Certificate No.: CB10202032

FCC and IC Radio Test Report

Equipment	:	Cisco Aironet 700 Series Access Point
Brand Name	:	CISCO
Model No.	:	AIR-CAP702I-A-K9, AIR-SAP702I-A-K9, AIR-CAP702I-N-K9, AIR-SAP702I-N-K9, AIR-CAP702I-Z-K9, AIR-SAP702I-Z-K9
FCC ID	:	LDK102085
IC	:	2461B-102085
Standard	:	47 CFR FCC Part 15.407 IC RSS-210 Issue 8 and RSS-Gen Issue 3
Frequency Range	:	5470 MHz – 5725 MHz
Equipment Class	:	NII
Applicant	:	CISCO System, Inc. 170 West Tasman Drive San Jose, CA 95134-1706
Manufacturer	:	Wistron NeWeb Corporation 20 Park Avenue II, Hsinchu Science Park, Hsinchu 308,Taiwan,R.O.C.
Operate Mode	:	Master

The product sample received on Oct. 05, 2012 and completely tested on Dec. 12, 2012. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Sam Chen

Testing Laboratory
1190

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Summary of Test Result

Conformance Test Specifications						
Report Clause	**Ref. Std. Clause**	**IC Std. Clause**	**Description**	**Measured**	**Limit**	**Result**
1.1.2	15.203	-	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	RSS-Gen 7.2.4	AC Power-line Conducted Emissions	[dBuV]: 21.169MHz 38.62 (Margin 11.38dB) - AV 40.70 (Margin 19.30dB) - QP	FCC 15.207 / RSS-Gen 7.2.4	Complied
3.2	15.407(a)	RSS-210 A9.2	Emission Bandwidth	Bandwidth [MHz] 20M:25.28 / 40M:52.64	Information only	Complied
3.3	15.407(a)	RSS-210 A9.2	RF Output Power (Maximum Conducted Output Power)	Power [dBm] 20M:20.62 / 40M:20.38	Power [dBm]:24	Complied
3.4	15.407(a)	RSS-210 A9.2	Peak Power Spectral Density	PPSD [dBm/MHz]: 20M:7.76 / 40M:4.69	PPSD [dBm/MHz]:11	Complied
3.5	15.407(a)	-	Peak Excursion	Peak Excursion [dB] 20M:10.64 / 40M:11.42	13 dB	Complied
3.6	15.407(b)	RSS-210 A9.2	Transmitter Conducted Bandedge Emissions	[dBm]: -25.35(Margin 4.10dB) - PK -41.35(Margin 0.10dB) - AV	Non-Restricted Bands: ≤ -27dBm Restricted Bands: FCC 15.209 / RSS-Gen 7.2.5 PK: -21.25dBm AV: -41.25dBm	Complied
3.7	15.407(b)	RSS-210 A9.2	Transmitter Conducted Unwanted Emissions	-28.03dB (Margin 1.03dB)	e.i.r.p. -27 dBm	Complied
3.8	15.407(b)	RSS-210 A9.2	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 41.09MHz 36.65 (Margin 3.35dB) - QP	Restricted Bands: FCC 15.209 / RSS-Gen 7.2.5	Complied
3.9	15.407(g)	-	Frequency Stability	1.76 ppm	Signal shall remain in-band	Complied

Revision History

Report No.	Version	Description	Issued Date
FR281405-03AE	Rev. 01	Initial issue of report	Feb. 08, 2013

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information				
Frequency Range (MHz)	**Operating Mode**	**Ch. Freq. (MHz)**	**Channel Number**	**Co-location**
5470-5725	Non HT-20, 6 to 54Mbps	5500-5700	100-140 [8]	Yes
5470-5725	Non HT-20, Beam Forming, 6 to 54Mbps	5500-5700	100-140 [8]	Yes
5470-5725	HT-20, M0 to M15	5500-5700	100-140 [8]	Yes
5470-5725	HT-20, STBC, M0 to M7	5500-5700	100-140 [8]	Yes
5470-5725	HT-20, Beam Forming, M0 to M7	5500-5700	100-140 [8]	Yes
5470-5725	HT-20, Beam Forming, M8 to M15	5500-5700	100-140 [8]	Yes
5470-5725	HT-40, M0 to M15	5510-5670	102-134 [3]	Yes
5470-5725	HT-40, STBC, M0 to M7	5510-5670	102-134 [3]	Yes
5470-5725	HT-40, Beam Forming, M0 to M7	5510-5670	102-134 [3]	Yes
5470-5725	HT-40, Beam Forming, M8 to M15	5510-5670	102-134 [3]	Yes

Note 1: RF output power specifies that Maximum Conducted Output Power.
Note 2: Non HT-20 / HT-20 / HT-40 uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
Note 3: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	WNC	WNC	PIFA Antenna	I-PEX	5
2	WNC	WNC	PIFA Antenna	I-PEX	5

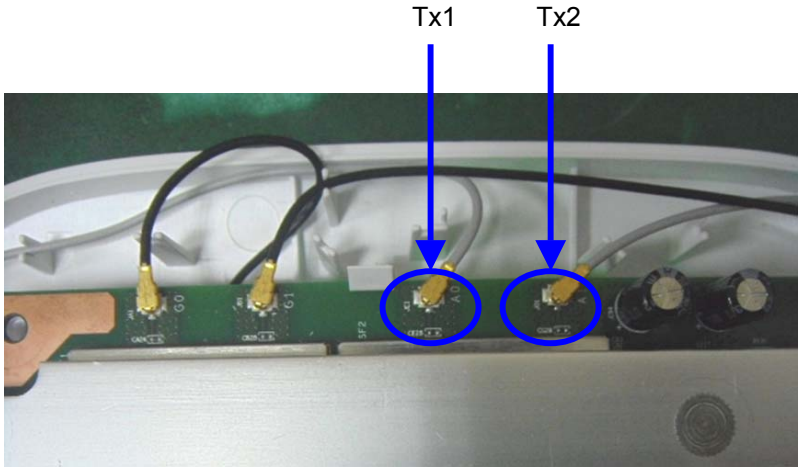
1.1.3 EUT Description

Operating Mode	Non HT-20 6 to 54Mbps		Non HT-20 BF 6 to 54Mbps		HT-20 M0 to M15		HT-20 STBC M0 to M7		HT-20BF M0 to M7		HT-20 BF M8 to M15	
Tx	1	2	1	2	1	2	1	2	1	2	1	2
Single (Tx)	V	-	-	-	V	-	-	-	-	-	-	-
Two (Tx)	V	V	V	V	V	V	V	V	V	V	V	V

Note: BF: Beam Forming

Operating Mode	HT-40 M0 to M15		HT-40 STBC M0 to M7		HT-40 BF M0 to M7		HT-40 BF M8 to M15	
Tx	1	2	1	2	1	2	1	2
Single (Tx)	V	-	-	-	-	-	-	-
Two (Tx)	V	V	V	V	V	V	V	V

Note: BF: Beam Forming



1.1.4 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	☐ Production ; ☒ Pre-Production ; ☐ Prototype
The EUT has six model names. All the models are identical; the different model names served as marketing strategy.	
Type of EUT	
☒	Stand-alone
☐	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: …
☐	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: …
☐	Other:

1.1.5 EUT Operational Condition

EUT Power Type	From Power Adapter / POE

1.1.6 DFS and TPC Information

The DFS/TPC Related Operating Mode(s) of the Equipment		
☒ Master		
☐ Slave with radar detection		
☐ Slave without radar detection		
Software / Firmware Version		
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
Frequency Range (MHz)	**TPC (Transmit Power Control)**	**Active Scan**
5470-5725	Yes	Yes
5600-5650	-	-

1.2 Accessories

Accessories					
No.	Equipment Name	Brand Name	Model Name	Rating	Remark
1	AC Adapter	CISCO	AA25480L	INPUT: 100-240V ~ 600mA, 50/60Hz OUTPUT: 48V, 380mA	With power cable
2	AC Adapter	CISCO	EADP-18MB B	INPUT: 100-240V ~ 0.5A, 50-60Hz OUTPUT: 48V, 0.38A	With power cable

1.3 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	M1330	E2KWM3945ABG
2	Notebook	DELL	E6220	E2KWM3945ABG
3	Notebook	DELL	E6220	E2KWM3945ABG
4	Notebook	DELL	E6400	E2KWM3945ABG
5	POE	CISCO	DPSN-35FB A	N/A
6	POE	CISCO	POE30U-560(G)	N/A
7	POE Swich	MOTOROLA	RFS-4010	N/A

1.4 Testing Applied Standards

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

- 47 CFR FCC Part 15
- ANSI C63.10-2009
- FCC KDB 789033
- FCC KDB 662911
- FCC KDB 412172
- IC RSS-210 Issue 8 and RSS-Gen Issue 3

1.5 Testing Location Information

Testing Location			
☐	HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
		TEL : 886-3-327-3456	FAX : 886-3-318-0055
☒	JHUBEI	ADD :	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
		TEL : 886-3-656-9065	FAX : 886-3-656-9085

Test Condition	Test Site No.	Test Engineer	Test Environment
RF Conducted	TH01-CB	Satoshi Yang	24°C / 60%
AC Conduction	CO01-CB	Sollo Luo	24°C / 64%
Radiated Emission	03CH01-CB	Satoshi Yang	24°C / 60%

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty			
Test Item		**Uncertainty**	**Limit**
AC power-line conducted emissions		±2.26 dB	N/A
Emission bandwidth		±1.42 %	N/A
RF output power, conducted		±0.63 dB	N/A
Power density, conducted		±0.81 dB	N/A
Unwanted emissions, conducted	30 – 1000 MHz	±0.51 dB	N/A
	1 – 18 GHz	±0.67 dB	N/A
	18 – 40 GHz	±0.83 dB	N/A
	40 – 200 GHz	N/A	N/A
All emissions, radiated	30 – 1000 MHz	±2.56 dB	N/A
	1 – 18 GHz	±3.59 dB	N/A
	18 – 40 GHz	±3.82 dB	N/A
	40 – 200 GHz	N/A	N/A
Temperature		±0.8 °C	N/A
Humidity		±3 %	N/A
DC and low frequency voltages		±3 %	N/A
Time		±1.42 %	N/A
Duty Cycle		±1.42 %	N/A

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing	
Operating Mode	**Worst Data Rate / MCS**
Non HT-20, 6 to 54Mbps	6Mbps
Non HT-20, Beam Forming, 6 to 54Mbps	6Mbps
HT-20, M0 to M15	6.5Mbps (M0)
HT-20, STBC, M0 to M7	6.5Mbps (M0)
HT-20, Beam Forming, M0 to M7	6.5Mbps (M0)
HT-20, Beam Forming, M8 to M15	13Mbps (M8)
HT-40, M0 to M15	13.5Mbps (M0)
HT-40, STBC, M0 to M7	13.5Mbps (M0)
HT-40, Beam Forming, M0 to M7	13.5Mbps (M0)
HT-40, Beam Forming, M8 to M15	27Mbps (M8)
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Worst modulation mode of Guard Interval (GI) is 400ns. Note 2: Modulation modes consist of below configuration: M: Modulation and Coding Scheme Note 3: RF output power specifies that Maximum Conducted Output Power.	

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration	
Operating Mode	**Test Channel Frequencies (MHz)**
Non HT-20, 6 to 54Mbps	5500, 5580, 5700
Non HT-20, Beam Forming, 6 to 54Mbps	
HT-20, M0 to M15	
HT-20, STBC, M0 to M7	
HT-20, Beam Forming, M0 to M7	
HT-20, Beam Forming, M8 to M15	
HT-40, M0 to M15	5510, 5550, 5670
HT-40, STBC, M0 to M7	
HT-40, Beam Forming, M0 to M7	
HT-40, Beam Forming, M8 to M15	

2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter							
Test Software Version	ART 2 GUI:2.3						
Operating Mode	**N_{TX}**	**Test Frequency (MHz)**					
		NCB: 20MHz			**NCB: 40MHz**		
		5500	**5580**	**5700**	**5510**	**5550**	**5670**
Non HT-20, 6 to 54Mbps	1	-	-	16.5	-	-	-
Non HT-20, 6 to 54Mbps	2	16.5	16.5	16.5	-	-	-
Non HT-20, Beam Forming, 6 to 54Mbps	2	16.5	16.5	13.5	-	-	-
HT-20, M0 to M7	1	-	-	16.5	-	-	-
HT-20, M0 to M15	2	16.5	16.5	16	-	-	-
HT-20, STBC, M0 to M7	2	16.5	16.5	16	-	-	-
HT-20, Beam Forming, M0 to M7	2	16.5	16.5	13	-	-	-
HT-20, Beam Forming, M8 to M15	2	16.5	16.5	16	-	-	-
HT-40, M0 to M7	1	-	-	-	14.5	-	-
HT-40, M0 to M15	2	-	-	-	13	16.5	17
HT-40, STBC, M0 to M7	2	-	-	-	13	16.5	17
HT-40, Beam Forming, M0 to M7	2	-	-	-	10	16.5	15.5
HT-40, Beam Forming, M8 to M15	2	-	-	-	13	16.5	17

2.4 Target Maximum Channel Power

		Target Maximum Channel Power (dBm)		
Operating Mode	**N_{TX}**	**Frequency (MHz)**		
		5500	**5580**	**5700**
Non HT-20, 6 to 54Mbps	1	-	-	17.06
Non HT-20, 6 to 54Mbps	2	20.51	20.38	19.22
Non HT-20, Beam Forming, 6 to 54Mbps	2	20.51	20.38	16.37
HT-20, M0 to M7	1	-	-	17.18
HT-20, M0 to M15	2	20.62	20.58	18.76
HT-20, STBC, M0 to M7	2	20.62	20.58	18.76
HT-20, Beam Forming, M0 to M7	2	20.62	20.58	15.95
HT-20, Beam Forming, M8 to M15	2	20.44	20.39	18.97
		5510	**5550**	**5670**
HT-40, M0 to M7	1	16.23	-	-
HT-40, M0 to M15	2	16.92	20.38	24.00
HT-40, STBC, M0 to M7	2	16.92	20.38	24.00
HT-40, Beam Forming, M0 to M7	2	14.03	20.38	21.99
HT-40, Beam Forming, M8 to M15	2	16.69	20.22	24.00

2.5 EUT Operation during Test

During the test, “ART 2 GUI:2.3” under WIN XP was executed the test program to control the EUT continuously transmit RF signal.

2.6 The Worst Case Measurement Configuration

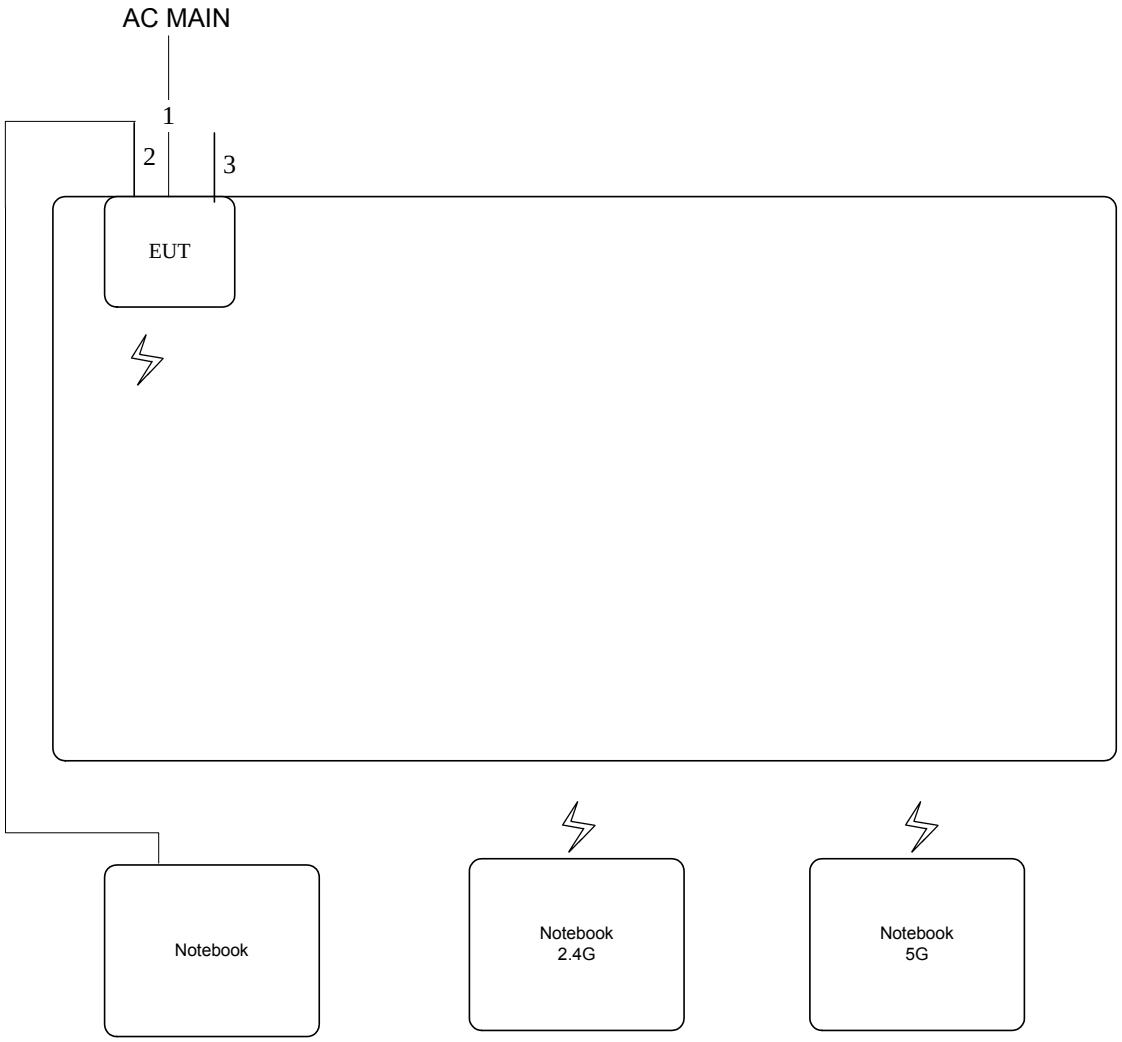
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Test Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Test Mode	Normal Link
1	EUT with AC Adapter 1 (CISCO AA25480L)
2	EUT with AC Adapter 2 (CISCO EADP-18MB B)
For test mode 2 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emission Bandwidth RF Output Power Peak Power Spectral Density Peak Excursion Transmitter Conducted Bandedge Emissions Transmitter Conducted Unwanted Emissions Frequency Stability
Test Condition	Conducted measurement at transmit chains
Operating Mode	Non HT-20 / Non HT-20, Beam Forming / HT-20 / HT-20, STBC / HT-20, Beam Forming / HT-40 / HT-40, STBC / HT-40, Beam Forming

The Worst Case Mode for Following Conformance Tests	
Tests Item	Transmitter Radiated Unwanted Emissions
Test Condition	Radiated measurement
Test Mode < 1GHz	Normal Link
1	Stand-up of EUT with AC Adapter 1 (CISCO AA25480L)
2	Laying-flat of EUT with AC Adapter 1 (CISCO AA25480L)
Mode 1 has been evaluated to be the worst case, thus measurement will follow this same test mode.	
3	Stand-up of EUT with AC Adapter 2 (CISCO EADP-18MB B)
4	Stand-up of EUT with POE 1 (CISCO DPSN-35FB A)
5	Stand-up of EUT with POE 2 (CISCO POE30U-560(G))
6	Stand-up of EUT with POE Swich (MOTOROLA RFS-4010)
For test mode 4 is the worst case and it was record in this test report.	
Operating Mode	Non HT-20 / Non HT-20, Beam Forming / HT-20 / HT-20, STBC / HT-20, Beam Forming / HT-40 / HT-40, STBC / HT-40, Beam Forming
Test Mode > 1GHz	Continuously transmit RF signal
1	Stand-up of EUT
2	Laying-flat of EUT
For test mode 2 is the worst case and it was record in this test report.	

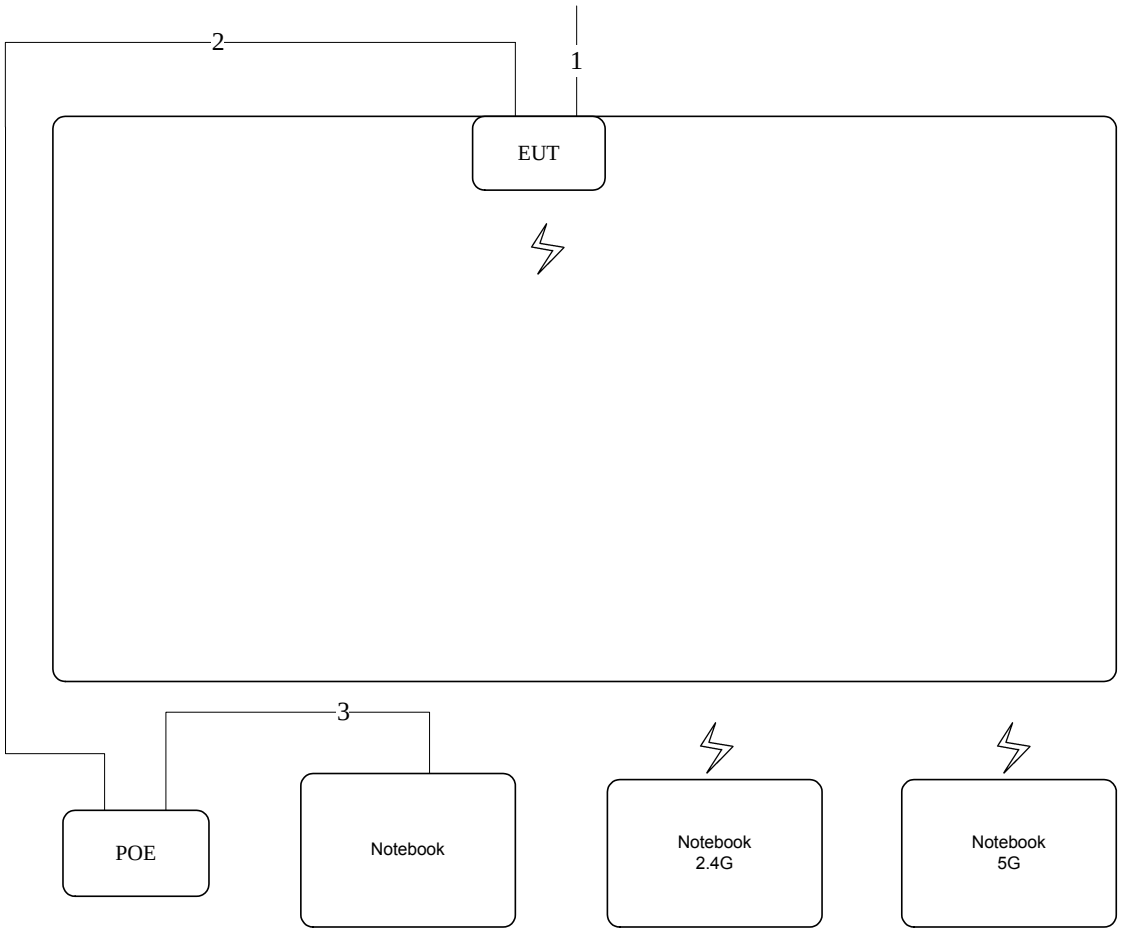
2.7 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test	
Test Mode 2	EUT with AC Adapter 2 (CISCO EADP-18MB B)



Item	Connection	Shield	Length	Remark
1	Power Cable	No	1.8m	-
2	RJ-45 Cable	No	10m	-
3	RS-232 Cable	No	1.5m	-

Test Setup Diagram - Radiated Test	
Test Mode 4	Stand-up of EUT with POE 1 (CISCO DPSN-35FB A)



Item	Connection	Shield	Length	Remark
1	RS-232 Cable	No	1.5m	-
2	RJ-45 Cable	No	10m	-
3	RJ-45 Cable	No	1.5m	-

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

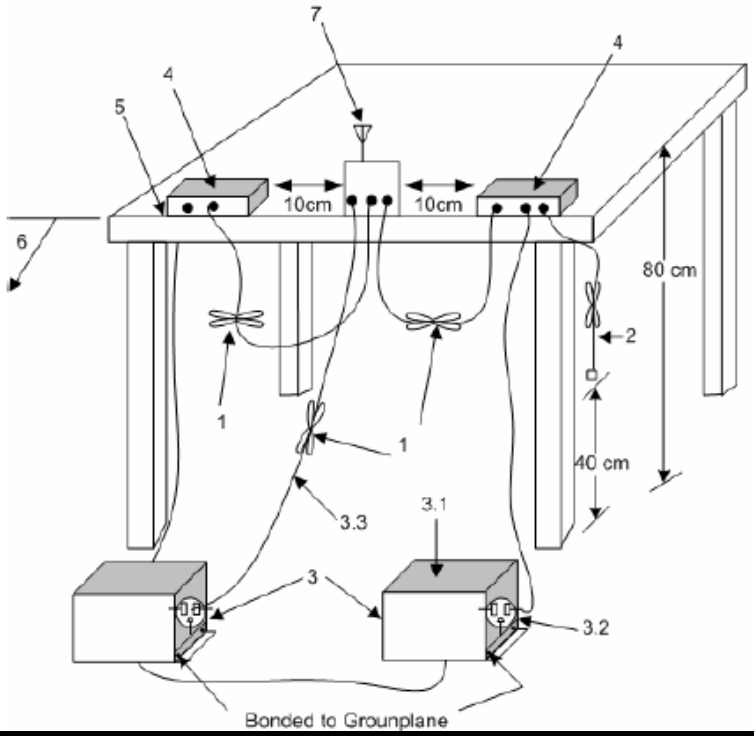
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
☒ Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

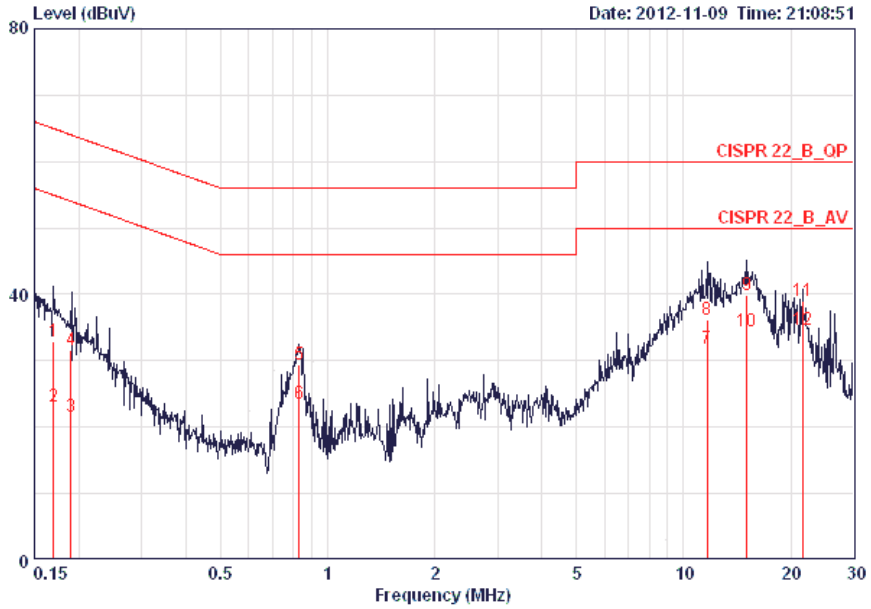
3.1.4 Test Setup

AC Power-line Conducted Emissions



3.1.5 Test Result of AC Power-line Conducted Emissions

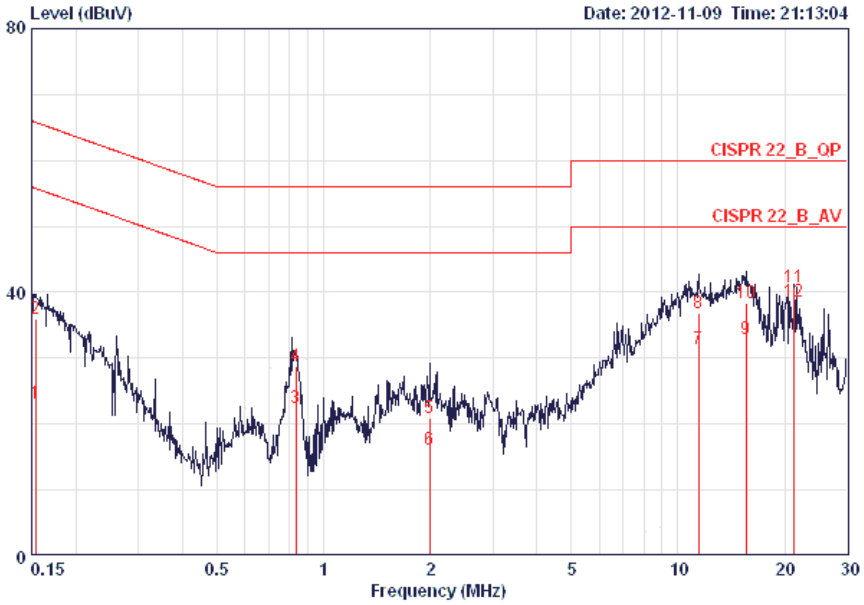
AC Power-line Conducted Emissions Result			
Test Mode	2	**Power Phase**	Neutral
Operating Function	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.16944	32.98	-32.01	64.99	32.70	0.08	0.20	NEUTRAL	QP
2	0.16944	23.05	-31.94	54.99	22.77	0.08	0.20	NEUTRAL	AVERAGE
3	0.18959	21.48	-32.57	54.05	21.20	0.08	0.20	NEUTRAL	AVERAGE
4	0.18959	31.50	-32.55	64.05	31.22	0.08	0.20	NEUTRAL	QP
5	0.83047	29.50	-26.50	56.00	29.21	0.09	0.20	NEUTRAL	QP
6	0.83047	23.49	-22.51	46.00	23.20	0.09	0.20	NEUTRAL	AVERAGE
7	11.621	31.73	-18.27	50.00	31.07	0.26	0.40	NEUTRAL	AVERAGE
8	11.621	36.29	-23.71	60.00	35.63	0.26	0.40	NEUTRAL	QP
9	15.066	39.92	-20.08	60.00	39.20	0.32	0.40	NEUTRAL	QP
10	15.066	34.55	-15.45	50.00	33.83	0.32	0.40	NEUTRAL	AVERAGE
11	21.662	38.91	-21.09	60.00	37.99	0.42	0.50	NEUTRAL	QP
12	21.662	34.57	-15.43	50.00	33.65	0.42	0.50	NEUTRAL	AVERAGE

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

AC Power-line Conducted Emissions Result			
Test Mode	2	**Power Phase**	Line
Operating Function	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15403	23.07	-32.71	55.78	22.71	0.16	0.20	LINE	AVERAGE
2	0.15403	36.02	-29.76	65.78	35.66	0.16	0.20	LINE	QP
3	0.83337	22.47	-23.53	46.00	22.11	0.16	0.20	LINE	AVERAGE
4	0.83337	28.81	-27.19	56.00	28.45	0.16	0.20	LINE	QP
5	1.991	20.87	-35.13	56.00	20.48	0.19	0.20	LINE	QP
6	1.991	16.05	-29.95	46.00	15.66	0.19	0.20	LINE	AVERAGE
7	11.438	31.31	-18.69	50.00	30.55	0.36	0.40	LINE	AVERAGE
8	11.438	36.85	-23.15	60.00	36.09	0.36	0.40	LINE	QP
9	15.552	32.98	-17.02	50.00	32.16	0.42	0.40	LINE	AVERAGE
10	15.552	38.45	-21.55	60.00	37.63	0.42	0.40	LINE	QP
11	21.169	40.70	-19.30	60.00	39.70	0.50	0.50	LINE	QP
12 @	21.169	38.62	-11.38	50.00	37.62	0.50	0.50	LINE	AVERAGE

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

3.2 Emission Bandwidth

3.2.1 Emission Bandwidth (EBW) Limit

Emission Bandwidth (EBW) Limit
For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.

3.2.2 Measuring Instruments

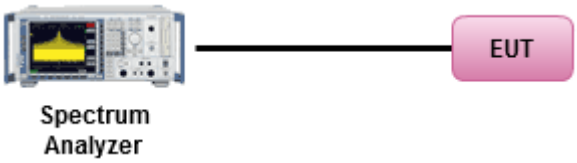
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
☒	For the emission bandwidth shall be measured using one of the options below:
☒	Refer as FCC KDB 789033, clause D for EBW measurement.
☐	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
☒	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.

3.2.4 Test Setup

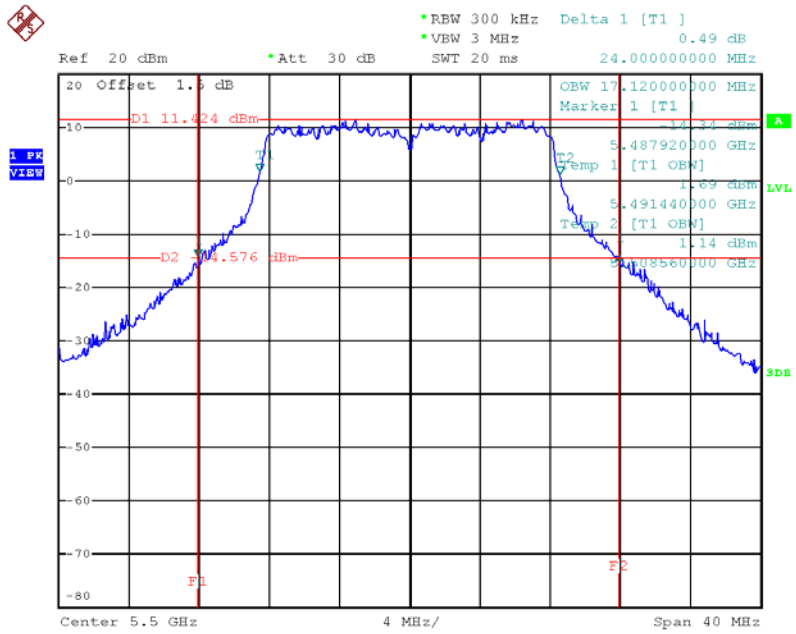
Emission Bandwidth



3.2.5 Test Result of Emission Bandwidth

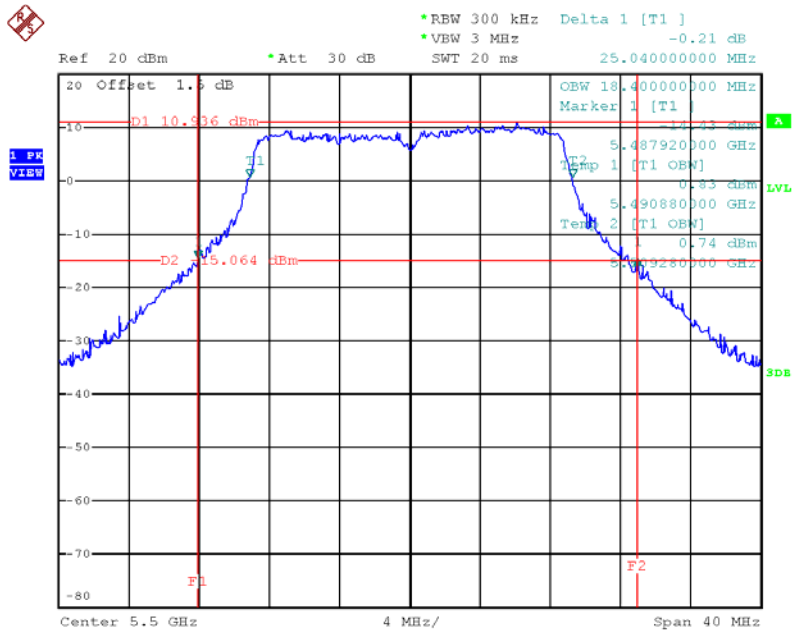
Freq. (MHz)	Operating Mode	Data Rate (Mbps)	99% BW (MHz)	26dB BW (MHz)
5500	Non HT-20, 6 to 54Mbps	6	17.12	24
	HT-20, Beam Forming, M0 to M7	M0	18.4	25.04
	HT-20, Beam Forming, M8 to M15	M8	18.24	24.16
5580	Non HT-20, 6 to 54Mbps	6	17.12	23.6
	HT-20, Beam Forming, M0 to M7	M0	18.4	25.28
	HT-20, Beam Forming, M8 to M15	M8	18.24	23.92
5700	Non HT-20, 6 to 54Mbps	6	17.12	24.08
	Non HT-20, 6 to 54Mbps	6	17.12	24.08
	HT-20, M0 to M7	M0	18.4	24.96
	HT-20, Beam Forming, M0 to M7	M0	18.4	24.96
	HT-20, Beam Forming, M8 to M15	M8	18.24	23.92
5510	HT-40, M0 to M7	M0	39.04	54.08
	HT-40, Beam Forming, M0 to M7	M0	38.4	50.72
	HT-40, Beam Forming, M8 to M15	M8	38..24	52.16
5550	HT-40, Beam Forming, M0 to M7	M0	38.4	51.2
	HT-40, Beam Forming, M8 to M15	M8	38.08	51.04
5670	HT-40, Beam Forming, M0 to M7	M0	38.4	52.64
	HT-40, Beam Forming, M8 to M15	M8	38.08	51.68

26 dB and 99% Bandwidth Plot on 5500 MHz, Non HT-20, 6Mbps



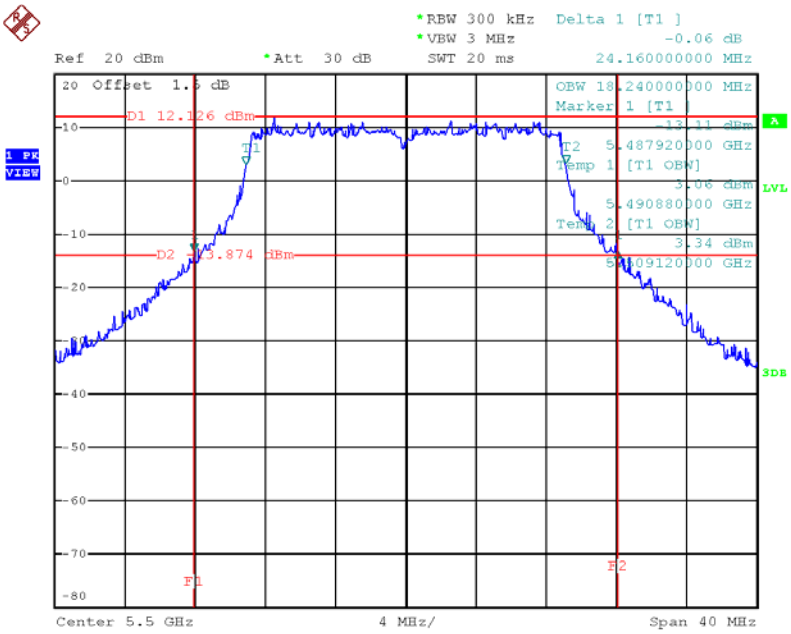
Date: 24.OCT.2012 04:16:39

26 dB and 99% Bandwidth Plot on 5500 MHz, HT-20, Beam Forming, M0



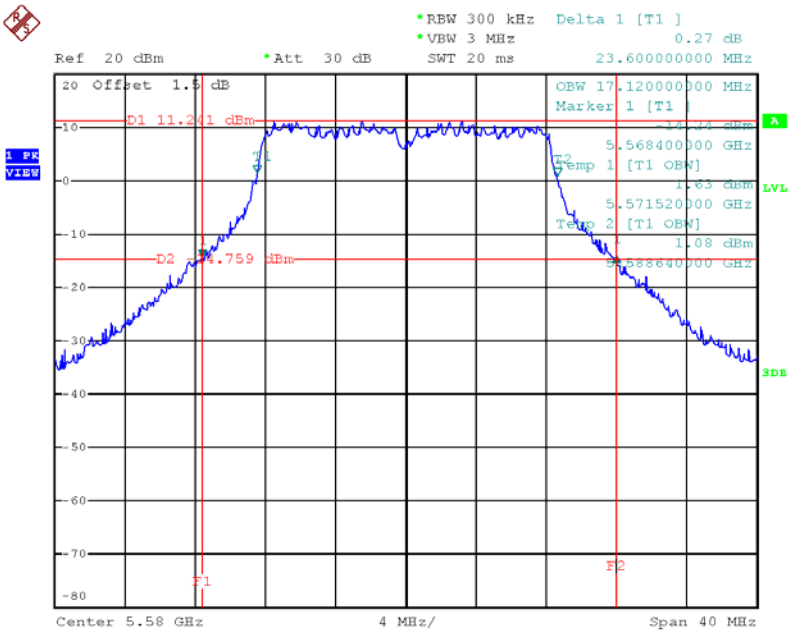
Date: 24.OCT.2012 04:20:00

26 dB and 99% Bandwidth Plot on 5500 MHz, HT-20, Beam Forming, M8



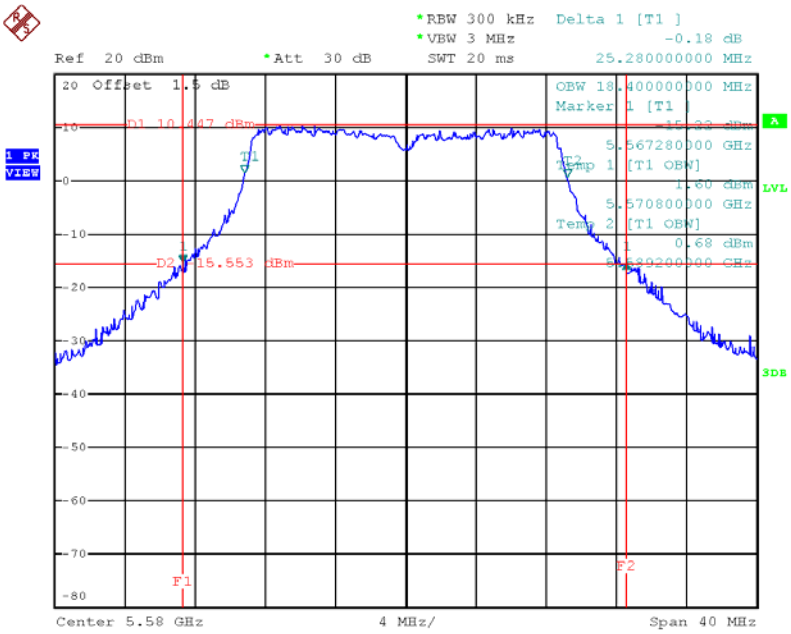
Date: 24.OCT.2012 04:20:26

26 dB and 99% Bandwidth Plot on 5580 MHz, Non HT-20, 6Mbps



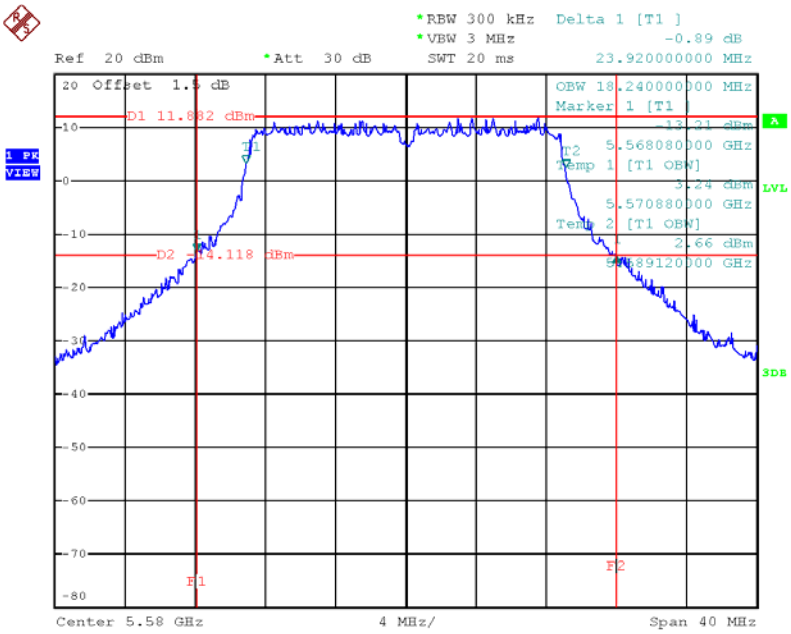
Date: 24.OCT.2012 04:17:08

26 dB and 99% Bandwidth Plot on 5580 MHz, HT-20, Beam Forming, M0



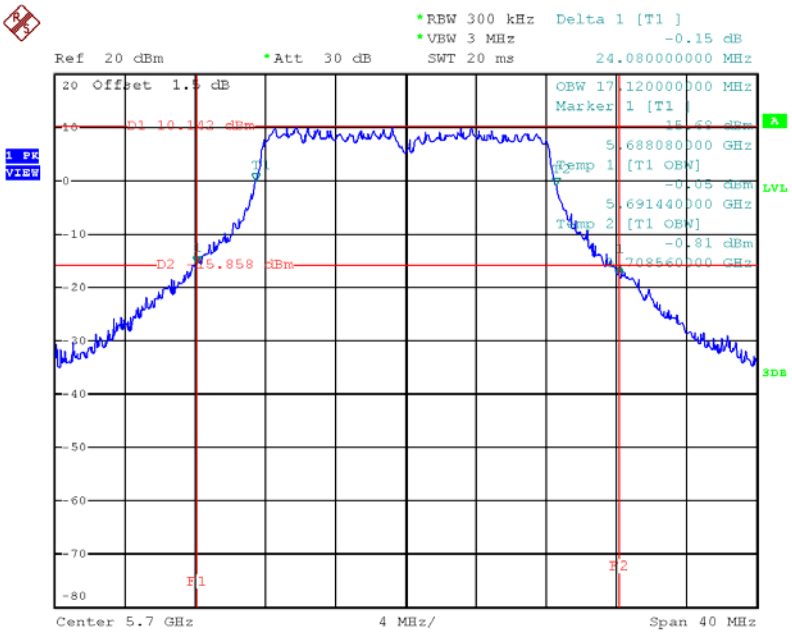
Date: 24.OCT.2012 04:19:27

26 dB and 99% Bandwidth Plot on 5580 MHz, HT-20, Beam Forming, M8



Date: 24.OCT.2012 04:19:00

26 dB and 99% Bandwidth Plot on 5700 MHz, Non HT-20, 6Mbps



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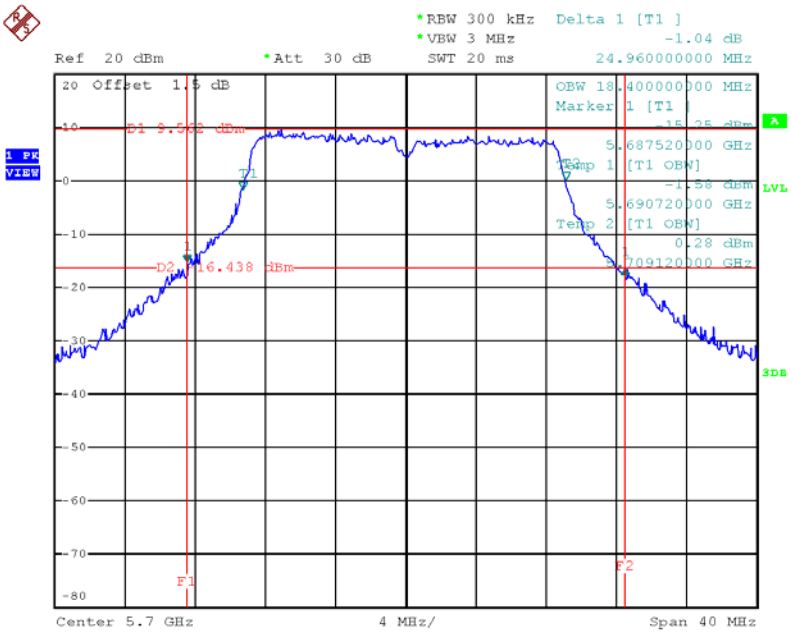
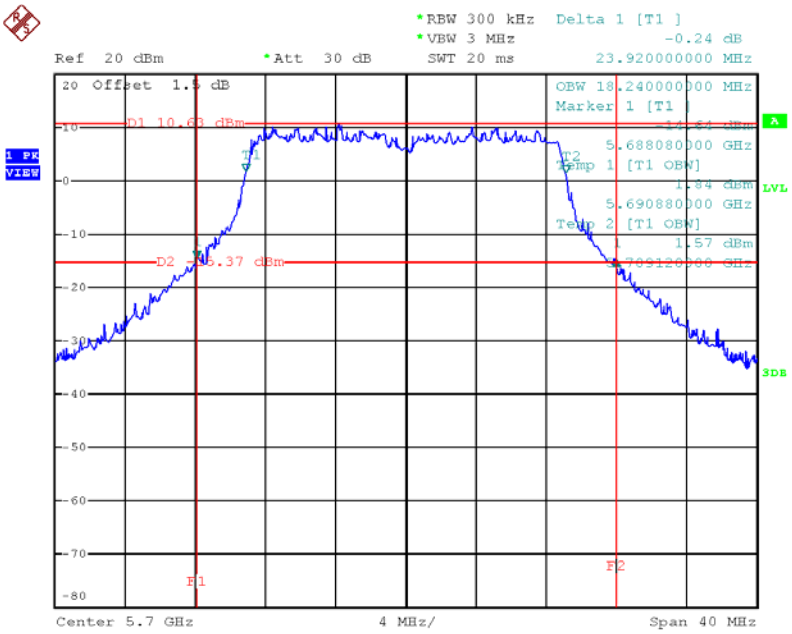
26 dB and 99% Bandwidth Plot on 5700 MHz, HT-20 / HT-20, Beam Forming, M0



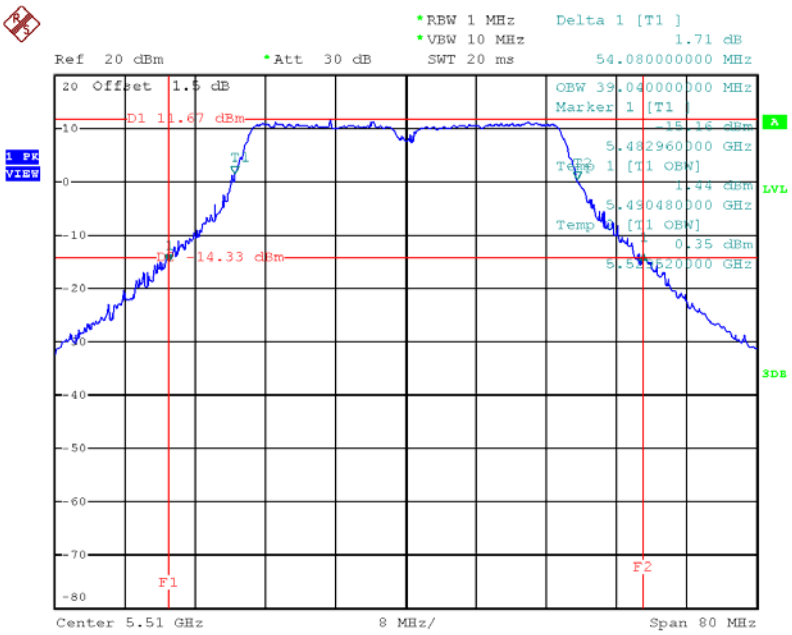
Date: 24.OCT.2012 04:18:15

26 dB and 99% Bandwidth Plot on 5700 MHz, HT-20, Beam Forming, M8



Date: 24.OCT.2012 04:18:38

26 dB and 99% Bandwidth Plot on 5510 MHz, HT-40, M0



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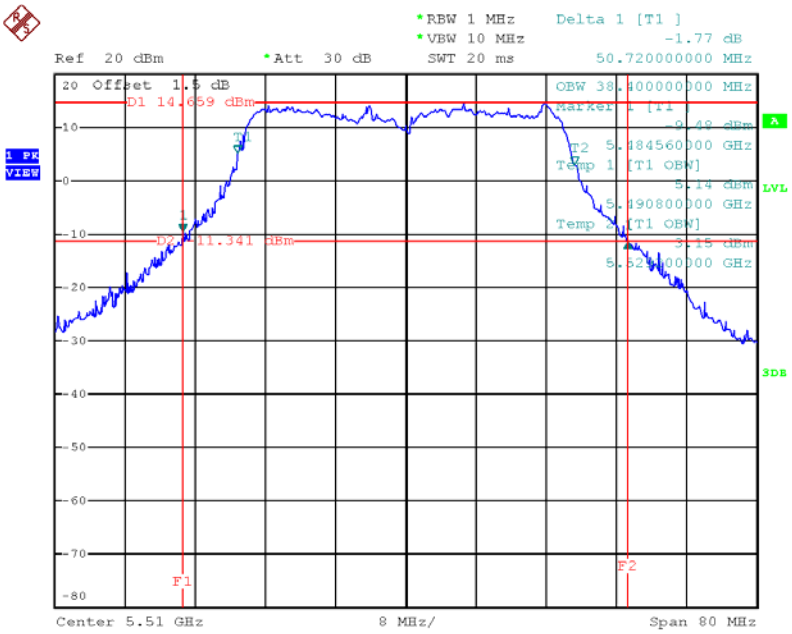
26 dB and 99% Bandwidth Plot on 5510 MHz, HT-40, Beam Forming, M0



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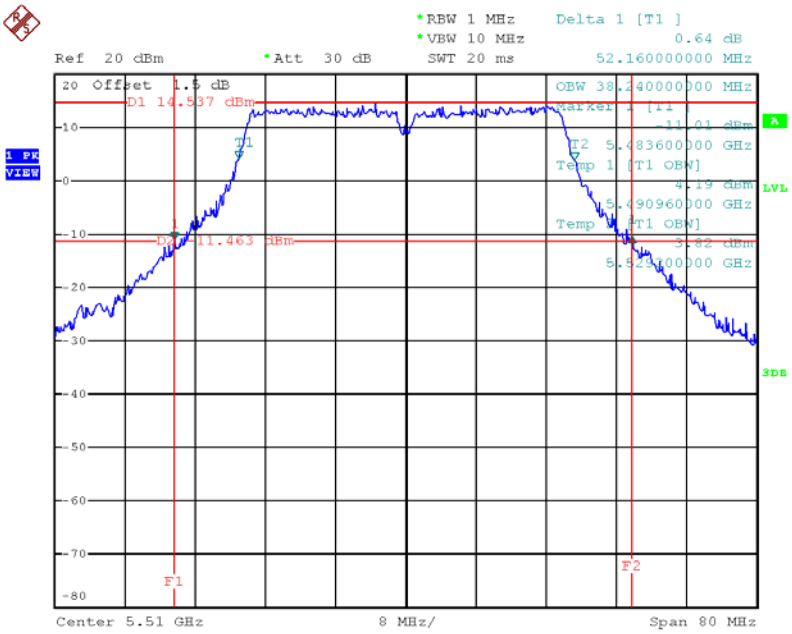
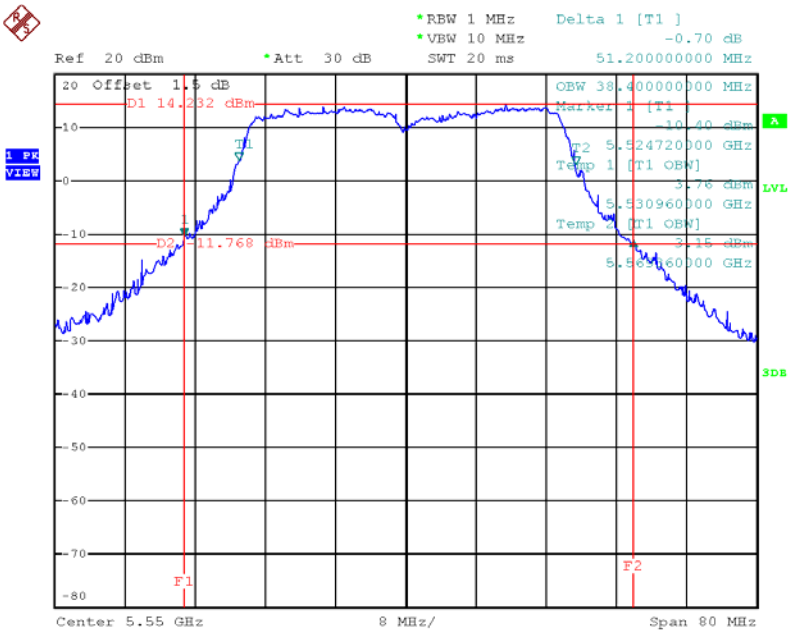
26 dB and 99% Bandwidth Plot on 5510 MHz, HT-40, Beam Forming, M8



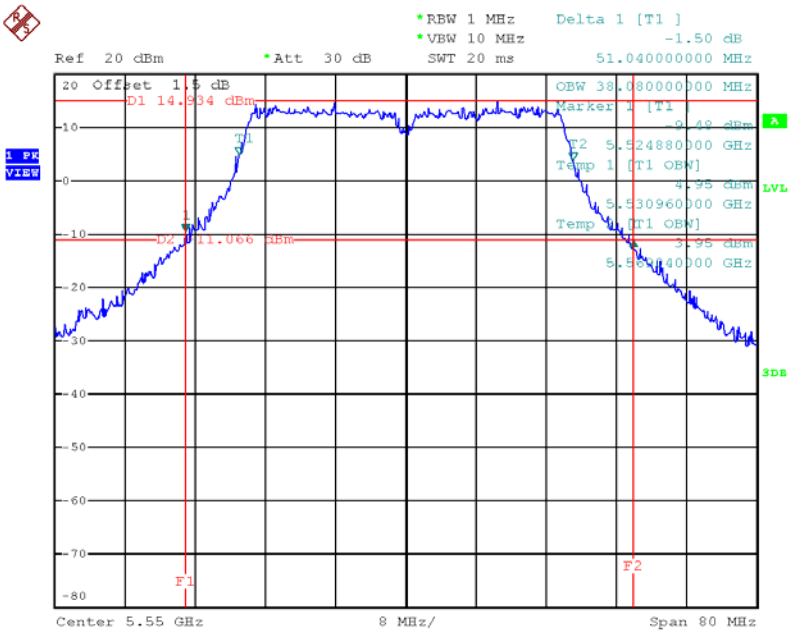
Date: 24.OCT.2012 04:21:32

26 dB and 99% Bandwidth Plot on 5550 MHz, HT-40, Beam Forming, M0



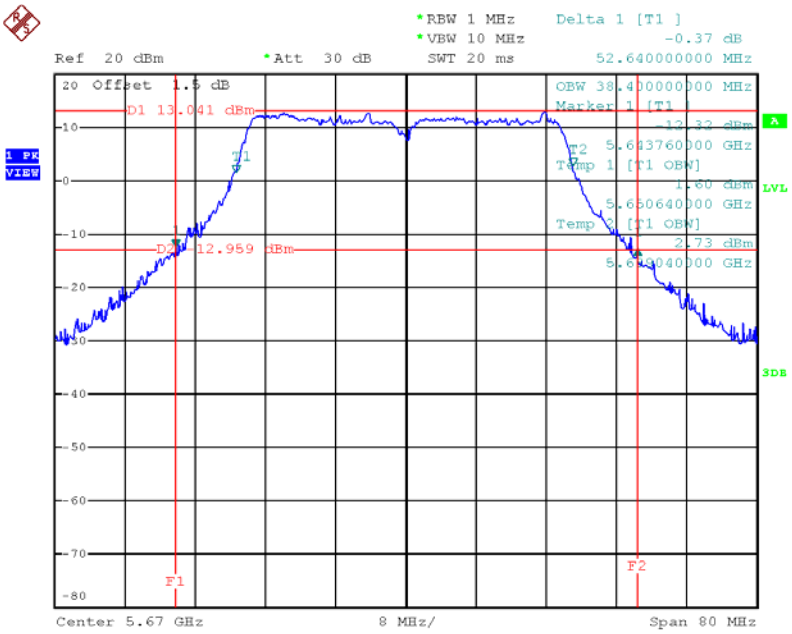
Date: 24.OCT.2012 04:22:09

26 dB and 99% Bandwidth Plot on 5550 MHz, HT-40, Beam Forming, M8



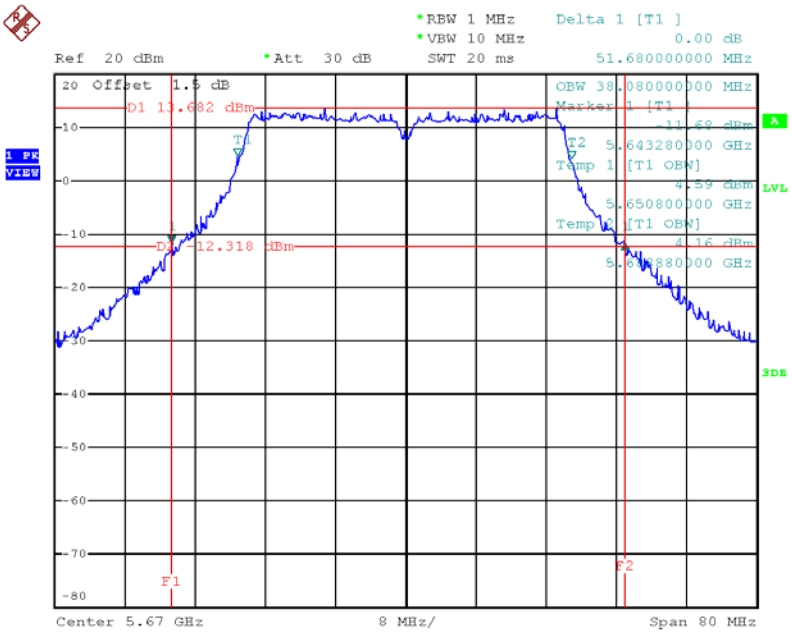
Date: 24.OCT.2012 04:22:39

26 dB and 99% Bandwidth Plot on 5670 MHz, HT-40, Beam Forming, M0



Date: 24.OCT.2012 04:23:22

26 dB and 99% Bandwidth Plot on 5670 MHz, HT-40, Beam Forming, M8



Date: 24.OCT.2012 04:23:03

3.3 RF Output Power

3.3.1 RF Output Power Limit

Maximum Conducted Output Power Limit
For the 5.47-5.725 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
P_{Out} = maximum conducted output power in dBm, **G_{TX}** = the maximum transmitting antenna directional gain in dBi.

