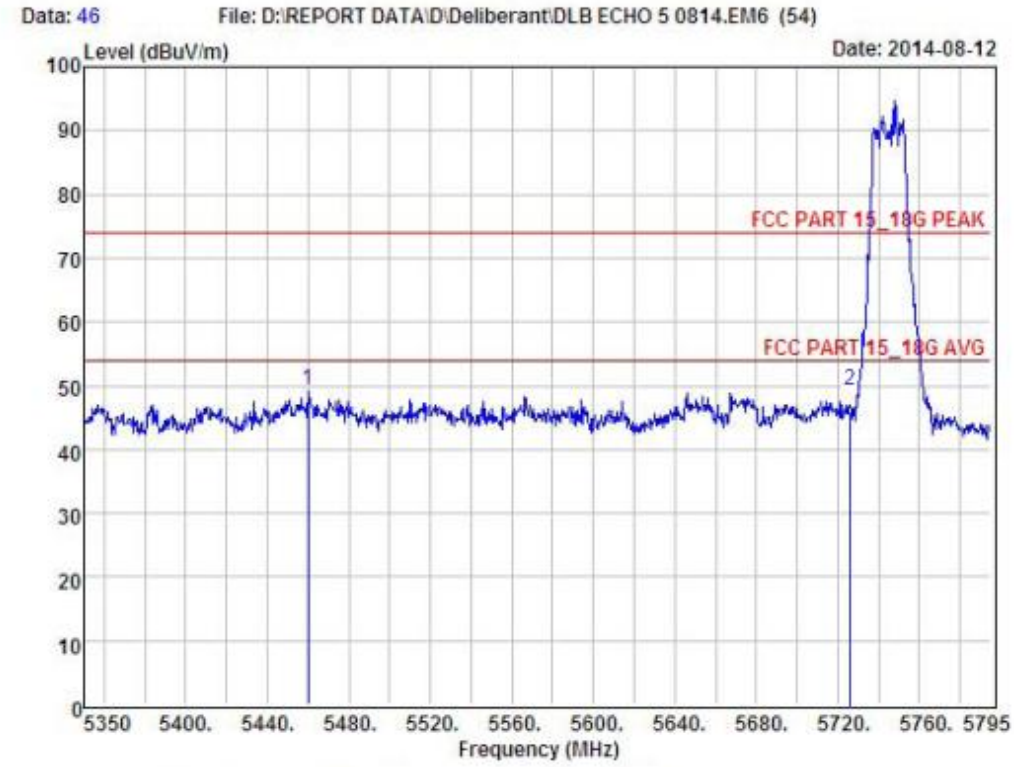


```
Condition      : FCC PART 15_18G PEAK 3m       POL: HORIZONTAL
EUT            : Broadband Digital Transmission System
Model No       : DLB ECHO 5
Test Mode      : 802.11nHT20 Low
Power          : DC 24V
Test Engineer  : Peter
Remark         :
Temp           : 24.2℃
Hum            : 54%
```

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	45.01	31.81	33.65	6.11	49.28	74.00	-24.72	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Remark: frequency point 2 is 5725 MHz.

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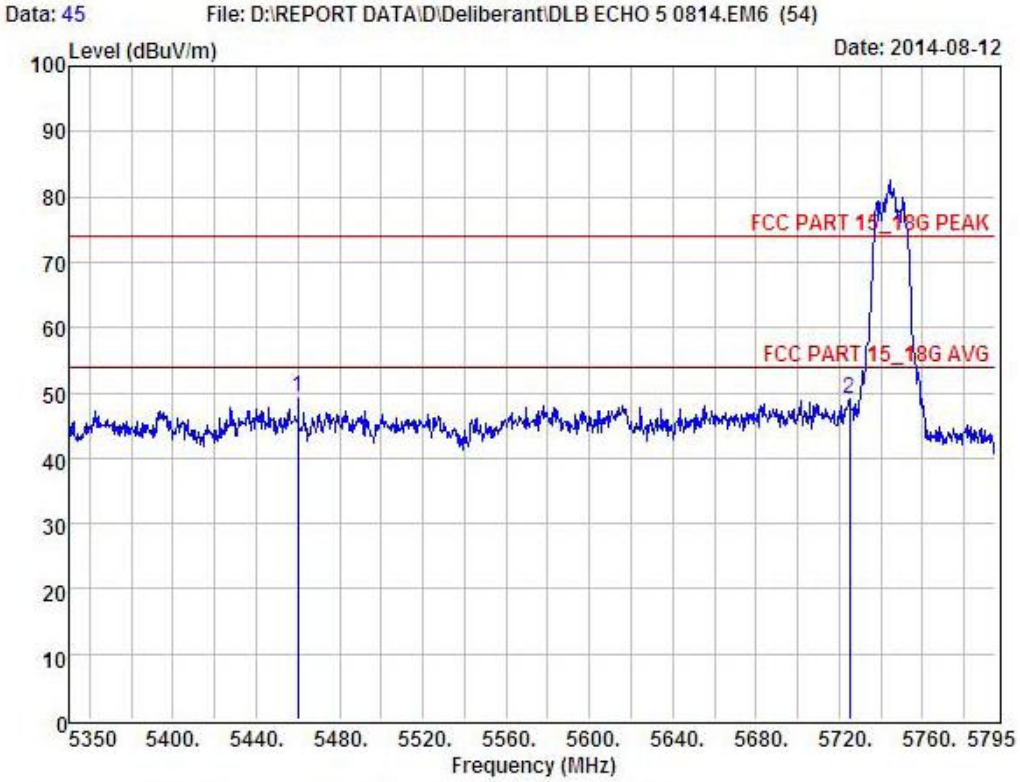

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT20 Low
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	45.01	31.81	33.65	6.11	49.28	74.00	-24.72	Peak
2	5725.00	43.99	32.27	33.58	6.26	48.94	74.00	-25.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

CH High :

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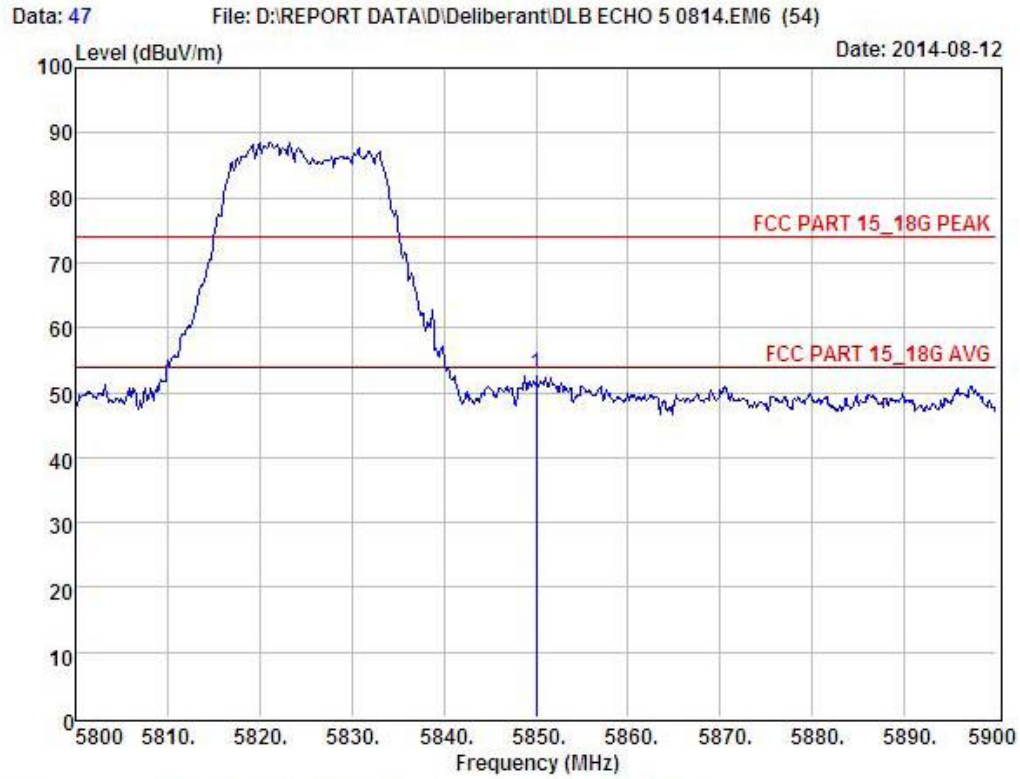

Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT20 High
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	47.75	32.50	33.64	6.33	52.94	74.00	-21.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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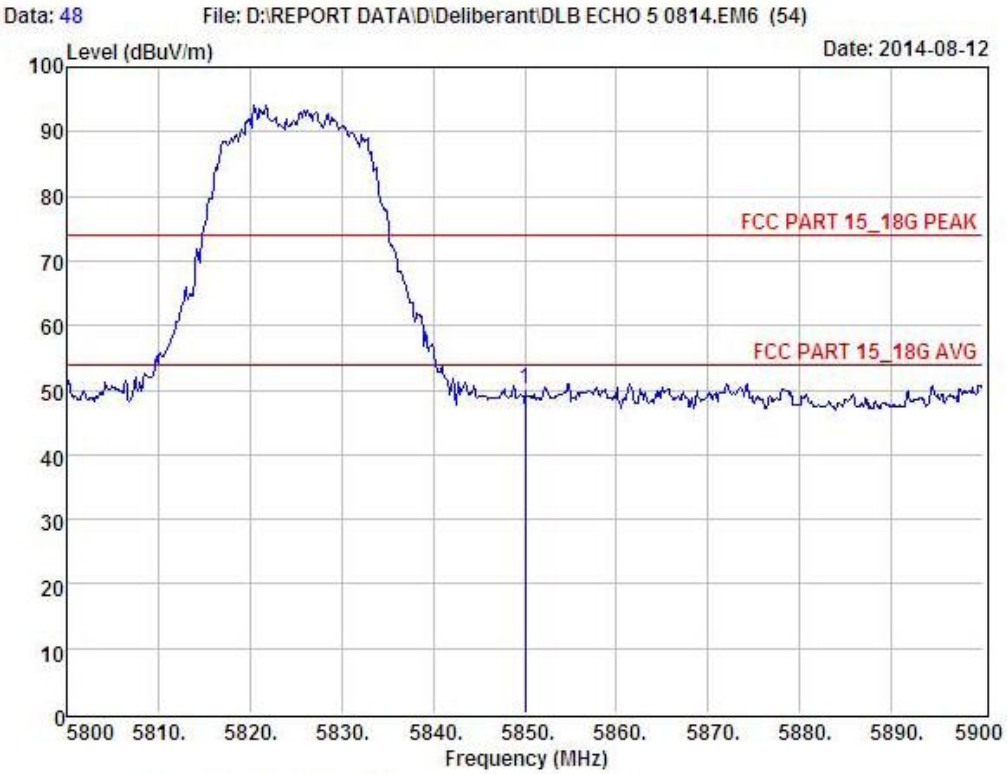

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT20 High
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	44.82	32.50	33.64	6.33	50.01	74.00	-23.99	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

IEEE 802.11n/HT40:
CH LOW :

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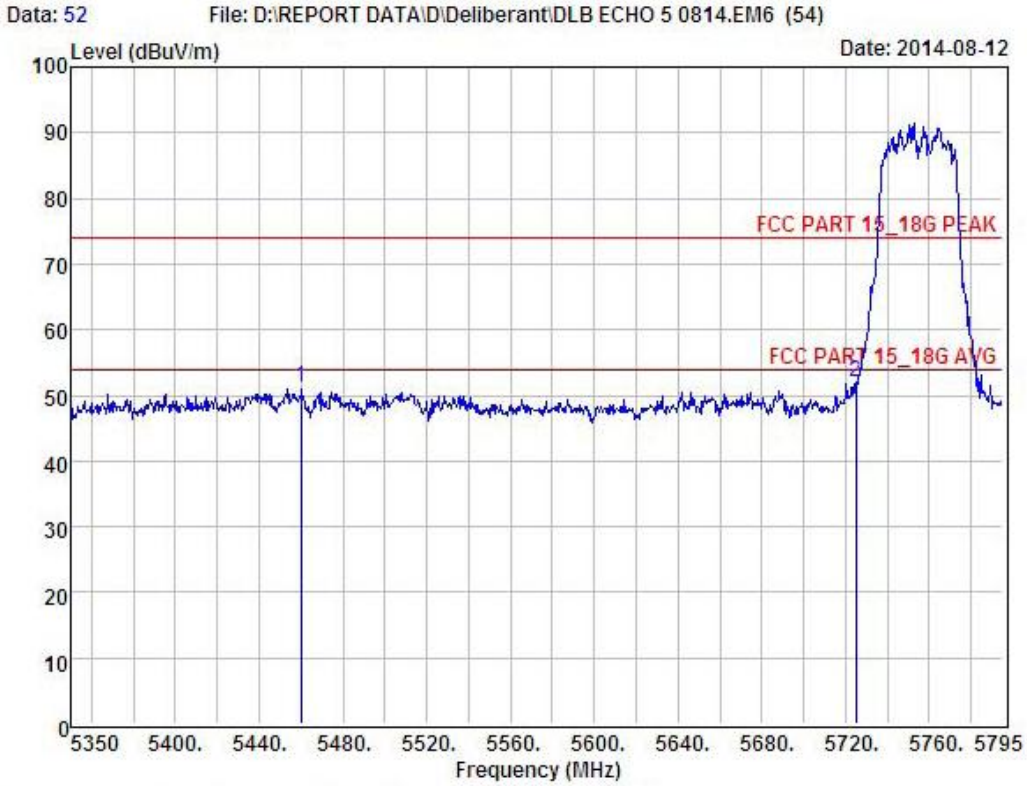
Website: http://www.cessz.com Email: Service@cessz.com



Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT40 Low
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	47.01	31.81	33.65	6.11	51.28	74.00	-22.72	Peak
2	5725.00	46.99	32.27	33.58	6.26	51.94	74.00	-22.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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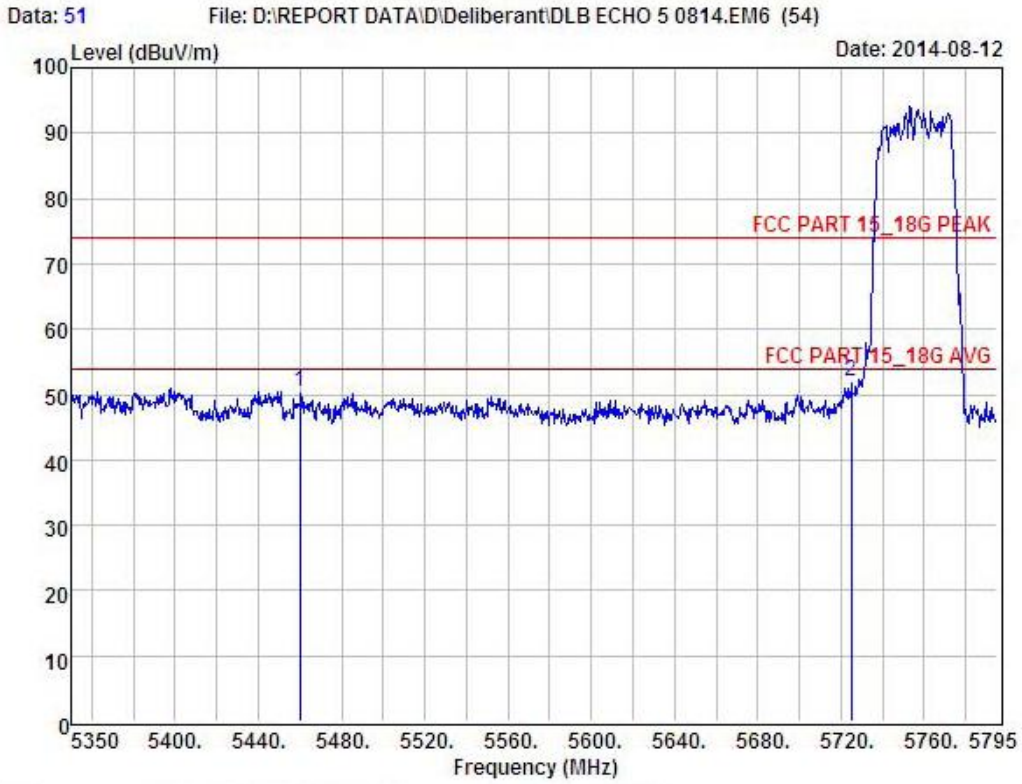
Website: http://www.cessz.com Email: Service@cessz.com



Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT40 Low
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	46.01	31.81	33.65	6.11	50.28	74.00	-23.72	Peak
2	5725.00	46.99	32.27	33.58	6.26	51.94	74.00	-22.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

CH High :

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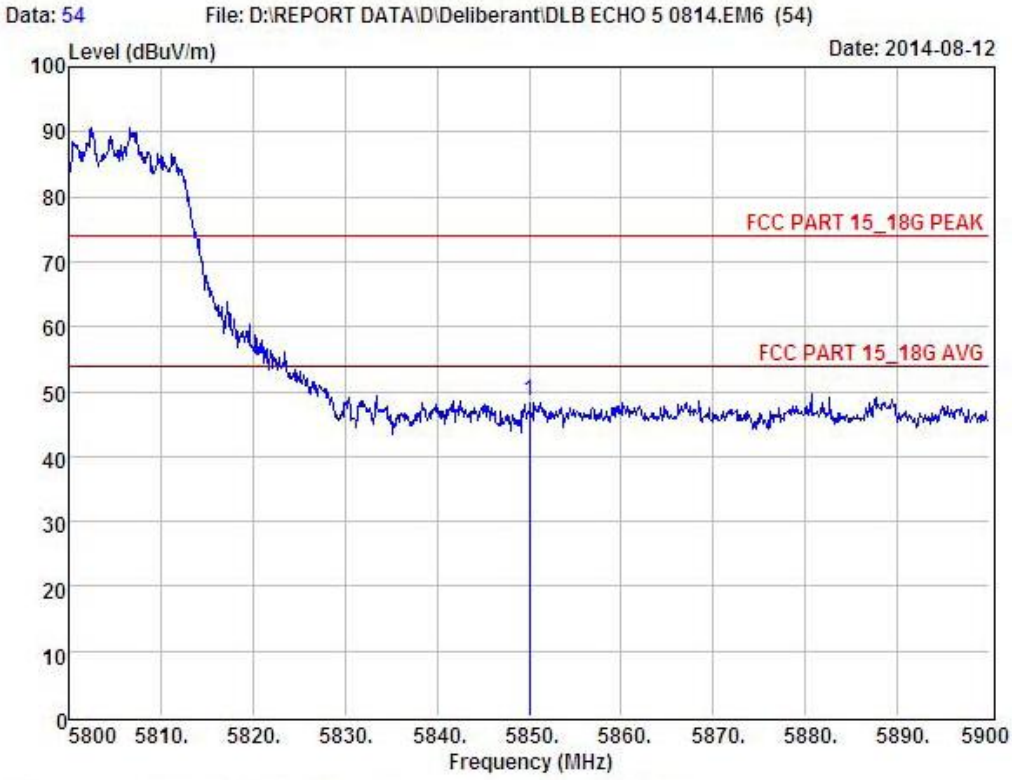


```
Condition      : FCC PART 15_18G PEAK 3m       POL: HORIZONTAL
EUT            : Broadband Digital Transmission System
Model No       : DLB ECHO 5
Test Mode      : 802.11nHT40 High
Power          : DC 24V
Test Engineer  : Peter
Remark         :
Temp           : 24.2℃
Hum            : 54%
```

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	43.31	32.50	33.64	6.33	48.50	74.00	-25.50	

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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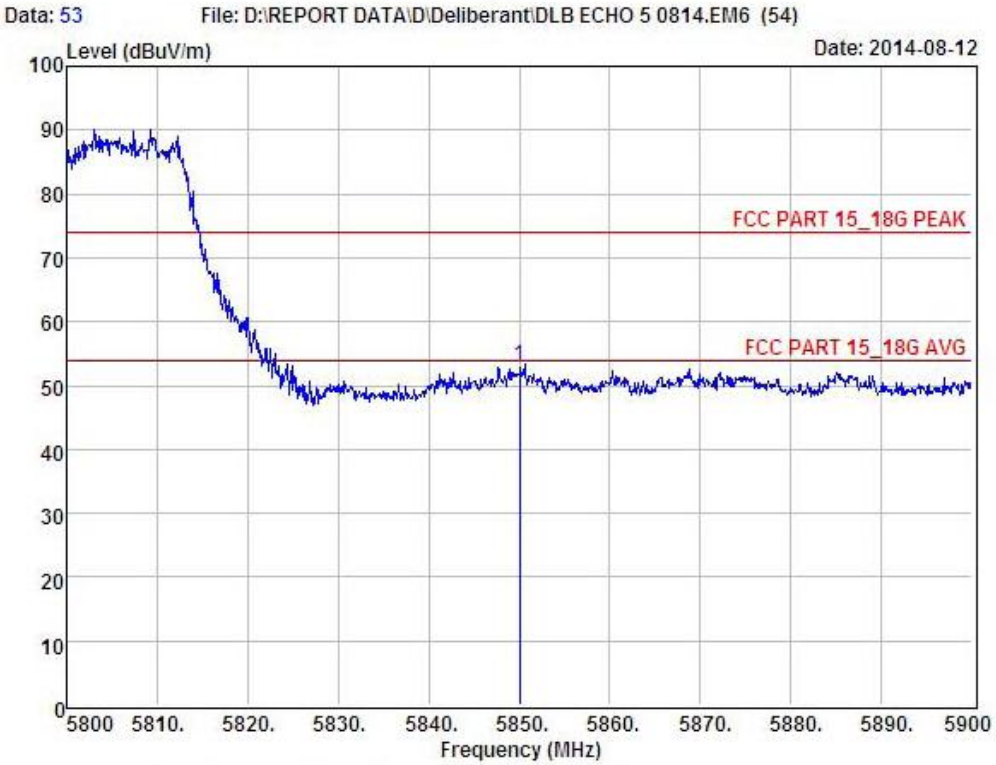