3.3.2 Measuring Instruments

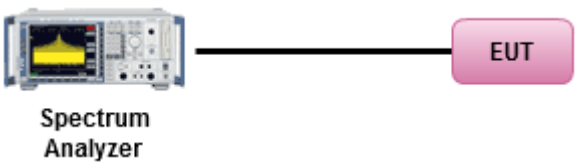
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
☒	Maximum Conducted Output Power
	[duty cycle ≥ 98% or external video / power trigger]
	☒ Refer as FCC KDB 789033, clause C Method SA-1 (spectral trace averaging).
	☐ Refer as FCC KDB 789033, clause C Method SA-1 Alt. (RMS detection with slow sweep speed)
	duty cycle < 98% and average over on/off periods with duty factor
	☐ Refer as FCC KDB 789033, clause C Method SA-2 (spectral trace averaging).
	☐ Refer as FCC KDB 789033, clause C Method SA-2 Alt. (RMS detection with slow sweep speed)
	Wideband RF power meter and average over on/off periods with duty factor
	☐ Refer as FCC KDB 789033, clause C Method PM (using an RF average power meter).
☒	For conducted measurement.
	☒ The EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.

3.3.4 Test Setup

RF Output Power (Spectrum Analyzer)

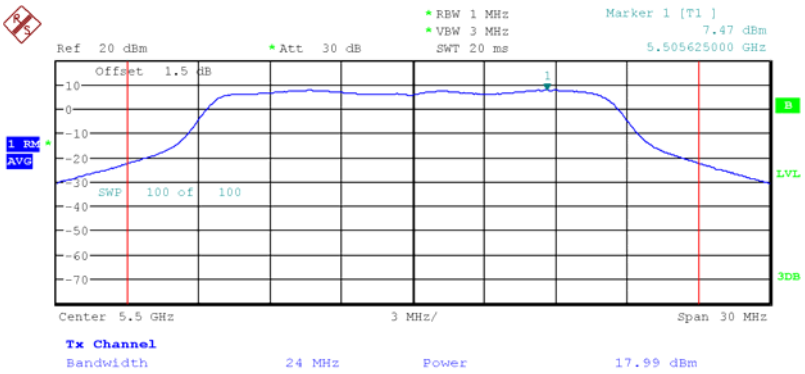


3.3.5 Test Result of Maximum Conducted Output Power

Freq. (MHz)	Operating Mode	N_{TX}	Correlated Antenna Gain (dBi)	Tx1 Output Power (dBm)	Tx2 Output Power (dBm)	Total Tx Channel Power (dBm)	Limit (dBm)	Margin (dB)
5500	Non HT-20, 6 to 54Mbps	2	5.00	17.99	16.95	20.51	24.00	3.49
	Non HT-20, Beam Forming, 6 to 54Mbps	2	8.01	17.99	16.95	20.51	21.99	1.48
	HT-20, M0 to M15	2	5.00	18.27	16.84	20.62	24.00	3.38
	HT-20, STBC, M0 to M7	2	5.00	18.27	16.84	20.62	24.00	3.38
	HT-20, Beam Forming, M0 to M7	2	8.01	18.27	16.84	20.62	21.99	1.37
	HT-20, Beam Forming, M8 to M15	2	5.00	18.11	16.63	20.44	24.00	3.56
5580	Non HT-20, 6 to 54Mbps	2	5.00	17.75	16.95	20.38	24.00	3.62
	Non HT-20, Beam Forming, 6 to 54Mbps	2	8.01	17.75	16.95	20.38	21.99	1.61
	HT-20, M0 to M15	2	5.00	17.97	17.12	20.58	24.00	3.42
	HT-20, STBC, M0 to M7	2	5.00	17.97	17.12	20.58	24.00	3.42
	HT-20, Beam Forming, M0 to M7	2	8.01	17.97	17.12	20.58	21.99	1.41
	HT-20, Beam Forming, M8 to M15	2	5.00	17.79	16.93	20.39	24.00	3.61
5700	Non HT-20, 6 to 54Mbps	1	5.00	17.06	-	17.06	24.00	6.94
	Non HT-20, 6 to 54Mbps	2	5.00	16.72	15.64	19.22	24.00	4.78
	Non HT-20, Beam Forming, 6 to 54Mbps	2	8.01	13.99	12.67	16.39	21.99	5.60
	HT-20, M0 to M7	1	5.00	17.18	-	17.18	24.00	6.82
	HT-20, M0 to M15	2	5.00	16.26	15.17	18.76	24.00	5.24
	HT-20, STBC, M0 to M7	2	5.00	16.26	15.17	18.76	24.00	5.24
	HT-20, Beam Forming, M0 to M7	2	8.01	13.45	12.36	15.95	21.99	6.04
	HT-20, Beam Forming, M8 to M15	2	5.00	16.34	15.54	18.97	24.00	5.03
5510	HT-40, M0 to M7	1	5.00	16.23	-	16.23	24.00	7.77
	HT-40, M0 to M15	2	5.00	14.8	12.78	16.92	24.00	7.08
	HT-40, STBC, M0 to M7	2	5.00	14.8	12.78	16.92	24.00	7.08
	HT-40, Beam Forming, M0 to M7	2	8.01	11.93	9.87	14.03	21.99	7.96
	HT-40, Beam Forming, M8 to M15	2	5.00	14.51	12.64	16.69	24.00	7.31
5550	HT-40, M0 to M15	2	5.00	17.55	17.19	20.38	24.00	3.62
	HT-40, STBC, M0 to M7	2	5.00	17.55	17.19	20.38	24.00	3.62
	HT-40, Beam Forming, M0 to M7	2	8.01	17.55	17.19	20.38	21.99	1.61
	HT-40, Beam Forming, M8 to M15	2	5.00	17.58	16.81	20.22	24.00	3.78
5670	HT-40, M0 to M15	2	5.00	17.96	16.9	20.47	24.00	3.53
	HT-40, STBC, M0 to M7	2	5.00	17.96	16.9	20.47	24.00	3.53
	HT-40, Beam Forming, M0 to M7	2	8.01	16.84	15.47	19.22	21.99	2.77
	HT-40, Beam Forming, M8 to M15	2	5.00	17.8	16.82	20.35	24.00	3.65

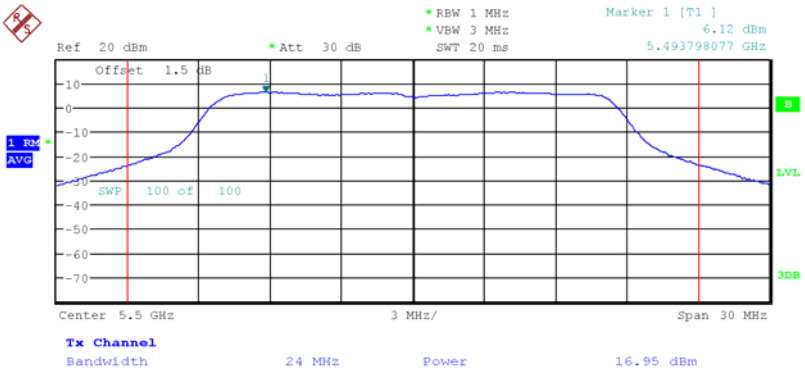
Maximum Conducted Output Power Plot on 5500 MHz,
Non HT-20 / Non HT-20, Beam Forming, 6Mbps

Tx1



Date: 25.OCT.2012 01:24:54

Tx2



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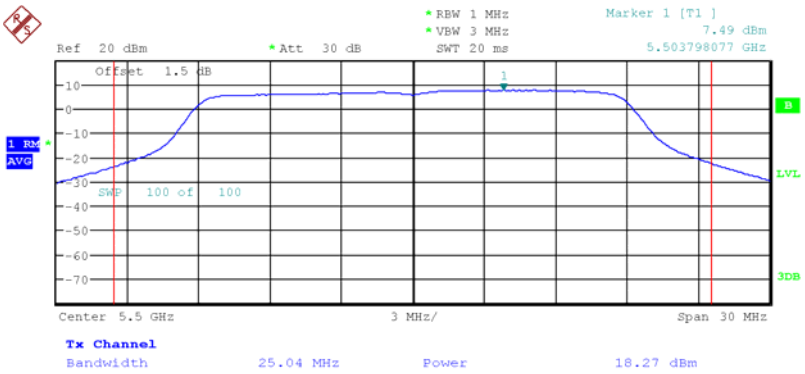
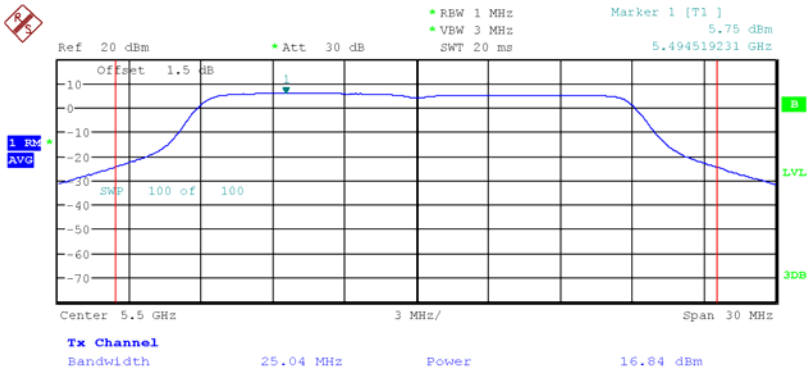
Maximum Conducted Output Power Plot on 5500 MHz,
HT-20 / HT-20, STBC / HT-20, Beam Forming, M0

Tx1



Date: 25.OCT.2012 01:29:02

Tx2



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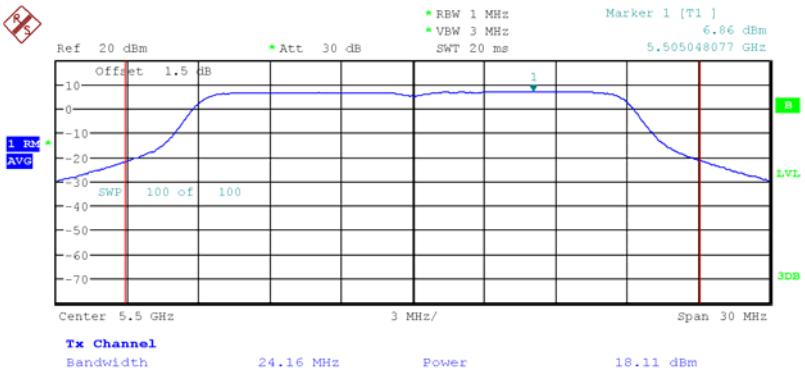
Maximum Conducted Output Power Plot on 5500 MHz, HT-20, Beam Forming, M8

Tx1



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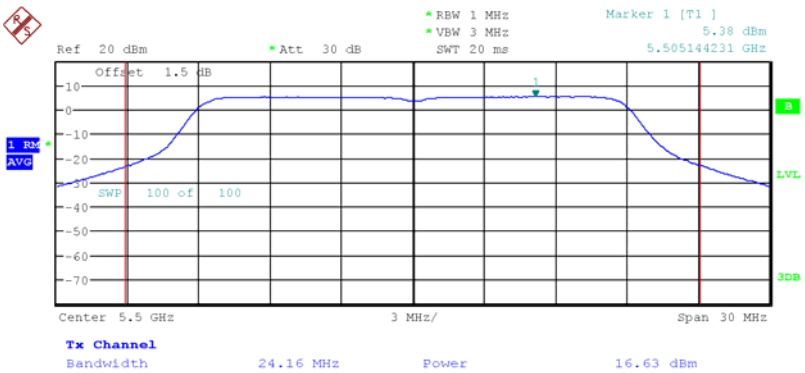
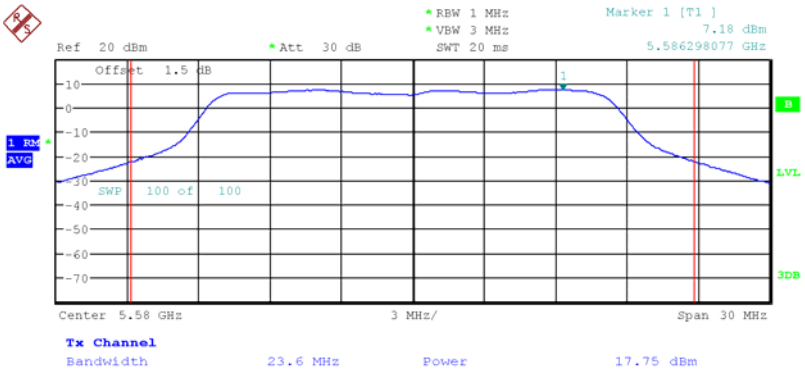


Date: 25.OCT.2012 01:30:27

Maximum Conducted Output Power Plot on 5580 MHz,
Non HT-20 / Non HT-20, Beam Forming, 6Mbps

Tx1



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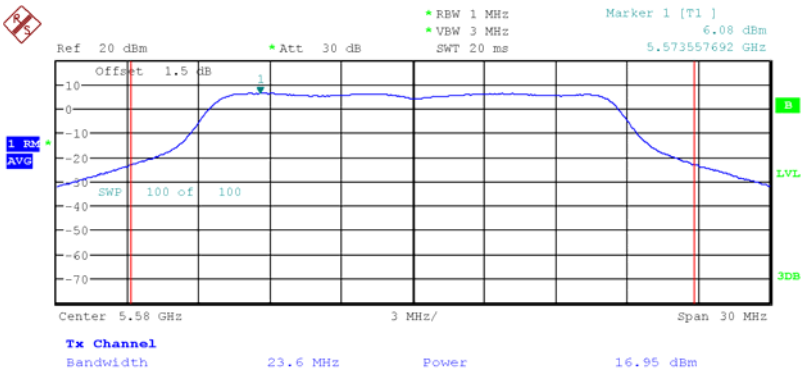
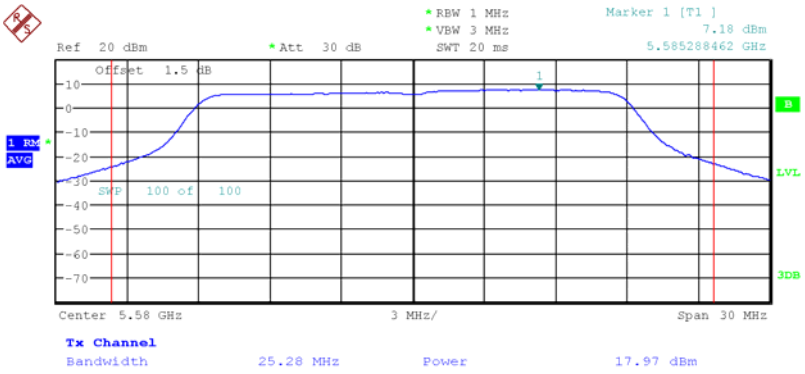
Tx2



Date: 25.OCT.2012 01:31:09

Maximum Conducted Output Power Plot on 5580 MHz,
HT-20 / HT-20, STBC / HT-20, Beam Forming, M0

Tx1



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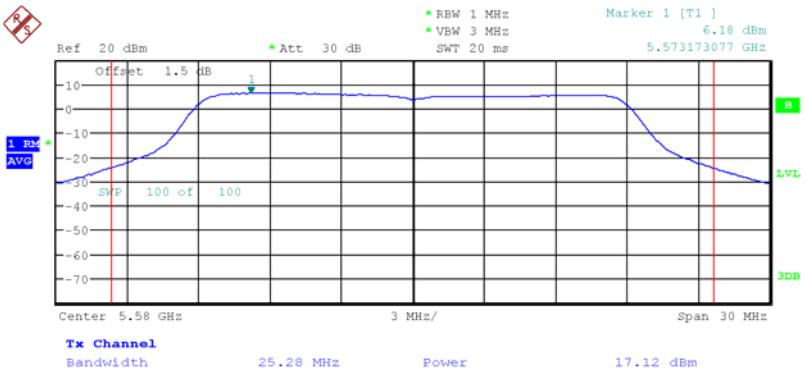
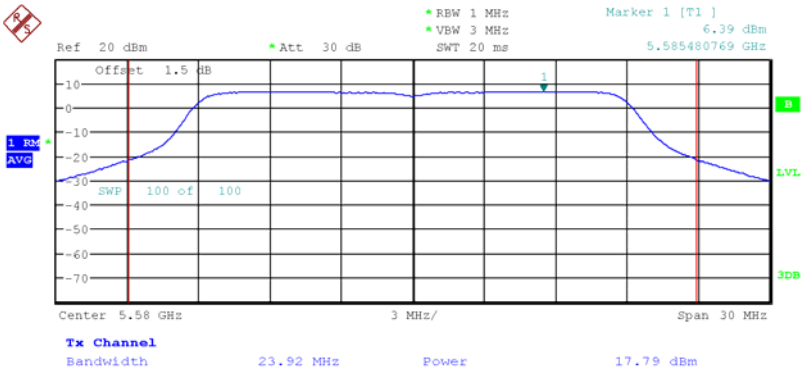
Tx2



Date: 25.OCT.2012 01:32:27

Maximum Conducted Output Power Plot on 5580 MHz, HT-20, Beam Forming, M8

Tx1



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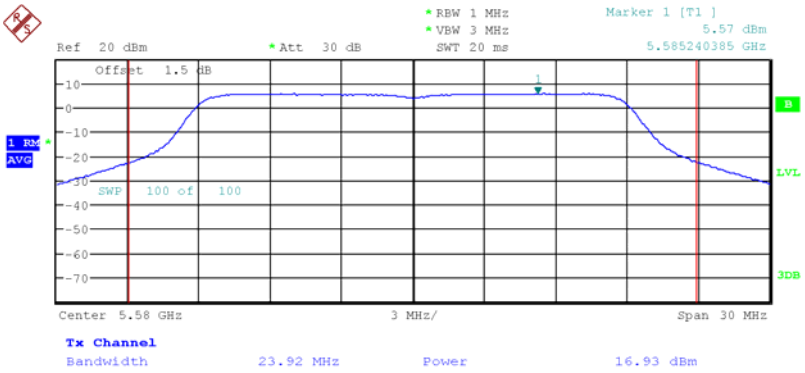
Tx2



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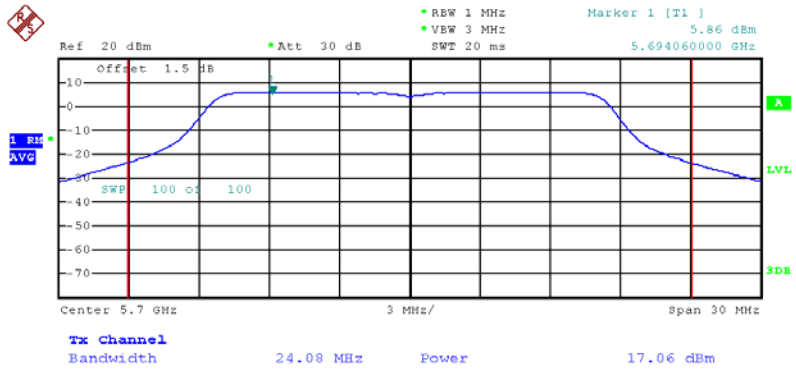
Maximum Conducted Output Power Plot on 5700 MHz, Non HT-20, 6Mbps

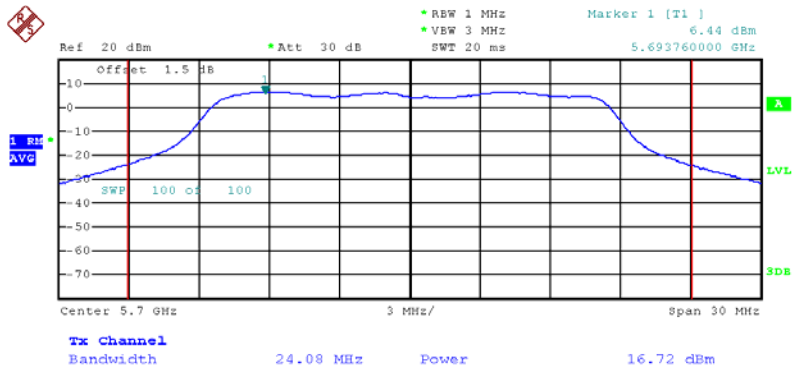
Tx1



Date: 1.NOV.2012 18:50:41

Maximum Conducted Output Power Plot on 5700 MHz, Non HT-20, 6Mbps

Tx1



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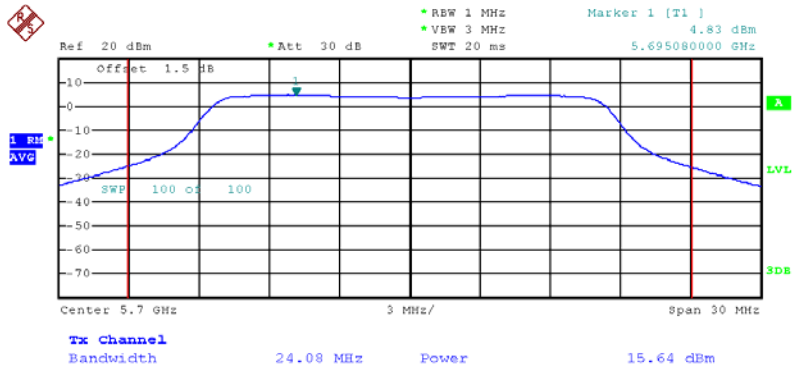
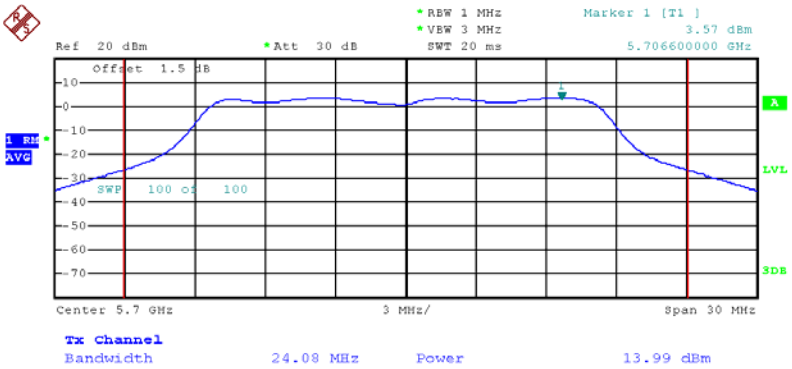
Tx2



Date: 26.OCT.2012 20:14:38

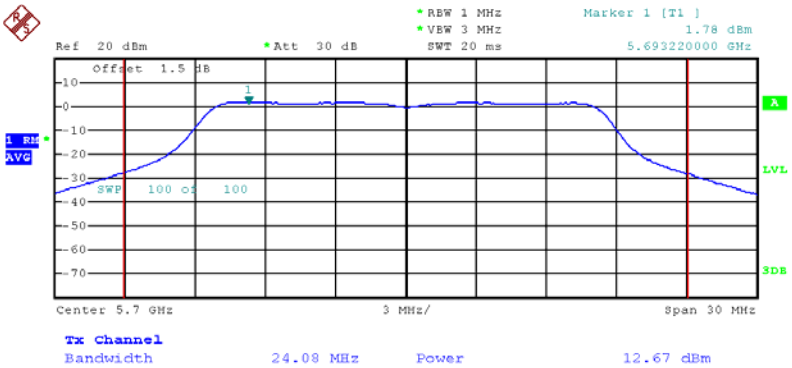
Maximum Conducted Output Power Plot on 5700 MHz, Non HT-20, Beam Forming, 6Mbps

Tx1



Date: 26.OCT.2012 20:15:31

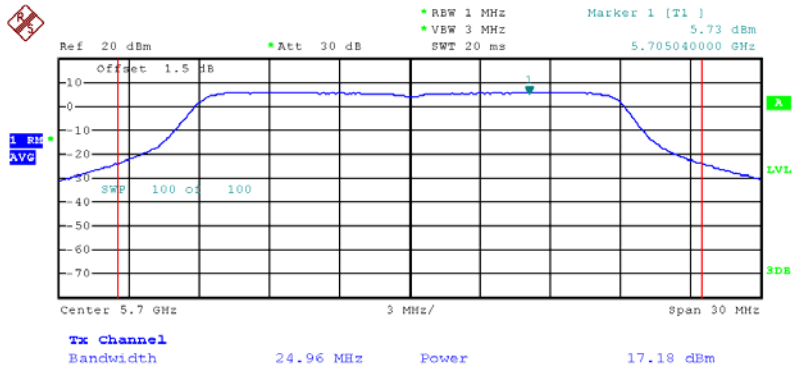
Tx2



Date: 26.OCT.2012 20:15:14

Maximum Conducted Output Power Plot on 5700 MHz, HT-20, M0

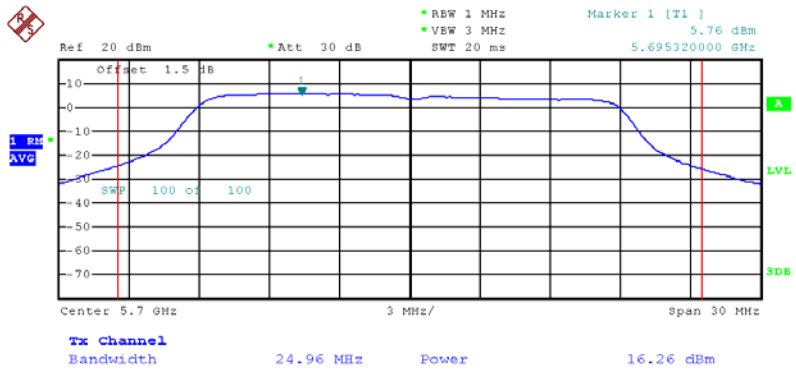
Tx1



Date: 1.NOV.2012 18:51:57

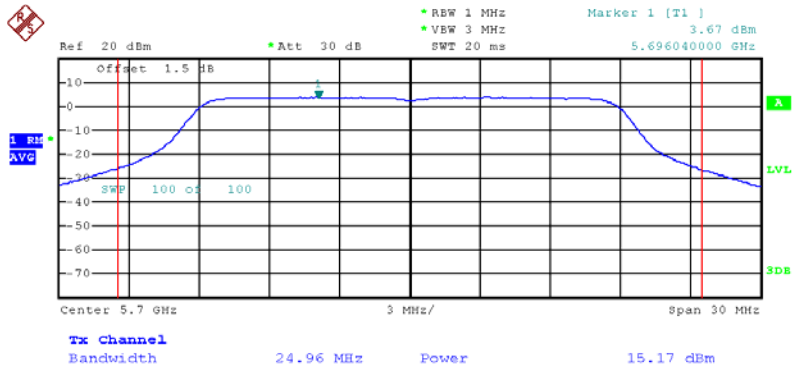
Maximum Conducted Output Power Plot on 5700 MHz, HT-20 / HT-20, STBC, M0

Tx1



Date: 26.OCT.2012 20:09:31

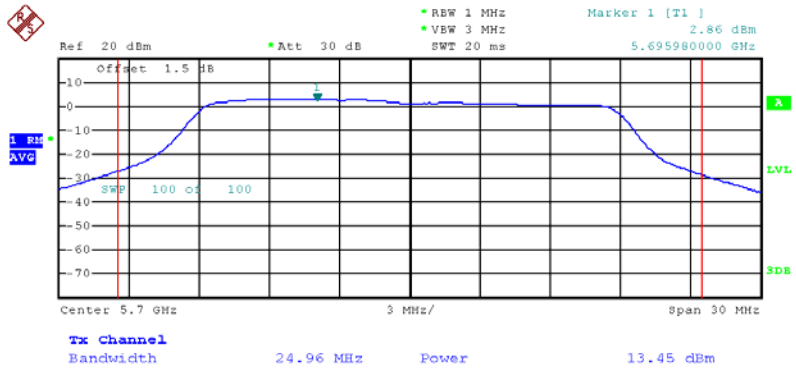
Tx2



Date: 26.OCT.2012 20:08:56

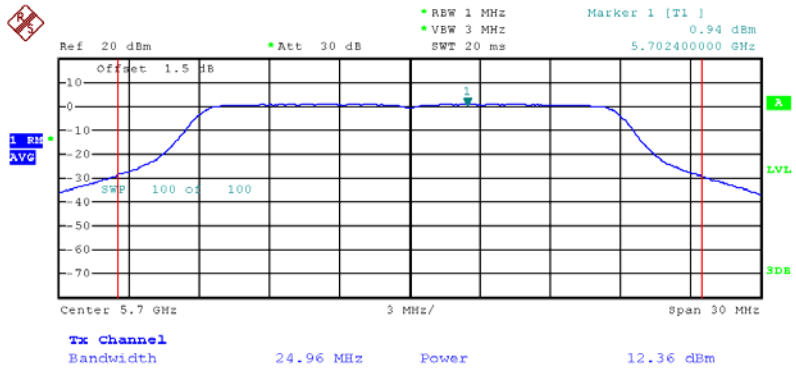
Maximum Conducted Output Power Plot on 5700 MHz, HT-20, Beam Forming, M0

Tx1



Date: 26.OCT.2012 20:18:38

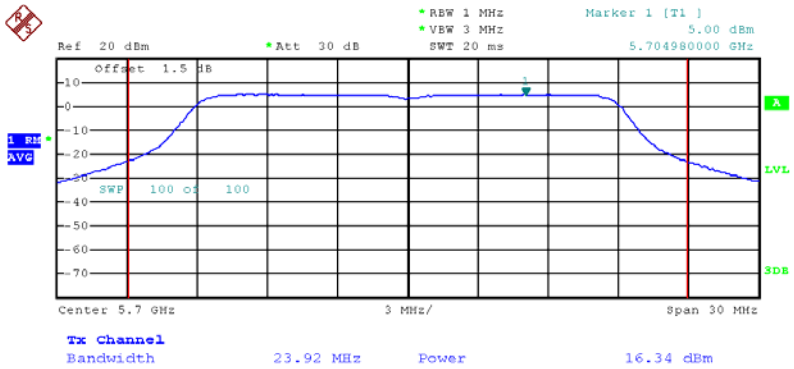
Tx2



Date: 26.OCT.2012 20:17:43

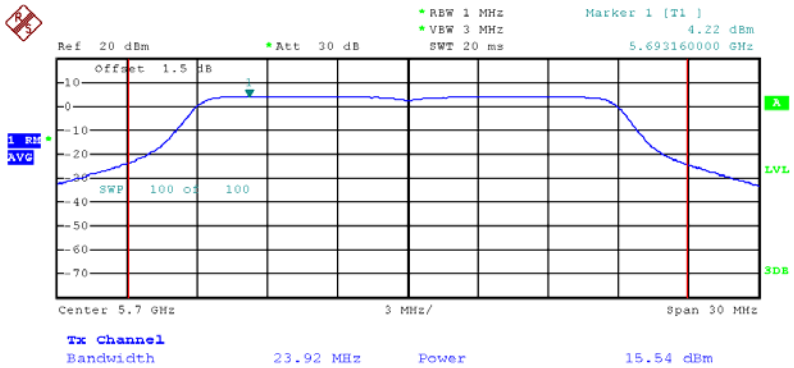
Maximum Conducted Output Power Plot on 5700 MHz, HT-20, Beam Forming, M8

Tx1



Date: 26.OCT.2012 20:05:53

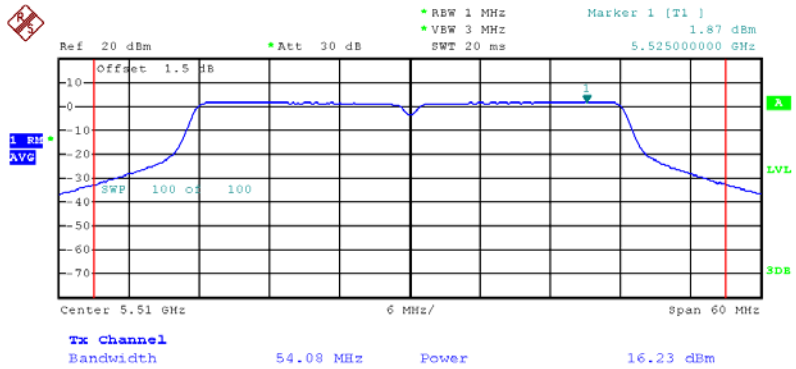
Tx2



Date: 26.OCT.2012 20:07:26

Maximum Conducted Output Power Plot on 5510 MHz, HT-40, M0

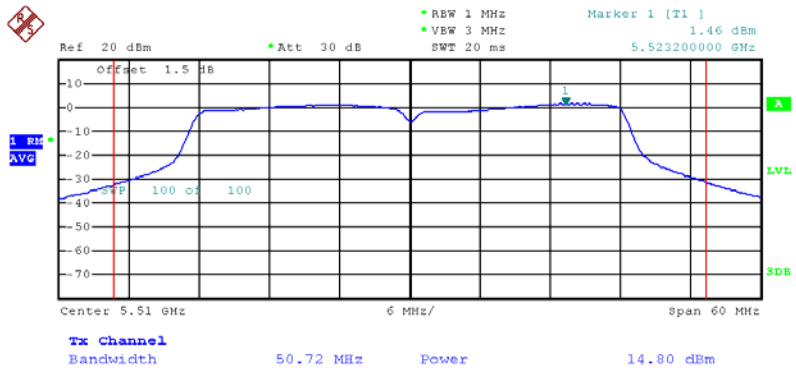
Tx1



Date: 1.NOV.2012 19:29:45

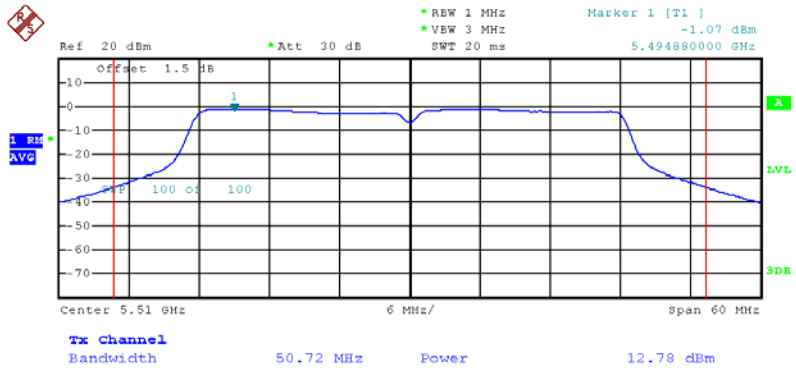
Maximum Conducted Output Power Plot on 5510 MHz, HT-40 / HT-40, STBC, M0

Tx1



Date: 26.OCT.2012 20:20:00

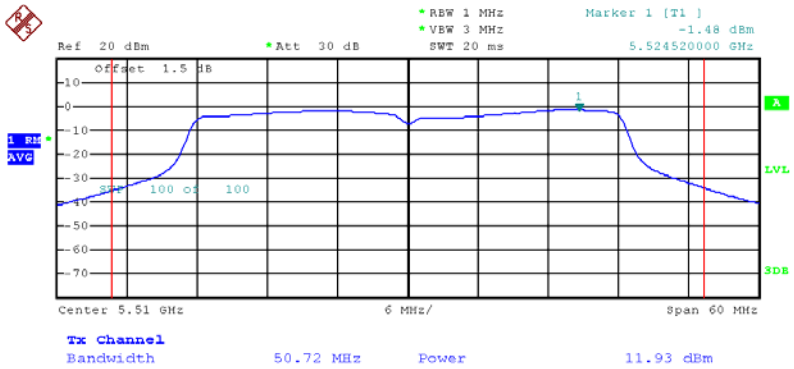
Tx2



Date: 26.OCT.2012 20:20:42

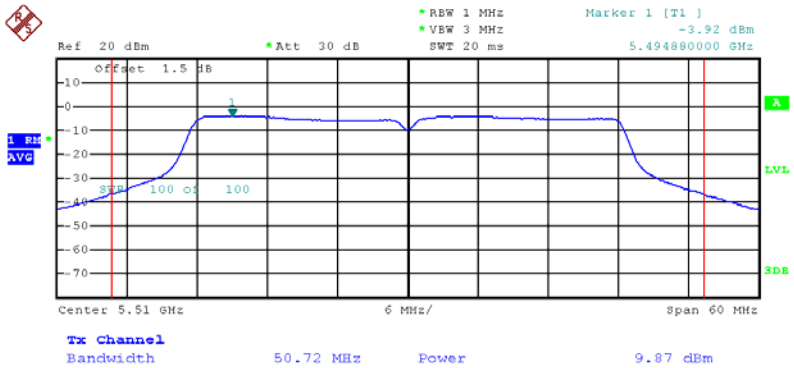
Maximum Conducted Output Power Plot on 5510 MHz, HT-40, Beam Forming, M0

Tx1



Date: 26.OCT.2012 20:21:39

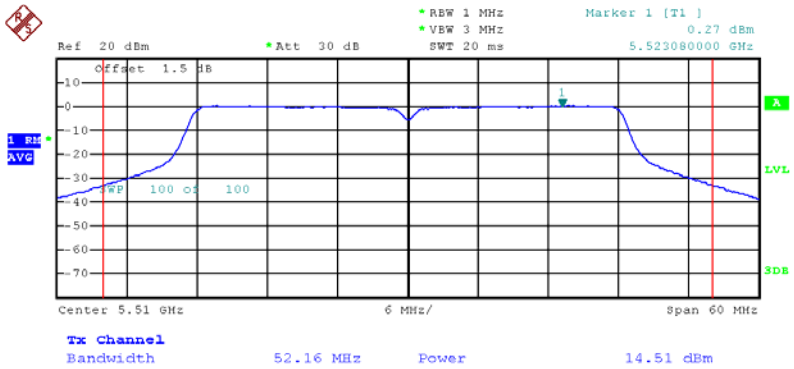
Tx2



Date: 26.OCT.2012 20:21:12

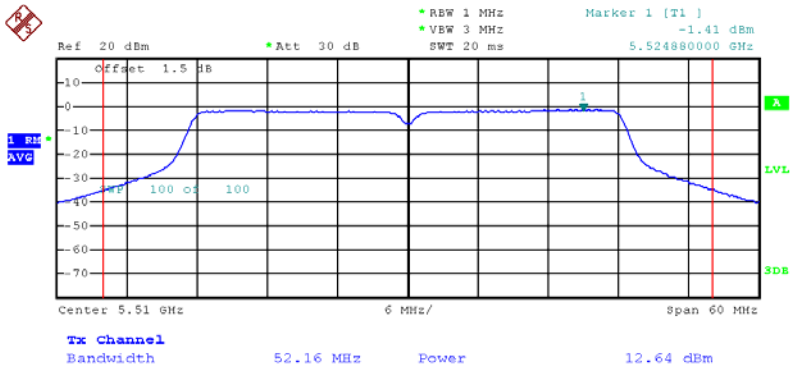
Maximum Conducted Output Power Plot on 5510 MHz, HT-40, Beam Forming, M8

Tx1



Date: 26.OCT.2012 20:22:10

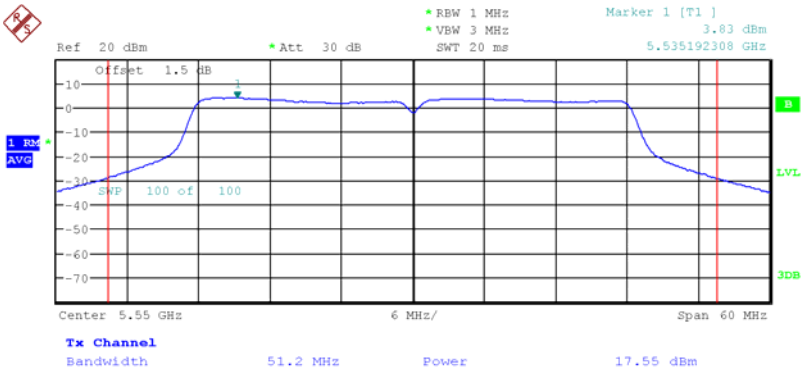
Tx2



Date: 26.OCT.2012 20:22:29

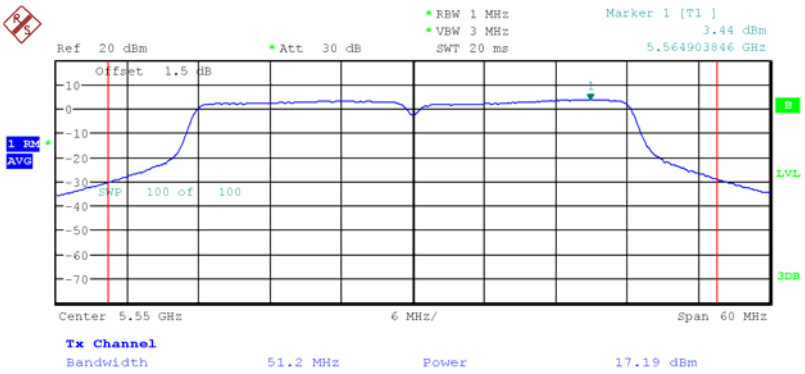
Maximum Conducted Output Power Plot on 5550 MHz,
HT-40 / HT-40, STBC / HT-40, Beam Forming, M0

Tx1



Date: 25.OCT.2012 01:43:31

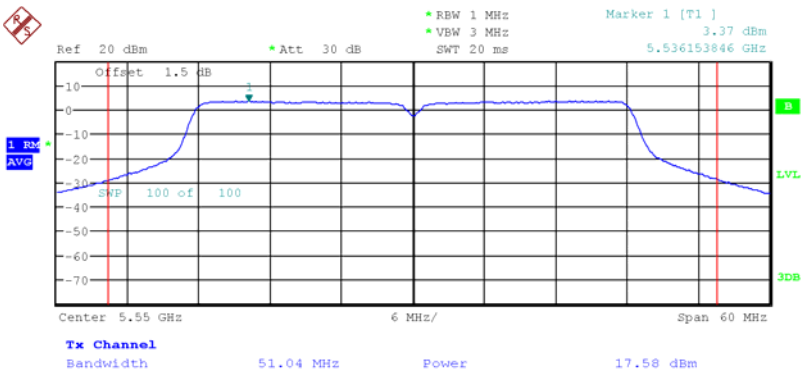
Tx2



Date: 25.OCT.2012 01:43:03

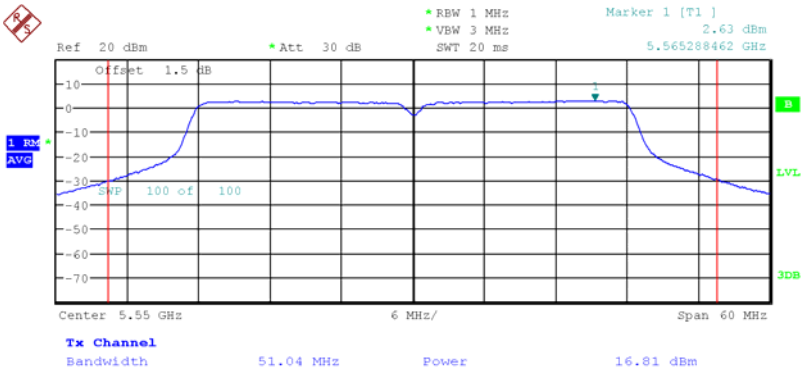
Maximum Conducted Output Power Plot on 5550 MHz, HT-40, Beam Forming, M8

Tx1



Date: 25.OCT.2012 01:44:18

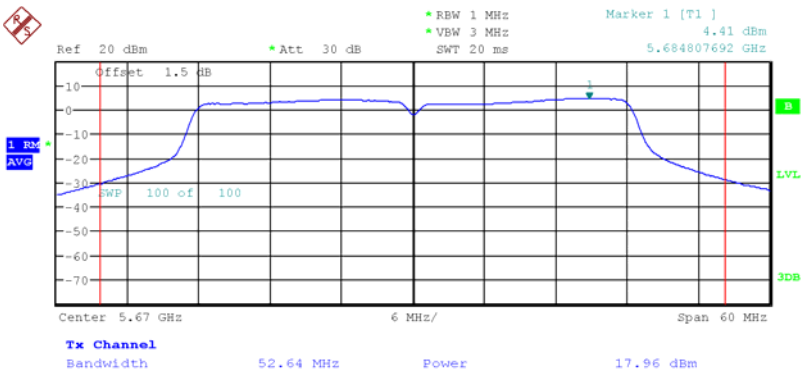
Tx2



Date: 25.OCT.2012 01:44:53

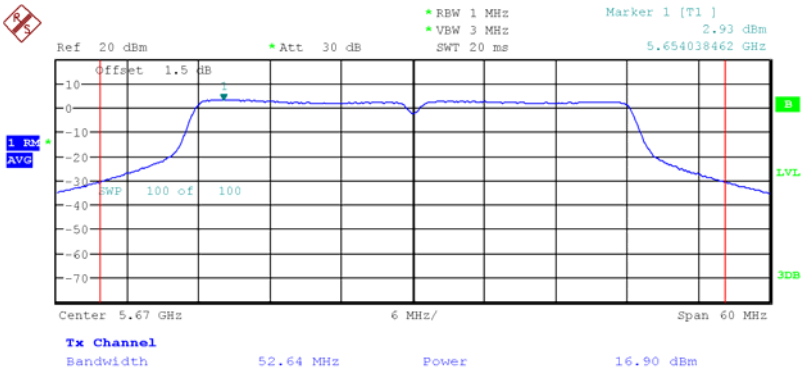
Maximum Conducted Output Power Plot on 5670 MHz, HT-40 / HT-40, STBC

Tx1



Date: 25.OCT.2012 01:45:55

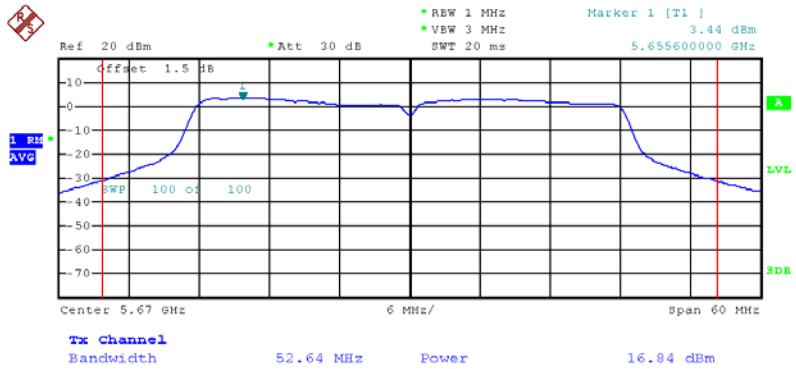
Tx2



Date: 25.OCT.2012 01:45:32

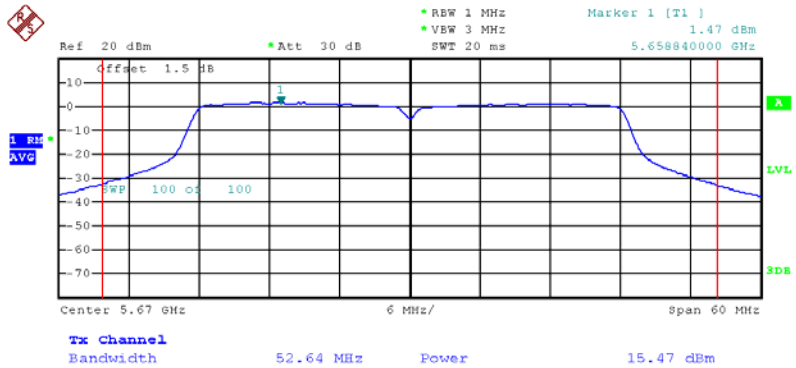
Maximum Conducted Output Power Plot on 5670 MHz, HT-40, Beam Forming, M0

Tx1



Date: 26.OCT.2012 20:23:51

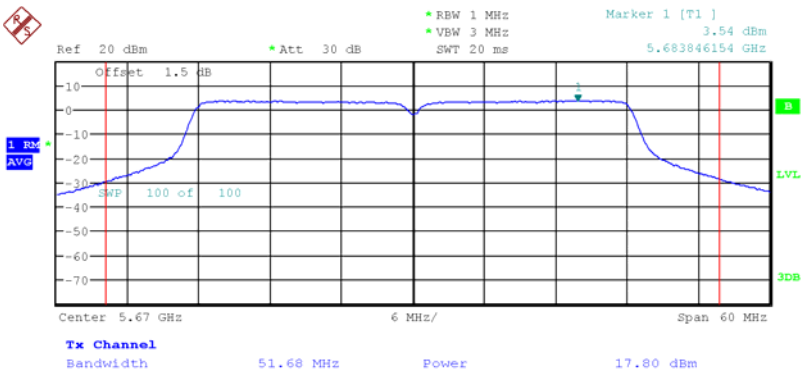
Tx2



Date: 26.OCT.2012 20:23:26

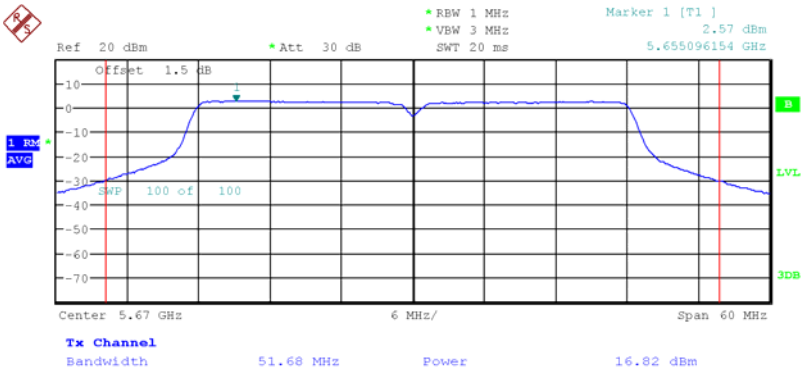
Maximum Conducted Output Power Plot on 5670 MHz, HT-40, Beam Forming, M8

Tx1



Date: 25.OCT.2012 01:46:20

Tx2



Date: 25.OCT.2012 01:46:42

3.4 Peak Power Spectral Density

3.4.1 Peak Power Spectral Density Limit

Peak Power Spectral Density Limit
For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6).
PPSD = peak power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz **G_{TX}** = the maximum transmitting antenna directional gain in dBi.

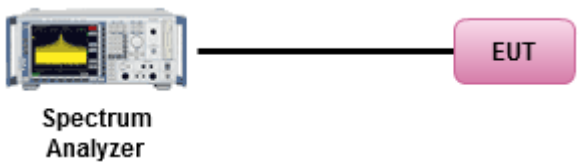
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method			
☒	Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:		
	☐	Refer as FCC KDB 789033, E)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth	
	[duty cycle ≥ 98% or external video / power trigger]		
	☒	Refer as FCC KDB 789033, clause C Method SA-1 (spectral trace averaging).	
	☐	Refer as FCC KDB 789033, clause C Method SA-1 Alt. (RMS detection with slow sweep speed)	
	duty cycle < 98% and average over on/off periods with duty factor		
	☐	Refer as FCC KDB 789033, clause C Method SA-2 (spectral trace averaging).	
	☐	Refer as FCC KDB 789033, clause C Method SA-2 Alt. (RMS detection with slow sweep speed)	
☒	For conducted measurement.		
	☒	The EUT supports multiple transmit chains using options given below:	
		☐	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
		☒	Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.