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT40 High
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	47.99	32.50	33.64	6.33	53.18	74.00	-20.82	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

27dBi dish antenna configuration:
IEEE 802.11a:
CH Low :

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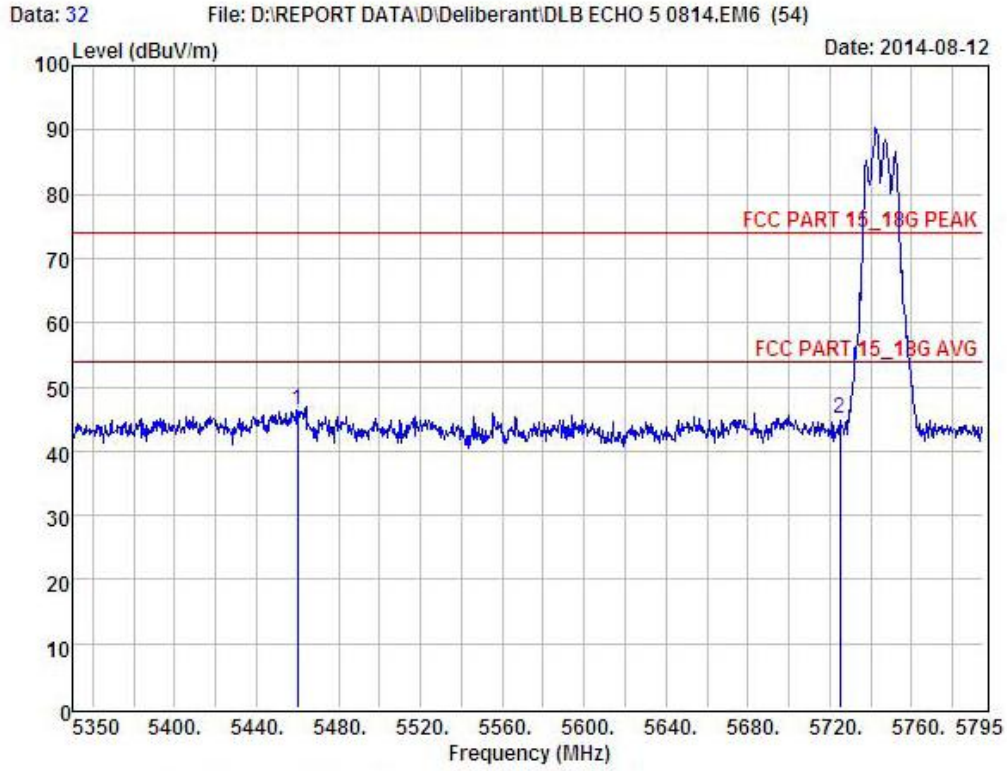

Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11a Low
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	42.01	31.81	33.65	6.11	46.28	74.00	-27.72	Peak
2	5725.00	39.99	32.27	33.58	6.26	44.94	74.00	-29.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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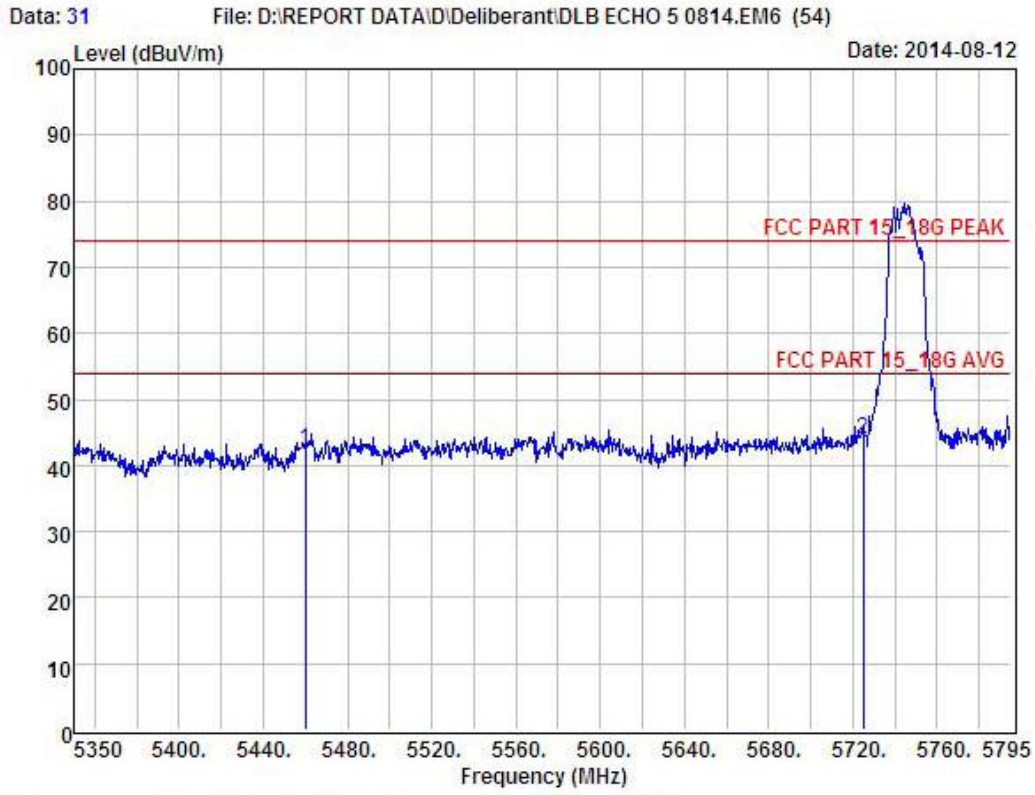

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11a Low
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	38.01	31.81	33.65	6.11	42.28	74.00	-31.72	Peak
2	5725.00	38.99	32.27	33.58	6.26	43.94	74.00	-30.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

IEEE 802.11a:
CH High :

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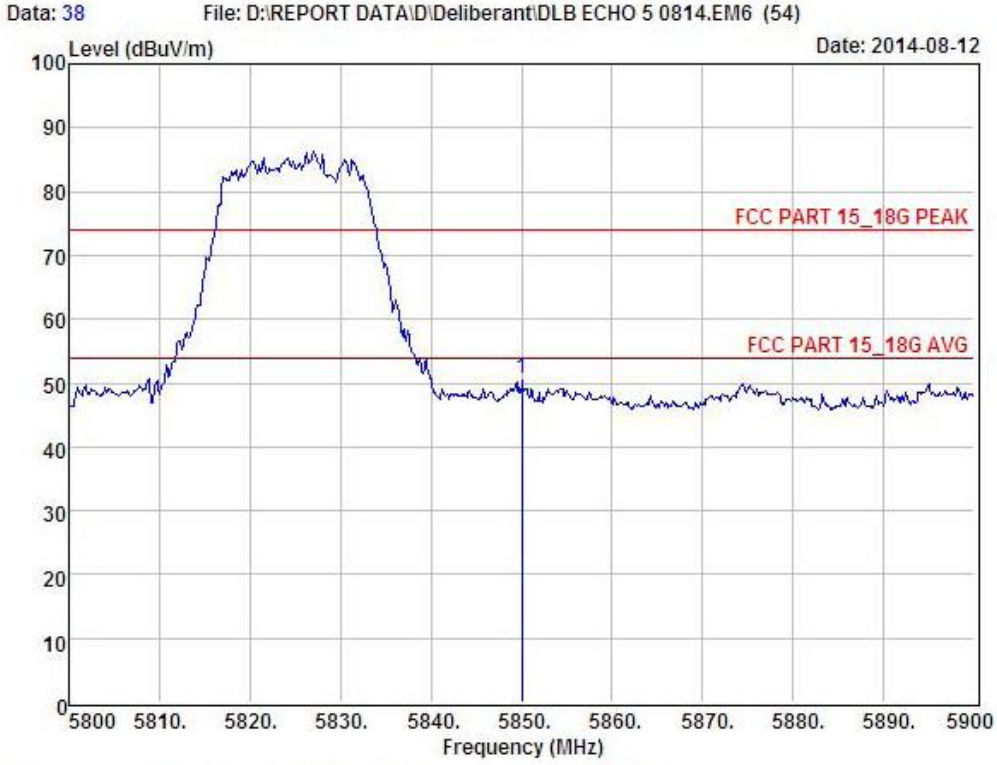

Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11a High
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	45.59	32.50	33.64	6.33	50.78	74.00	-23.22	

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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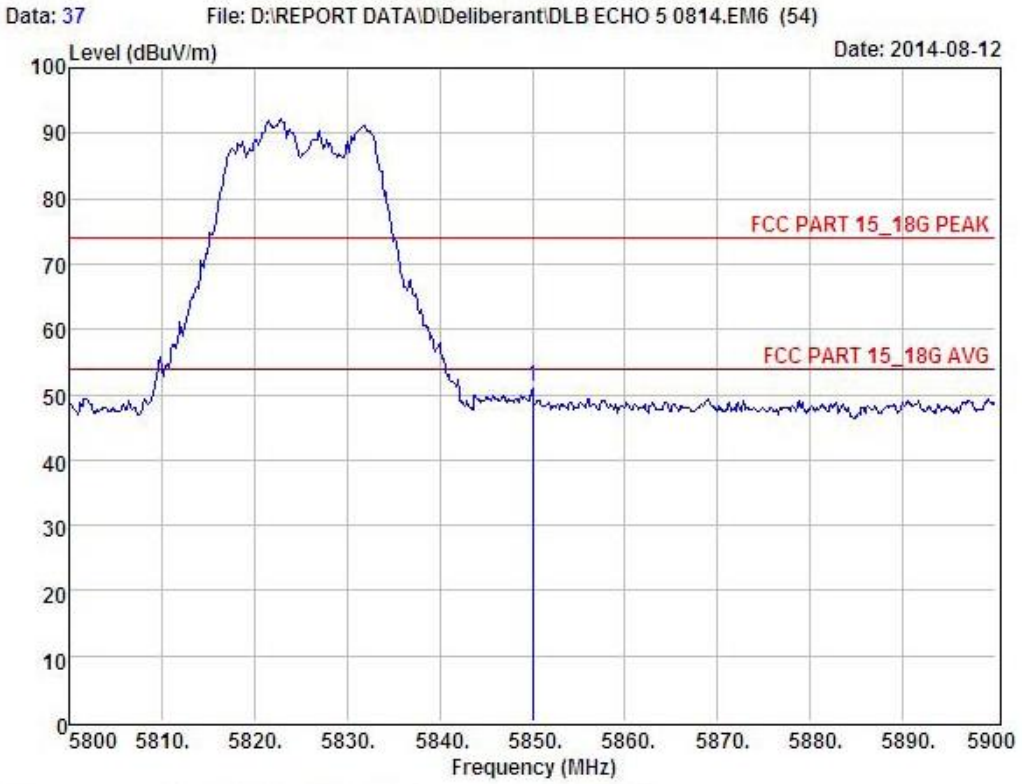

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11a High
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	45.91	32.50	33.64	6.33	51.10	74.00	-22.90	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

IEEE 802.11n HT20:
CH Low :

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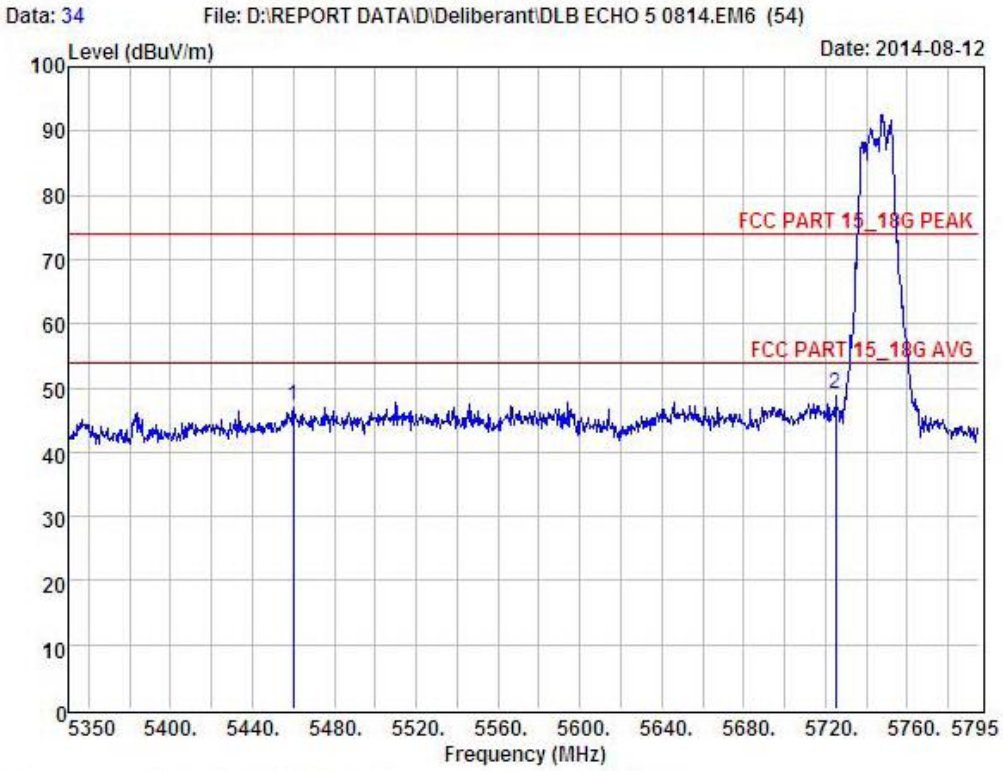
Website: http://www.cessz.com Email: Service@cessz.com




```
Condition      : FCC PART 15_18G PEAK 3m       POL: HORIZONTAL
EUT            : Broadband Digital Transmission System
Model No       : DLB ECHO 5
Test Mode      : 802.11nHT20 Low
Power          : DC 24V
Test Engineer  : Peter
Remark         :
Temp           : 24.2℃
Hum            : 54%
```