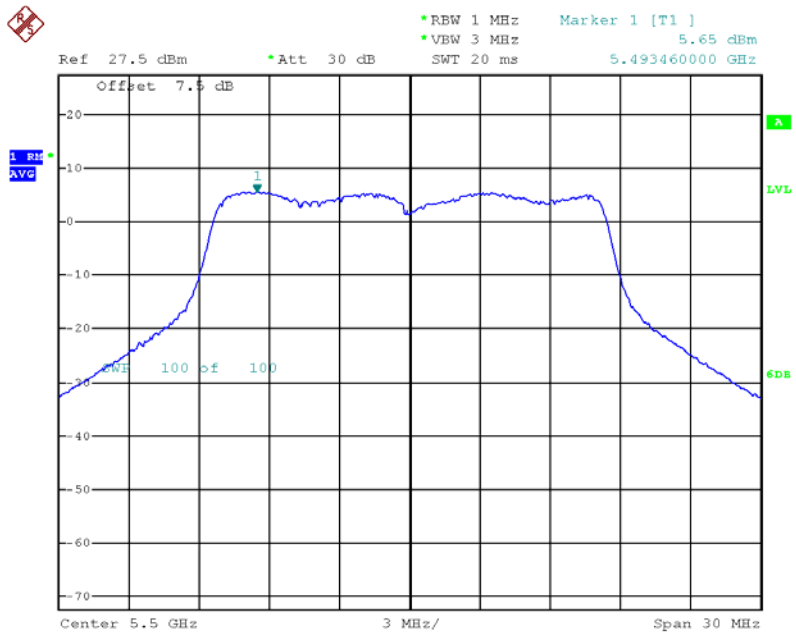
3.4.4 Test Setup

Power Spectral Density


3.4.5 Test Result of Peak Power Spectral Density

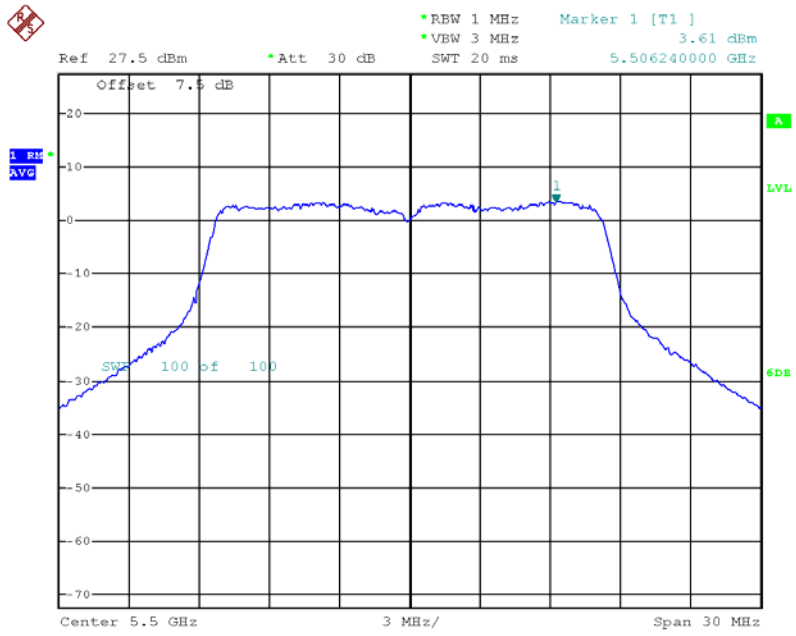
Freq. (MHz)	Operating Mode	N_{TX}	Data Rate (Mbps)	Tx1 PSD Antenna (dBm/MHz)	Tx2 PSD Antenna (dBm/MHz)	1Port Limit (dBm/MHz)	1Port Margin (dB)	Total Tx PSD Antenna (dBm/MHz)	Total Port Limit (dBm/MHz)	Margin (dB)
5500	Non HT-20, 6 to 54Mbps	2	6	5.65	3.61	5.98	0.33	7.76	8.99	1.23
	Non HT-20, Beam Forming, 6 to 54Mbps	2	6	5.65	3.61	5.98	0.33	7.76	8.99	1.23
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	2	M0	5.33	3.44	7.99	2.66	7.50	11.00	3.50
	HT-20, Beam Forming, M0 to M7	2	M0	5.33	3.44	5.98	0.65	7.50	8.99	1.49
	HT-20, Beam Forming, M8 to M15	2	M8	4.4	2.5	7.99	3.59	6.56	11.00	4.44
5580	Non HT-20, 6 to 54Mbps	2	6	4.7	3.42	5.98	1.28	7.12	8.99	1.87
	Non HT-20, Beam Forming, 6 to 54Mbps	2	6	4.7	3.42	5.98	1.28	7.12	8.99	1.87
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	2	M0	4.14	2.47	7.99	3.85	6.40	11.00	4.60
	HT-20, Beam Forming, M0 to M7	2	M0	4.14	2.47	5.98	1.84	6.40	8.99	2.59
	HT-20, Beam Forming, M8 to M15	2	M8	3.51	2.06	7.99	4.48	5.86	11.00	5.14
5700	Non HT-20, 6 to 54Mbps	1	6	3.77	-	-	-	3.77	11.00	7.23
	Non HT-20, 6 to 54Mbps	2	6	4.68	2.95	5.98	1.30	6.91	8.99	2.08
	Non HT-20, Beam Forming, 6 to 54Mbps	2	6	1.6	-0.07	5.98	4.38	3.86	8.99	5.13
	HT-20, M0 to M7	1	M0	3.48	-	-	-	3.48	11.00	7.52
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	2	M0	4	2.15	7.99	3.99	6.18	11.00	4.82
	HT-20, Beam Forming, M0 to M7	2	M0	0.95	-0.9	5.98	5.03	3.13	8.99	5.86
	HT-20, Beam Forming, M8 to M15	2	M8	2.54	1.7	7.99	5.45	5.15	11.00	5.85
5510	HT-40, M0 to M7	1	M0	-0.11	-	-	-	-0.11	11.00	11.11
	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	2	M0	-0.87	-2.37	7.99	8.86	1.45	11.00	9.55
	HT-40, Beam Forming, M0 to M7	2	M0	-3.51	-5.28	5.98	9.49	-1.30	8.99	10.28
	HT-40, Beam Forming, M8 to M15	2	M8	-1.73	-3.43	7.99	9.72	0.51	11.00	10.49
5550	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	2	M0	0.68	0.56	7.99	7.31	3.63	11.00	7.37
	HT-40, Beam Forming, M0 to M7	2	M0	0.68	0.56	5.98	5.30	3.63	8.99	5.36
	HT-40, Beam Forming, M8 to M15	2	M8	1.28	0.19	7.99	6.71	3.78	11.00	7.22
5670	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	2	M0	2.5	0.68	7.99	5.49	4.69	11.00	6.31
	HT-40, Beam Forming, M0 to M7	2	M0	1.01	-0.97	5.98	4.97	3.14	8.99	5.85
	HT-40, Beam Forming, M8 to M15	2	M8	1.49	0.23	7.99	6.50	3.92	11.00	7.08

Peak Power Spectral Density Plot on 5500 MHz, Non HT-20 / Non HT-20, Beam Forming, 6 Mbps
Tx1



Date: 26.OCT.2012 18:44:00

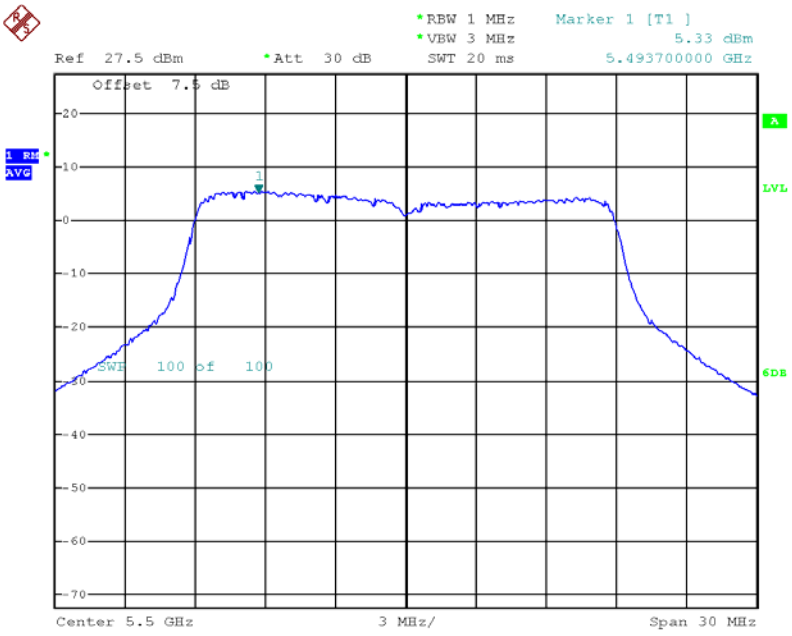
Tx2



Date: 26.OCT.2012 18:44:25

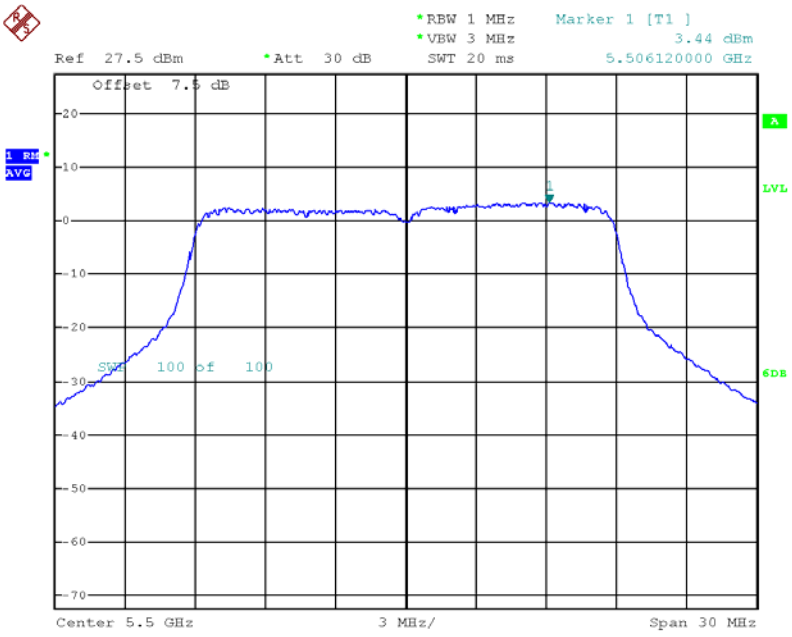
Peak Power Spectral Density Plot on 5500 MHz, HT-20 / HT-20, STBC / HT-20, Beam Forming, M0

Tx1



Date: 26.OCT.2012 18:45:17

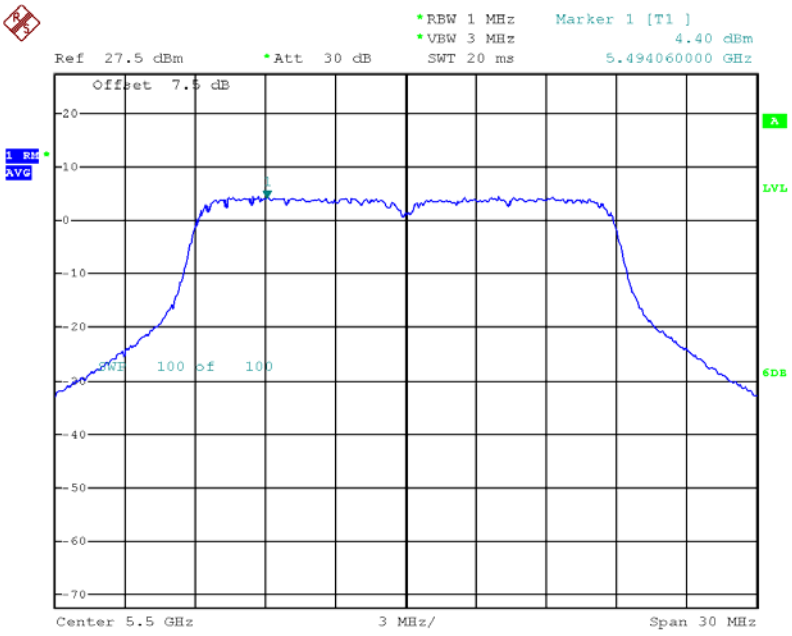
Tx2



Date: 26.OCT.2012 18:44:54

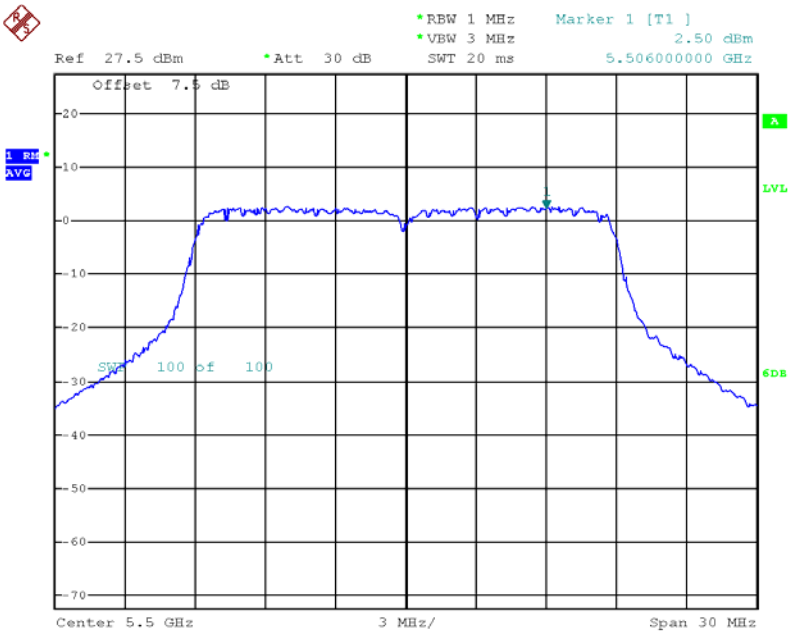
Peak Power Spectral Density Plot on 5500 MHz, HT-20, Beam Forming, M8

Tx1



Date: 26.OCT.2012 18:45:37

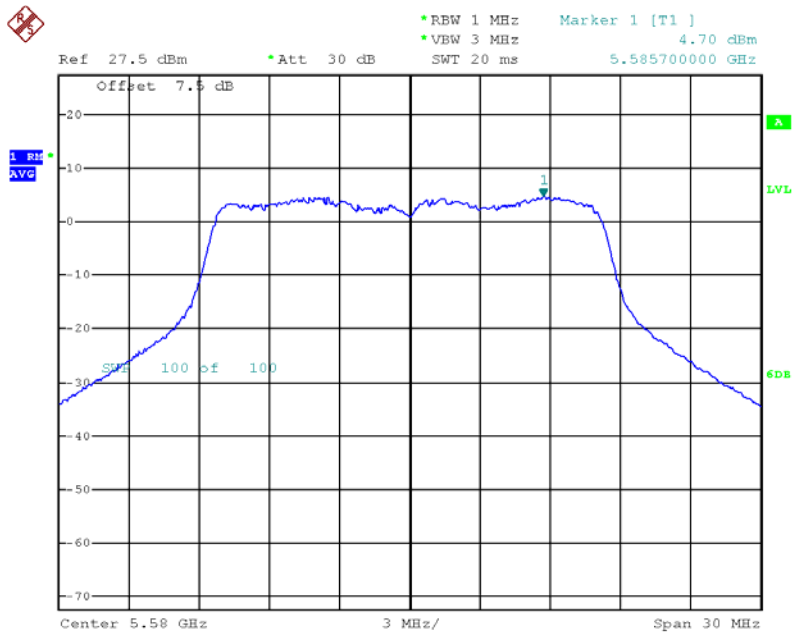
Tx2



Date: 26.OCT.2012 18:45:55

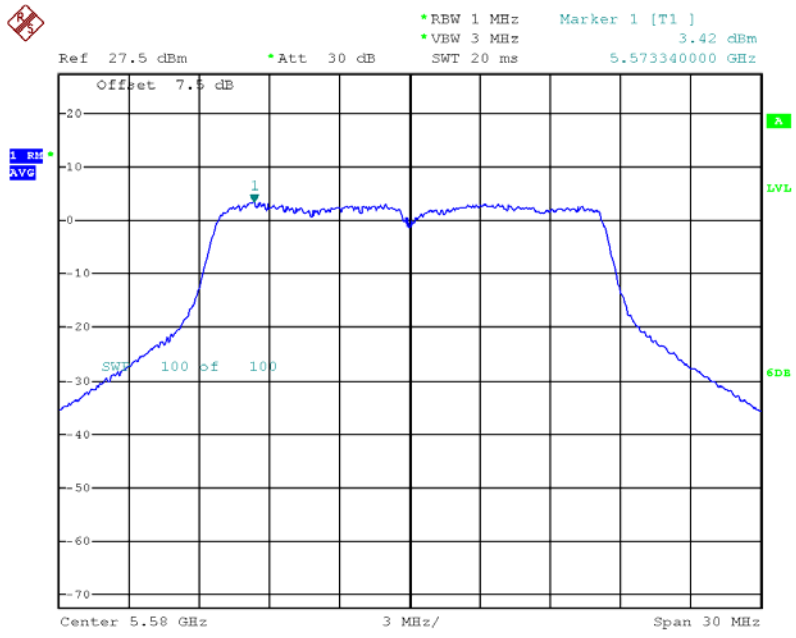
Peak Power Spectral Density Plot on 5580 MHz, Non HT-20 / Non HT-20, Beam Forming, 6 Mbps

Tx1



Date: 26.OCT.2012 18:46:40

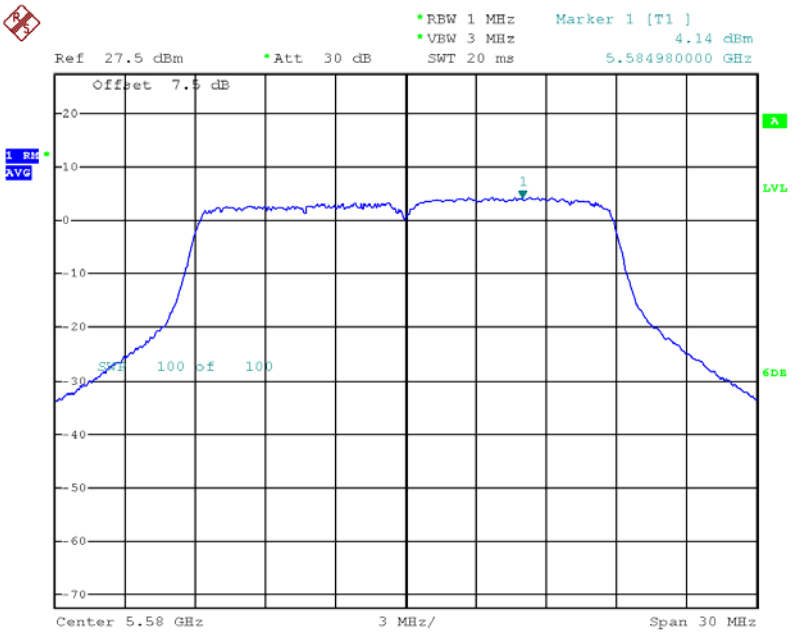
Tx2



Date: 26.OCT.2012 18:46:22

Peak Power Spectral Density Plot on 5580 MHz, HT-20 / HT-20, STBC / HT-20, Beam Forming, M0

Tx1



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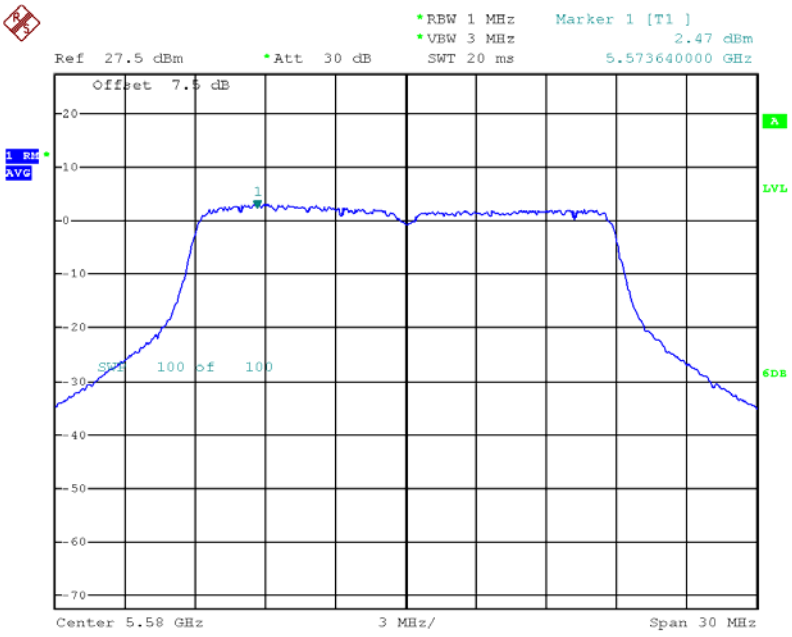
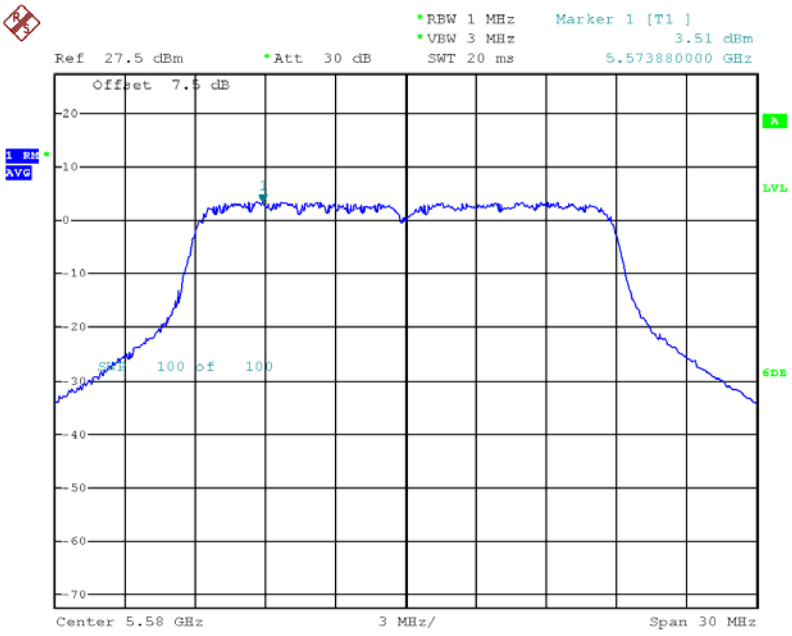
Tx2



Date: 26.OCT.2012 18:47:27

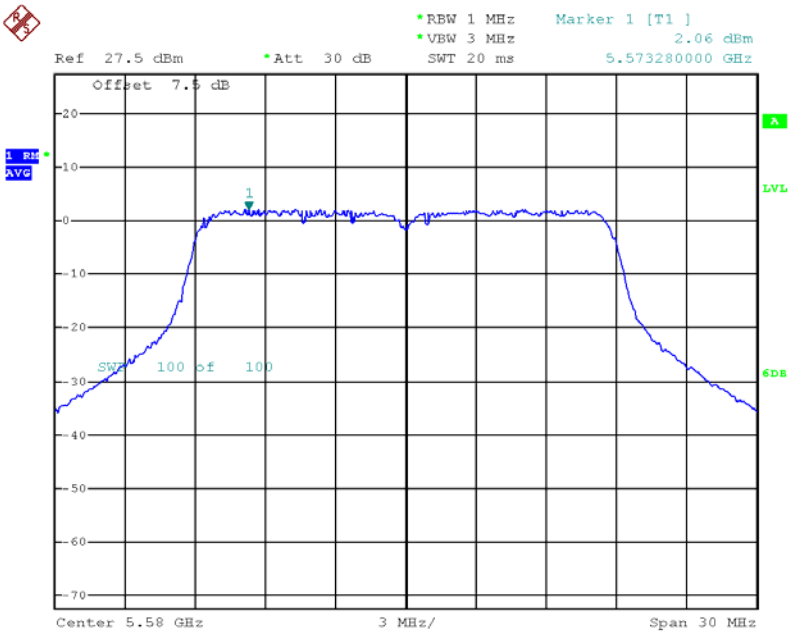
Peak Power Spectral Density Plot on 5580 MHz, HT-20, Beam Forming, M8

Tx1



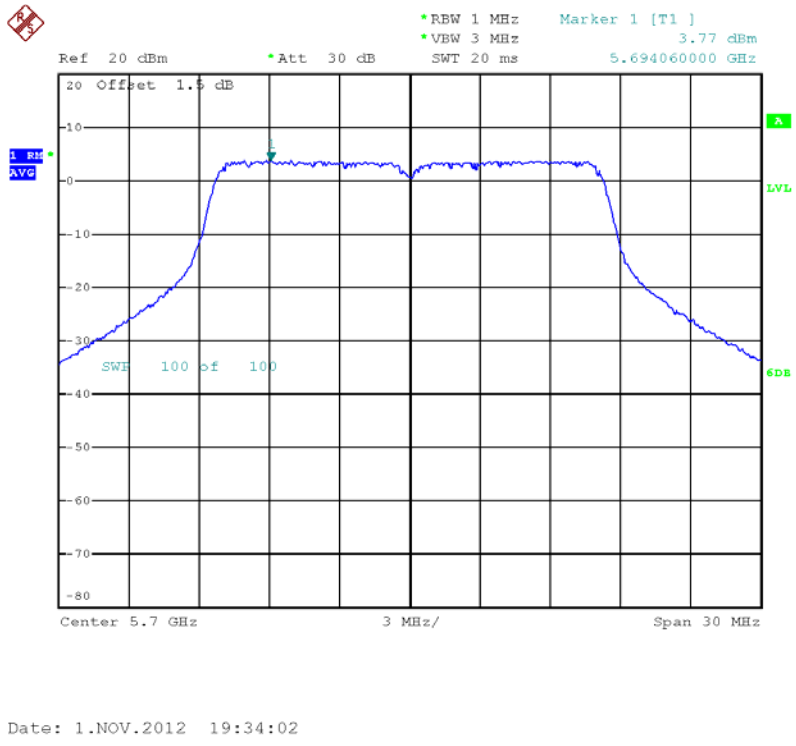
Date: 26.OCT.2012 18:48:09

Tx2



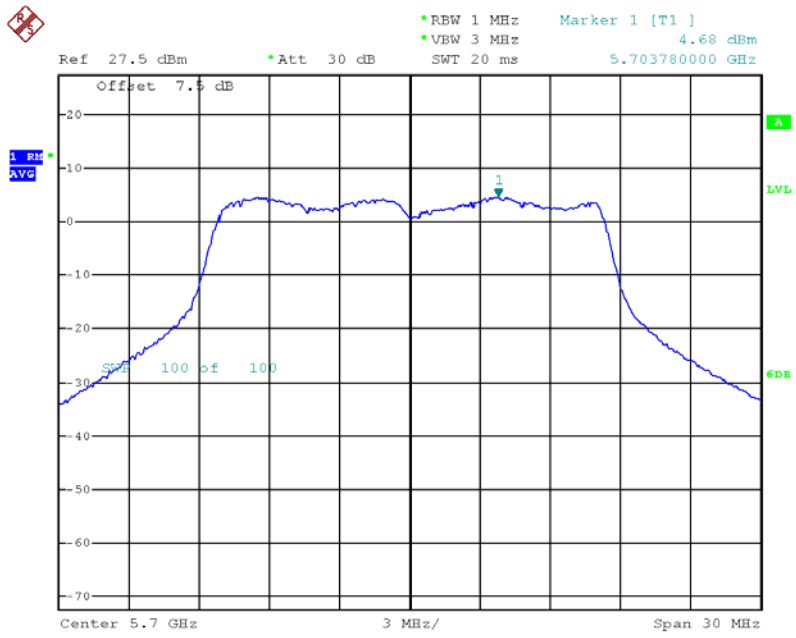
Date: 26.OCT.2012 18:47:52

Peak Power Spectral Density Plot on 5700 MHz, Non HT-20, 6Mbps
Tx1



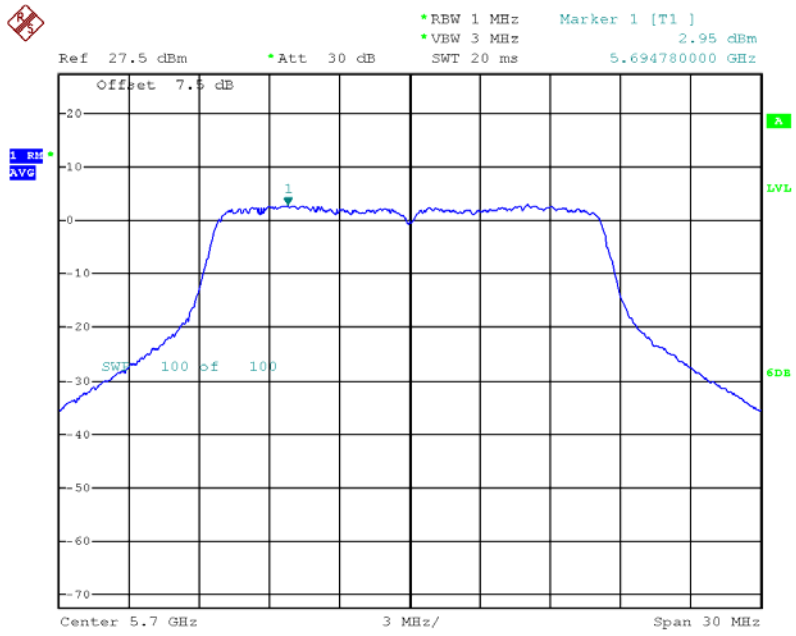
Peak Power Spectral Density Plot on 5700 MHz, Non HT-20, 6Mbps

Tx1



Date: 26.OCT.2012 18:49:26

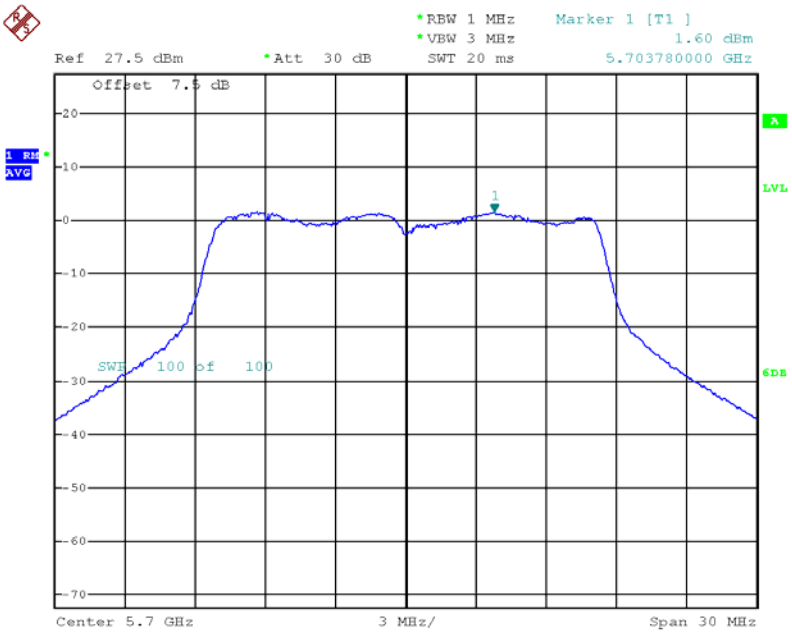
Tx2



Date: 26.OCT.2012 18:49:43

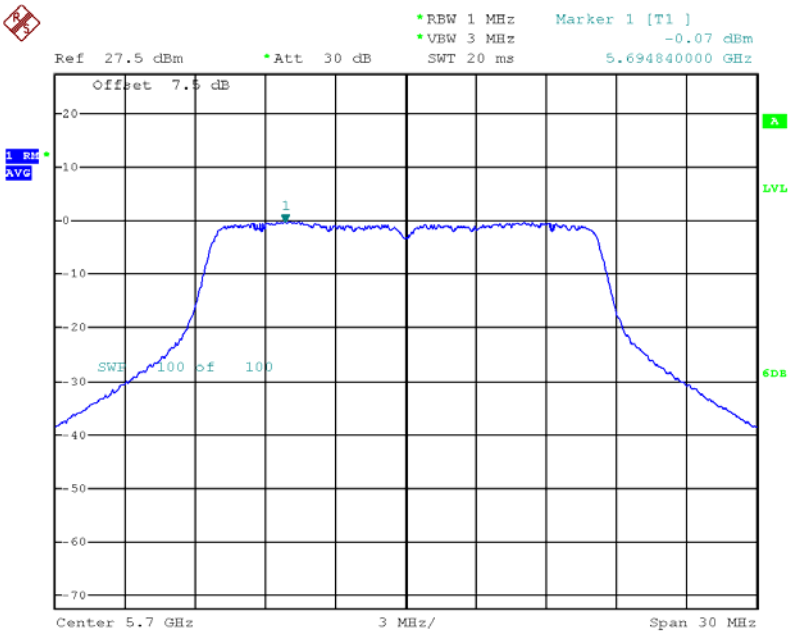
Peak Power Spectral Density Plot on 5700 MHz, Non HT-20, Beam Forming, 6Mbps

Tx1



Date: 26.OCT.2012 18:50:25

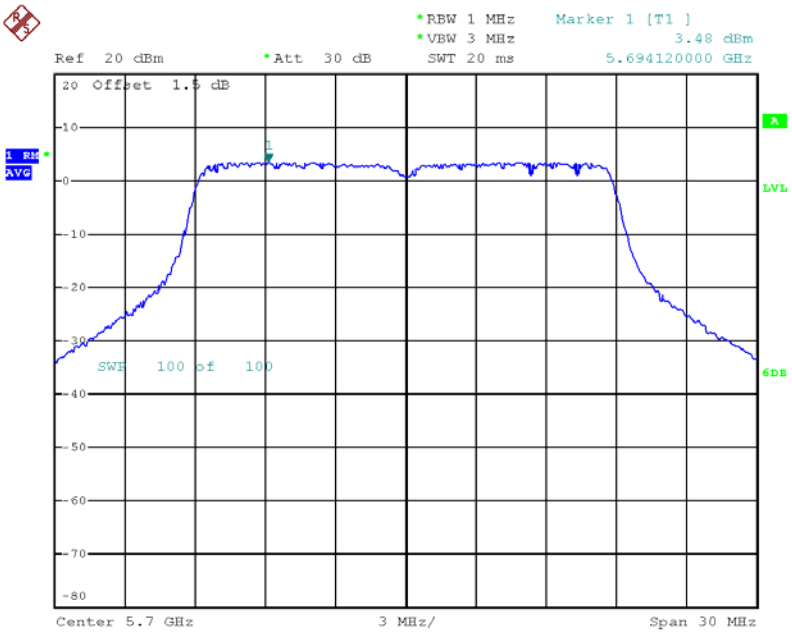
Tx2



Date: 26.OCT.2012 18:50:03

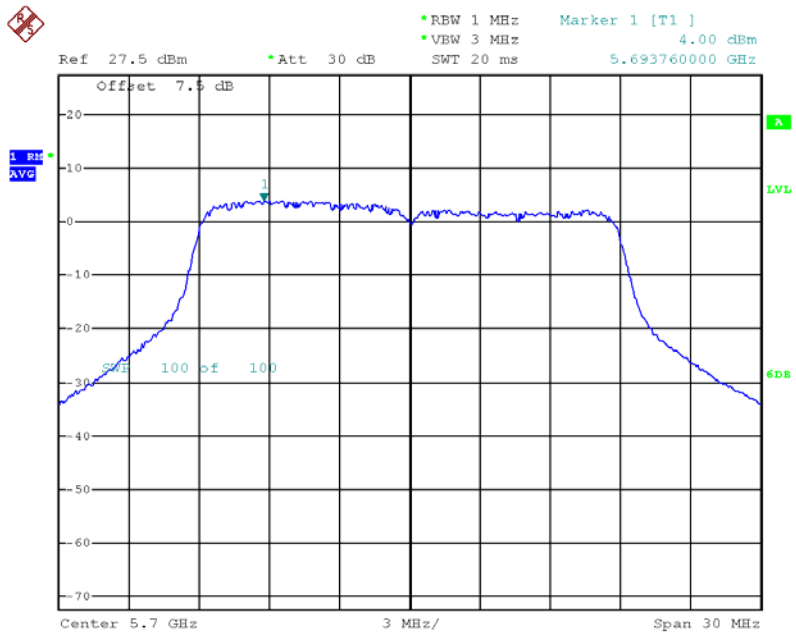
Peak Power Spectral Density Plot on 5700 MHz, HT-20, M0

Tx1



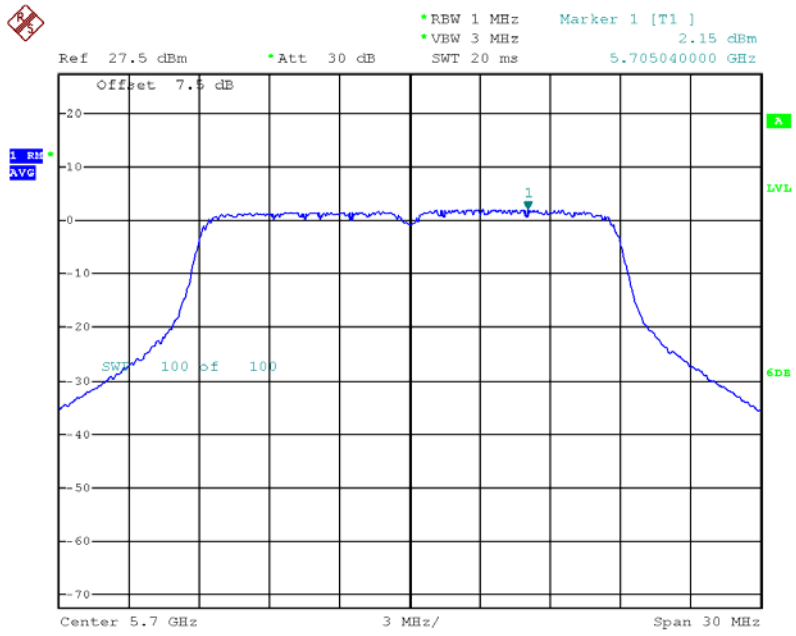
Peak Power Spectral Density Plot on 5700 MHz, HT-20 / HT-20, STBC, M0

Tx1



Date: 26.OCT.2012 18:50:43

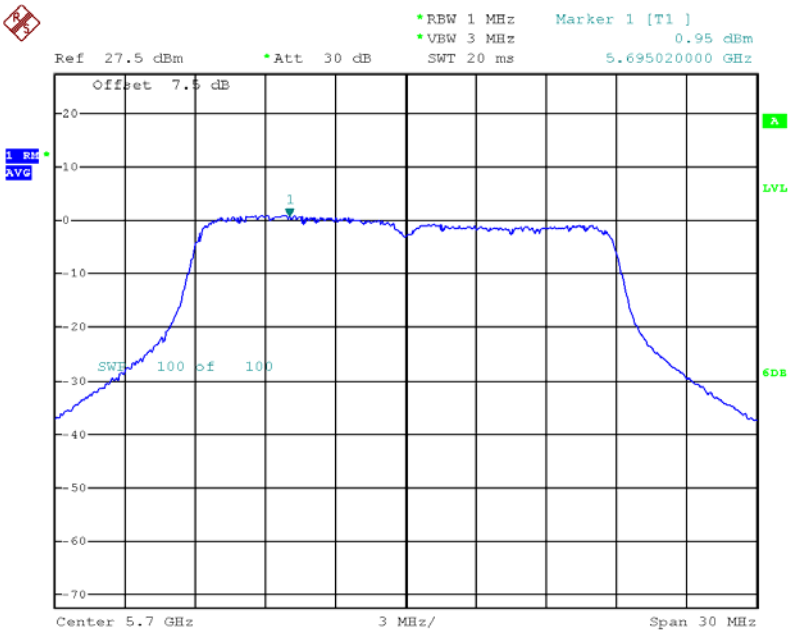
Tx2



Date: 26.OCT.2012 18:51:10

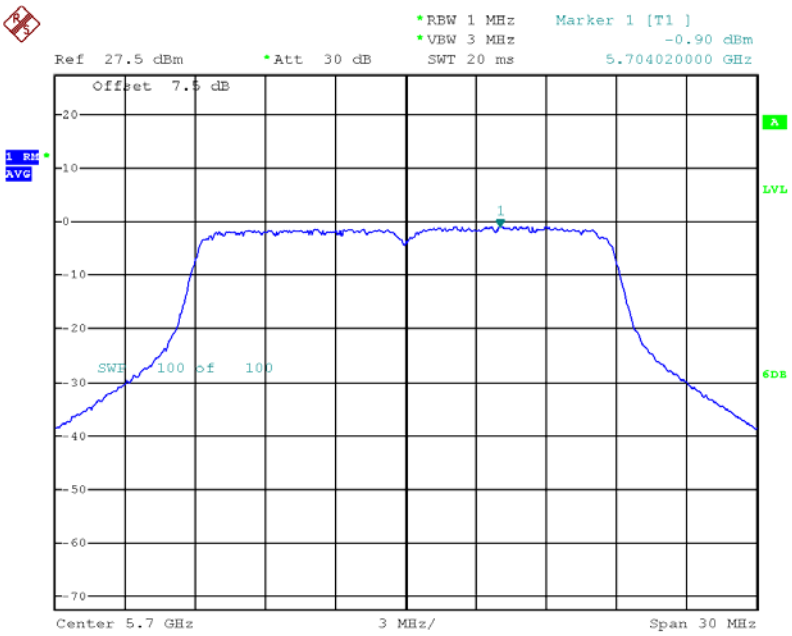
Peak Power Spectral Density Plot on 5700 MHz, HT-20, Beam Forming, M0

Tx1



Date: 26.OCT.2012 18:51:41

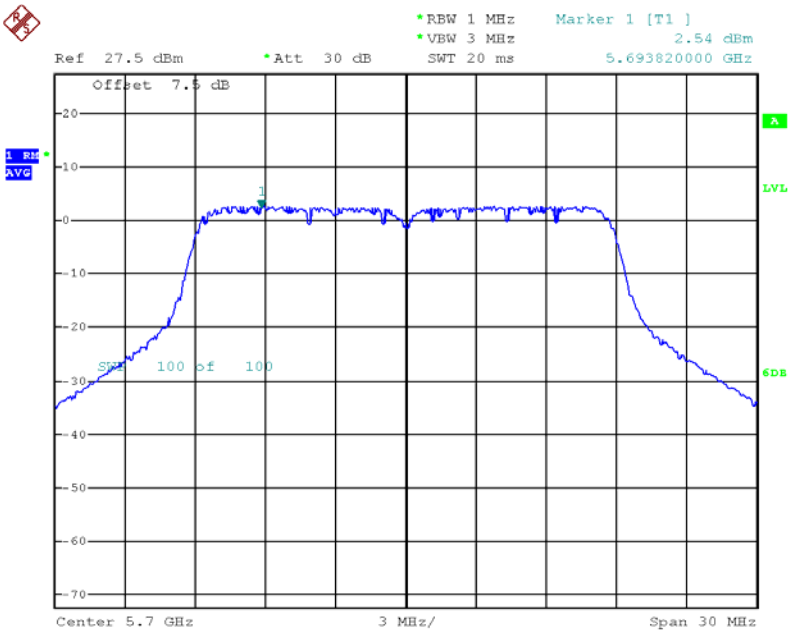
Tx2



Date: 26.OCT.2012 18:51:24

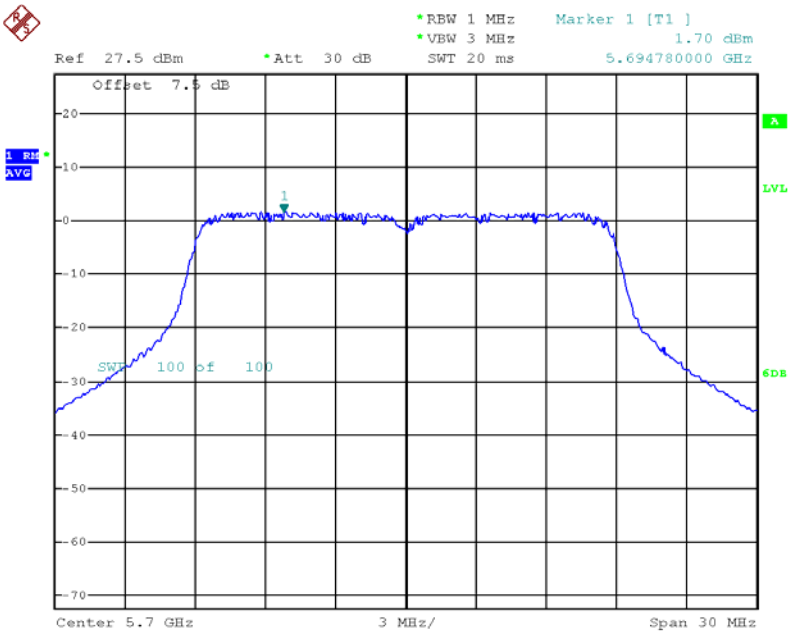
Peak Power Spectral Density Plot on 5700 MHz, HT-20, Beam Forming, M8

Tx1



Date: 26.OCT.2012 18:52:02

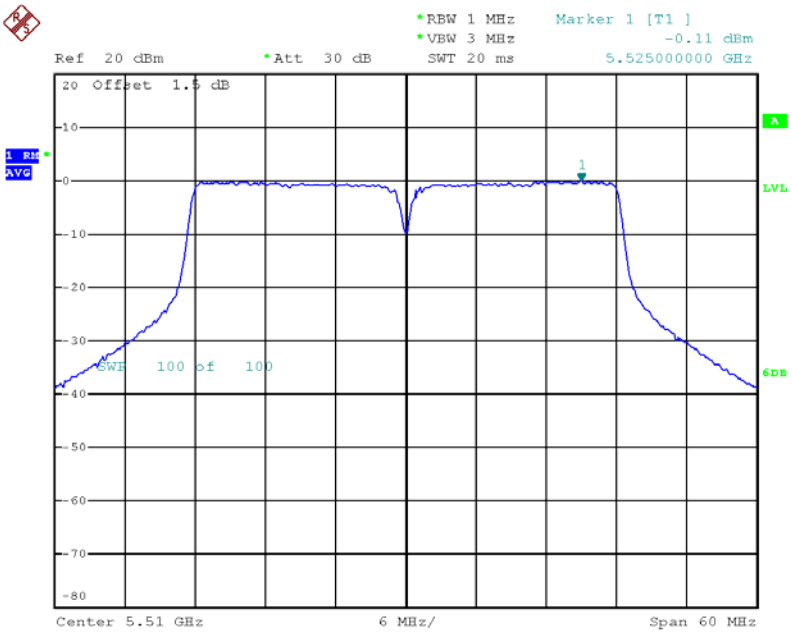
Tx2



Date: 26.OCT.2012 18:52:45

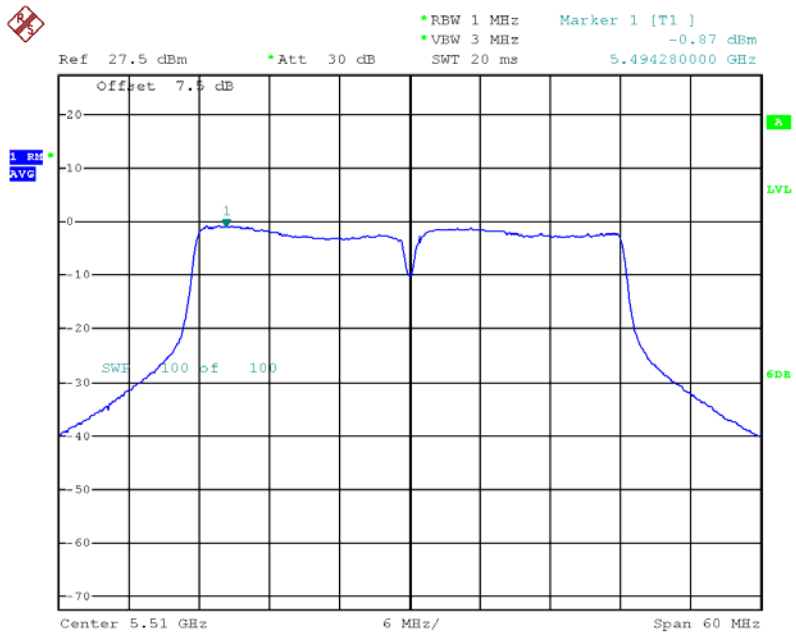
Peak Power Spectral Density Plot on 5510 MHz, HT-40, M0

Tx1



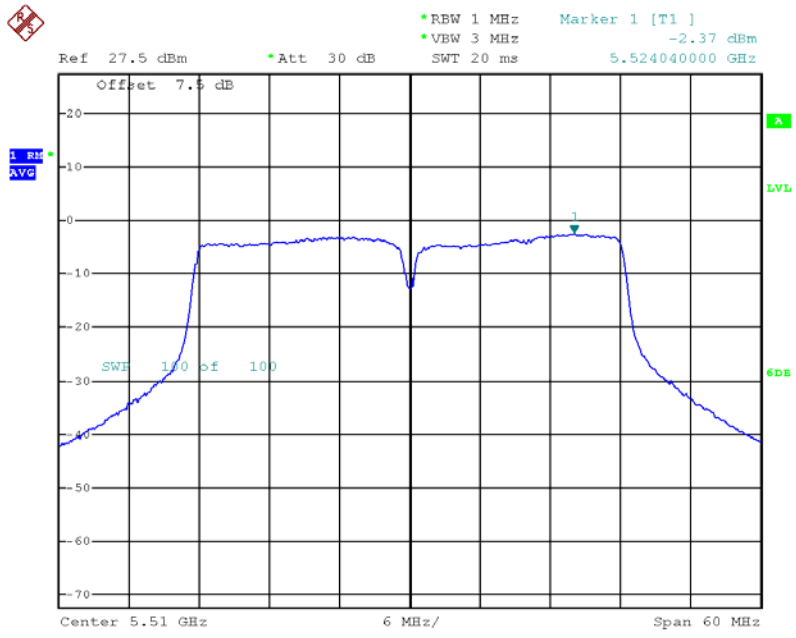
Peak Power Spectral Density Plot on 5510 MHz, HT-40 / HT-40, STBC, M0

Tx1



Date: 26.OCT.2012 18:55:55

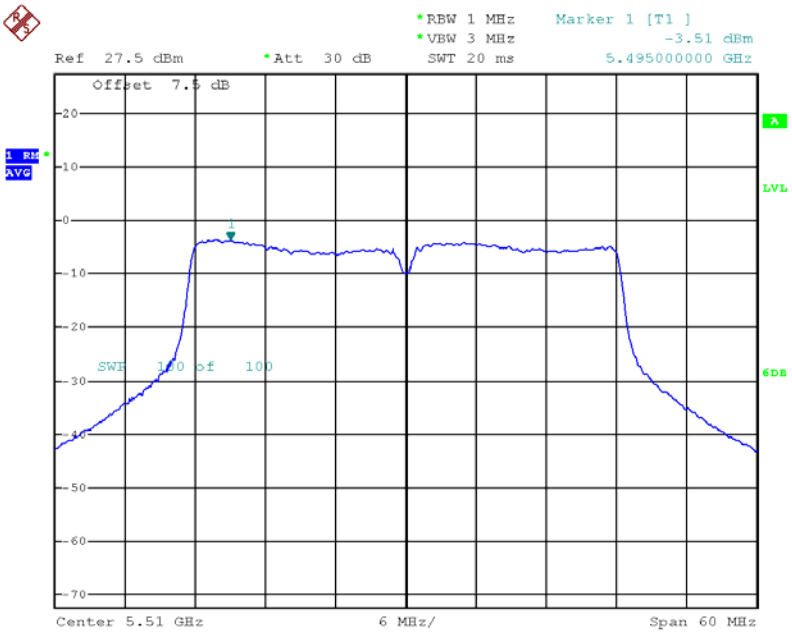
Tx2



Date: 26.OCT.2012 18:56:09

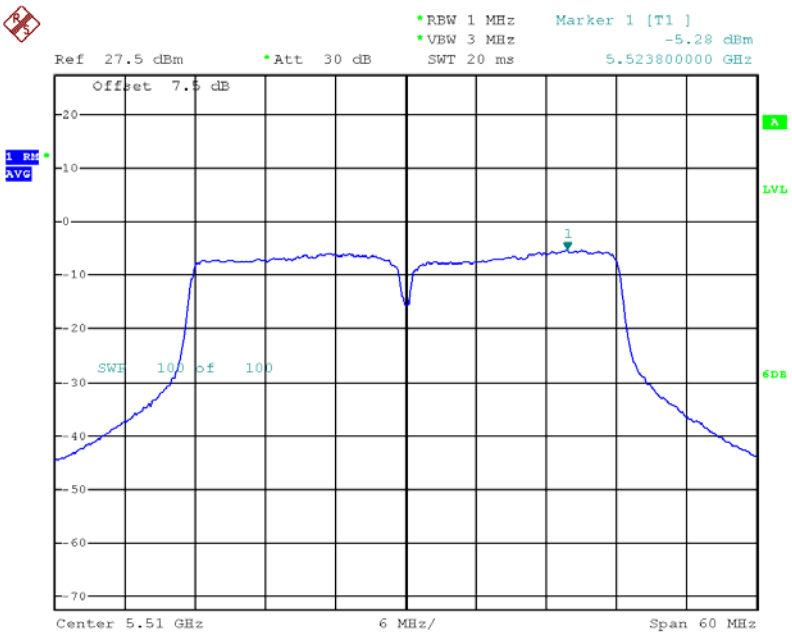
Peak Power Spectral Density Plot on 5510 MHz, HT-40, Beam Forming, M0

Tx1



Date: 26.OCT.2012 18:56:43

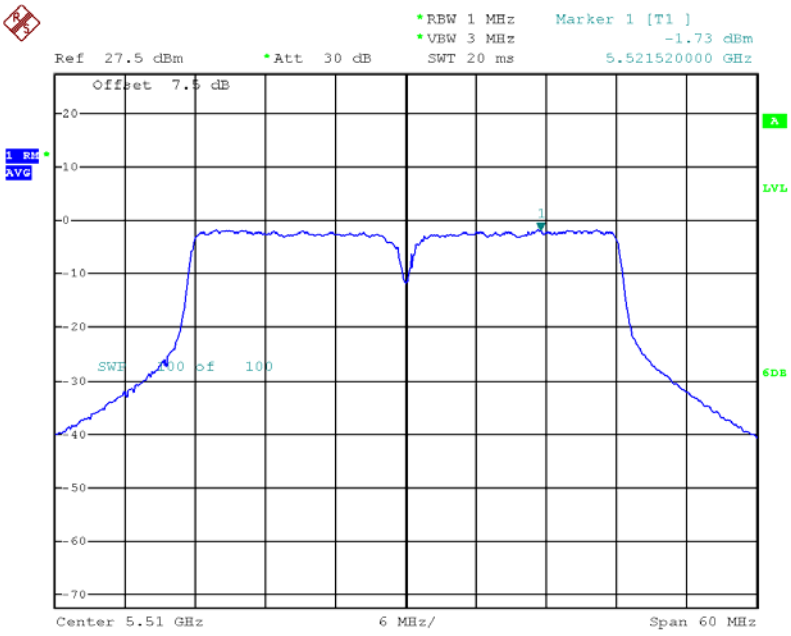
Tx2



Date: 26.OCT.2012 18:56:27

Peak Power Spectral Density Plot on 5510 MHz, HT-40, Beam Forming, M8

Tx1



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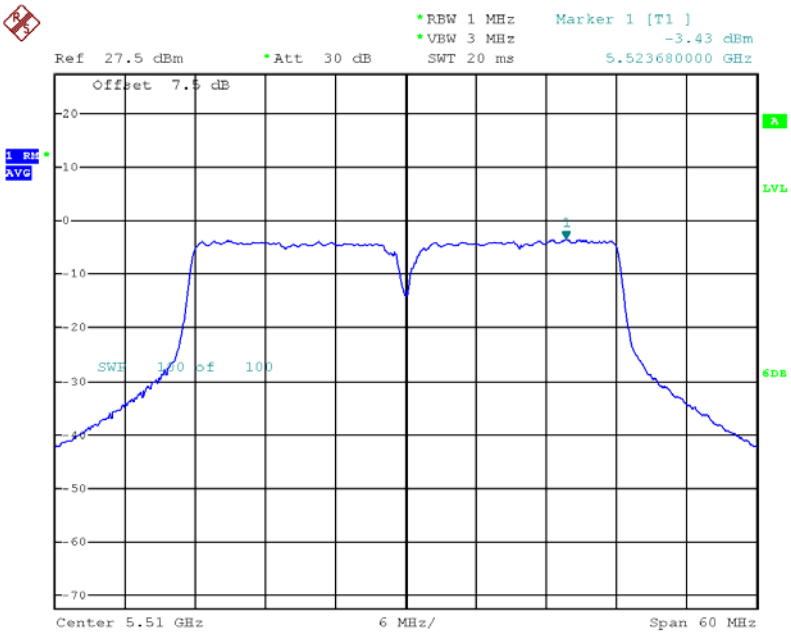
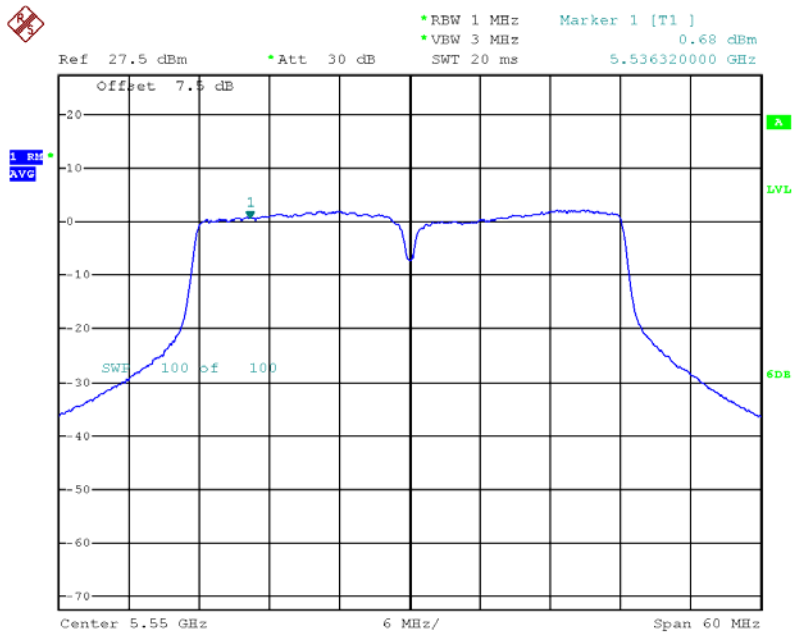
Tx2