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	43.01	31.81	33.65	6.11	47.28	74.00	-26.72	Peak
2	5725.00	43.99	32.27	33.58	6.26	48.94	74.00	-25.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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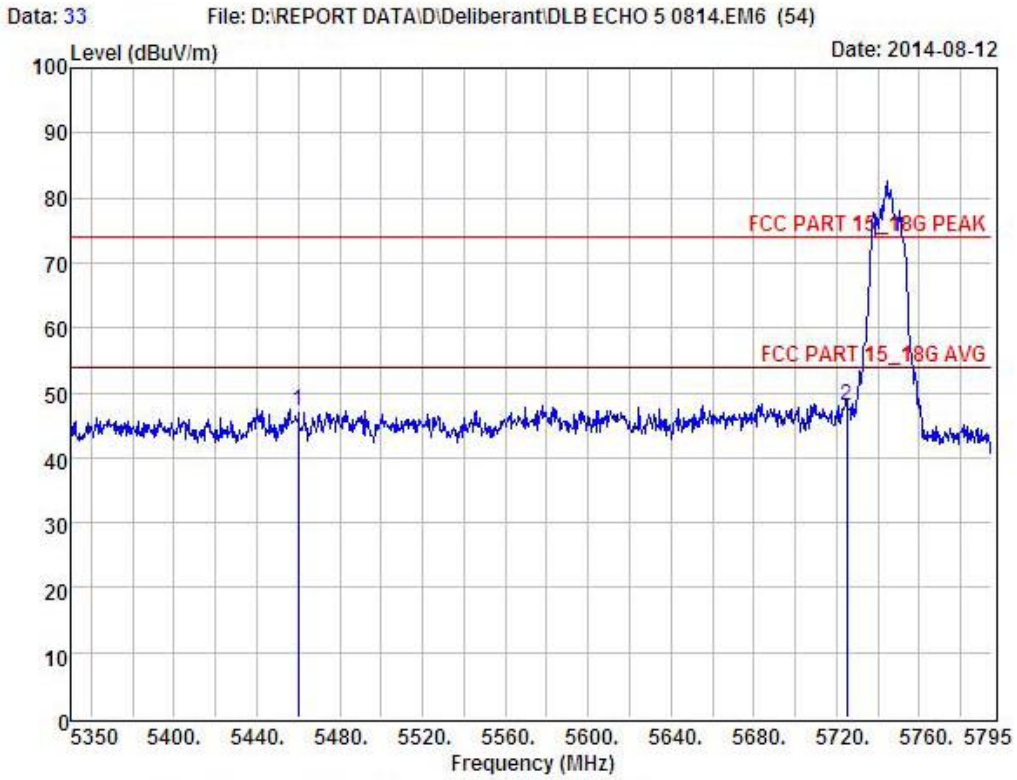

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT20 Low
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	43.01	31.81	33.65	6.11	47.28	74.00	-26.72	Peak
2	5725.00	42.99	32.27	33.58	6.26	47.94	74.00	-26.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

IEEE 802.11n HT20:
CH High :

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2F, Building B, East Area of Nanchang Second Industrial Zone,
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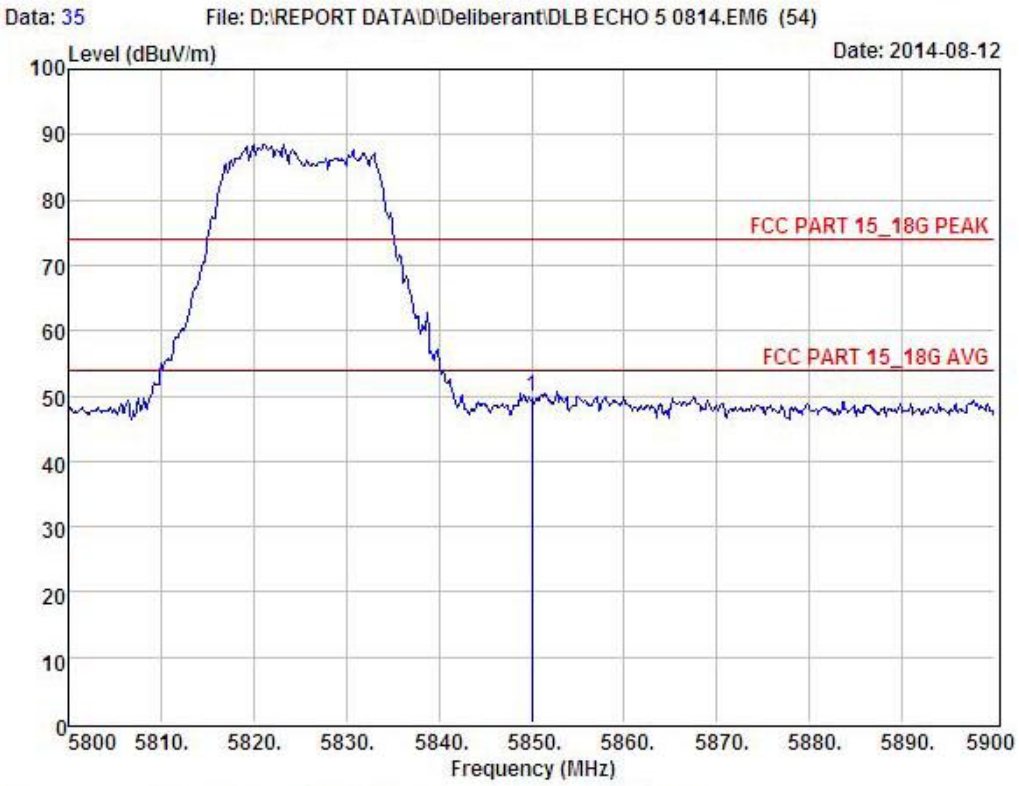


```
Condition      : FCC PART 15_18G PEAK 3m       POL: HORIZONTAL
EUT            : Broadband Digital Transmission System
Model No       : DLB ECHO 5
Test Mode      : 802.11nHT20 High
Power          : DC 24V
Test Engineer  : Peter
Remark         :
Temp           : 24.2℃
Hum            : 54%
```