Date: 26.OCT.2012 18:57:16

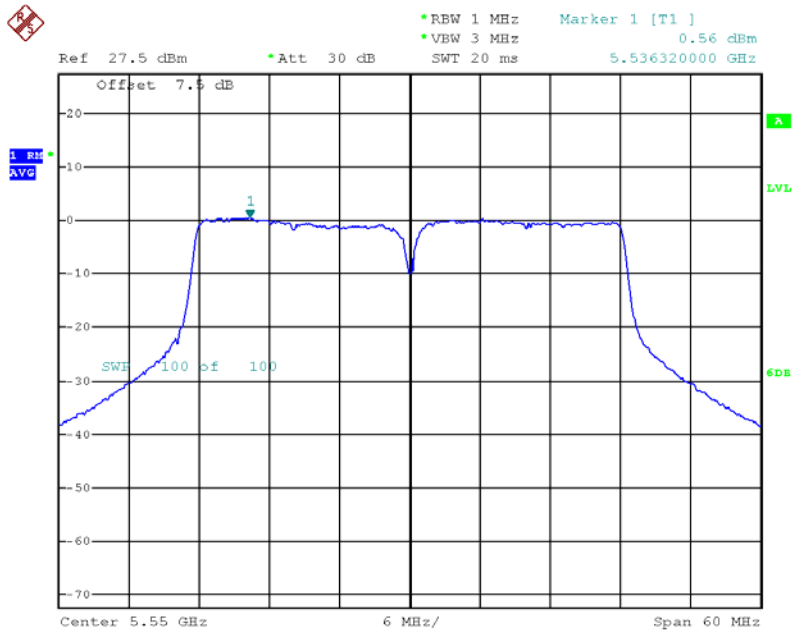
Peak Power Spectral Density Plot on 5550 MHz, HT-40 / HT-40, STBC / HT-40, Beam Forming, M0

Tx1



Date: 26.OCT.2012 18:58:00

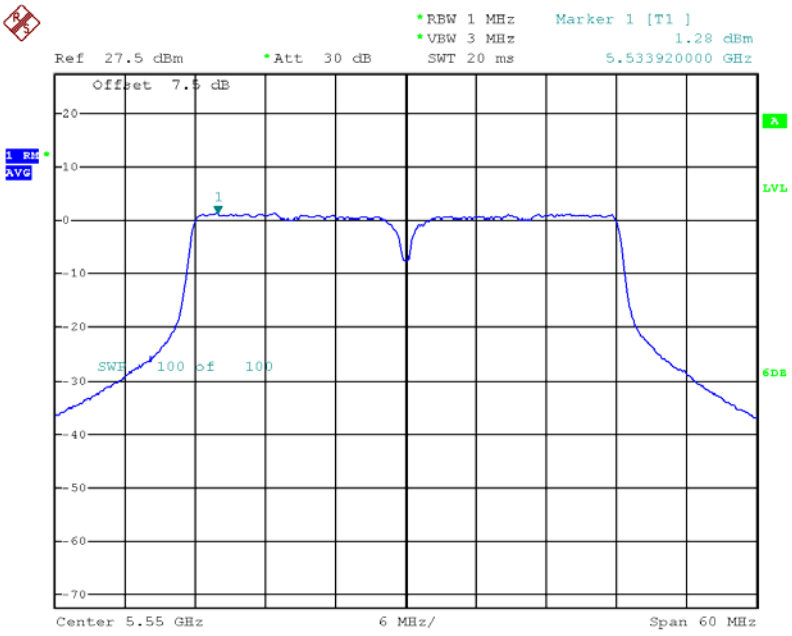
Tx2



Date: 26.OCT.2012 18:57:40

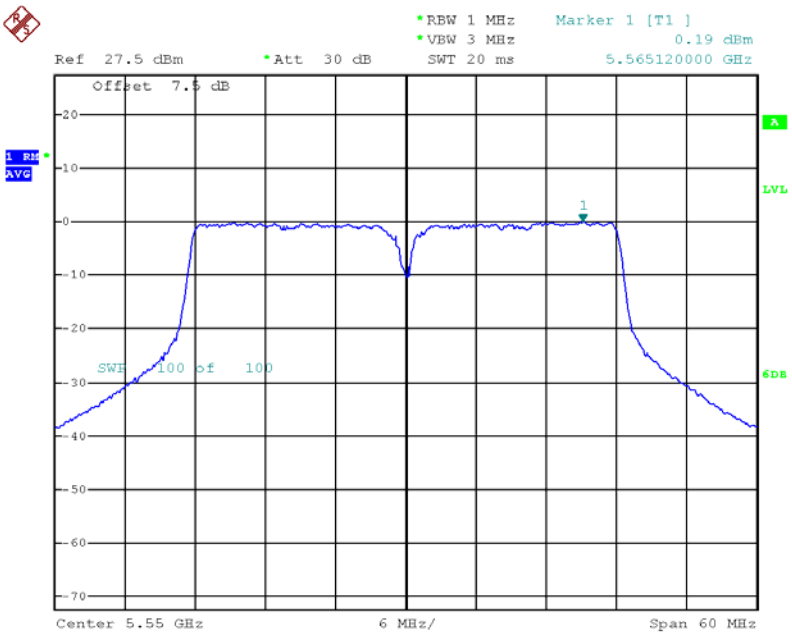
Peak Power Spectral Density Plot on 5550 MHz, HT-40, Beam Forming, M8

Tx1



Date: 26.OCT.2012 18:58:29

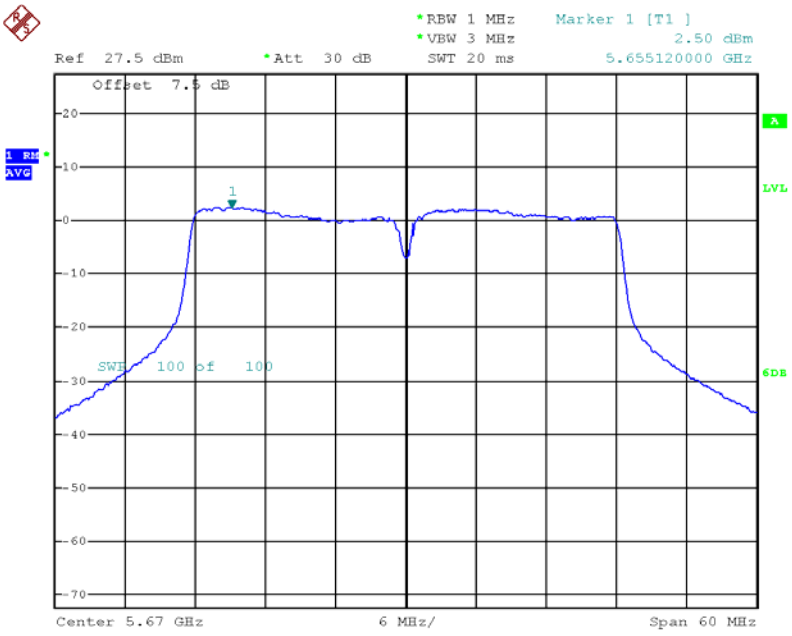
Tx2



Date: 26.OCT.2012 18:58:50

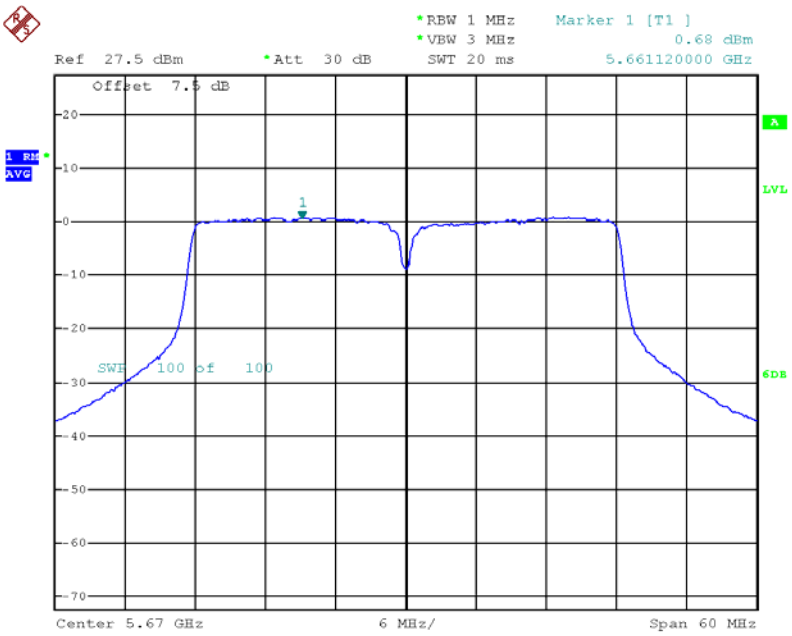
Peak Power Spectral Density Plot on 5670 MHz, HT-40 / HT-40, STBC, M0

Tx1



Date: 26.OCT.2012 19:00:04

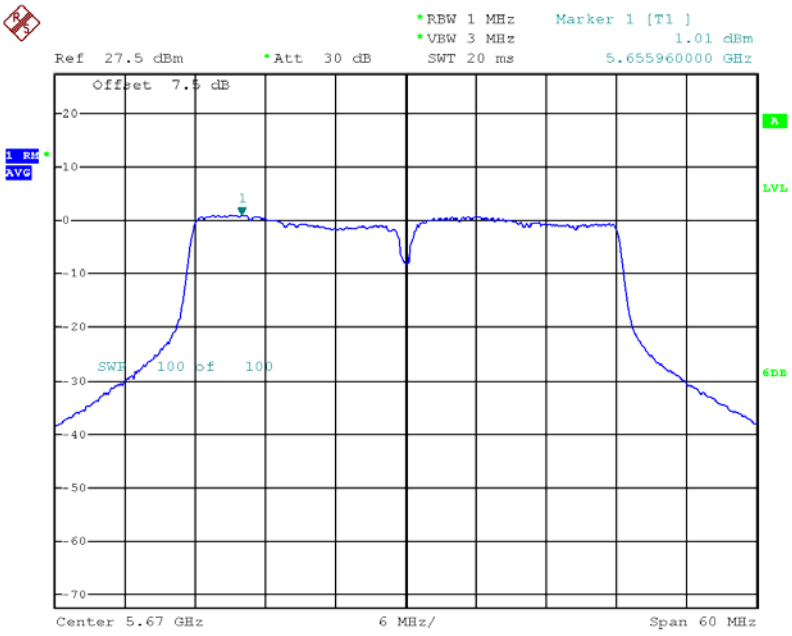
Tx2



Date: 26.OCT.2012 18:59:46

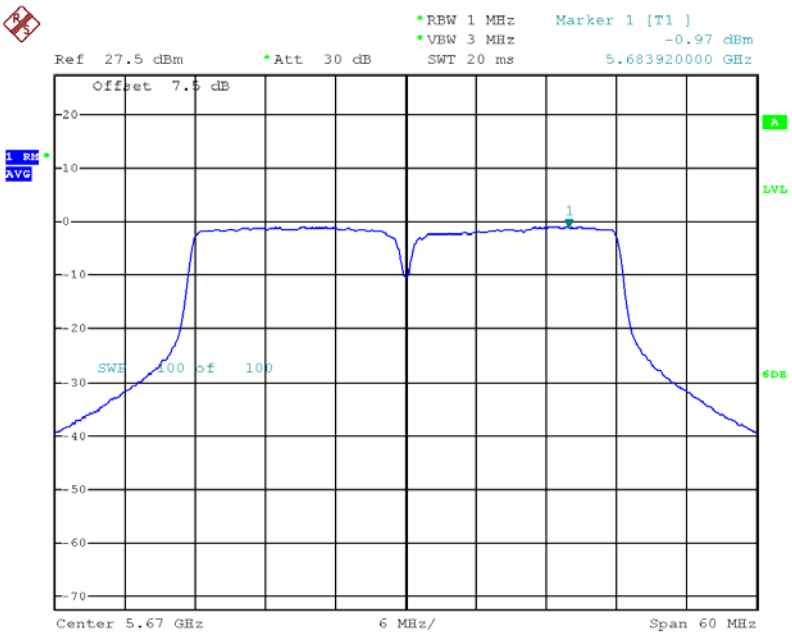
Peak Power Spectral Density Plot on 5670 MHz, HT-40, Beam Forming, M0

Tx1



Date: 26.OCT.2012 19:00:16

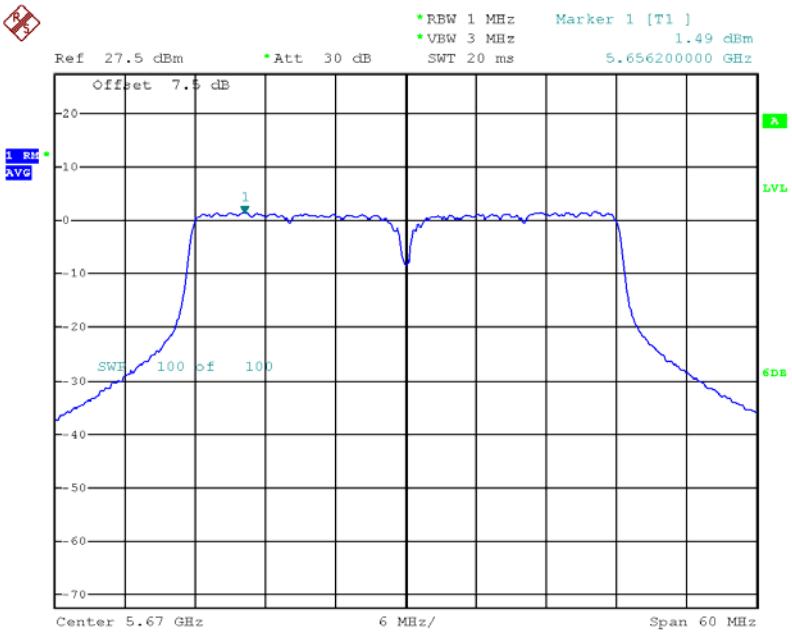
Tx2



Date: 26.OCT.2012 19:00:50

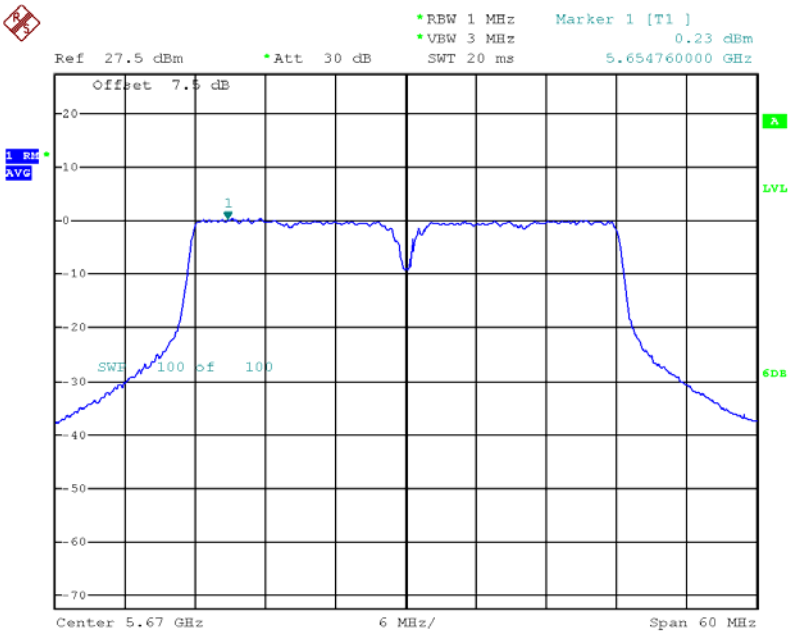
Peak Power Spectral Density Plot on 5670 MHz, HT-40, Beam Forming, M8

Tx1



Date: 26.OCT.2012 19:01:43

Tx2



Date: 26.OCT.2012 19:01:16

3.5 Peak Excursion

3.5.1 Peak Excursion Limit

Peak Excursion Limit
Peak excursion ≤ 13 dB. The ratio of the maximum of the peak-max-hold spectrum to the maximum of the average spectrum for continuous transmission does not exceed 13 dB. (Earlier procedures that required computing the ratio of the two spectra at each frequency across the emission bandwidth can lead to unintended failures at band edges and will no longer be required.)

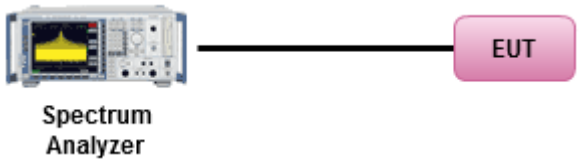
3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method	
☒	Refer as FCC KDB 789033, clause F peak excursion method.
☒	Testing each modulation mode on a single channel is sufficient to demonstrate compliance with the peak excursion requirement
☒	For conducted measurement.
☒	The EUT supports multiple transmit chains using given below method: Refer as FCC KDB 662911, when testing in-band (peak to average ratio) against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N).
☒	Test result plots with peak excursion ratio of the maximum of the peak-max-hold spectrum to the maximum of the average spectrum.

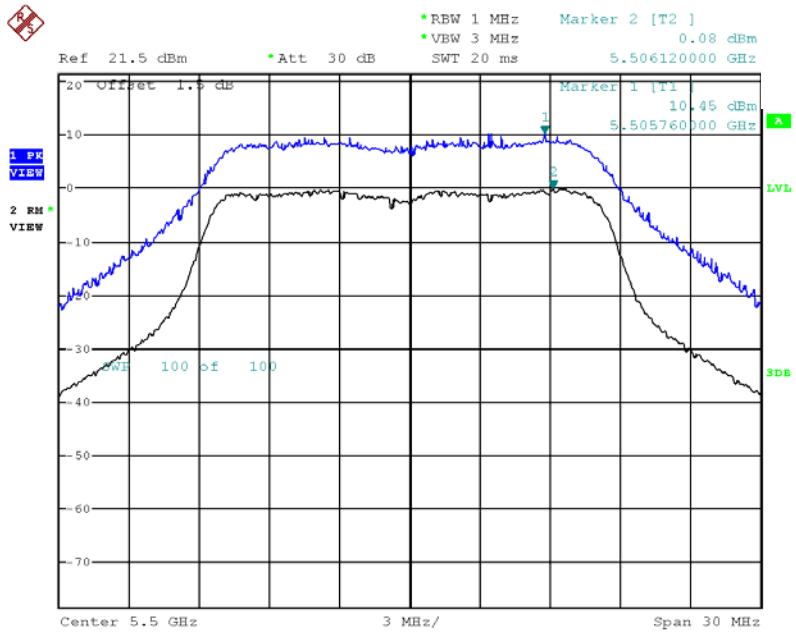
3.5.4 Test Setup

Peak Excursion


3.5.5 Test Result of Peak Excursion

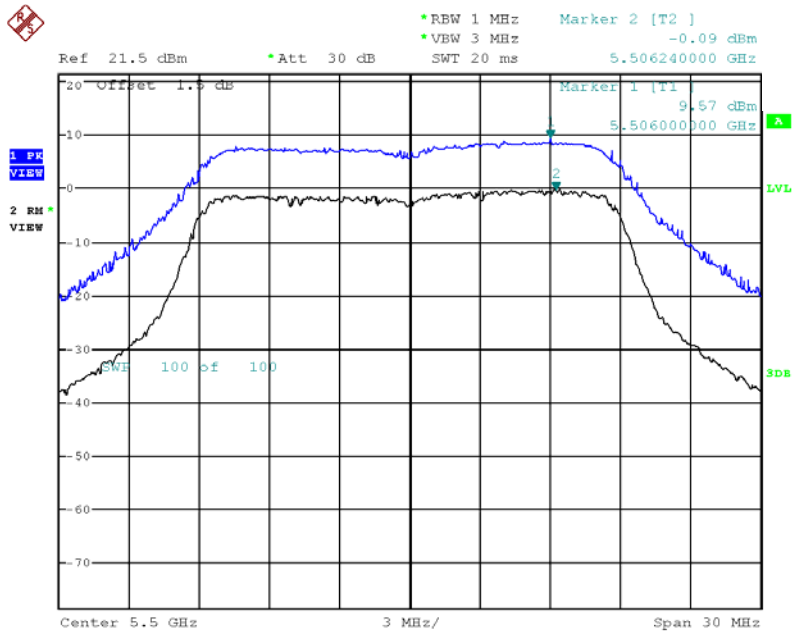
Freq. (MHz)	Operating Mode	Data Rate (Mbps)	Conducted Spur Delta (dB)	Limit (dB)	Margin (dB)
5500	Non HT-20, 6 to 54Mbps	6	10.37	13	2.63
	Non HT-20, Beam Forming, 6 to 54Mbps	6	10.37	13	2.63
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	9.66	13	3.34
	HT-20, Beam Forming, M0 to M7	M0	9.66	13	3.34
	HT-20, Beam Forming, M8 to M15	M8	10.52	13	2.48
5580	Non HT-20, 6 to 54Mbps	6	9.76	13	3.24
	Non HT-20, Beam Forming, 6 to 54Mbps	6	9.76	13	3.24
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	9.15	13	3.85
	HT-20, Beam Forming, M0 to M7	M0	9.15	13	3.85
	HT-20, Beam Forming, M8 to M15	M8	10.59	13	2.41
5700	Non HT-20, 6 to 54Mbps	6	9.49	13	3.51
	Non HT-20, 6 to 54Mbps	6	10.53	13	2.47
	Non HT-20, Beam Forming, 6 to 54Mbps	6	10.53	13	2.47
	HT-20, M0 to M7	M0	9.46	13	3.54
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	9.41	13	3.59
	HT-20, Beam Forming, M0 to M7	M0	9.41	13	3.59
	HT-20, Beam Forming, M8 to M15	M8	10.64	13	2.36
5510	HT-40, M0 to M7	M0	9.49	13	3.51
	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	9.72	13	3.28
	HT-40, Beam Forming, M0 to M7	M0	9.72	13	3.28
	HT-40, Beam Forming, M8 to M15	M8	11.42	13	1.58
5550	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	9.43	13	3.57
	HT-40, Beam Forming, M0 to M7	M0	9.43	13	3.57
	HT-40, Beam Forming, M8 to M15	M8	10.96	13	2.04
5670	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	9.55	13	3.45
	HT-40, Beam Forming, M0 to M7	M0	9.55	13	3.45
	HT-40, Beam Forming, M8 to M15	M8	11.21	13	1.79

Peak Excursion Plot on 5500 MHz, Non HT-20 / Non HT-20, Beam Forming, 6Mbps



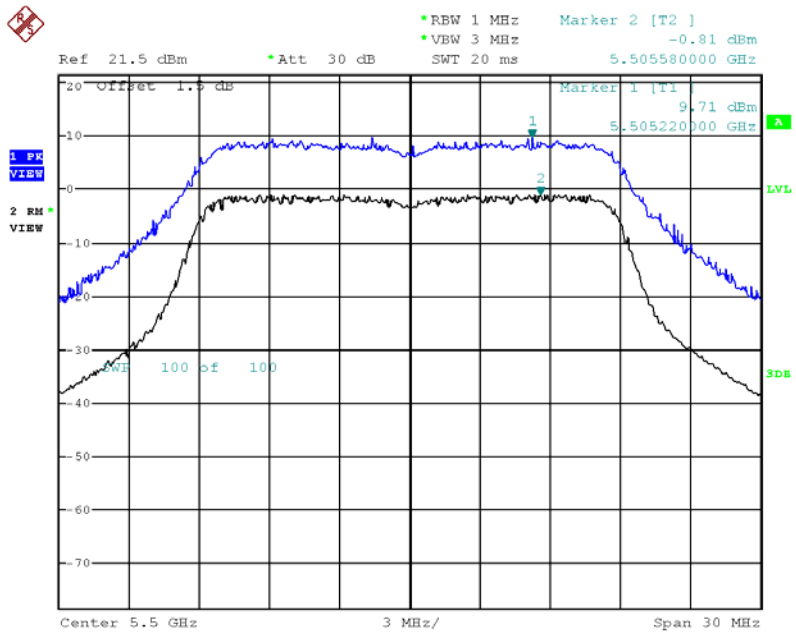
Date: 26.OCT.2012 19:32:49

Peak Excursion Plot on 5500 MHz, HT-20 / HT-20, STBC / HT-20, Beam Forming, M0



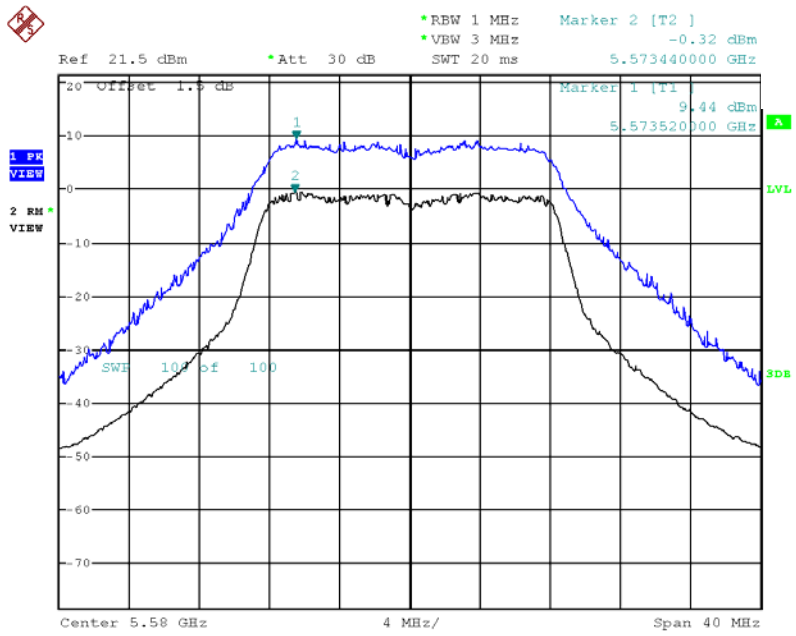
Date: 26.OCT.2012 19:33:40

Peak Excursion Plot on 5500 MHz, Non HT-20 / HT-20, Beam Forming, M8



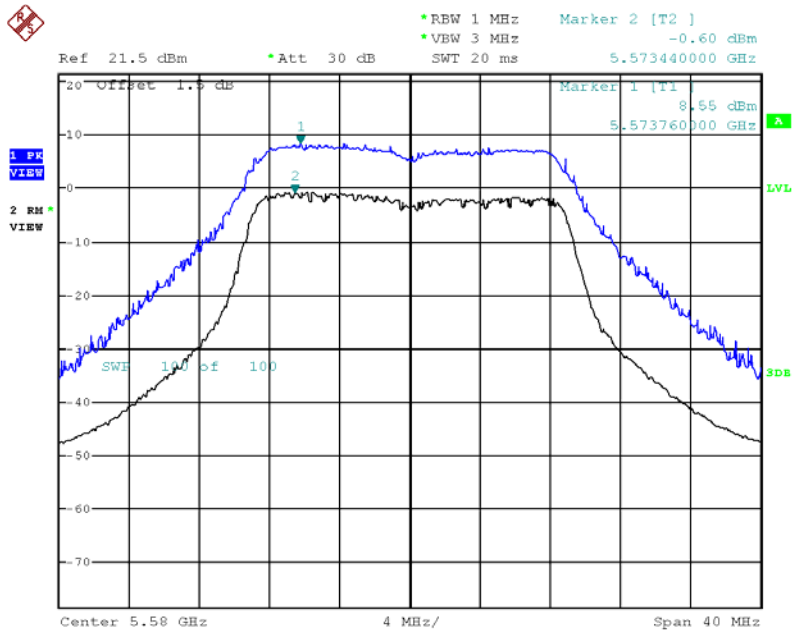
Date: 26.OCT.2012 19:34:22

Peak Excursion Plot on 5580 MHz, Non HT-20 / Non HT-20, Beam Forming, 6Mbps



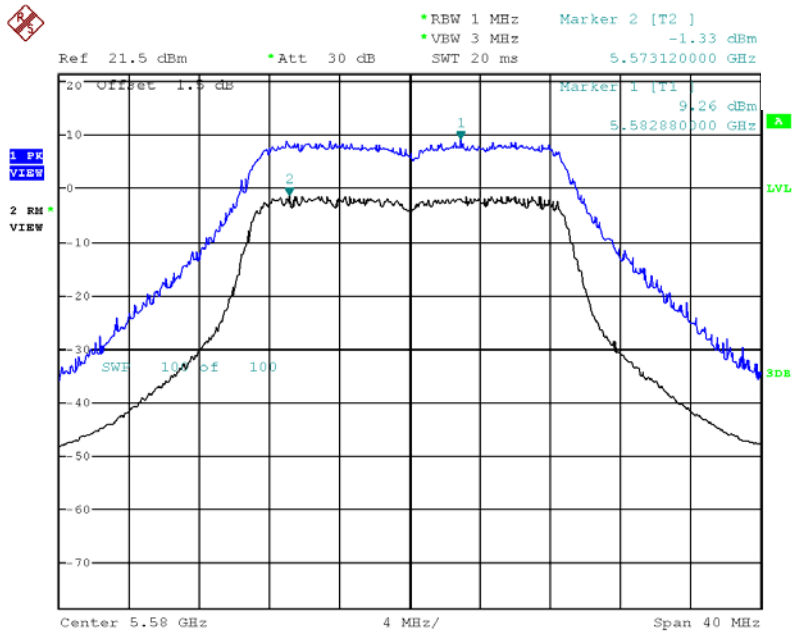
Date: 26.OCT.2012 19:35:08

Peak Excursion Plot on 5580 MHz, HT-20 / HT-20, STBC / HT-20, Beam Forming, M0



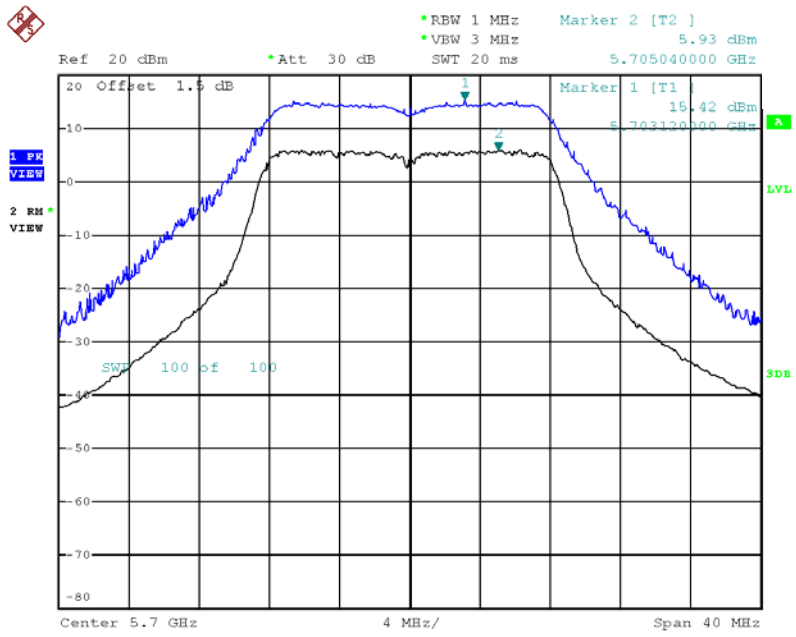
Date: 26.OCT.2012 19:35:47

Peak Excursion Plot on 5580 MHz, HT-20, Beam Forming, M8



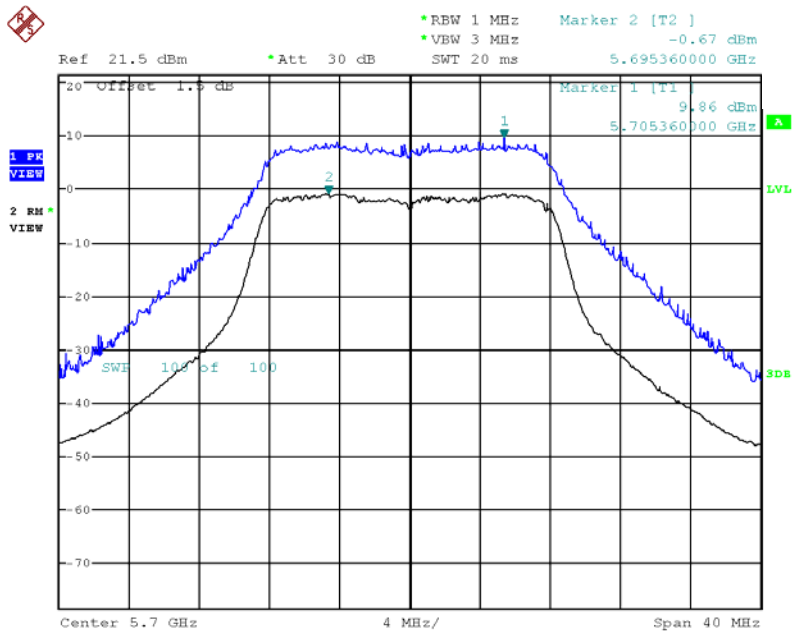
Date: 26.OCT.2012 19:37:06

Peak Excursion Plot on 5700 MHz, Non HT-20 , 6Mbps



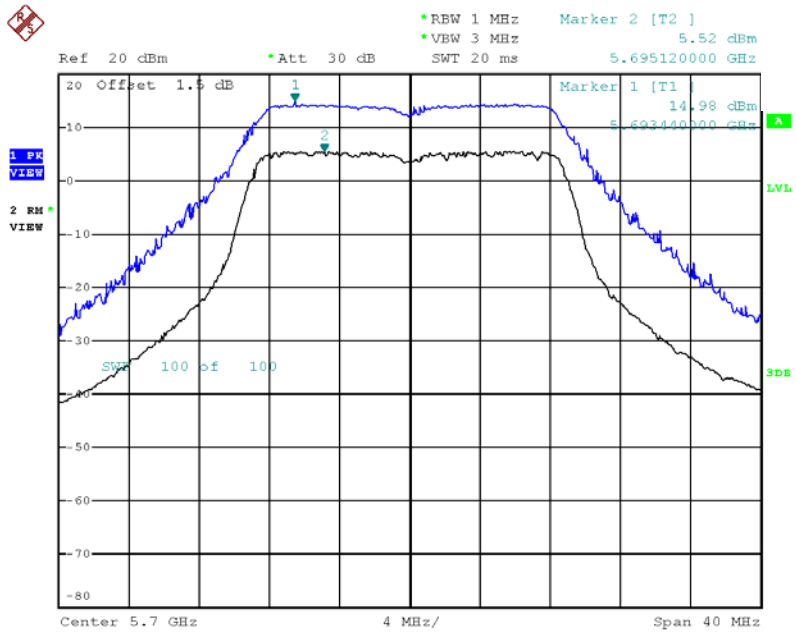
Date: 1.NOV.2012 19:53:25

Peak Excursion Plot on 5700 MHz, Non HT-20 / Non HT-20, Beam Forming, 6Mbps



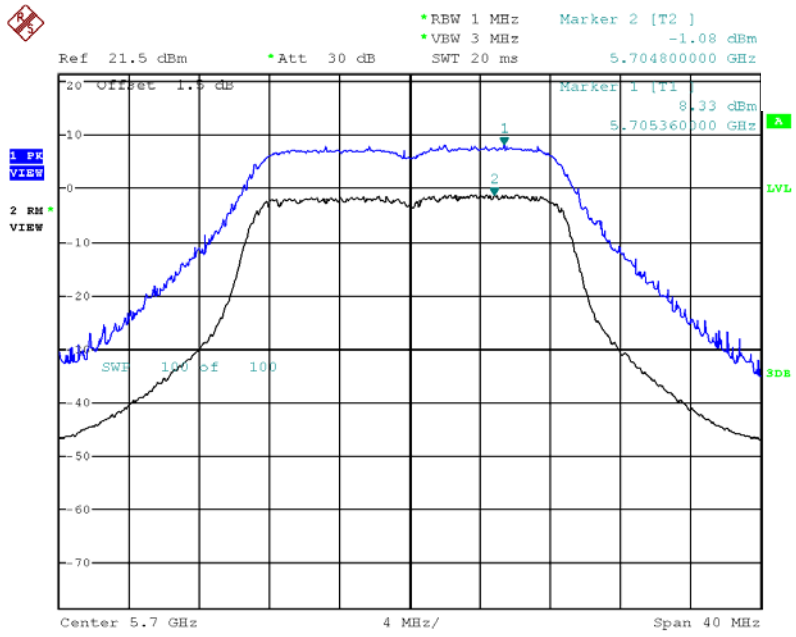
Date: 26.OCT.2012 19:38:11

Peak Excursion Plot on 5700 MHz, HT-20, M0



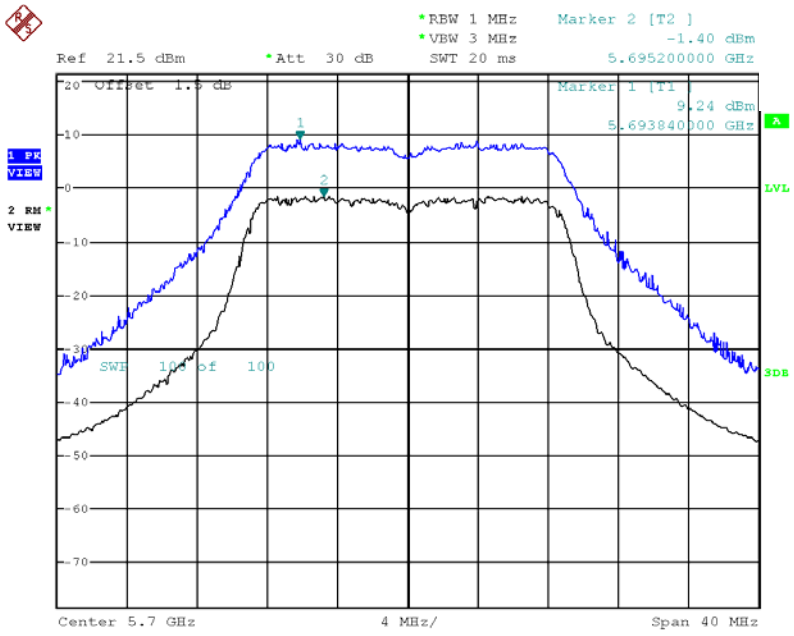
Date: 1.NOV.2012 19:52:30

Peak Excursion Plot on 5700 MHz, HT-20 / HT-20, STBC / HT-20, Beam Forming, M0



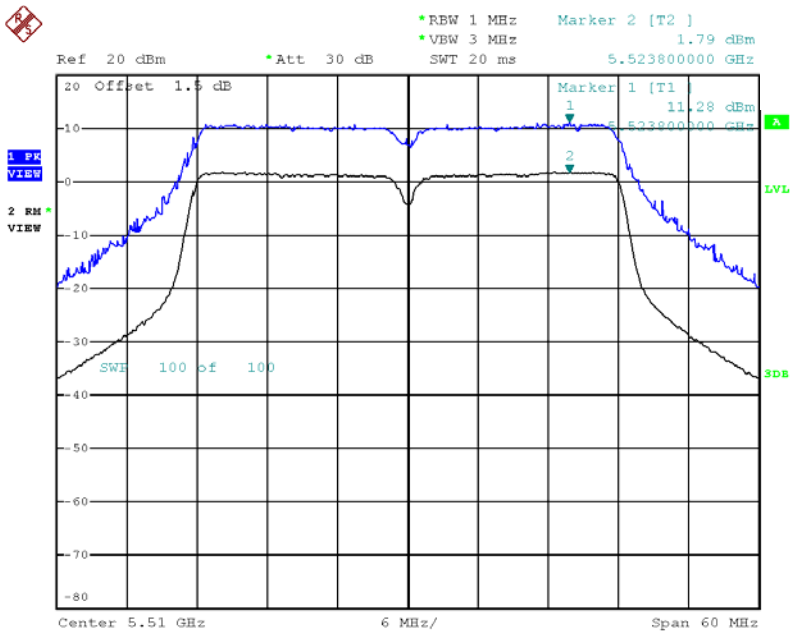
Date: 26.OCT.2012 19:38:57

Peak Excursion Plot on 5700 MHz, HT-20, Beam Forming, M8



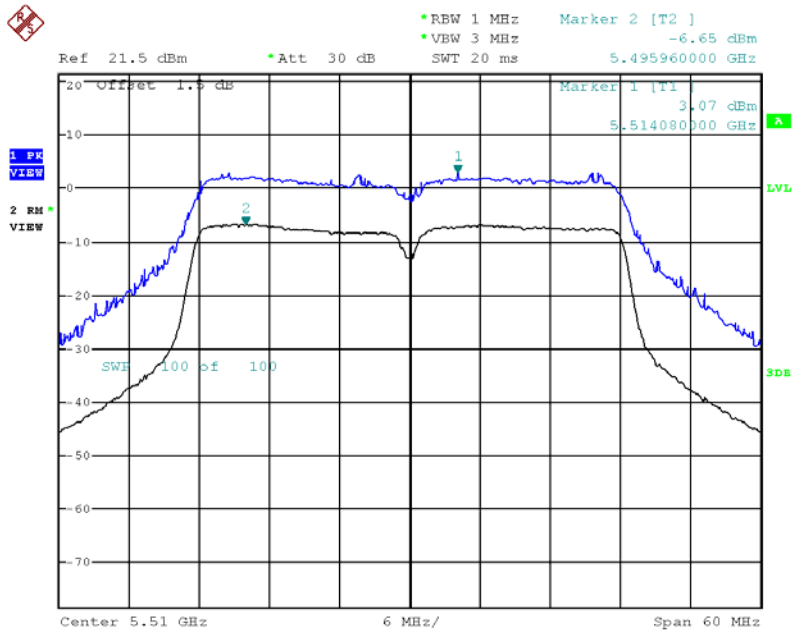
Date: 26.OCT.2012 19:39:54

Peak Excursion Plot on 5510 MHz, HT-40, M0



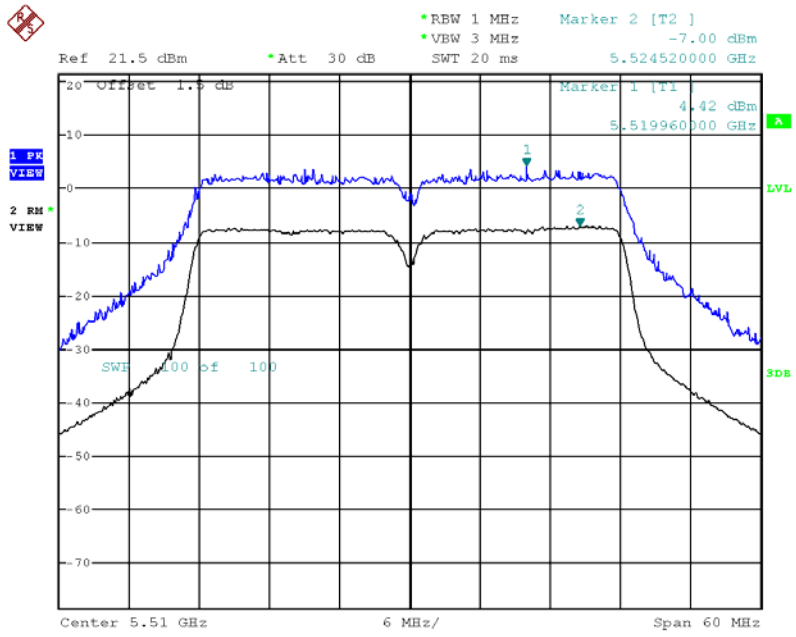
Date: 1.NOV.2012 19:51:38

Peak Excursion Plot on 5510 MHz, HT-40 / HT-40, STBC / HT-40, Beam Forming, M0



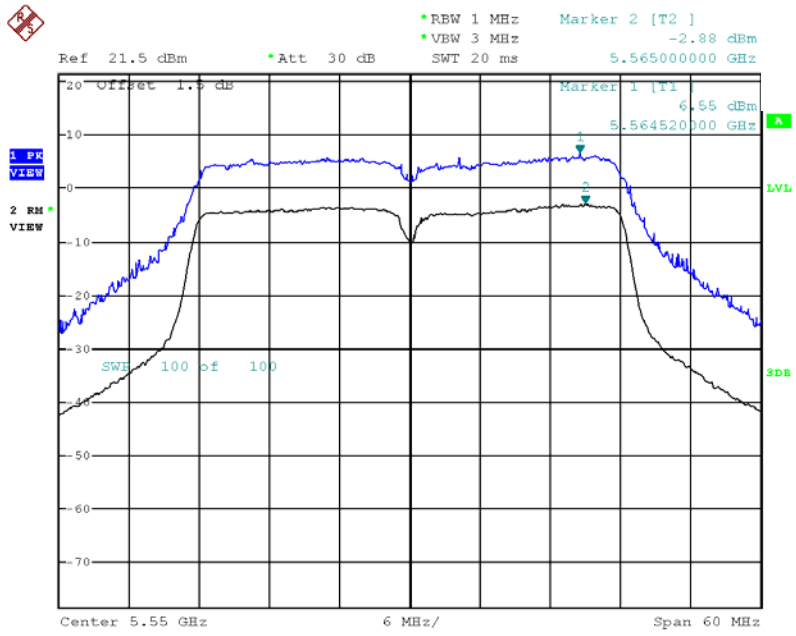
Date: 26.OCT.2012 19:41:00

Peak Excursion Plot on 5510 MHz, HT-40, Beam Forming, M8



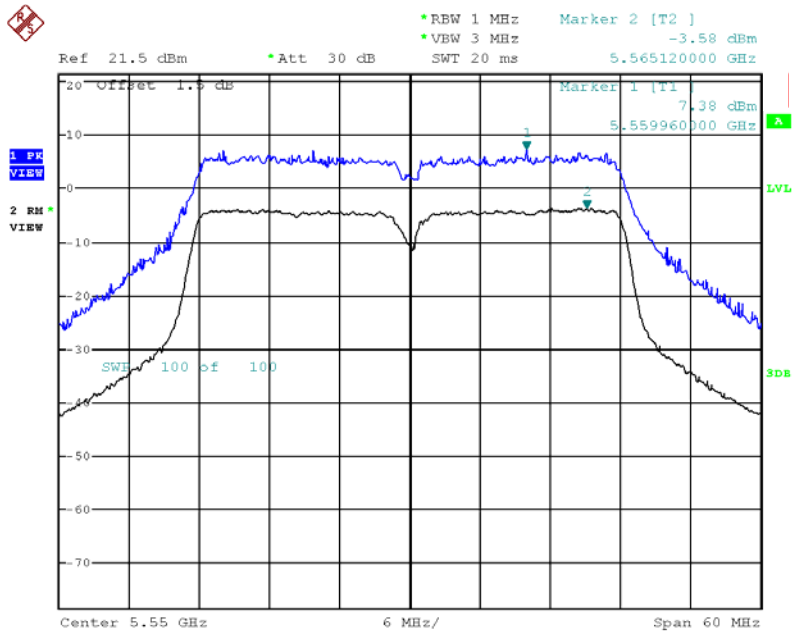
Date: 26.OCT.2012 19:41:42

Peak Excursion Plot on 5550 MHz, HT-40 / HT-40, STBC / HT-40, Beam Forming, M0



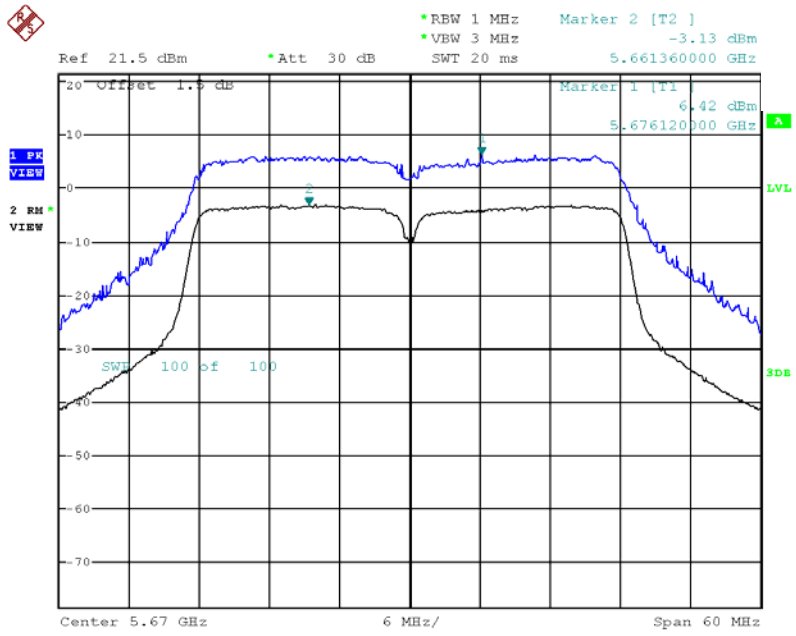
Date: 26.OCT.2012 19:42:34

Peak Excursion Plot on 5550 MHz, HT-40, Beam Forming, M8



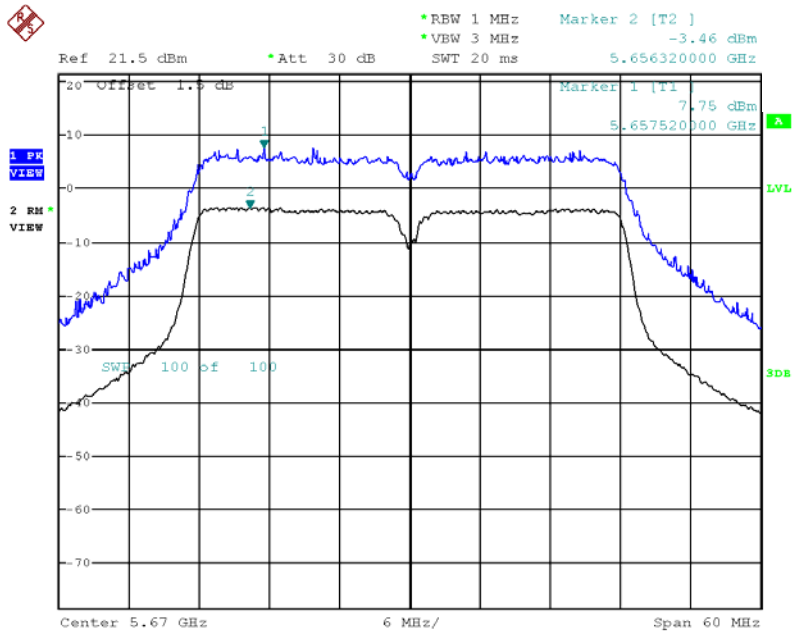
Date: 26.OCT.2012 19:43:13

Peak Excursion Plot on 5670 MHz, HT-40 / HT-40, STBC / HT-40, Beam Forming, M0



Date: 26.OCT.2012 19:43:54

Peak Excursion Plot on 5670 MHz, HT-40, Beam Forming, M8

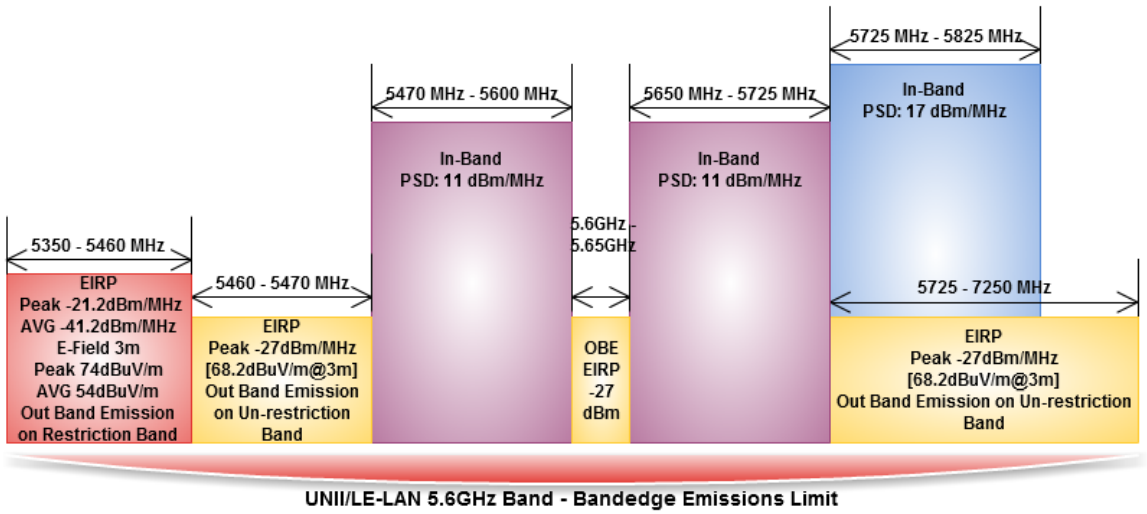


Date: 26.OCT.2012 19:45:02

3.6 Transmitter Conducted Bandedge Emissions

3.6.1 Transmitter Conducted Bandedge Emissions Limit

Transmitter Bandedge Emissions Limit



Refer as FCC KDB 789033, G)2)c)(i) specifying that if a non-restricted-band out-of-band emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm or -17 dBm peak emission limit. Reason for change: to ensure that emission requirements in the non-restricted bands are not more stringent than those in the restricted bands.

3.6.2 Measuring Instruments

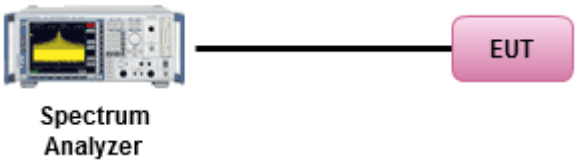
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method			
☒	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].		
☒	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.		
☒	For the transmitter unwanted emissions shall be measured using following options below:		
	☒	Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.	
	☒	Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.	
		☐	Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
		☐	Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
		☒	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) - Duty cycle ≥ 98%.
		☐	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒	Refer as FCC KDB 789033, clause G)5) measurement procedure peak limit.
		☐	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
☒	For the transmitter bandedge emissions shall be measured using following options below:		
	☐	Refer as FCC KDB 789033, clause G)3)d) marker-delta method for band-edge measurements.	
	☒	Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.	
	☐	Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.	
☒	For conducted measurement, refer as FCC KDB 789033, clause G.		

3.6.4 Test Setup

Transmitter Conducted Bandedge Emissions



3.6.5 Test Result of Transmitter Conducted Bandedge Emissions

Transmitter Conducted Bandedge Emissions Result – Average

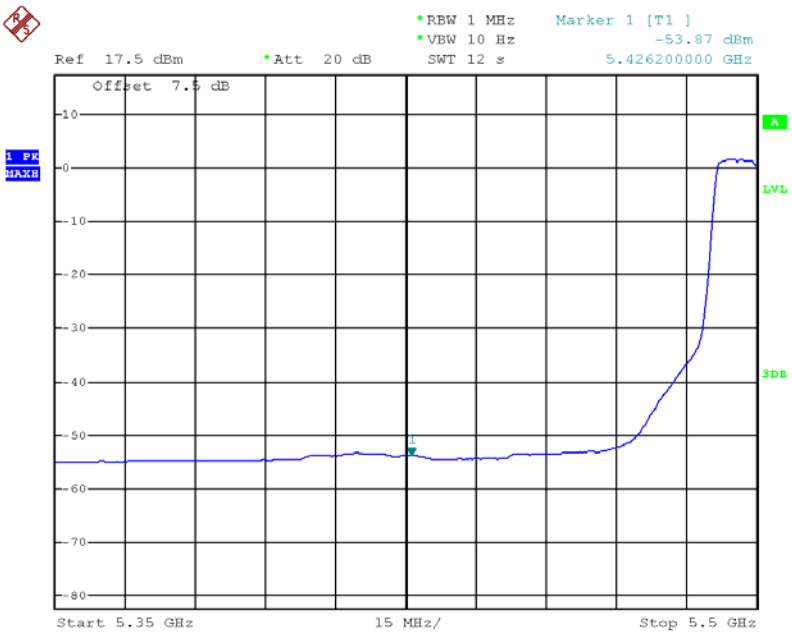
Freq. (MHz)	Operating Mode	N_{TX}	Correlated Antenna Gain (dBi)	TX1 Bandedge Level (dBm)	TX2 Bandedge Level (dBm)	Total TX Bandedge Level (dBm)	Limit (dBm)	Margin (dB)
5500	Non HT-20, 6 to 54Mbps	2	5.00	-53.87	-52.73	-45.25	-41.25	4.00
	Non HT-20, Beam Forming, 6 to 54Mbps	2	8.01	-53.87	-52.73	-42.24	-41.25	0.99
	HT-20, M0 to M15/HT-20, STBC, M0 to M7	2	5.00	-53.53	-52.71	-45.09	-41.25	3.84
	HT-20, Beam Forming, M0 to M7	2	8.01	-53.53	-52.71	-42.08	-41.25	0.83
	HT-20, Beam Forming, M8 to M15	2	5.00	-53.84	-52.85	-45.31	-41.25	4.06
5580	Non HT-20, 6 to 54Mbps	2	5.00	-54.63	-51.37	-44.69	-41.25	3.44
	Non HT-20, Beam Forming, 6 to 54Mbps	2	8.01	-54.63	-51.37	-41.68	-41.25	0.43
	HT-20, M0 to M15/HT-20, STBC, M0 to M7	2	5.00	-54.66	-50.98	-44.43	-41.25	3.18
	HT-20, Beam Forming, M0 to M7	2	8.01	-54.66	-50.98	-41.42	-41.25	0.17
	HT-20, Beam Forming, M8 to M15	2	5.00	-54.84	-51.32	-44.72	-41.25	3.47
5700	Non HT-20, 6 to 54Mbps	1	5.00	-48.57	-	-43.57	-41.25	2.32
	Non HT-20, 6 to 54Mbps	2	5.00	-48.69	-50.15	-41.35	-41.25	0.10
	Non HT-20, Beam Forming, 6 to 54Mbps	2	8.01	-52.00	-53.46	-41.65	-41.25	0.40
	HT-20, M0 to M7	1	5.00	-47.43	-	-42.43	-41.25	1.18
	HT-20, M0 to M15/ HT-20, STBC, M0 to M7	2	5.00	-48.99	-50.28	-41.58	-41.25	0.33
	HT-20, Beam Forming, M0 to M7	2	8.01	-51.51	-53.58	-41.40	-41.25	0.15
	HT-20, Beam Forming, M8 to M15	2	5.00	-49.15	-50.80	-41.89	-41.25	0.64
5510	HT-40, M0 to M7	1	5.00	-46.80	-	-41.80	-41.25	0.55
	HT-40, M0 to M15/ HT-40, STBC, M0 to M7	2	5.00	-49.16	-50.95	-41.95	-41.25	0.70
	HT-40, Beam Forming, M0 to M7	2	8.01	-51.90	-53.47	-41.59	-41.25	0.34
	HT-40, Beam Forming, M8 to M15	2	5.00	-49.34	-51.48	-42.27	-41.25	1.02
5550	HT-40, M0 to M15/ HT-40, STBC, M0 to M7	2	5.00	-54.05	-54.96	-46.47	-41.25	5.22
	HT-40, Beam Forming, M0 to M7	2	8.01	-54.05	-54.96	-43.46	-41.25	2.21
	HT-40, Beam Forming, M8 to M15	2	5.00	-54.42	-55.20	-46.78	-41.25	5.53
5670	HT-40, M0 to M15/ HT-40, STBC, M0 to M7	2	5.00	-50.60	-51.64	-43.08	-41.25	1.83
	HT-40, Beam Forming, M0 to M7	2	8.01	-51.95	-52.97	-41.41	-41.25	0.16
	HT-40, Beam Forming, M8 to M15	2	5.00	-50.77	-52.47	-43.53	-41.25	2.28

Transmitter Conducted Bandedge Emissions Result – Peak

Freq. (MHz)	Operating Mode	N_{TX}	Correlated Antenna Gain (dBi)	TX1 Bandedge Level (dBm)	TX2 Bandedge Level (dBm)	Total TX Bandedge Level (dBm)	Limit (dBm)	Margin (dB)
5500	Non HT-20, 6 to 54Mbps	2	5.00	-37.44	-39.88	-30.48	-21.25	9.23
	Non HT-20, Beam Forming, 6 to 54Mbps	2	8.01	-37.44	-39.88	-27.47	-21.25	6.22
	HT-20, M0 to M15/HT-20, STBC, M0 to M7	2	5.00	-38.34	-39.39	-30.82	-21.25	9.57
	HT-20, Beam Forming, M0 to M7	2	8.01	-38.34	-39.39	-27.81	-21.25	6.56
	HT-20, Beam Forming, M8 to M15	2	5.00	-36.76	-38.24	-29.43	-21.25	8.18
5580	Non HT-20, 6 to 54Mbps	2	5.00	-42.17	-42.07	-34.11	-21.25	12.86
	Non HT-20, Beam Forming, 6 to 54Mbps	2	8.01	-42.17	-42.07	-31.10	-21.25	9.85
	HT-20, M0 to M15/HT-20, STBC, M0 to M7	2	5.00	-43.80	-40.68	-33.96	-21.25	12.71
	HT-20, Beam Forming, M0 to M7	2	8.01	-43.80	-40.68	-30.95	-21.25	9.70
	HT-20, Beam Forming, M8 to M15	2	5.00	-42.59	-40.67	-33.51	-21.25	12.26
5700	Non HT-20, 6 to 54Mbps	1	5.00	-33.48	-	-28.48	-21.25	7.23
	Non HT-20, 6 to 54Mbps	2	5.00	-33.17	-33.56	-25.35	-21.25	4.10
	Non HT-20, Beam Forming, 6 to 54Mbps	2	8.01	-35.74	-37.98	-25.70	-21.25	4.45
	HT-20, M0 to M7	1	5.00	-31.46	-	-26.46	-21.25	5.21
	HT-20, M0 to M15/ HT-20, STBC, M0 to M7	2	5.00	-31.58	-32.37	-23.95	-21.25	2.70
	HT-20, Beam Forming, M0 to M7	2	8.01	-36.63	-38.66	-26.51	-21.25	5.26
	HT-20, Beam Forming, M8 to M15	2	5.00	-31.96	-35.87	-25.48	-21.25	4.23
5510	HT-40, M0 to M7	1	5.00	-30.72	-	-25.72	-21.25	4.47
	HT-40, M0 to M15/ HT-40, STBC, M0 to M7	2	5.00	-32.01	-35.55	-25.42	-21.25	4.17
	HT-40, Beam Forming, M0 to M7	2	8.01	-36.36	-39.31	-26.57	-21.25	5.32
	HT-40, Beam Forming, M8 to M15	2	5.00	-32.47	-35.07	-25.57	-21.25	4.32
5550	HT-40, M0 to M15/ HT-40, STBC, M0 to M7	2	5.00	-42.44	-41.63	-34.01	-21.25	12.76
	HT-40, Beam Forming, M0 to M7	2	8.01	-42.44	-41.63	-31.00	-21.25	9.75
	HT-40, Beam Forming, M8 to M15	2	5.00	-41.70	-42.51	-34.08	-21.25	12.83
5670	HT-40, M0 to M15/ HT-40, STBC, M0 to M7	2	5.00	-36.01	-38.54	-29.08	-21.25	7.83
	HT-40, Beam Forming, M0 to M7	2	8.01	-39.70	-39.97	-28.81	-21.25	7.56
	HT-40, Beam Forming, M8 to M15	2	5.00	-37.17	-38.36	-29.71	-21.25	8.46

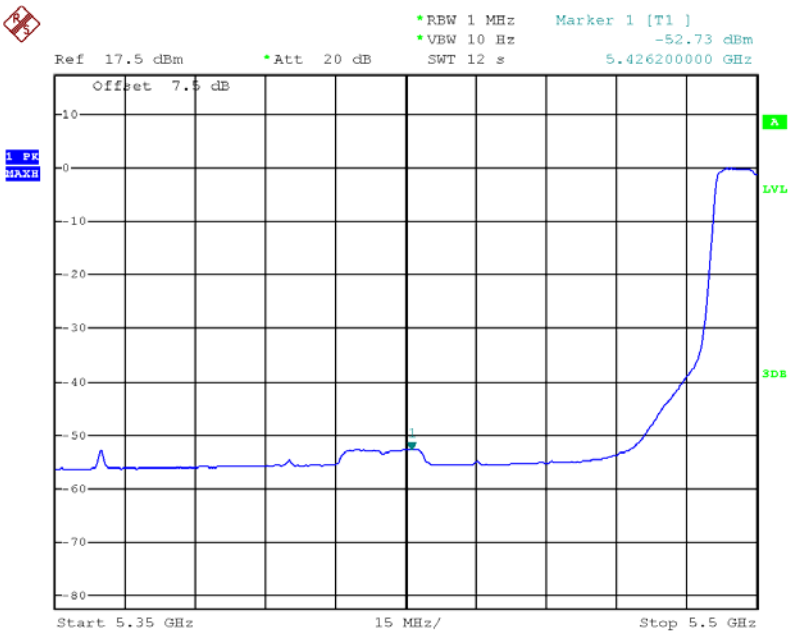
Transmitter Conducted Bandedge Emissions Plot–Average on 5500 MHz,
Non HT-20 / Non HT-20, Beam Forming, 6Mbps

Tx1



Date: 26.OCT.2012 14:56:31

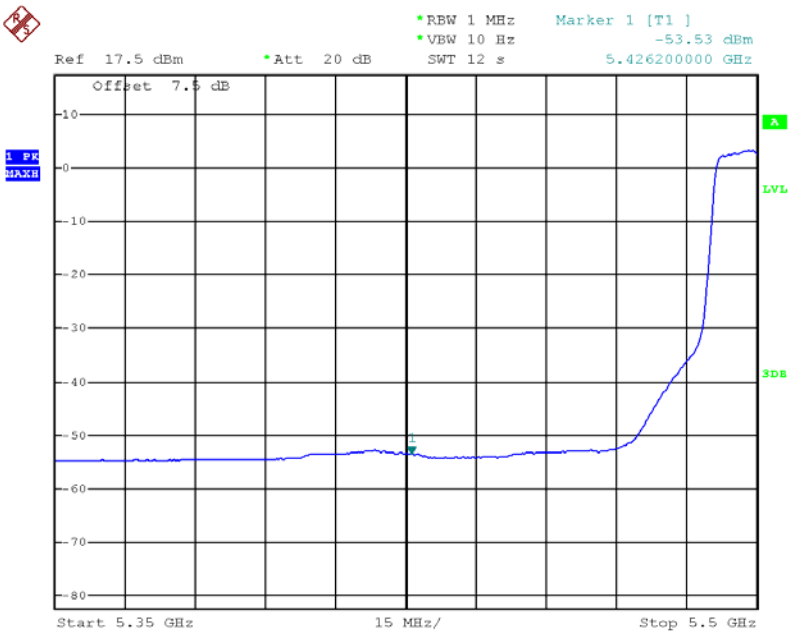
Tx2



Date: 26.OCT.2012 14:56:53

Transmitter Conducted Bandedge Emissions Plot–Average on 5500 MHz, HT-20 / HT-20, STBC / HT-20, Beam Forming, M0

Tx1



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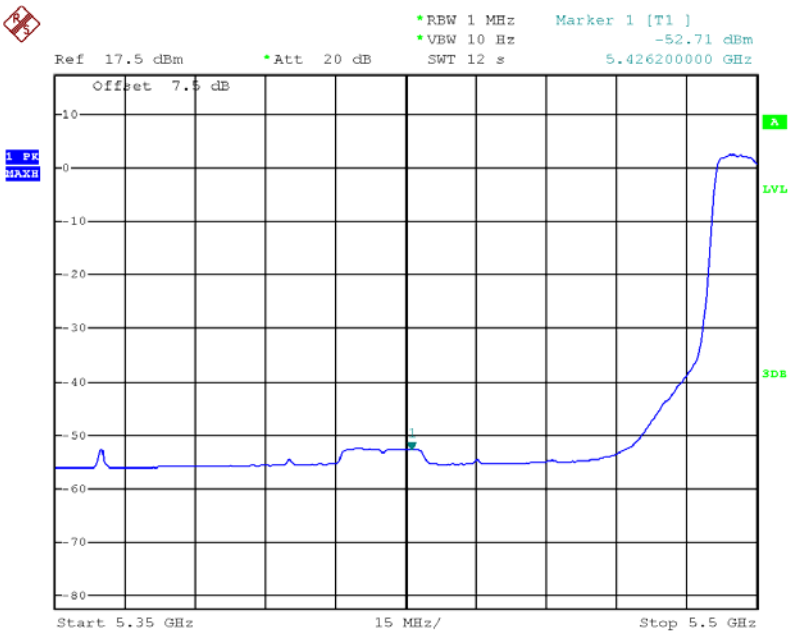

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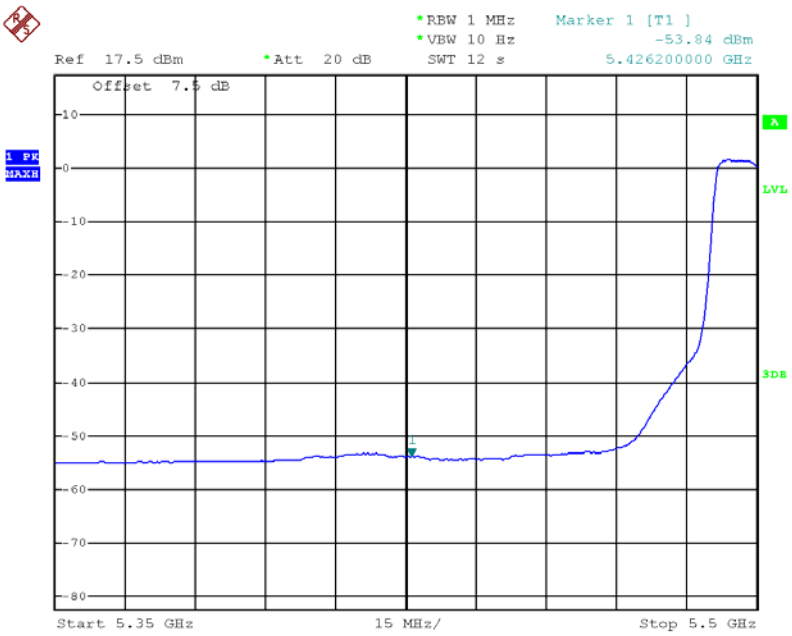
Transmitter Conducted Bandedge Emissions Plot–Average on 5500 MHz, HT-20, Beam Forming, M8
Tx1



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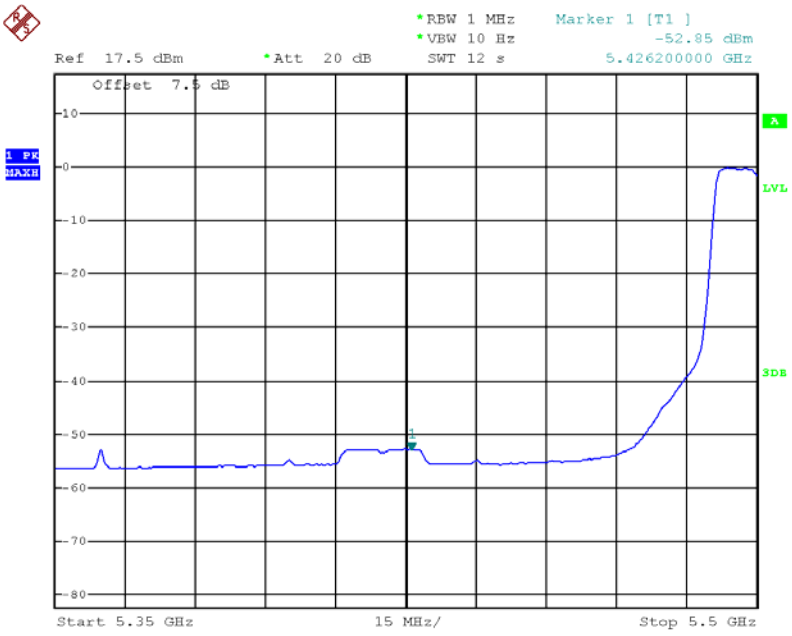
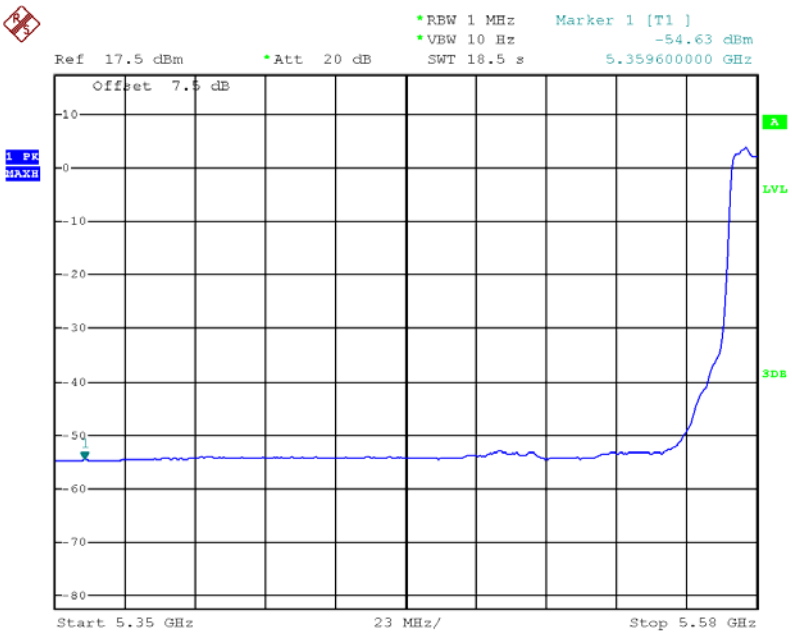
Tx2



Date: 26.OCT.2012 15:00:59

Transmitter Conducted Bandedge Emissions Plot–Average on 5580 MHz,
Non HT-20 / Non HT-20, Beam Forming, 6Mbps

Tx1



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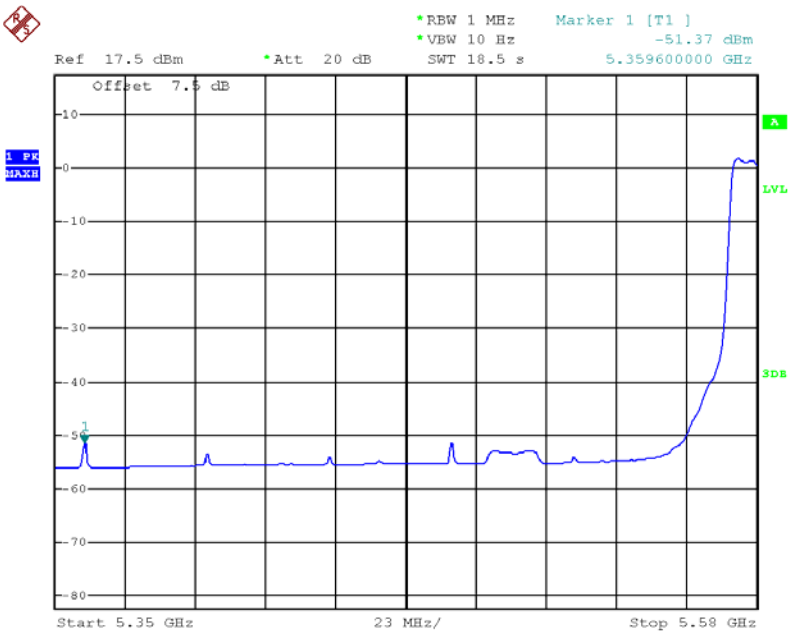
Tx2



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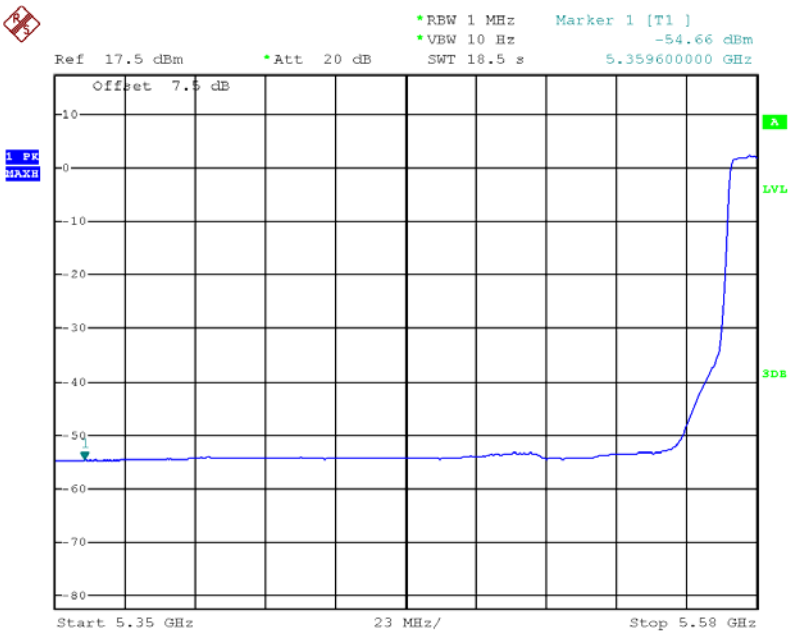
Transmitter Conducted Bandedge Emissions Plot–Average on 5580 MHz,
HT-20 / HT-20, STBC / HT-20, Beam Forming, M0

Tx1



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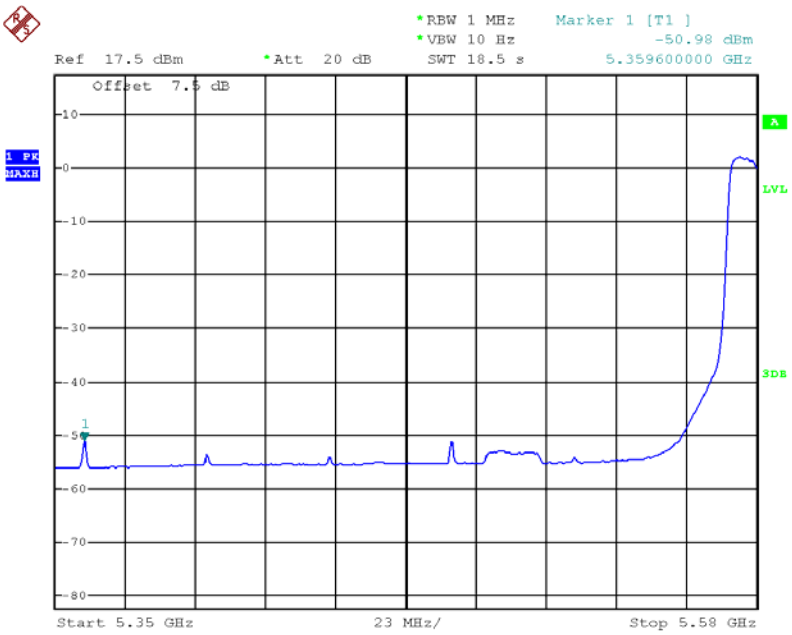
Tx2



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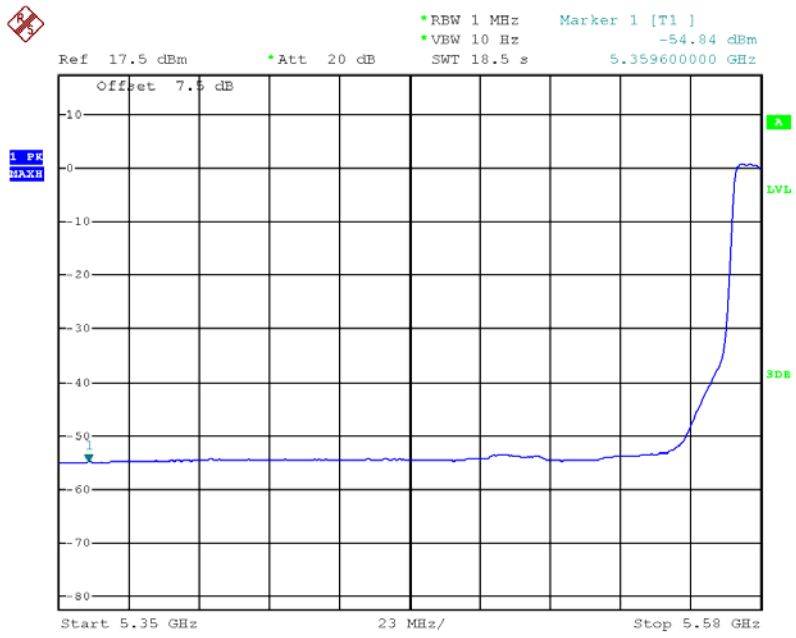
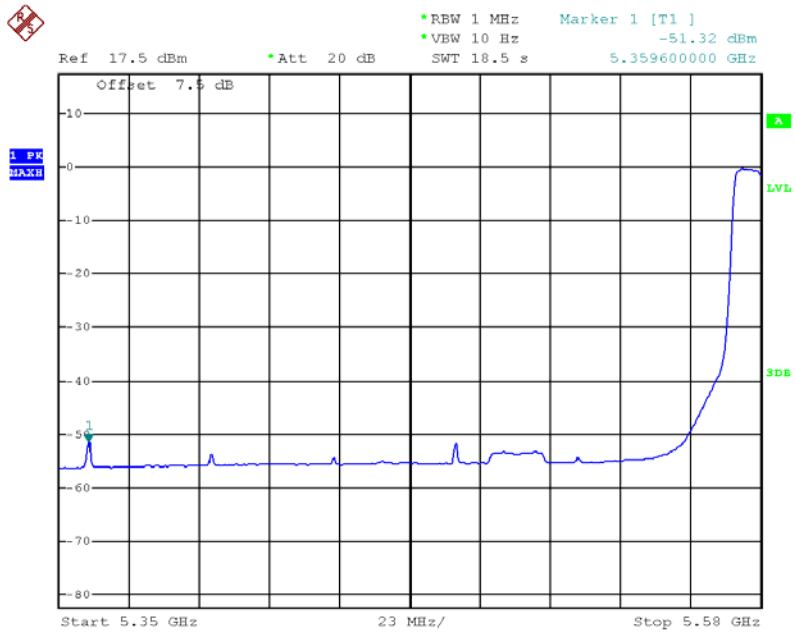
Transmitter Conducted Bandedge Emissions Plot–Average on 5580 MHz, HT-20, Beam Forming, M8
Tx1



Date: 26.OCT.2012 15:10:25

Tx2



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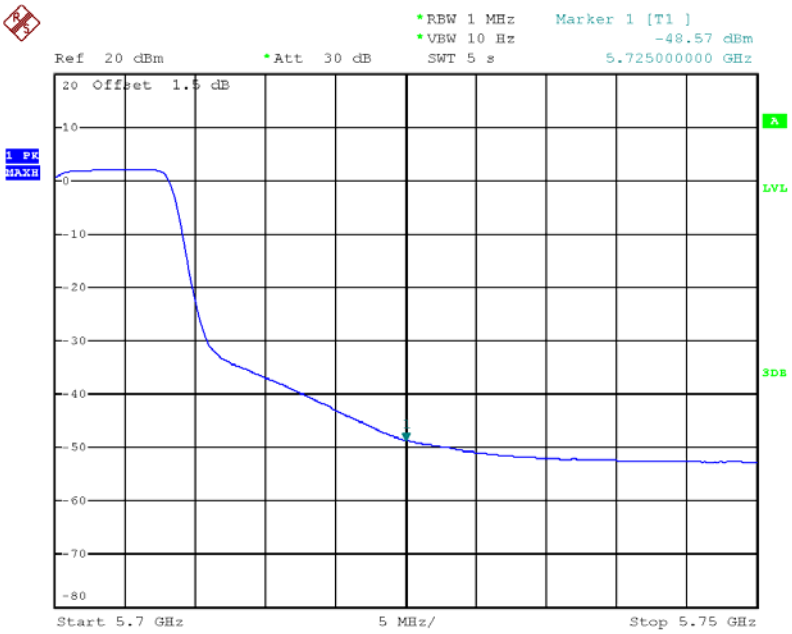
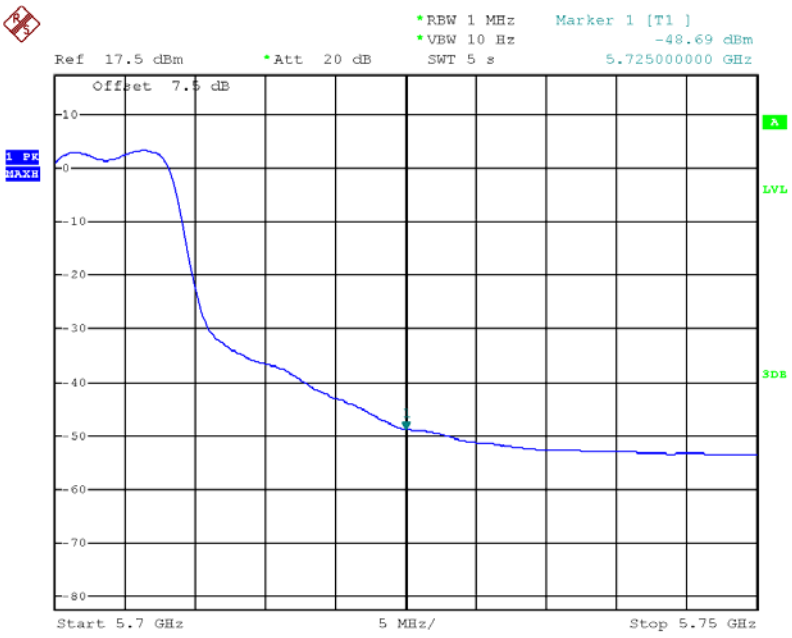
Transmitter Conducted Bandedge Emissions Plot–Average on 5700 MHz, Non HT-20, 6Mbps

Tx1



Transmitter Conducted Bandedge Emissions Plot–Average on 5700 MHz, Non HT-20, 6Mbps

Tx1



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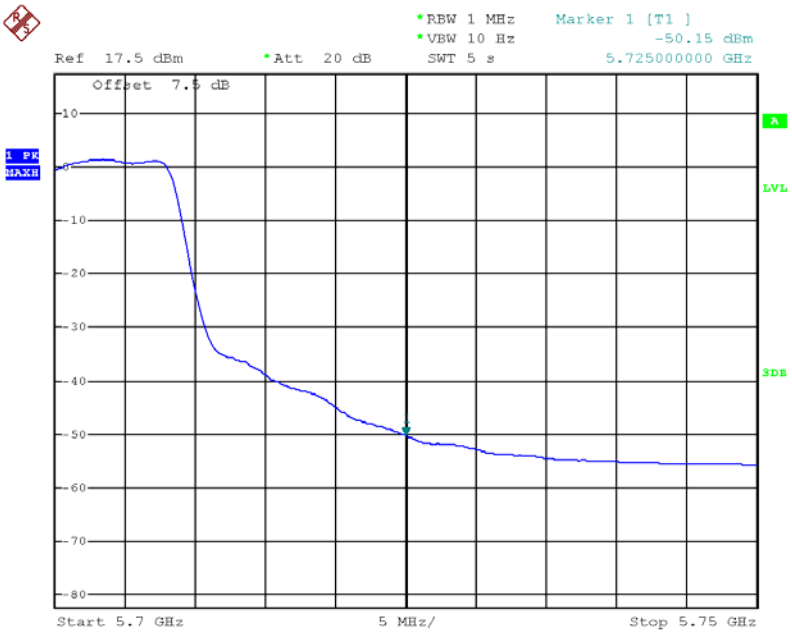

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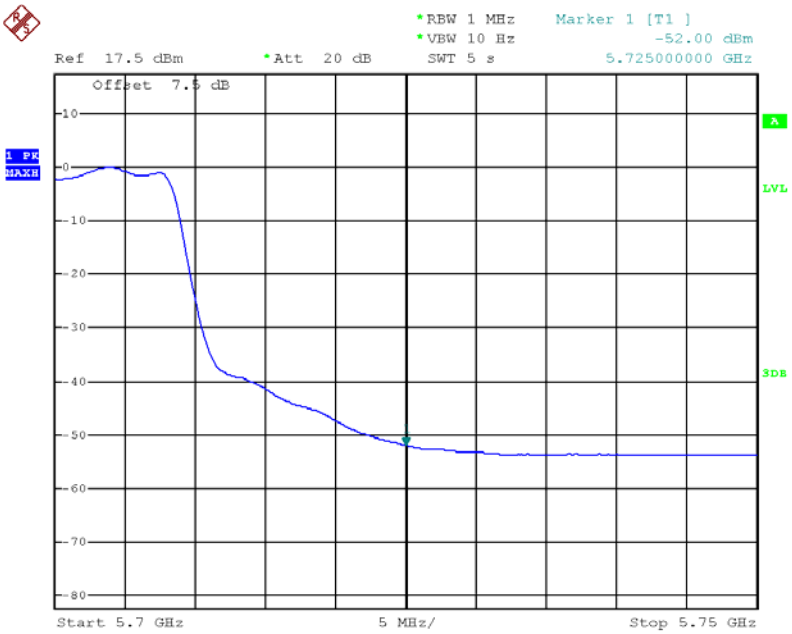
Transmitter Conducted Bandedge Emissions Plot–Average on 5700 MHz, Non HT-20, Beam Forming, 6Mbps

Tx1



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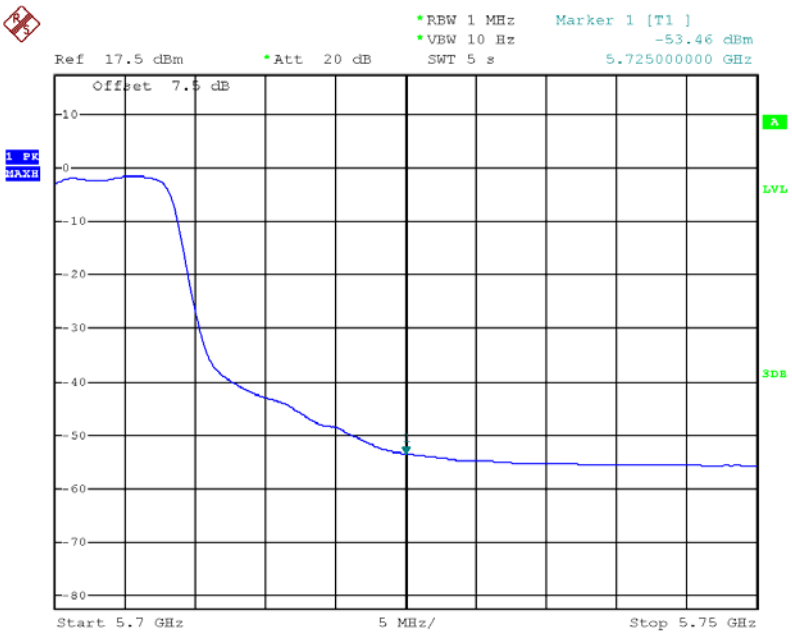
Tx2



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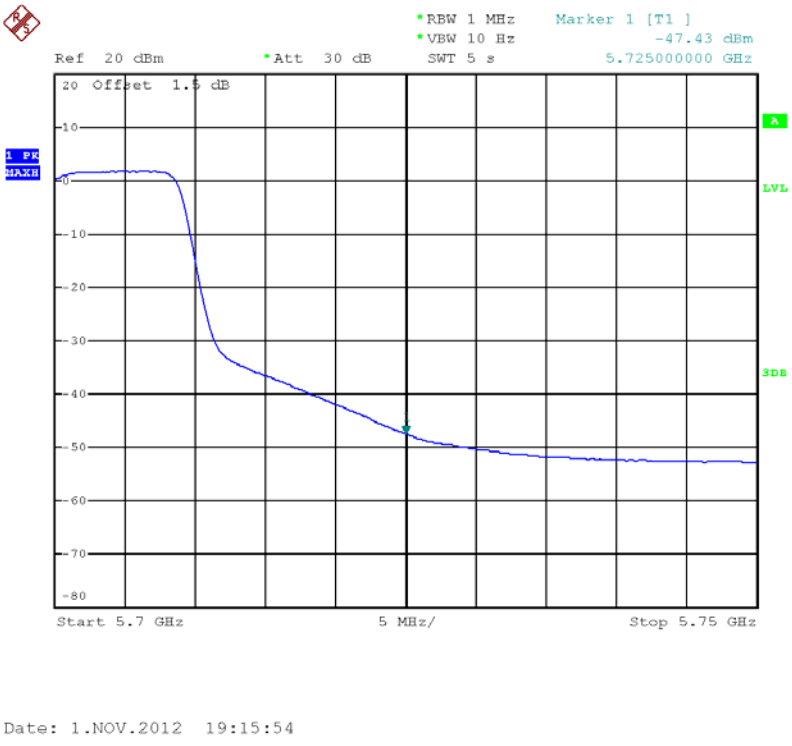
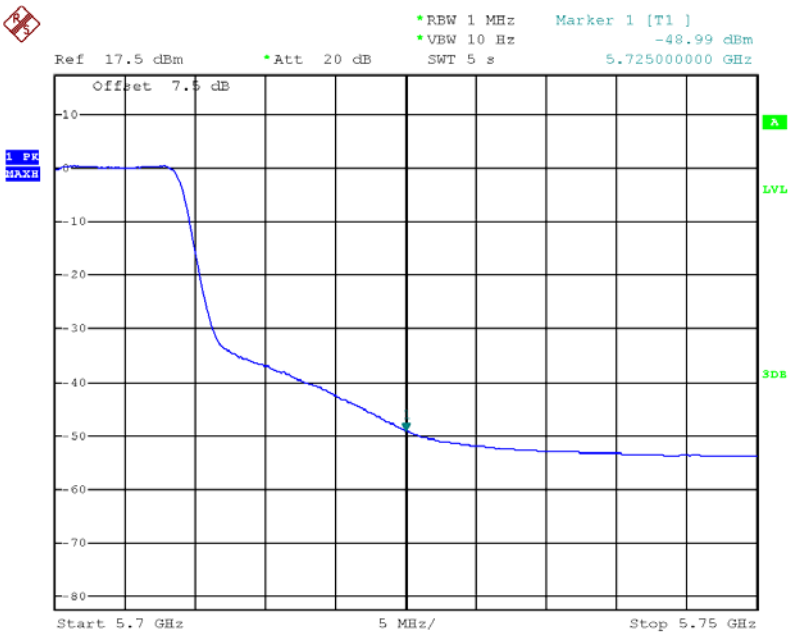
Transmitter Conducted Bandedge Emissions Plot–Average on 5700 MHz, HT-20, M0

Tx1



Transmitter Conducted Bandedge Emissions Plot–Average on 5700 MHz, HT-20 / HT-20, STBC, M0

Tx1



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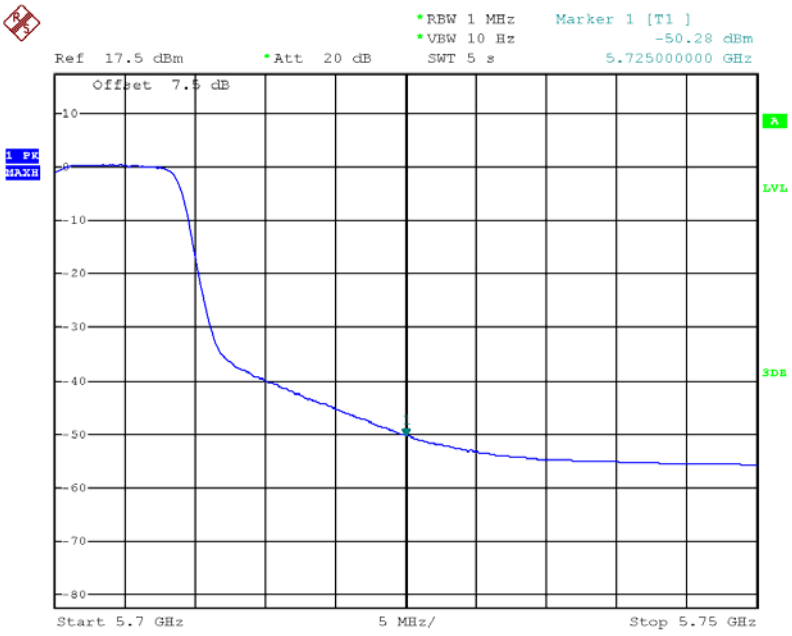
Tx2



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Transmitter Conducted Bandedge Emissions Plot–Average on 5700 MHz, HT-20, Beam Forming, M0
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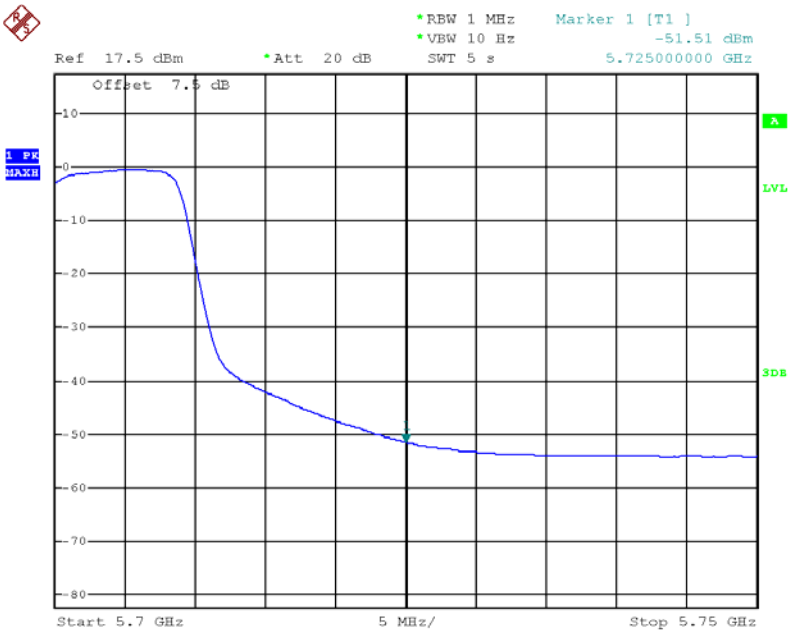
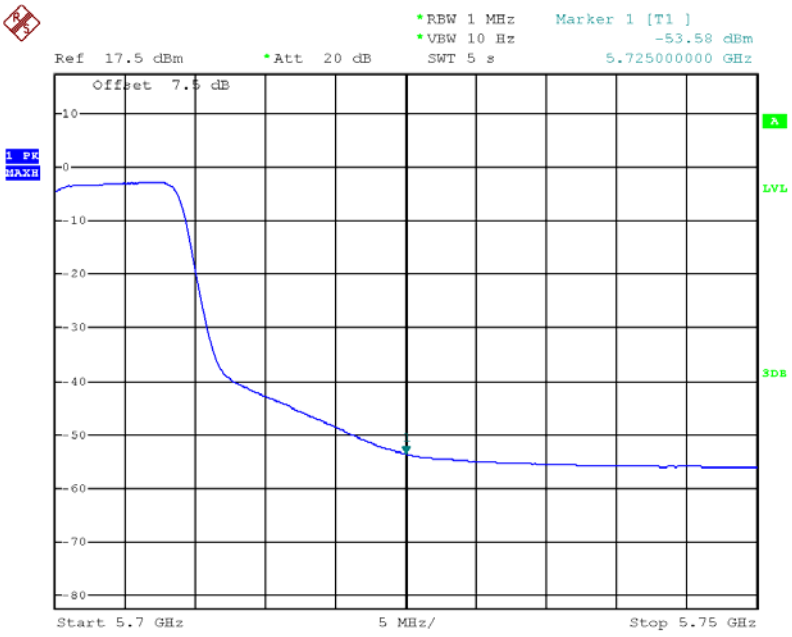


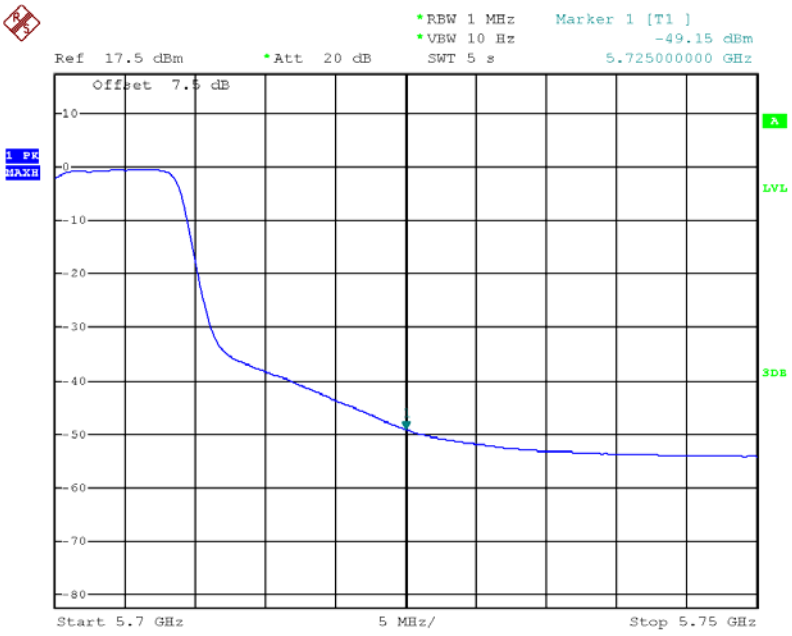
Date: 26.OCT.2012 17:42:37

Tx2



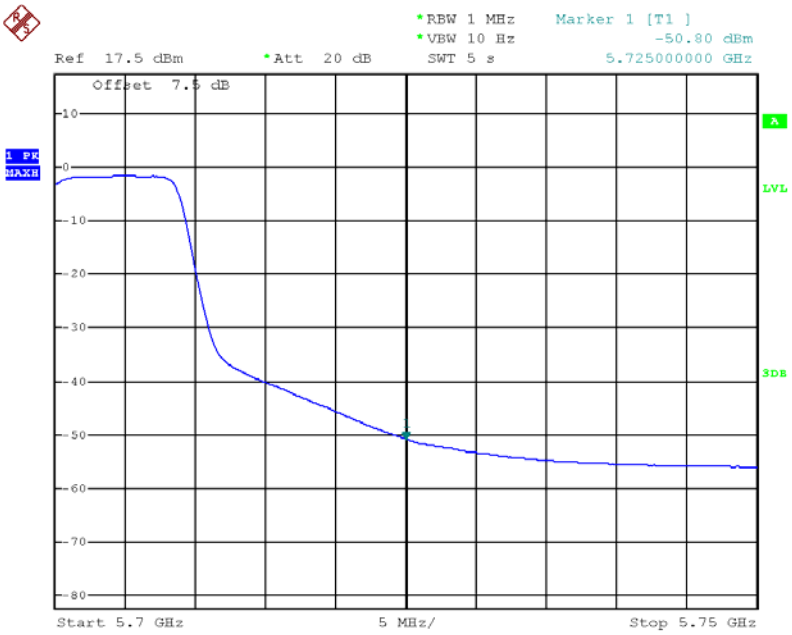
Date: 26.OCT.2012 17:43:05

Transmitter Conducted Bandedge Emissions Plot–Average on 5700 MHz, HT-20, Beam Forming, M8
Tx1



Date: 26.OCT.2012 17:47:47

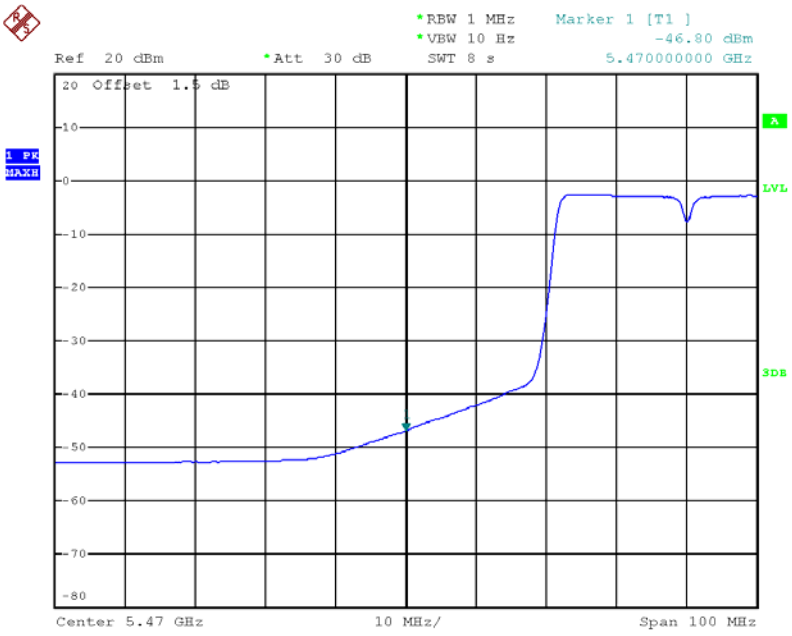
Tx2



Date: 26.OCT.2012 17:48:10

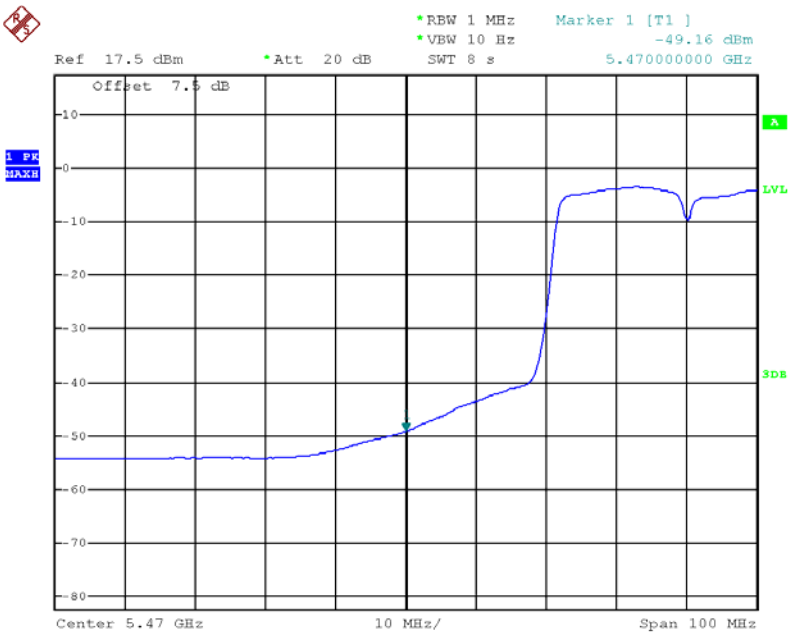
Transmitter Conducted Bandedge Emissions Plot–Average on 5510 MHz, HT-40, M0

Tx1

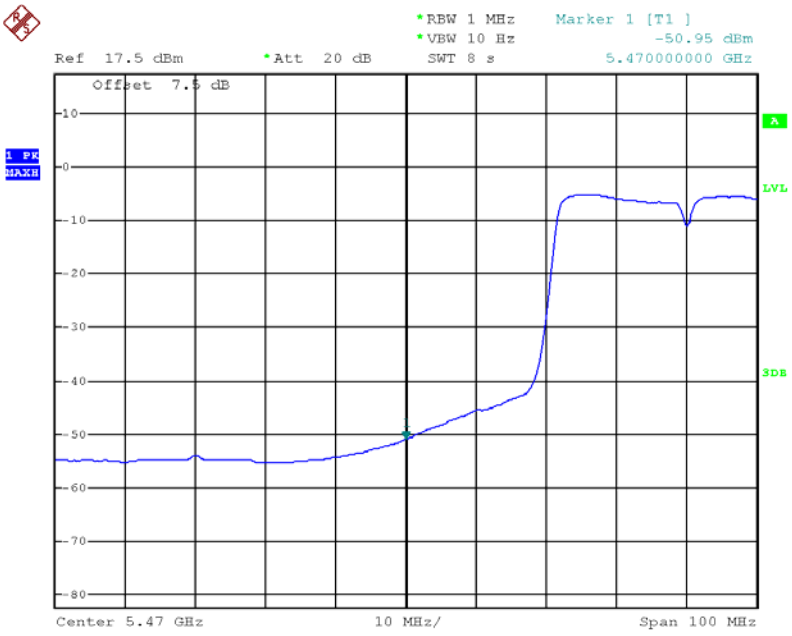


Transmitter Conducted Bandedge Emissions Plot–Average on 5510 MHz, HT-40 / HT-40, STBC, M0

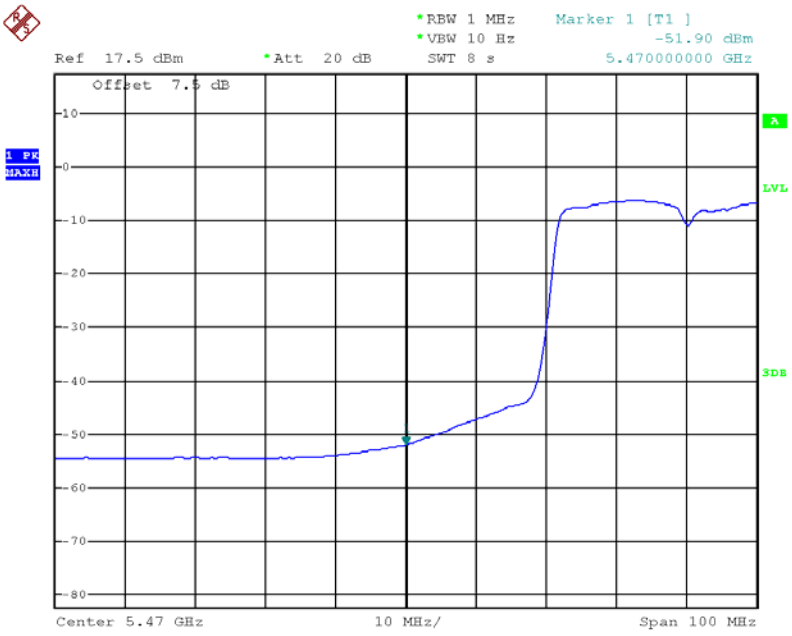
Tx1



Tx2

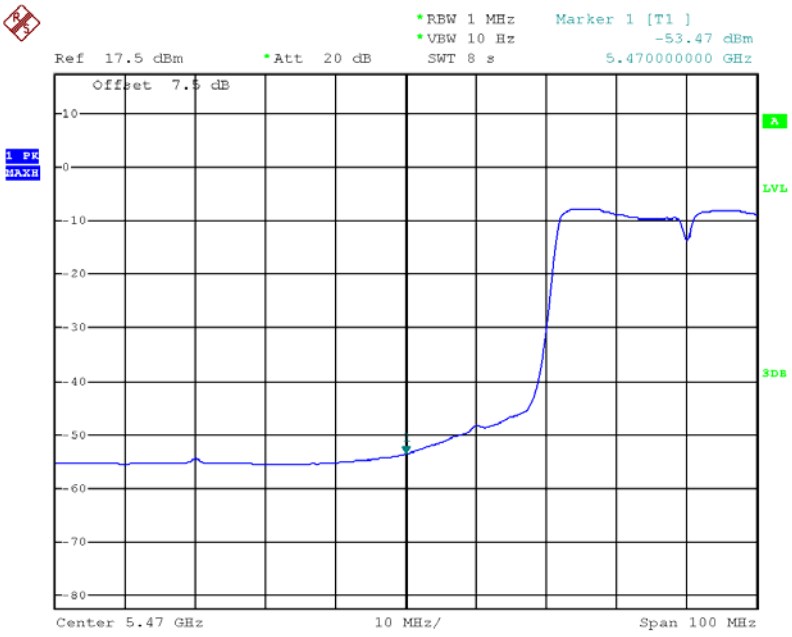


Transmitter Conducted Bandedge Emissions Plot–Average on 5510 MHz, HT-40, Beam Forming, M0
Tx1



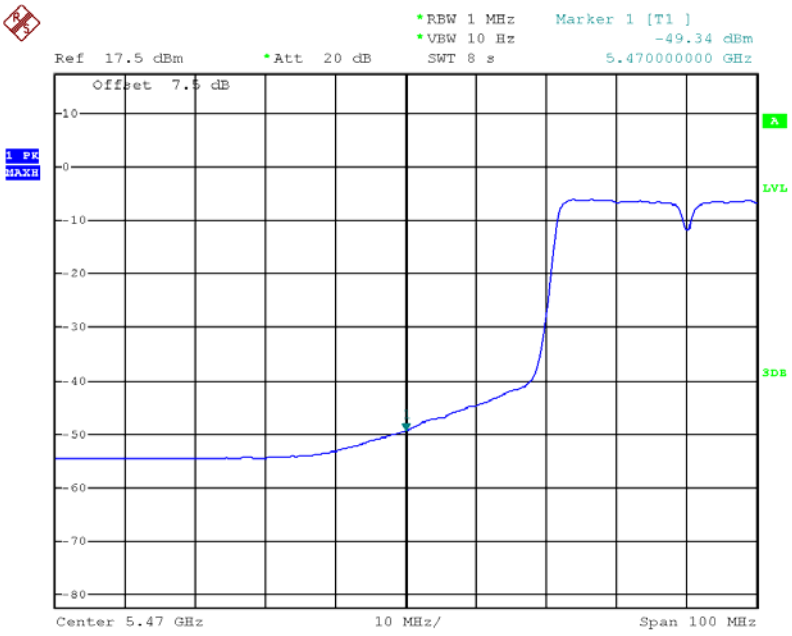
Date: 26.OCT.2012 18:00:46

Tx2



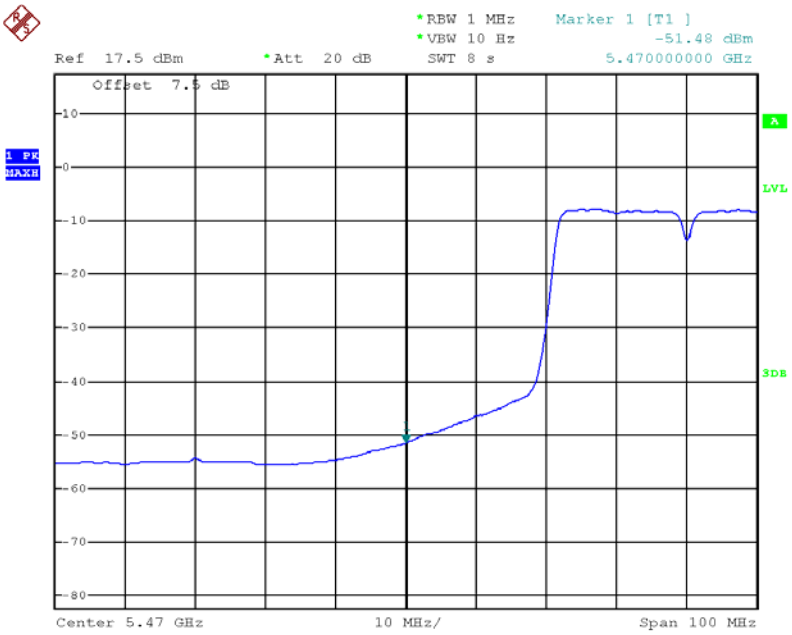
Date: 26.OCT.2012 18:01:21

Transmitter Conducted Bandedge Emissions Plot–Average on 5510 MHz, HT-40, Beam Forming, M8
Tx1