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	44.75	32.50	33.64	6.33	49.94	74.00	-24.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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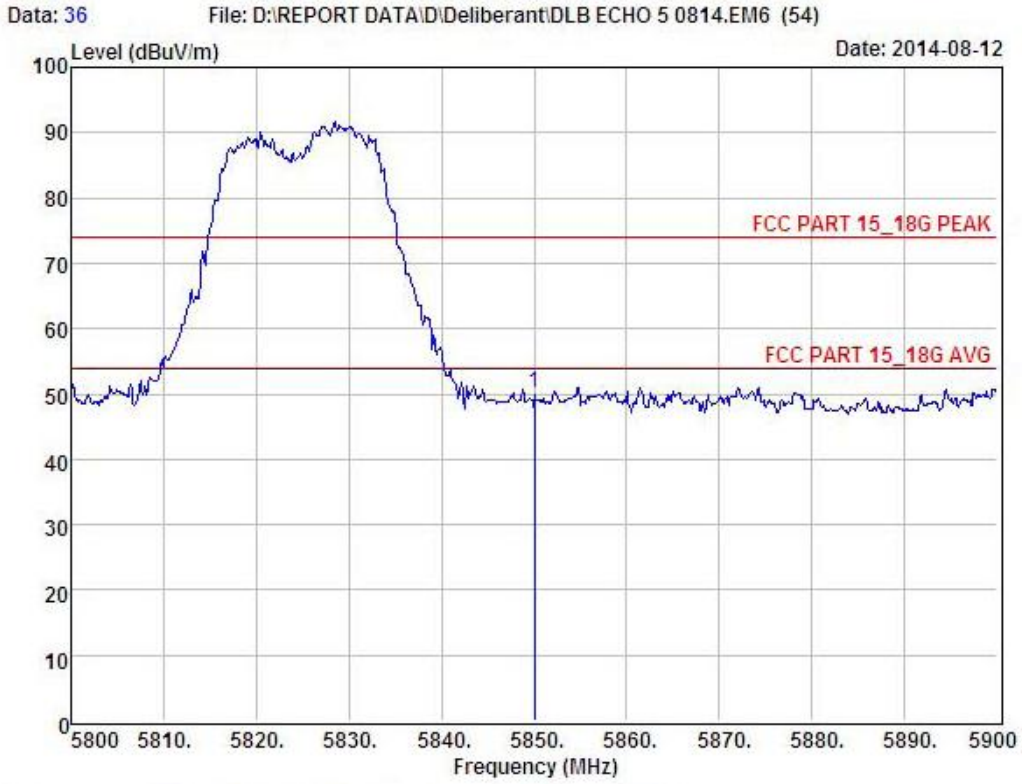

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT20 High
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	44.82	32.50	33.64	6.33	50.01	74.00	-23.99	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

IEEE 802.11n HT40:
CH Low :

Shenzhen Certification Technology Service Co., Ltd.
2F, Building B, East Area of Nanchang Second Industrial Zone,
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Tel: 4006786199 FAX: +86-755-26736857
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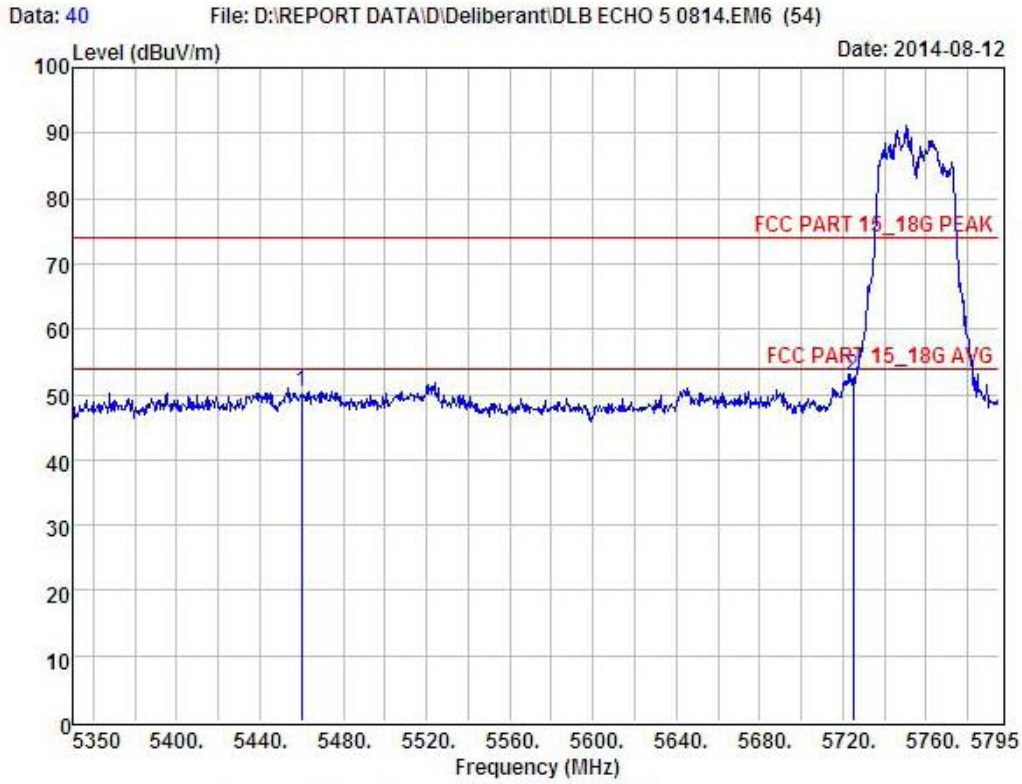

Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT40 Low
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	46.01	31.81	33.65	6.11	50.28	74.00	-23.72	Peak
2	5725.00	47.99	32.27	33.58	6.26	52.94	74.00	-21.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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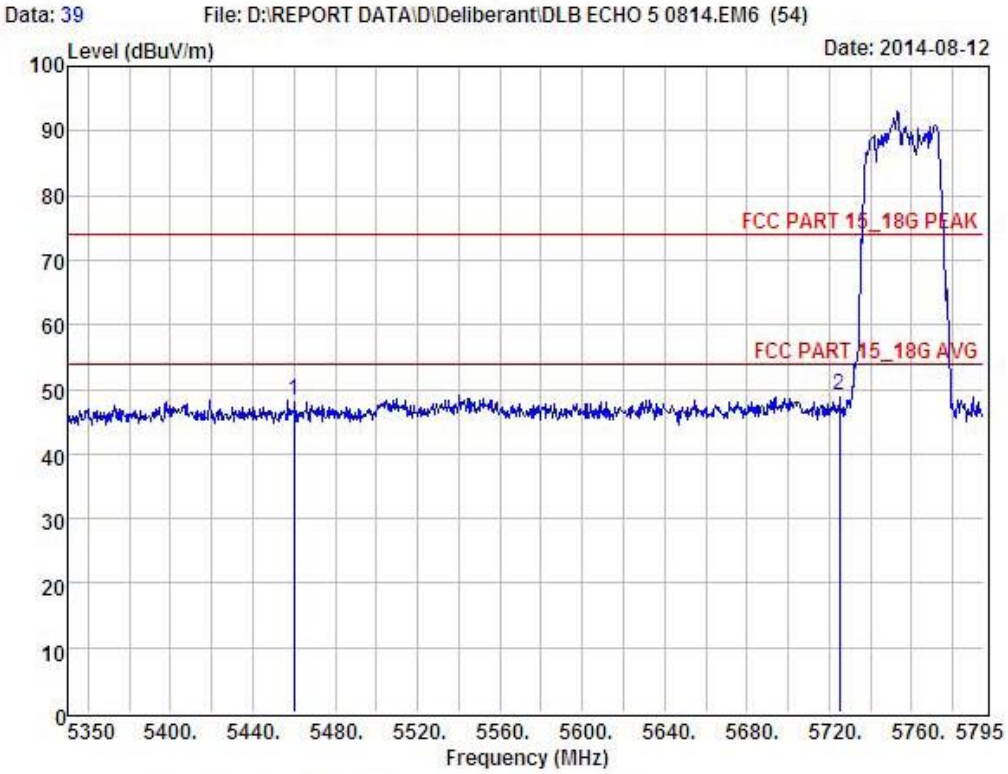