Date: 26.OCT.2012 18:03:33

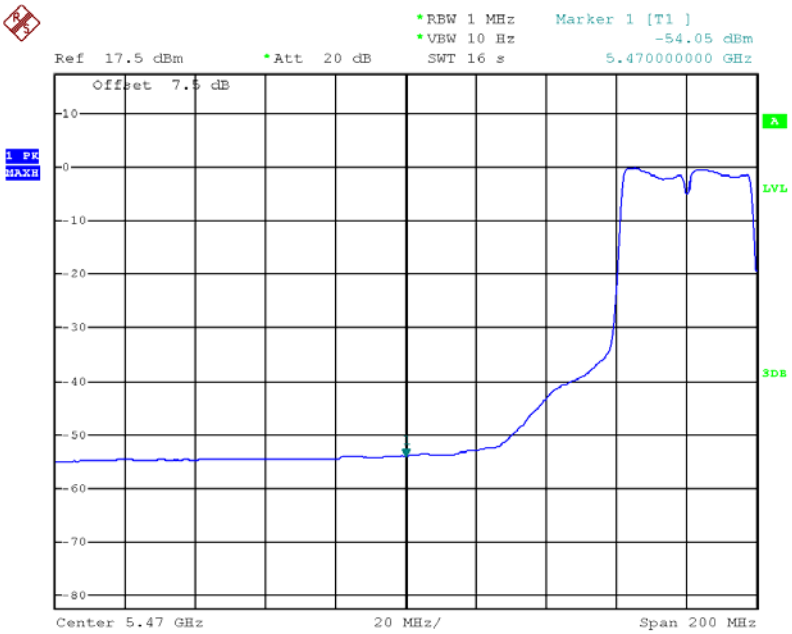
Tx2



Date: 26.OCT.2012 18:03:59

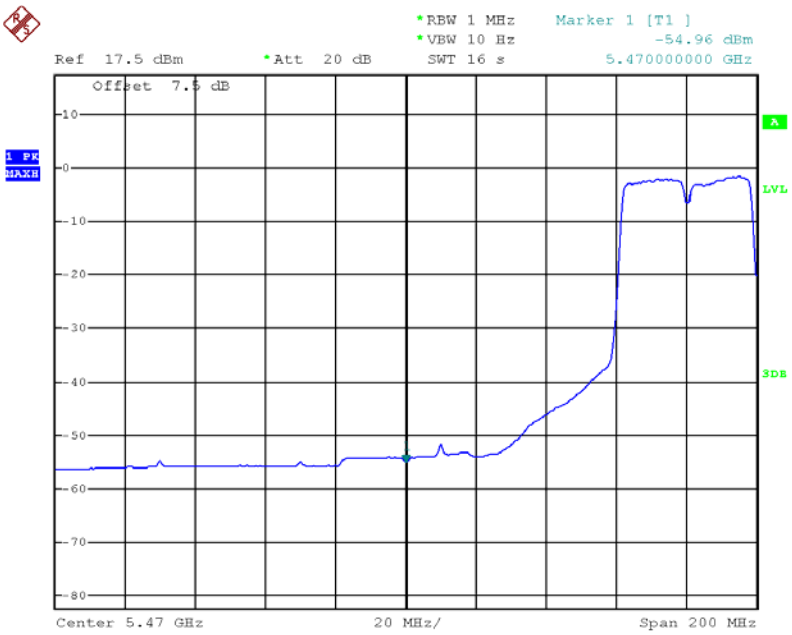
Transmitter Conducted Bandedge Emissions Plot–Average on 5550 MHz, HT-40 / HT-40, STBC / HT-40, Beam Forming, M0

Tx1



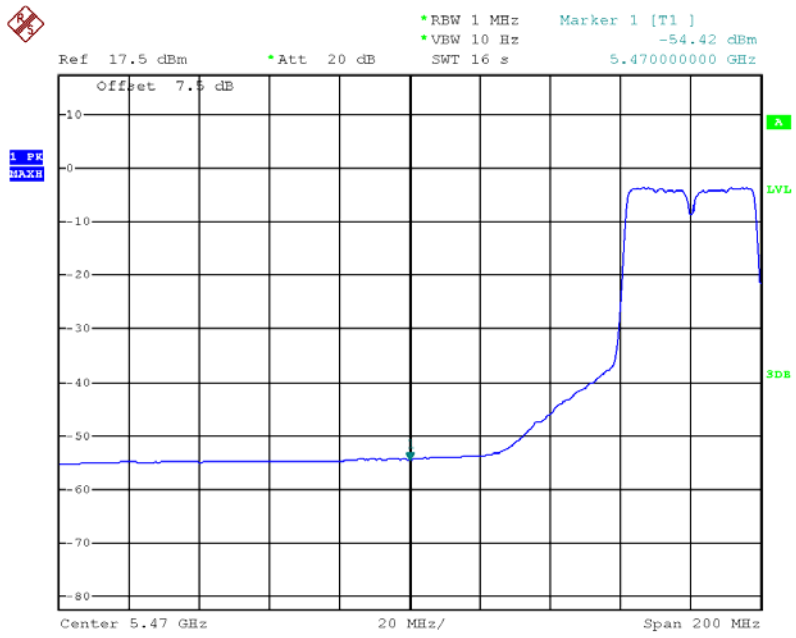
Date: 26.OCT.2012 18:11:37

Tx2



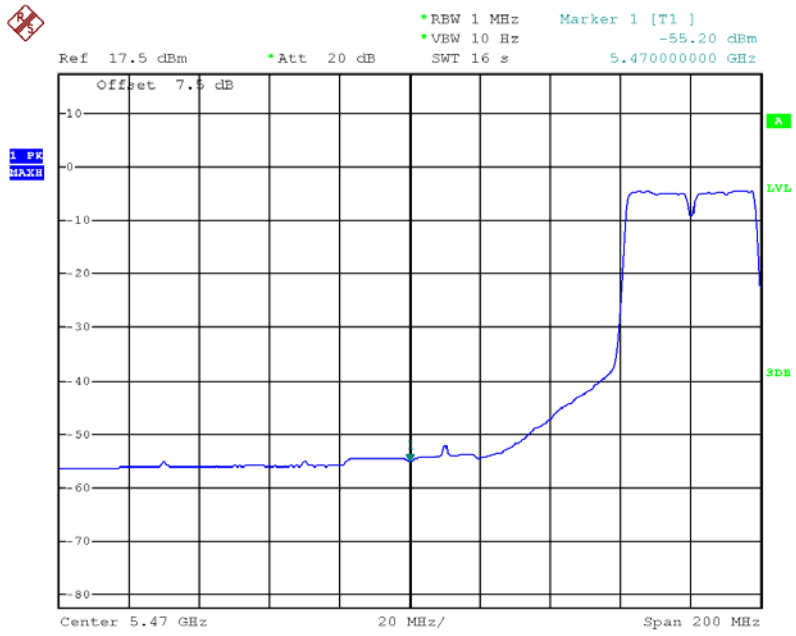
Date: 26.OCT.2012 18:12:06

Transmitter Conducted Bandedge Emissions Plot–Average on 5550 MHz, HT-40, Beam Forming, M8
Tx1



Date: 26.OCT.2012 18:07:03

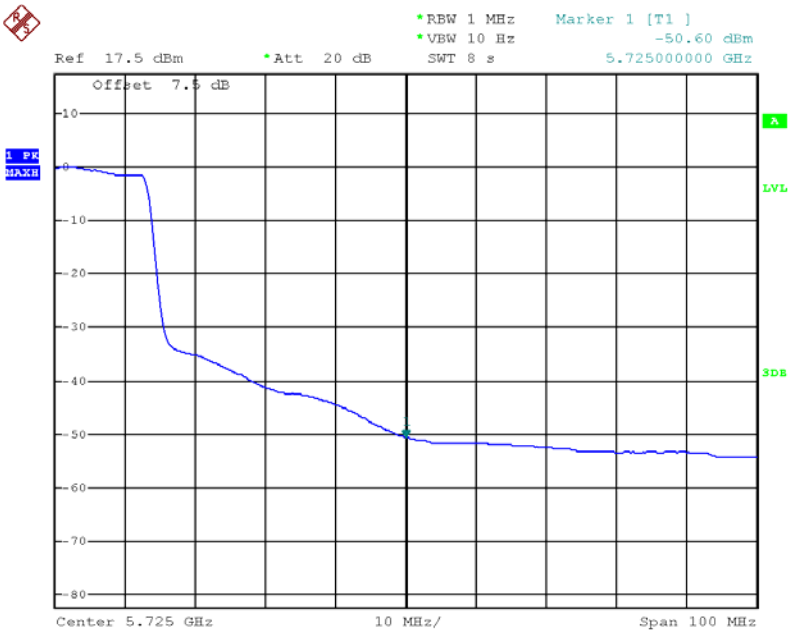
Tx2



Date: 26.OCT.2012 18:08:13

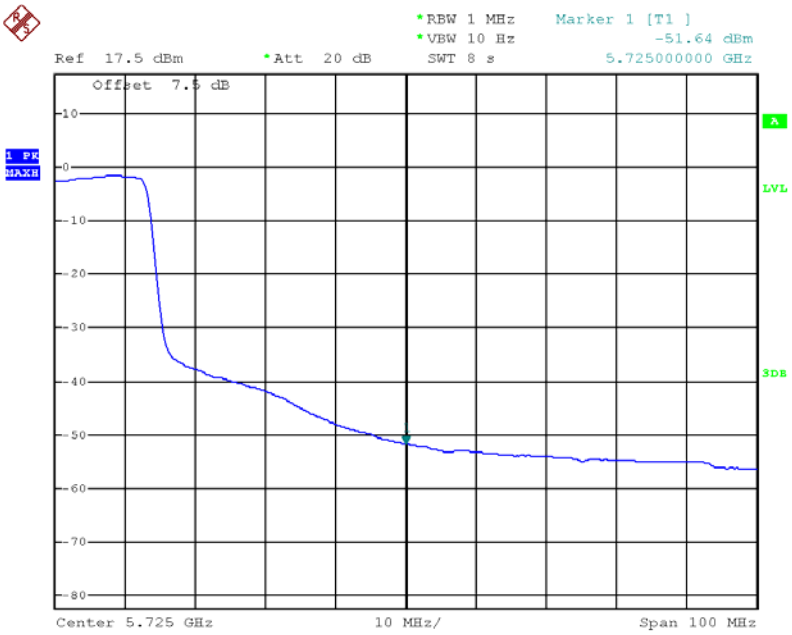
Transmitter Conducted Bandedge Emissions Plot–Average on 5670 MHz, HT-40 / HT-40, STBC, M0

Tx1



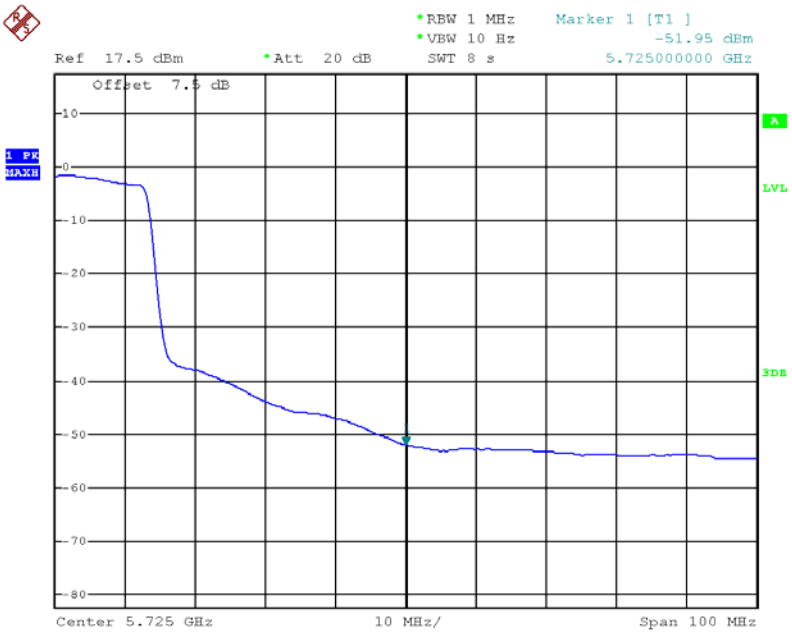
Date: 26.OCT.2012 18:17:37

Tx2



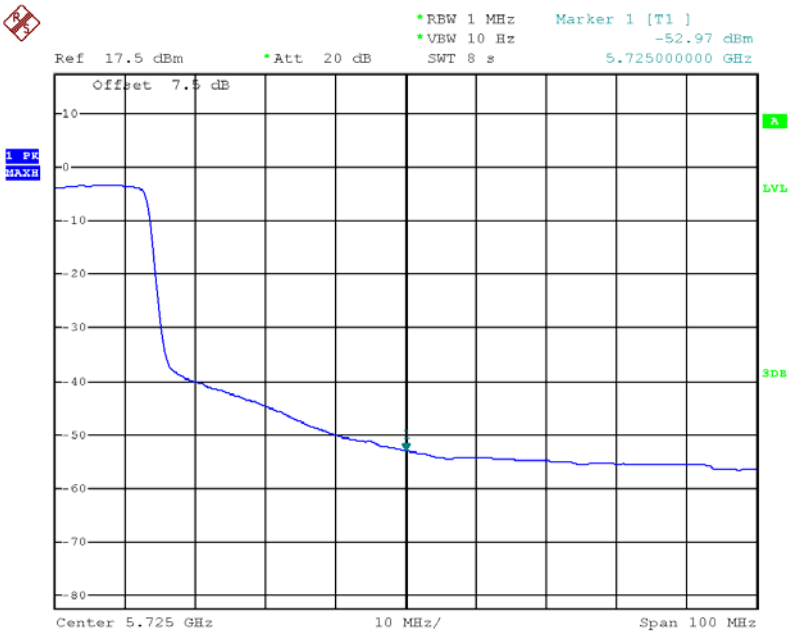
Date: 26.OCT.2012 18:17:20

Transmitter Conducted Bandedge Emissions Plot–Average on 5670 MHz, HT-40, Beam Forming, M0
Tx1



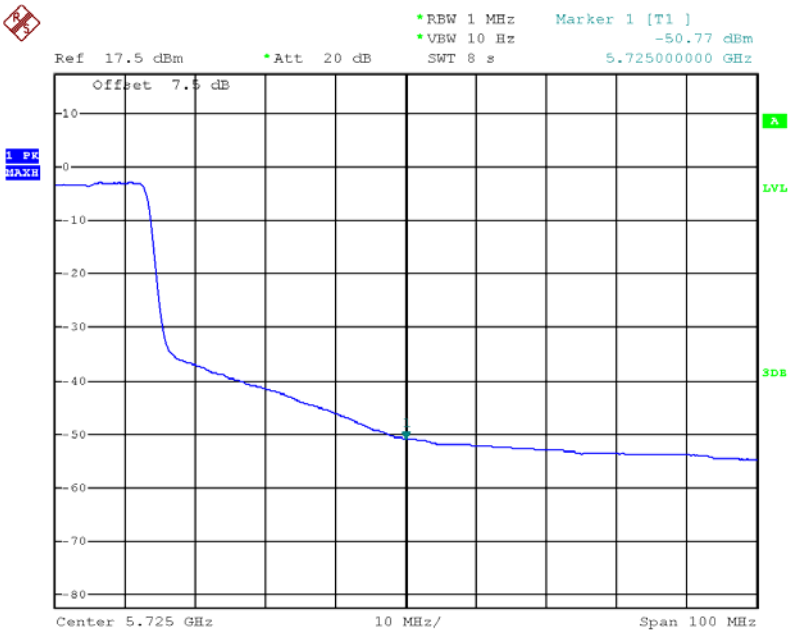
Date: 26.OCT.2012 18:20:30

Tx2



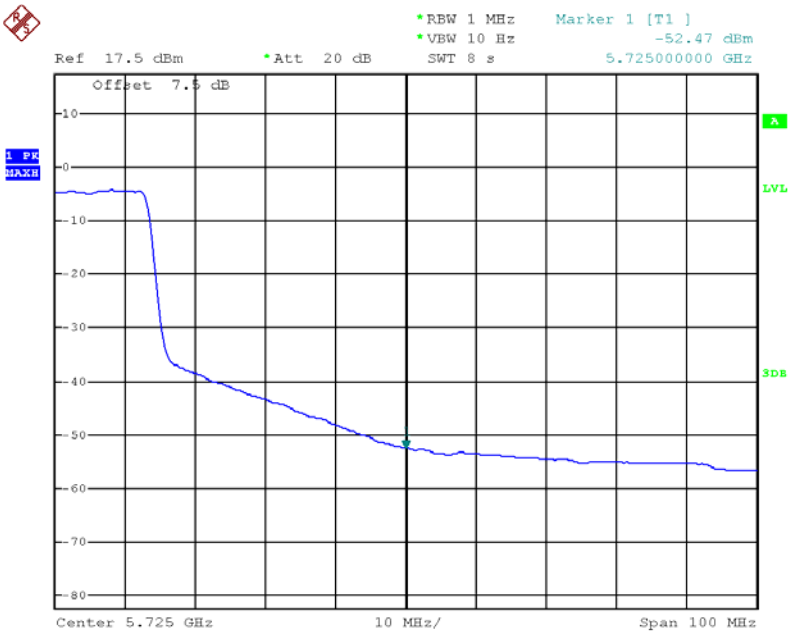
Date: 26.OCT.2012 18:20:10

Transmitter Conducted Bandedge Emissions Plot–Average on 5670 MHz, HT-40, Beam Forming, M8
Tx1



Date: 26.OCT.2012 18:23:18

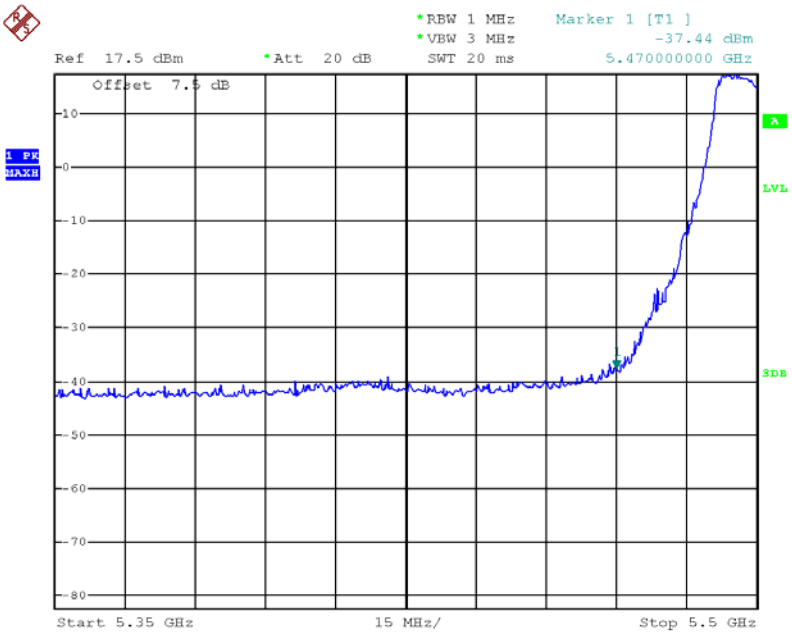
Tx2



Date: 26.OCT.2012 18:23:44

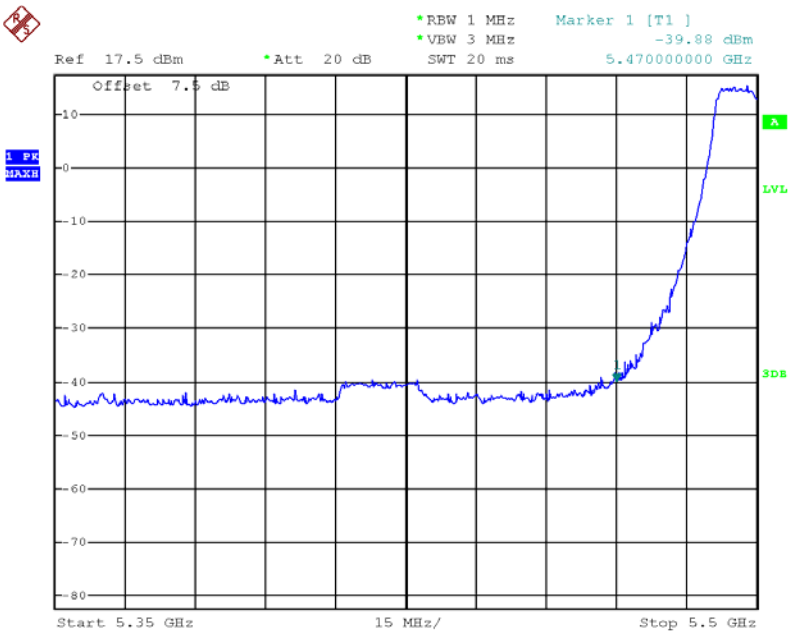
Transmitter Conducted Bandedge Emissions Plot–Peak on 5500 MHz,
Non HT-20 / Non HT-20, Beam Forming, 6Mbps

Tx1



Date: 26.OCT.2012 14:56:12

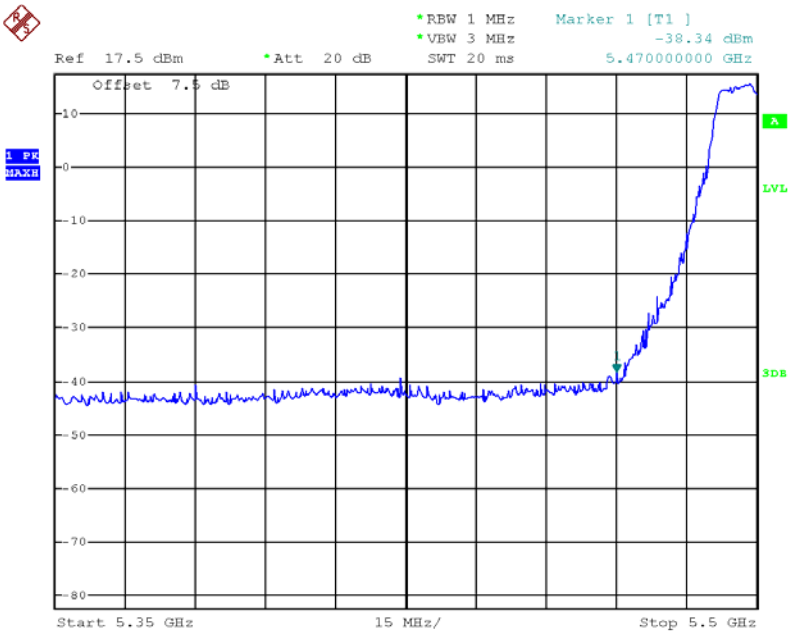
Tx2



Date: 26.OCT.2012 14:57:13

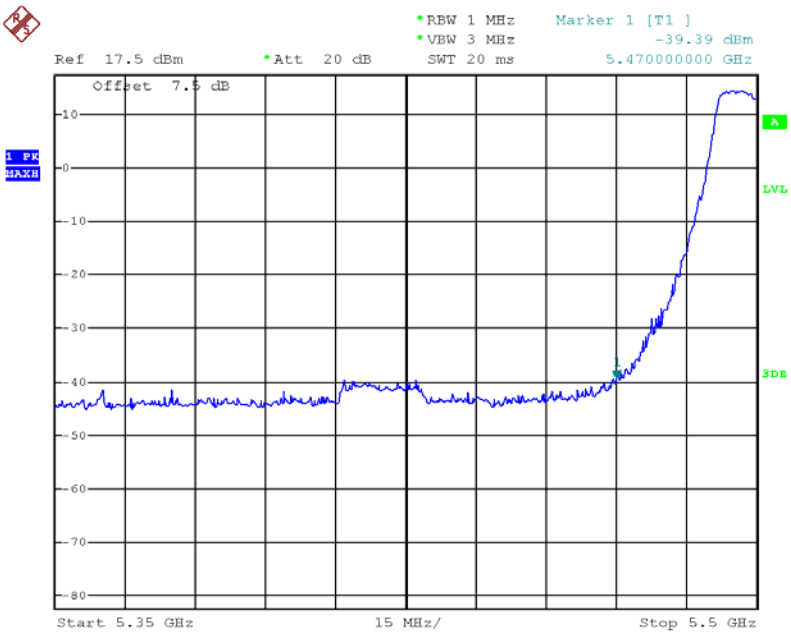
Transmitter Conducted Bandedge Emissions Plot–Peak on 5500 MHz, HT-20 / HT-20, STBC / HT-20, Beam Forming, M0

Tx1



Date: 26.OCT.2012 14:58:07

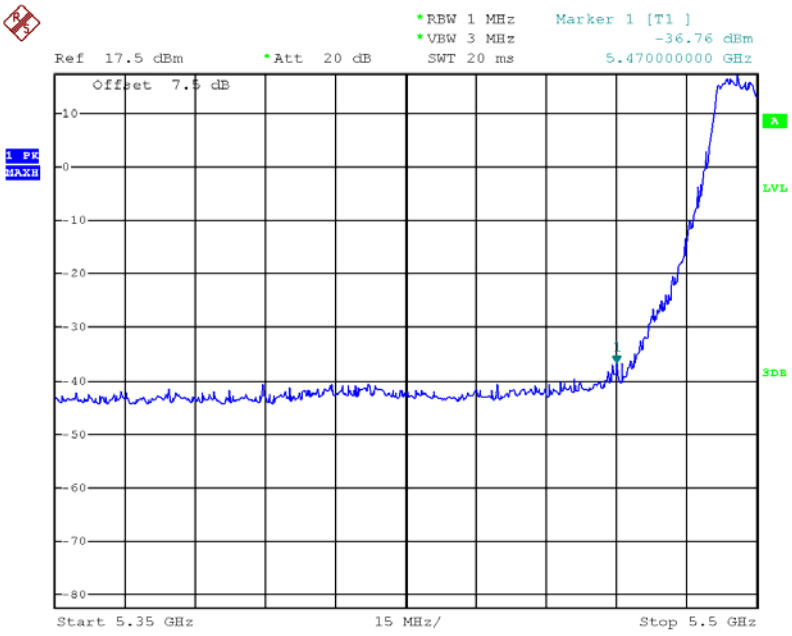
Tx2



Date: 26.OCT.2012 14:59:24

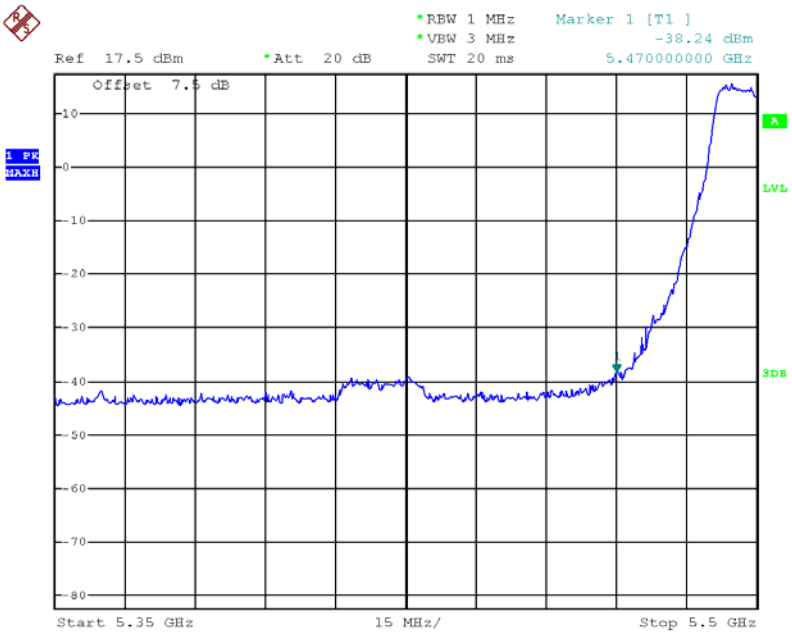
Transmitter Conducted Bandedge Emissions Plot–Peak on 5500 MHz, HT-20, Beam Forming, M8

Tx1



Date: 26.OCT.2012 15:00:19

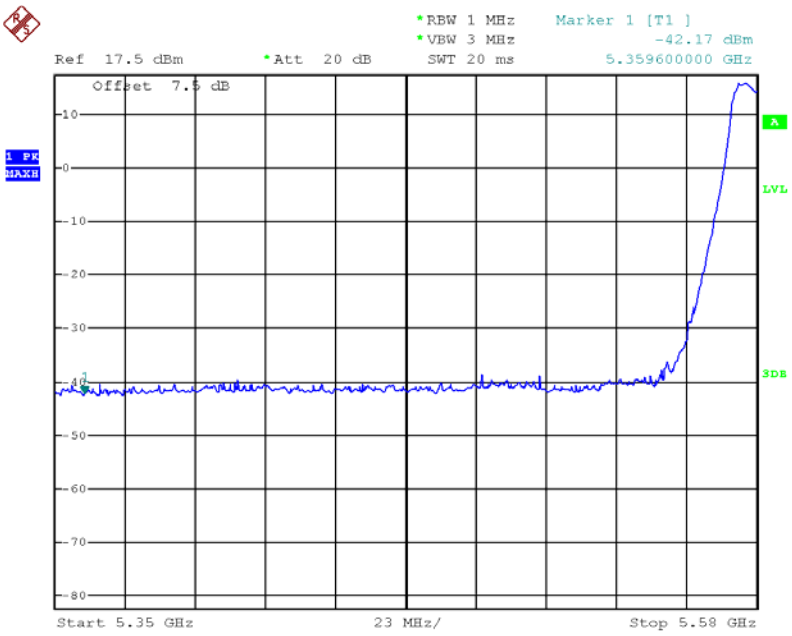
Tx2



Date: 26.OCT.2012 15:01:29

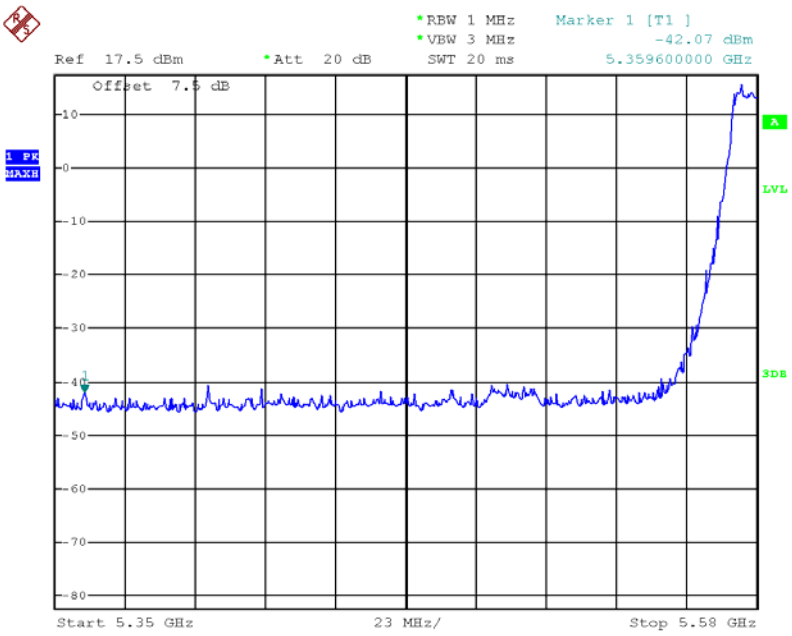
Transmitter Conducted Bandedge Emissions Plot–Peak on 5580 MHz,
Non HT-20 / Non HT-20, Beam Forming, 6Mbps

Tx1



Date: 26.OCT.2012 15:04:33

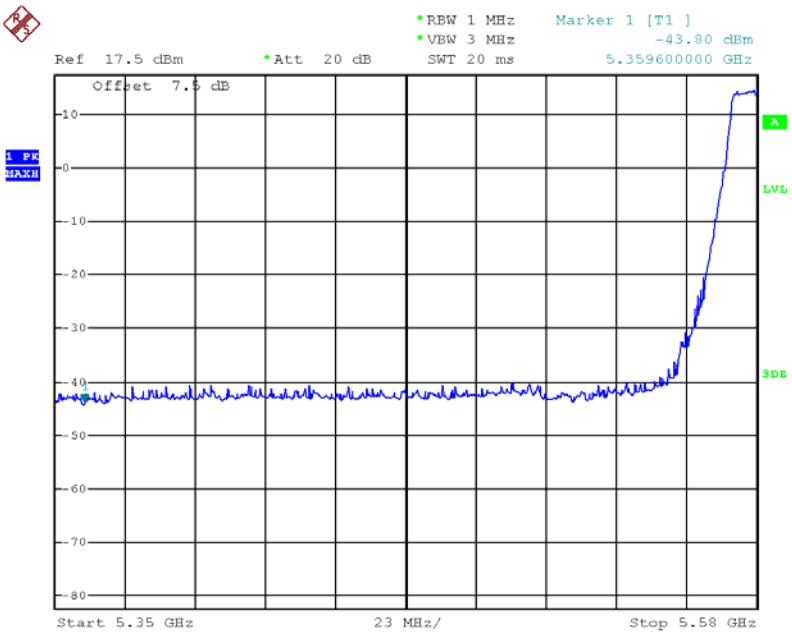
Tx2



Date: 26.OCT.2012 15:07:10

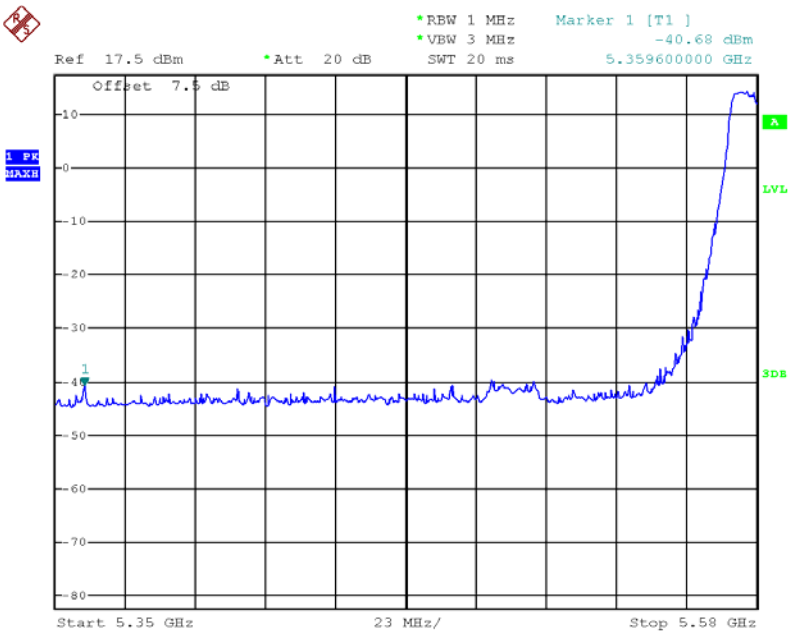
Transmitter Conducted Bandedge Emissions Plot–Peak on 5580 MHz,
HT-20 / HT-20, STBC / HT-20, Beam Forming, M0

Tx1



Date: 26.OCT.2012 15:08:06

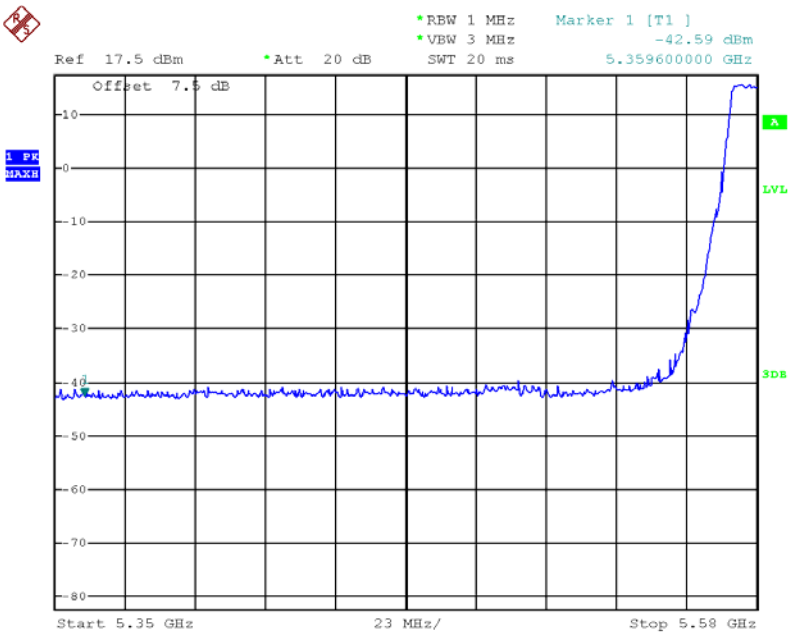
Tx2



Date: 26.OCT.2012 15:09:13

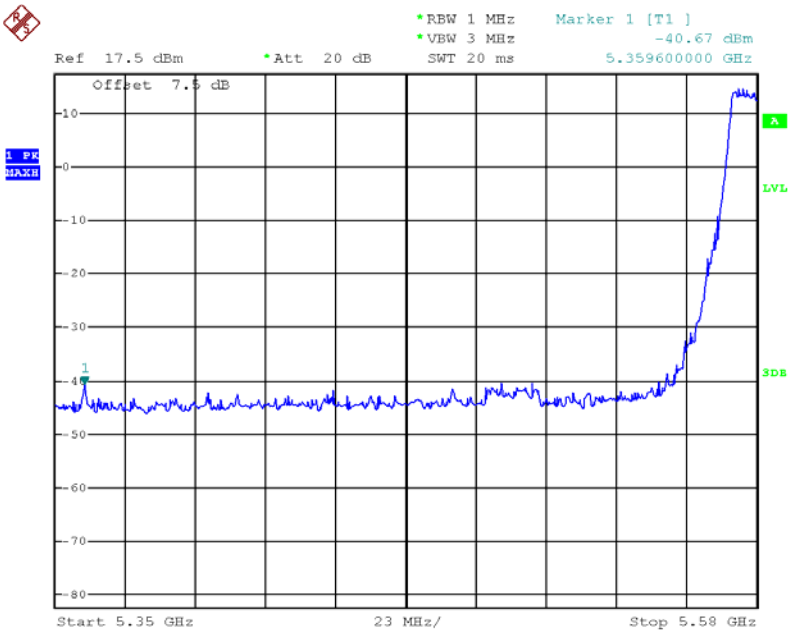
Transmitter Conducted Bandedge Emissions Plot–Peak on 5580 MHz, HT-20, Beam Forming, M8

Tx1



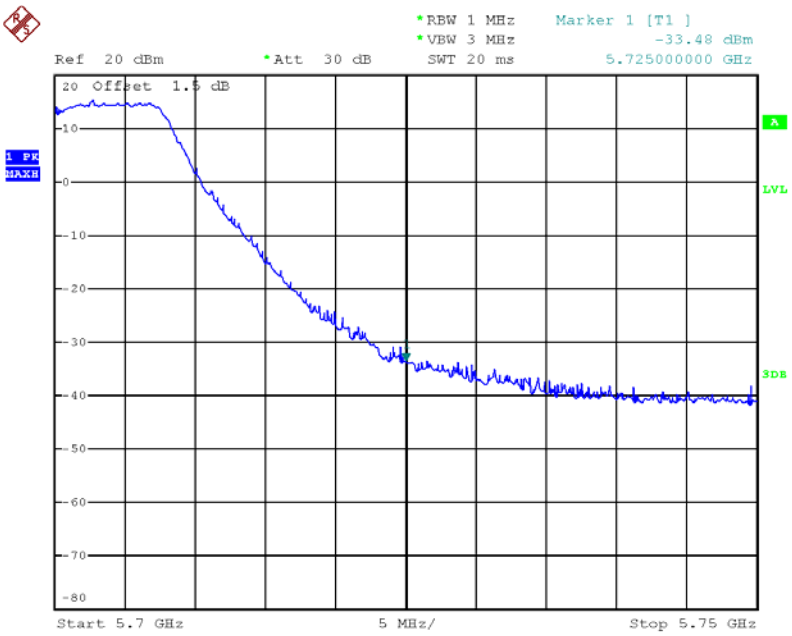
Date: 26.OCT.2012 15:10:10

Tx2



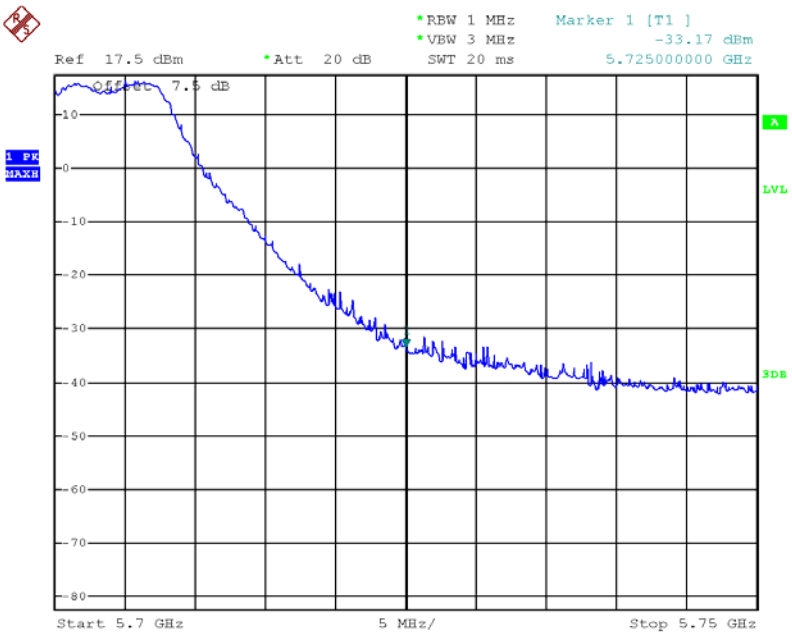
Date: 26.OCT.2012 15:11:05

Transmitter Conducted Bandedge Emissions Plot–Peak on 5700 MHz, Non HT-20, 6Mbps
Tx1



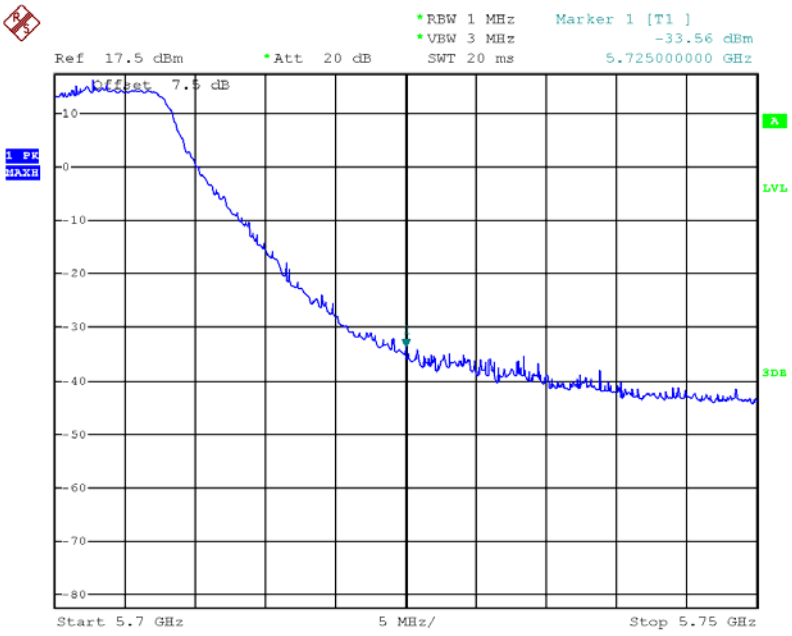
Transmitter Conducted Bandedge Emissions Plot–Peak on 5700 MHz, Non HT-20, 6Mbps

Tx1



Date: 26.OCT.2012 15:16:58

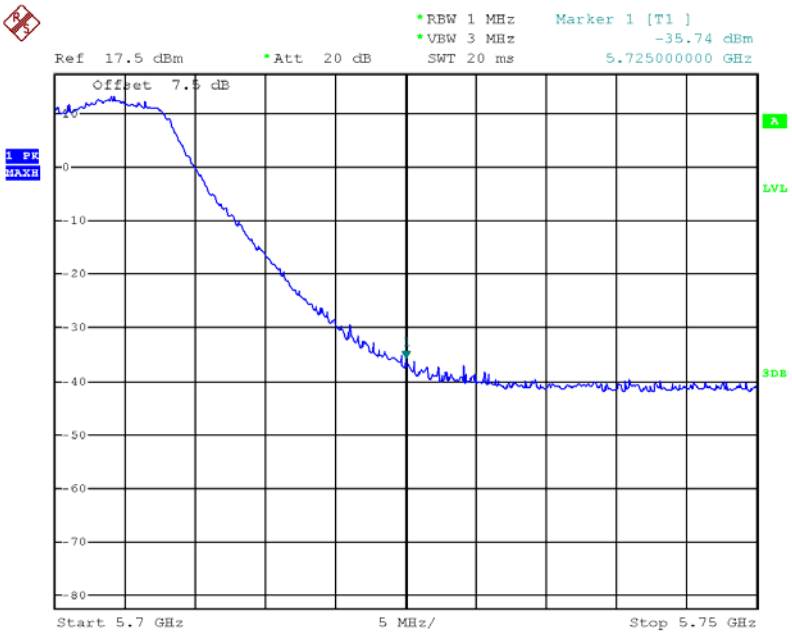
Tx2



Date: 26.OCT.2012 15:17:43

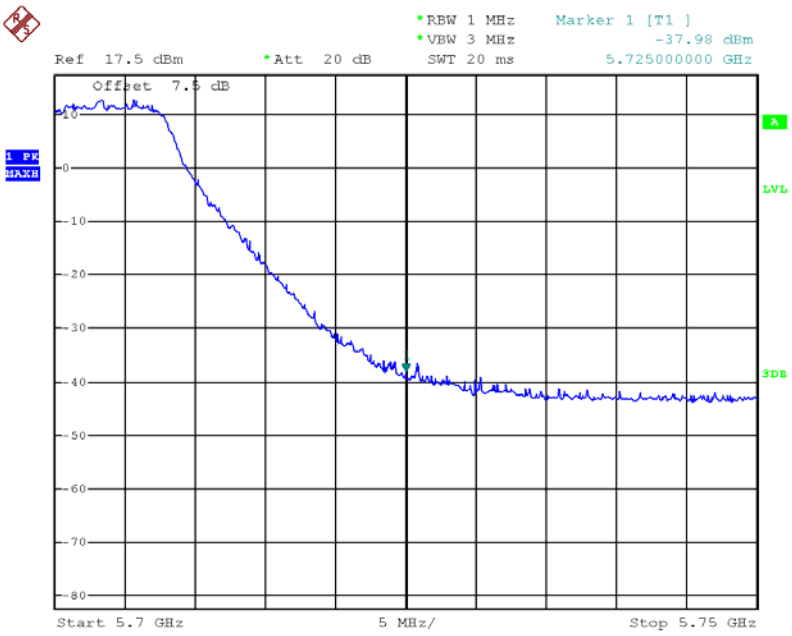
Transmitter Conducted Bandedge Emissions Plot–Peak on 5700 MHz, Non HT-20, Beam Forming, 6Mbps

Tx1



Date: 26.OCT.2012 17:31:47

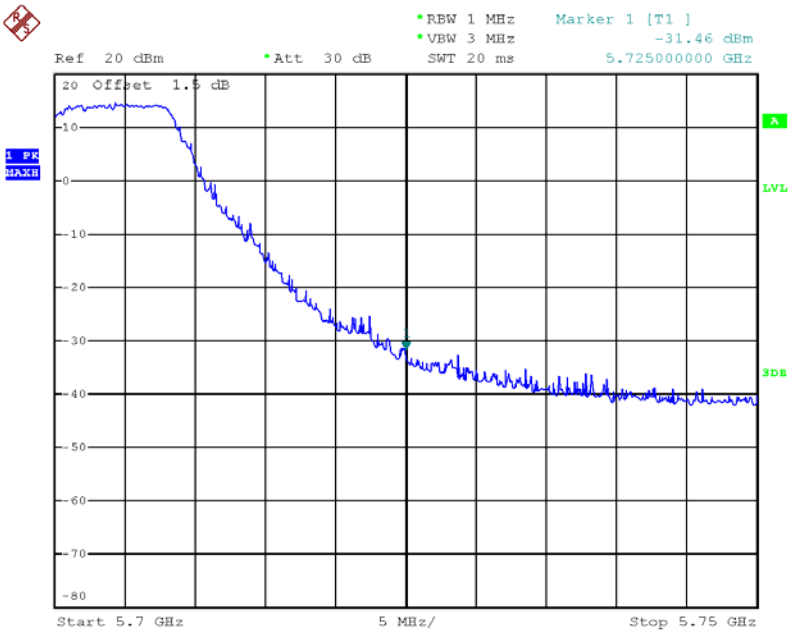
Tx2



Date: 26.OCT.2012 17:31:13

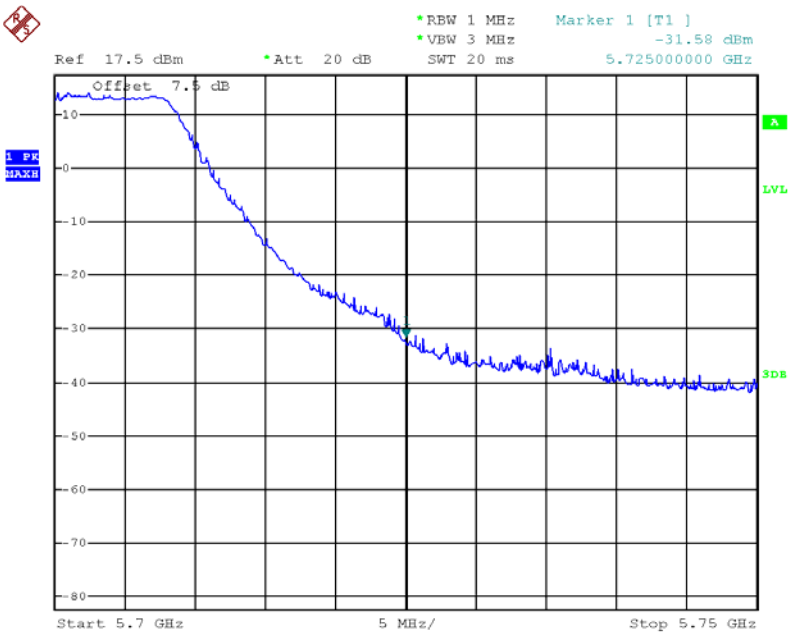
Transmitter Conducted Bandedge Emissions Plot–Peak on 5700 MHz, HT-20, M0

Tx1



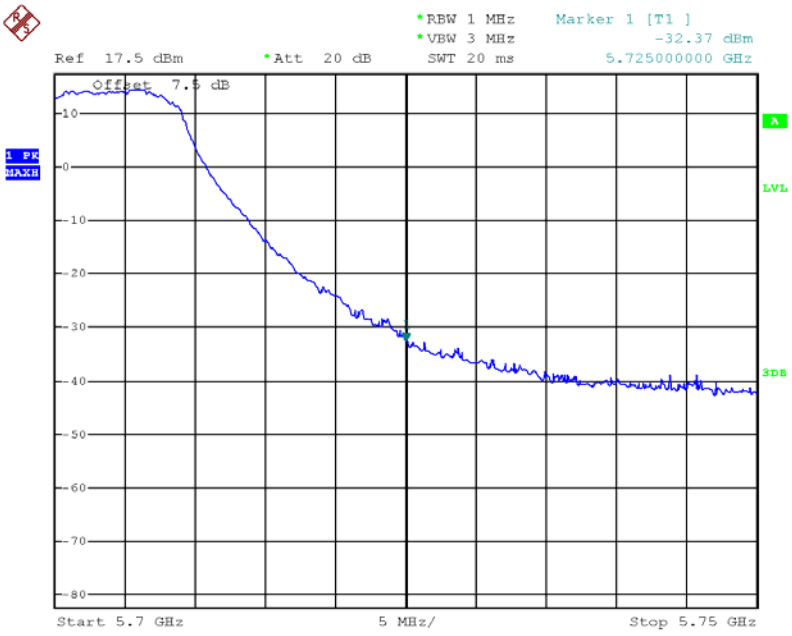
Transmitter Conducted Bandedge Emissions Plot–Peak on 5700 MHz, HT-20 / HT-20, STBC, M0

Tx1



Date: 26.OCT.2012 17:41:05

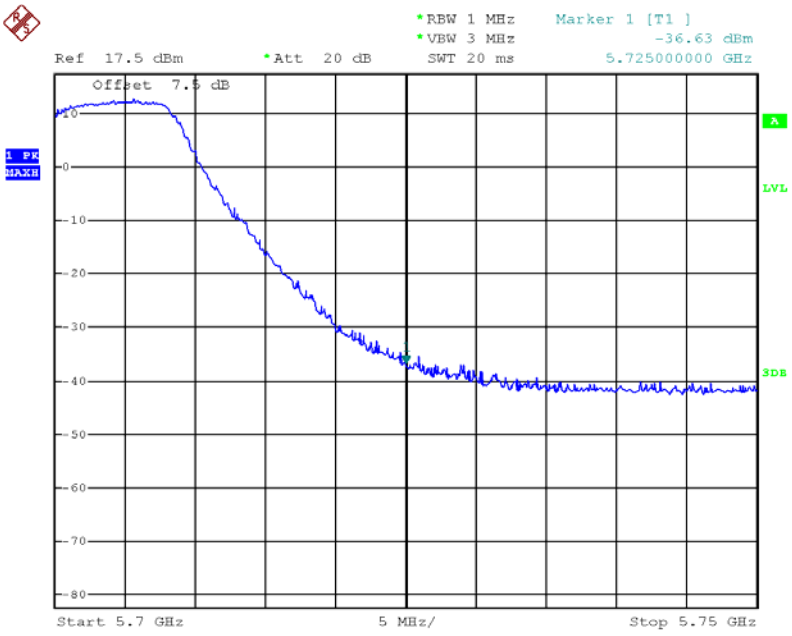
Tx2



Date: 26.OCT.2012 17:40:34

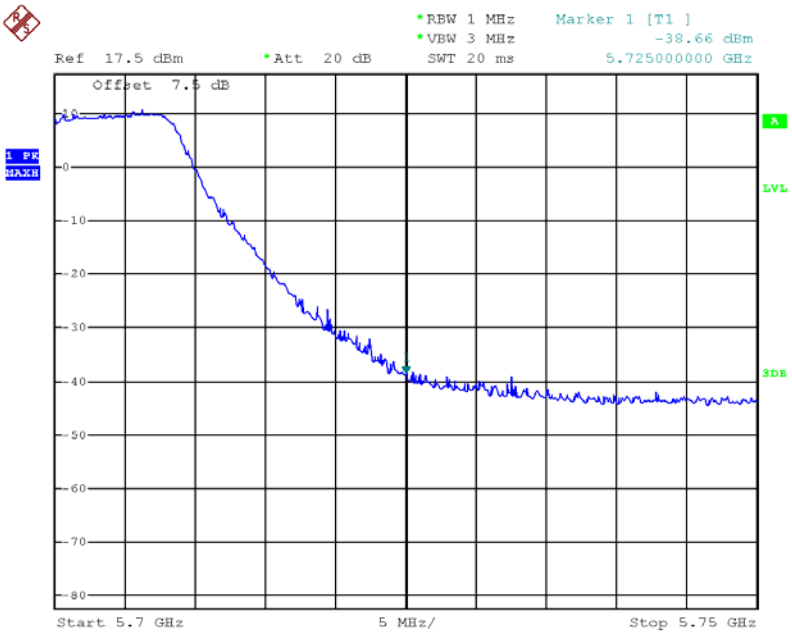
Transmitter Conducted Bandedge Emissions Plot–Peak on 5700 MHz, HT-20, Beam Forming, M0

Tx1



Date: 26.OCT.2012 17:44:13

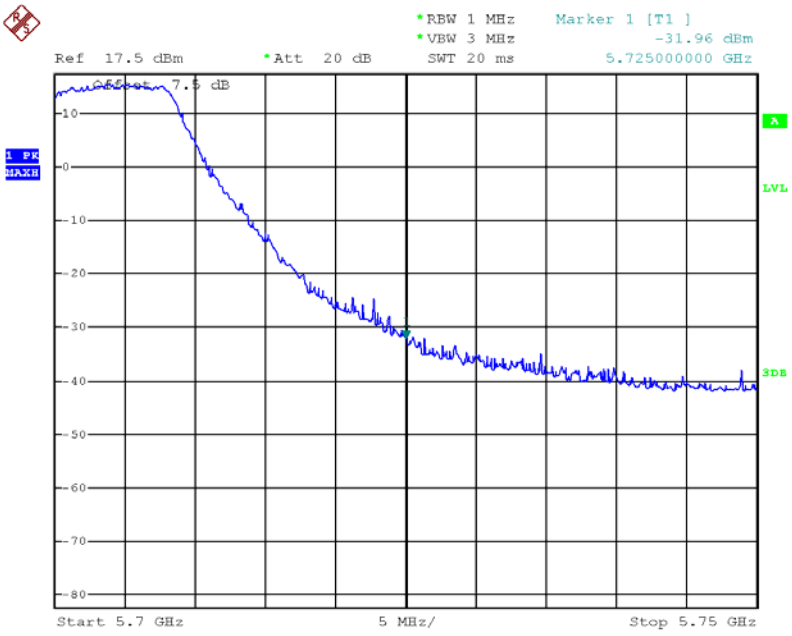
Tx2



Date: 26.OCT.2012 17:43:51

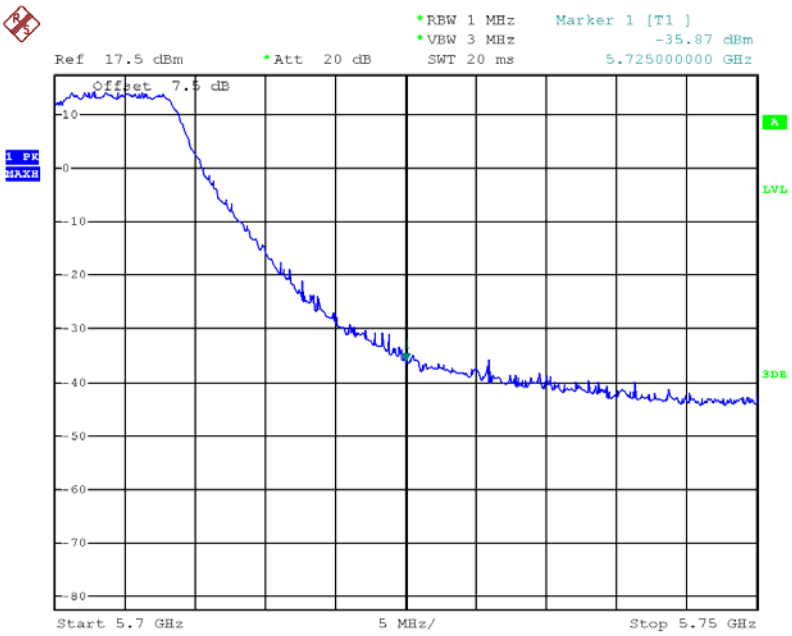
Transmitter Conducted Bandedge Emissions Plot–Peak on 5700 MHz, HT-20, Beam Forming, M8

Tx1



Date: 26.OCT.2012 17:48:57

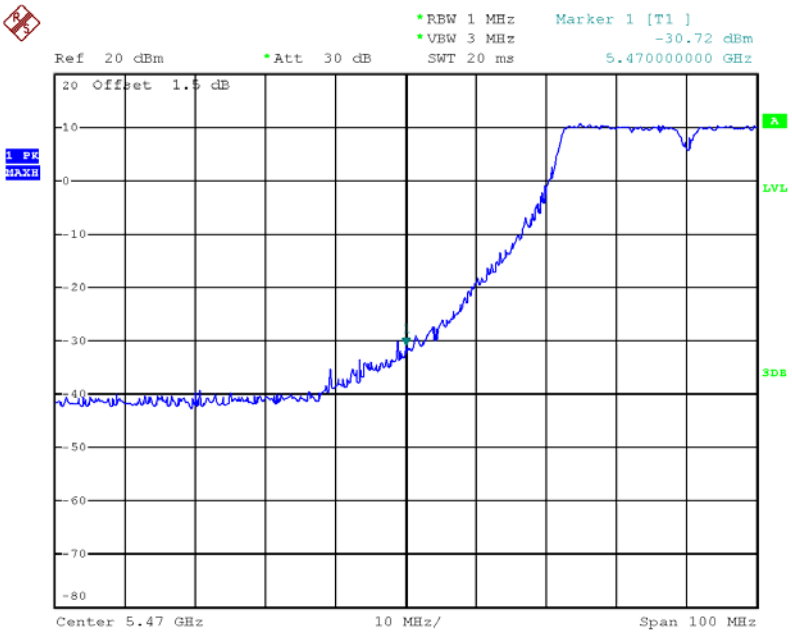
Tx2



Date: 26.OCT.2012 17:48:36

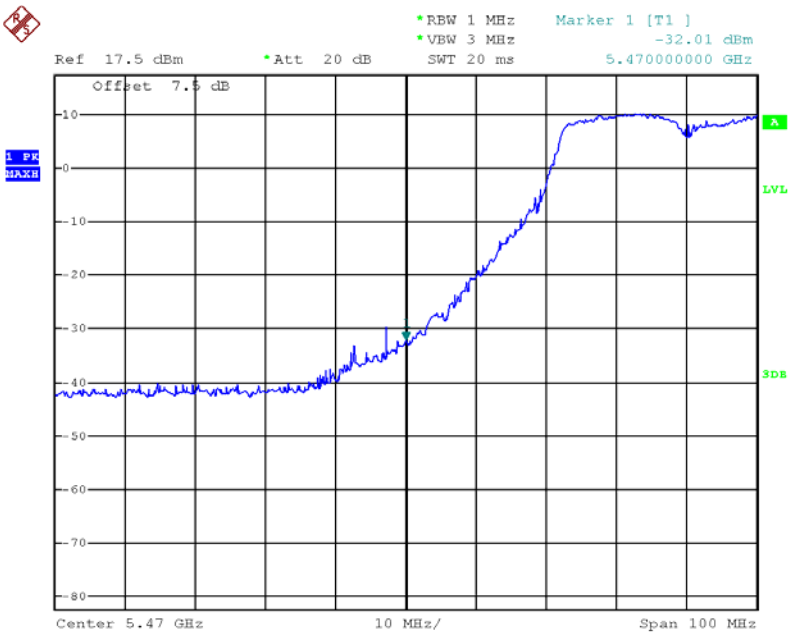
Transmitter Conducted Bandedge Emissions Plot–Peak on 5510 MHz, HT-40, M0

Tx1



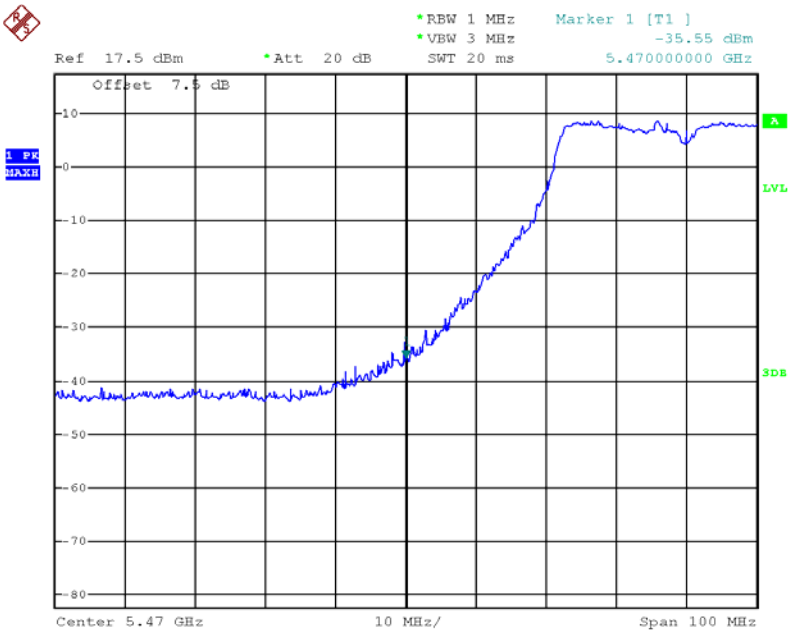
Transmitter Conducted Bandedge Emissions Plot–Peak on 5510 MHz, HT-40 / HT-40, STBC, M0

Tx1



Date: 26.OCT.2012 17:59:23

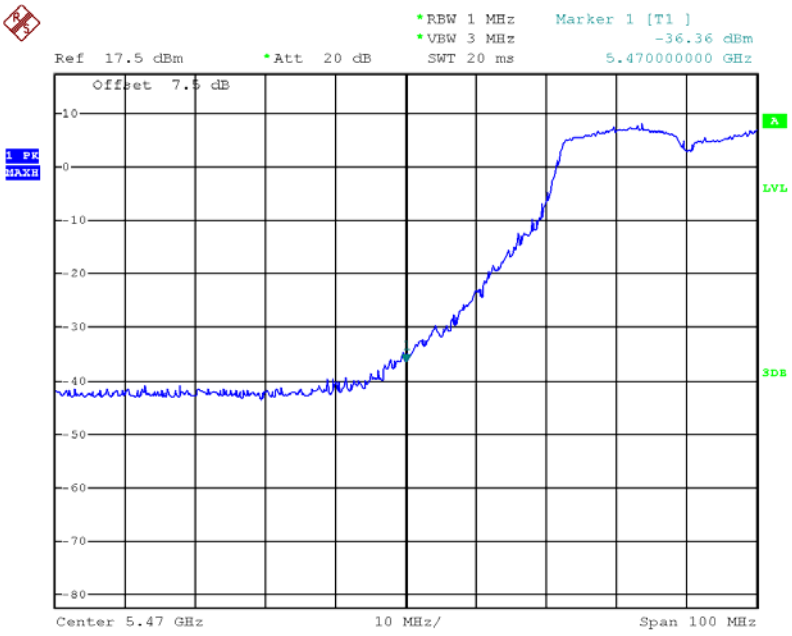
Tx2



Date: 26.OCT.2012 17:59:01

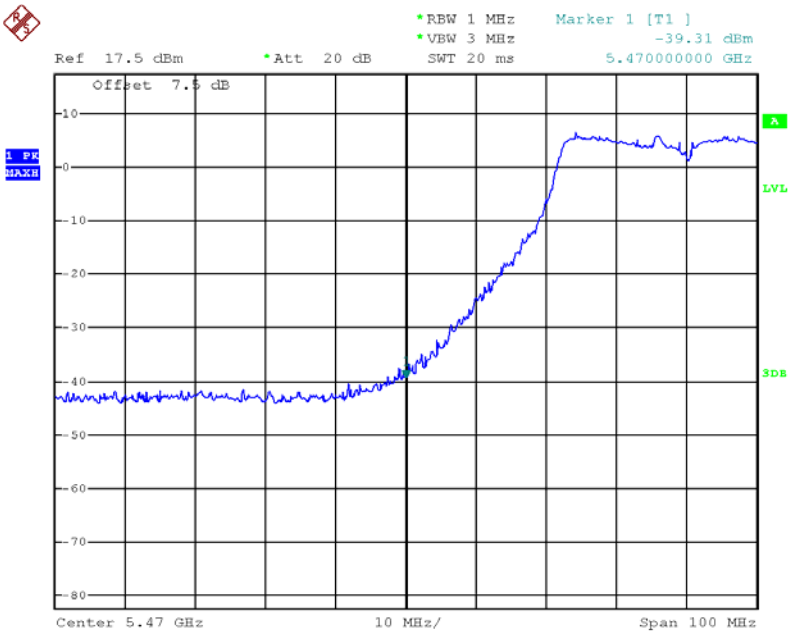
Transmitter Conducted Bandedge Emissions Plot–Peak on 5510 MHz, HT-40, Beam Forming, M0

Tx1



Date: 26.OCT.2012 18:01:58

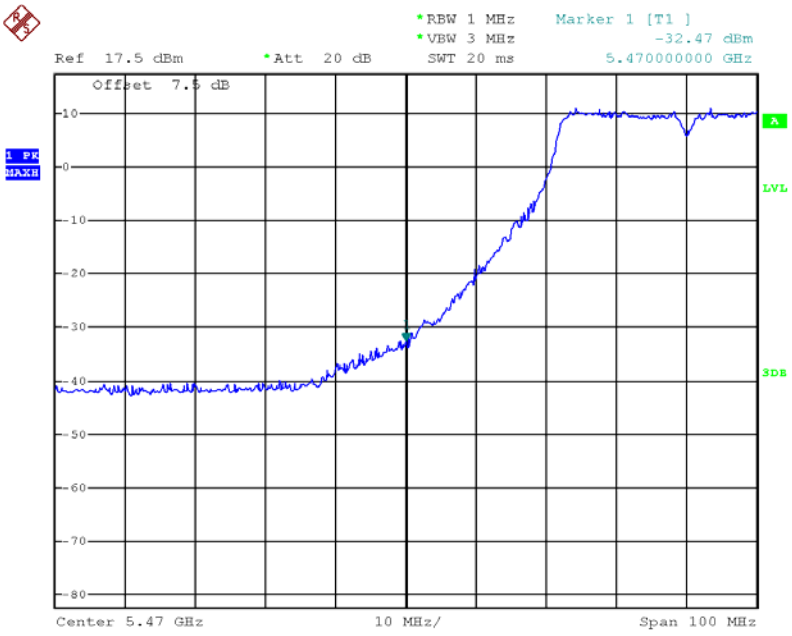
Tx2



Date: 26.OCT.2012 18:01:40

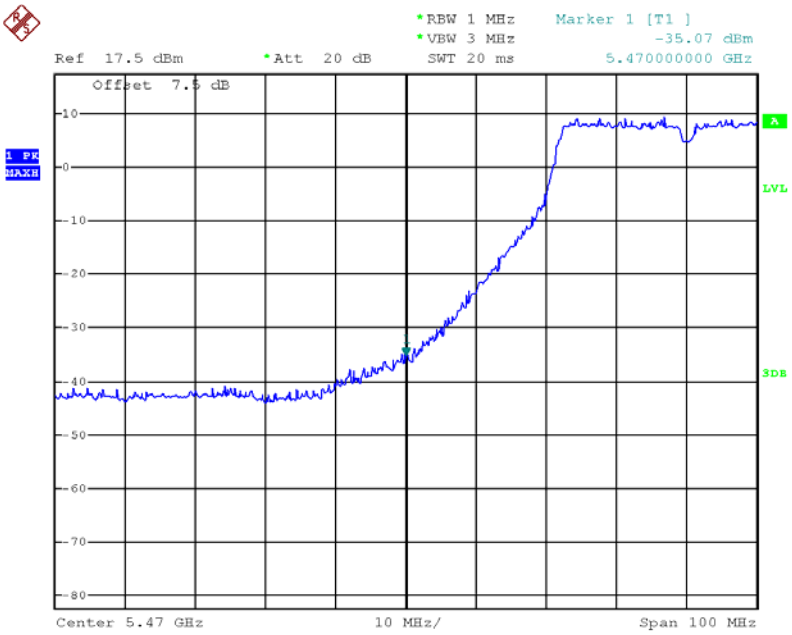
Transmitter Conducted Bandedge Emissions Plot–Peak on 5510 MHz, HT-40, Beam Forming, M8

Tx1



Date: 26.OCT.2012 18:04:46

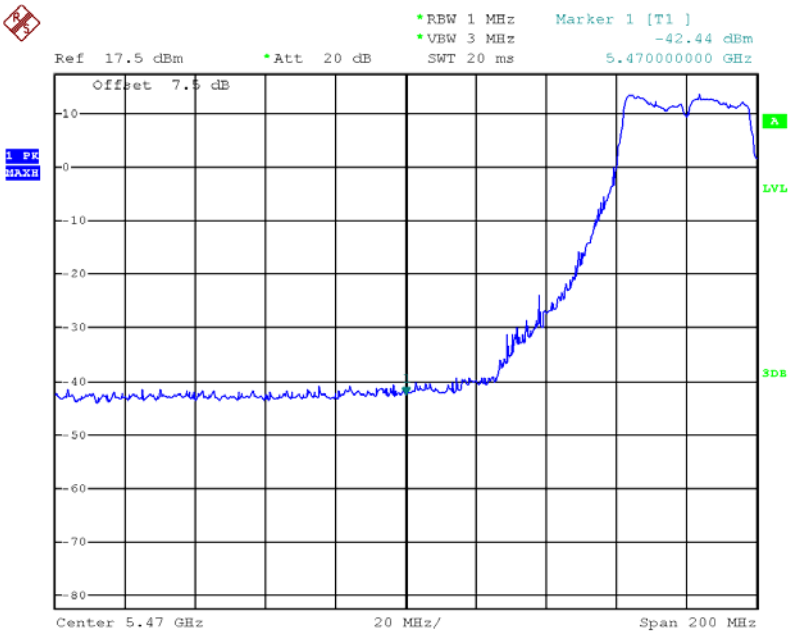
Tx2



Date: 26.OCT.2012 18:04:17

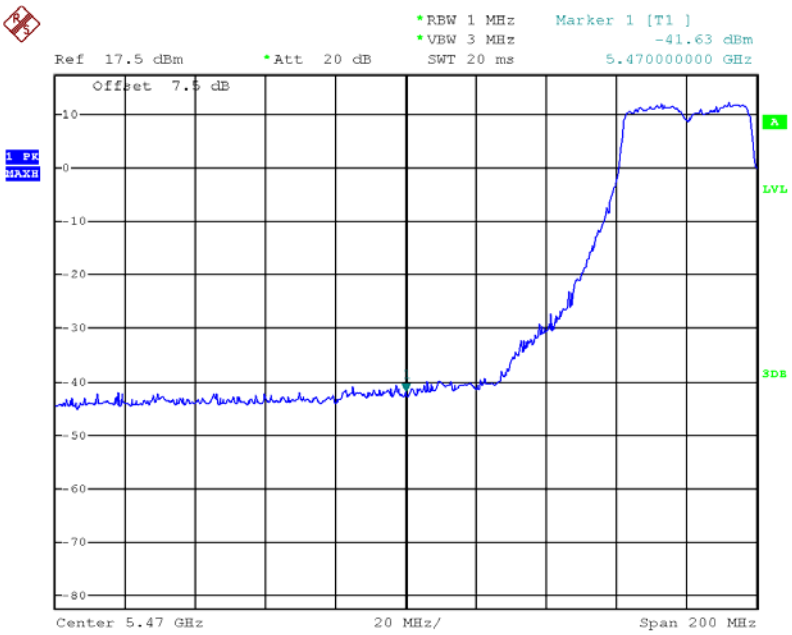
Transmitter Conducted Bandedge Emissions Plot–Peak on 5550 MHz,
HT-40 / HT-40, STBC / HT-40, Beam Forming, M0

Tx1



Date: 26.OCT.2012 18:12:44

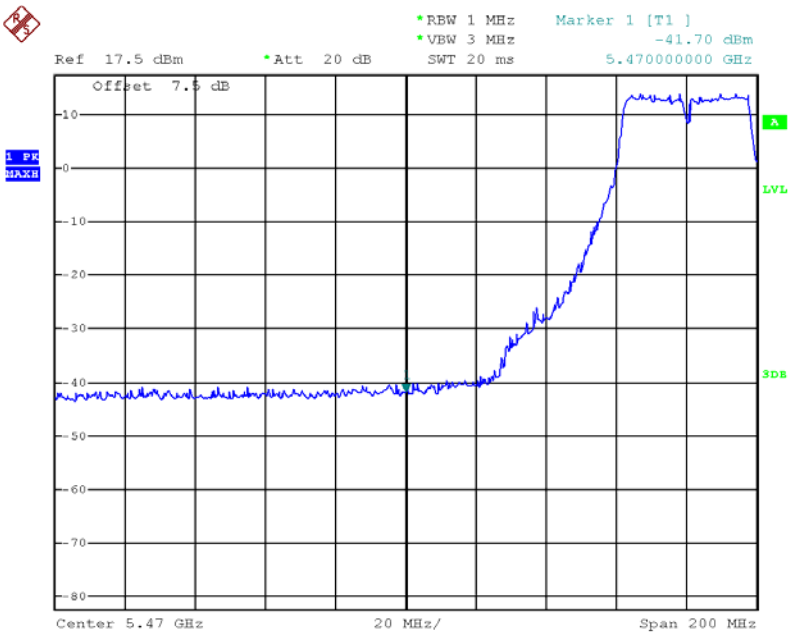
Tx2



Date: 26.OCT.2012 18:12:26

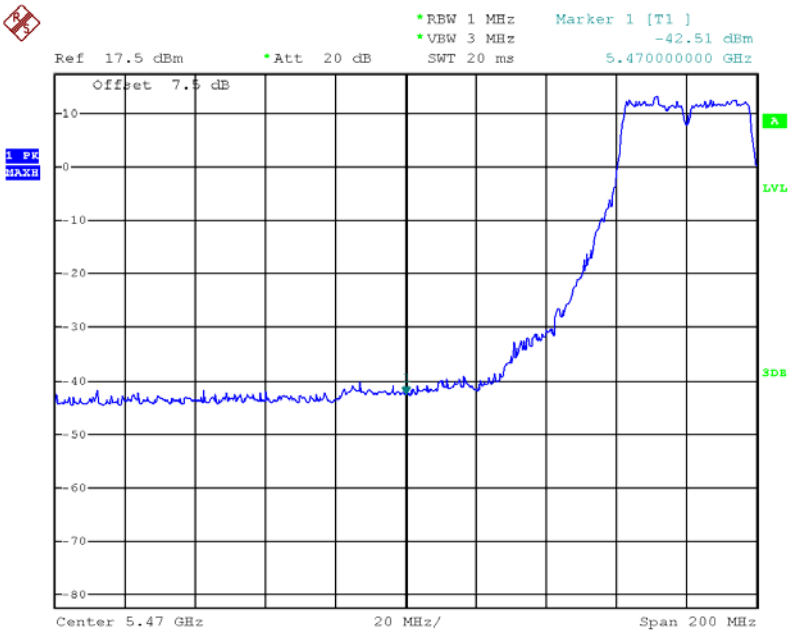
Transmitter Conducted Bandedge Emissions Plot–Peak on 5550 MHz, HT-40, Beam Forming, M8

Tx1



Date: 26.OCT.2012 18:10:14

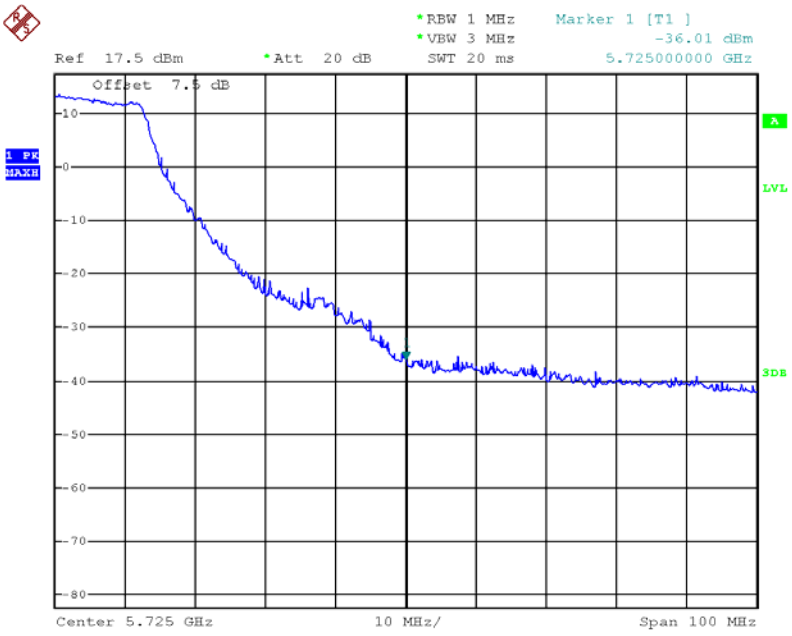
Tx2



Date: 26.OCT.2012 18:09:47

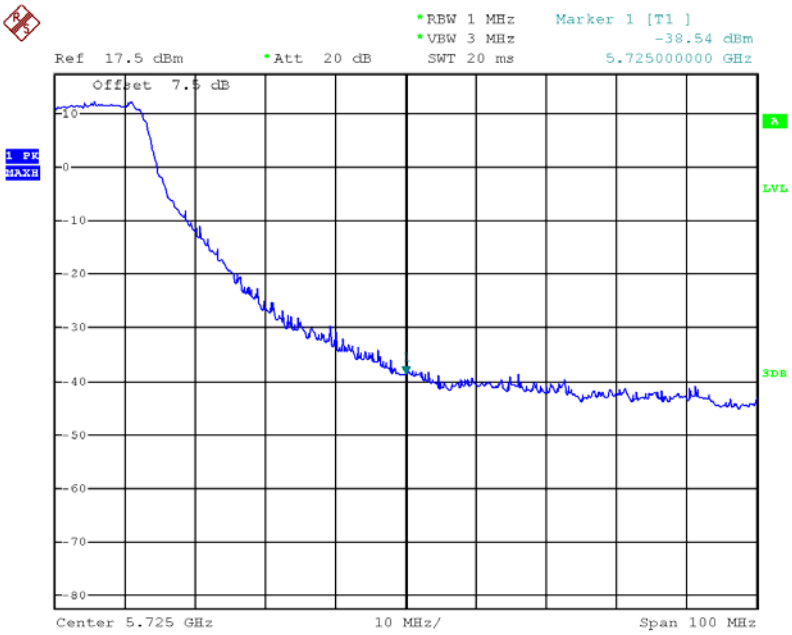
Transmitter Conducted Bandedge Emissions Plot–Peak on 5670 MHz, HT-40 / HT-40, STBC, M0

Tx1



Date: 26.OCT.2012 18:18:10

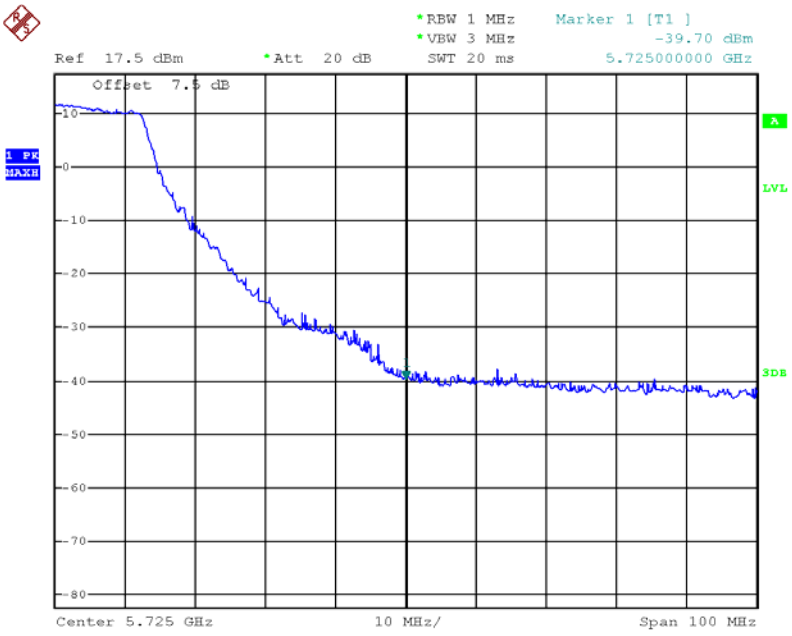
Tx2



Date: 26.OCT.2012 18:18:26

Transmitter Conducted Bandedge Emissions Plot–Peak on 5670 MHz, HT-40, Beam Forming, M0

Tx1



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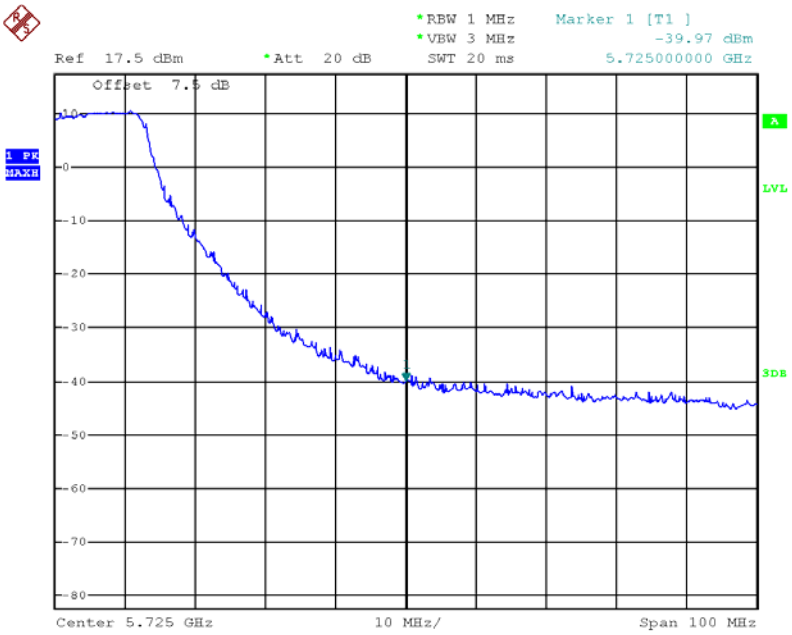
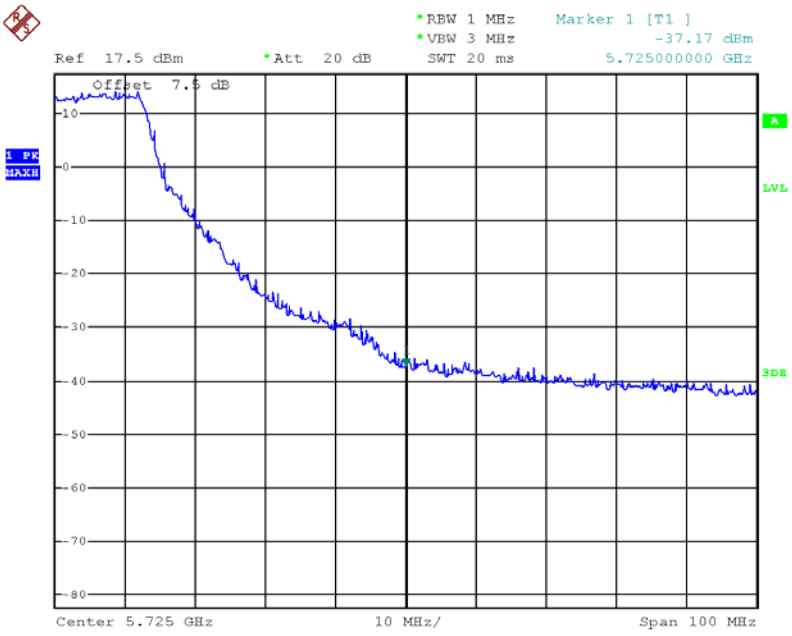
Tx2



Date: 26.OCT.2012 18:20:49

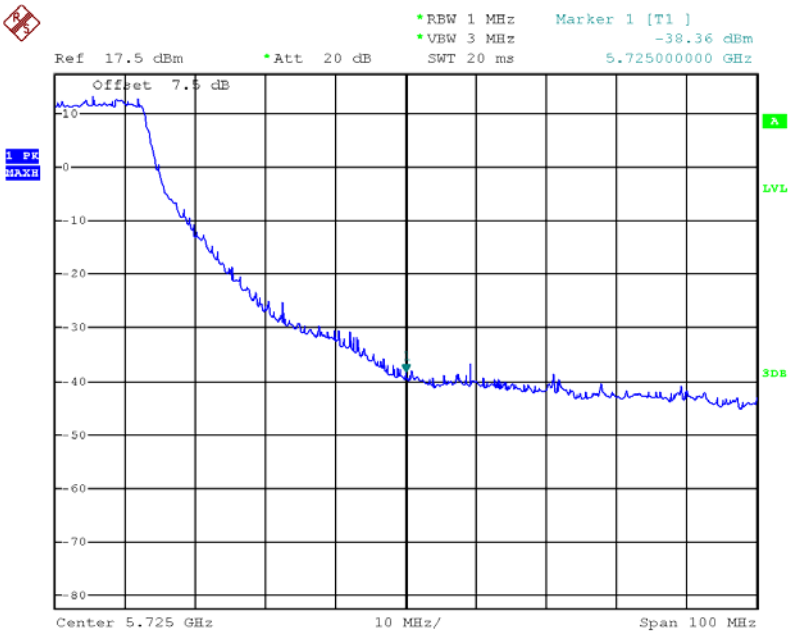
Transmitter Conducted Bandedge Emissions Plot–Peak on 5670 MHz, HT-40, Beam Forming, M8

Tx1



Date: 26.OCT.2012 18:24:24

Tx2



Date: 26.OCT.2012 18:24:06

3.7 Transmitter Conducted Unwanted Emissions

3.7.1 Transmitter Conducted Unwanted Emissions Limit

Un-restricted band emissions above 1GHz Limit	
Operating Band	**Limit**
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).	

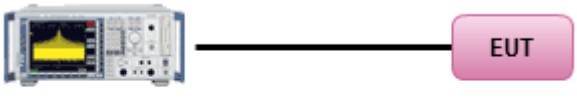
3.7.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

Test Method			
☒	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].		
☒	For the transmitter unwanted emissions shall be measured using following options below:		
	☒	Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.	
	☒	Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.	
		☐	Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
		☐	Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
		☒	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty ≥ 98%.
		☐	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒	Refer as FCC KDB 789033, clause G)5) measurement procedure peak limit.
		☐	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
☒	For conducted measurement, refer as FCC KDB 789033, clause G.		

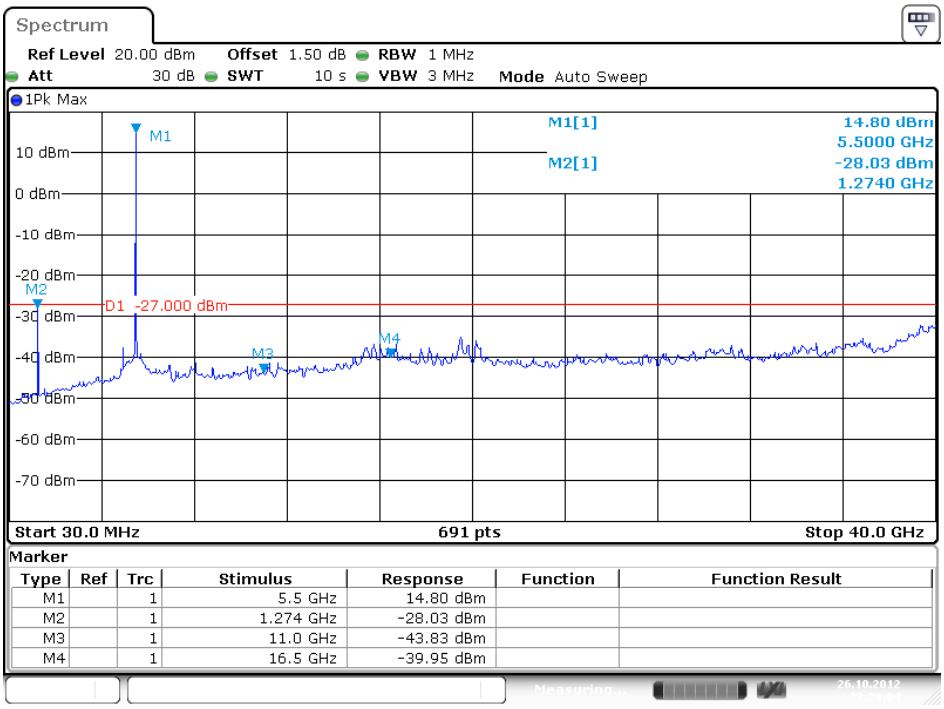
3.7.4 Test Setup

Transmitter Conducted Unwanted Emissions
 Spectrum Analyzer

3.7.5 Test Result of Transmitter Conducted Unwanted Emissions

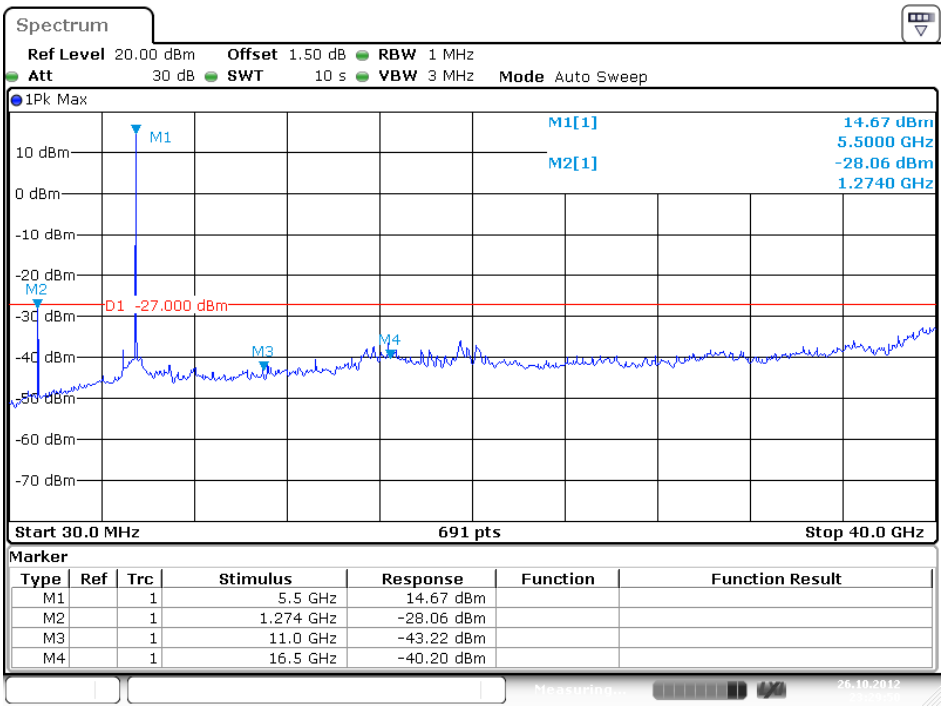
Freq. (MHz)	Operating Mode	Data Rate (Mbps)	Conducted Spur Delta(dB)	Limit (dBm)	Margin (dB)
5500	Non HT-20, 6 to 54Mbps	6	-28.03	-27	1.03
	Non HT-20, Beam Forming, 6 to 54Mbps	6	-28.03	-27	1.03
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	-28.06	-27	1.06
	HT-20, Beam Forming, M0 to M7	M0	-28.06	-27	1.06
	HT-20, Beam Forming, M8 to M15	M8	-30.6	-27	3.6
5580	Non HT-20, 6 to 54Mbps	6	-31.78	-27	4.78
	Non HT-20, Beam Forming, 6 to 54Mbps	6	-31.78	-27	4.78
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	-32.53	-27	5.53
	HT-20, Beam Forming, M0 to M7	M0	-32.53	-27	5.53
	HT-20, Beam Forming, M8 to M15	M8	-32.61	-27	5.61
5700	Non HT-20, 6 to 54Mbps	6	-28.34	-27	1.34
	Non HT-20, 6 to 54Mbps	6	-28.39	-27	1.39
	Non HT-20, Beam Forming, 6 to 54Mbps	6	-28.39	-27	1.39
	HT-20, M0 to M7	M0	-28.51	-27	1.51
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	-29.55	-27	2.55
	HT-20, Beam Forming, M0 to M7	M0	-29.55	-27	2.55
	HT-20, Beam Forming, M8 to M15	M8	-31.45	-27	4.45
5510	HT-40, M0 to M7	M0	-35.01	-27	8.01
	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	-30.34	-27	3.34
	HT-40, Beam Forming, M0 to M7	M0	-30.34	-27	3.34
	HT-40, Beam Forming, M8 to M15	M8	-30.36	-27	3.36
5550	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	-33.15	-27	6.15
	HT-40, Beam Forming, M0 to M7	M0	-33.15	-27	6.15
	HT-40, Beam Forming, M8 to M15	M8	-32.09	-27	5.09
5670	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	-32.6	-27	5.6
	HT-40, Beam Forming, M0 to M7	M0	-32.6	-27	5.6
	HT-40, Beam Forming, M8 to M15	M8	-32.07	-27	5.07

Transmitter Conducted Unwanted Emissions Plot on 5500 MHz,
Non HT-20 / Non HT-20, Beam Forming, 6Mbps



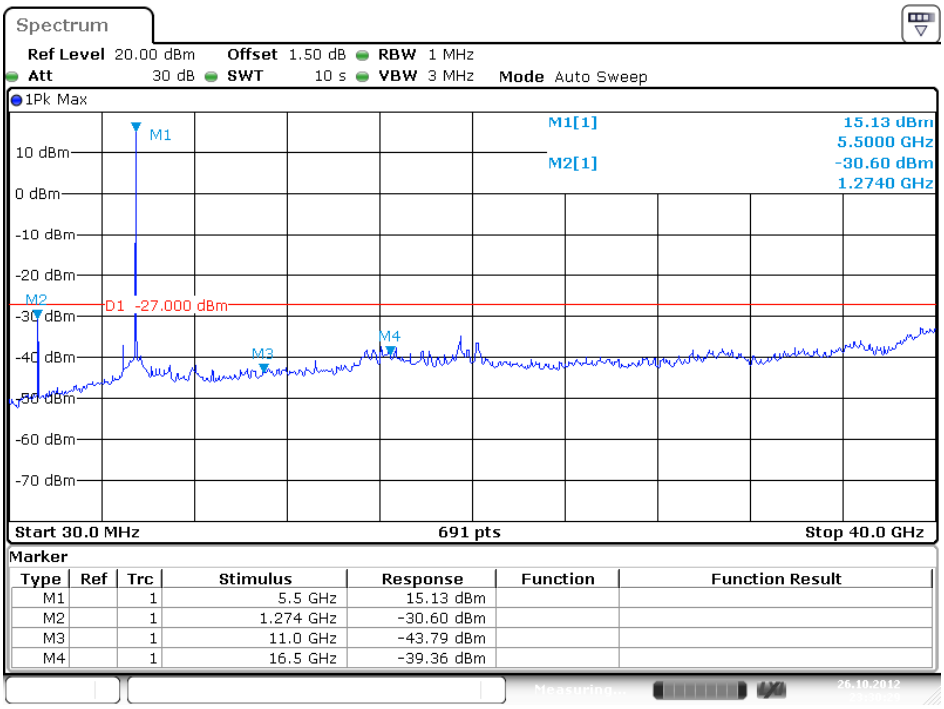
Date: 26.OCT.2012 23:29:04

Transmitter Conducted Unwanted Emissions Plot on 5500 MHz,
HT-20 / HT-20, STBC / HT-20, Beam Forming, M0



Date: 26.OCT.2012 23:29:50

Transmitter Conducted Unwanted Emissions Plot on 5500 MHz, HT-20, Beam Forming, M8

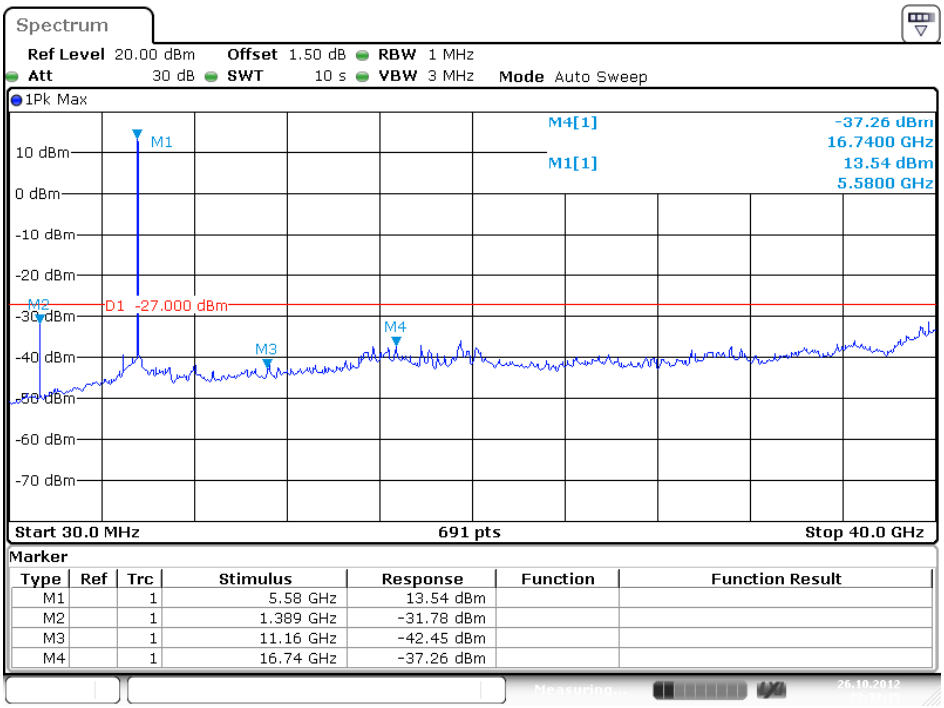


Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	5.5 GHz	15.13 dBm		
M2		1	1.274 GHz	-30.60 dBm		
M3		1	11.0 GHz	-43.79 dBm		
M4		1	16.5 GHz	-39.36 dBm		

Date: 26.OCT.2012 23:30:29

Transmitter Conducted Unwanted Emissions Plot on 5580 MHz, Non HT-20 / Non HT-20, Beam Forming, 6Mbps

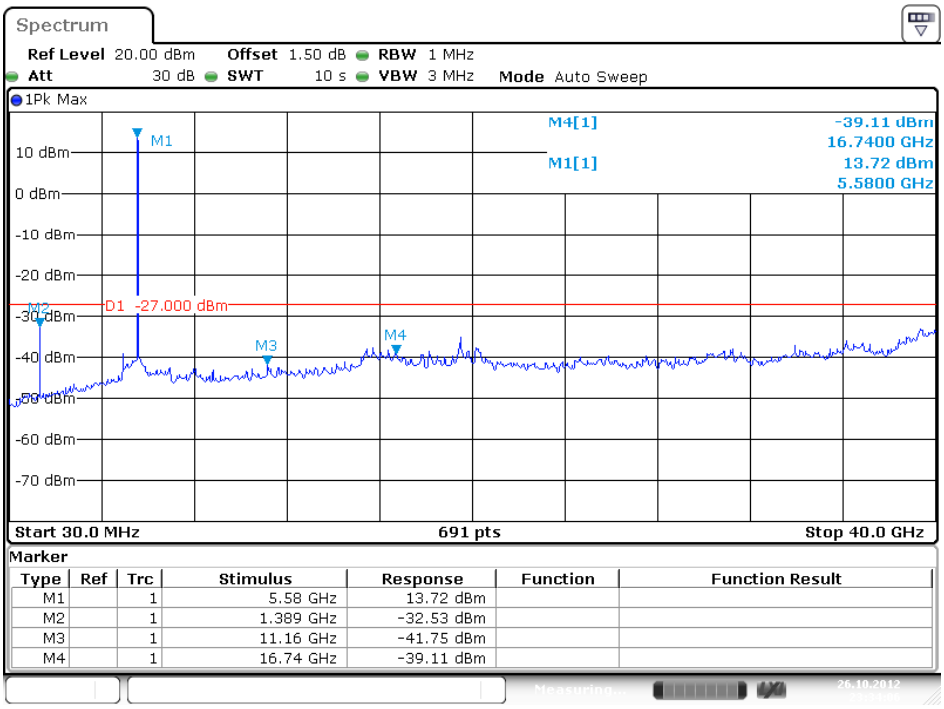


Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	5.58 GHz	13.54 dBm		
M2		1	1.389 GHz	-31.78 dBm		
M3		1	11.16 GHz	-42.45 dBm		
M4		1	16.74 GHz	-37.26 dBm		

Date: 26.OCT.2012 23:33:35

Transmitter Conducted Unwanted Emissions Plot on 5580 MHz, HT-20 / HT-20, STBC / HT-20, Beam Forming, M0

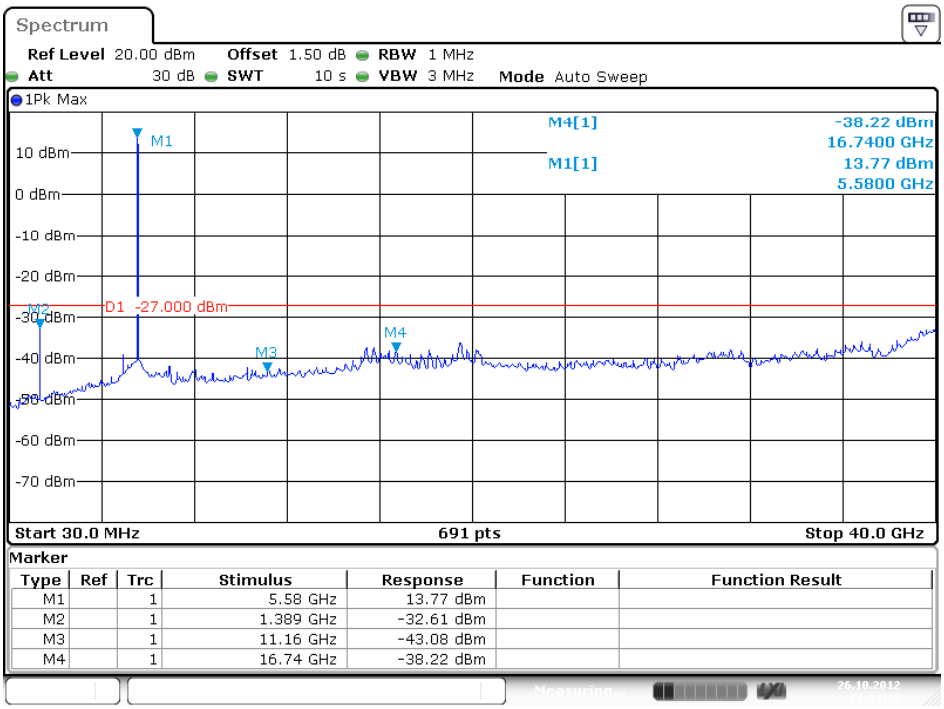


Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	5.58 GHz	13.72 dBm		
M2		1	1.389 GHz	-32.53 dBm		
M3		1	11.16 GHz	-41.75 dBm		
M4		1	16.74 GHz	-39.11 dBm		

Date: 26.OCT.2012 23:34:05

Transmitter Conducted Unwanted Emissions Plot on 5580 MHz, HT-20, Beam Forming, M8

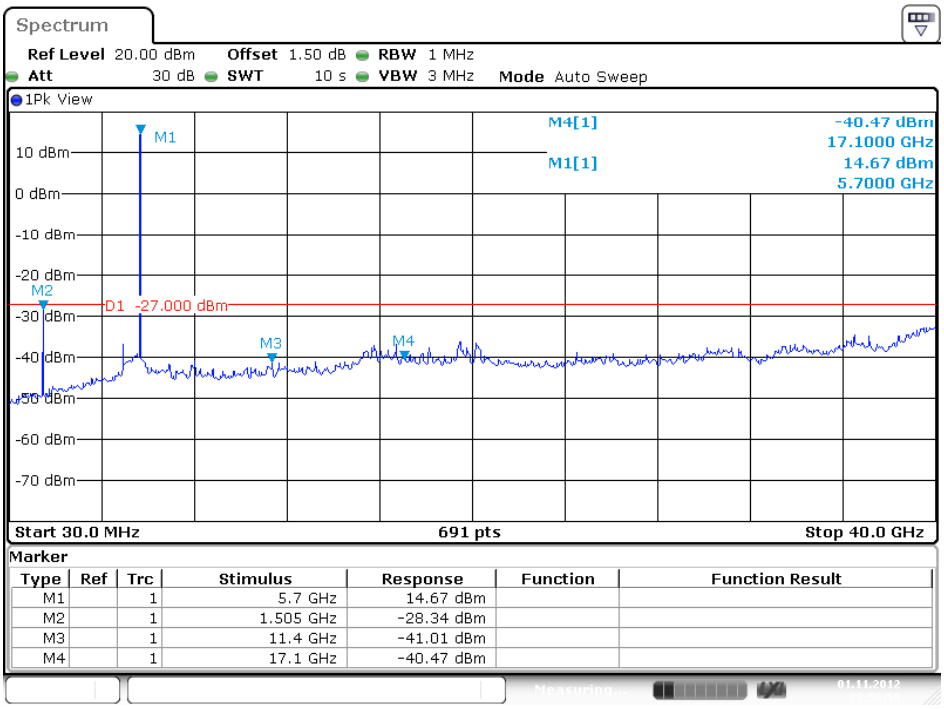


Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	5.58 GHz	13.77 dBm		
M2		1	1.389 GHz	-32.61 dBm		
M3		1	11.16 GHz	-43.08 dBm		
M4		1	16.74 GHz	-38.22 dBm		

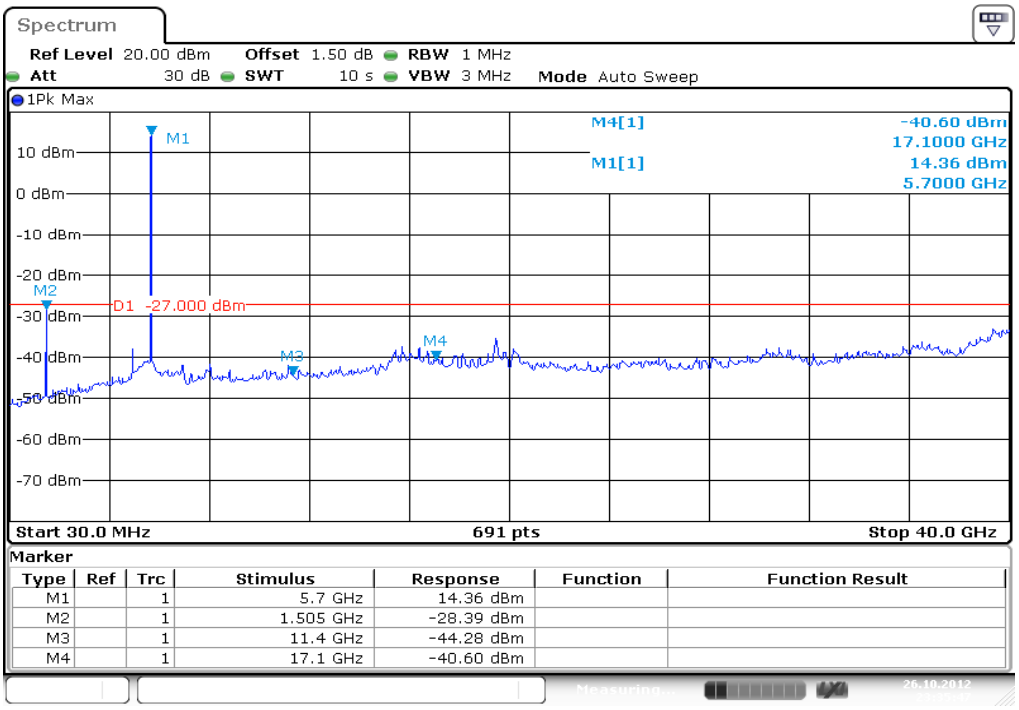
Date: 26.OCT.2012 23:34:38

Transmitter Conducted Unwanted Emissions Plot on 5700 MHz, Non HT-20, 6Mbps



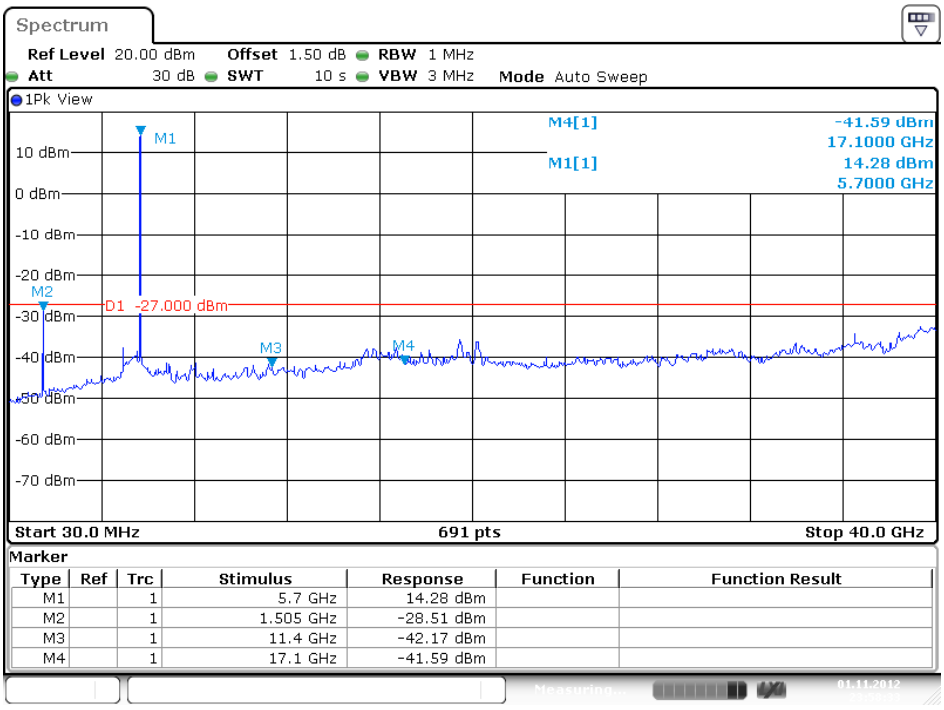
Date: 1.NOV.2012 23:56:59

Transmitter Conducted Unwanted Emissions Plot on 5700 MHz, Non HT-20 / Non HT-20, Beam Forming, 6Mbps



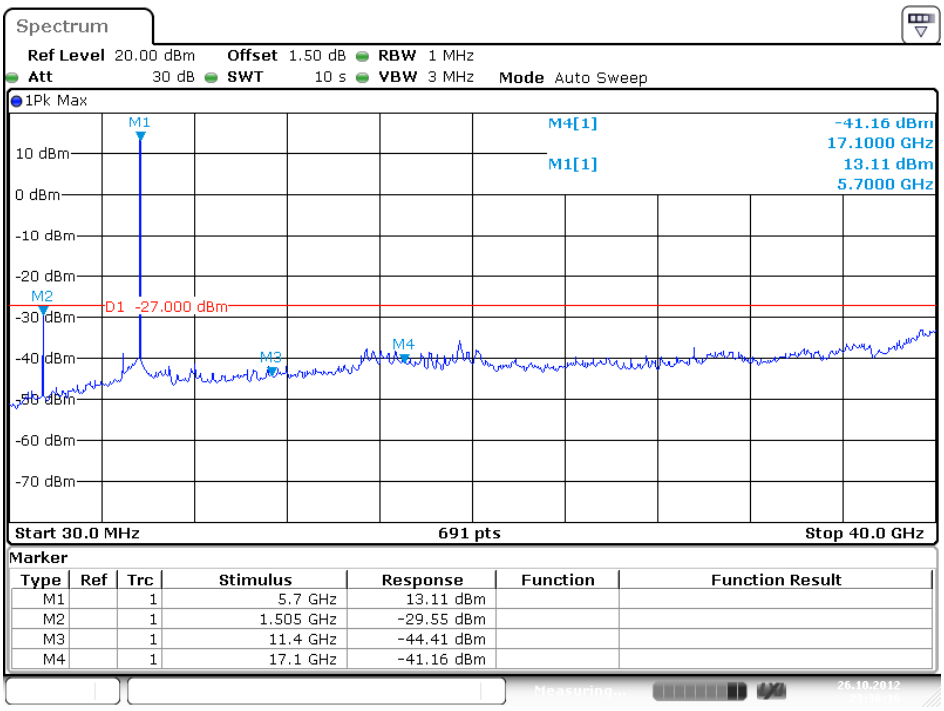
Date: 26.OCT.2012 23:35:47

Transmitter Conducted Unwanted Emissions Plot on 5700 MHz, HT-20, M0



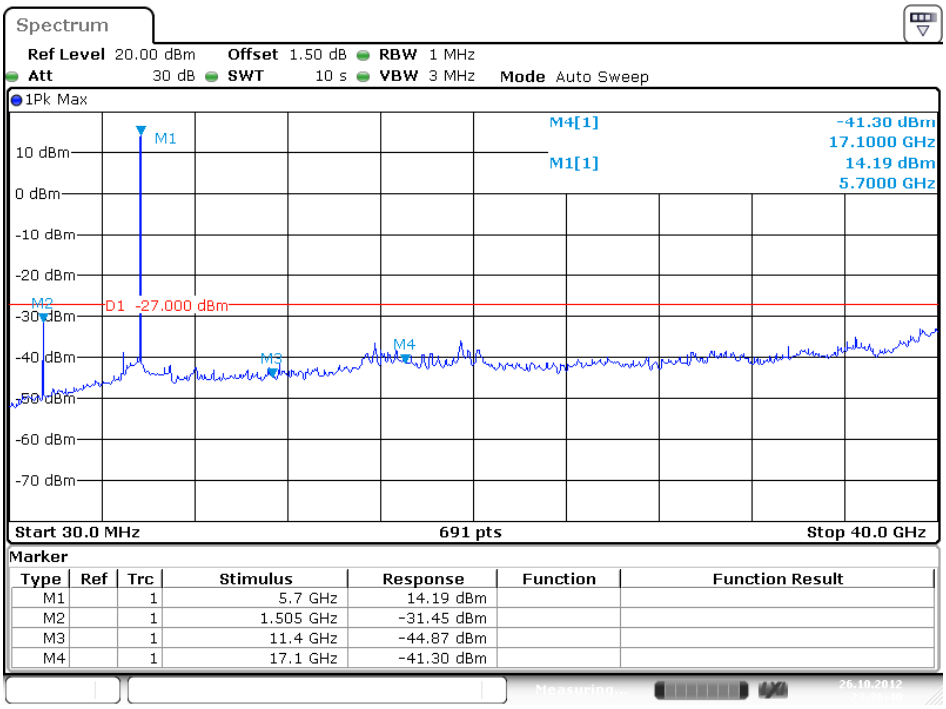
Date: 1.NOV.2012 23:58:33

Transmitter Conducted Unwanted Emissions Plot on 5700 MHz, HT-20 / HT-20, STBC / HT-20, Beam Forming, M0