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT40 Low
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5460.00	44.01	31.81	33.65	6.11	48.28	74.00	-25.72	Peak
2	5725.00	43.99	32.27	33.58	6.26	48.94	74.00	-25.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

IEEE 802.11n HT40:
CH High :

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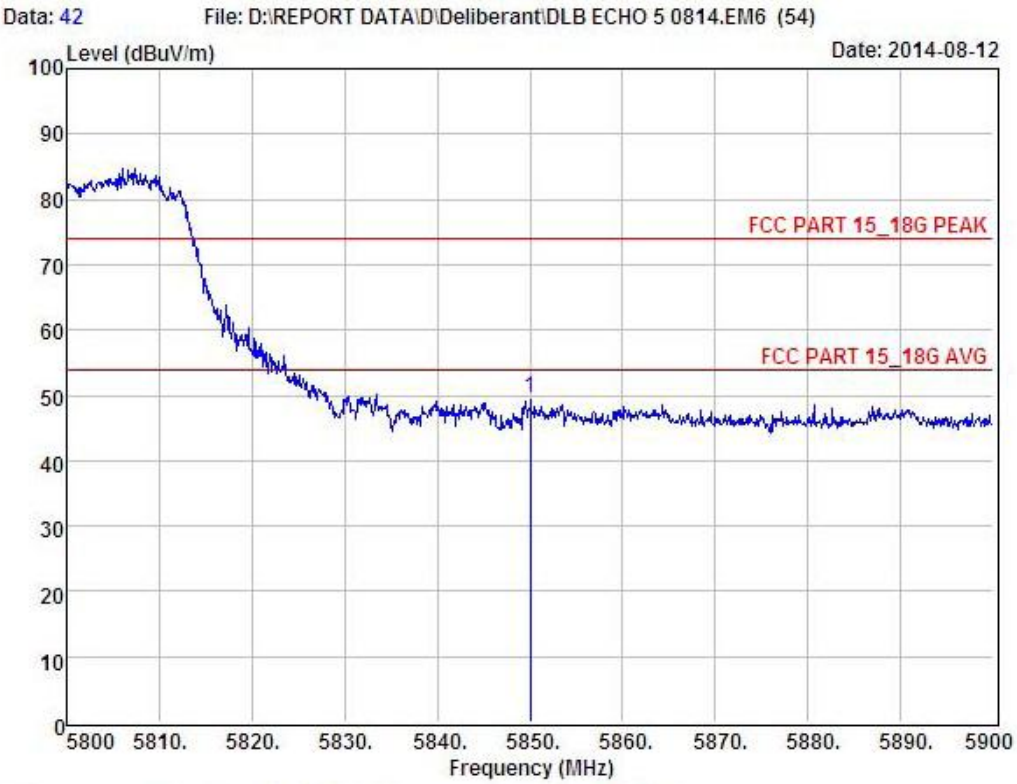


```
Condition      : FCC PART 15_18G PEAK 3m       POL: HORIZONTAL
EUT            : Broadband Digital Transmission System
Model No       : DLB ECHO 5
Test Mode      : 802.11nHT40 High
Power          : DC 24V
Test Engineer  : Peter
Remark         :
Temp           : 24.2℃
Hum            : 54%
```

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	44.31	32.50	33.64	6.33	49.50	74.00	-24.50	

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

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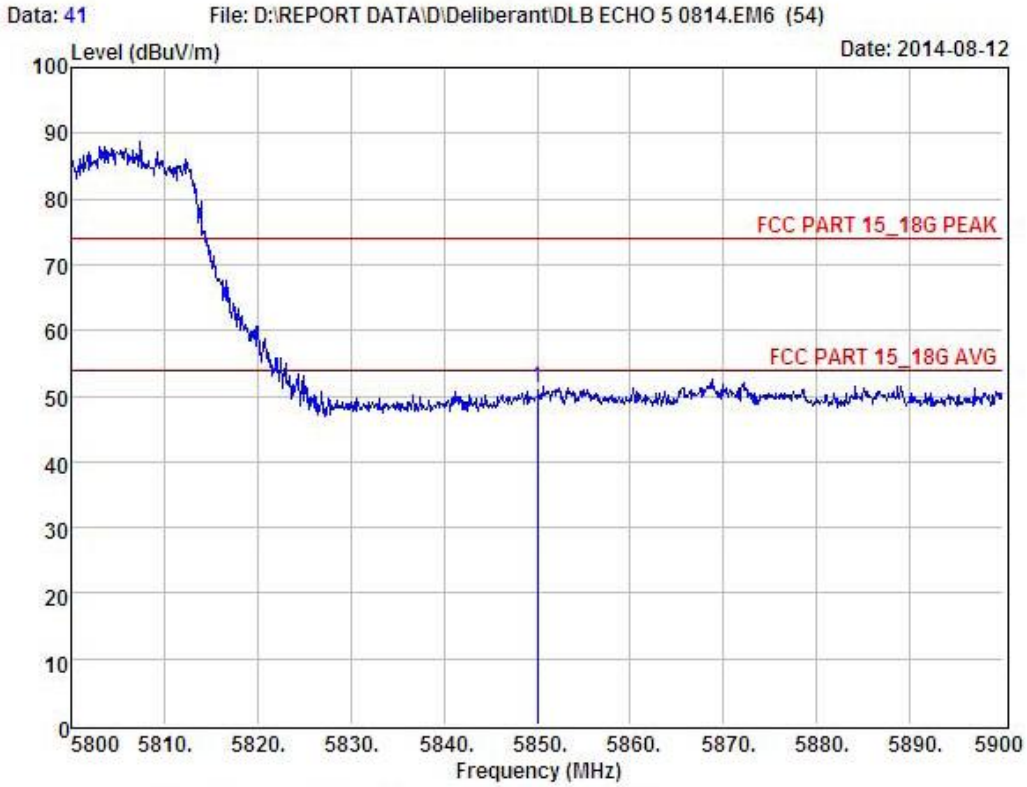

Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : Broadband Digital Transmission System
Model No : DLB ECHO 5
Test Mode : 802.11nHT40 High
Power : DC 24V
Test Engineer : Peter
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	5850.00	45.99	32.50	33.64	6.33	51.18	74.00	-22.82	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

11 Antenna Requirement

11.1 Standard Requirement

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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

11.2 Antenna Connected Construction

All EUT antenna configurations are professional installations.

11.3 Result

Pass

---------END OF THE REPORT-------