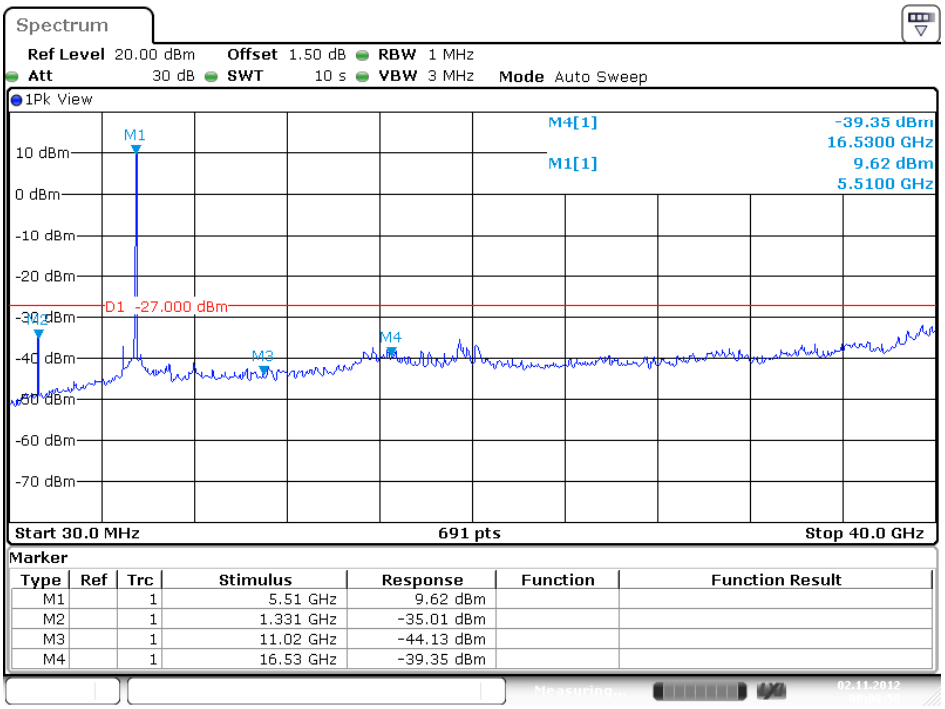
Date: 26.OCT.2012 23:36:16

Transmitter Conducted Unwanted Emissions Plot on 5700 MHz, HT-20, Beam Forming, M8



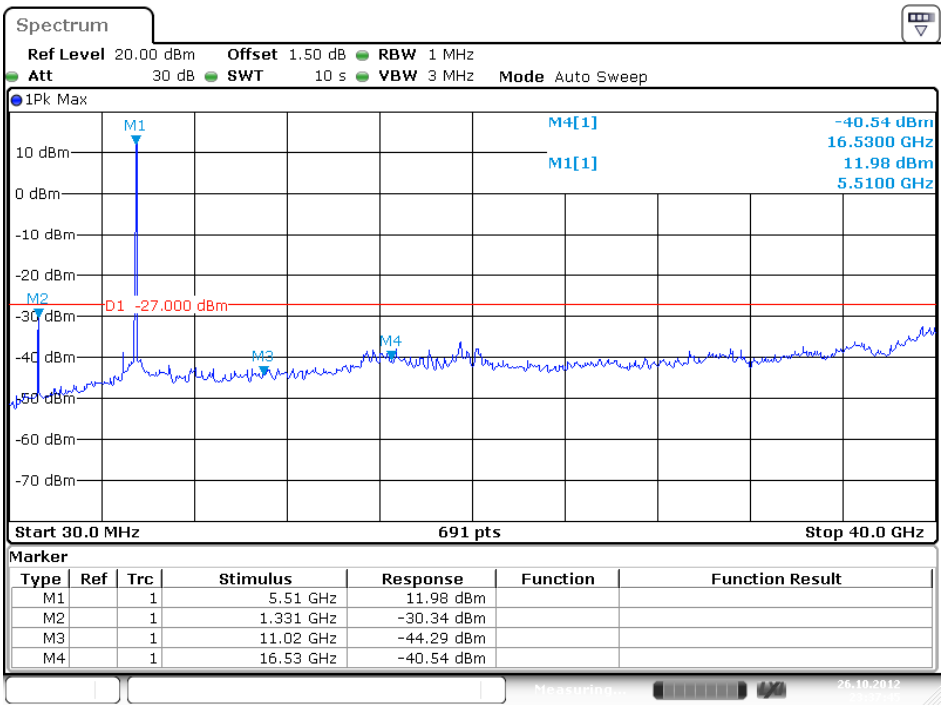
Date: 26.OCT.2012 23:36:40

Transmitter Conducted Unwanted Emissions Plot on 5510 MHz, HT-40, M0



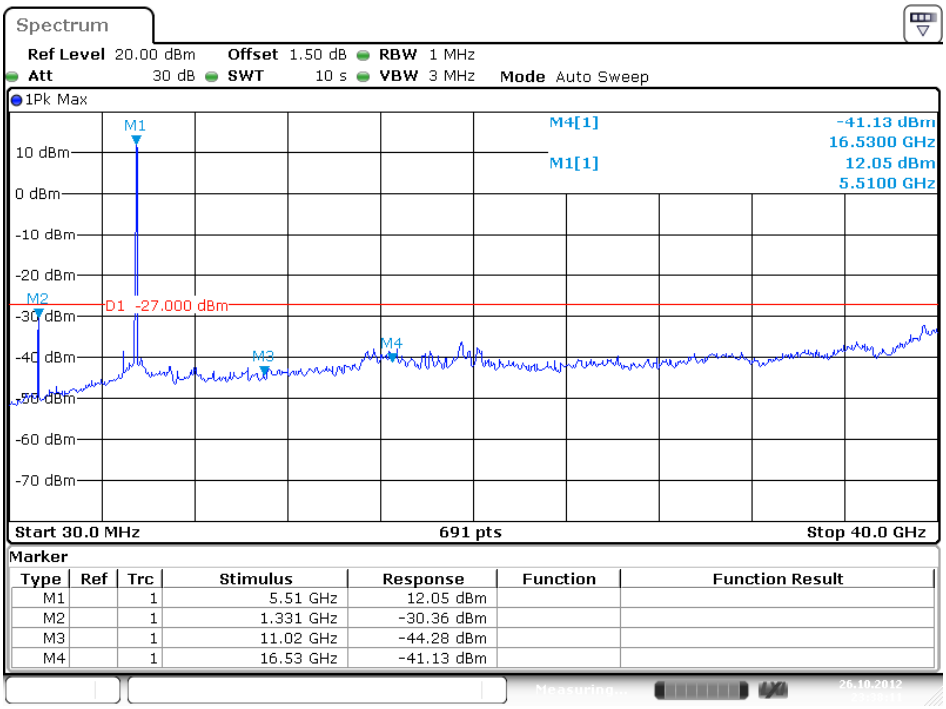
Date: 2.NOV.2012 00:00:49

Transmitter Conducted Unwanted Emissions Plot on 5510 MHz, HT-40 / HT-40, STBC / HT-40, Beam Forming, M0



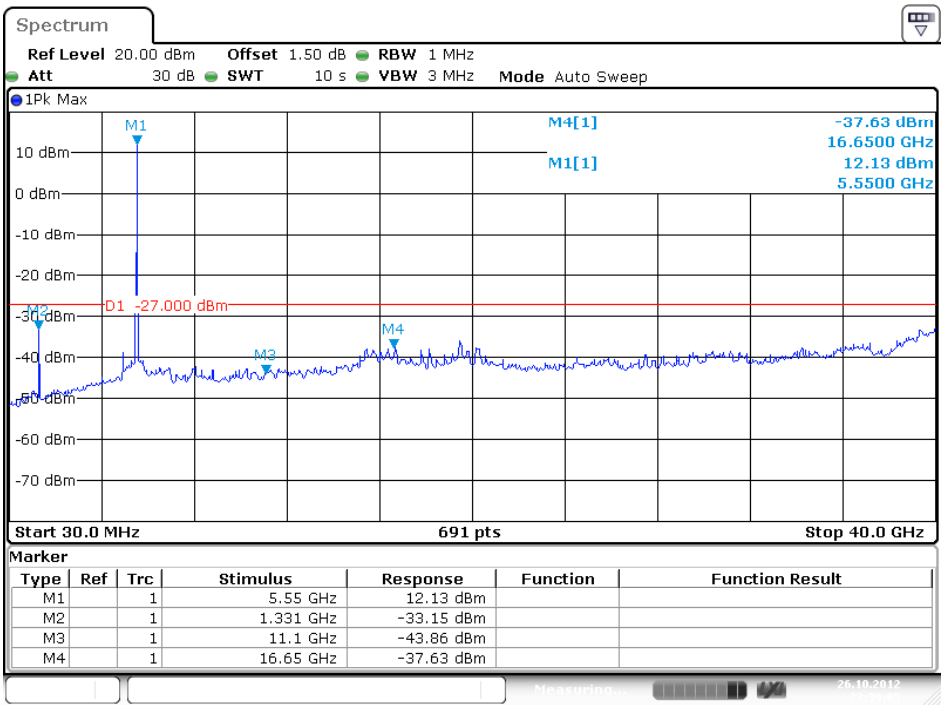
Date: 26.OCT.2012 23:37:45

Transmitter Conducted Unwanted Emissions Plot on 5510 MHz, HT-40, Beam Forming, M8



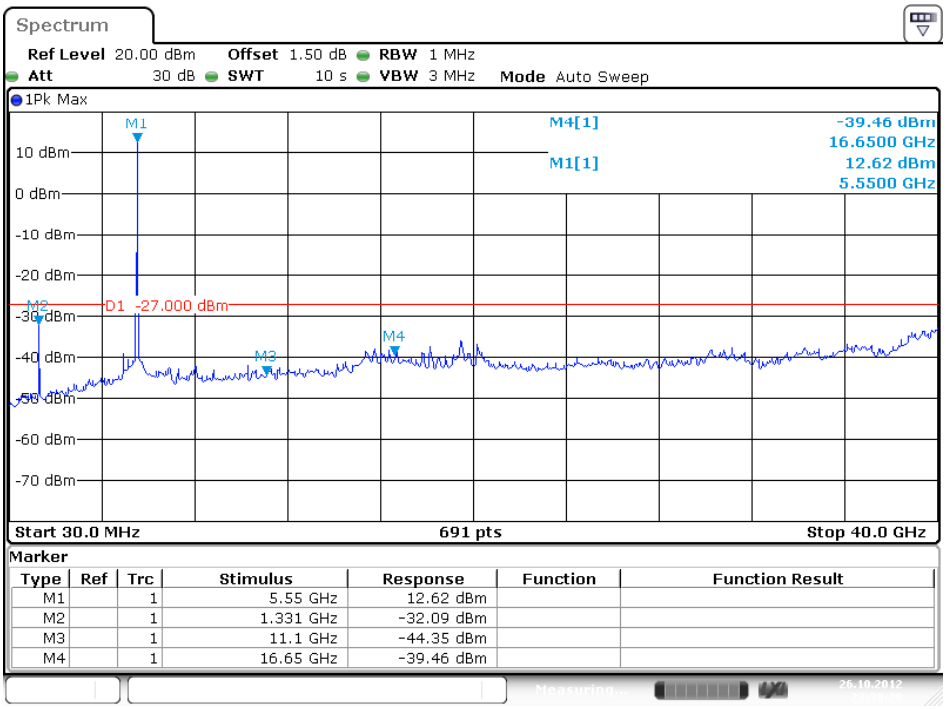
Date: 26.OCT.2012 23:38:11

Transmitter Conducted Unwanted Emissions Plot on 5550 MHz, HT-40 / HT-40, STBC / HT-40, Beam Forming, M0



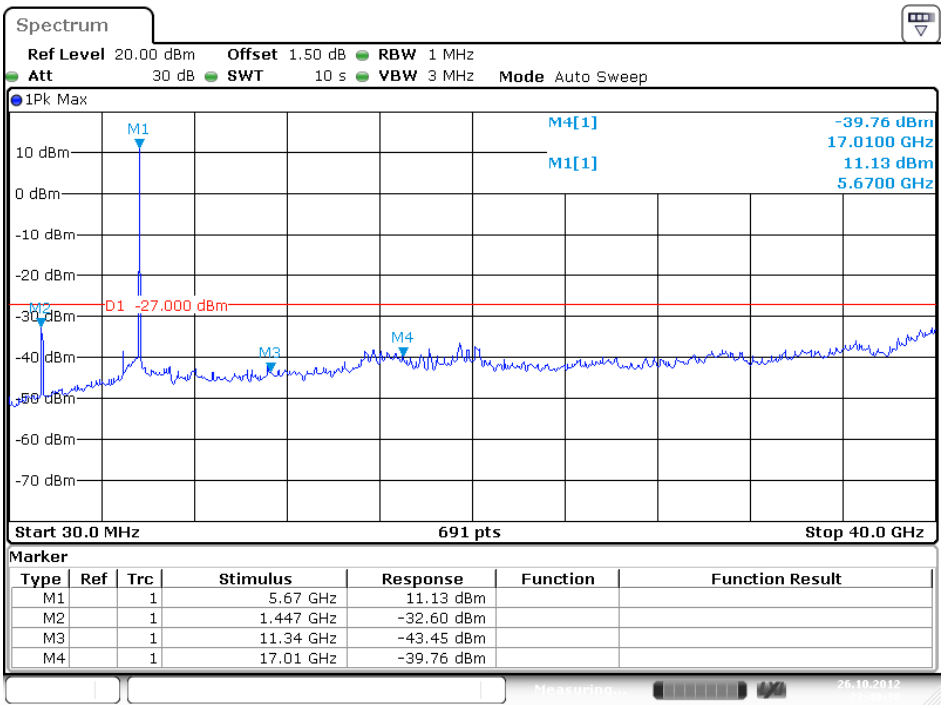
Date: 26.OCT.2012 23:39:05

Transmitter Conducted Unwanted Emissions Plot on 5550 MHz, HT-40, Beam Forming, M8



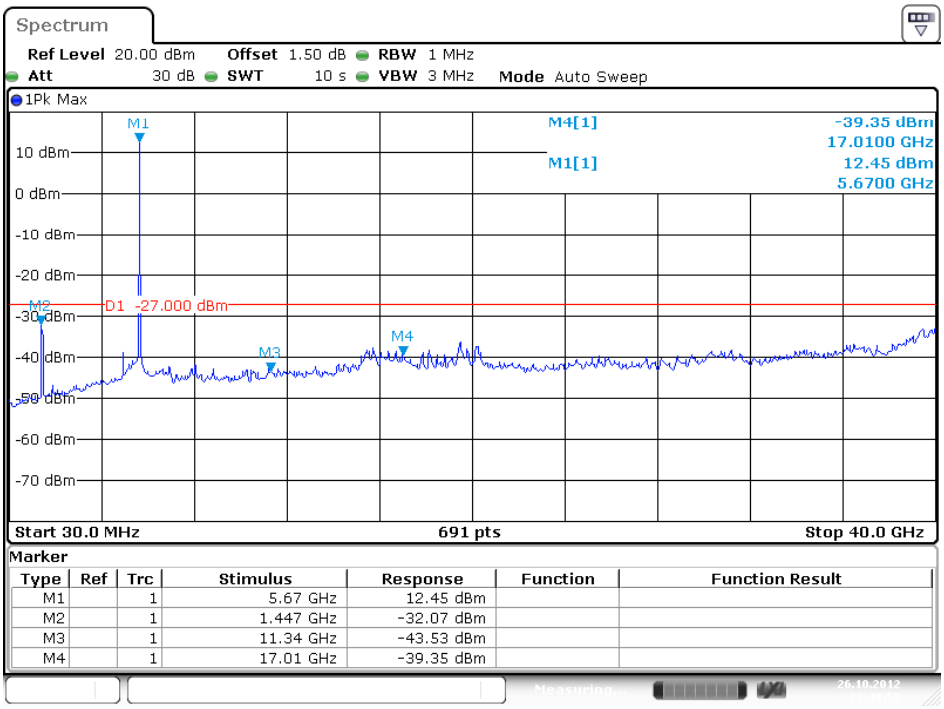
Date: 26.OCT.2012 23:39:28

Transmitter Conducted Unwanted Emissions Plot on 5670 MHz, HT-40 / HT-40, STBC / HT-40, Beam Forming, M0



Date: 26.OCT.2012 23:40:38

Transmitter Conducted Unwanted Emissions Plot on 5670 MHz, HT-40, Beam Forming, M8



Date: 26.OCT.2012 23:40:59

3.8 Transmitter Radiated Unwanted Emissions

3.8.1 Transmitter Radiated Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

3.8.2 Measuring Instruments

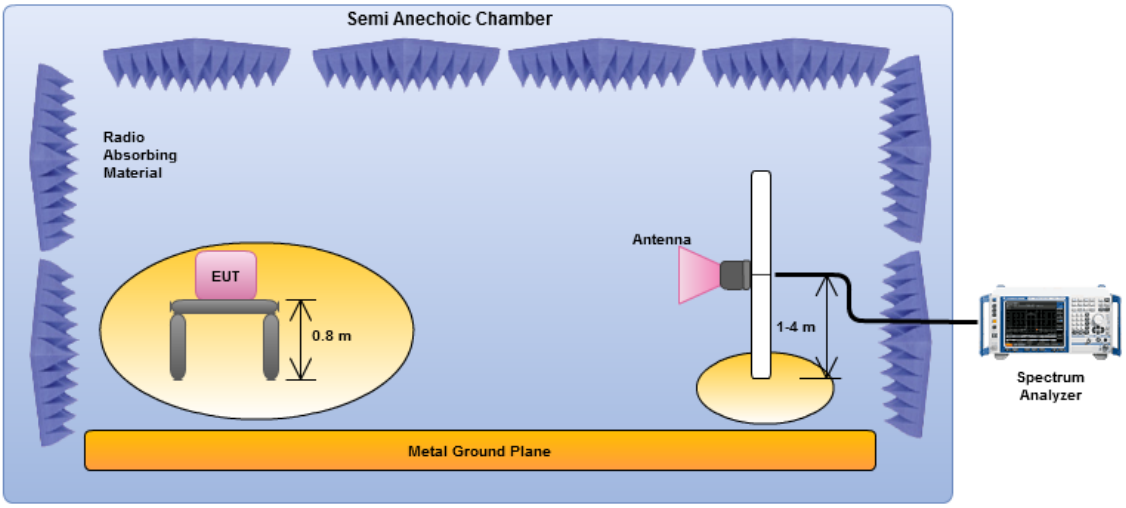
Refer a test equipment and calibration data table in this test report.

3.8.3 Test Procedures

Test Method		
☒	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).	
	☒	Measurements in the frequency range 1 GHz - 40GHz are typically made at a closer distance 3m, because the instrumentation noise floor is typically close to the radiated emission limit.
☒	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].	
☒	For the transmitter unwanted emissions shall be measured using following options below:	
	☒	Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.
	☒	Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.
		☐ Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
		☐ Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
		☒ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty ≥ 98%.
		☐ Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒ Refer as FCC KDB 789033, clause G)5) measurement procedure peak limit.
		☐ Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
☒	For radiated measurement.	
	☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
	☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
	☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.

3.8.4 Test Setup

Transmitter Radiated Unwanted Emissions



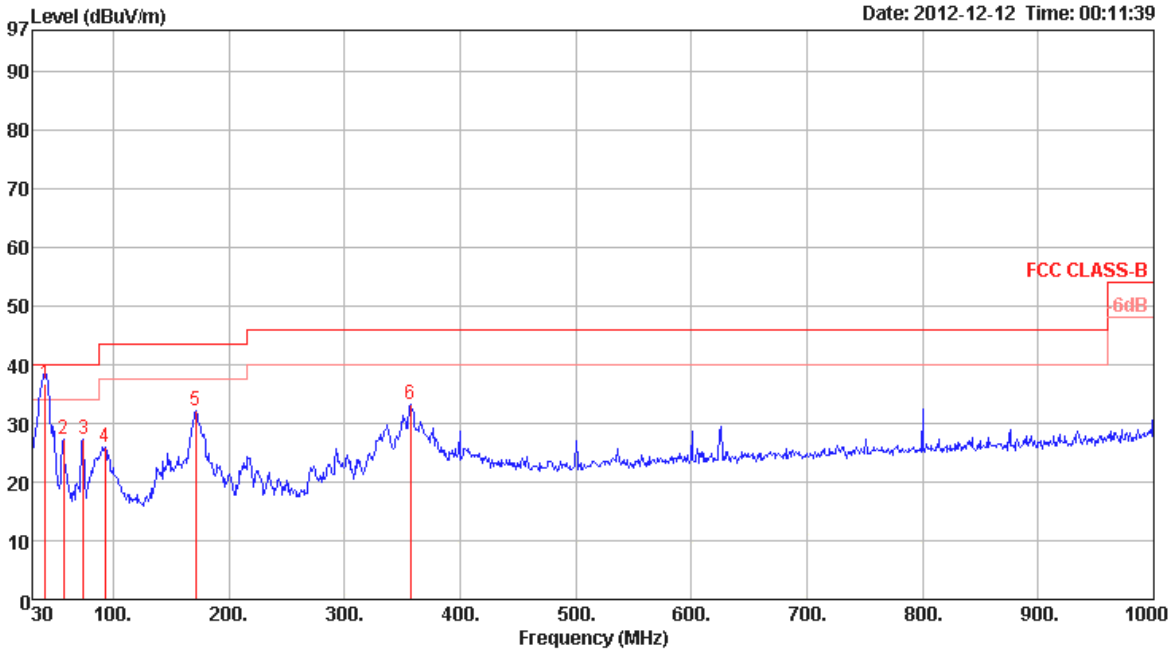
Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna and the frequency range of 1 GHz to 40 GHz using a calibrated horn antenna.

3.8.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.8.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

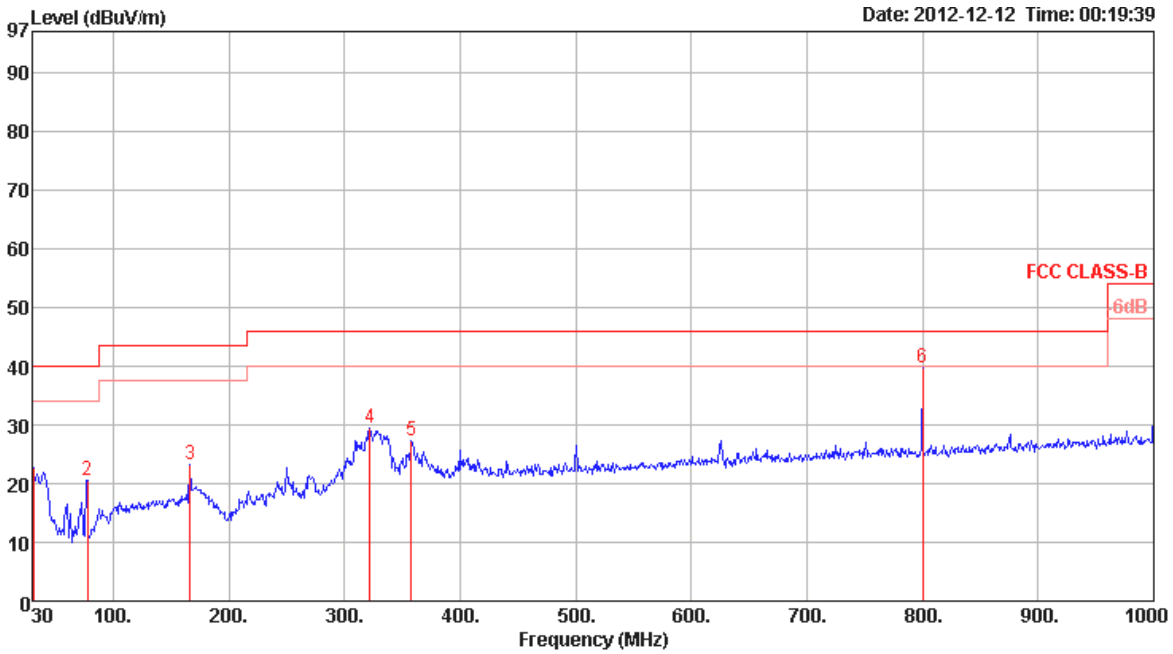
Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Test Mode	4	**Polarization**	Vertical
Operating Function	Normal Link		



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	41.09	36.65	40.00	-3.35	51.20	0.70	12.55	27.80	QP	100	170	VERTICAL
2	57.16	27.32	40.00	-12.68	46.99	0.80	7.30	27.77	Peak	400	0	VERTICAL
3	74.62	27.20	40.00	-12.80	47.12	0.90	6.88	27.70	Peak	400	0	VERTICAL
4	93.05	26.03	43.50	-17.47	42.98	1.10	9.58	27.63	Peak	400	0	VERTICAL
5	171.62	32.09	43.50	-11.41	44.87	1.56	12.90	27.24	Peak	400	0	VERTICAL
6	356.89	33.36	46.00	-12.64	43.53	2.21	14.91	27.29	Peak	400	0	VERTICAL

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Test Mode	4	**Polarization**	Horizontal
Operating Function	Normal Link		



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	30.97	22.61	40.00	-17.39	31.69	0.50	18.22	27.80	Peak	100	0	HORIZONTAL
2	77.53	20.55	40.00	-19.45	40.21	1.00	7.03	27.69	Peak	100	0	HORIZONTAL
3	166.77	23.34	43.50	-20.16	36.54	1.53	12.54	27.27	Peak	100	0	HORIZONTAL
4	321.97	29.56	46.00	-16.44	40.51	2.14	13.96	27.05	Peak	100	0	HORIZONTAL
5	357.86	27.37	46.00	-18.63	37.52	2.22	14.93	27.30	Peak	100	0	HORIZONTAL
6	800.18	39.69	46.00	-6.31	44.22	3.30	19.77	27.60	Peak	100	0	HORIZONTAL

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

3.8.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Transmitter Radiated Unwanted Emissions Result - Average

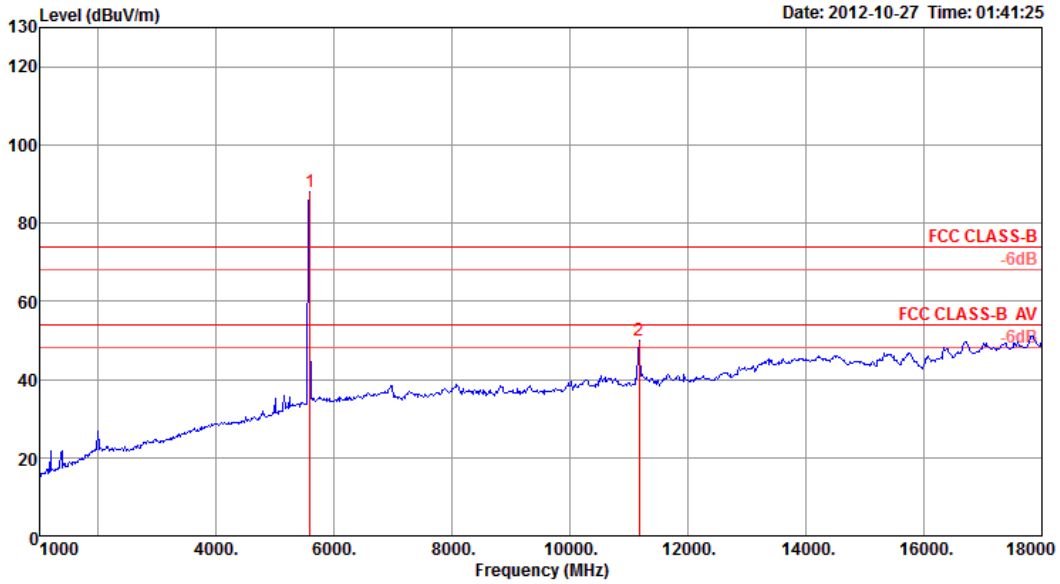
Freq. (MHz)	Operating Mode	Data Rate (Mbps)	Spurious Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5500	Non HT-20, 6 to 54Mbps	6	44.06	54	9.94
	Non HT-20, Beam Forming, 6 to 54Mbps	6	44.06	54	9.94
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	44.06	54	9.94
	HT-20, Beam Forming, M0 to M7	M0	44.06	54	9.94
	HT-20, Beam Forming, M8 to M15	M8	44.06	54	9.94
5580	Non HT-20, 6 to 54Mbps	6	49.89	54	4.11
	Non HT-20, Beam Forming, 6 to 54Mbps	6	49.89	54	4.11
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	49.89	54	4.11
	HT-20, Beam Forming, M0 to M7	M0	49.89	54	4.11
	HT-20, Beam Forming, M8 to M15	M8	49.89	54	4.11
5700	Non HT-20, 6 to 54Mbps	6	46.95	54	7.05
	Non HT-20, 6 to 54Mbps	6	46.95	54	7.05
	Non HT-20, Beam Forming, 6 to 54Mbps	6	46.95	54	7.05
	HT-20, M0 to M7	M0	46.95	54	7.05
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	46.95	54	7.05
	HT-20, Beam Forming, M0 to M7	M0	46.95	54	7.05
	HT-20, Beam Forming, M8 to M15	M8	46.95	54	7.05
5510	HT-40, M0 to M7	M0	39.27	54	14.73
	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	39.27	54	14.73
	HT-40, Beam Forming, M0 to M7	M0	39.27	54	14.73
	HT-40, Beam Forming, M8 to M15	M8	39.27	54	14.73
5550	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	48.91	54	5.09
	HT-40, Beam Forming, M0 to M7	M0	48.91	54	5.09
	HT-40, Beam Forming, M8 to M15	M8	48.91	54	5.09
5670	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	44.96	54	9.04
	HT-40, Beam Forming, M0 to M7	M0	44.96	54	9.04
	HT-40, Beam Forming, M8 to M15	M8	44.96	54	9.04

Transmitter Radiated Unwanted Emissions Result - Peak

Freq. (MHz)	Operating Mode	Data Rate (Mbps)	Spurious Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5500	Non HT-20, 6 to 54Mbps	6	54.51	74	19.49
	Non HT-20, Beam Forming, 6 to 54Mbps	6	54.51	74	19.49
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	54.51	74	19.49
	HT-20, Beam Forming, M0 to M7	M0	54.51	74	19.49
	HT-20, Beam Forming, M8 to M15	M8	54.51	74	19.49
5580	Non HT-20, 6 to 54Mbps	6	60.93	74	13.07
	Non HT-20, Beam Forming, 6 to 54Mbps	6	60.93	74	13.07
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	60.93	74	13.07
	HT-20, Beam Forming, M0 to M7	M0	60.93	74	13.07
	HT-20, Beam Forming, M8 to M15	M8	60.93	74	13.07
5700	Non HT-20, 6 to 54Mbps	6	56.81	74	17.19
	Non HT-20, 6 to 54Mbps	6	56.81	74	17.19
	Non HT-20, Beam Forming, 6 to 54Mbps	6	56.81	74	17.19
	HT-20, M0 to M7	M0	56.81	74	17.19
	HT-20, M0 to M15 / HT-20, STBC, M0 to M7	M0	56.81	74	17.19
	HT-20, Beam Forming, M0 to M7	M0	56.81	74	17.19
	HT-20, Beam Forming, M8 to M15	M8	56.81	74	17.19
5510	HT-40, M0 to M7	M0	48.41	74	25.59
	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	48.41	74	25.59
	HT-40, Beam Forming, M0 to M7	M0	48.41	74	25.59
	HT-40, Beam Forming, M8 to M15	M8	48.41	74	25.59
5550	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	52.27	74	21.73
	HT-40, Beam Forming, M0 to M7	M0	52.27	74	21.73
	HT-40, Beam Forming, M8 to M15	M8	52.27	74	21.73
5670	HT-40, M0 to M15 / HT-40, STBC, M0 to M7	M0	53.59	74	20.41
	HT-40, Beam Forming, M0 to M7	M0	53.59	74	20.41
	HT-40, Beam Forming, M8 to M15	M8	53.59	74	20.41

Transmitter Radiated Unwanted Emissions Worst Plots (Above 1GHz)

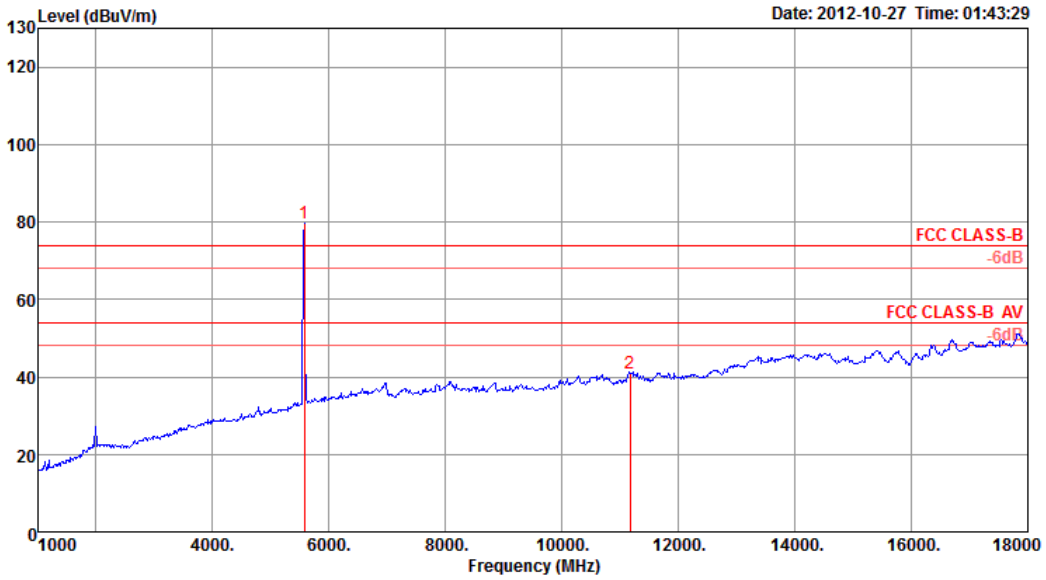
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Operating Mode	for all modulation rates and all operating modes		
Test Freq. (MHZ)	5580	**Polarization**	Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	5585.80	88.05	54.00	34.05	84.10	4.63	34.64	33.96	Average	360	100	VERTICAL
2 !	11168.50	49.89	54.00	-4.11	39.71	6.56	34.81	38.43	Average	178	100	VERTICAL

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

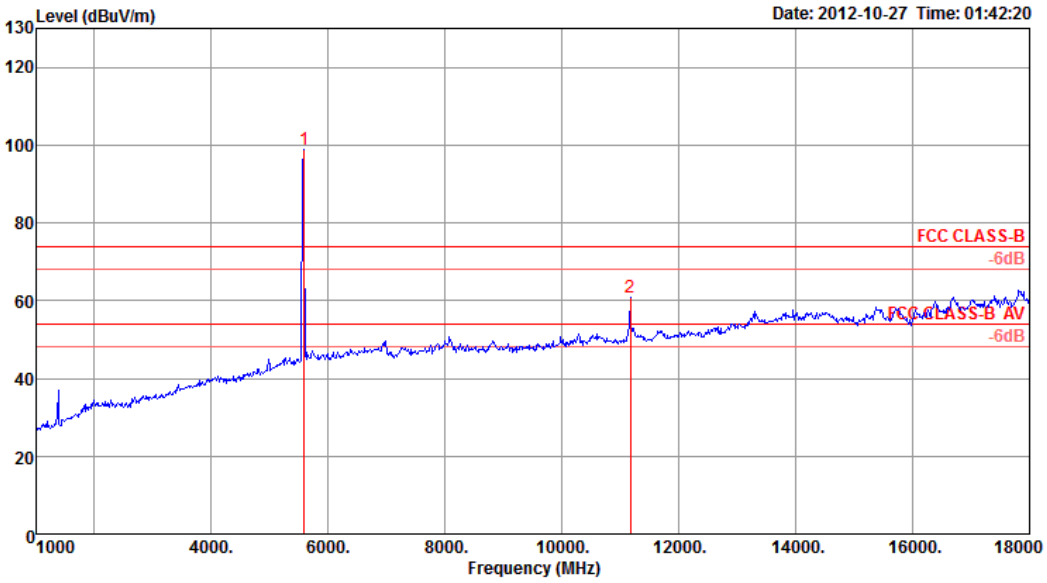
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Operating Mode	for all modulation rates and all operating modes		
Test Freq. (MHZ)	5580	**Polarization**	Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	5577.30	79.53	54.00	25.53	75.64	4.62	34.64	33.91	Average	0	100	HORIZONTAL
2	11168.50	40.95	54.00	-13.05	30.77	6.56	34.81	38.43	Average	77	100	HORIZONTAL

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

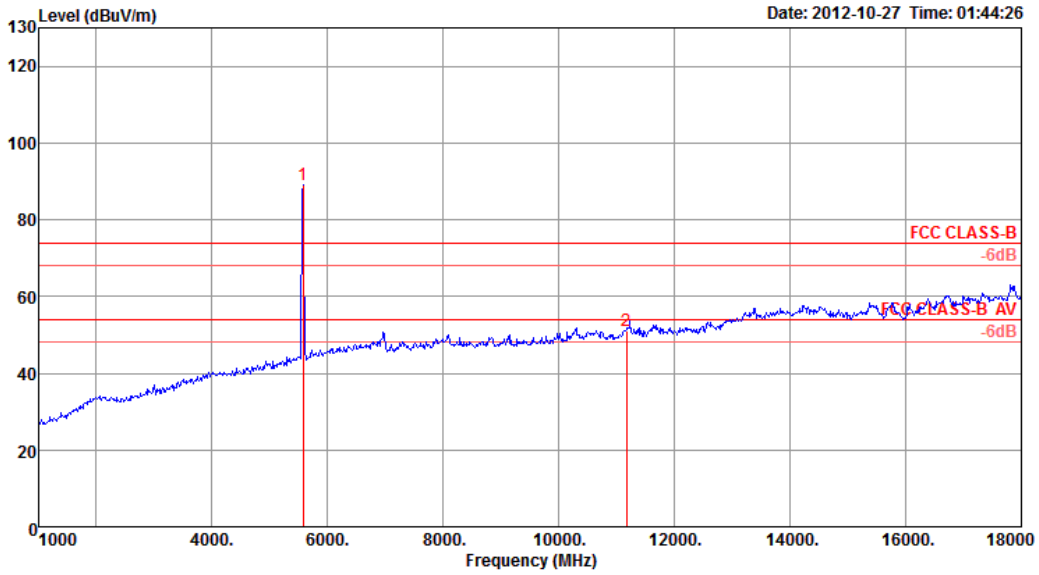
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Operating Mode	for all modulation rates and all operating modes		
Test Freq. (MHZ)	5580	**Polarization**	Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	5585.80	99.03	74.00	25.03	95.08	4.63	34.64	33.96	Peak	360	100	VERTICAL
2	11168.50	60.93	74.00	-13.07	50.75	6.56	34.81	38.43	Peak	178	100	VERTICAL

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Operating Mode	for all modulation rates and all operating modes		
Test Freq. (MHZ)	5580	**Polarization**	Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	5577.30	89.20	74.00	15.20	85.31	4.62	34.64	33.91	Peak	0	100	HORIZONTAL
2	11168.50	50.96	74.00	-23.04	40.78	6.56	34.81	38.43	Peak	77	100	HORIZONTAL

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

3.9 Frequency Stability

3.9.1 Frequency Stability Limit

Frequency Stability Limit	
☒	In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.
☒	The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band and ± 25 ppm maximum for the 2.4 GHz band.

3.9.2 Measuring Instruments

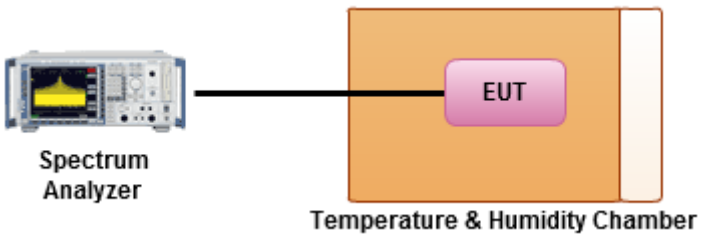
Refer a test equipment and calibration data table in this test report.

3.9.3 Test Procedures

Test Method		
☒	Refer as ANSI C63.10, clause 6.8 for frequency stability tests	
	☒	Frequency stability with respect to ambient temperature
	☒	Frequency stability when varying supply voltage
☒	For conducted measurement.	
	☒	For conducted measurements on devices with multiple transmit chains: Measurements need only to be performed on one of the active transmit chains (antenna outputs)
☐	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.	

3.9.4 Test Setup

Frequency Stability



3.9.5 Test Result of Frequency Stability

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	5580
126.5	5580.006600
110	5580.006200
93.5	5580.007400
Max. Deviation (MHz)	0.007400
Max. Deviation (ppm)	1.33

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(℃)	5580
-30	5580.004800
-20	5580.004200
-10	5580.003600
0	5580.006800
10	5580.006400
20	5580.009800
30	5580.008400
40	5580.006600
50	5580.005400
Max. Deviation (MHz)	0.009800
Max. Deviation (ppm)	1.76

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100377	9kHz ~ 2.75GHz	Oct. 23, 2012	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 14, 2011	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127-478	9K ~ 30MHz	Jun. 22, 2012	Conduction (CO01-CB)
PULSE LIMITER	R&S	ESH3-Z2	100430	9K~30MHz	Feb. 03, 2012	Conduction (CO01-CB)
Signal analyzer	R&S	FSV40	100979	9KHz~40GHz	Oct. 08, 2012	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 05, 2012	Conducted (TH01-CB)
RF Power Divider	HP	11636A	00306	2GHz ~ 18GHz	N.C.R.	Conducted (TH01-CB)
RF Power Splitter	Anaren	44100	1839	2GHz ~ 18GHz	N.C.R.	Conducted (TH01-CB)
RF Power Splitter	Anaren	42100	17930	2GHz ~ 18GHz	N.C.R.	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-12	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-13	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Jan. 11, 2012	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10783	9KHz ~ 1.3GHz	Feb. 17, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Jul. 31, 2012	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100056	9KHz~40GHz	Nov. 02, 2012	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 20, 2012	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Oct. 29, 2012	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R.	Radiation (03CH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Remark
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2011	Radiation (03CH01-CB)

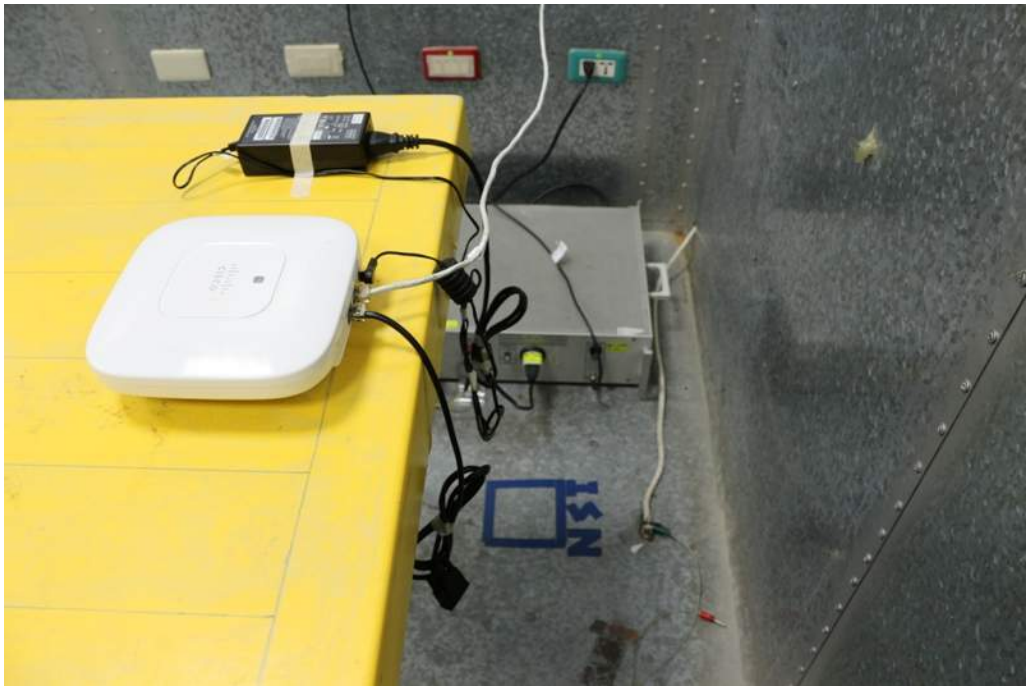
Note: Calibration Interval of instruments listed above is one year.
N.C.R. means Non-Calibration required.

APPENDIX A. TEST PHOTOS

1. Photographs of Conducted Emissions Test Configuration

FRONT VIEW

REAR VIEW



2. Photographs of Radiated Emissions Test Configuration

Test Configuration: 9kHz ~30MHz

FRONT VIEW

REAR VIEW

Test Configuration: 30MHz~1GHz

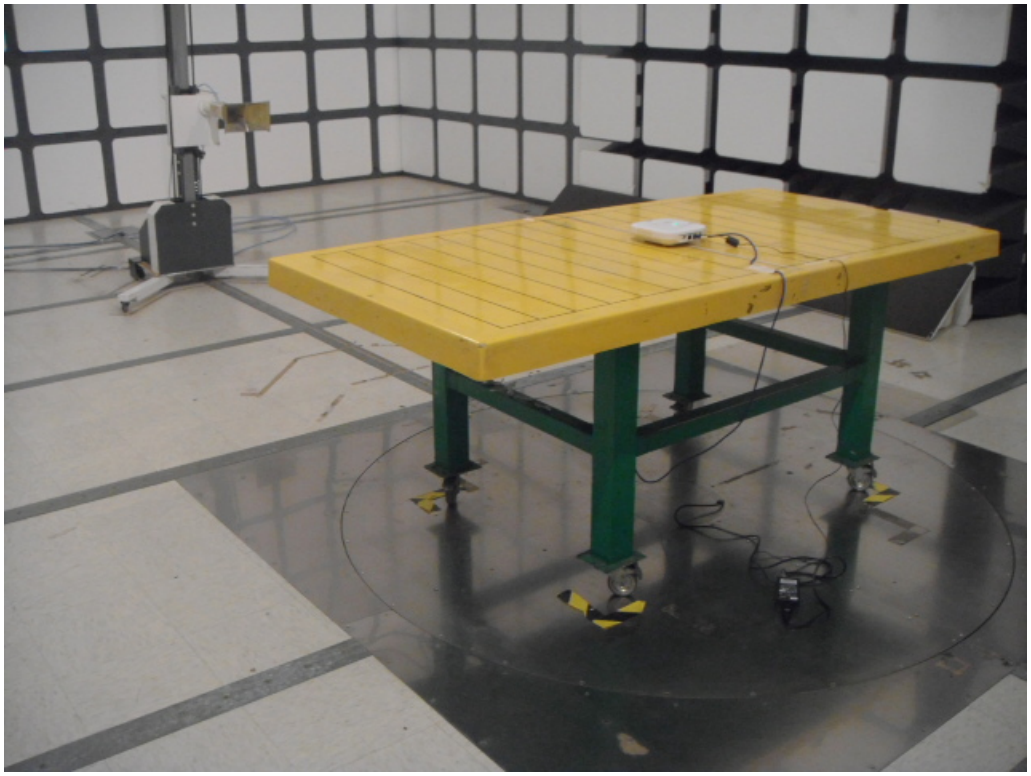
FRONT VIEW

REAR VIEW

Test Configuration: Above 1GHz

FRONT VIEW

REAR VIEW



APPENDIX B. MAXIMUM PERMISSIBLE EXPOSURE

1. Maximum Permissible Exposure

1.1. Applicable Standard

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 and RSS-102 Issue 4 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

1.2. MPE Calculation Method

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

Pd = $\frac{30 \times P \times G}{377 \times d^2}$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

1.3. Calculated Result and Limit

For 2.4GHz DTS:

Antenna Type : PIFA

Max Conducted Power for Non HT-20, Beam Forming, 6Mbps: 20.42 dBm

Directional Antenna Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
6.01	3.9905	20.42	110.0611	0.087421	1	**Complies**

Note: Directional Antenna Gain = G_{ANT} + 10 log(N_{TX})

For 5GHz DTS Band 4:

Antenna Type : PIFA

Max Conducted Power for HT-40, Beam Forming, M0: 20.73dBm

Directional Antenna Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
8.01	6.3246	20.73	118.2746	0.148892	1	**Complies**

Note: Directional Antenna Gain = G_{ANT} + 10 log(N_{TX})

For 5GHz UNII Band 1:

Antenna Type : PIFA

Max Conducted Power for HT-20, Beam Forming, M0 : 14.08dBm

Directional Antenna Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
8.01	6.3246	14.08	25.5805	0.032202	1	**Complies**

Note: Directional Antenna Gain = G_{ANT} + 10 log(N_{TX})

For 5GHz UNII Band 2:

Antenna Type : PIFA

Max Conducted Power for HT-20, Beam Forming, M0 : 20.23dBm

Directional Antenna Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
8.01	6.3246	20.23	105.5306	0.132849	1	**Complies**

Note: Directional Antenna Gain = GANT + 10 log(NTX)

For 5GHz UNII Band 3:

Antenna Type : PIFA

Max Conducted Power for HT-40, Beam Forming, M0 : 21.99dBm

Directional Antenna Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
8.01	6.3246	21.99	158.1139	0.199045	1	**Complies**

Note: Directional Antenna Gain = G_{ANT} + 10 log(N_{TX})

CONCULSION:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously, the formula of calculatedthe MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ...etc. < 1

CPD = Calculation power density

LPD = Limit of power density

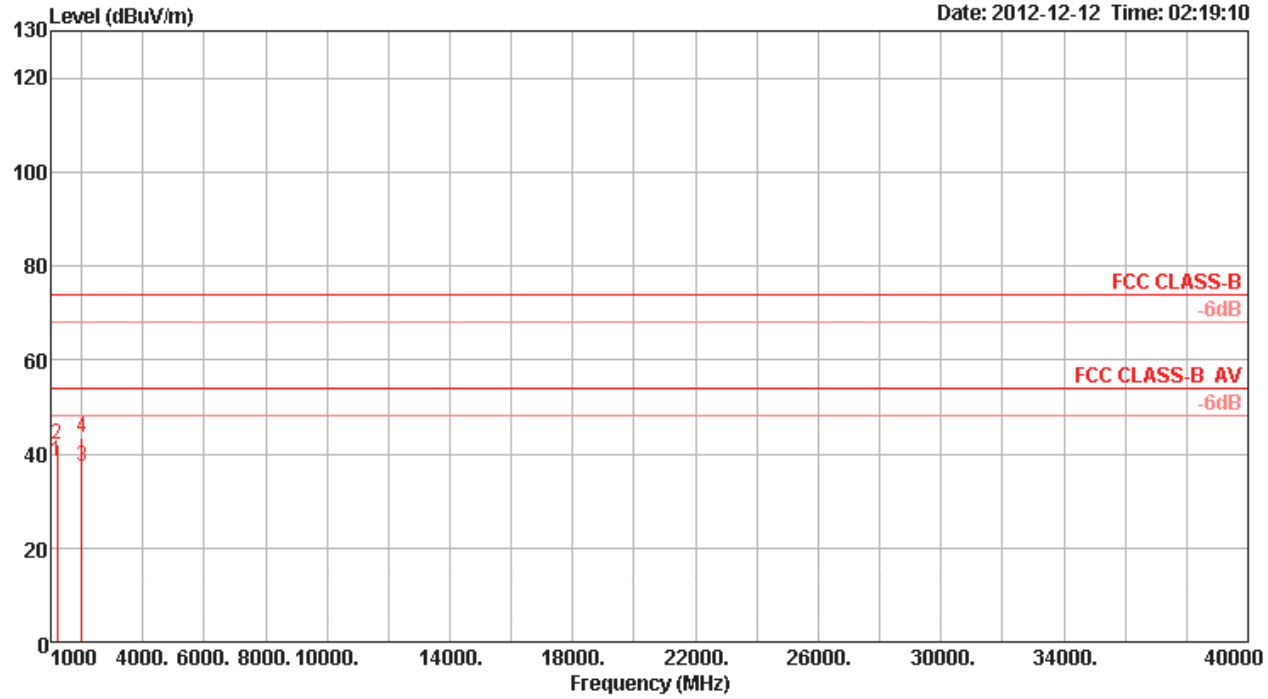
Therefore, the worst-case situation is 0.087421 / 1 + 0.199045 / 1 = 0.286466, which isless than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Appendix C. Co-location

1. Results of Radiated Emissions for Co-located

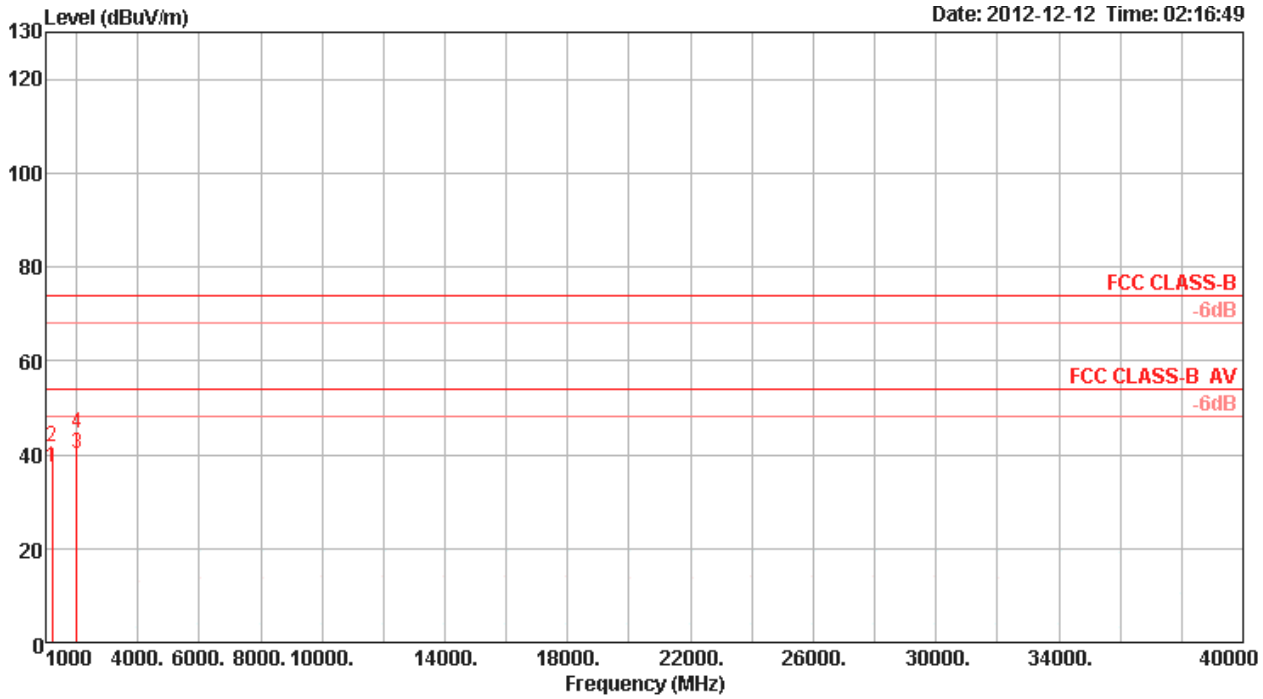
Temperature	24°C	Humidity	60%
Test Engineer	Satoshi Yang	Configurations	2.4G + 5G

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	1199.98	38.35	54.00	-15.65	45.21	3.02	24.64	34.52	Average	120	245	HORIZONTAL
2	1200.05	41.89	74.00	-32.11	48.75	3.02	24.64	34.52	Peak	120	245	HORIZONTAL
3	1999.99	37.43	54.00	-16.57	41.22	4.01	27.10	34.90	Average	144	57	HORIZONTAL
4	2000.09	43.36	74.00	-30.64	47.15	4.01	27.10	34.90	Peak	144	57	HORIZONTAL

Vertial



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	1199.99	37.28	54.00	-16.72	44.14	3.02	24.64	34.52	Average	100	120	VERTICAL
2	1200.00	41.60	74.00	-32.40	48.46	3.02	24.64	34.52	Peak	100	120	VERTICAL
3	2000.00	40.03	54.00	-13.97	43.82	4.01	27.10	34.90	Average	108	10	VERTICAL
4	2000.20	44.40	74.00	-29.60	48.19	4.01	27.10	34.90	Peak	108	10	VERTICAL